Monthly water situation report

Yorkshire Area

Summary – May 2020

A warm and very dry May ensured another month of well below average rainfall totals. Declining low flow conditions were common throughout the Pennine fed catchments and more normal flow conditions within the chalk fed Hull catchment. Soils continued to dry out, groundwater levels were falling but remained within the normal range or were higher, and reservoir stocks continued to fall at a regular weekly rate.

Rainfall

May was another very dry month across Yorkshire. There was the odd day that received some welcome rain but they were few and far between as settled, high pressure conditions dominated for the majority of the month. There was 19 to 28 days during May that recorded no rainfall.

Using the Met Office Had-UK data set, catchment averaged monthly rainfall ranged between 10% and 33% of the long term average (LTA) and was classified in the notably low or exceptionally low category (see rainfall map below). The driest catchments were those in West and South Yorkshire. Yorkshire has now received two and three month cumulative rainfall totals classed as being exceptionally low. Also using the Met Office Had-UK data set shows it was the driest two-month period to end in May since 1891 in all catchments except the Ure catchment. The Ure catchment was the 2nd driest two-month period to end in May since 1891. And it was the driest three-month period to end in May since 1891 in the Ouse, Rye, Aire and Don catchments while being the 2nd driest three-month period to end in May since 1891 in the Swale, Nidd, Wharfe, Esk, Derwent, Calder and Hull catchments.

Soil Moisture Deficit (SMD)

At the end of April soils across Yorkshire were classified as dry apart from the Pennine ridge in the west and the upper Rother catchment in the south. The warm dry weather in May ensured the SMD continued to rise and by the end of the month saw all of Yorkshire being classed as very dry.

River Flows

At the beginning of the month, the majority of the Pennine fed rivers and the River Derwent further east had flows below what would normally be expected for the time of year. The general trend through May was of declining flow although there were very brief periods of minor fluctuations in response to the limited rainfall. By month end many of the catchments had daily mean flow classed as exceptionally low, with summer low flow conditions being measured at gauging stations within the Swale, Ure, Nidd, Ouse, Foss, Wharfe, Aire, Calder, Rother and Derwent catchments. The overall monthly mean flows in the majority of Pennine fed rivers and the River Derwent were in the exceptionally low or notably low range, between 22% and 52% of the LTA, with the River Went also below normal, at 68% of the LTA.

Declining flows also occurred within the groundwater fed River Hull catchment on the East Yorkshire Chalk. However, flows in the east of Yorkshire Area were, in general terms, within the normal flow range expected for the time of year. The exception being within the Market Weighton region as the Market Weighton Canal and River Foulness had flows that reached the below normal and notably low range respectively.

Groundwater Levels

Due to Covid-19, the boreholes have not been manually dipped so this report has been generated from telemetry data. For consistency, data has been taken from the same day of the month that each borehole was last visited.

<u>Magnesian Limestone</u>
No Data

Millstone Grit
No Data

Sherwood Sandstone
The groundwater levels at Great Ouseburn were exceptionally high in the previous couple of months due to the amount of rain received earlier in the year. Although still notably high, the levels decreased in May which was expected for the time of year. At Riccal Approach, the groundwater levels were normal for the time of year. However, the levels were decreasing at a faster rate from what is typically expected.

Corallian Limestone
The groundwater level at Sproxton decreased over the month and was at the bottom of the 'normal' range. At the East Ness site, the groundwater levels were exceptionally low.

