Monthly water situation report

Yorkshire Area

Summary – May 2019

Unsettled conditions at the start and end of the month, although below average monthly rainfall totals were recorded across Yorkshire. Below normal river flows were common apart from the River Ure, upper River Aire, and upper River Hull which recorded normal flows. The soils were becoming dry, groundwater levels were decreasing, reaching drought trigger levels in some of the Area's aquifers, and overall reservoir stocks continued to fall below the long term average.

Rainfall

Unsettled weather, producing one or two particularly wetter days, occurred during the first week of the month. However, the rain that did fall wasn't widespread. More settled conditions then followed over a two week period and contained many rain free days. But the weather then changed once more, with unsettled conditions returning and created another wet week at the end the month. Despite these periods of rainfall, the majority of our monitoring raingauges recorded below long term average (LTA) monthly totals.

With regards to the individual catchment average rainfall totals, using the Met Office National Climate Information Centre (NCIC) dataset from 1910, it is showing to be the 8th driest 2-month period ending in May for the Calder and the Don catchments.

Soil Moisture Deficit (SMD)

At the beginning of May, ground conditions in Yorkshire were classed to be within the normal range apart from the western most Pennine ridge region which was classed as being wet. Despite the periods of rainfall, the SMD increased each week and by the end of the month was reaching dry conditions. The monthly SMD was showing the western most Pennine ridge plus the most north-eastern regions were in normal conditions while the rest of Yorkshire was classed as being dry.

River Flows

Within the Pennine fed catchments, the beginning of the month saw declining flows and there were many locations experiencing below normal flow compared to what would have been expected for the time of year. However, many of the rivers responded quickly to rain that fell on the 6th to the 8th May, showing a short duration high flow peak. Once the drier weather arrived, the rivers quickly declined back into lower flow conditions, with the summer low flow, or Q95, being measured in the upper Calder, Wiske, and lower Aire catchments on approximately the 20th May. The situation changed again during the final week of the month in response to further unsettled weather. The rivers began to rise out of their lower flow regimes into normal, or above normal, flow ranges for the time of year, with high flow peaks observed particularly on the River Wharfe and River Ure on the 31st May. With regards to the monthly mean flows, as shown in the map below, the Don and Calder catchments were notably low for the time of year while the other catchments were either below normal or within the normal range expected for the time of year.

In the groundwater dominated catchments in the east, the River Derwent flow declined during the beginning of the month, being classed as notably low for the time of year. It did respond to the rainfall early in the month, and rose into normal flow conditions, however declining flows then resumed soon after. The monthly mean flow for the River Derwent was classed as being notably low for the time of year. Within the upper River Hull, as monitored at Wansford Snakeholm Lock, flows declined through the month but were still within the normal flow range expected for the time of year. The watercourses of Mires Beck and the River Foulness that flow directly into the Humber Estuary showed some minor responses to rainfall, but overall they had declining flows and were classed as being below what would normally be expected for the time of year.

Groundwater Levels

Magnesian Limestone

The groundwater level at Brick House Farm had decreased below the drought trigger level for the time of year.

Millstone Grit

The groundwater level at Hill Top Farm decreased slightly and was marginally below average for the time of year.
Note - Access to the site was not possible between December 2018 and March 2019.

Sherwood Sandstone

The groundwater level in the north of the Sherwood Sandstone remained slightly above the average for the time of year. The level in the south of the aquifer also remained above the average for the time of year.

Corallian Limestone

The groundwater level at Sproxton had decreased and was at the drought trigger level for the time of year. The groundwater level monitored at East Ness also decreased and was at the drought trigger level for the time of year.

Chalk

The groundwater level in the northern area of the aquifer, as monitored at Wetwang, had decreased and was well below the average level for the time of year. At Dalton Estate in the south of the aquifer the groundwater level decreased and remained below the average for the time of year.

Reservoir Storage

After a slight increase in overall reservoir stocks during the first week, they then decreased steadily for the remainder of the month and finished a little over 7% below the LTA.

