Monthly water situation report

East of England

Summary – February 2021

The beginning of February saw further rainfall across East Anglia contributing to the second wettest December to February on record for the area. Whilst the remainder of the month was drier, so rainfall totals were classified as normal, flows at the majority of river indicator sites continued to be notably or exceptionally high. There were further increases in groundwater levels at the majority of indicator sites, reflecting the high rainfall and sustained low soil moisture deficit.

Rainfall

In February the total average rainfall across East Anglia was 41.3mm, equivalent to 112% of the Long Term Average (LTA) and classified as normal for the time of year. The majority of the rainfall fell in the first two weeks of February, followed by some drier weather. There was variation across the area with higher amounts falling in the North Norfolk catchments which received a total of 54.1mm, 139% of the LTA, compared to only 96% of the LTA falling in North and South Essex (33.4mm and 30.9mm respectively). Despite the normal classification for the month, the additional rainfall following the high totals in December and January means that the period from December to February is the second wettest three months ending in February since records started in 1891 (a total of 241.3mm, or 169% of LTA). Accordingly, the 12 month rainfall surplus remains high at 694mm – 98mm above the 1961-90 annual mean.

Soil Moisture Deficit/Recharge

The Soil Moisture Deficit (SMD) remained low for the first half of the month reflecting the continued rainfall, and then began to increase towards the end of the month. By the end of February the area had an average SMD of 9.9mm, classified as normal for the time of year. There is some variance across East Anglia with the south-east including Essex having higher deficits than the west.

River Flows

River flows continued to respond to the high rainfall of the previous month and the beginning of February with continued high flows recorded. Combined with the high groundwater levels and low SMD conditions, 62% of the indicator sites recorded exceptionally high flows, and a further 19% recorded notably high flows for the time of year. Of particular note are rivers in the North Norfolk catchments which received higher rainfall and continue to experience exceptionally high groundwater levels. For example the River Burn at Burnham Overy reached a monthly mean flow of 1.39 cumecs, 332% of the LTA, and the River Wensum a monthly mean flow of 12.6 cumecs, or 307% of the LTA. In comparison to January, rivers in South Essex and the Bedford Ouse catchments showed a slight reduction in flows.

Groundwater Levels

Groundwater recharge has been sustained with the continued combination of low SMD and additional rainfall providing conditions for groundwater levels to increase at the majority of sites. The exceptions showing a slight decrease were Fringford in the Great Oolite, Biggleswade in the Ivel Sandstone and Bury St Edmunds in the Upper Lark Chalk, however these remain at notably or exceptionally high levels even with the reductions. 35% of the indicator sites have reported exceptionally high levels, six of these seven are found in the chalk aquifer. A further 25% of indicator sites have reported notably high groundwater levels. Two groundwater flood alerts remain in place for Bury St Edmunds and Newmarket.

Reservoir Storage/Water Resource Zone Stocks

Reservoir storage increased by the end of the month at three of the five reservoirs (Alton, Abberton and Hanningfield) which are all operating above their normal operating curves. Grafham and Ardleigh maintained very similar levels to January, and are reporting slightly below the normal operating curves.

Environmental Impact

Groundwater support scheme operations have remained minimal in February. The Lodes-Granta groundwater support scheme has 1 of the 6 pumps operating, with no pumping taking place in the Rhee, Hiz and Thet-Little Ouse schemes.

Forward Look

Probabilistic ensemble projections for river flows at key sites

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

June 2021: There is reduced probability of exceptionally low flows at all key sites with an increased probability of normal flows at the majority of key sites in June.

Probabilistic ensemble projections for groundwater levels in key aquifers

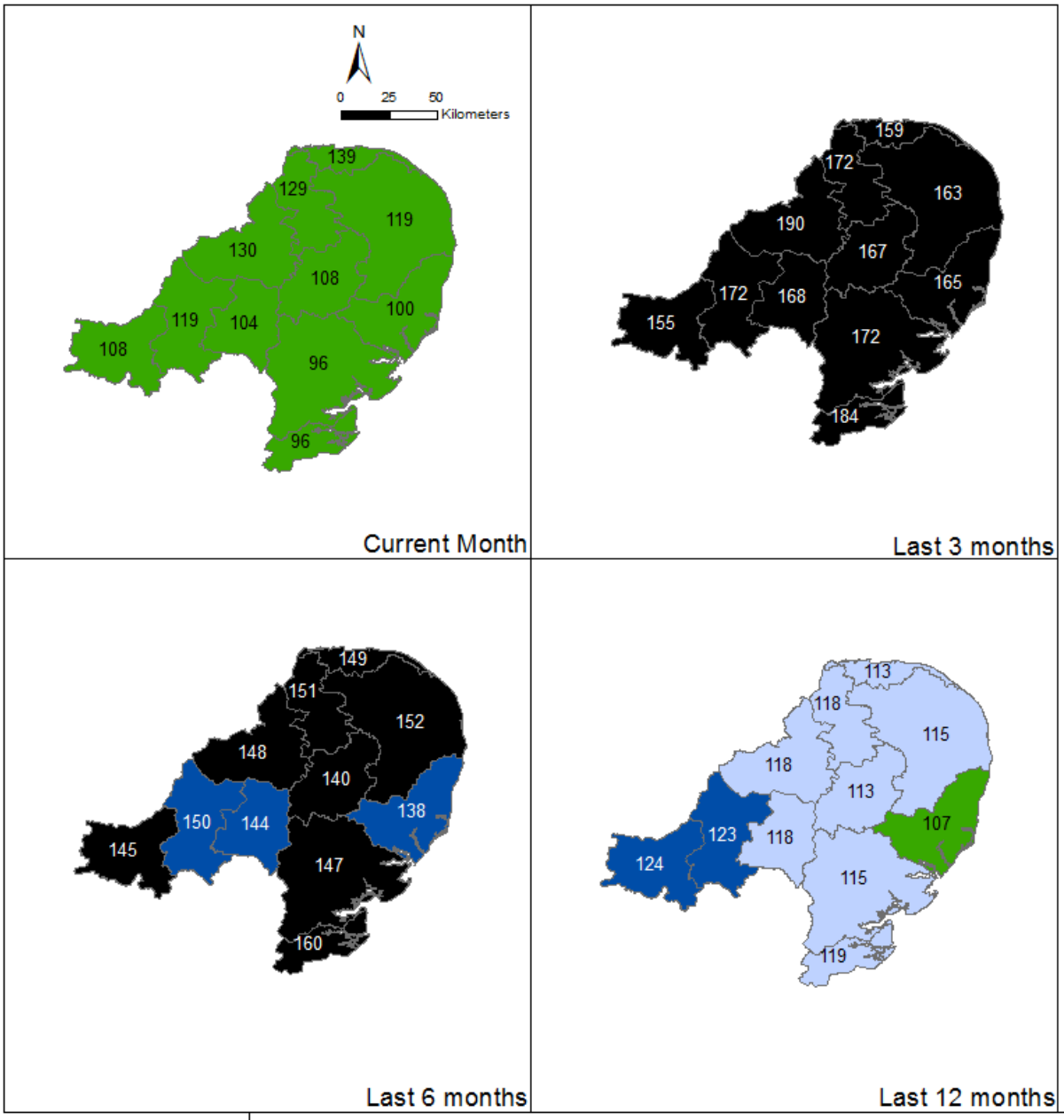
March 2021: There is a greatly increased probability of groundwater levels being exceptionally high at the majority of key sites, with a greatly reduced probability of groundwater levels classified normal or lower at all key sites in March.

September 2021: There is a reduced probability of below normal or lower groundwater levels at all key sites in September and an increased probability of levels above normal or higher at Smeetham in the Essex chalk; Kenninghall in the Little Ouse chalk; Therfield Rectory in the North Herts chalk and Bircham Newton and Washpit Farm in the NW Norfolk chalk.

Author: Hydrology & Operations Contact details: 03708506506

Rainfall

February 2021



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

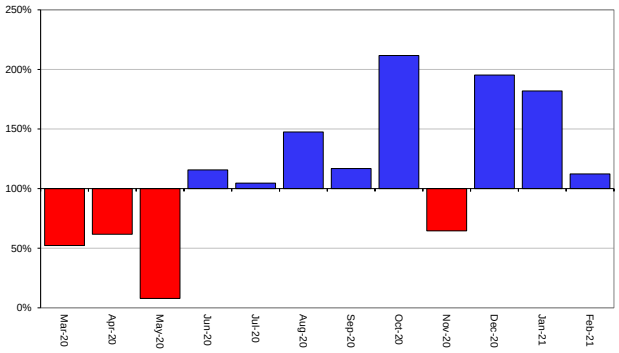
Rainfall expressed as percentage of 1961-1990 Long Term Average for the specified duration. Classes derived from data for the period 1891 to 2017 based on the HadUK dataset (Met Office © Crown Copyright)

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, 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.