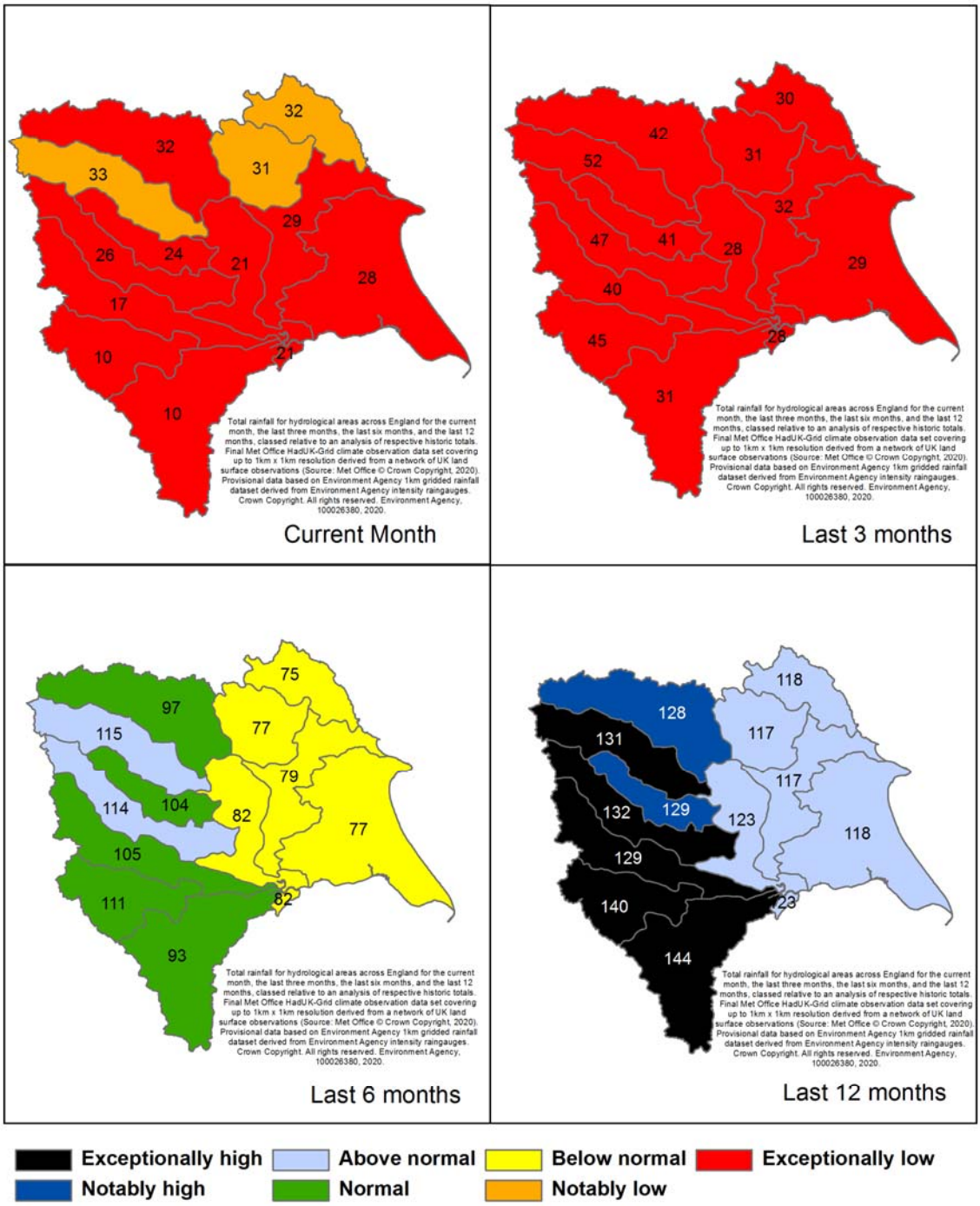
Chalk
The groundwater level in the northern area of the aquifer, as monitored at Wetwang, was normal for the time of year but was relatively responsive to the lack of rain in the previous couple of months and fell at a faster rate than is typically expected. At Dalton Estate in the south of the aquifer, the groundwater level had also decreased but not as quickly as compared to the north of the aquifer.

Reservoir Storage
The Yorkshire Supply reservoir stocks decreased during May at a regular 3% per week. By the end of the month overall reservoir stocks were approximately 15% below the LTA for the time of year.

Environmental Impact
37 abstraction licences had their Hands off Flow (HoF) in force and were unable to abstract water. By the end of May, 77 additional advance warning notifications had been sent although these licences were still able to continue abstracting.

Author: Yorkshire Hydrology

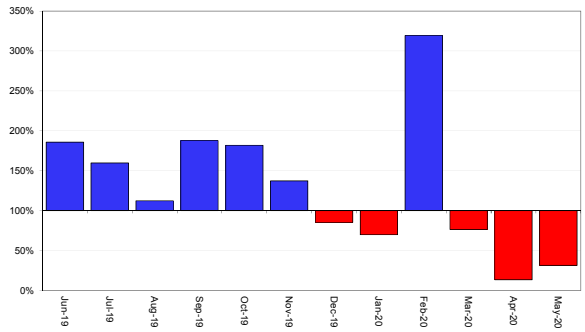
Rainfall



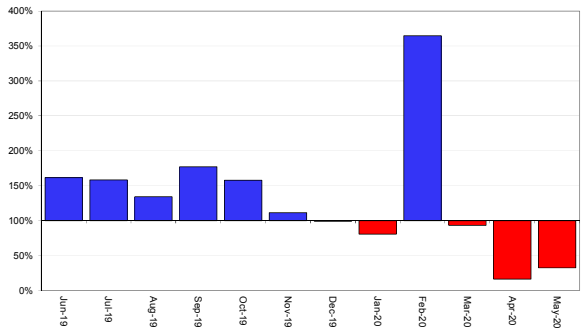
Above average rainfall

Below average rainfall

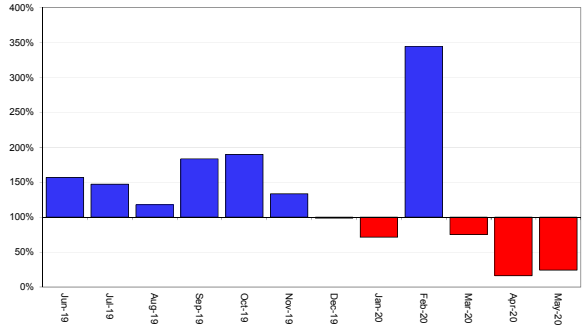
1-Month Period for Swale (NE)



