Monthly water situation report

Yorkshire Area

Summary – July 2020

A wet month with above average monthly rainfall in the west and more average monthly rainfall in the east. High flows dominated early July in the Pennine catchments before slowly declining and more normal conditions were within the chalk fed Hull catchment. The majority of central, eastern and southern Yorkshire soils became very dry and groundwater levels remained within the normal range or were higher. Overall reservoir stocks were above the long term average level.

Rainfall

July was another month of unsettled, wet weather. A very wet period occurred at the beginning of the month, between the 1st to the 8th July. Localised heavy rainfall occurred on the first day of the month, then the western catchments adjacent to the Pennine ridge received heavy rainfall on the 3rd and 5th, followed by widespread heavy rain on the 8th July. This eight day period accounted for 37% to 76% of the recorded monthly totals and recorded nearly the long term average (LTA) or above LTA totals in the upper Aire, Calder, Don, Nidd, Wharfe and Hull catchments. The next two weeks saw more stable conditions return, although were not rain free, before another period of particularly wet weather during the 22nd to the 28th July. The rainfall over 11 days in the month accounted for 56% to 91% of the monthly totals.

Using the Met Office Had-UK data set, catchment averaged monthly rainfall ranged from over 150% in the west to around average in the north-east and were classified in the notably high or normal category (see rainfall map below). The wettest catchment was the Calder catchment in West Yorkshire which also recorded nearly twice the LTA during the last two consecutive months. Also using the Met Office Had-UK data set shows it was the 6th wettest two-month period to end in July since 1891 in the Wharfe and Calder catchments.

Soil Moisture Deficit (SMD)

At the end of June, central, eastern and southern Yorkshire had soils that were classed as being dry or very dry while the western Pennine ridge and north-east were in the normal range. The first half of July saw decreasing SMD although the only real change was the western Pennine ridge turned wet. In the second half of July the pattern became more variable. All of Yorkshire experienced an increase of 10mm to 18mm during the third week, with the final week showing a decrease in the western Pennine ridge while the rest of the area experienced further increases ranging from 0.5mm to 12mm. By the month end, the western Pennine ridge had soils classed as wet while the vast majority of the remaining area was classed as being very dry.

River Flows

The monthly mean flows in the Pennine fed rivers were in the above normal or notably high range, generally between 110% and 250% of the LTA. The exception was on the Rother in the far south of the area with a monthly mean of only 61% of the LTA and classed as being below normal.

The very wet start to the month ensured that flows in the Pennine fed catchments, apart from the Don and Rother catchments, rose significantly and remained in the notably high or exceptionally high range for over a week. The Don and Rother rivers did also respond to the rainfall but only recorded notably high or exceptionally high flows for a couple of days at the end of the first week. Once the weather became more stable, the flows declined slowly although did respond when any rain fell, and generally remained within the normal range expected for the time of year. The Rother on the other hand declined back into below normal or lower flow. The wetter conditions towards the end of the month led to further high flow peaks except within the Don and Rother catchments which remained relatively dry in comparison to the rest of Yorkshire. Flows at the end of the month on the Rother were reaching exceptionally low while the rest of the Pennine fed rivers were within the normal range.

On the River Derwent and Chalk-fed West Beck in the River Hull catchment, flows generally declined through the month. Some minor response occurred to any significant rainfall but the rivers started the month with flows in the normal range and ended to the month with slightly lower flows still in the normal range. The main exceptions were on the lower Derwent and on the River Foulness. The majority of the month in the lower Derwent had flow in the below normal, or lower, range ending July in the notably low range. The River Foulness responded in a similar way to the Pennine fed catchments, having high flows occurring during the early part of the month and then steadily declined into the normal flow range by month end. Monthly mean flows were 56% of the LTA on the lower Derwent and 69% of LTA on West Beck.

Groundwater Levels

There is no July dip reading for Great Ouseburn and Hill Top Farm. Great Ouseburn has telemetry installed so the telemetry data was taken for this borehole but there is no data for Hill Top Farm.

Magnesian Limestone

The groundwater levels were extremely high in February following a wet winter and had dropped for the June and July readings but the groundwater levels remained notably high for the time of year.

Millstone Grit

No data available.

Sherwood Sandstone

The groundwater levels at Great Ouseburn had only slightly decreased since the winter period and were exceptionally high for the time year. At Riccall Approach, the groundwater levels rapidly decreased during the dry period from March to May but had rebounded slightly during June. In July, the groundwater levels slightly decreased at Riccall Approach and were normal for the time of year.

Corallian Limestone

The groundwater levels at Sproxton rapidly decreased between March and May but the rate of decrease slowed in June, and in July the groundwater levels did not change. The groundwater levels were within the normal range at Sproxton, whereas at East Ness the groundwater levels were exceptionally low.

Chalk

The groundwater levels in the chalk were normal for the time of year. The north of the aquifer, as monitored at Wetwang, was at the lower end of the normal band whereas in the south of the aquifer, as monitored at Dalton Estate, the groundwater levels were higher in the normal band. This is because the north of the aquifer was more responsive to the lack of rain during the spring period and started dropping earlier than the groundwater levels in the south.