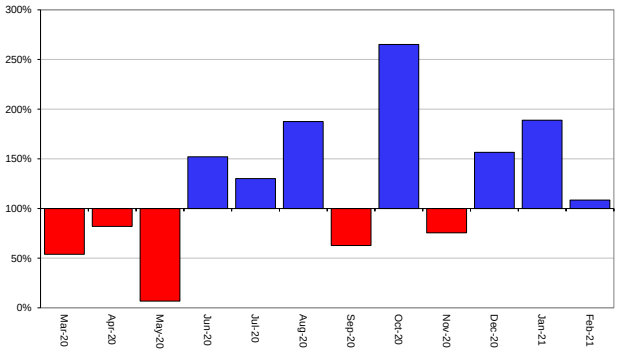
Above average rainfall

Below average rainfall

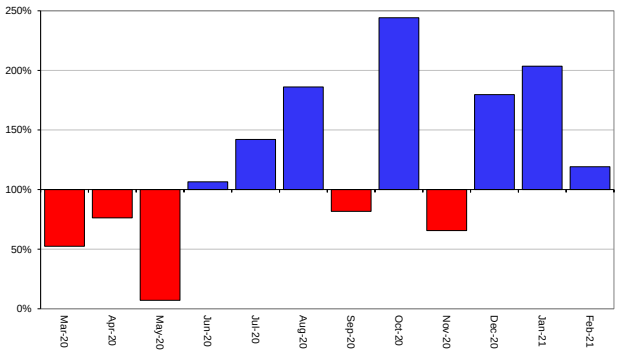
1-Month Period for East Anglia



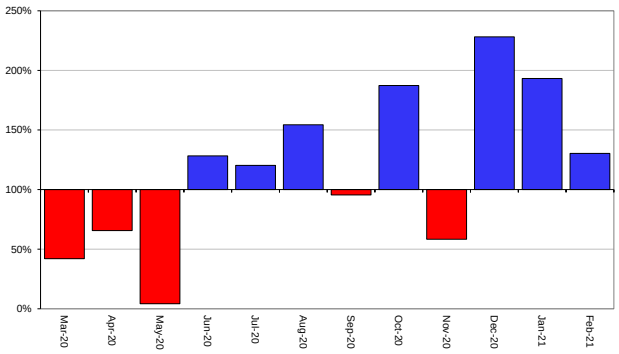
1-Month Period for Upper Bedford Ouse



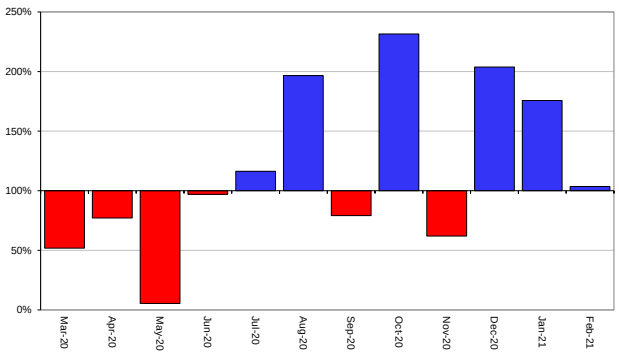
1-Month Period for Lower Bedford Ouse



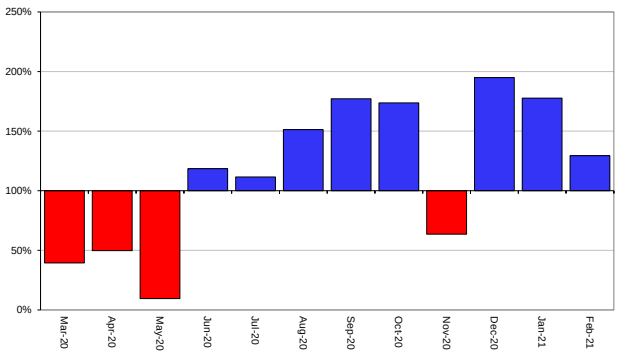
1-Month Period for Central Area Fenland



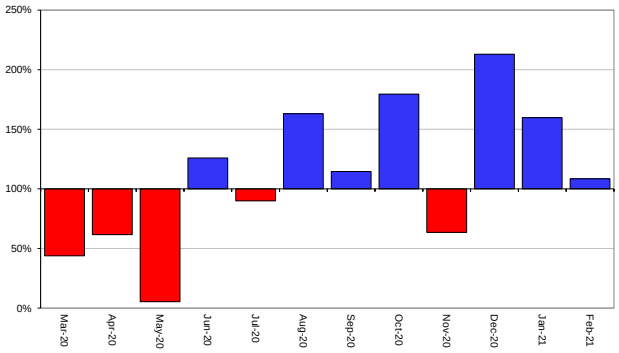
1-Month Period for Cam



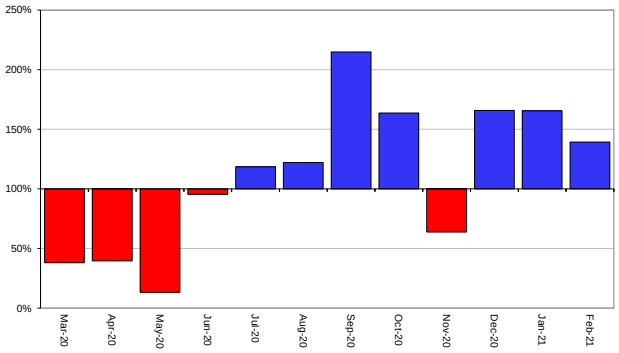
1-Month Period for NW Norfolk and Wissey