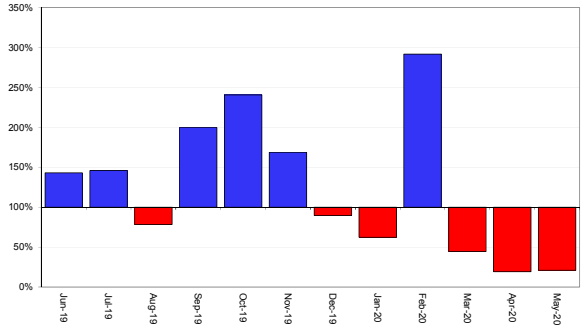
1-Month Period for Ure



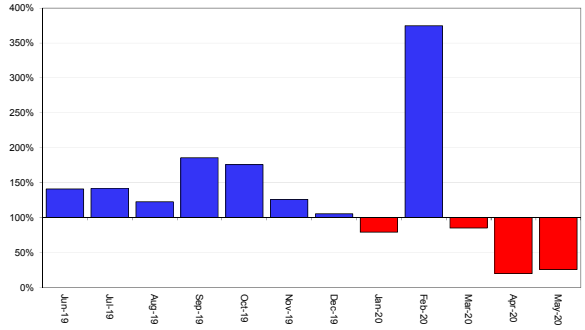
1-Month Period for Nidd



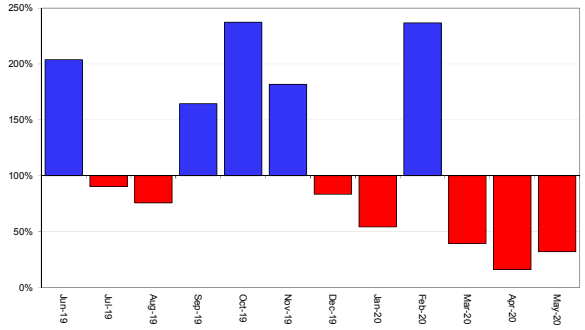
1-Month Period for Ouse



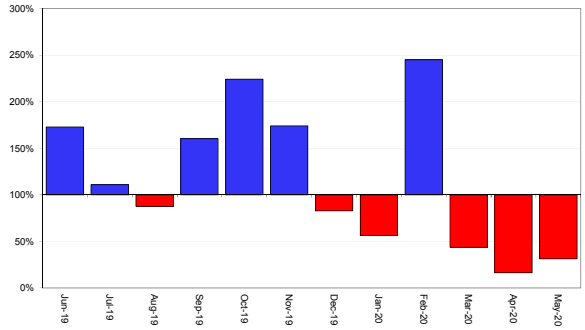
1-Month Period for Wharfe



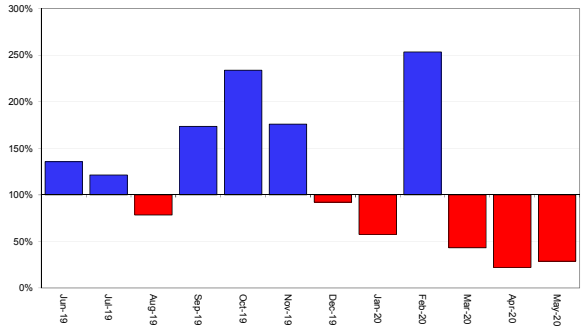
1-Month Period for Dales North Sea Tribs