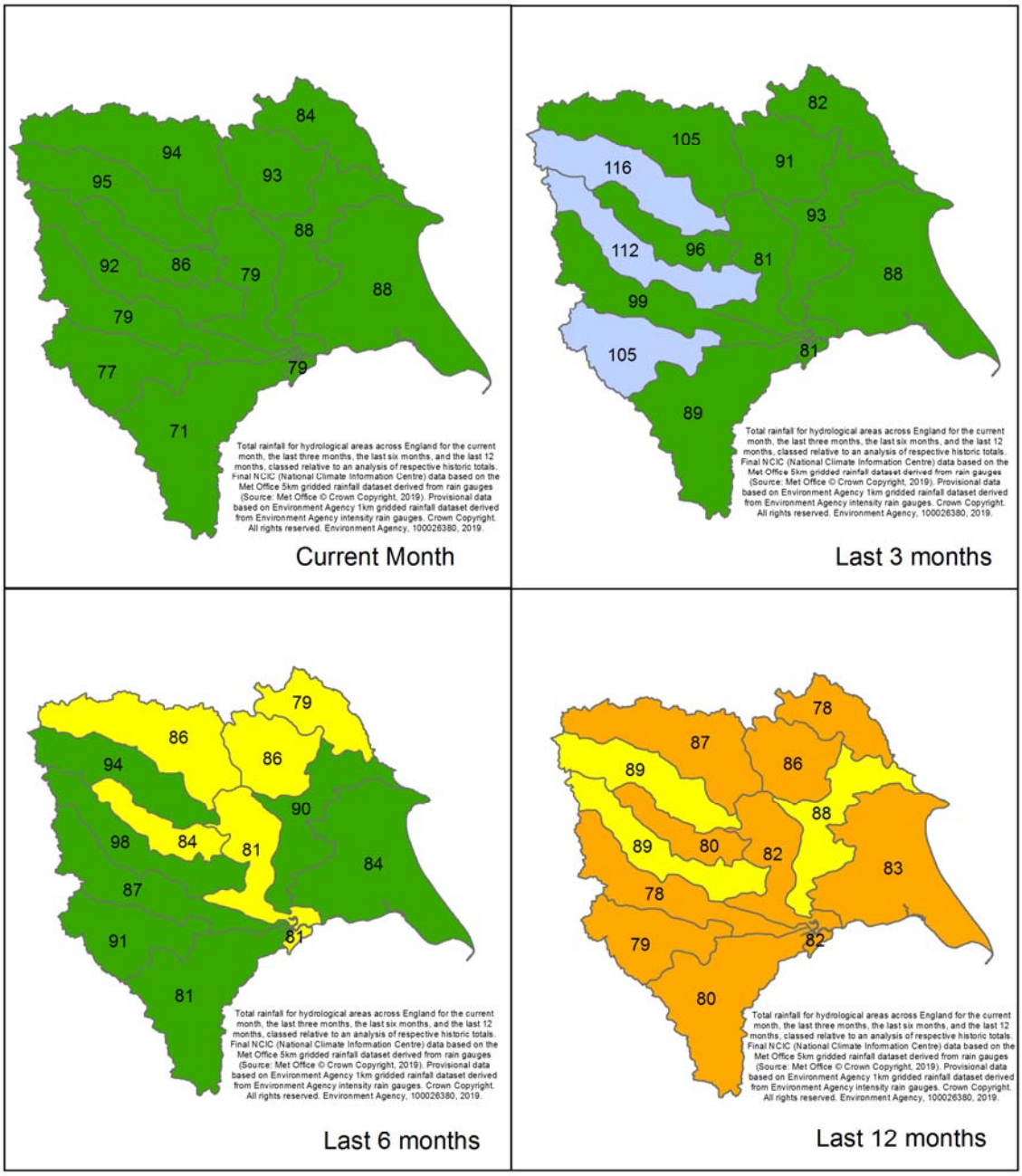
Environmental Impact

There were 15 abstraction licences that had Hands off Flow (HOF) in force. The Derwent catchment contained 5 HOFs, the SUNO (Swale, Ure, Nidd, and Ouse) catchments contained 8 HOFs, while the Hull & Humber contained 2 HOFs. Out of the total that had stopped, 6 had been in force throughout the month (apart from a brief period around the 9th May when they were able to temporarily resume for a few days), 5 were stopped for the first time this season around the middle of the month, and 4 were stopped at the end of the month.