1-Month Period for Little Ouse and Lark

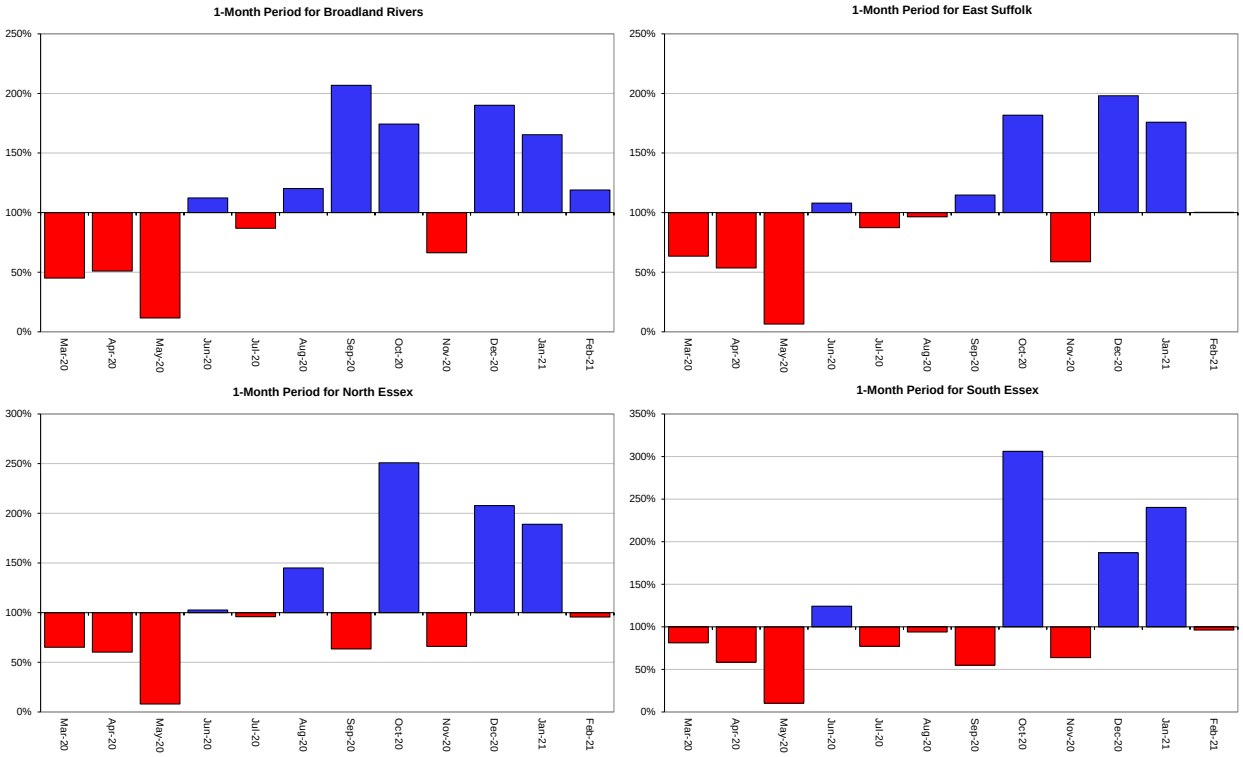


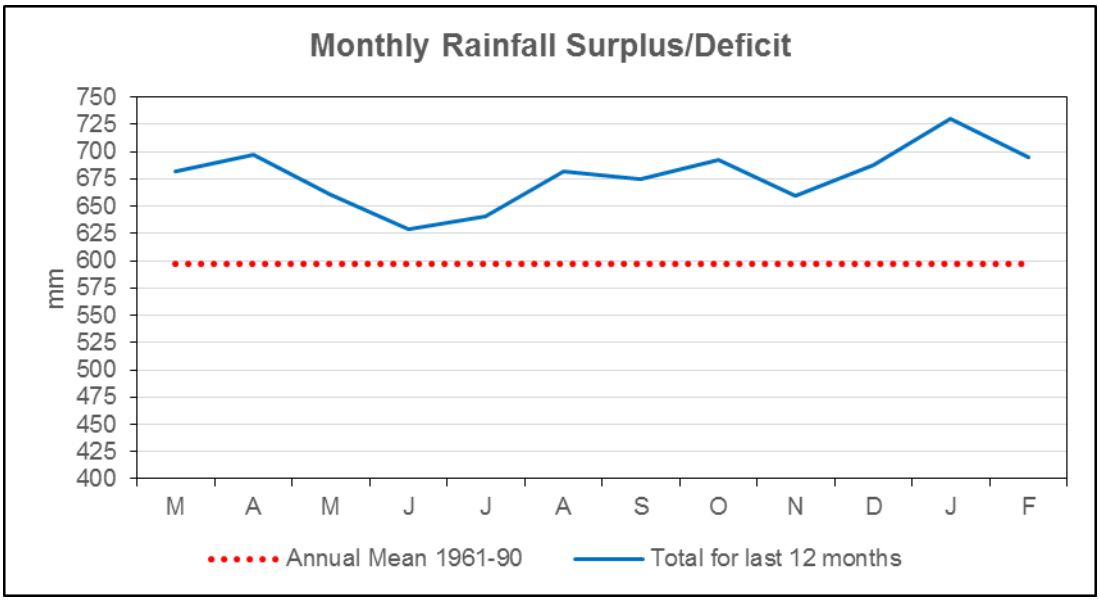
1-Month Period for North Norfolk



Above average rainfall

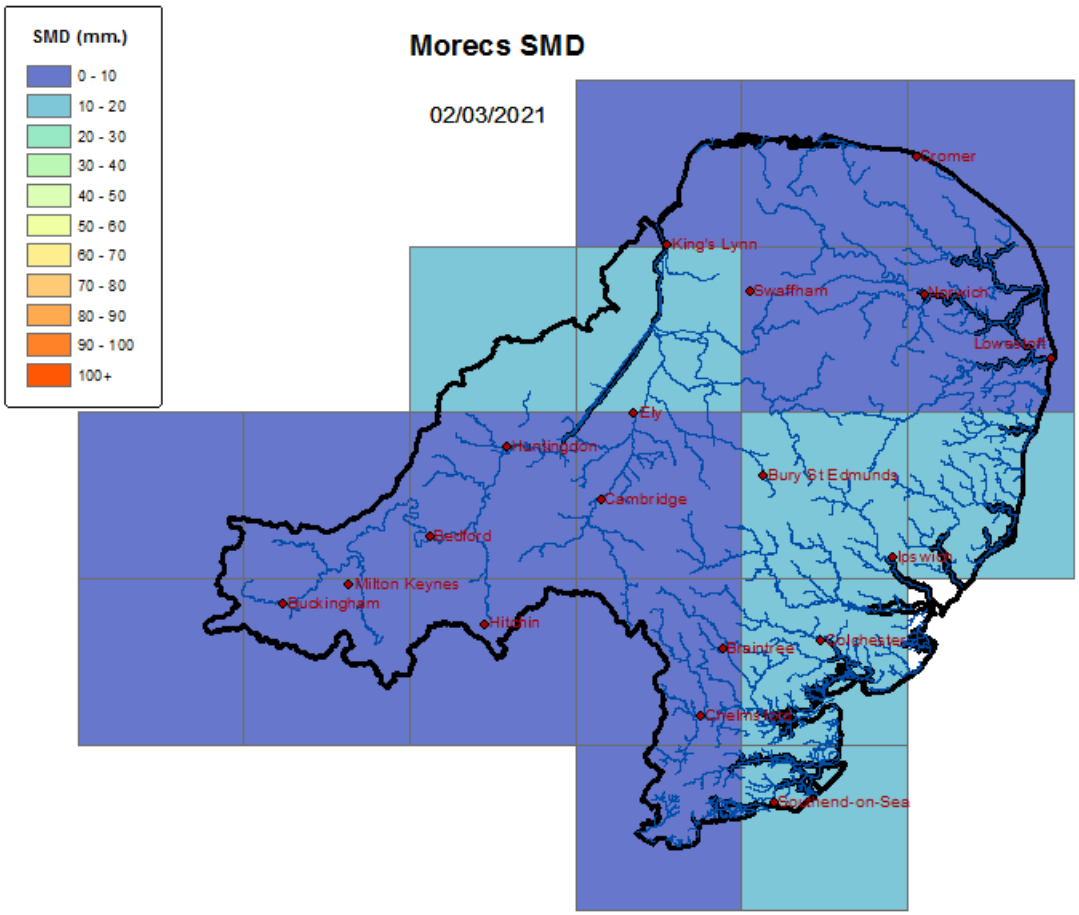
Below average rainfall





Soil Moisture Deficit

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

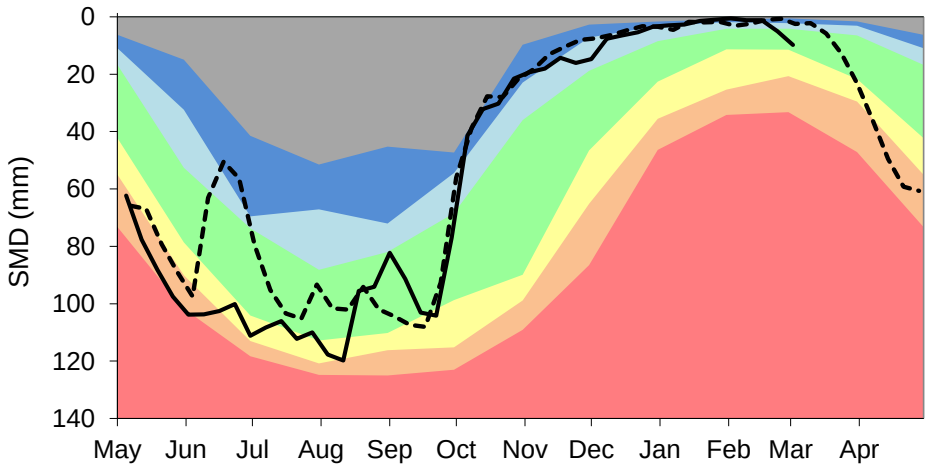


Data based on MORECS (Met Office © Crown Copyright)

——2020-21
– – –2019-20
Exceptionally high
Notably high
Above normal
Normal
Below normal
Notably low
Exceptionally low
—— Latest data

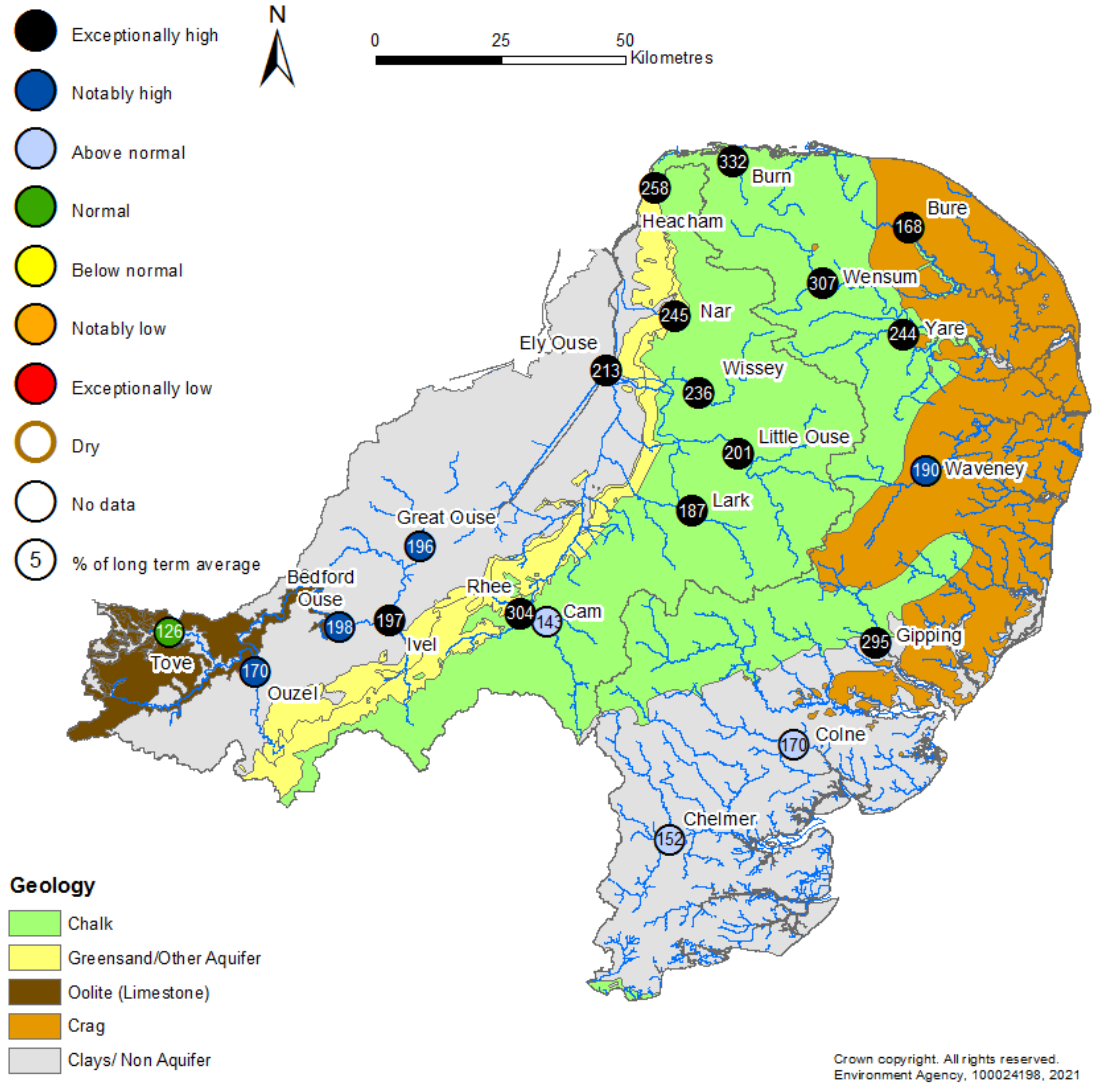
East Anglia

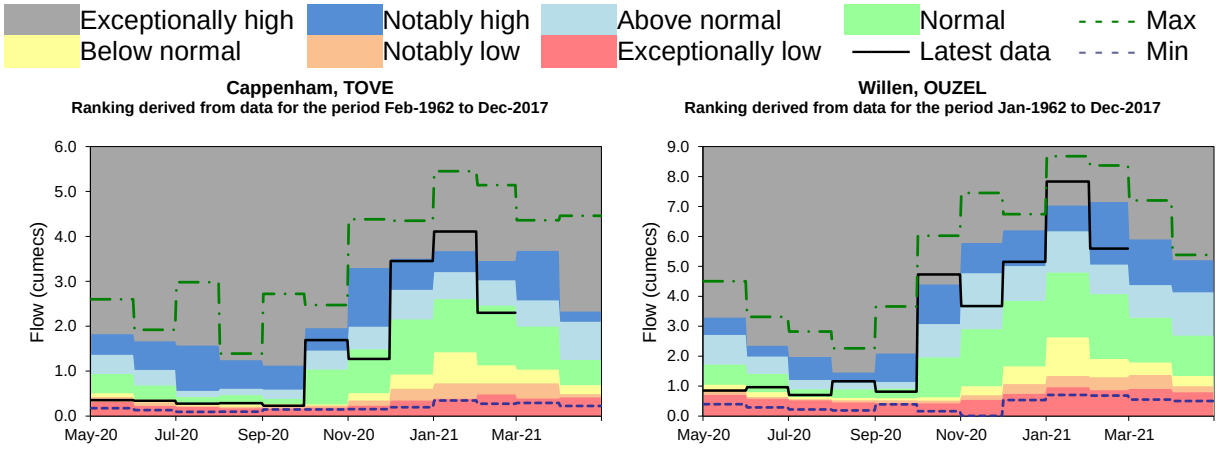
Ranking derived from data for the period Jan-1961 to Dec-2012



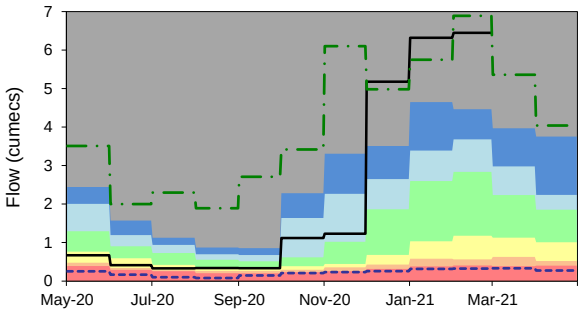
River Flow

February 2021

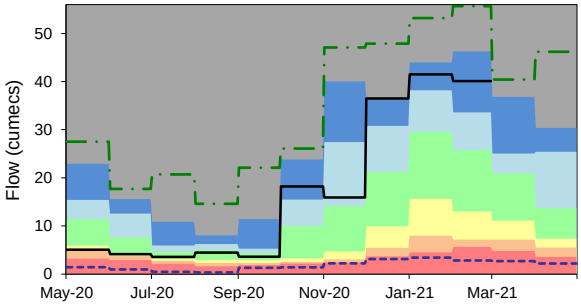




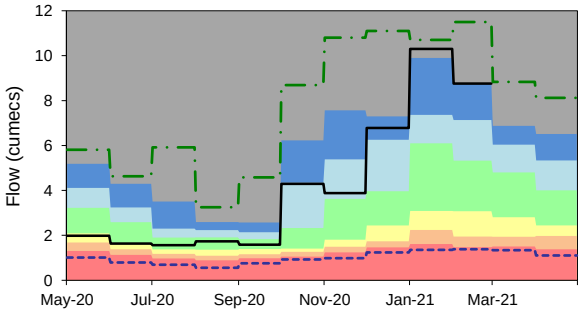
Burnt Mill, RHEE
Ranking derived from data for the period Oct-1962 to Dec-2017