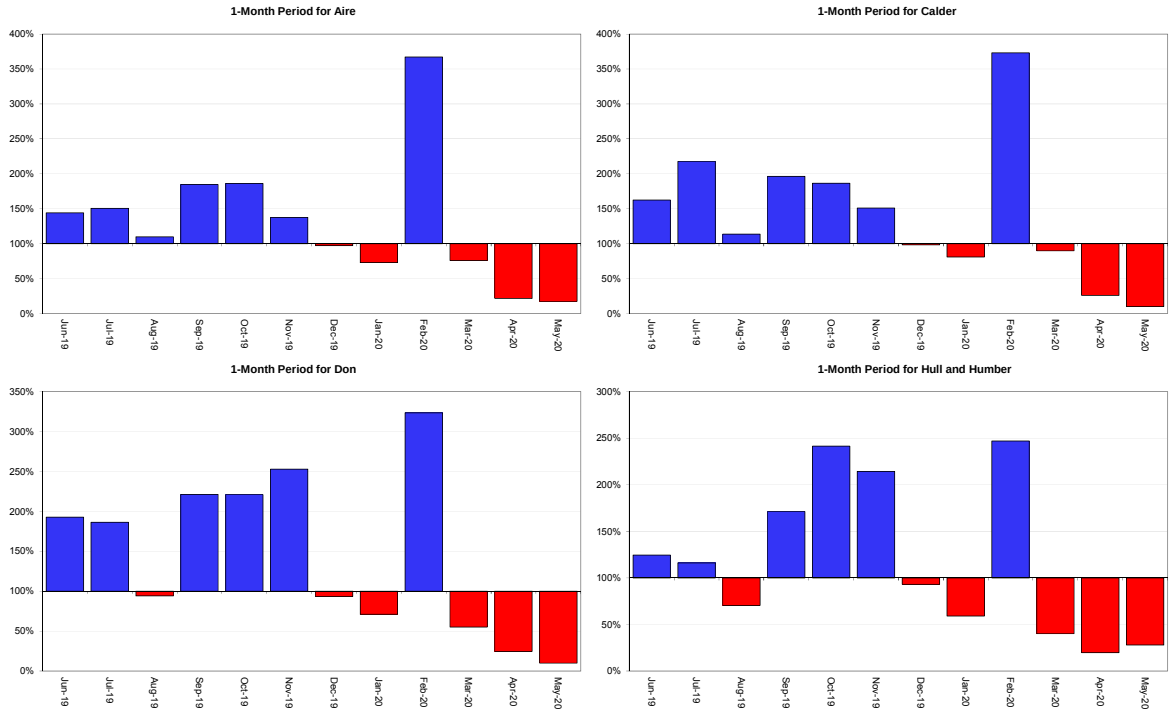
1-Month Period for Rye



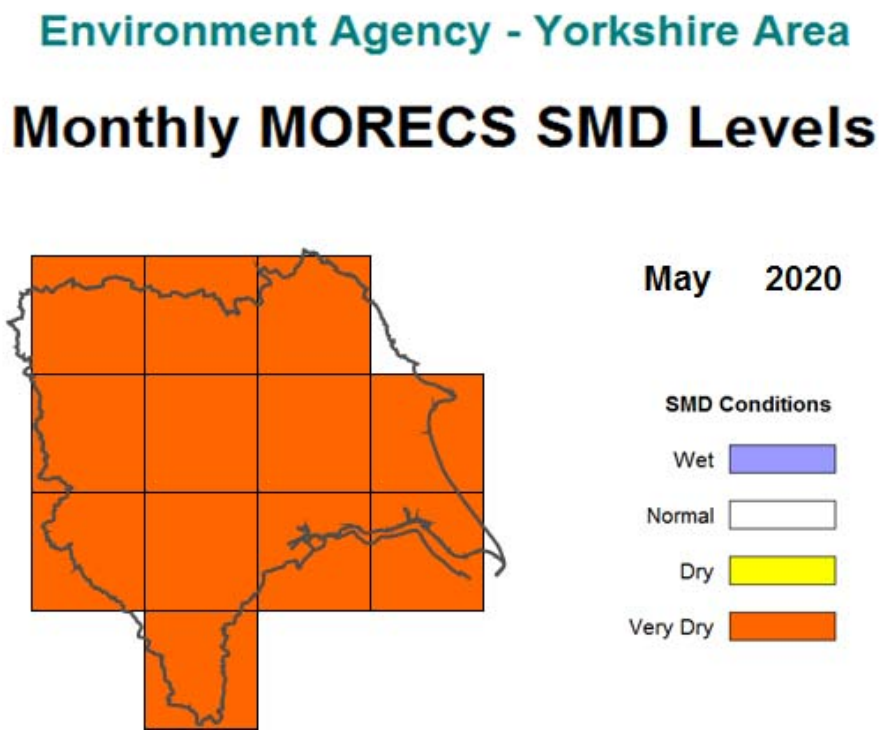
1-Month Period for Derwent (NE)



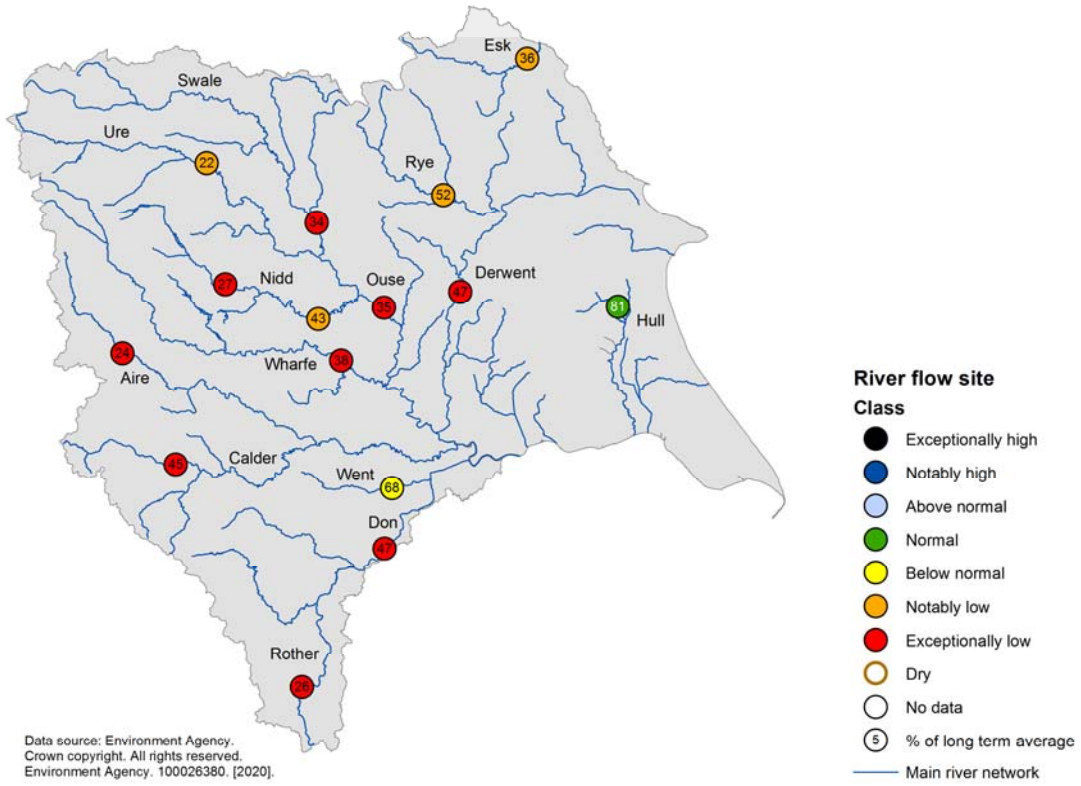
Above average rainfall Below average rainfall

