Monthly water situation report

Yorkshire Area

Summary – September 2020

Unsettled weather at the beginning and end of the month with two weeks of dry, stable conditions in the middle. Average or near average monthly rainfall totals were recorded except within the Calder catchment and South Yorkshire where conditions were drier. River flows were mainly normal for the time of year except when responding to the heavier periods of rainfall. Dry soils were still being experienced in the south of the area and along the Humber Estuary, and groundwater levels remained within the normal range or were higher. Overall reservoir stocks were above the long term average level.

Rainfall

September was a mixture of sunshine and showers that contained episodes featuring prolonged periods of heavy rainfall. A wet start to the month across the upper Pennine fed catchments on the 2nd was followed by a widespread wet period over the 5th to the 8th. Conditions then stabilised and very little rain fell for almost two weeks. Widespread unsettled conditions then returned during the 22nd to the 25th, with the final day of the month experiencing another very wet day in the upper Pennine fed catchments. The 8 days covering the 5th to the 8th plus 22nd to the 25th recorded 43% to 77% of the monthly total rainfall.

Using the Met Office Had-UK data set, most of Yorkshire received rainfall totals classed as normal with monthly long term average (LTA) occurring in the eastern and north-eastern catchments and a little below average rainfall within North Yorkshire. South Yorkshire and the Calder catchment recorded much less rainfall with around half of the LTA and were classed as recording below normal monthly totals.

Soil Moisture Deficit (SMD)

At the start of September, soils along the western Pennine ridge and in the north-east were classed as wet while much of central and eastern Yorkshire was classed as normal. Only in the lower Ouse-lower Don area did soils remain dry.

There was very little overall change during the first week. Only during the fortnight of dry weather did the deficit begin to increase once again. By the week ending 22nd September, half of Yorkshire had returned into the dry category – South Yorkshire, middle to lower Calder, and the chalk fed catchments of the Derwent and Hull – although the western Pennine ridge remained wet. The final week saw some reduction in SMD but soils in South Yorkshire, middle to lower Calder, and the lower Ouse and lower Hull remained dry. Central and some eastern catchments were classed as normal while the western Pennine ridge and north-east were almost fully saturated.

River Flows

The monthly mean flows in the Pennine fed rivers were mostly in the normal range, generally between 80% and 110% of the LTA. The exception was on the Nidd which experienced slightly higher flows and was in the above normal range while the Rother in the far south of the area was classed as below normal with a monthly mean of only 52% of the LTA.

The wet weather at the start of September ensured peak flows in the notably high, or higher, range prevailed. However, when conditions stabilised, the rivers slowly declined for approximately two weeks, falling into the normal range expected for the time of year apart from the River Rother in the very south of the area. Flow on the Rother fell through the below normal range and reached the notably low range by the 22nd. The unsettled weather from the 22nd ensured the Pennine rivers rose significantly, producing high flow peaks over the 24th and 25th except within the Rother catchment which remained relatively dry in comparison to the rest of Yorkshire. Flows at the end of the month on the Rother just rose out of the notably low range and into the normal range, while the rest of the Pennine fed rivers were within the normal range expected or higher.

On the River Derwent, flows slowly declined from being notably high at the beginning of the month into the normal range from the 11th to the 24th. Flows rose more significantly over the 25th to the 28th, having a high flow peak on the 27th, before declining again. A similar pattern was observed on its tributary the River Rye, although with earlier peaks on this more responsive catchment.

On the Chalk fed West Beck in the River Hull catchment, flows were in the normal range and showed a very slow decline until the 22nd of the month. After a slight rise up to the 25th, flows declined again slowly to the end of the month. A very similar pattern was observed further west on the River Foulness. Flows slowly declined within the normal range, showing a minor response to the rain on the 24th before falling once again.

Groundwater Levels

There was no September dip reading for Riccall Approach Farm and Hill Top Farm. Riccall Approach Farm has telemetry installed so the telemetry data was taken for this borehole but there is no data for Hill Top Farm.

Magnesian Limestone

Although the groundwater levels have continued to drop each month since February, the groundwater level during September remained notably high for the time of year.

Millstone Grit

No Data.

Sherwood Sandstone

The groundwater level at Great Ouseburn slightly decreased during September and had dropped to notably high for the time of year. At Riccall Approach, the groundwater level increased although was still within the normal range for the time of year.

Corallian Limestone

The groundwater level at Sproxton rapidly decreased between March and May but the rate of decrease slowed down in June, July and August. The groundwater level had increased in September and was comfortably in the normal range for the time of year.

Chalk

The groundwater levels in the chalk were normal for the time of year. In the north of the aquifer, as monitored at Wetwang, the level was virtually the same as that recorded during August. In the south of the aquifer, as monitored by Dalton Estate, the groundwater level continued to decrease which was expected at this location for the time of year.