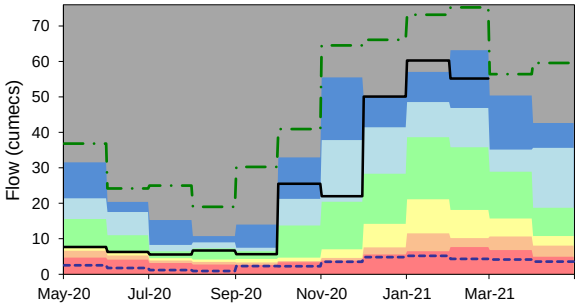
Roxton, GREAT OUSE
Ranking derived from data for the period Oct-1972 to Dec-2017



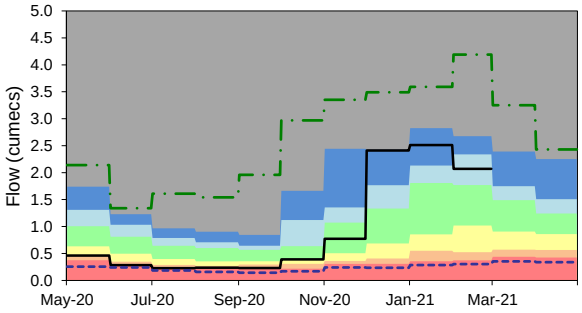
Blunham, IVEL
Ranking derived from data for the period Aug-1959 to Dec-2017



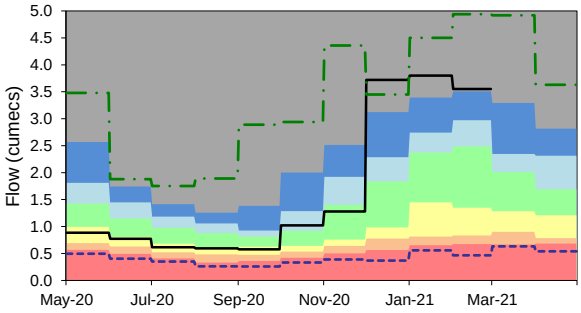
Offord (Gross Flows), GREAT OUSE
Ranking derived from data for the period Jan-1972 to Dec-2017



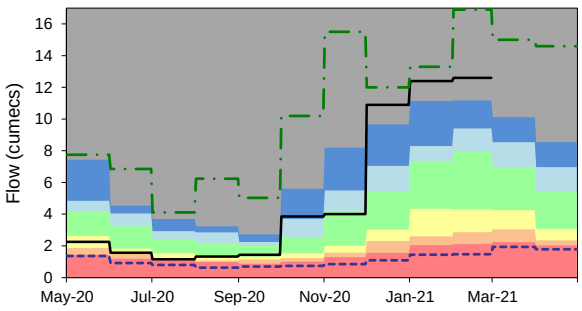
Dernford, CAM
Ranking derived from data for the period Feb-1949 to Dec-2017



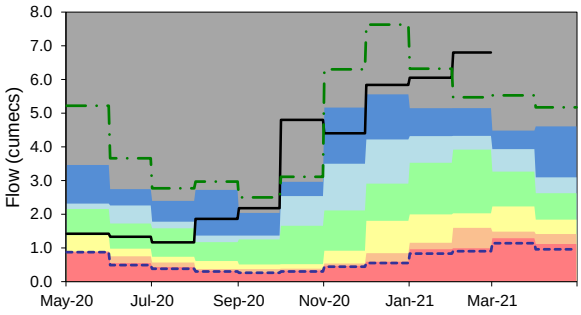
Temple, LARK
Ranking derived from data for the period Nov-1960 to Dec-2017



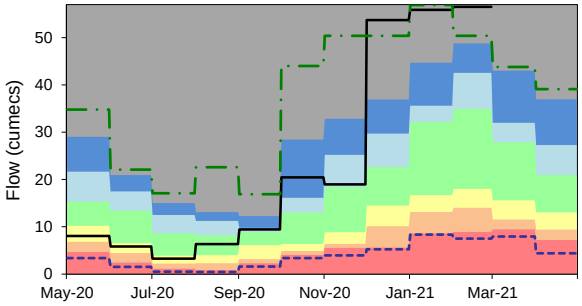
Abbey Heath, LITTLE OUSE
Ranking derived from data for the period Jun-1968 to Dec-2017



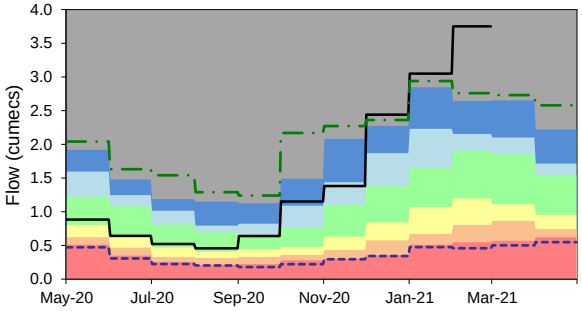
Northwold Total, WISSEY
Ranking derived from data for the period Jul-1983 to Dec-2012



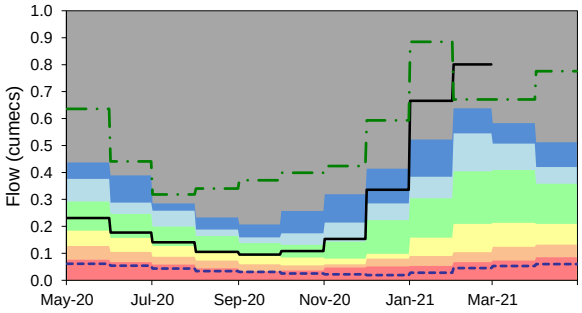
Denver, ELY OUSE
Ranking derived from data for the period Nov-1971 to Dec-2017



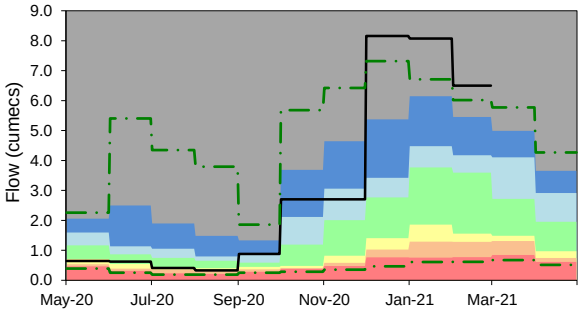
Marham, NAR
Ranking derived from data for the period Apr-1982 to Dec-2017



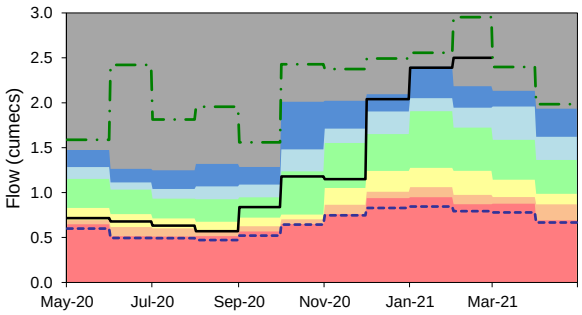
Heacham, HEACHAM
Ranking derived from data for the period Nov-1965 to Dec-2017



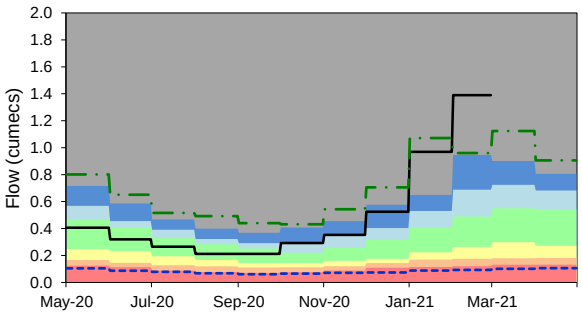
Colney, YARE
Ranking derived from data for the period Jan-1970 to Dec-2017



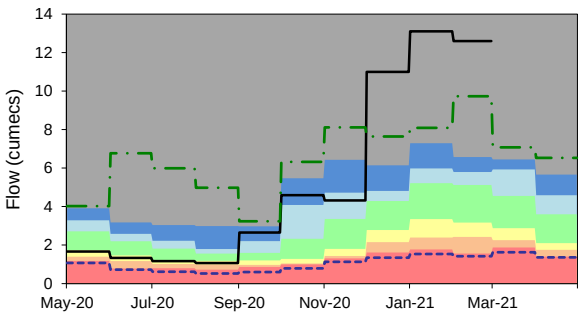
Ingworth, BURE
Ranking derived from data for the period Jan-1970 to Dec-2017



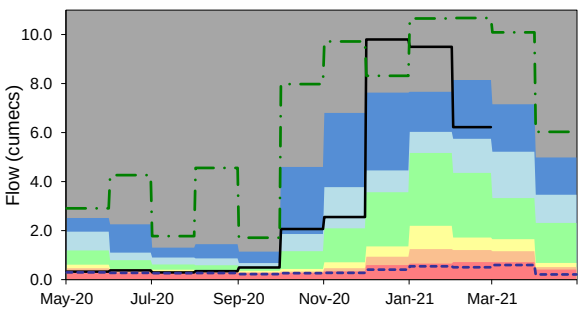
Burnham Overy, BURN
Ranking derived from data for the period Jan-1970 to Dec-2017



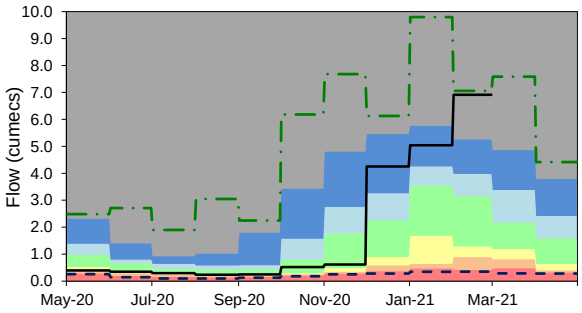
Swanton Morley Total, WENSUM
Ranking derived from data for the period Jan-1970 to Dec-2017