Reservoir Storage

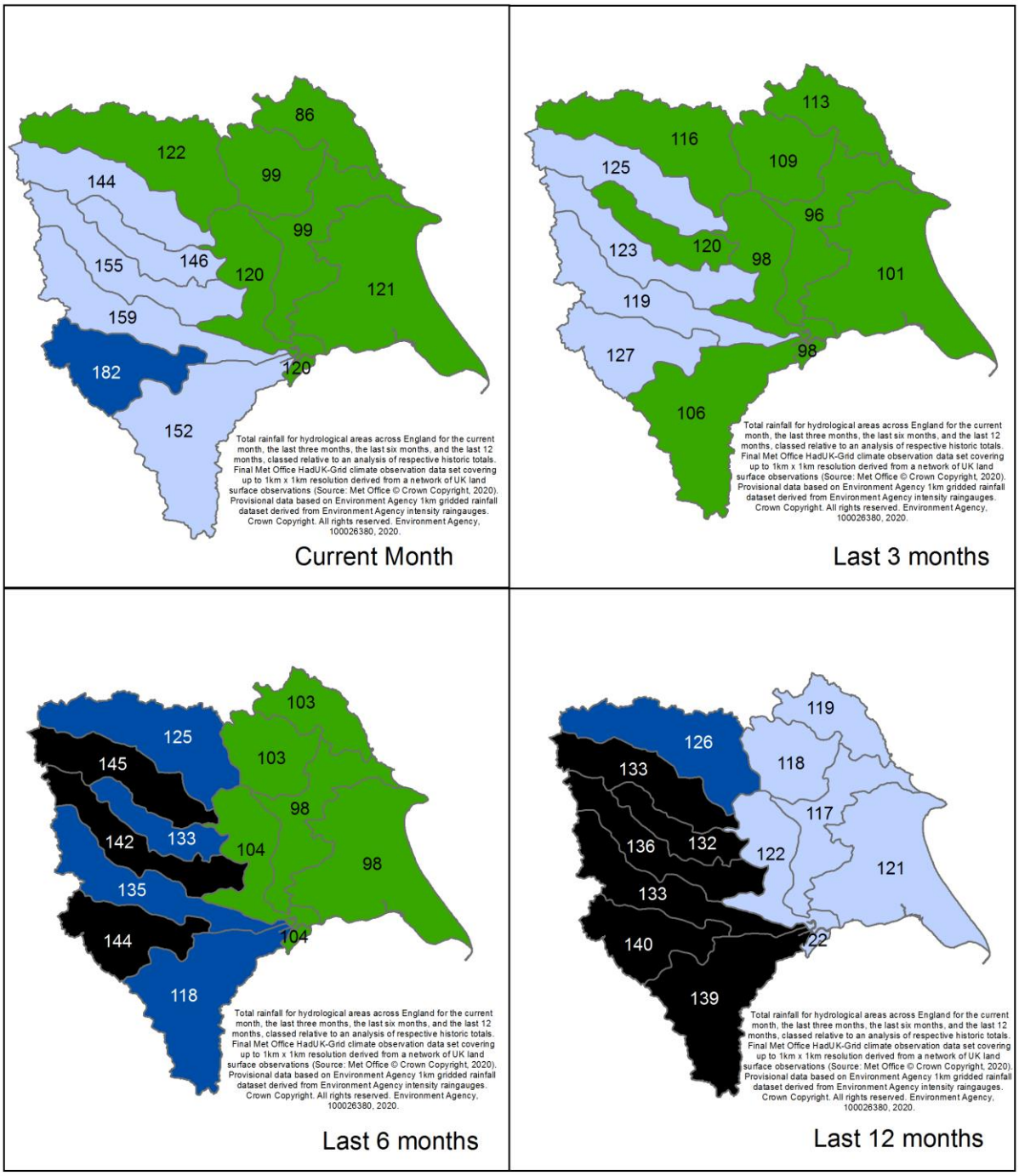
During the first two weeks of July the overall Yorkshire Supply reservoir stocks increased significantly in response to the high rainfall totals, and rose above the LTA for the first time since the end of March. Once the weather stabilised, reservoir levels declined steadily but more gradually than that seen in April and May. By the end of the month overall reservoir stocks were approximately 9% above the LTA for the time of year.

Environmental Impact

July saw a total of 44 abstraction licences that had their Hands off Flow (HoF) in force and were unable to abstract water. The great majority of these being within the Derwent and Swale catchments. By the end of the month, 86 additional advance warning notifications had been sent although these licences were still able to continue abstracting.

Author: Yorkshire Hydrology

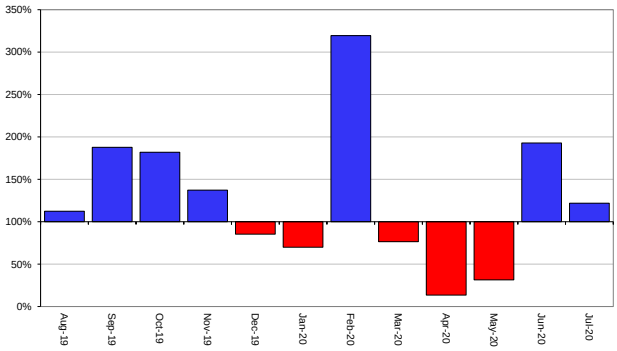
Rainfall



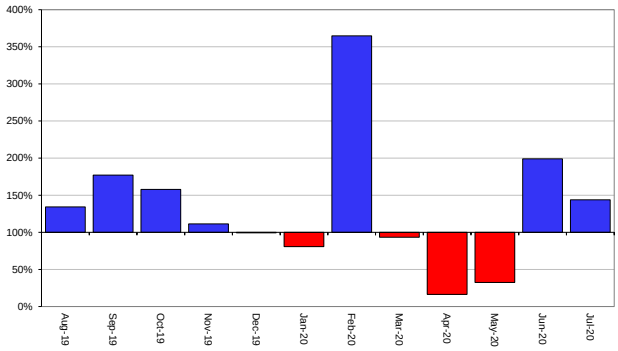
Above average rainfall

Below average rainfall

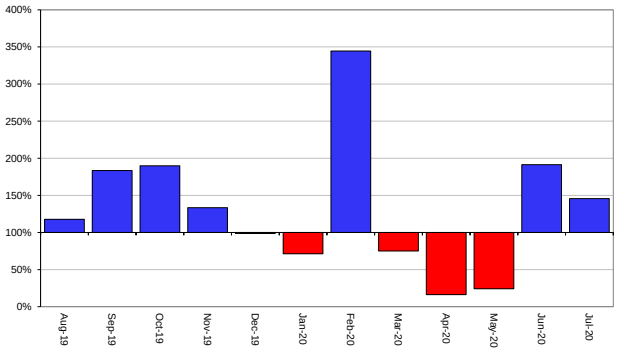
1-Month Period for Swale (NE)