Reservoir Storage

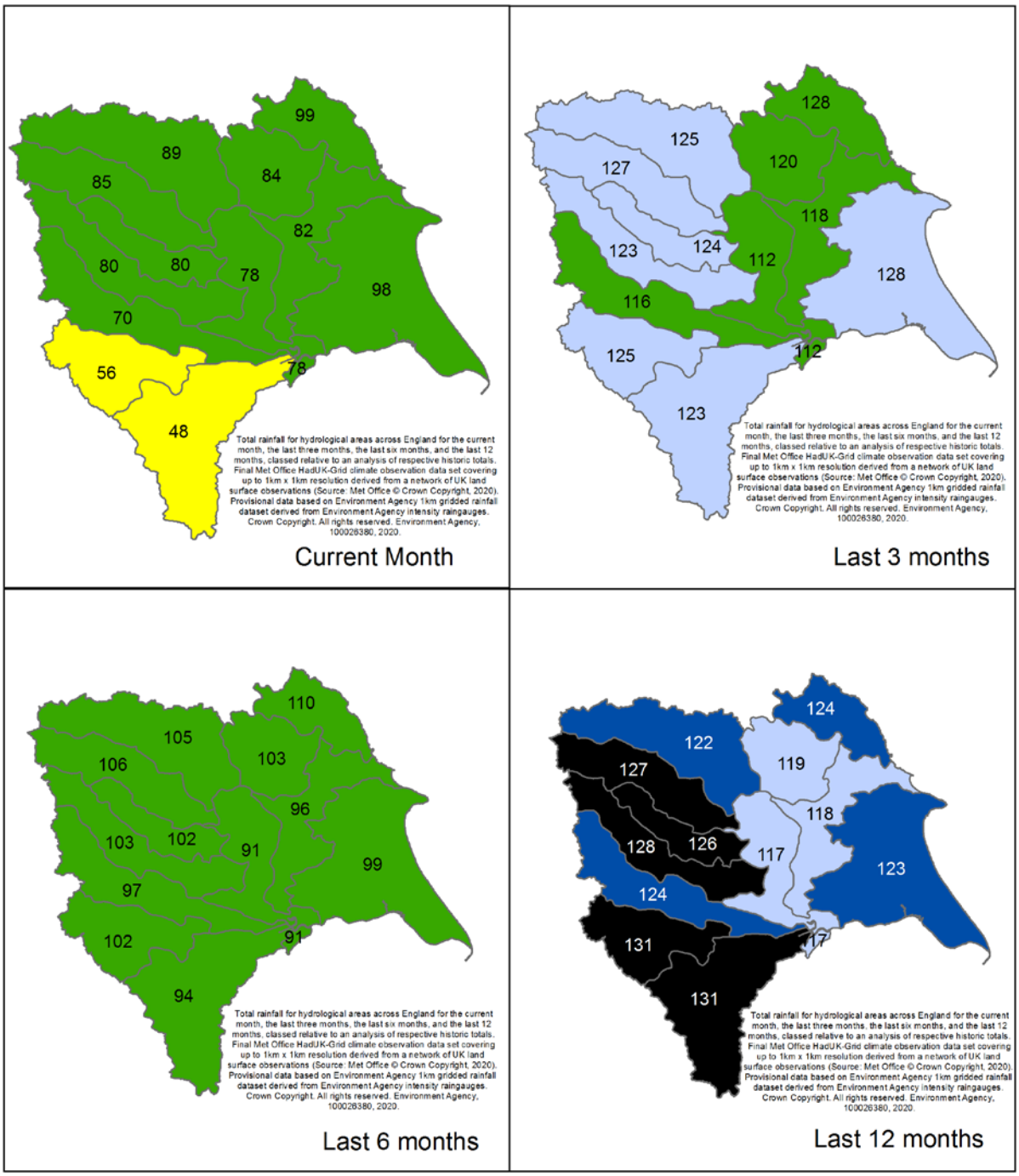
The overall Yorkshire Supply reservoir stocks declined through the month although the rate of decline varied from week to week. The largest fall, of approximately 2%, occurred during the week between the 14th to the 21st when the weather was stable and dry. At the month end, they were almost 21% above the LTA for the time of year.

Environmental Impact

By the end of September, there were 7 abstraction licences that had their Hands off Flow (HoF) in force and were unable to abstract water. There was also 117 licences with an advance warning notification although they were still able to continue abstracting.

Author: Yorkshire Hydrology

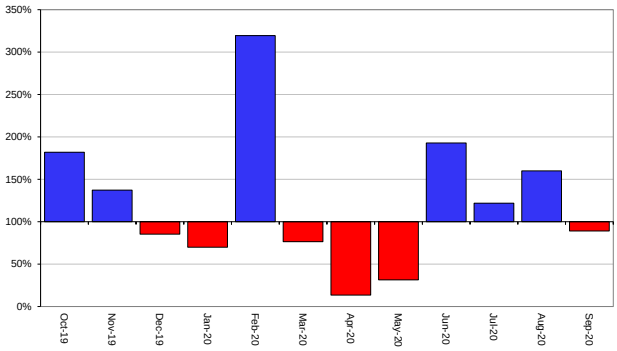
Rainfall



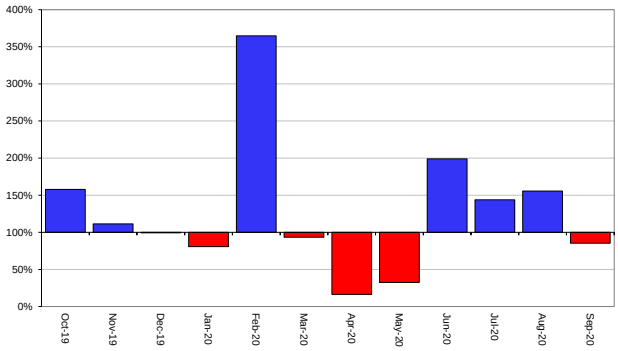
Above average rainfall

Below average rainfall

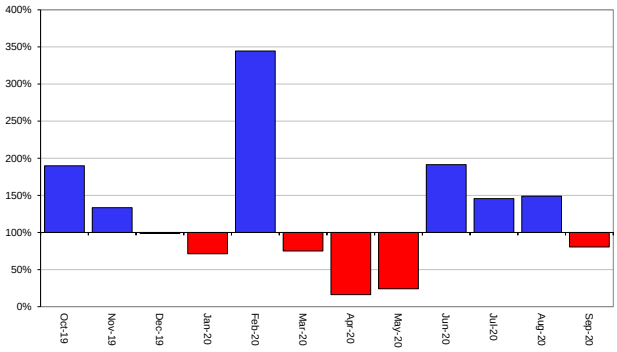
1-Month Period for Swale (NE)



