Monthly water situation report

East Anglia

Summary – December 2020

December was a very wet month with a total average rainfall of 108 mm (195% of the LTA) across East Anglia. The river flows has increased at all the indicator sites with majority of the sites reporting an exceptionally high flows. Soil Moisture Deficit (SMD) has decreased and ended the month with a below normal SMD of 3mm. The groundwater has continue to recharge at majority of the indicator sites with all the sites reporting a normal or higher ground water levels. The reservoir levels at all the sites are above their normal operating curves and some of the groundwater support schemes have been able to reduced operation.

Rainfall

East Anglia as a whole received an exceptionally high amount of rainfall with a total averaged rainfall of 108 mm in December which was 195% of the Long Term Average (LTA). The rainfall varied across the area with majority of the catchments receiving an exceptionally high amount of rainfall (relative to the monthly LTA) making it the second wettest December since the record started in 1981. Over the past 12 months, rainfall across the area has been 115% of the LTA (Above Normal category), and over the winter period to date (the past 3 months) rainfall has been 154% of the LTA (Notably high category). The 12-months accumulation of rainfall surplus has increased to 688 mm for the time of the year.

Soil Moisture Deficit/Recharge

Soil moisture deficits (SMD) continues to decreased following the exceptionally high rainfall in December and is fairly consistent across the area. By the end of December SMD for the area as a whole had decreased to 3 mm, which is in the below normal category.

River Flows

The monthly river flows has increased at all the indicator sites as a results of an exceptionally high rain falling on the saturated ground in December. All the indicator sites has reported a notably high or higher flows with majority of the sites (62% out of 21 indicator sites) reporting an exceptionally high flows for the time of the year.

Groundwater Levels

In response to the below normal SMD across East Anglia, the groundwater continues to recharge and levels has increased at all indicator sites with the exception of Hazlewood Common in the Sufflok Crag. Out of the 20 indicator sites all the sites has reported a normal or higher groundwater levels with 4 sites (viz., Fringford, Biggleswade, Bury St. Edmunds and Washpit Farm) reporting exceptionally high levels in December.

Reservoir Storage/Water Resource Zone Stocks

The reservoir storage levels have increased at 3 out of the 5 indicator sites. All the Indicator sites reported a normal storage level with the exception of Ardleigh reporting below normal storage level. The reservoir levels at all the sites are above their normal operating curves for the time of the year.

Environmental Impact

Majority of the support schemes had been able to turn off operation during December. The Lodes-Granta groundwater support scheme has 2 out of 6 pumps operating and there are no pumps operating at the Rhee, the Hiz, the Thet and the Little Ouse by the end of December.

Forward Look

Probabilistic ensemble projections for river flows at key sites

March 2021: There is a reduced probability of exceptionally low river flows at all the key sites with an increased probability of exceptionally high flows at the river Stiffkey, Ely Ouse and Ivel in March.

June 2021: There is a reduce probability of exceptionally low river flows at all the key sites with a reduce probability of notably low flows at majority of the key sites.

Probabilistic ensemble projections for groundwater levels in key aquifers

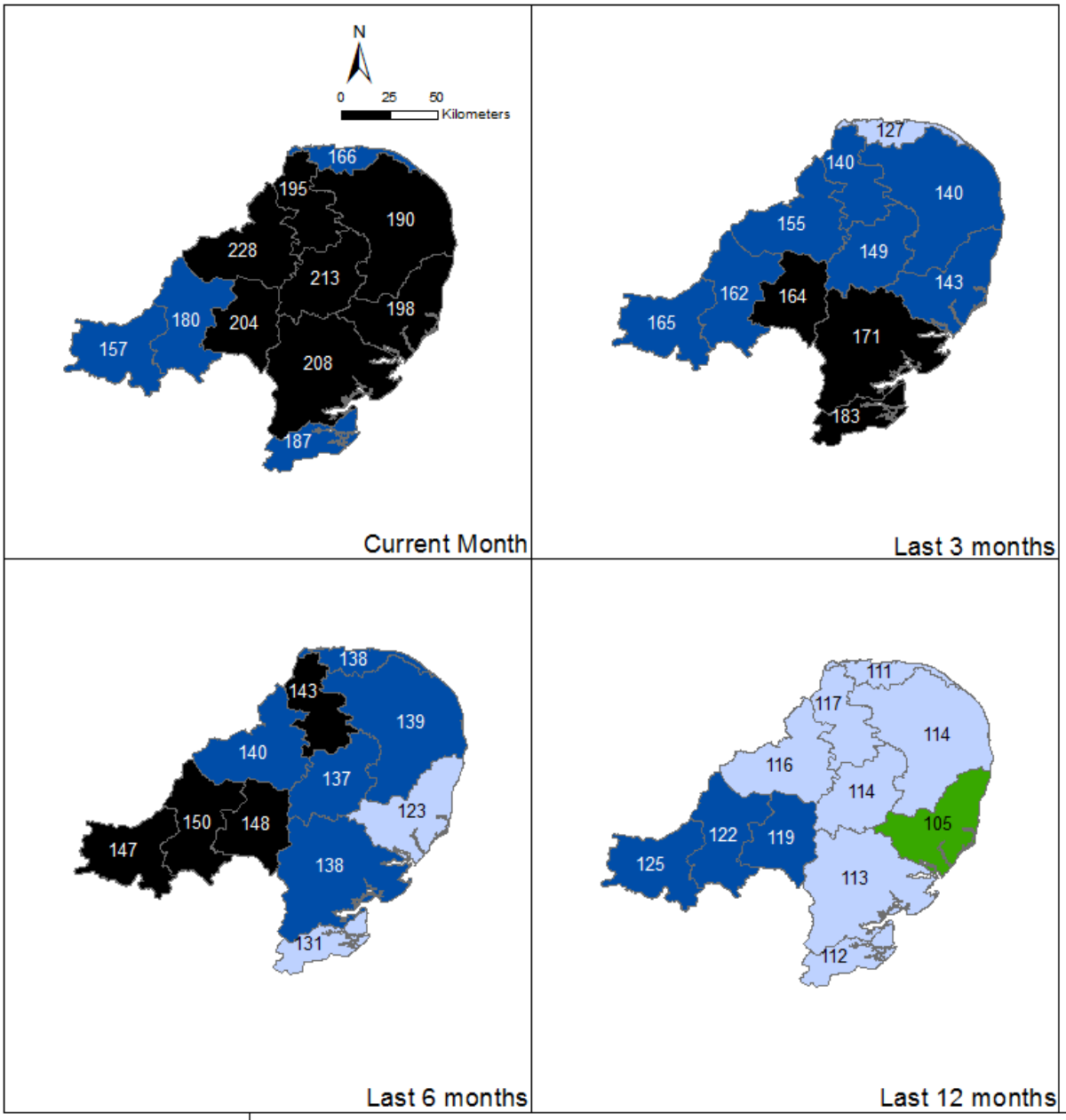
March 2021: The probability of groundwater levels to be in the below normal or lower category has reduced at all the key sites for March with an increased probability of exceptionally high groundwater levels at majority of the key sites.

September 2021: The probability of groundwater levels to be in the below normal or lower category has reduced at all the key sites with an increased probability of above normal groundwater levels at majority of the key indicator sites in September.

Author: Hydrology & Operations Contact details: 03708506506

Rainfall

December 2020



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

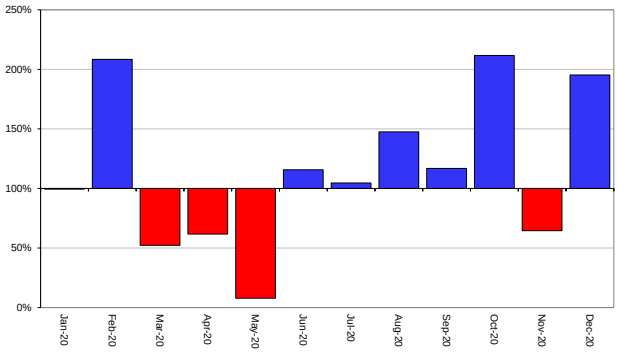
Rainfall expressed as percentage of 1961-1990 Long Term Average for the specified duration. Classes derived from data for the period 1891 to 2017 based on the HadUK dataset (Met Office © Crown Copyright)

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, 2020). 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, 2020.