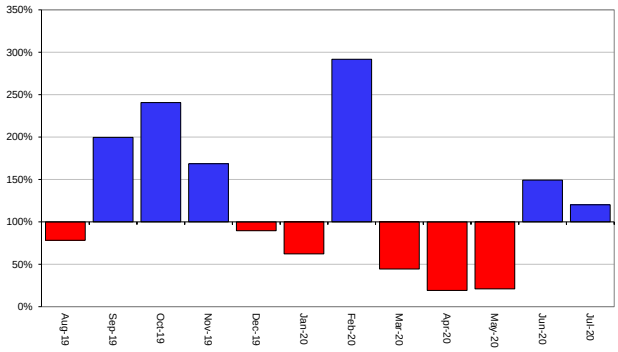
1-Month Period for Ure



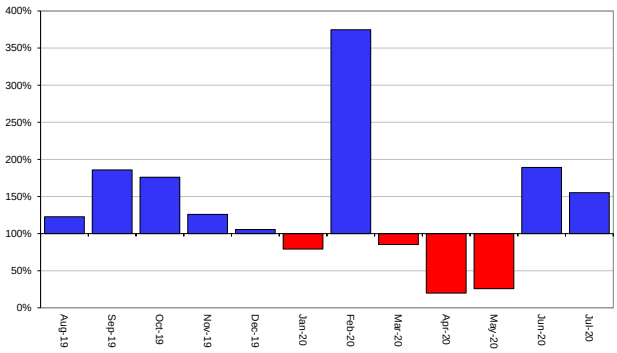
1-Month Period for Nidd



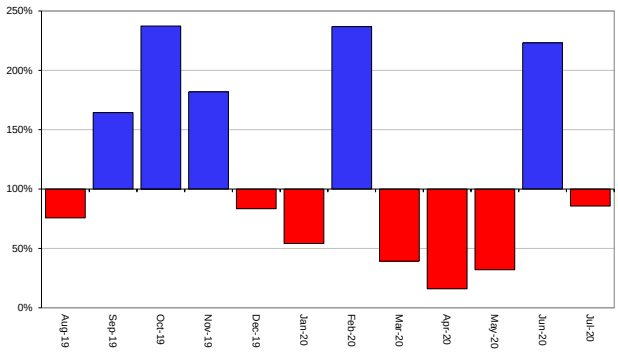
1-Month Period for Ouse



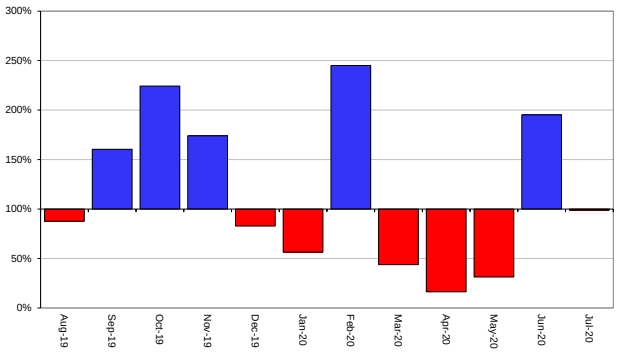
1-Month Period for Wharfe



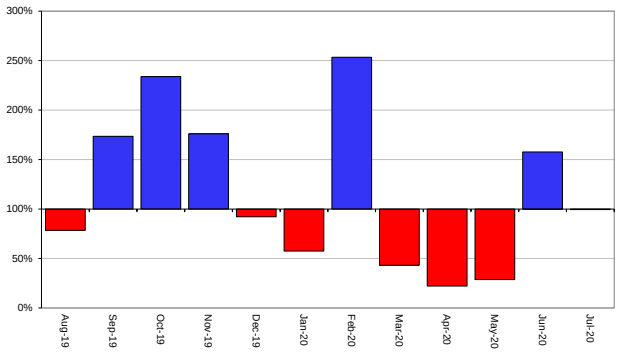
1-Month Period for Dales North Sea Tribs