An additional 75 abstractors were on advance warning notifications although they were still able to abstract. The majority of these warning notifications had been sent out earlier in the season, but 13 were issued for the first time this season during May and most were towards the end of the month.

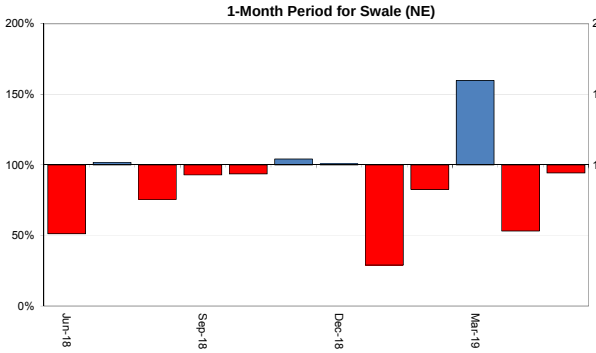
Author: Yorkshire Hydrology

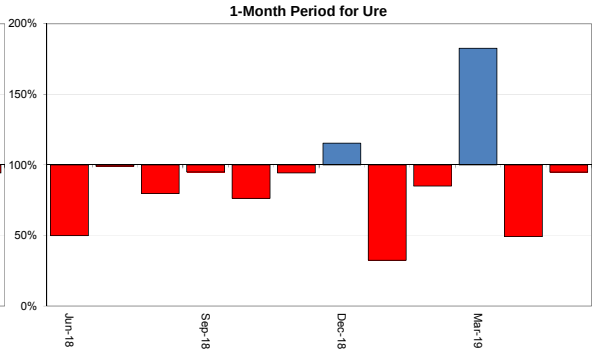
Rainfall

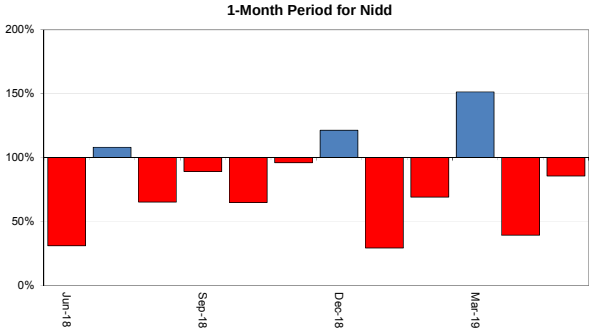


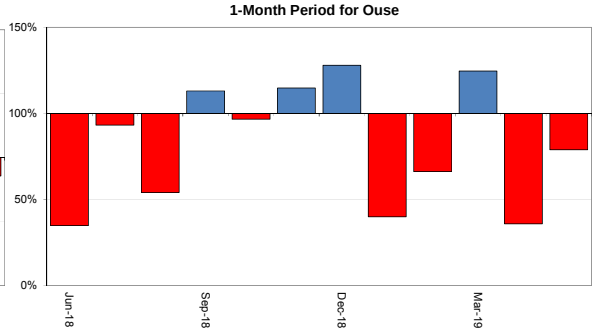
Above average rainfall

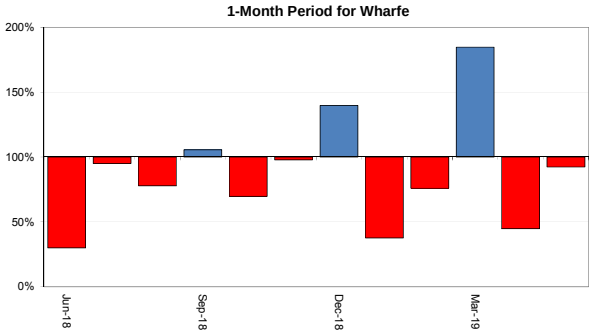
Below average rainfall