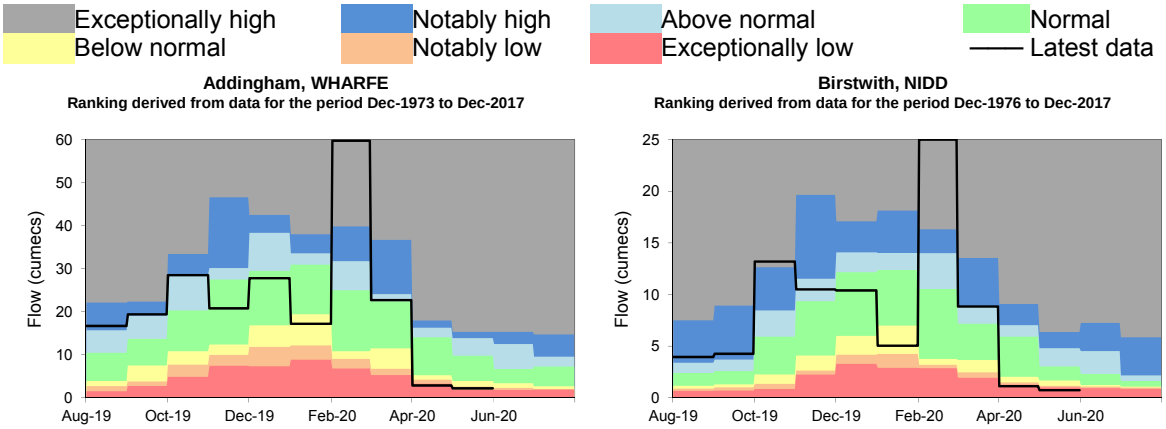


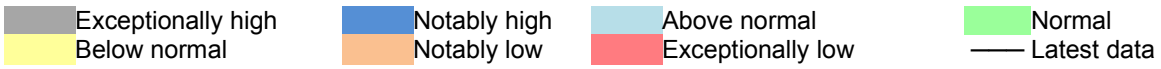
Soil Moisture Deficit



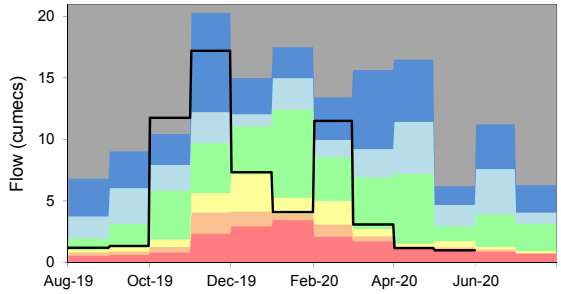
River Flow



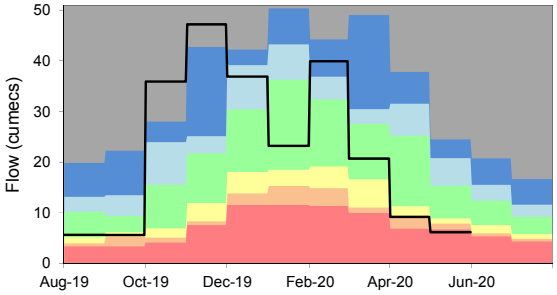




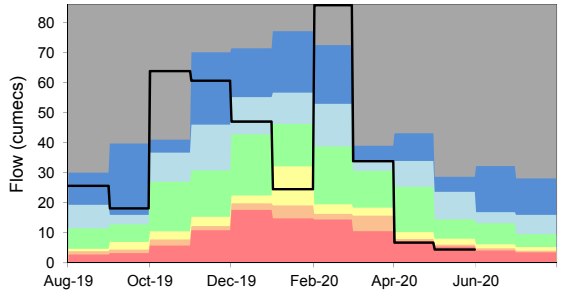
Briggswath, ESK
Ranking derived from data for the period Jan-1993 to Dec-2017



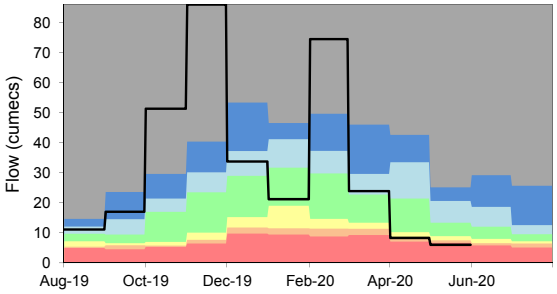
Buttercrambe, DERWENT
Ranking derived from data for the period Sep-1973 to Dec-2017



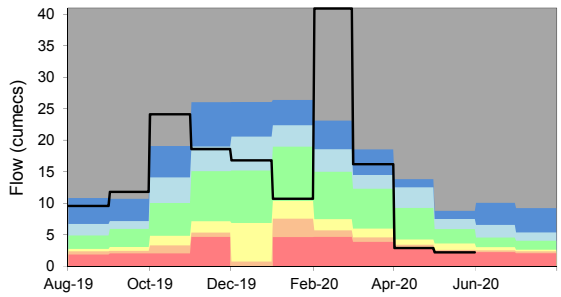
Crakehill Topcliffe, SWALE
Ranking derived from data for the period Jun-1980 to Dec-2017



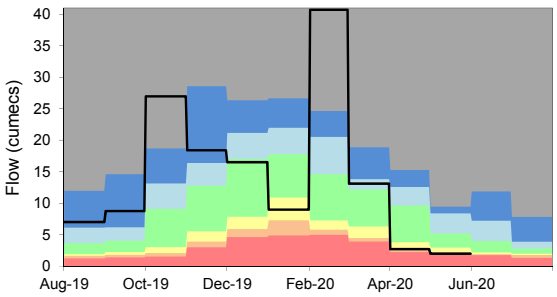
Doncaster, DON
Ranking derived from data for the period Jul-1959 to Dec-2017