1-Month Period for Rye

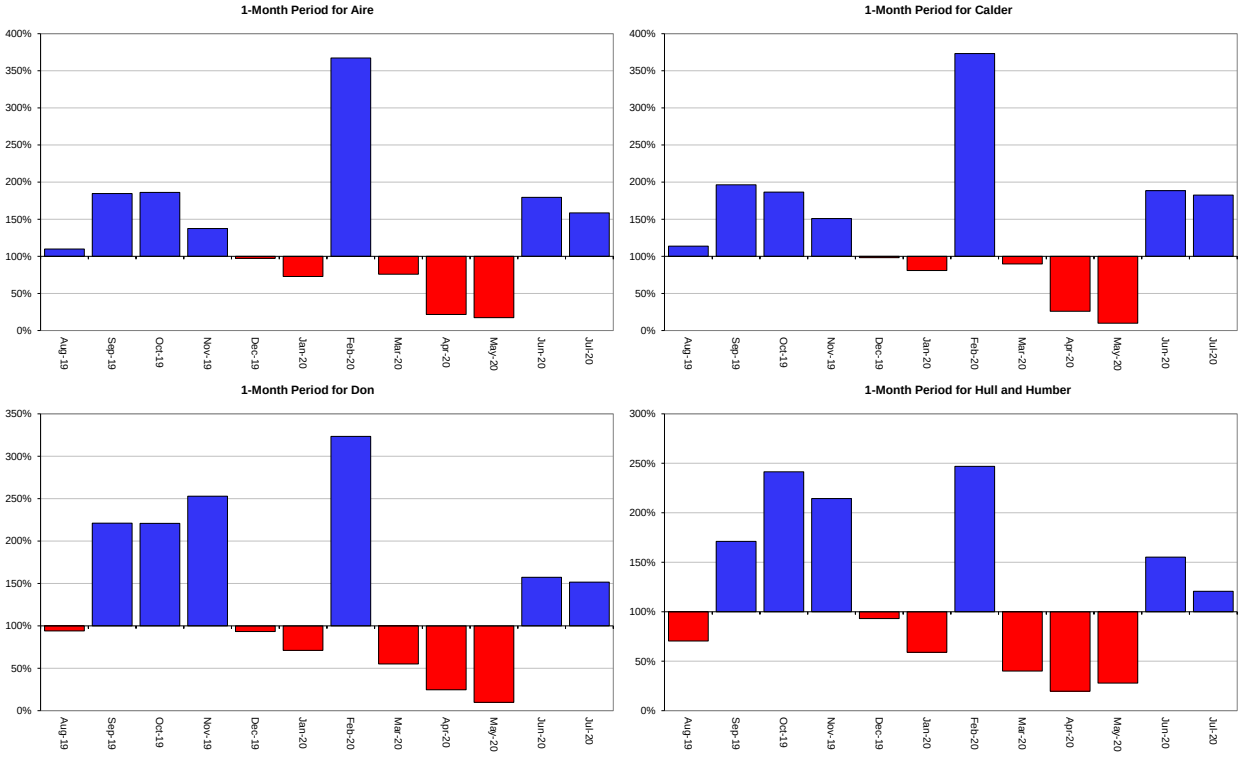


1-Month Period for Derwent (NE)