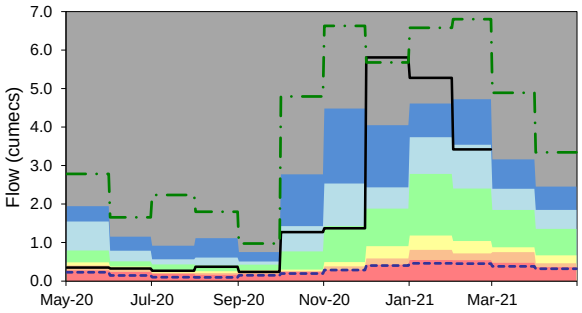
Needham Weir Total, WAVENEY (LOWER)
Ranking derived from data for the period Jan-1970 to Dec-2017



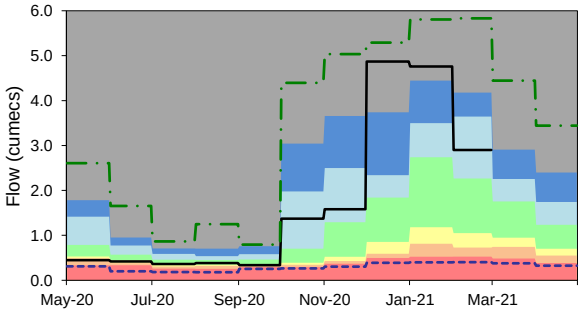
Bramford, GIPPING
Ranking derived from data for the period Jan-1970 to Dec-2017



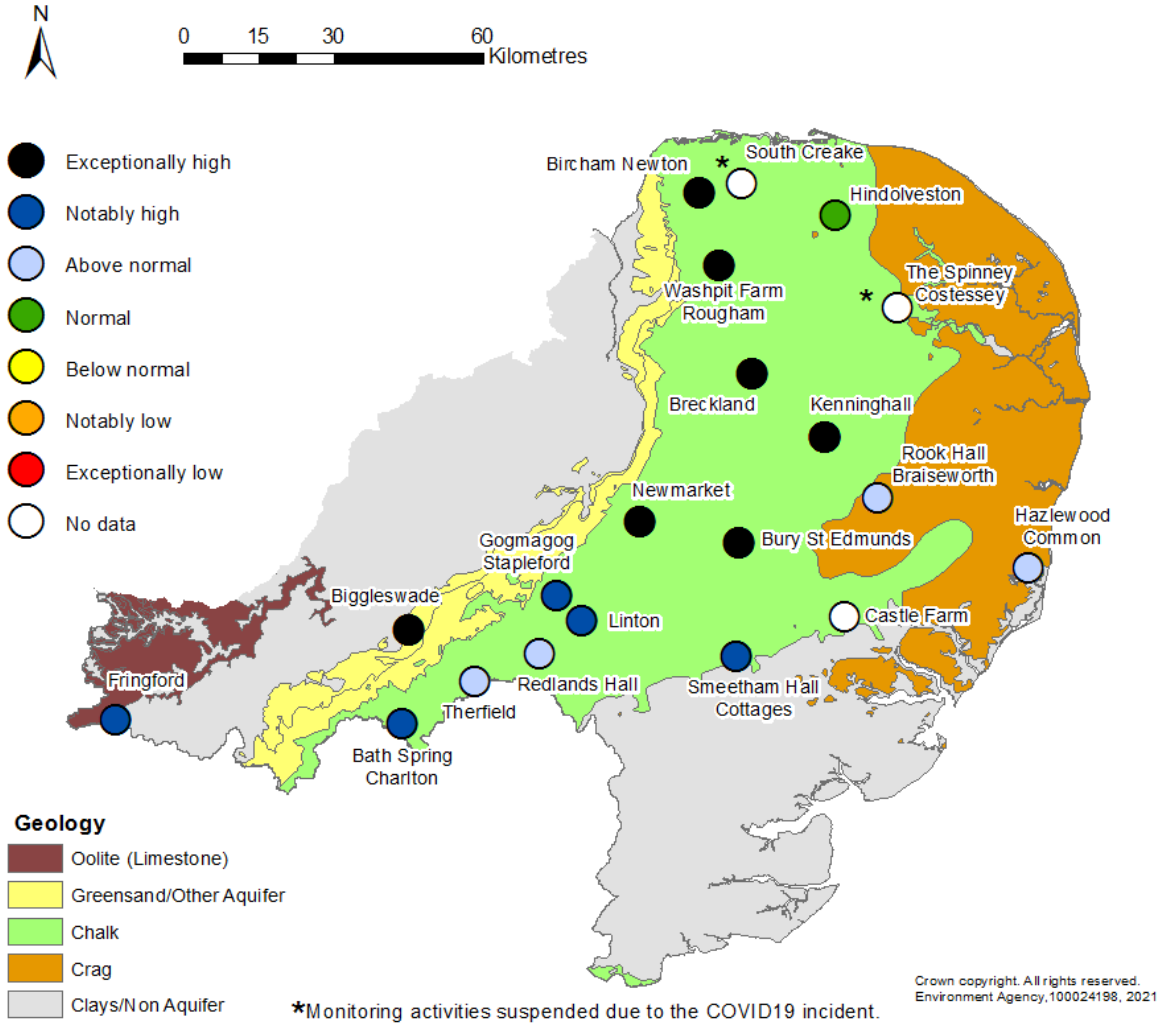
Lexden, COLNE
Ranking derived from data for the period Jan-1970 to Dec-2017

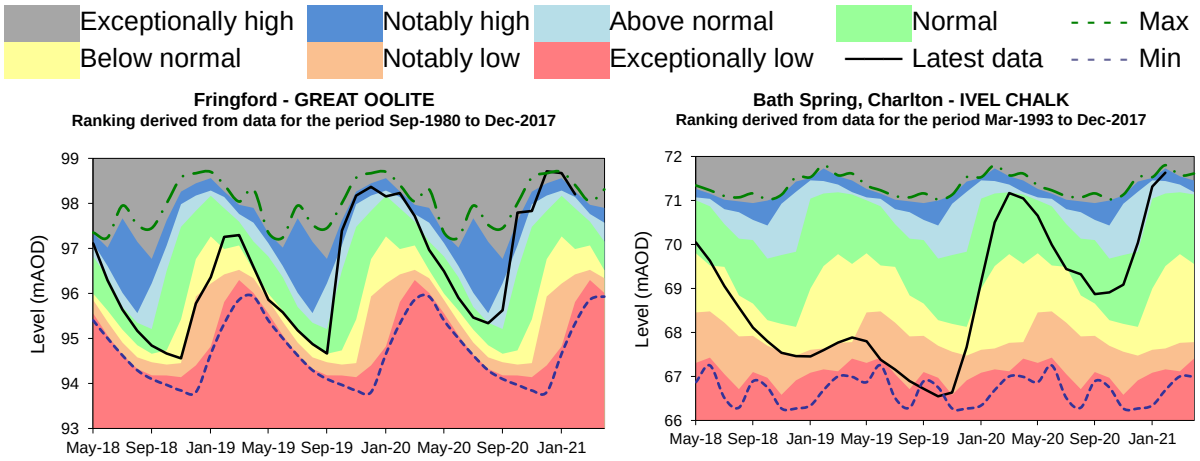


Springfield, CHELMER
Ranking derived from data for the period Jan-1970 to Dec-2017

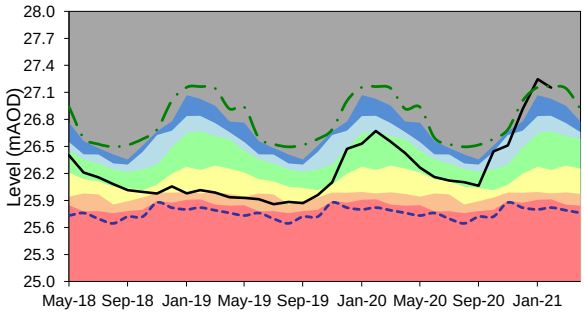


Groundwater Levels February 2021

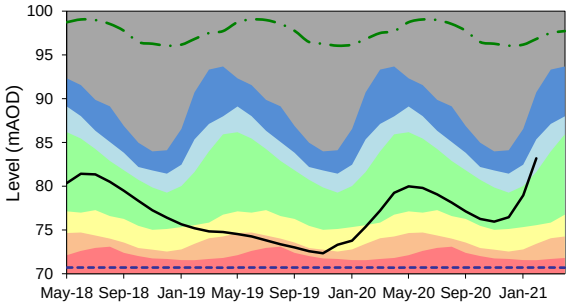




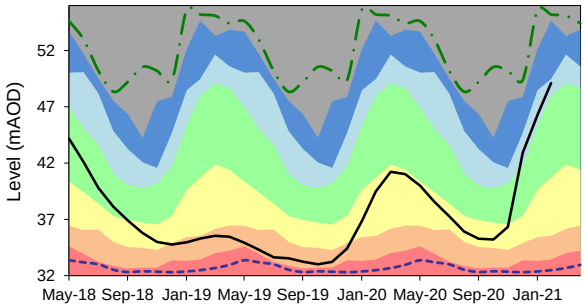
Biggleswade - IVEL SANDSTONE
Ranking derived from data for the period Mar-1968 to Dec-2017



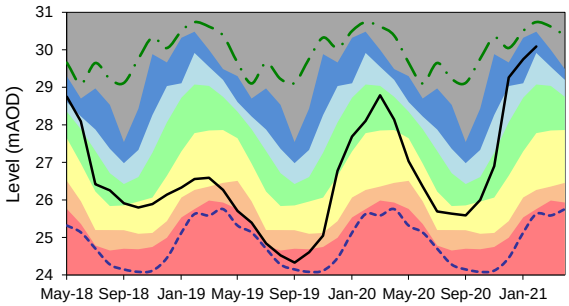
Therfield Rectory - N HERTS CHALK
Ranking derived from data for the period Jan-1883 to Dec-2017



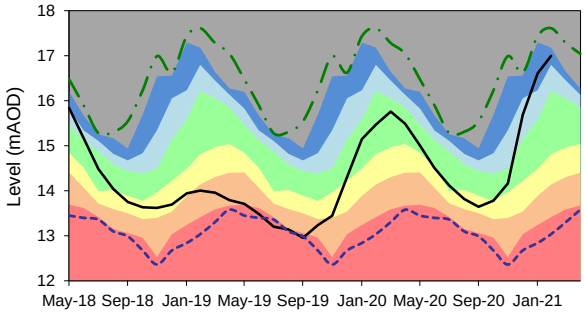
Redlands Hall, Ickleton - CAM CHALK
Ranking derived from data for the period Aug-1963 to Dec-2017