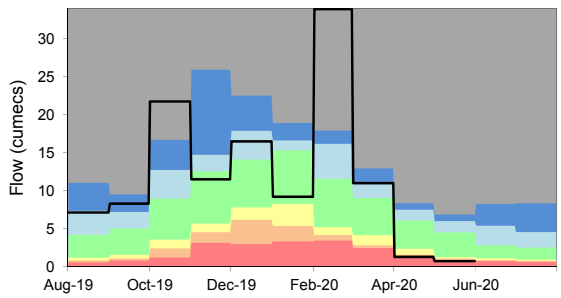
Elland, CALDER
Ranking derived from data for the period Jul-1971 to Dec-2017



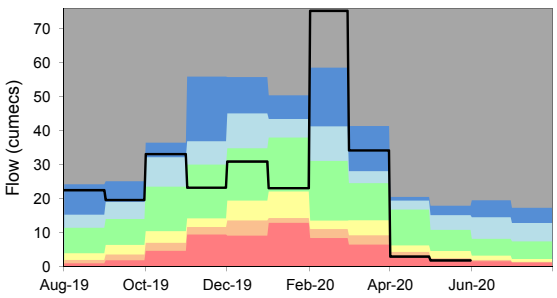
Hunsingore, NIDD
Ranking derived from data for the period Oct-1968 to Dec-2017

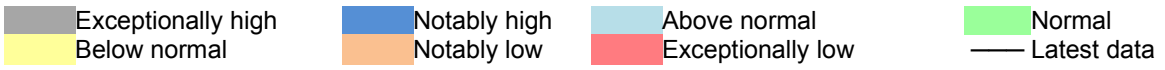


Kildwick, AIRE
Ranking derived from data for the period Aug-1971 to Dec-2017

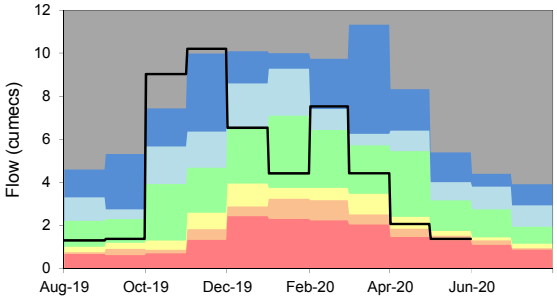


Kilgram Bridge, URE
Ranking derived from data for the period Aug-1971 to Dec-2017

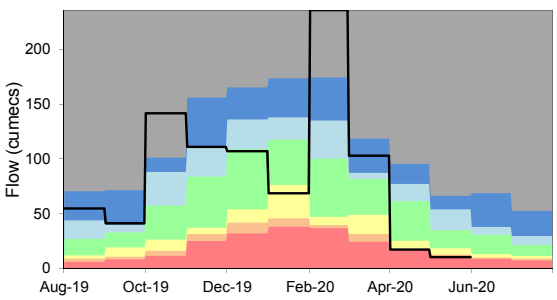




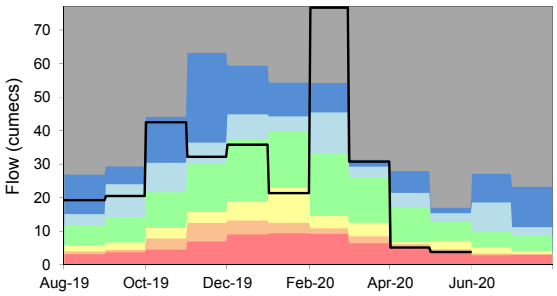
Ness, RYE
Ranking derived from data for the period Sep-1974 to Dec-2017



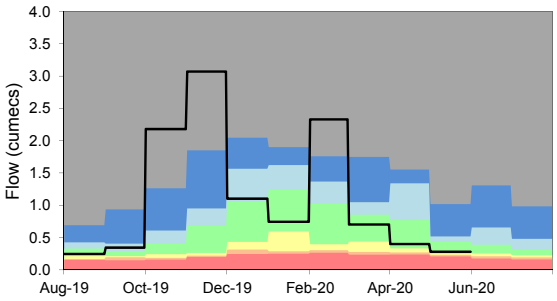
Skelton, OUSE
Ranking derived from data for the period Sep-1969 to Dec-2017



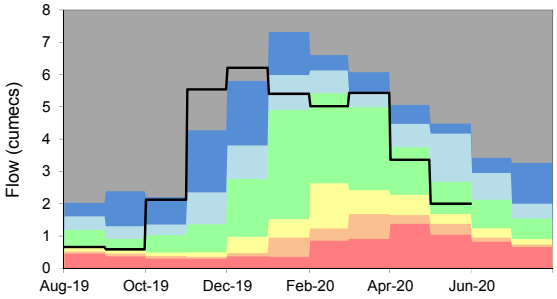
Tadcaster, WHARFE
Ranking derived from data for the period Jul-1991 to Dec-2017