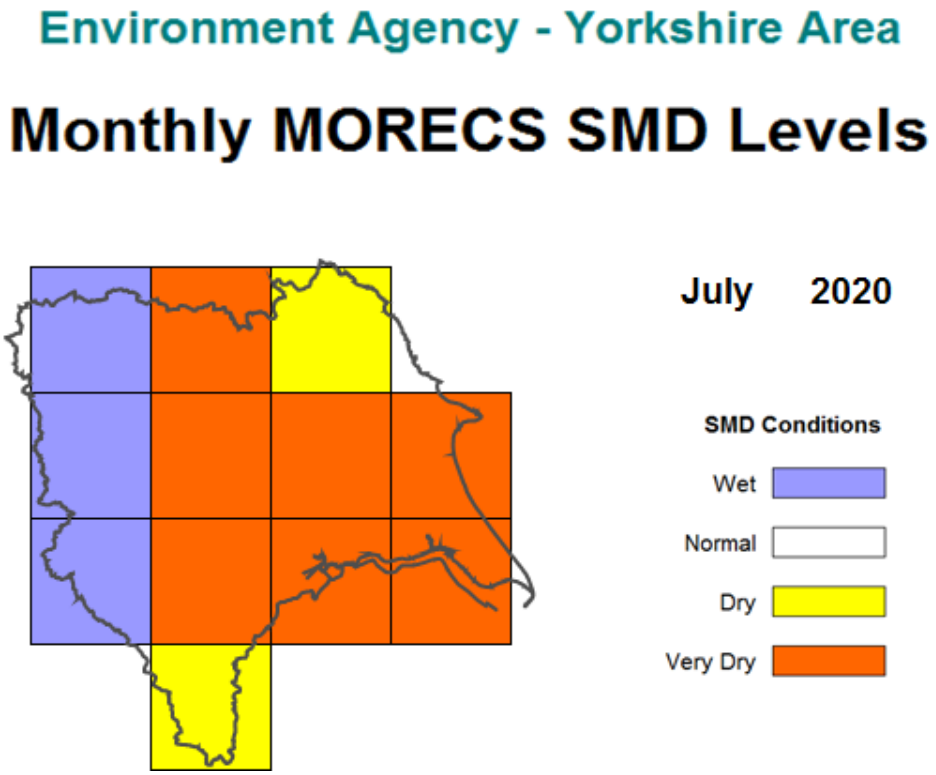


Above average rainfall

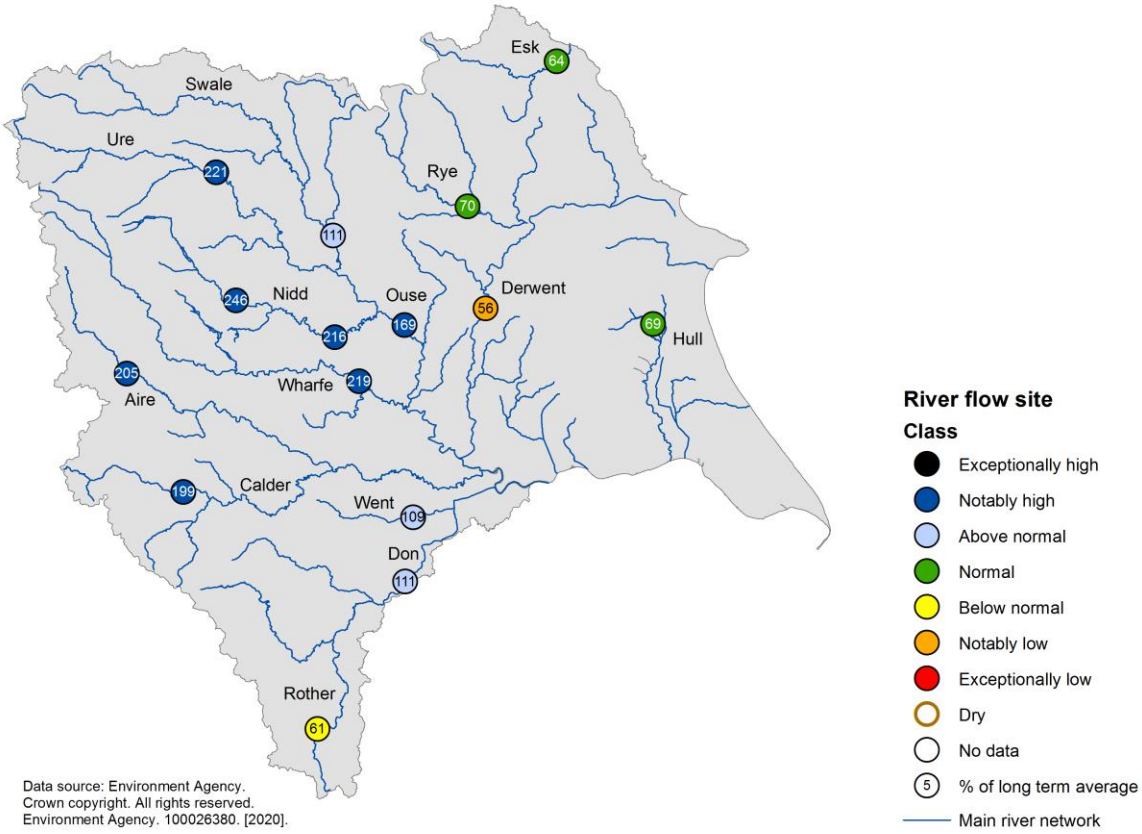
Below average rainfall

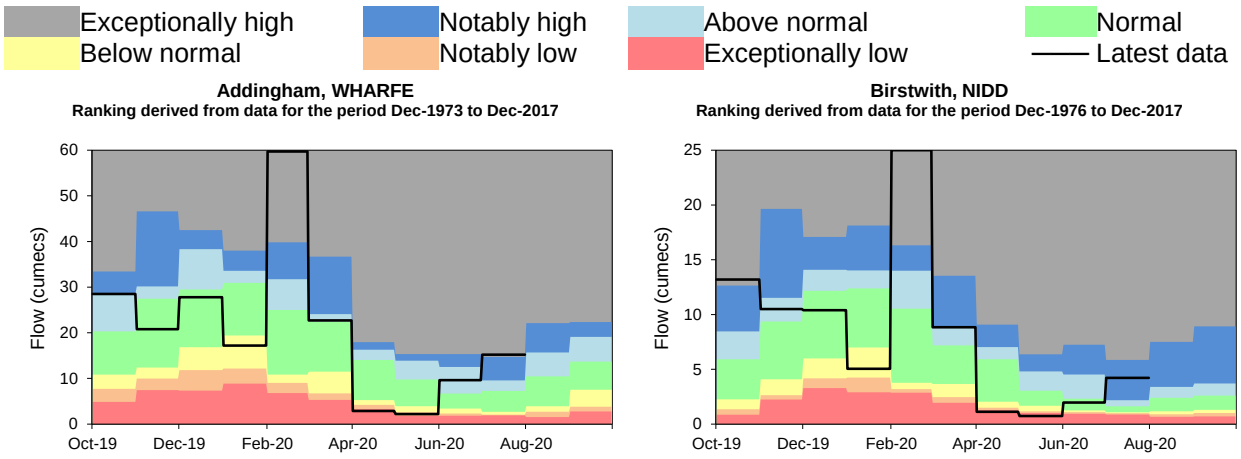


Soil Moisture Deficit



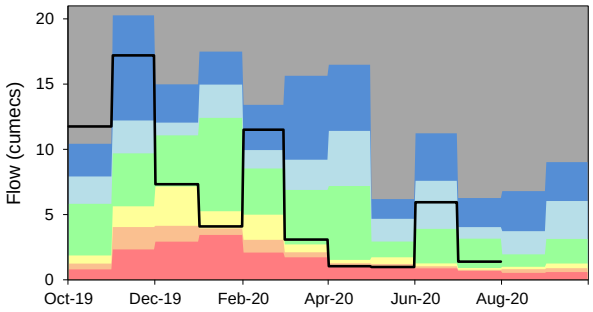
River Flow



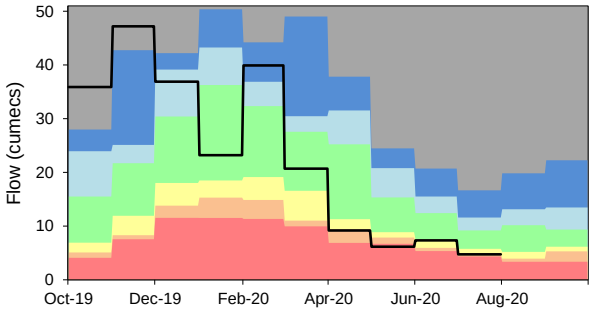


Exceptionally high | Notably high | Above normal | Normal
Below normal | Notably low | Exceptionally low | Latest data

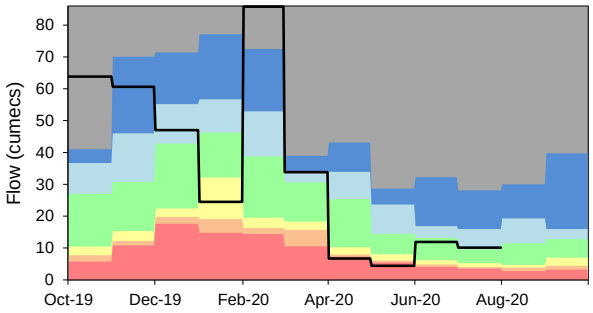
Briggswath, ESK
Ranking derived from data for the period Jan-1993 to Dec-2017



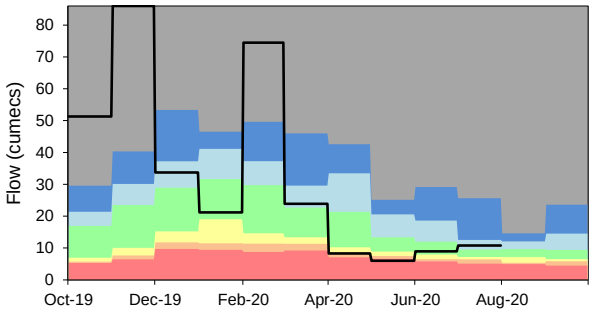
Buttercrambe, DERWENT
Ranking derived from data for the period Sep-1973 to Dec-2017