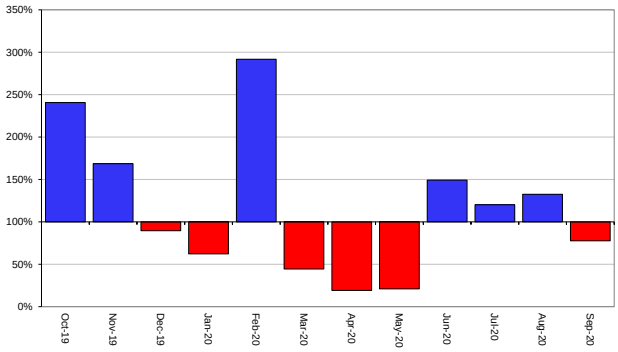
1-Month Period for Ure



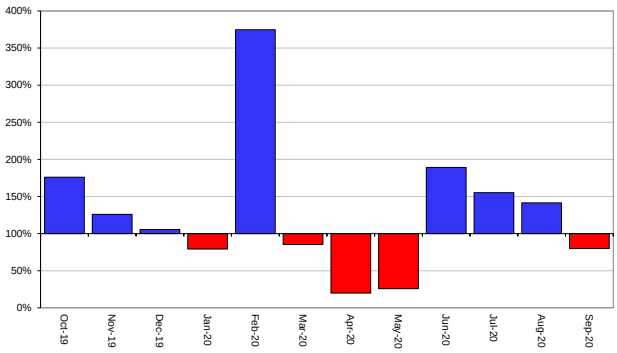
1-Month Period for Nidd



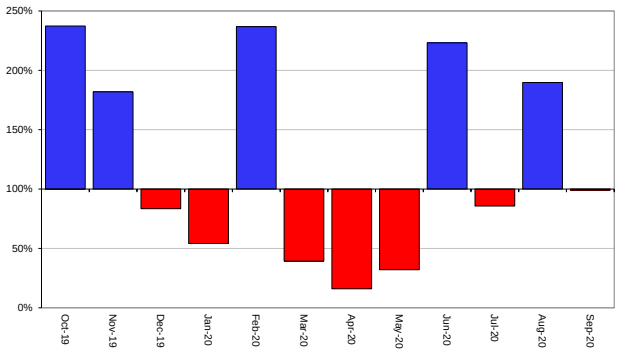
1-Month Period for Ouse



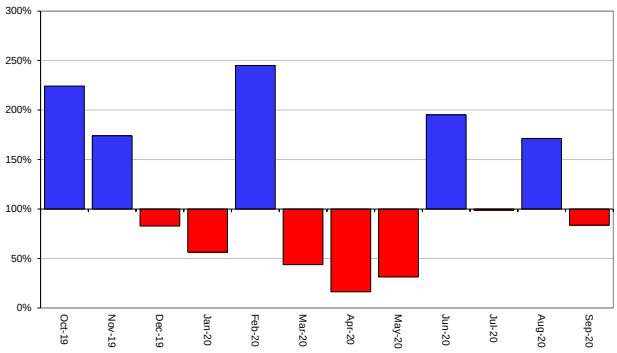
1-Month Period for Wharfe



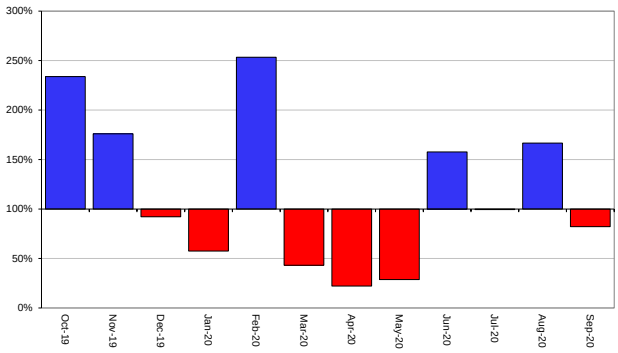
1-Month Period for Dales North Sea Tribs