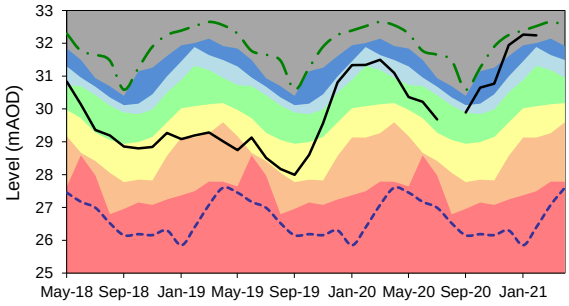
Linton - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



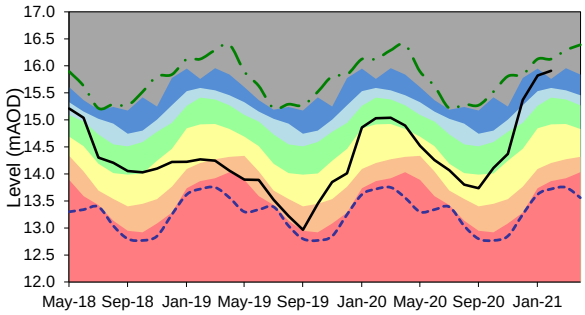
Gog Magog, Stapleford - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



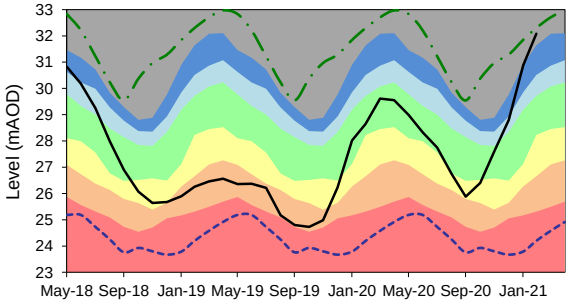
Bury St Edmunds - UPPER LARK CHALK
Ranking derived from data for the period May-1983 to Dec-2017



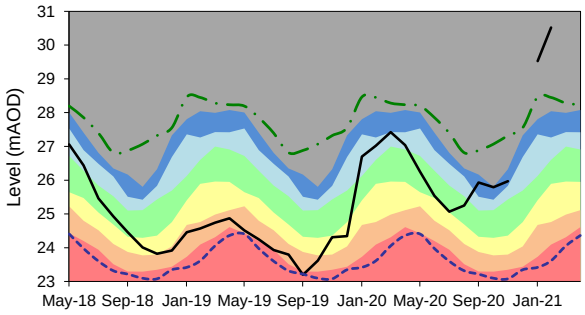
Newmarket - SNAIL CHALK
Ranking derived from data for the period Feb-1983 to Dec-2017



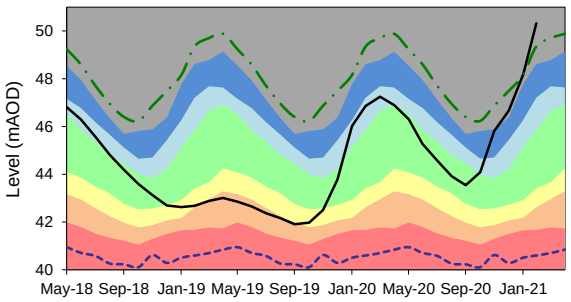
Kenninghall - LITTLE OUSE CHALK
Ranking derived from data for the period Aug-1973 to Dec-2017



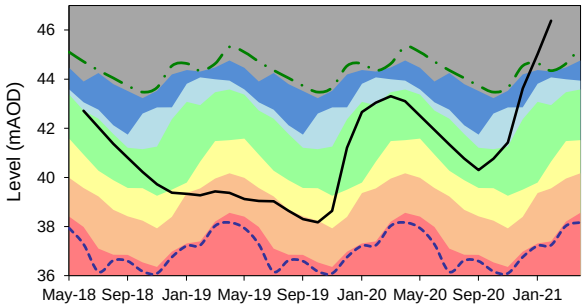
Breckland - WISSEY CHALK
Ranking derived from data for the period Jan-1971 to Nov-2017



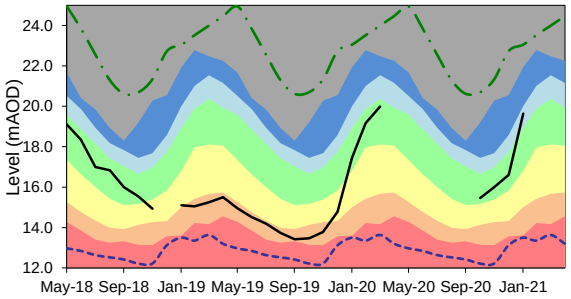
Washpit Farm, Rougham - NW NORFOLK CHALK
Ranking derived from data for the period May-1950 to Dec-2017



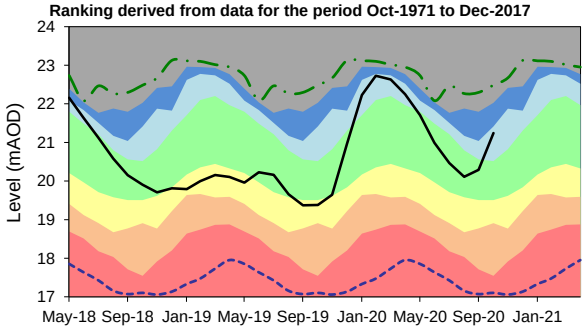
Bircham Newton - NW NORFOLK CHALK
Ranking derived from data for the period Mar-1995 to Sep-2017



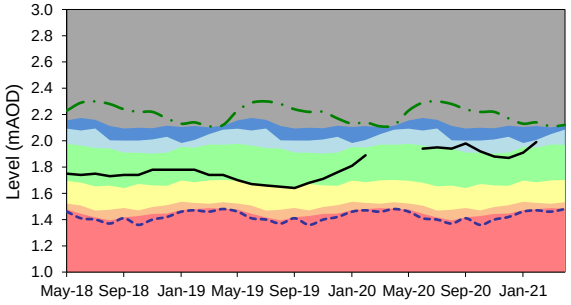
Castle Farm, Offton - MID SUFFOLK CHALK
Ranking derived from data for the period Mar-1967 to Dec-2017



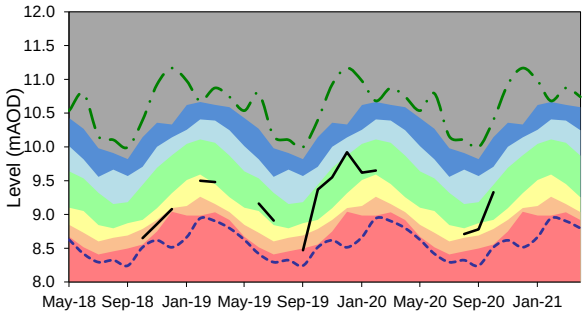
Old Primary School, South Creake
NW NORFOLK CHALK
Ranking derived from data for the period Oct-1971 to Dec-2017



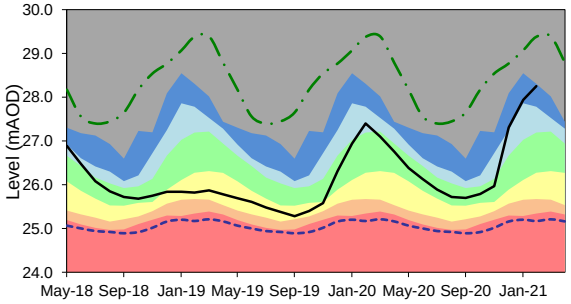
Hazlewood Common - SUFFOLK CRAG
Ranking derived from data for the period Oct-1988 to Feb-2020

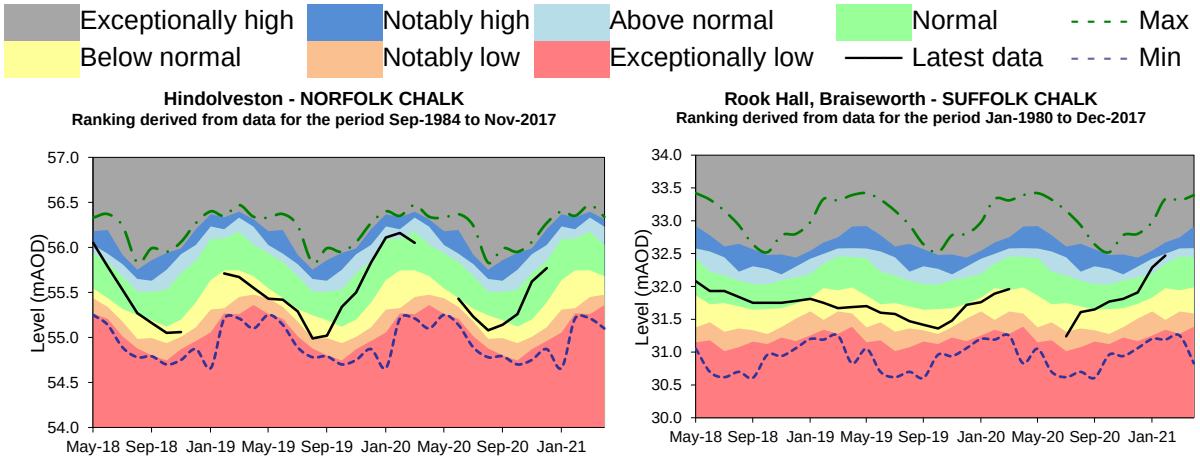


The Spinney, Costessey - WENSUM CHALK
Ranking derived from data for the period Oct-1971 to Dec-2017