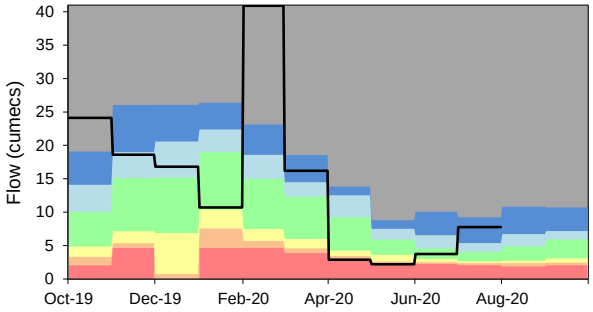
Crakehill Topcliffe, SWALE
Ranking derived from data for the period Jun-1980 to Dec-2017



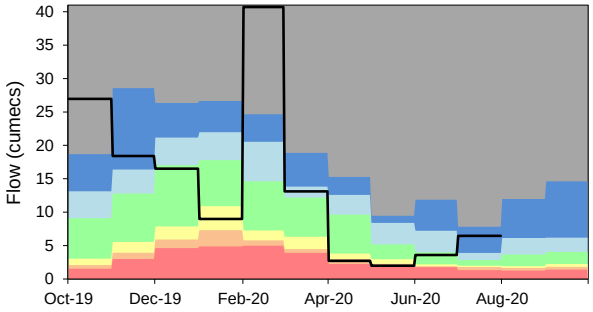
Doncaster, DON
Ranking derived from data for the period Jul-1959 to Dec-2017



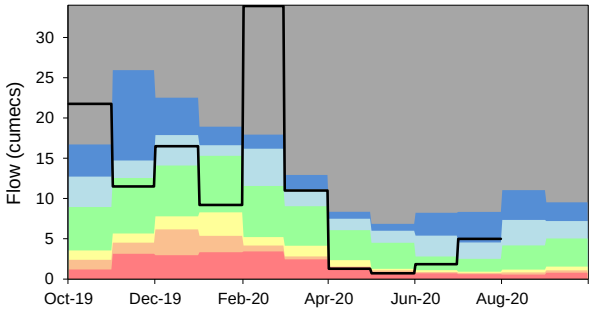
Elland, CALDER
Ranking derived from data for the period Jul-1971 to Dec-2017



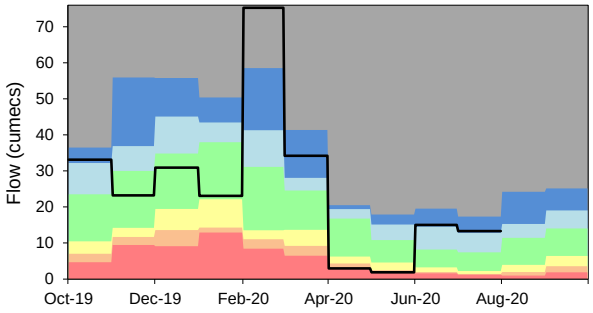
Hunsingore, NIDD
Ranking derived from data for the period Oct-1968 to Dec-2017

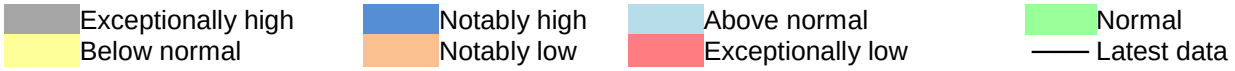


Kildwick, AIRE
Ranking derived from data for the period Aug-1971 to Dec-2017

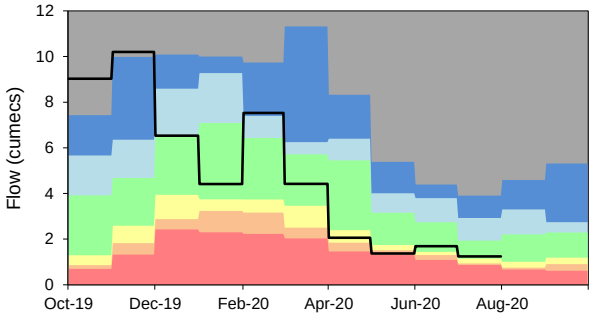


Kilgram Bridge, URE
Ranking derived from data for the period Aug-1971 to Dec-2017

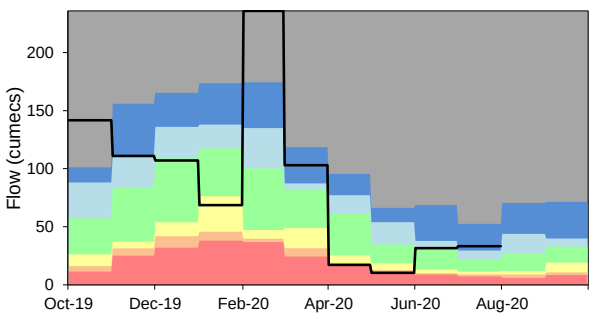




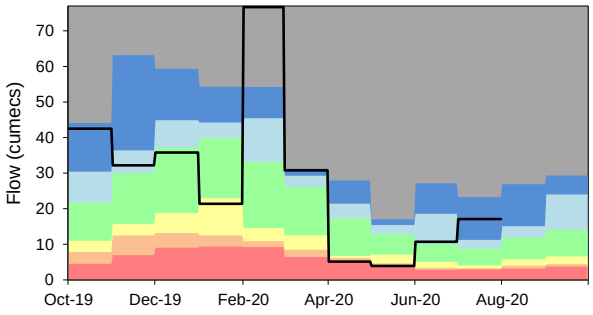
Ness, RYE
Ranking derived from data for the period Sep-1974 to Dec-2017



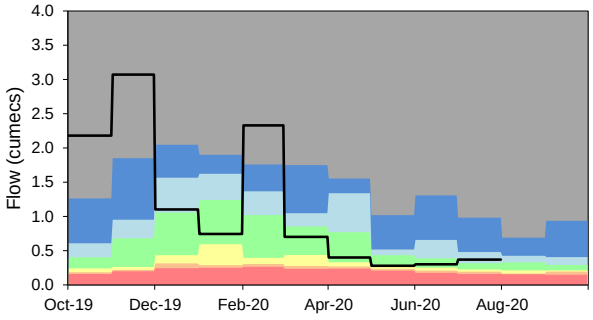
Skelton, OUSE
Ranking derived from data for the period Sep-1969 to Dec-2017