1-Month Period for Rye

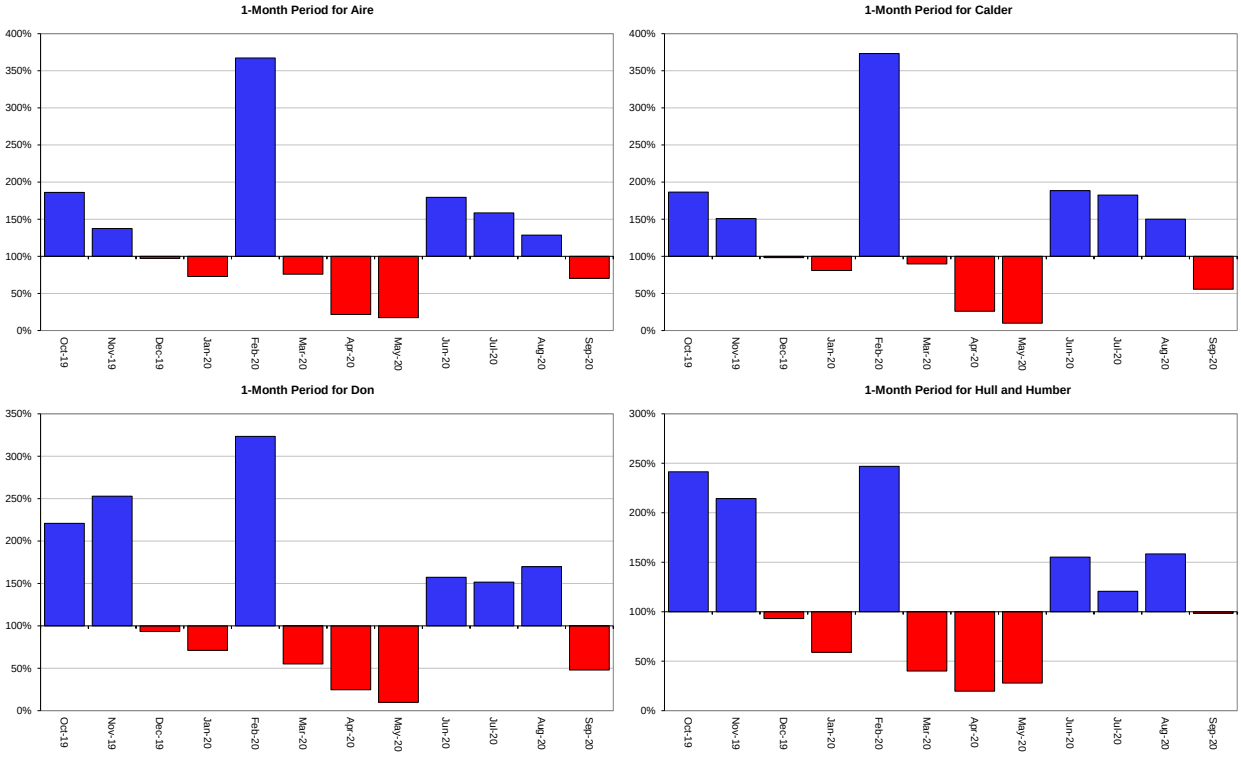


1-Month Period for Derwent (NE)