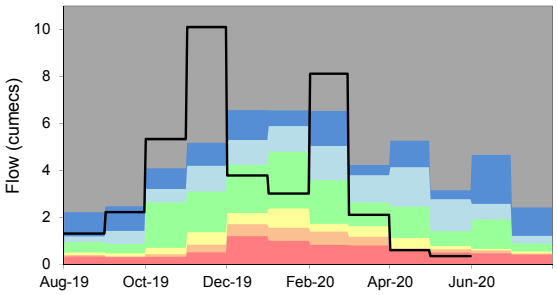
Walden Stubbs, WENT
Ranking derived from data for the period Oct-1979 to Dec-2017



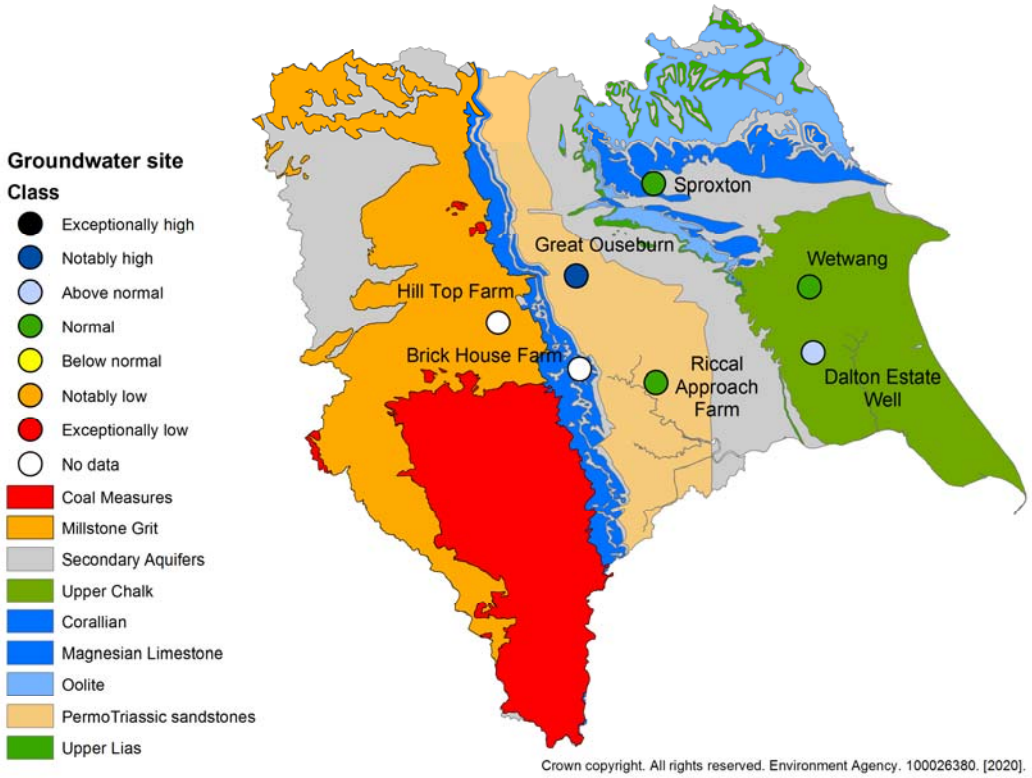
Wansford Snakeholm Lock - West Beck, WEST BECK
Ranking derived from data for the period Nov-1988 to Dec-2017

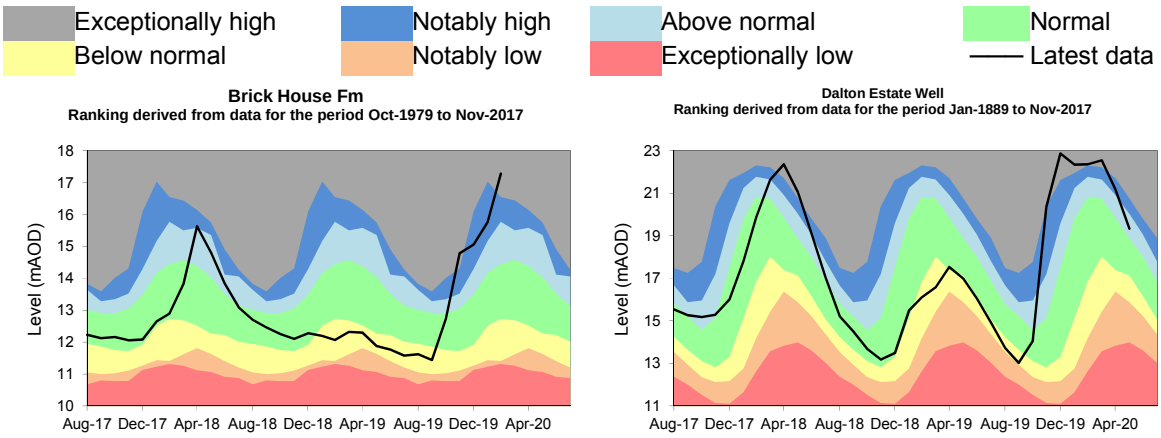


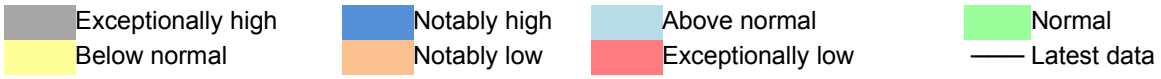
Whittington, ROTHER
Ranking derived from data for the period Nov-1979 to Dec-2017