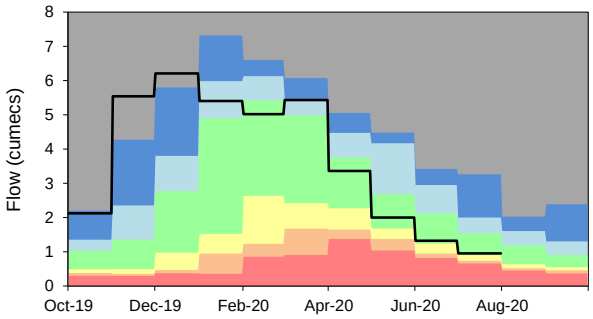
Tadcaster, WHARFE
Ranking derived from data for the period Jul-1991 to Dec-2017



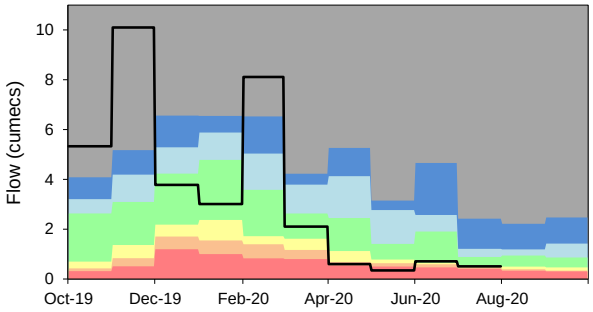
Walden Stubbs, WENT
Ranking derived from data for the period Oct-1979 to Dec-2017



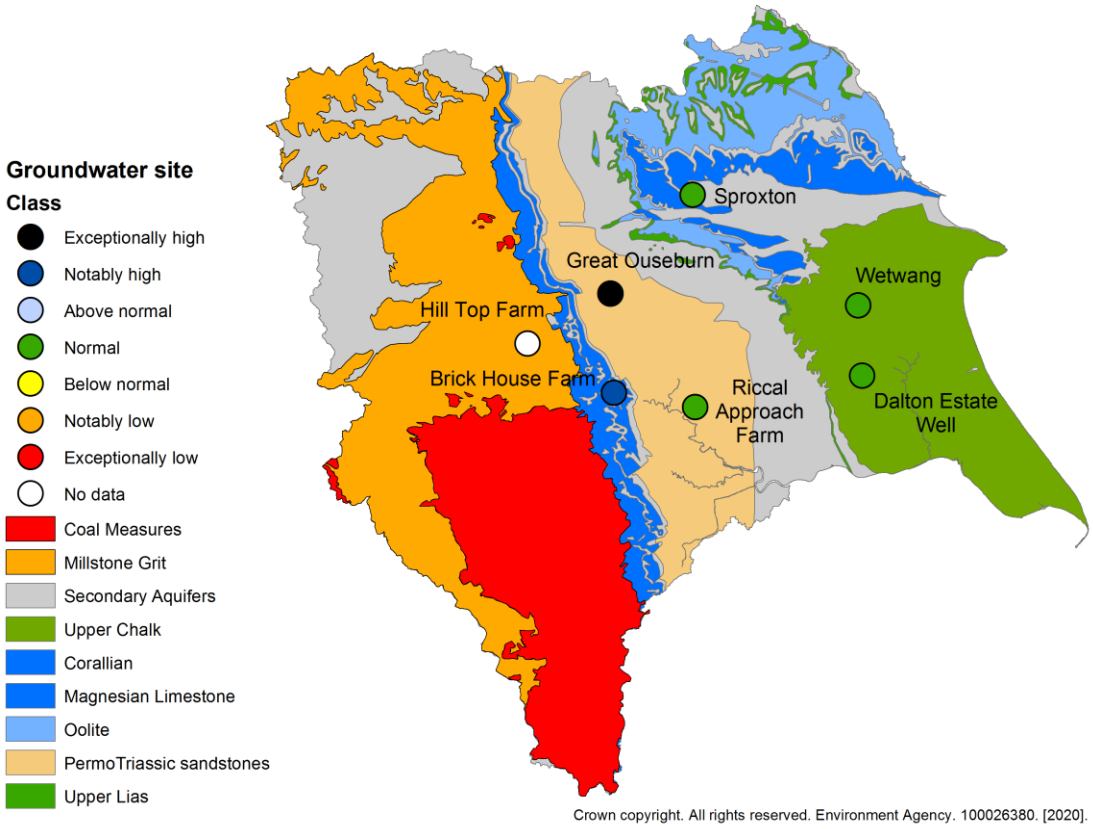
Wansford Snakeholm Lock - West Beck, WEST BECK
Ranking derived from data for the period Nov-1988 to Dec-2017

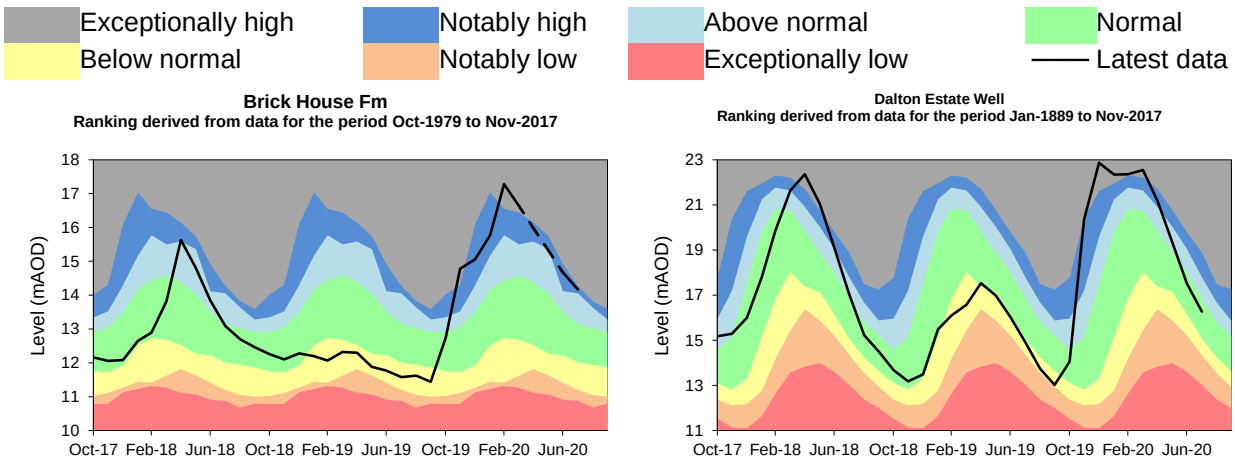


Whittington, ROTHER
Ranking derived from data for the period Nov-1979 to Dec-2017