Above average rainfall

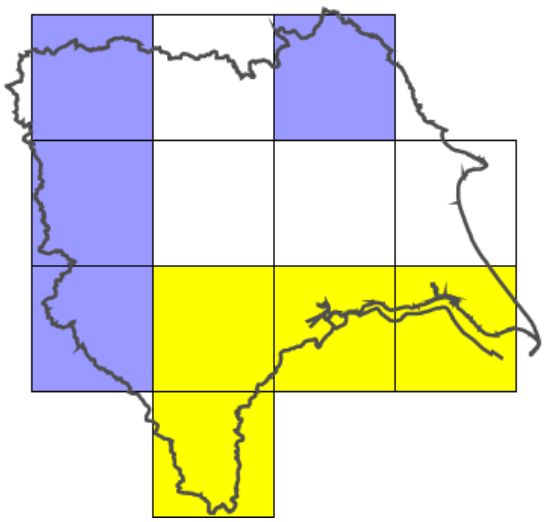
Below average rainfall



Soil Moisture Deficit

Environment Agency - Yorkshire Area

Monthly MORECS SMD Levels

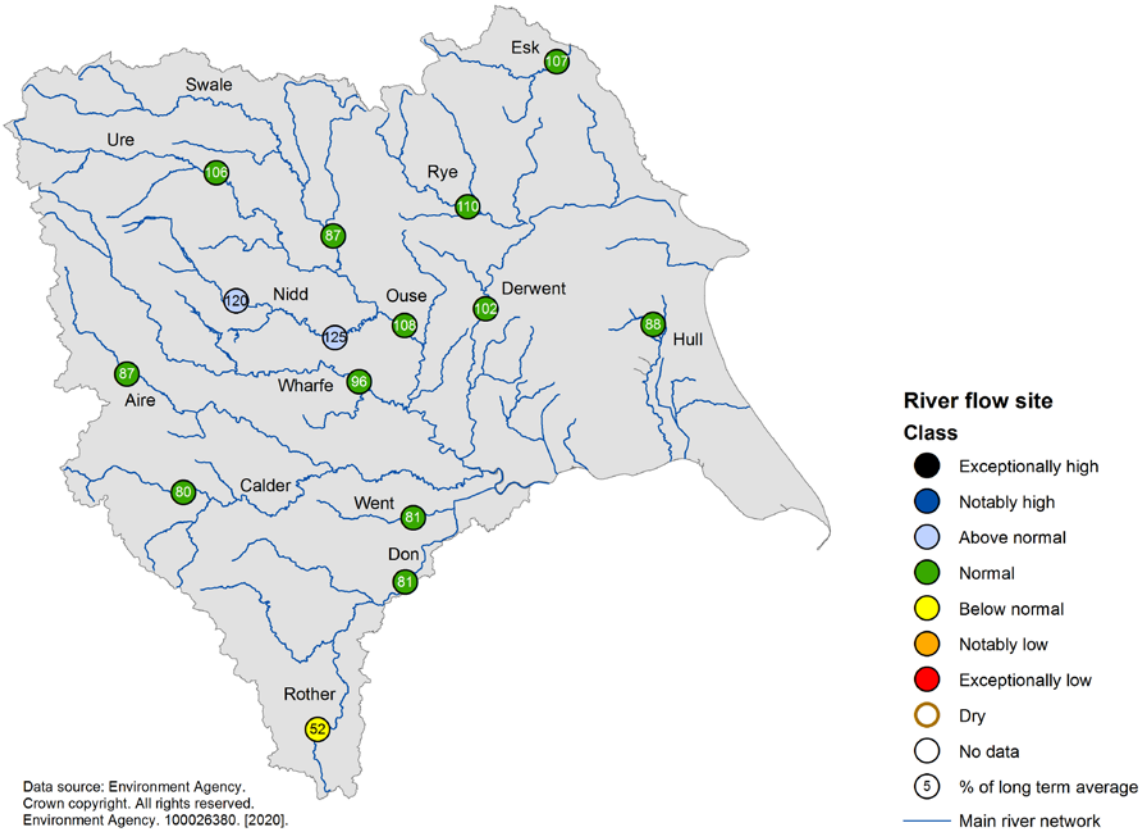


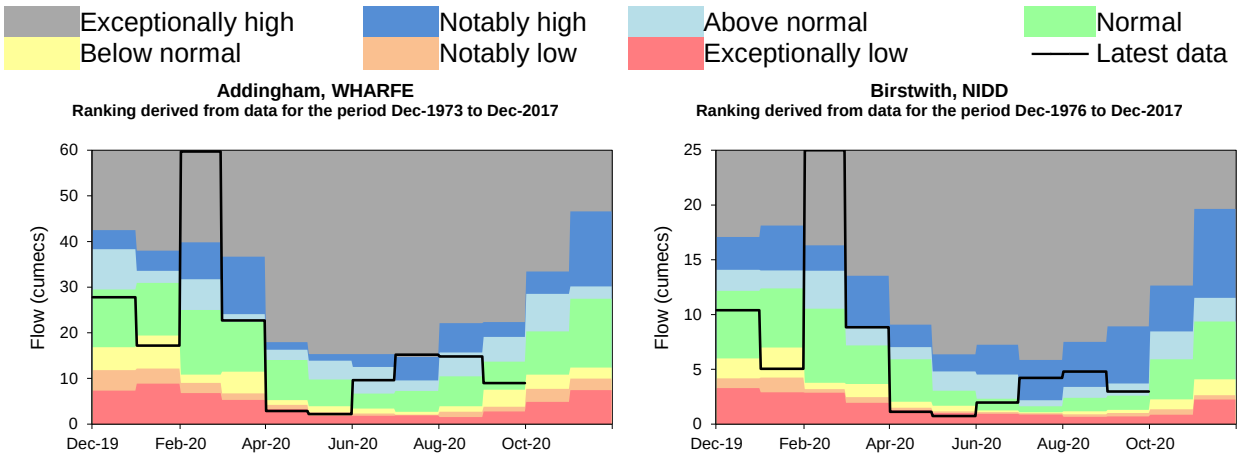
September 2020

SMD Conditions

- Wet
- Normal
- Dry
- Very Dry

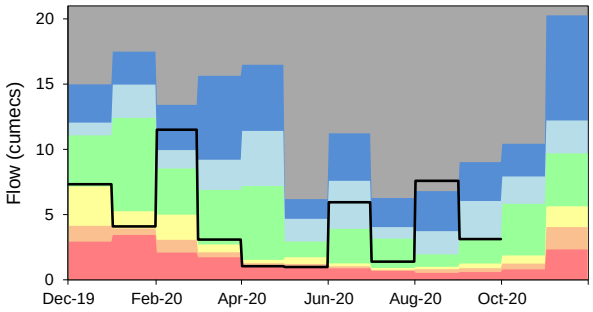
River Flow



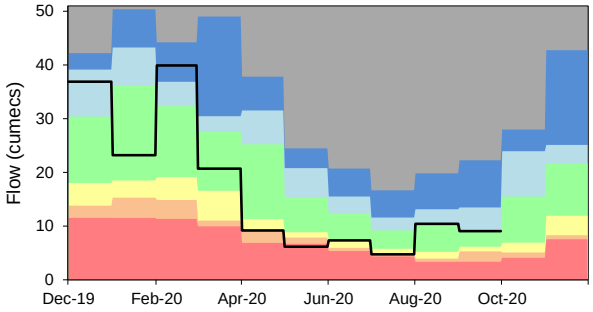


Exceptionally high | Notably high | Above normal | Normal
Below normal | Notably low | Exceptionally low | Latest data

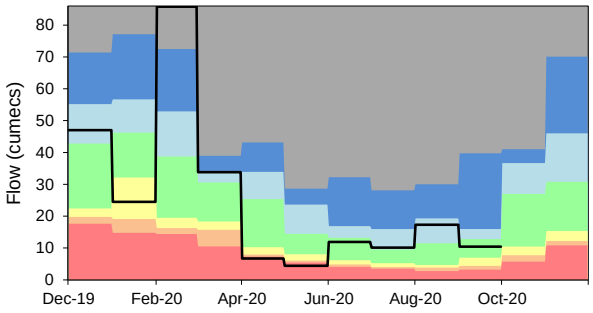
Briggswath, ESK
Ranking derived from data for the period Jan-1993 to Dec-2017



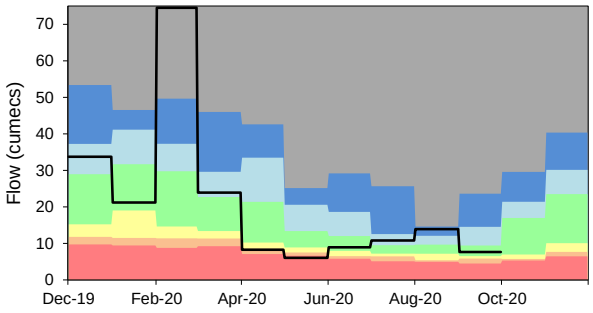
Buttercrambe, DERWENT
Ranking derived from data for the period Sep-1973 to Dec-2017



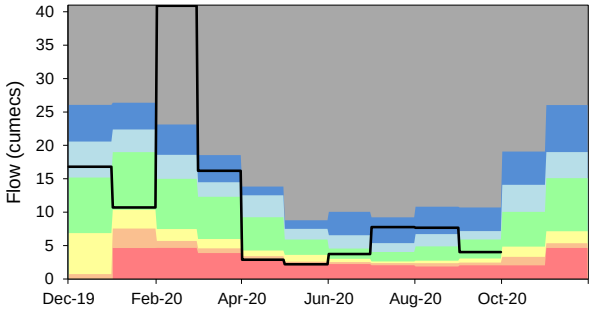
Crakehill Topcliffe, SWALE
Ranking derived from data for the period Jun-1980 to Dec-2017



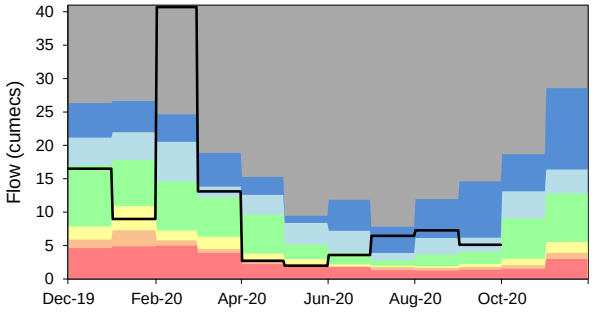
Doncaster, DON
Ranking derived from data for the period Jul-1959 to Dec-2017