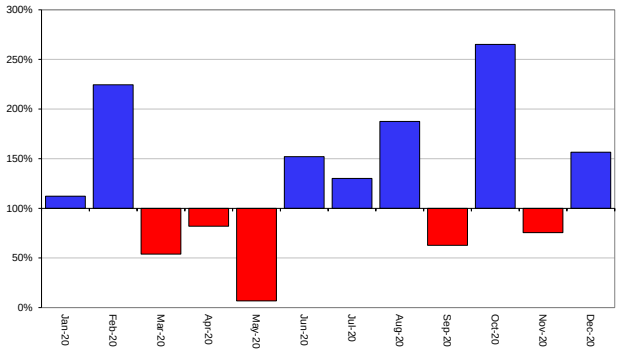
Above average rainfall

Below average rainfall

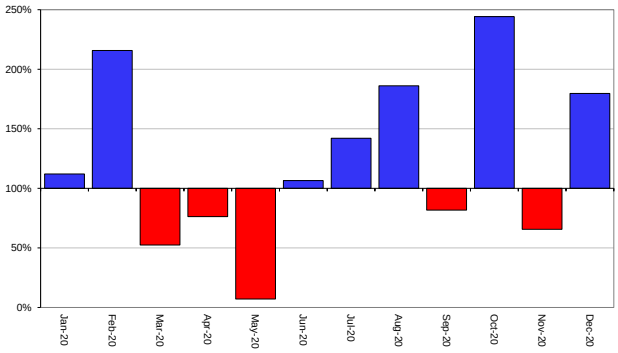
1-Month Period for East Anglia



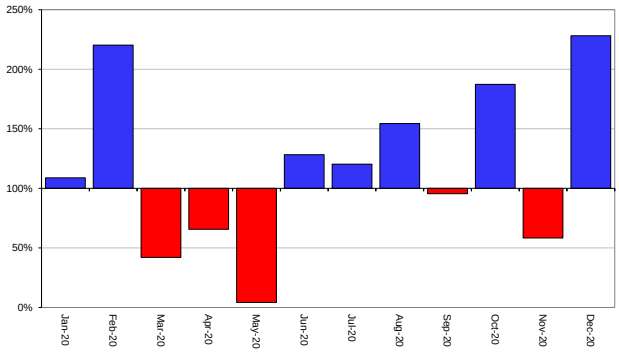
1-Month Period for Upper Bedford Ouse



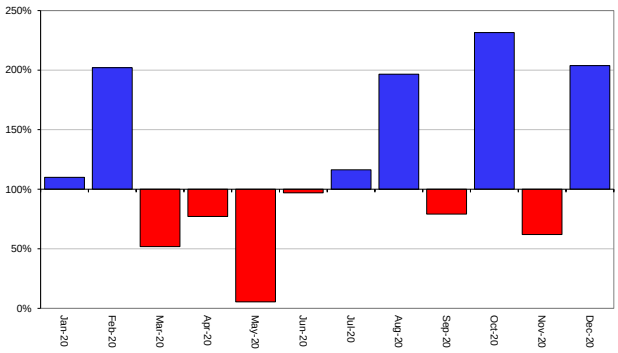
1-Month Period for Lower Bedford Ouse



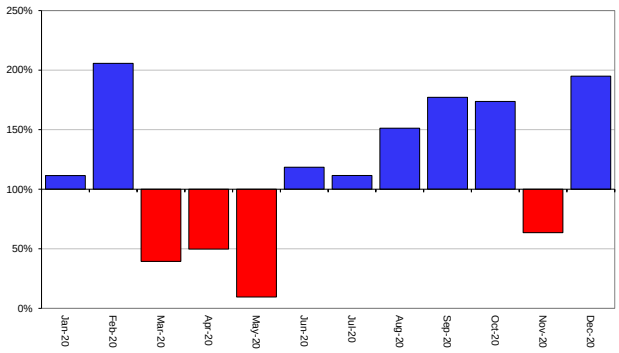
1-Month Period for Central Area Fenland



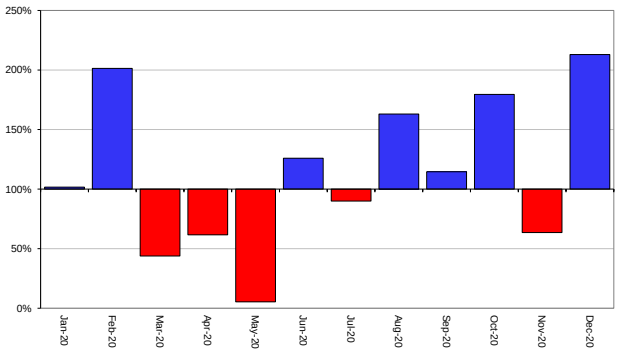
1-Month Period for Cam



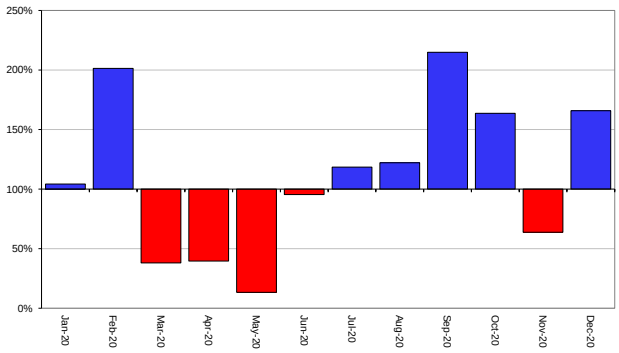
1-Month Period for NW Norfolk and Wissey