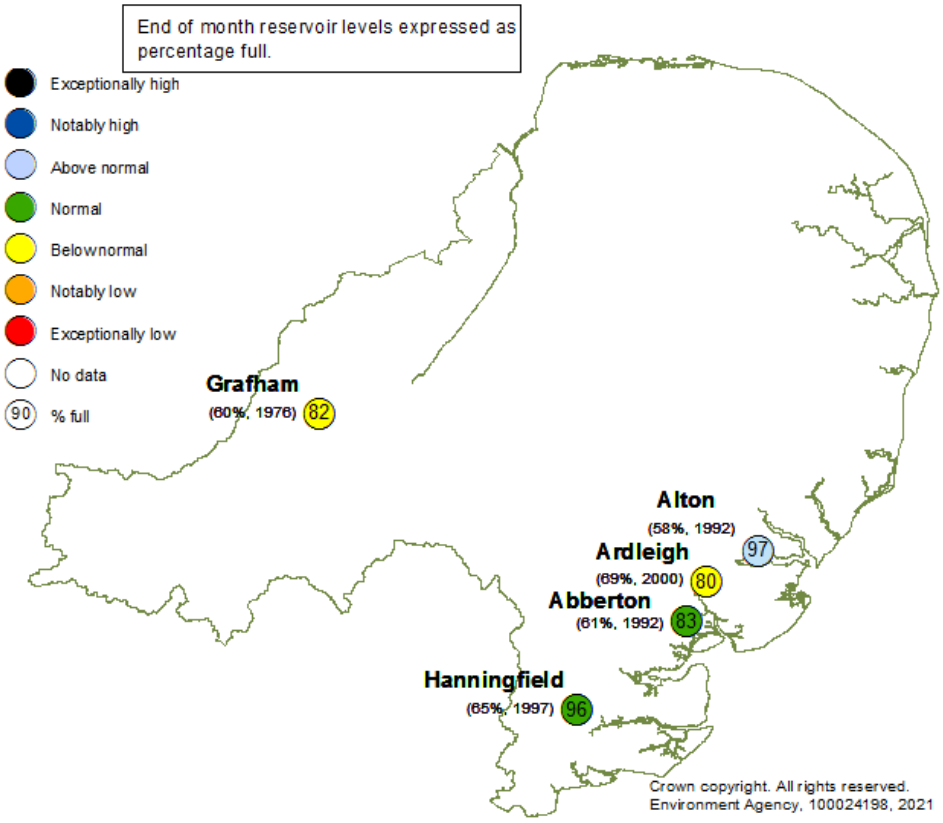


Smeetham Hall Cottages, Bulmer - ESSEX CHALK
Ranking derived from data for the period Jan-1964 to Dec-2017