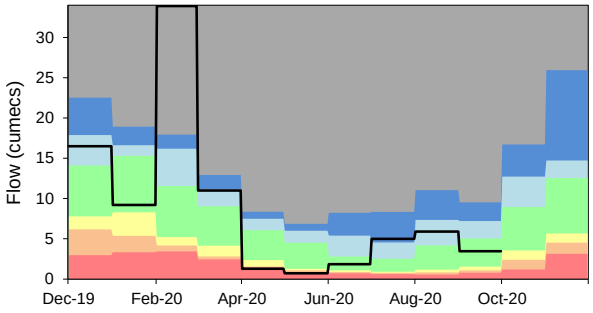
Elland, CALDER
Ranking derived from data for the period Jul-1971 to Dec-2017



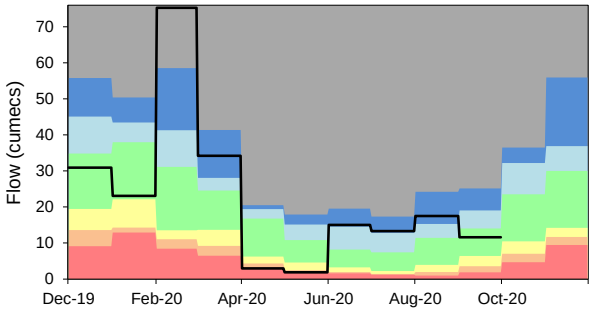
Hunsingore, NIDD
Ranking derived from data for the period Oct-1968 to Dec-2017

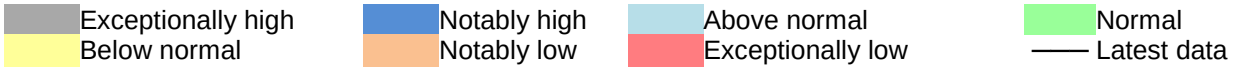


Kildwick, AIRE
Ranking derived from data for the period Aug-1971 to Dec-2017

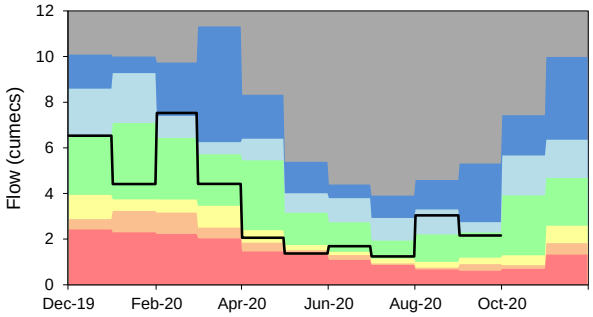


Kilgram Bridge, URE
Ranking derived from data for the period Aug-1971 to Dec-2017

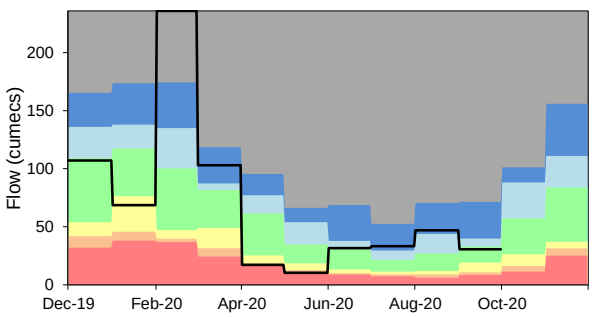




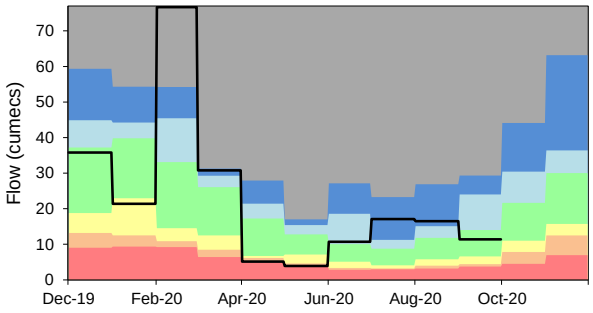
Ness, RYE
Ranking derived from data for the period Sep-1974 to Dec-2017



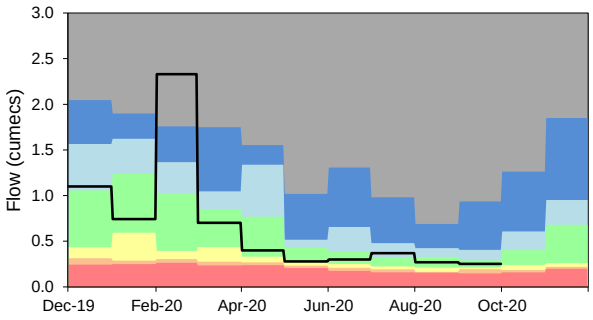
Skelton, OUSE
Ranking derived from data for the period Sep-1969 to Dec-2017



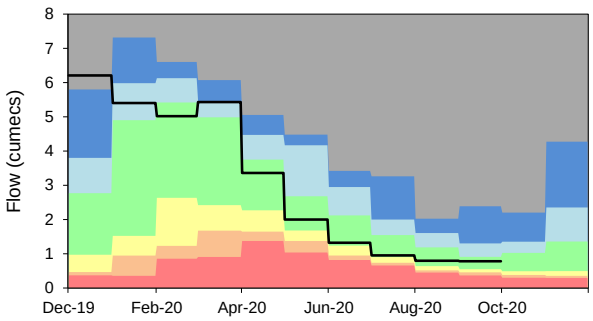
Tadcaster, WHARFE
Ranking derived from data for the period Jul-1991 to Dec-2017