1-Month Period for Little Ouse and Lark

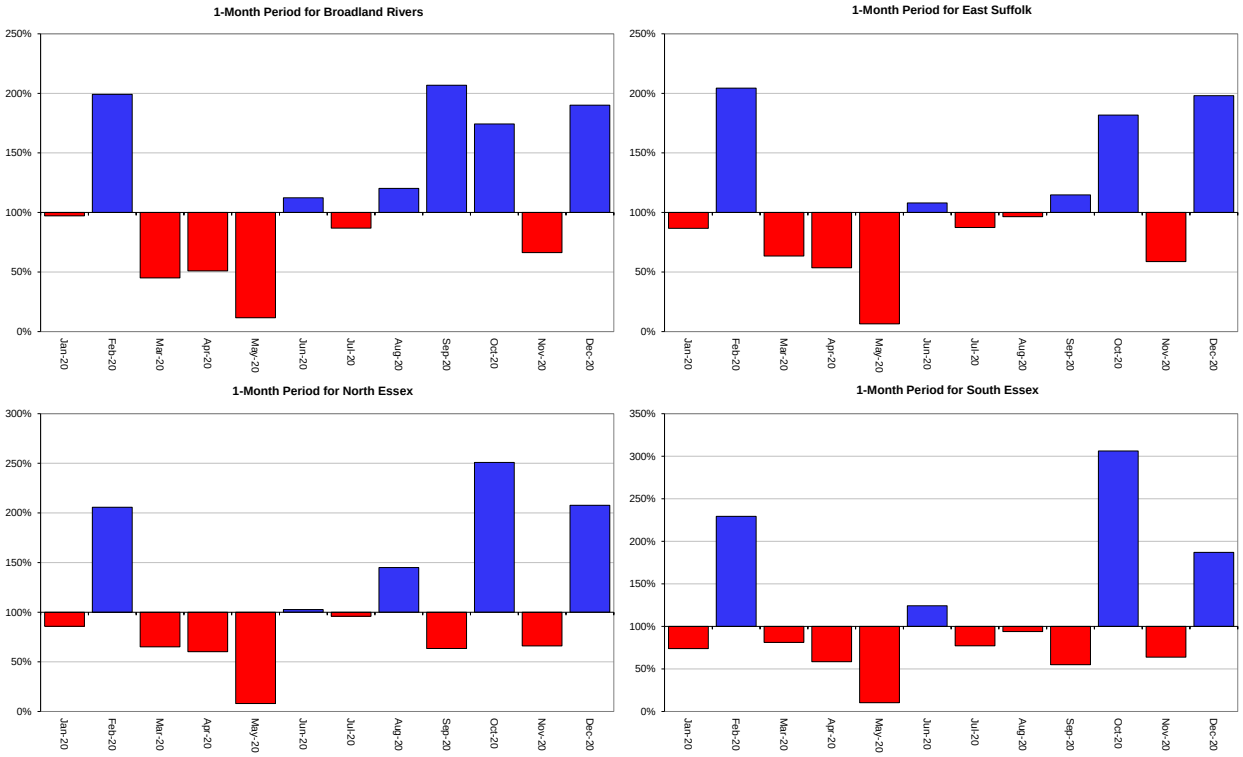


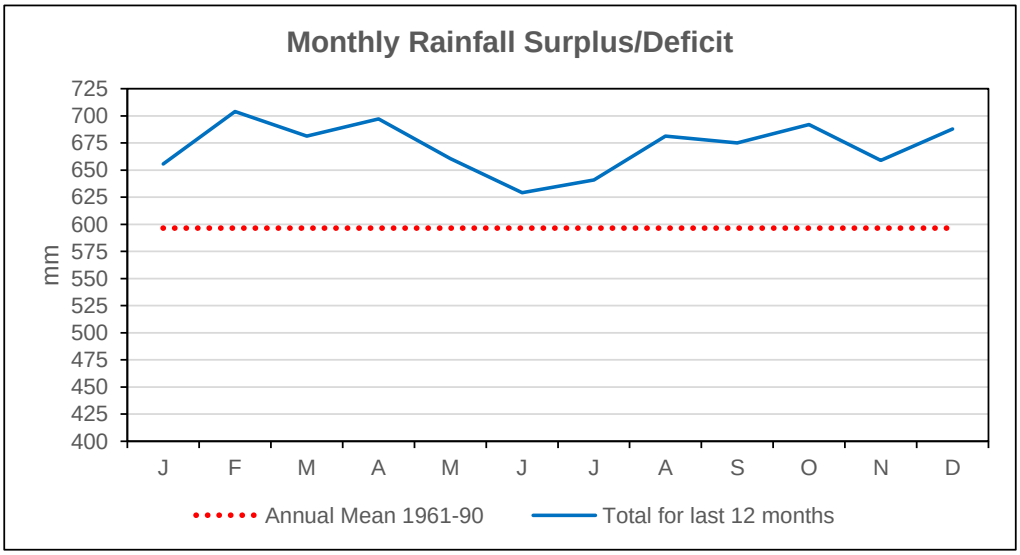
1-Month Period for North Norfolk



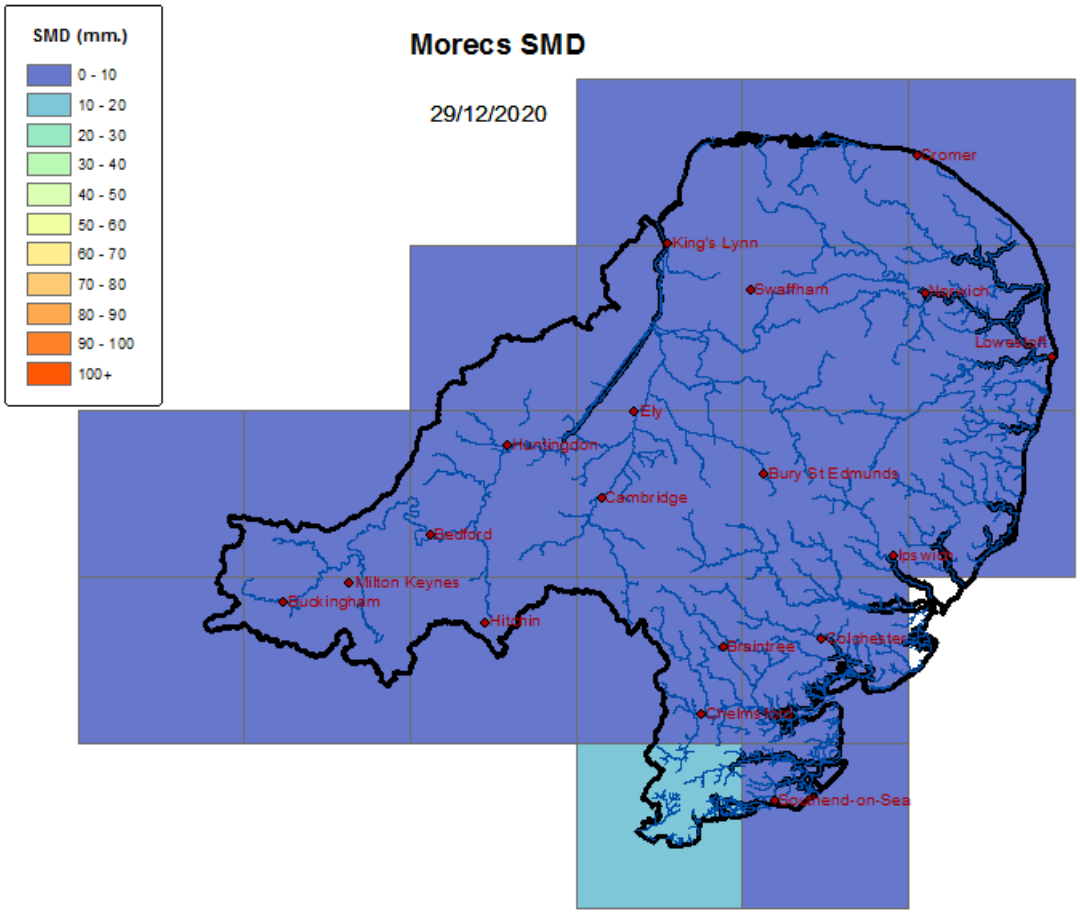
Above average rainfall

Below average rainfall





Soil Moisture Deficit

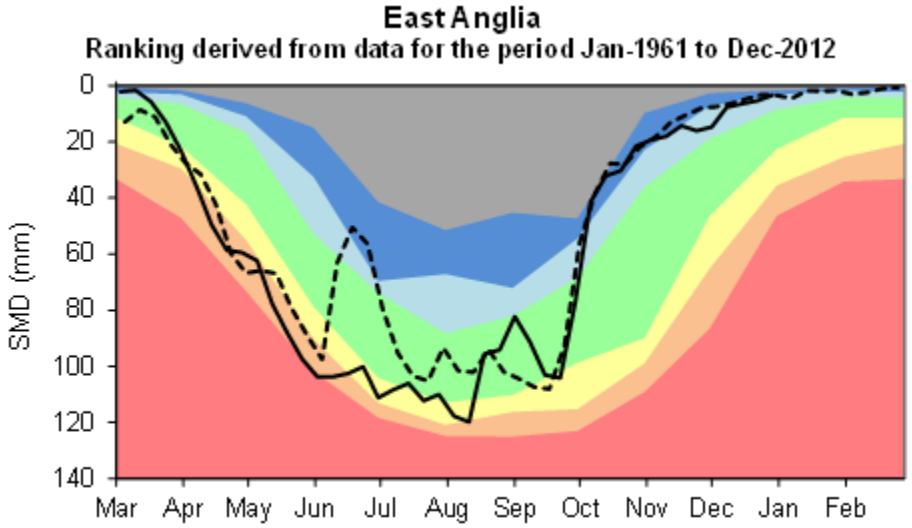


Data based on MORECS (Met Office © Crown Copyright)

——2020-21 – – –2019-20

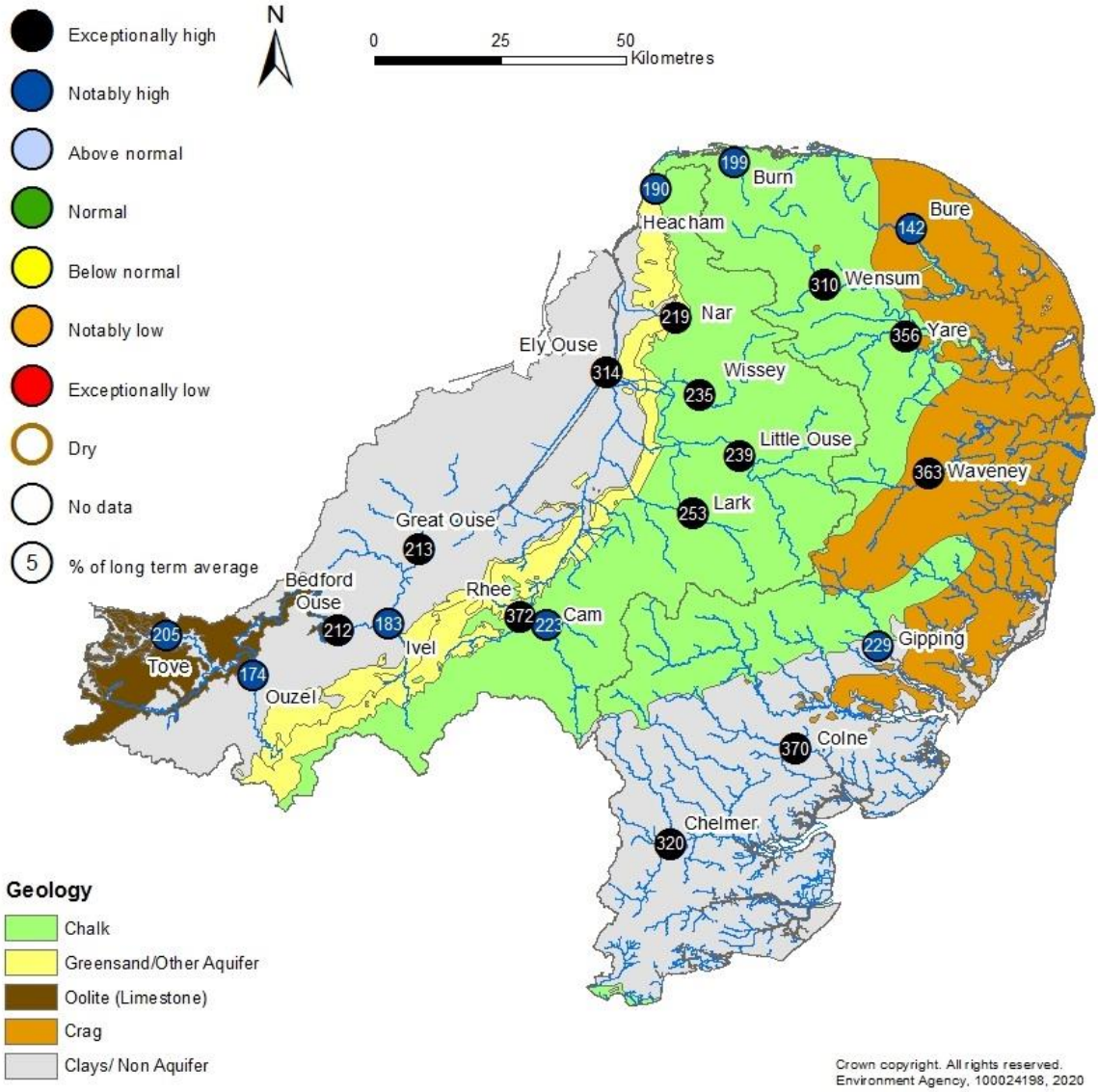
Exceptionally high | Notably high | Above normal | Normal

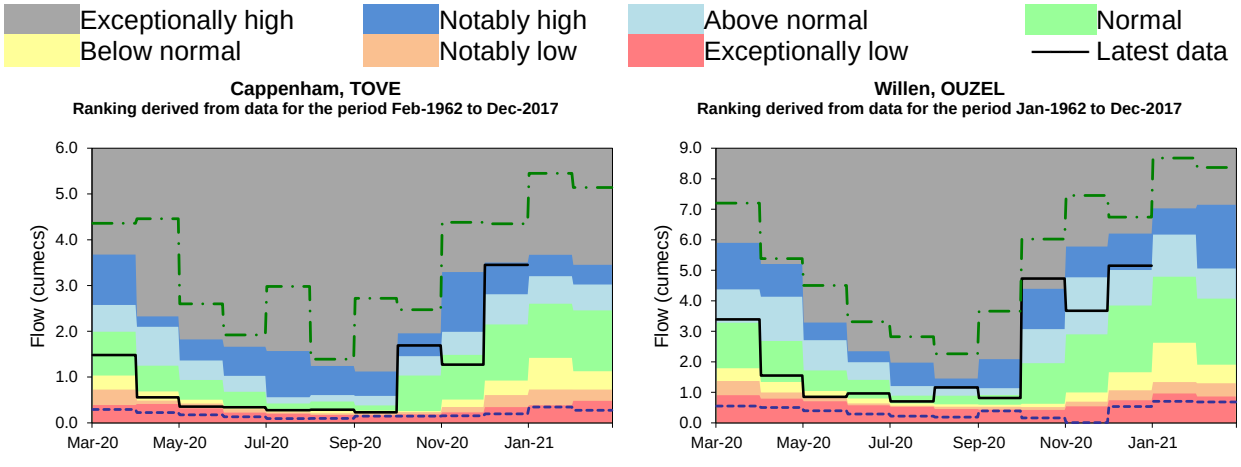
Below normal | Notably low | Exceptionally low | —— Latest data

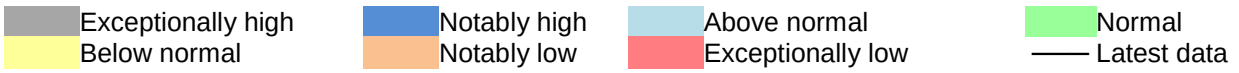


River Flow

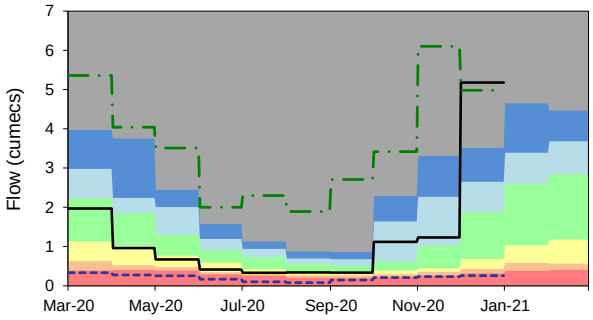
December 2020



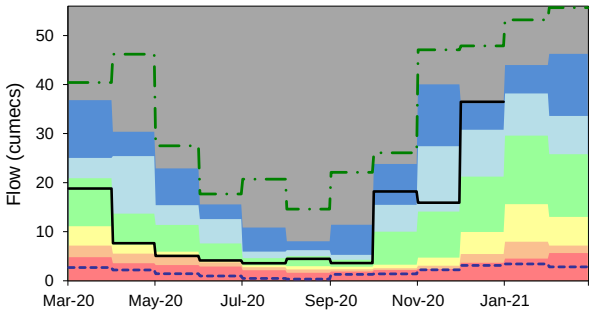




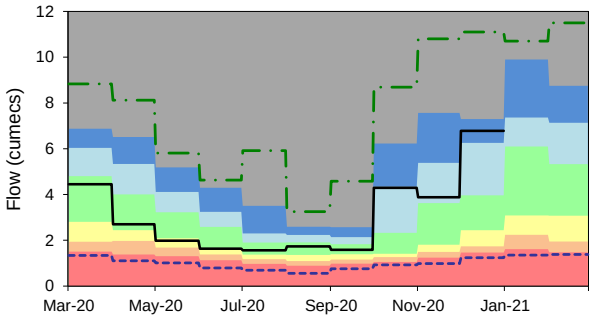
Burnt Mill, RHEE
Ranking derived from data for the period Oct-1962 to Dec-2017



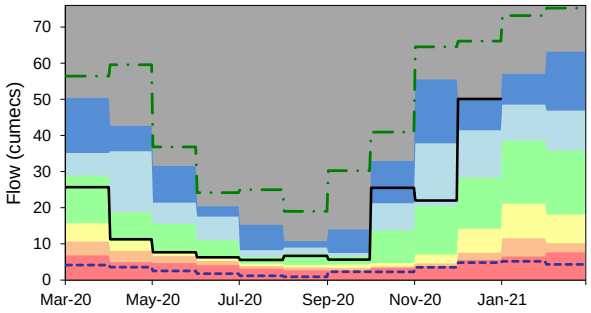
Roxton, GREAT OUSE
Ranking derived from data for the period Oct-1972 to Dec-2017