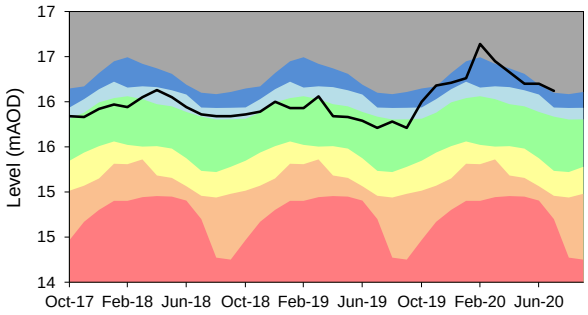
Groundwater Levels



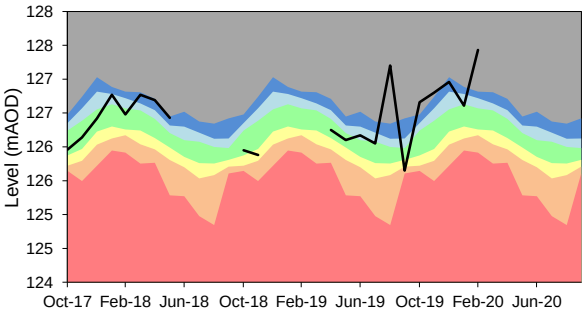


Exceptionally high | Notably high | Above normal | Normal
Below normal | Notably low | Exceptionally low | Latest data

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
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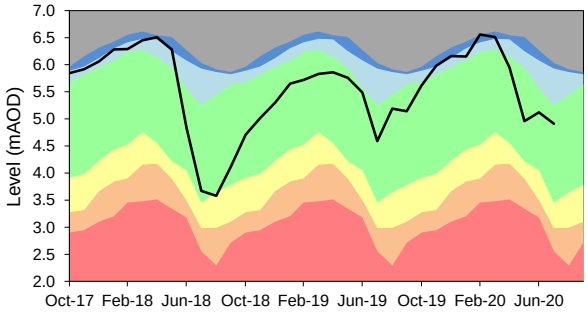

Sproxton
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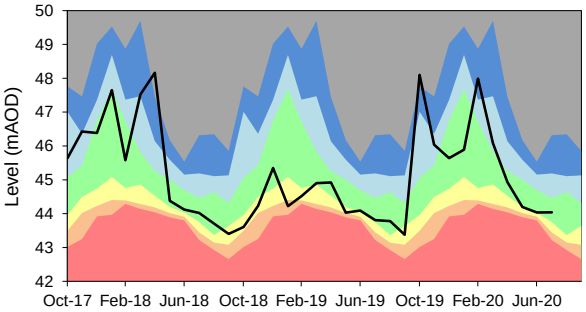

Wetwang
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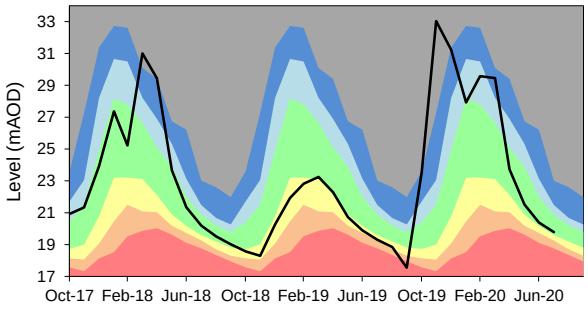
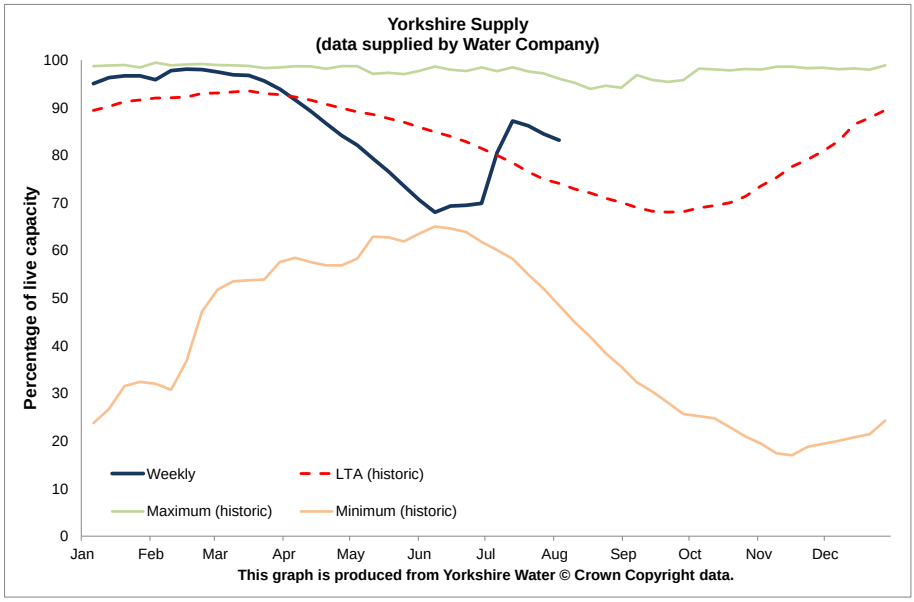


Reservoir Stocks – Data from Water Company



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