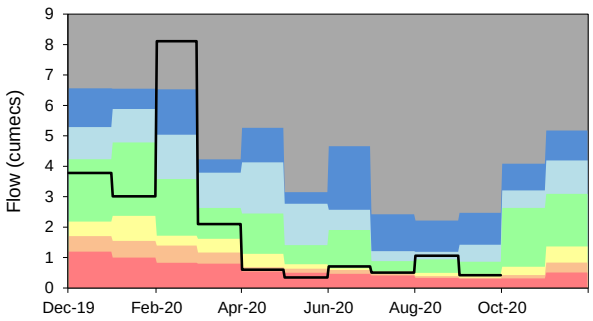
Walden Stubbs, WENT
Ranking derived from data for the period Oct-1979 to Dec-2017



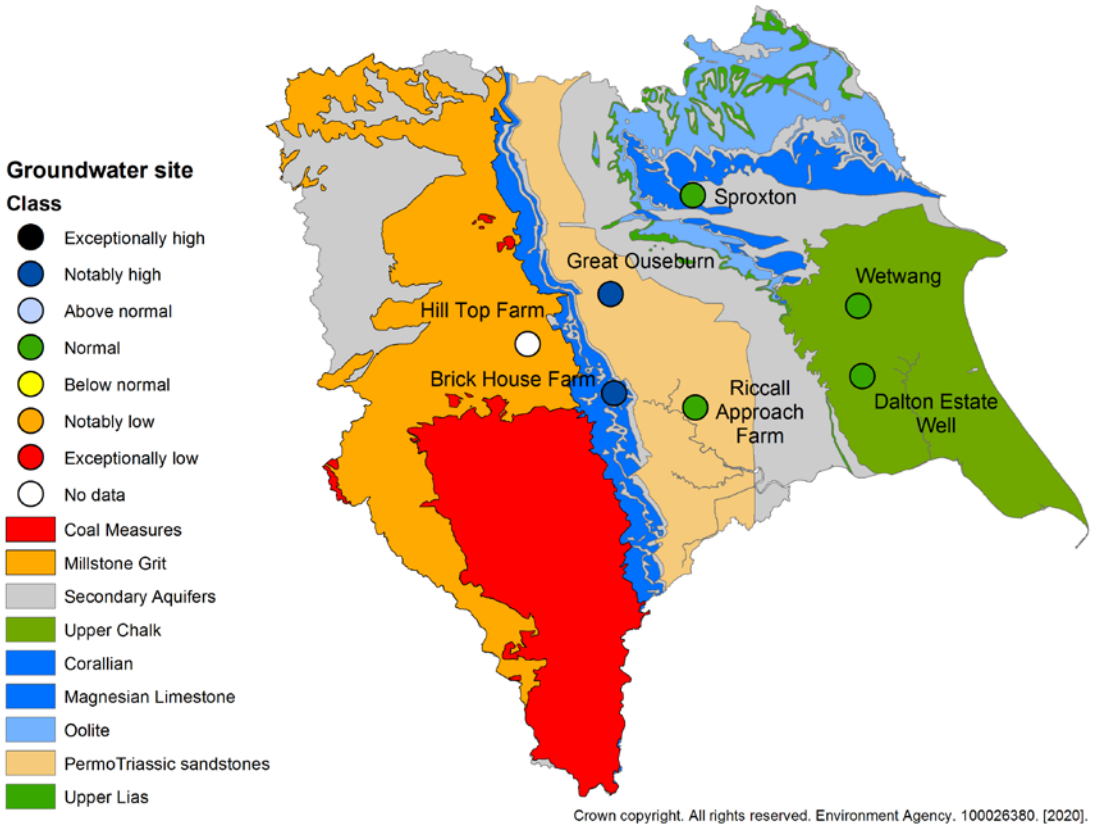
Wansford Snakeholm Lock - West Beck, WEST BECK
Ranking derived from data for the period Nov-1988 to Dec-2017

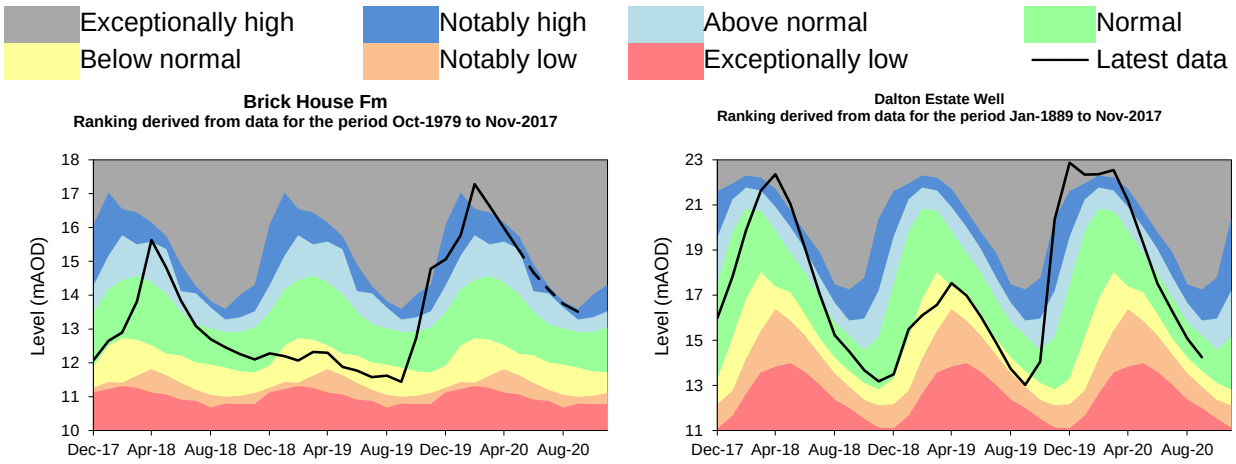


Whittington, ROTHER
Ranking derived from data for the period Nov-1979 to Dec-2017