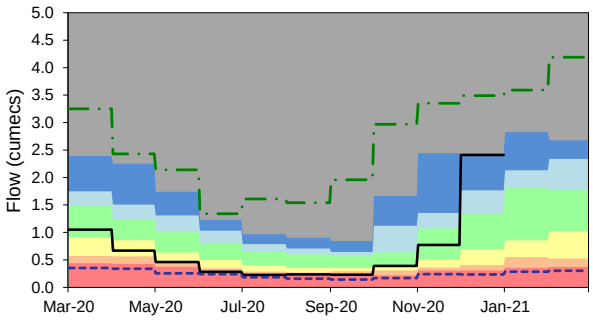
Blunham, IVEL
Ranking derived from data for the period Aug-1959 to Dec-2017



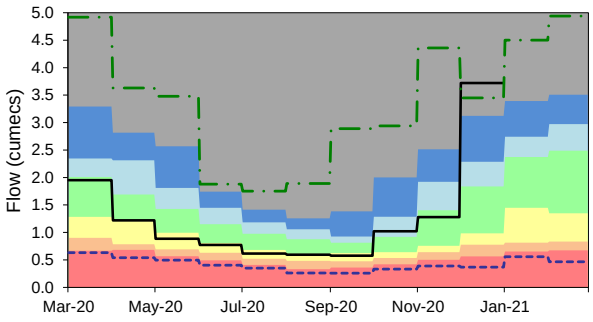
Offord (Gross Flows), GREAT OUSE
Ranking derived from data for the period Jan-1972 to Dec-2017



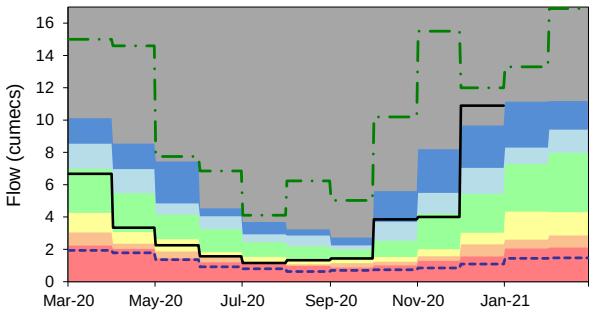
Dernford, CAM
Ranking derived from data for the period Feb-1949 to Dec-2017



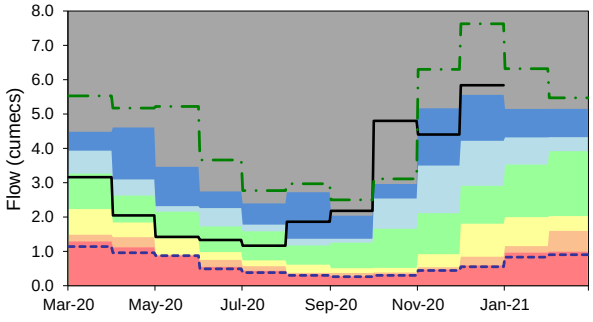
Temple, LARK
Ranking derived from data for the period Nov-1960 to Dec-2017



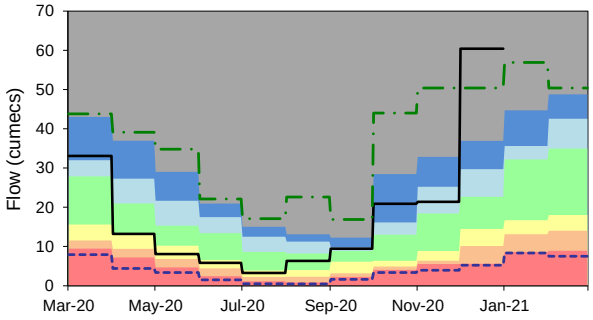
Abbey Heath, LITTLE OUSE
Ranking derived from data for the period Jun-1968 to Dec-2017



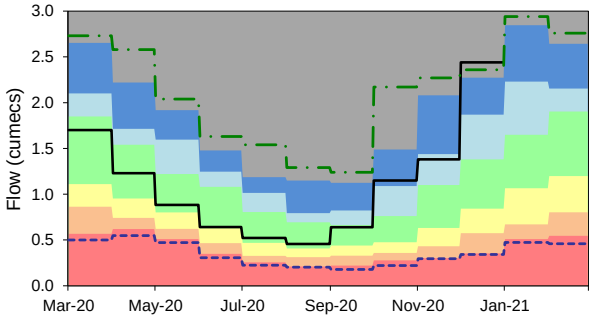
Northwold Total, WISSEY
Ranking derived from data for the period Jul-1983 to Dec-2012



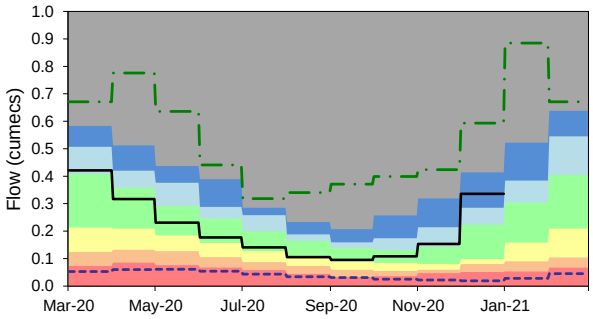
Denver, ELY OUSE
Ranking derived from data for the period Nov-1971 to Dec-2017



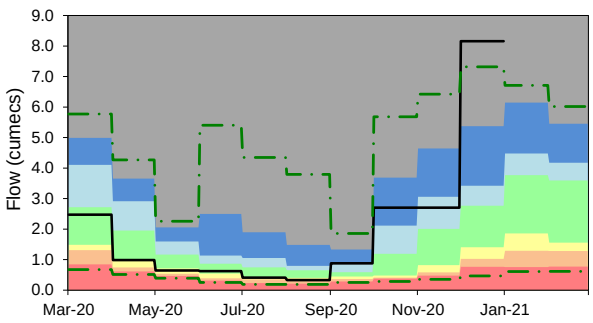
Marham, NAR
Ranking derived from data for the period Apr-1982 to Dec-2017



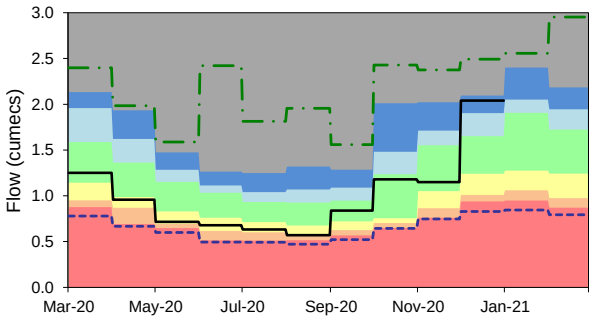
Heacham, HEACHAM
Ranking derived from data for the period Nov-1965 to Dec-2017



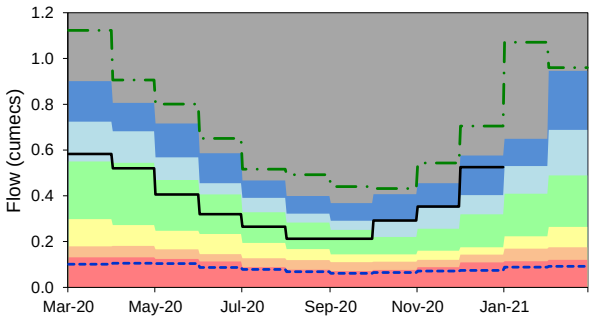
Colney, YARE
Ranking derived from data for the period Jan-1970 to Dec-2017



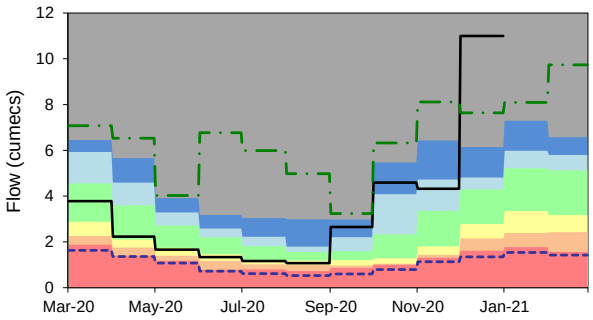
Ingworth, BURE
Ranking derived from data for the period Jan-1970 to Dec-2017



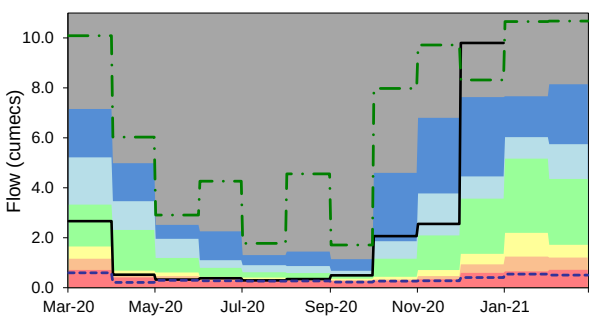
Burnham Overy, BURN
Ranking derived from data for the period Jan-1970 to Dec-2017

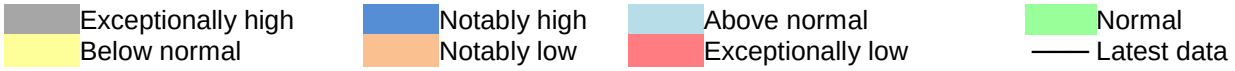


Swanton Morley Total, WENSUM
Ranking derived from data for the period Jan-1970 to Dec-2017

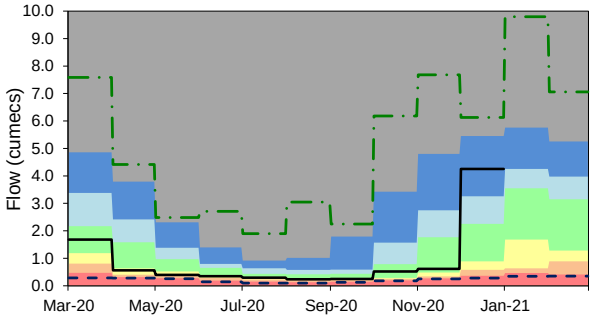


Needham Weir Total, WAVENEY (LOWER)
Ranking derived from data for the period Jan-1970 to Dec-2017