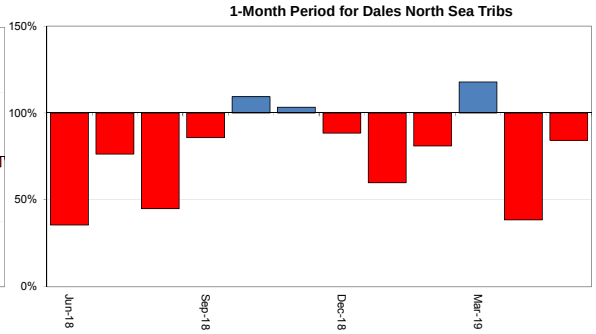


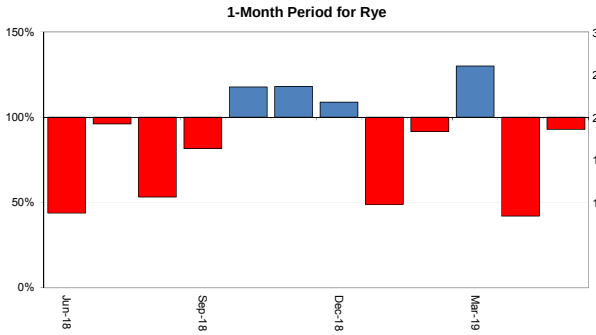


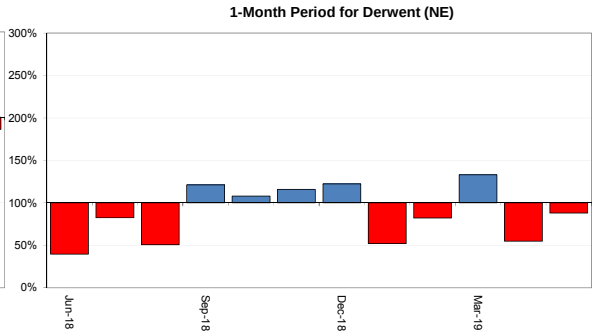




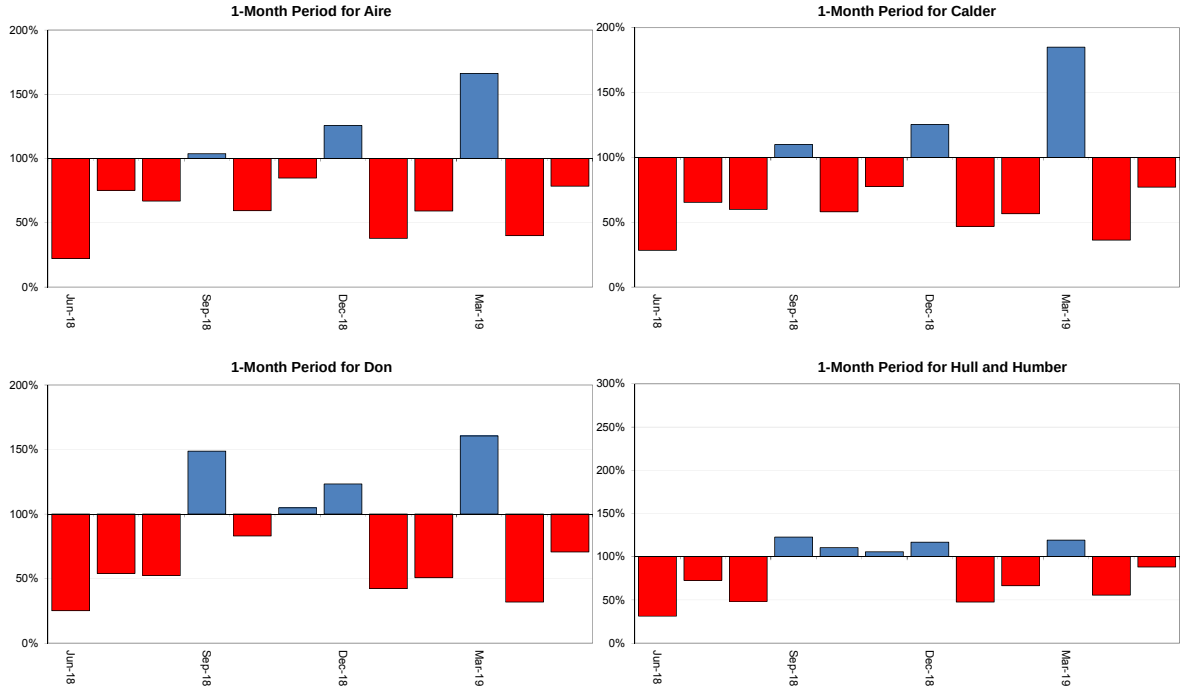




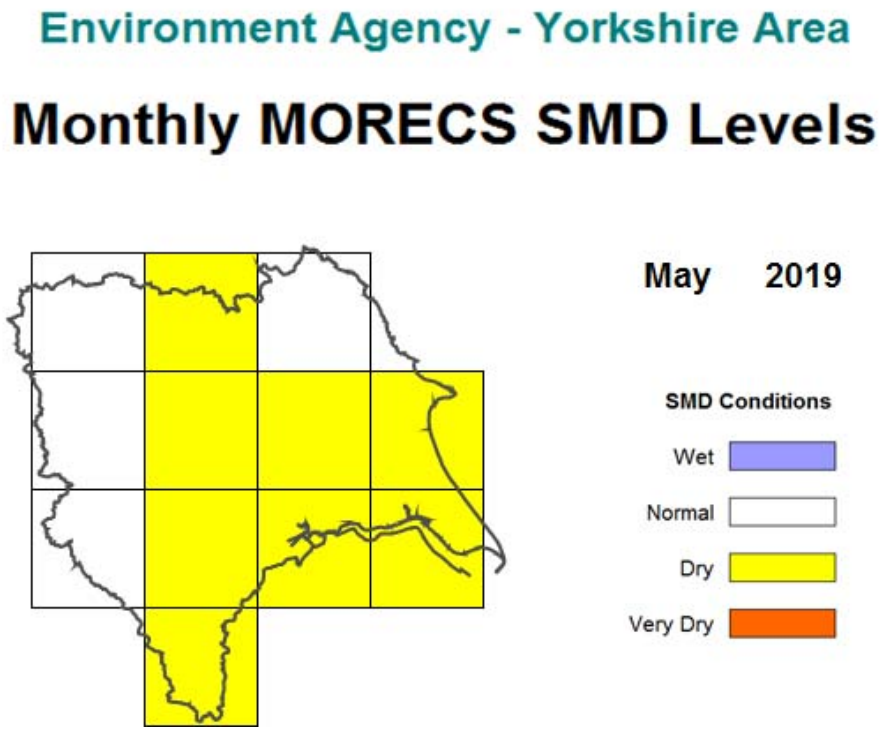




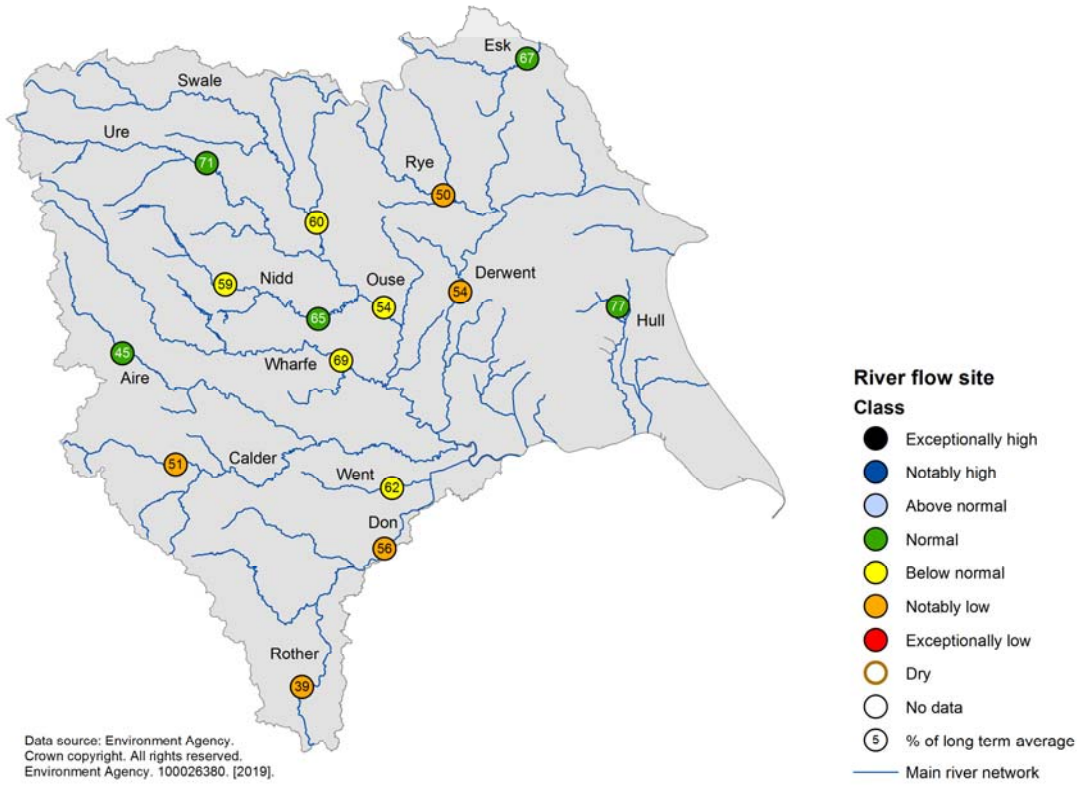
Above average rainfall Below average rainfall