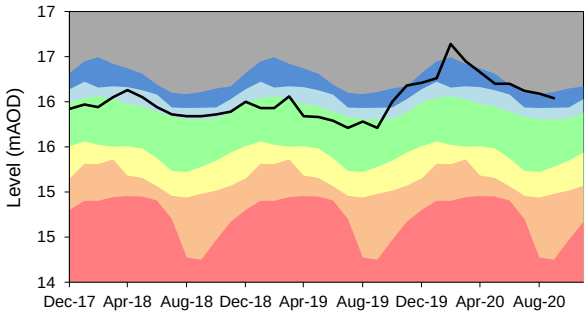


Groundwater Levels

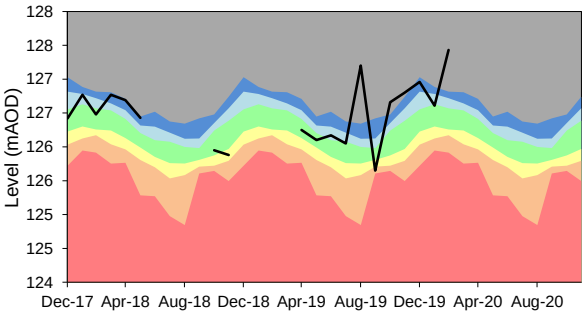




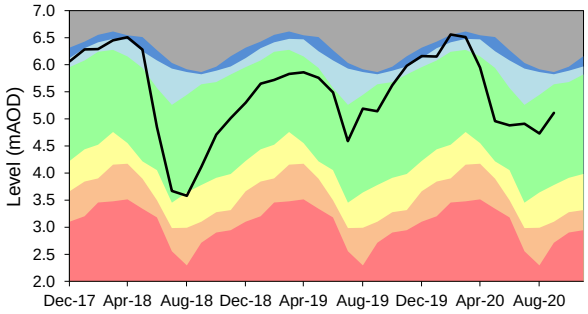
Great Ouseburn
Ranking derived from data for the period Jan-1976 to Nov-2017



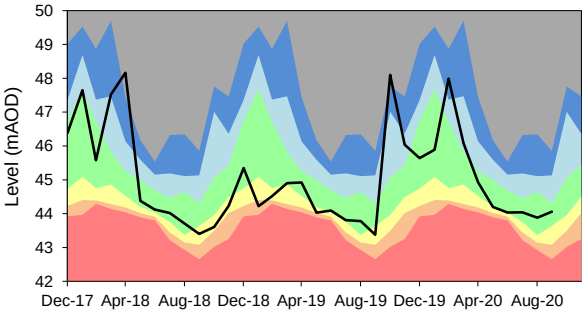
Hill Top Fm
Ranking derived from data for the period Oct-1973 to Nov-2017



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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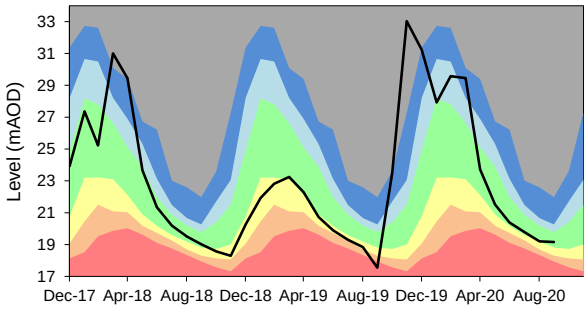
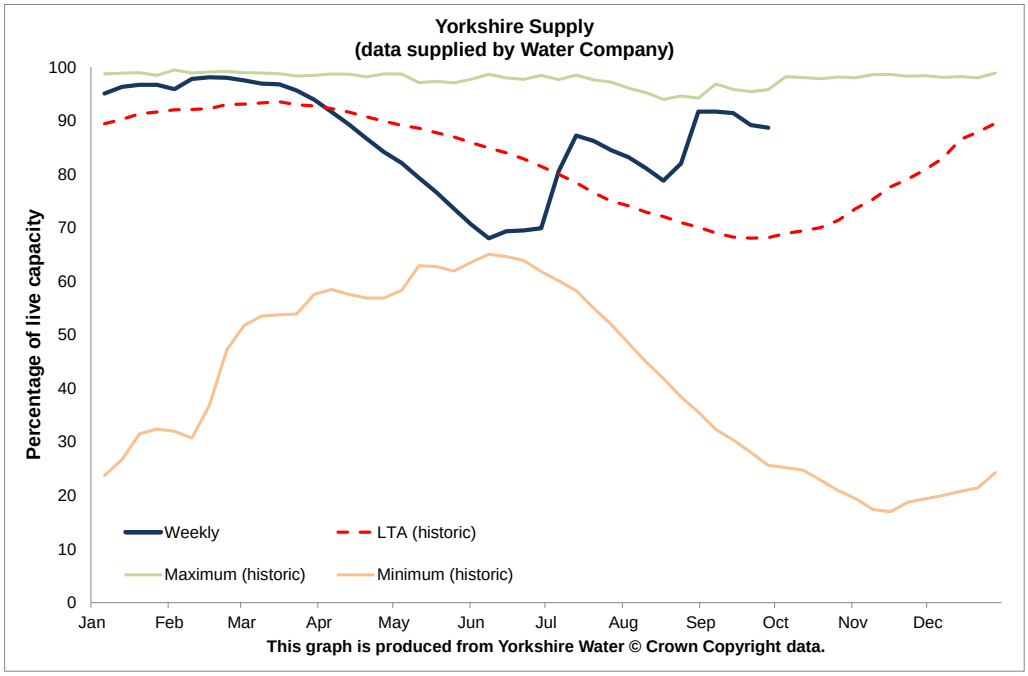


Reservoir Stocks – Data from Water Company



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