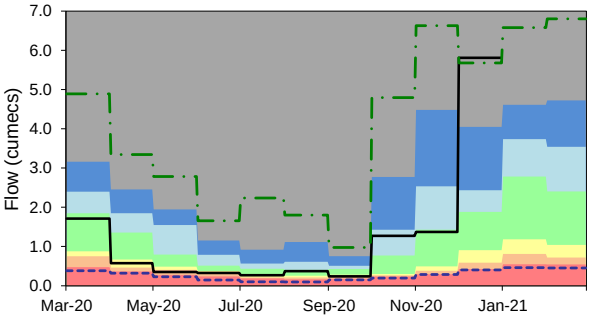




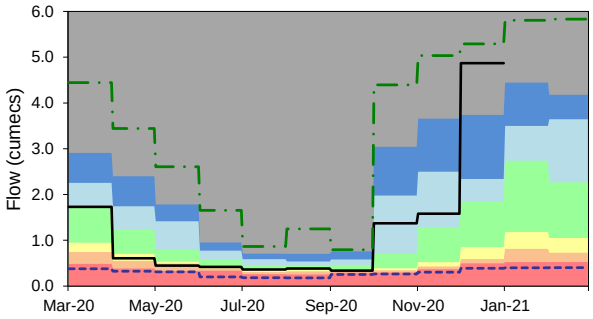
Bramford, GIPPING
Ranking derived from data for the period Jan-1970 to Dec-2017



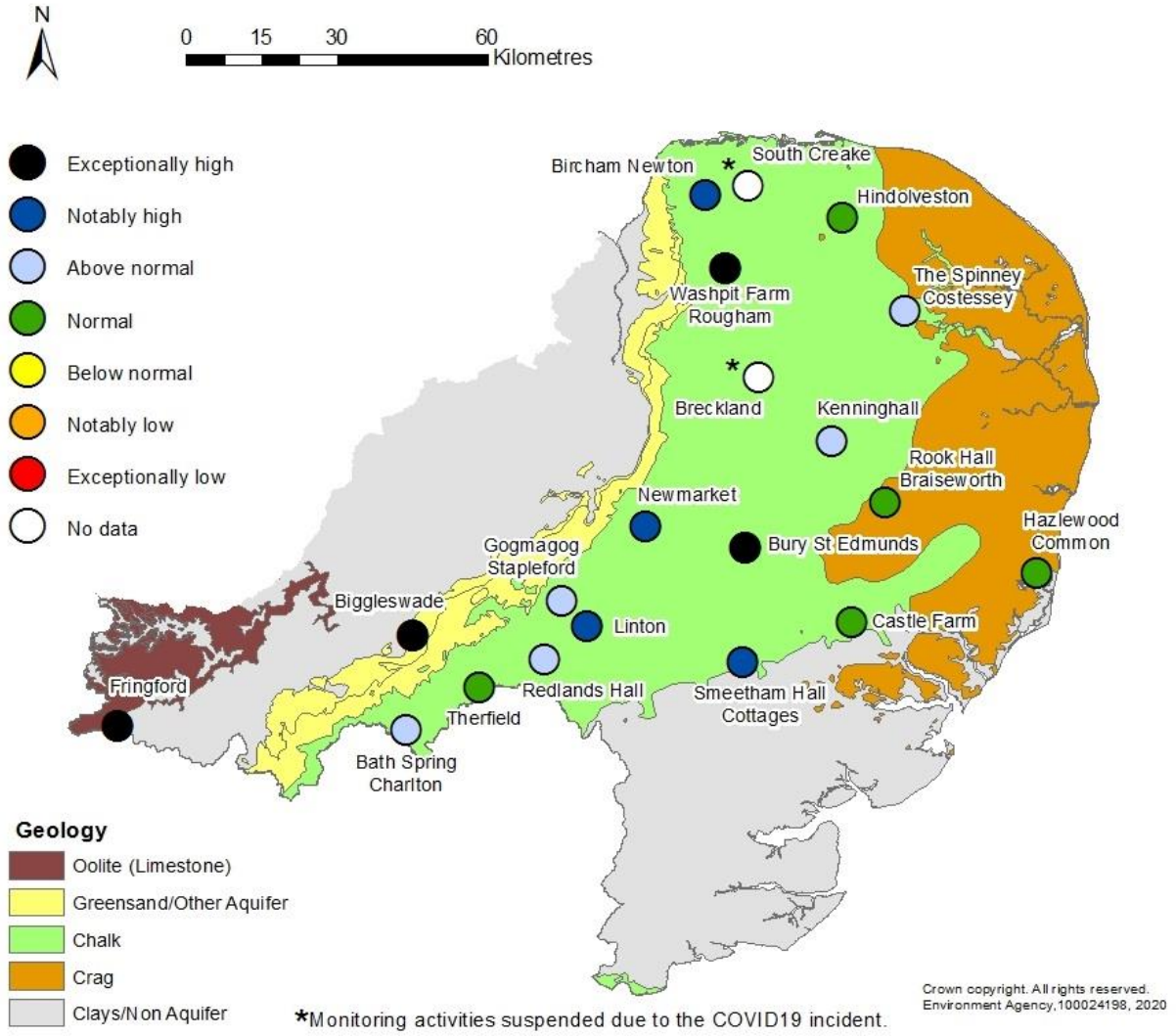
Lexden, COLNE
Ranking derived from data for the period Jan-1970 to Dec-2017



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

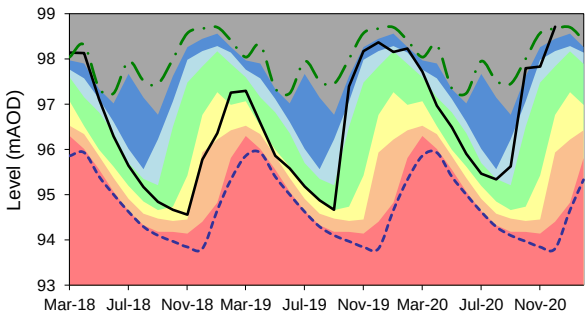


Groundwater Levels December 2020

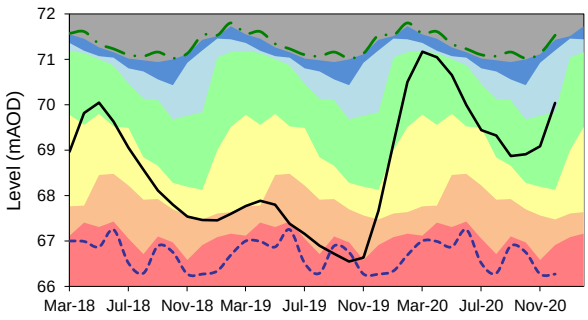


Exceptionally high | Notably high | Above normal | Normal
Below normal | Notably low | Exceptionally low | Latest data

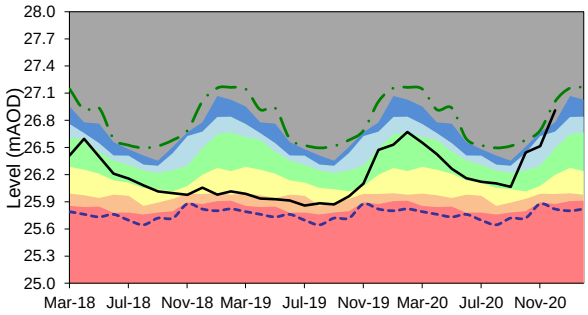
Fringford - GREAT OOLITE
Ranking derived from data for the period Sep-1980 to Dec-2017



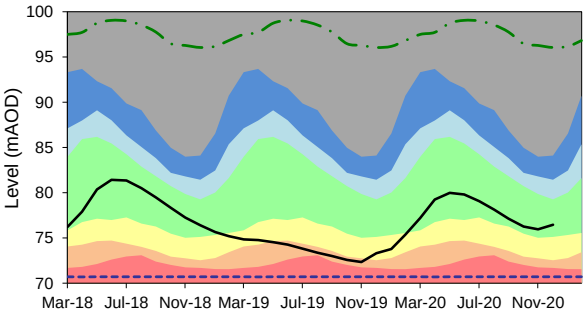
Bath Spring, Charlton - IVEL CHALK
Ranking derived from data for the period Mar-1993 to Dec-2017



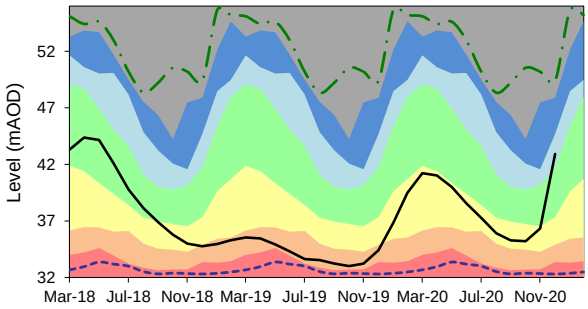
Biggleswade - IVEL SANDSTONE
Ranking derived from data for the period Mar-1968 to Dec-2017



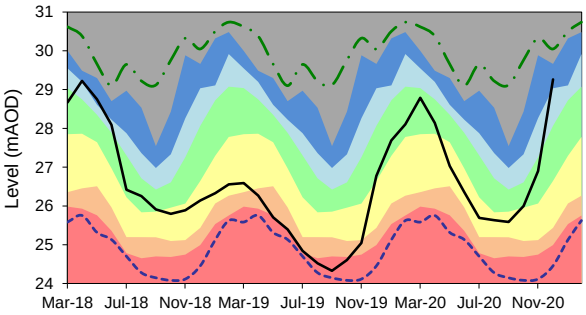
Therfield Rectory - N HERTS CHALK
Ranking derived from data for the period Jan-1883 to Dec-2017



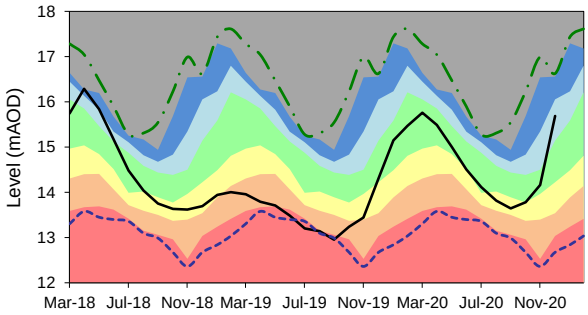
Redlands Hall, Ickleton - CAM CHALK
Ranking derived from data for the period Aug-1963 to Dec-2017



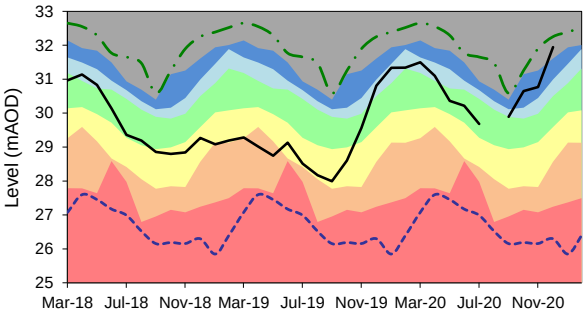
Linton - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



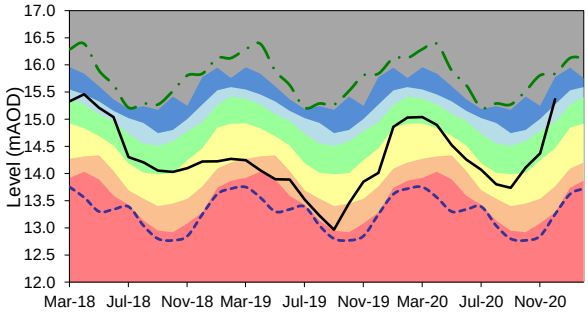
Gog Magog, Stapleford - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