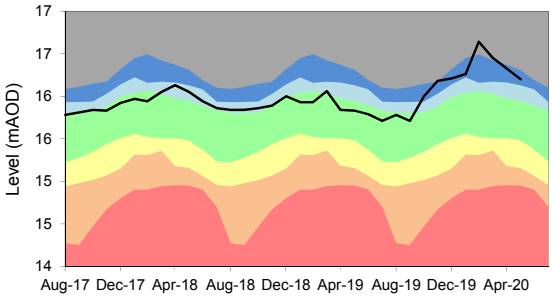
Groundwater Levels



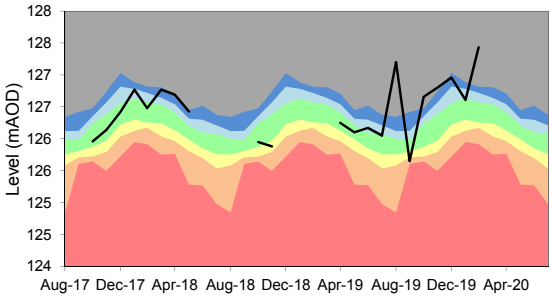




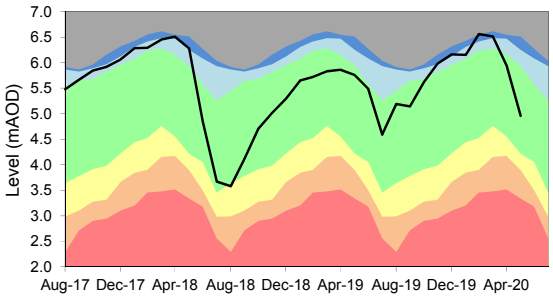
Great Ouseburn
Ranking derived from data for the period Jan-1976 to Nov-2017



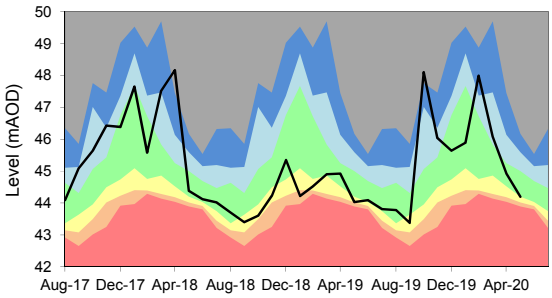
Hill Top Fm
Ranking derived from data for the period Oct-1973 to Nov-2017



Riccall Approach Farm
Ranking derived from data for the period Feb-1977 to Nov-2017



Sproxton
Ranking derived from data for the period May-1975 to Nov-2017



Wetwang
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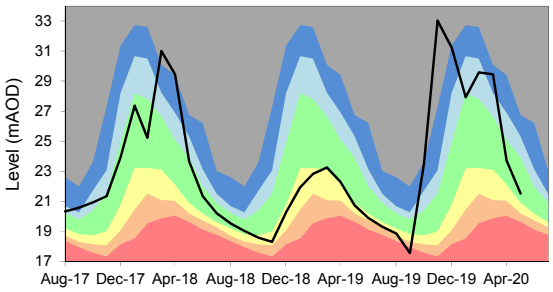
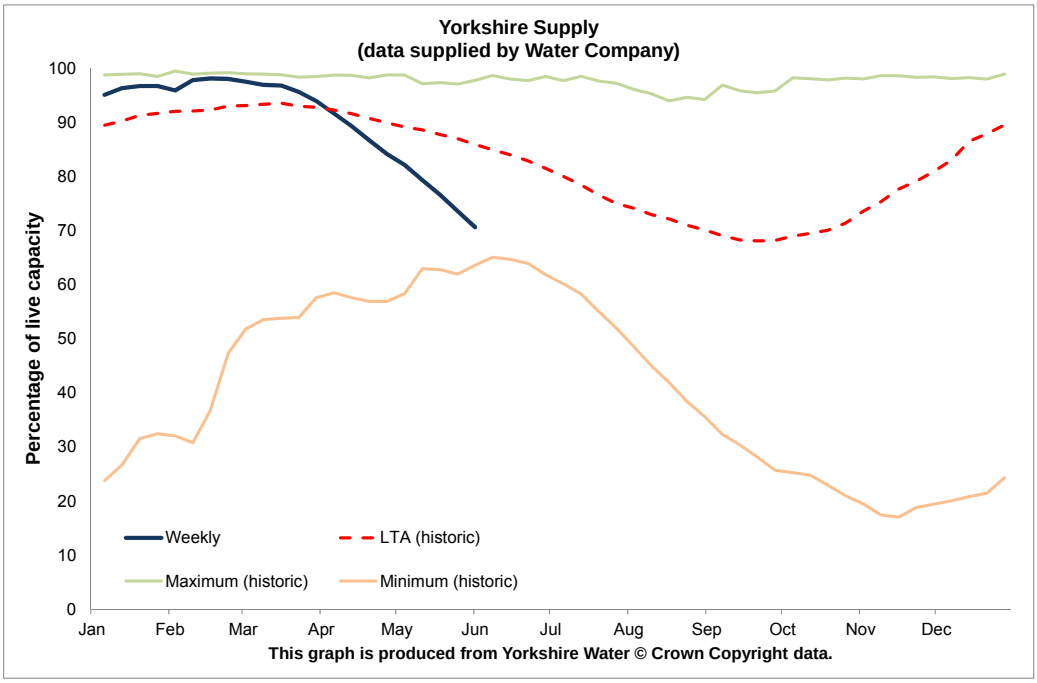


Reservoir Stocks – Data from Water Company



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.
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