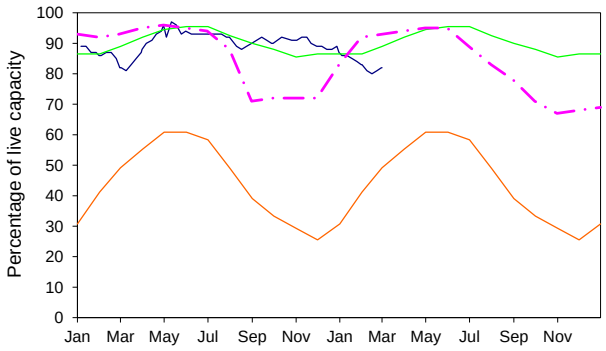


Reservoir Stocks February 2021

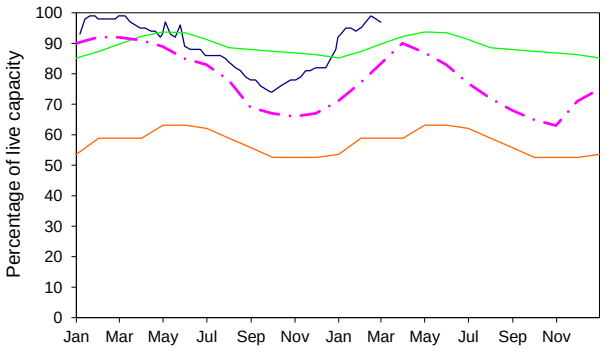


2020-2021 Normal Operating Curve Drought Alert Curve 1995-1996

Grafham

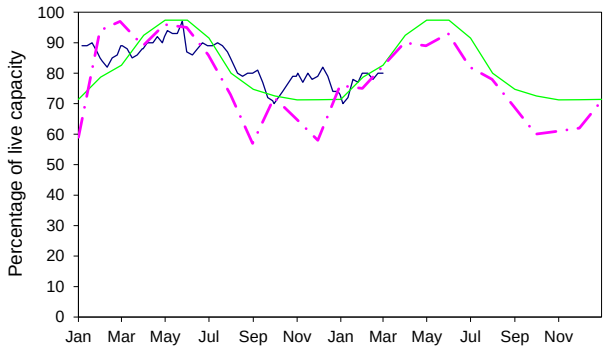


Alton

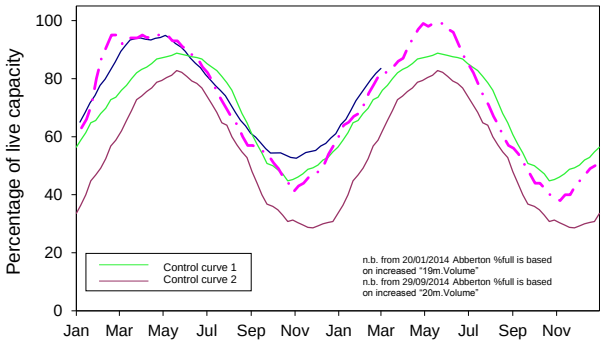


2020-2021 Normal Operating Curve Drought Alert Curve 1995-1996

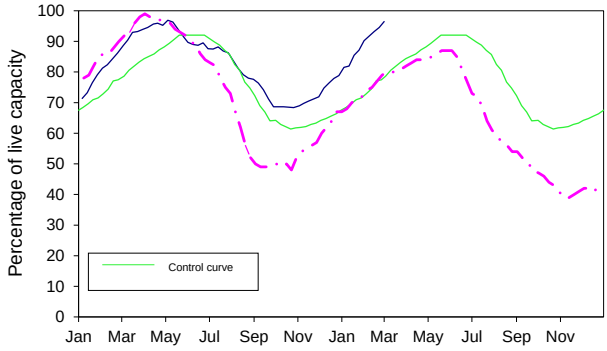
Ardleigh



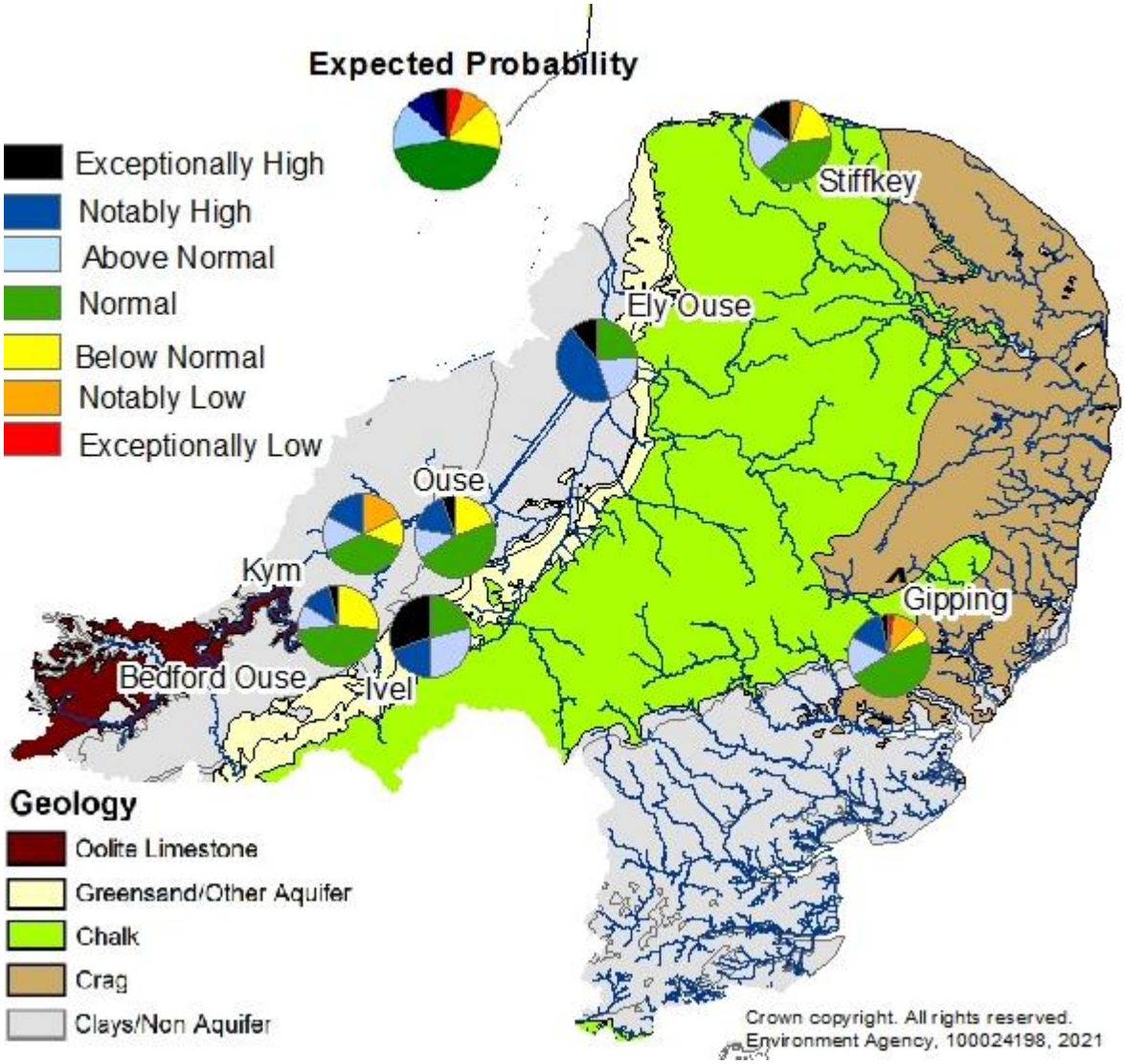
Abberton



Hanningfield



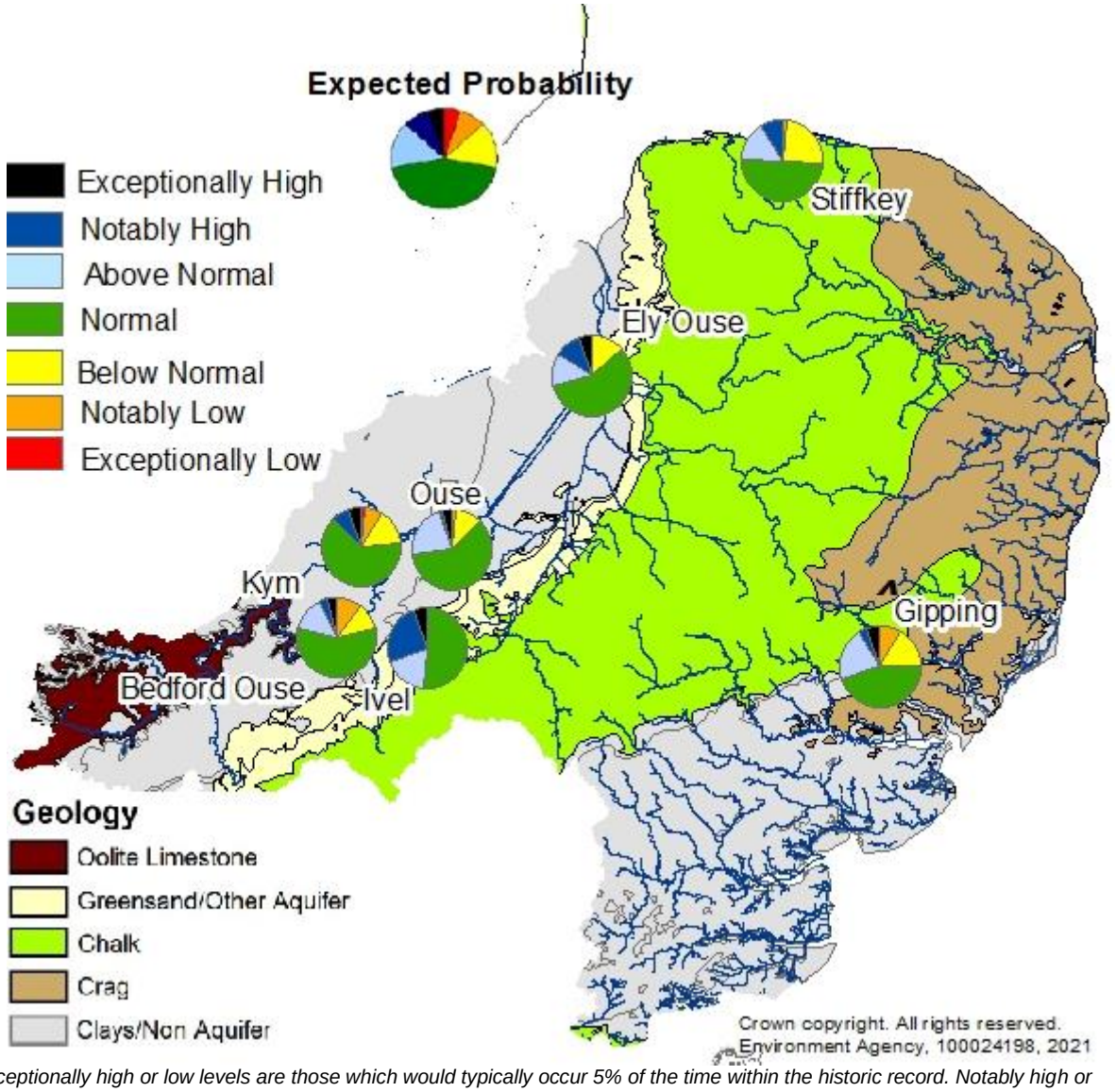
Forward Look – River Flows



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, 2021.

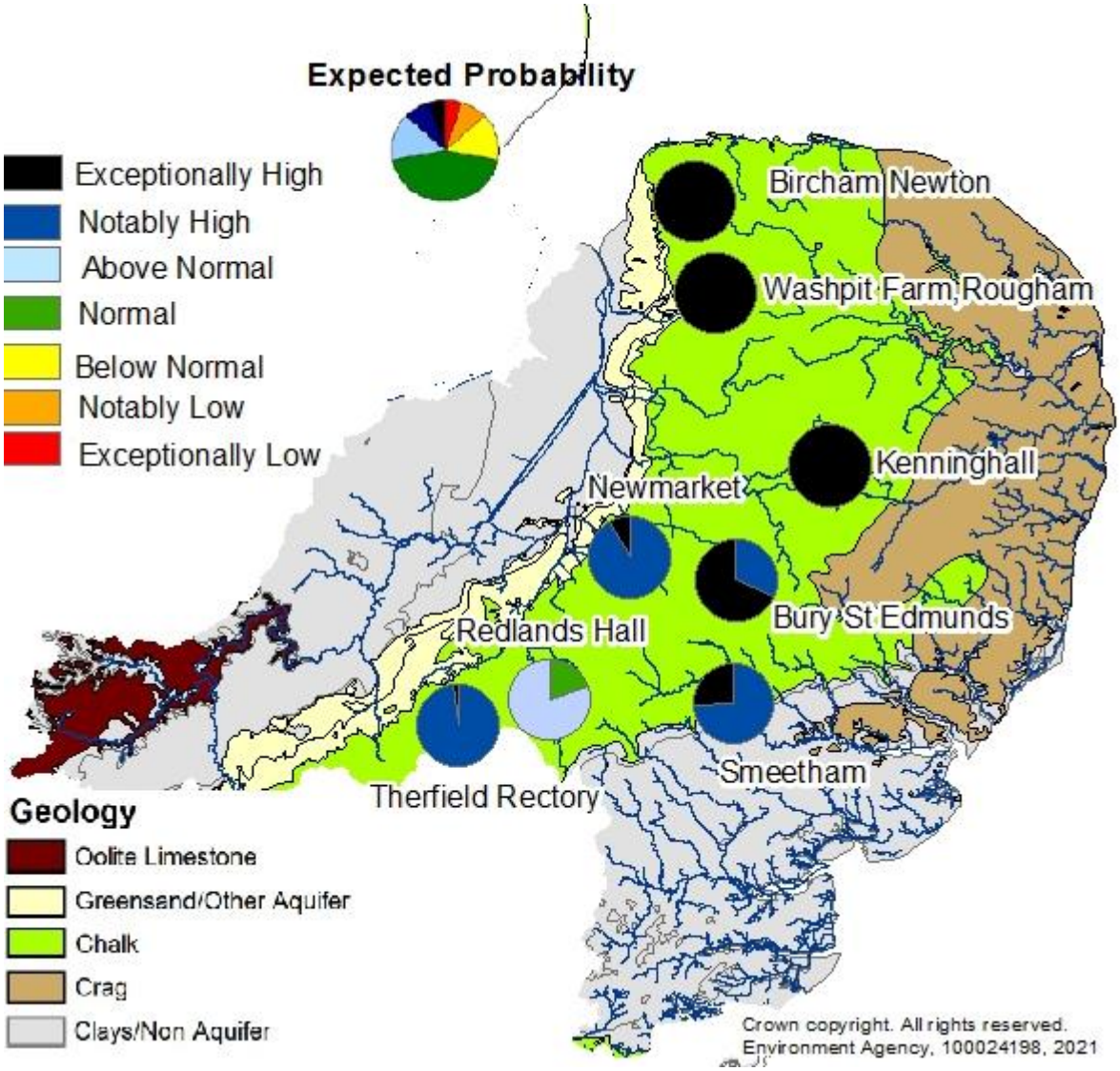
^ *"Naturalised" flows are projected for these sites'*



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.

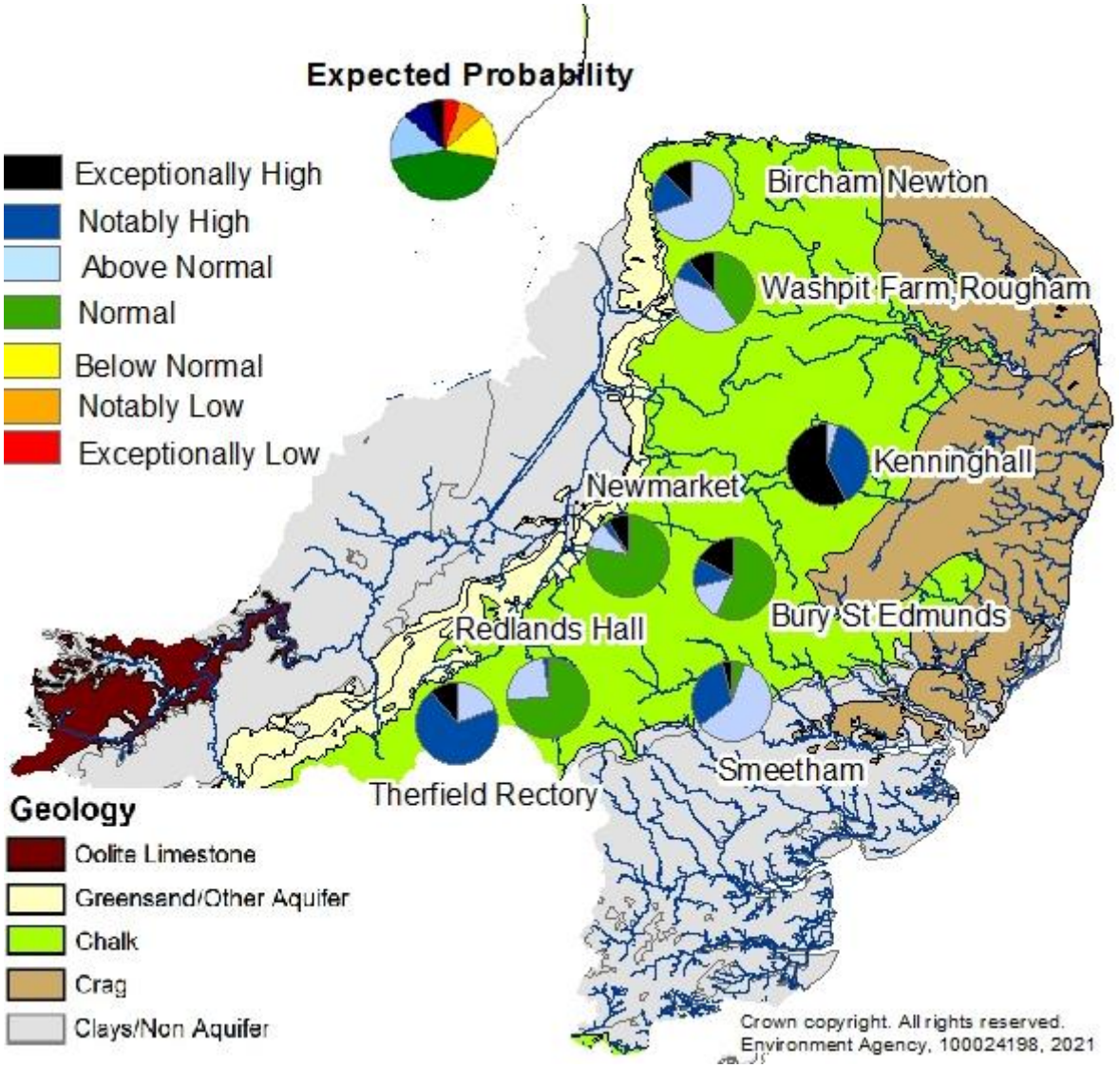
Probabilistic ensemble projections of river flows at key indicator sites in June 2021. Pie charts indicate probability, based on climatology, of the surface water flow at each site being e.g. exceptionally low for the time of year. (Source: Centre for Ecology and Hydrology, Environment Agency) Geological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



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, 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^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.
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.