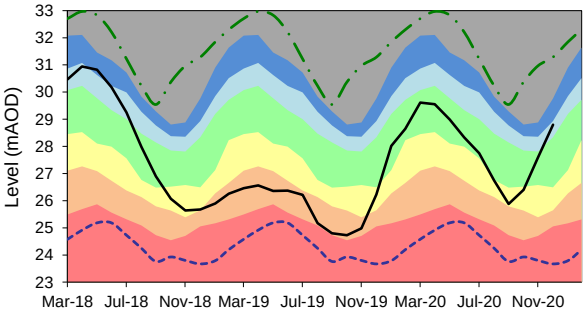
Bury St Edmunds - UPPER LARK CHALK
Ranking derived from data for the period May-1983 to Dec-2017



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

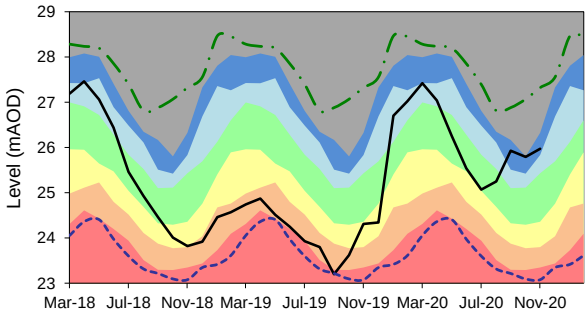


Kenninghall - LITTLE OUSE CHALK
Ranking derived from data for the period Aug-1973 to Dec-2017

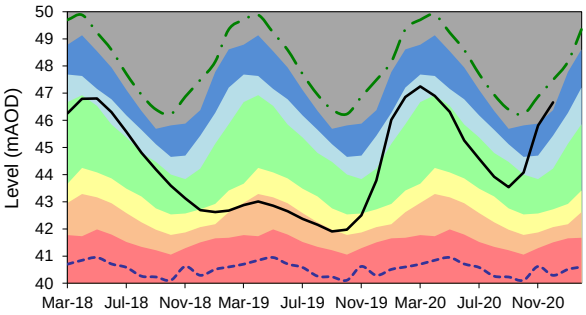


Exceptionally high | Notably high | Above normal | Normal
Below normal | Notably low | Exceptionally low | Latest data

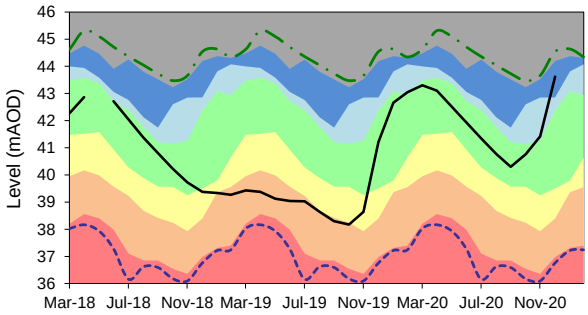
Breckland - WISSEY CHALK
Ranking derived from data for the period Jan-1971 to Nov-2017



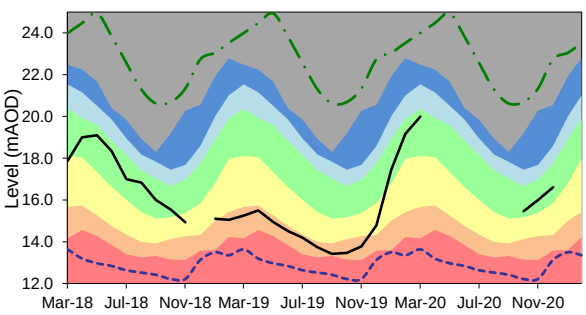
Washpit Farm, Rougham - NW NORFOLK CHALK
Ranking derived from data for the period May-1950 to Dec-2017



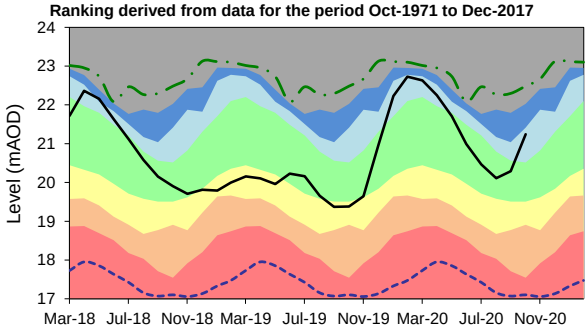
Bircham Newton - NW NORFOLK CHALK
Ranking derived from data for the period Mar-1995 to Sep-2017



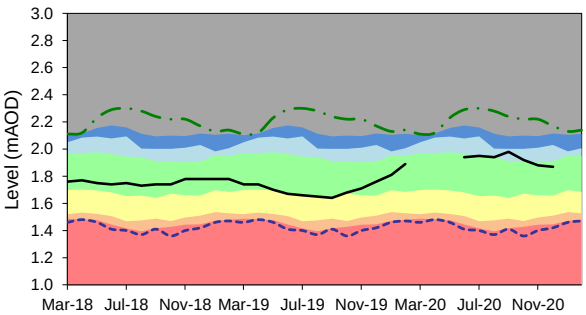
Castle Farm, Offton - MID SUFFOLK CHALK
Ranking derived from data for the period Mar-1967 to Dec-2017



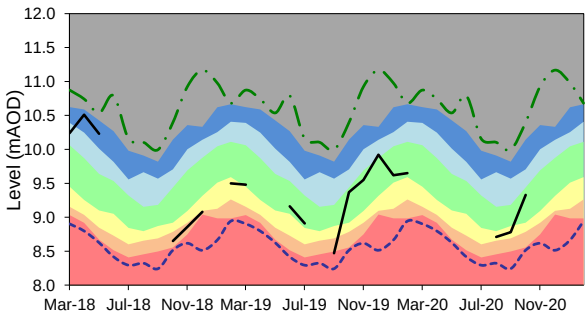
Old Primary School, South Creake
NW NORFOLK CHALK
Ranking derived from data for the period Oct-1971 to Dec-2017



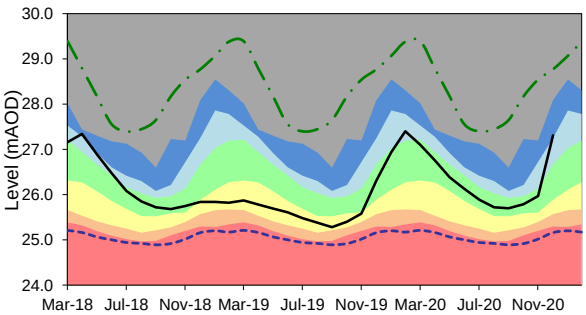
Hazlewood Common - SUFFOLK CRAG
Ranking derived from data for the period Oct-1988 to Feb-2020

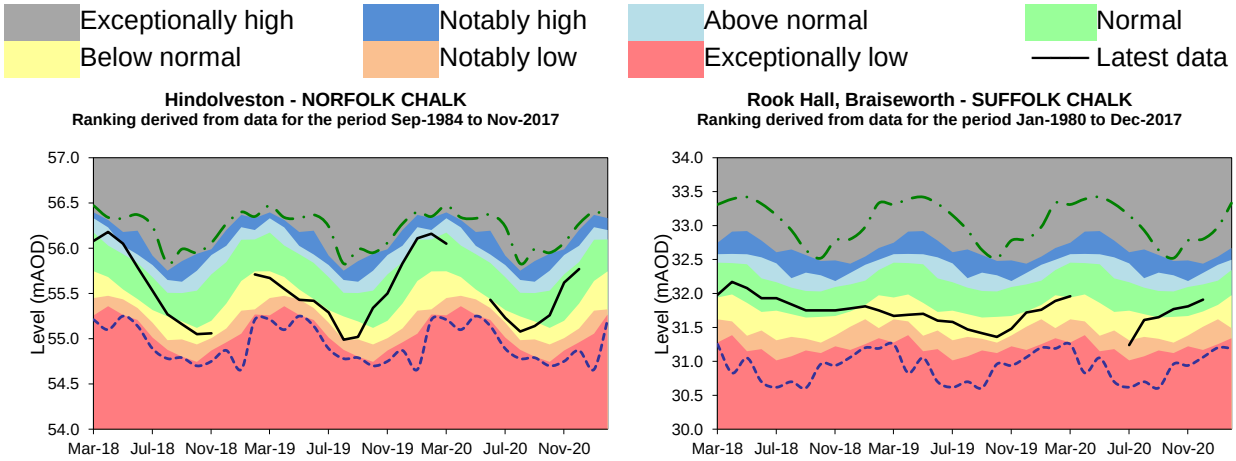


The Spinney, Costessey - WENSUM CHALK
Ranking derived from data for the period Oct-1971 to Dec-2017

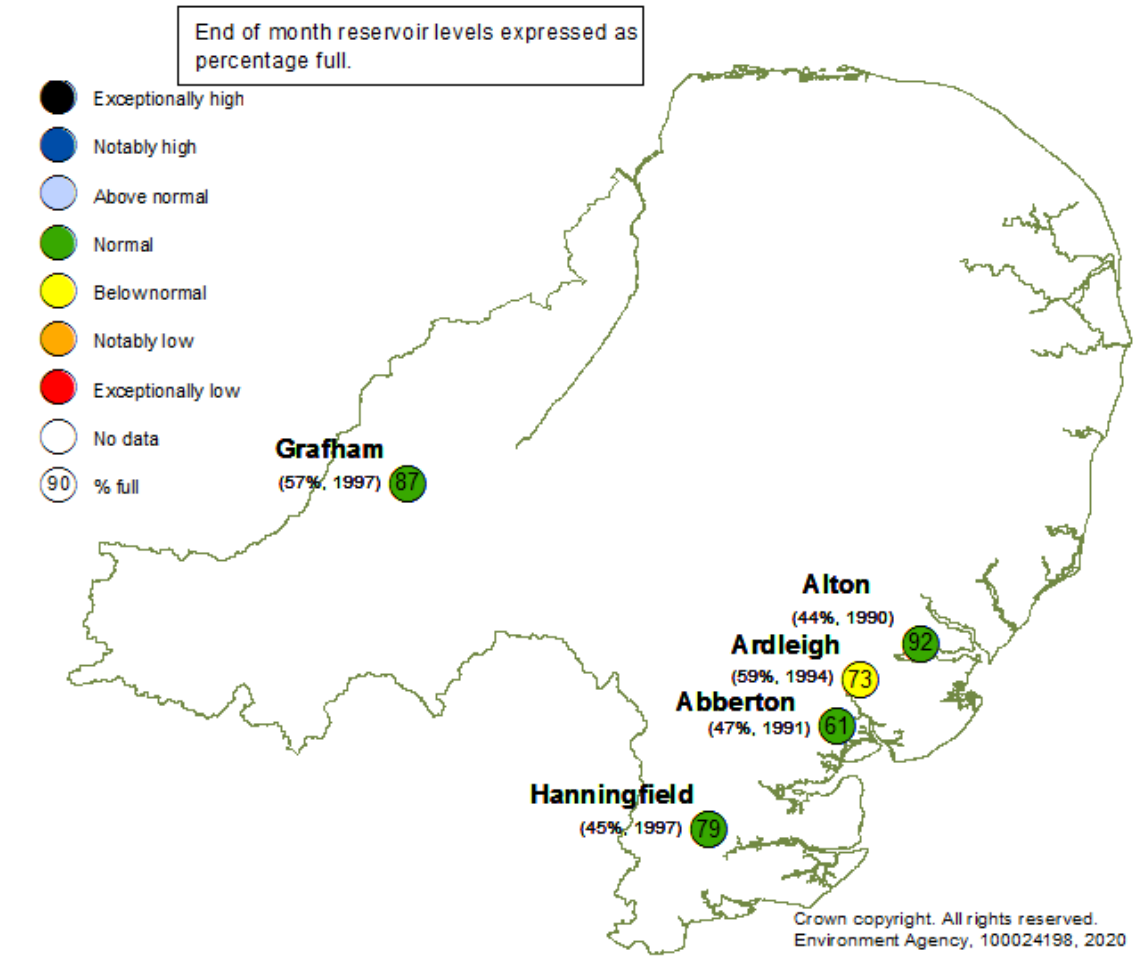


Smeetham Hall Cottages, Bulmer - ESSEX CHALK
Ranking derived from data for the period Jan-1964 to Dec-2017



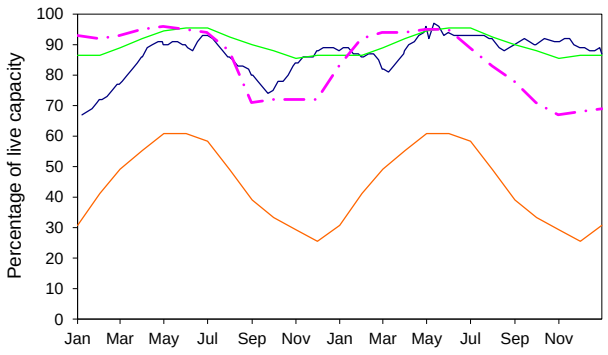


Reservoir Stocks December 2020

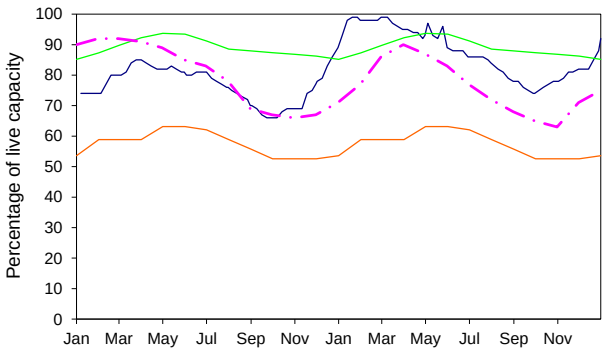


2020-2021 Normal Operating Curve Drought Alert Curve 1995-1996

Grafham

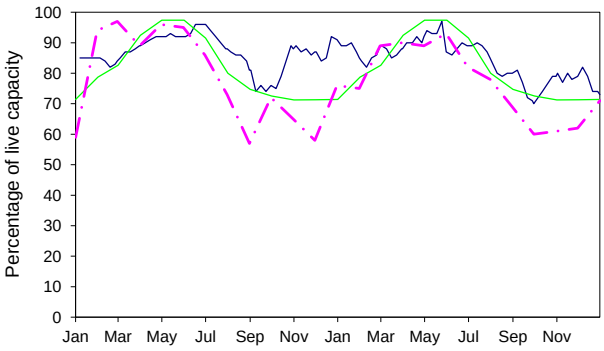


Alton

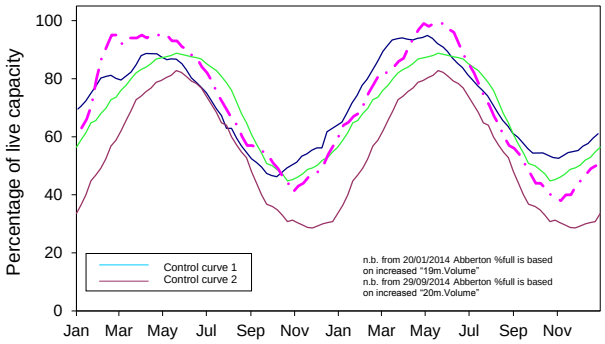


2020-2021 Normal Operating Curve Drought Alert Curve 1995-1996

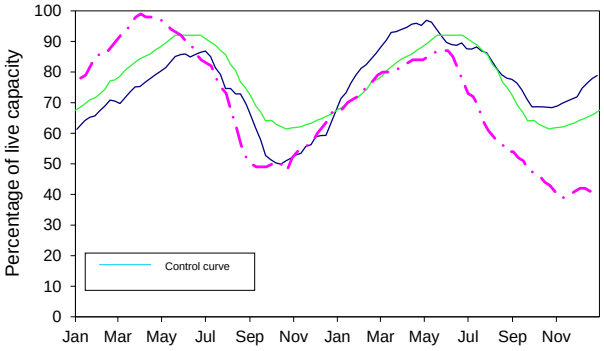
Ardleigh



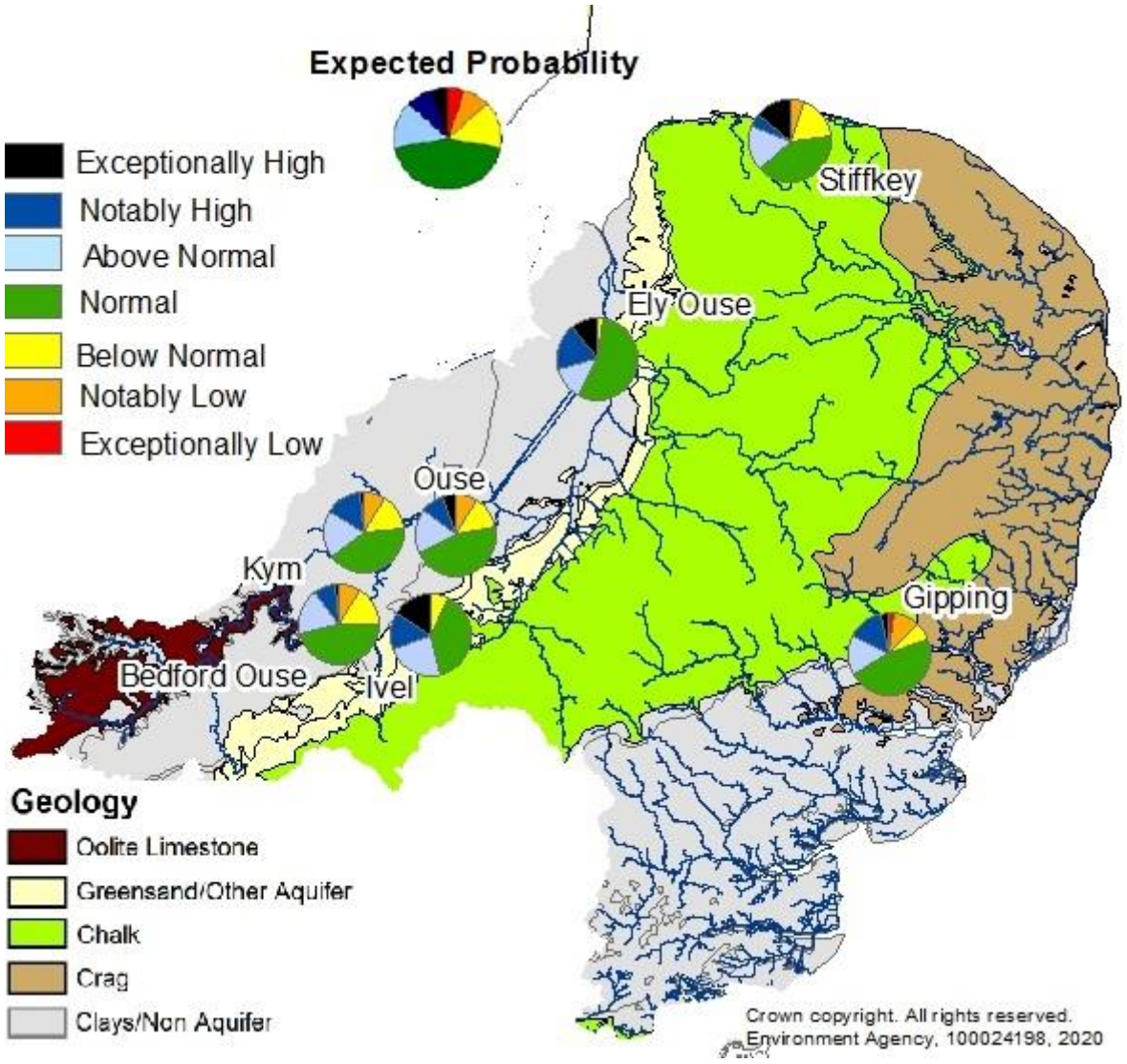
Abberton



Hanningfield



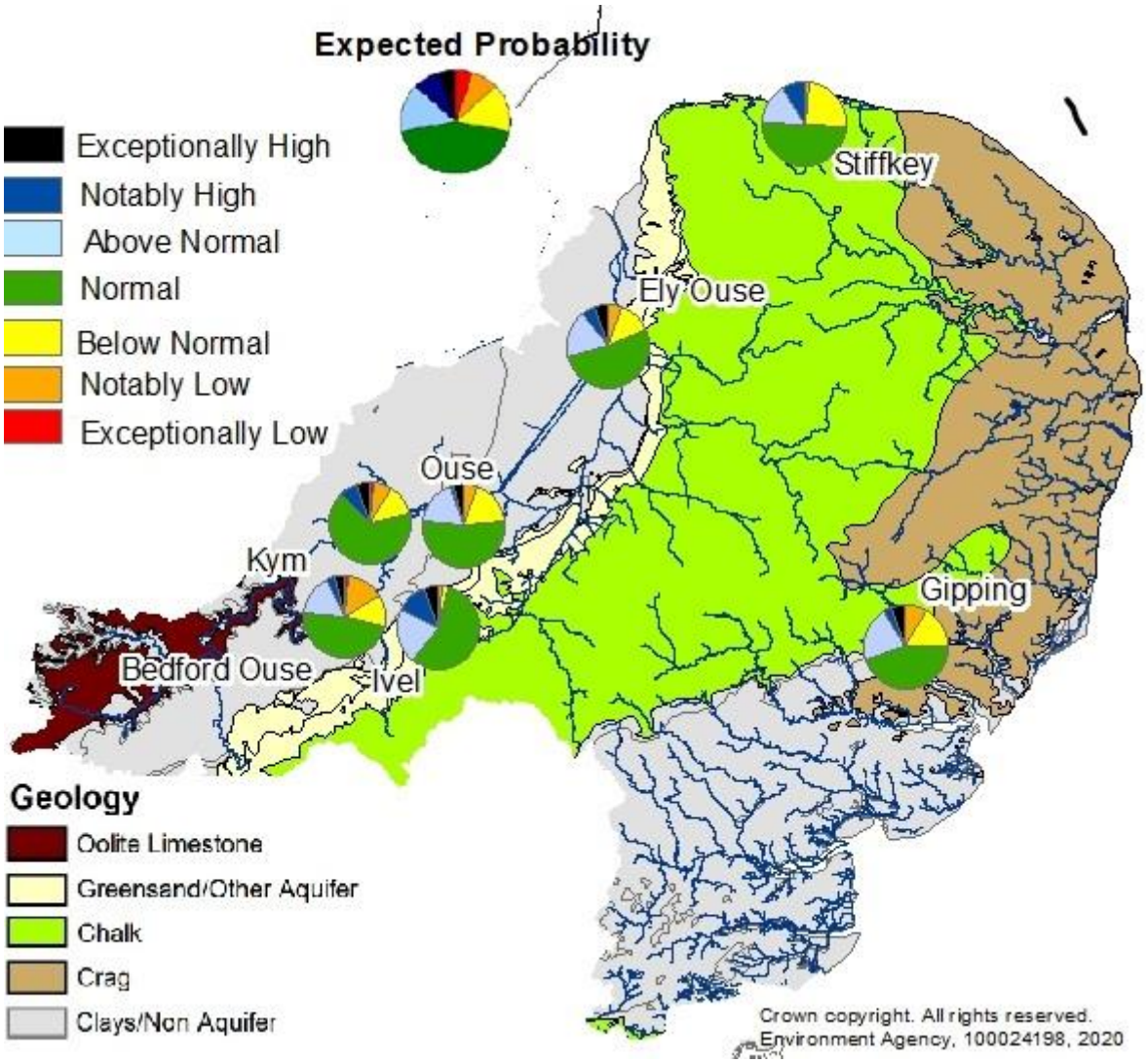
Forward Look – River Flows



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 March 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, 2020.

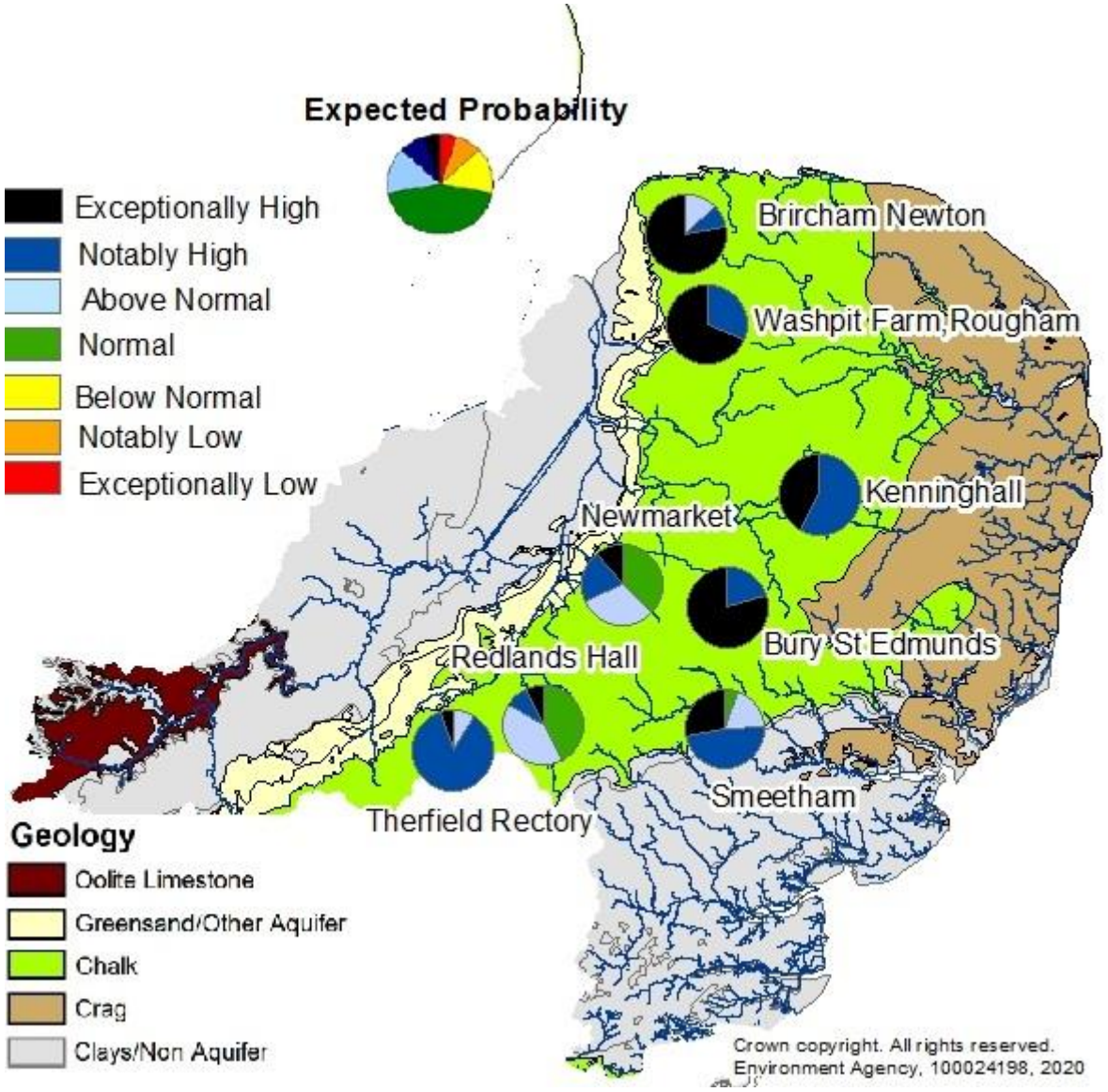
^ *"Naturalised" flows are projected for these sites'*



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

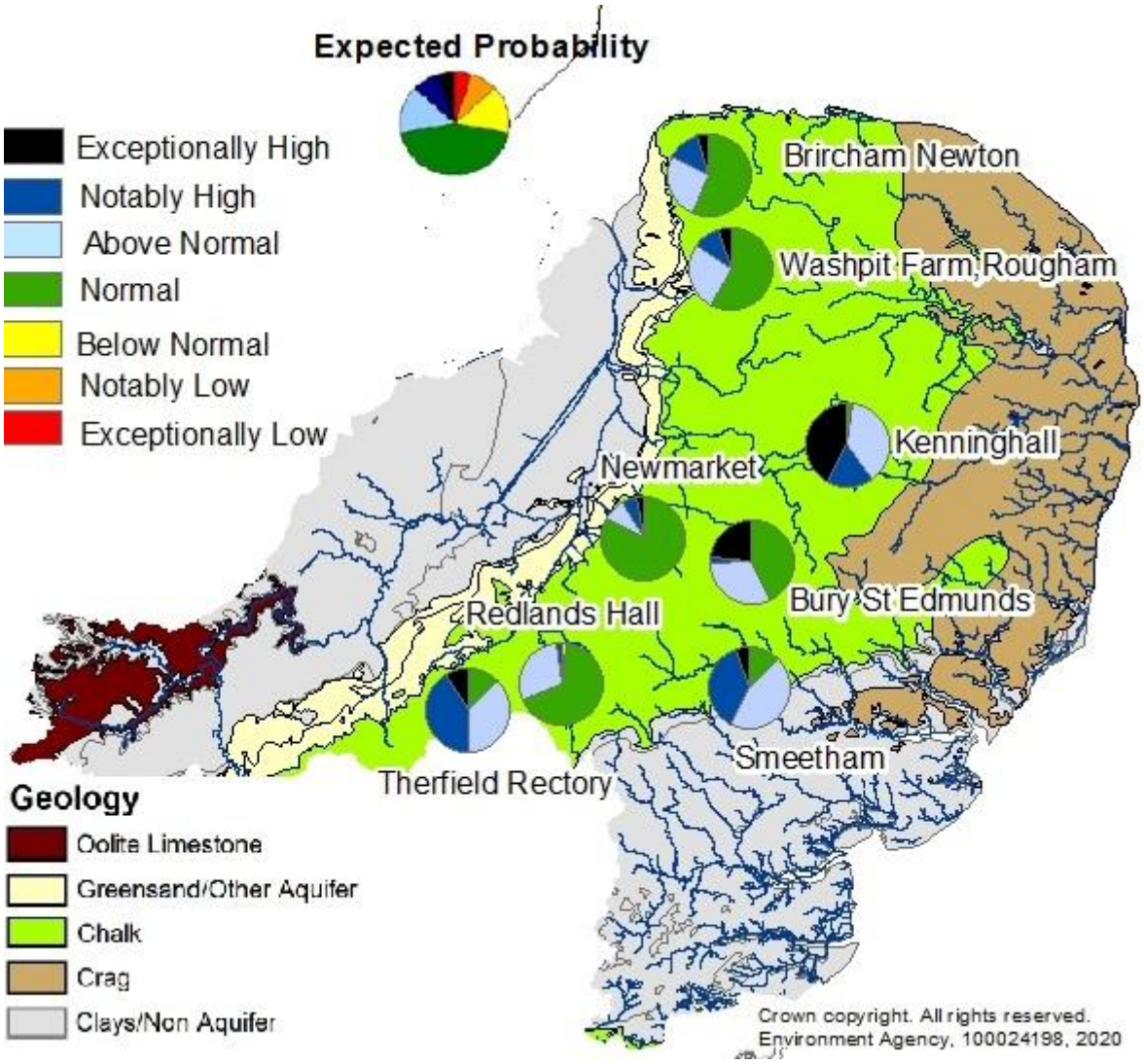
Probabilistic ensemble projections of river flows at key indicator sites in June 2021. Pie charts indicate probability, based on climatology, of the surface water flow at each site being e.g. exceptionally low for the time of year. (Source: Centre for Ecology and Hydrology, Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2020

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 2021. Pie charts indicate probability, based on climatology, of the groundwater level at each site being e.g. exceptionally low for the time of year. (Source: Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2020.



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 2021. Pie charts indicate probability, based on climatology, of the groundwater level at each site being e.g. exceptionally low for the time of year. (Source: Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2020.

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^3s^{-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.
Flow	The water passing in the river, as measured.
Groundwater	The water found in an aquifer, as measured.
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