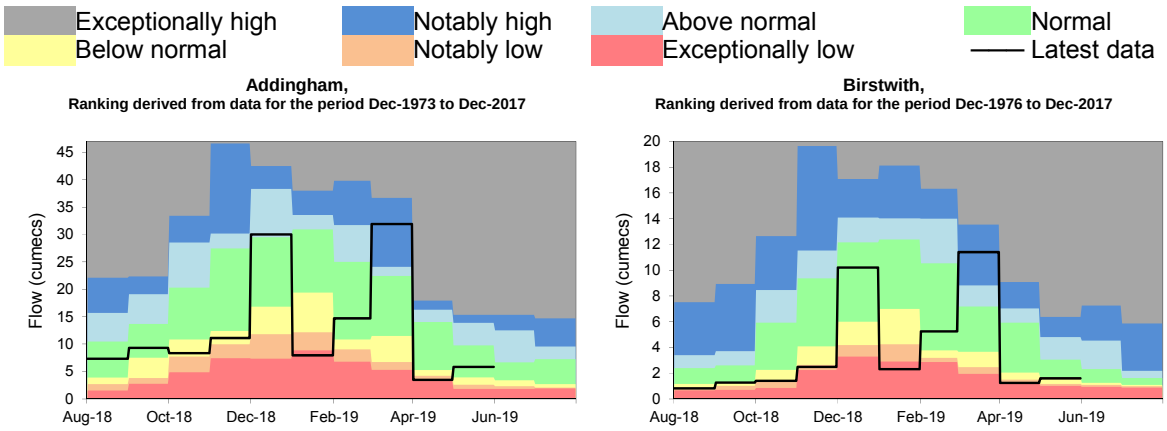


Soil Moisture Deficit

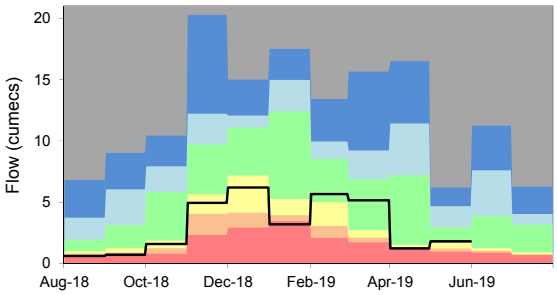


River Flow





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



Buttercrambe,
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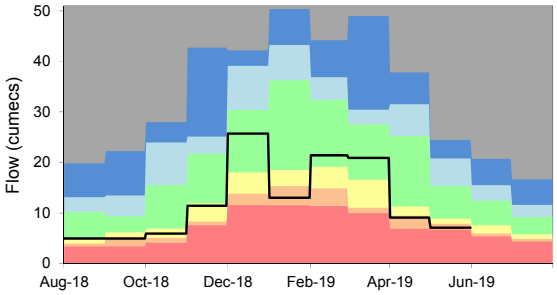

Crakehill Topcliffe,
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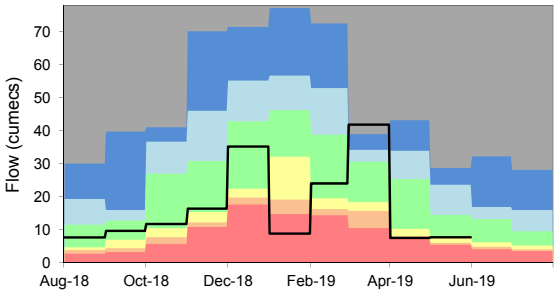
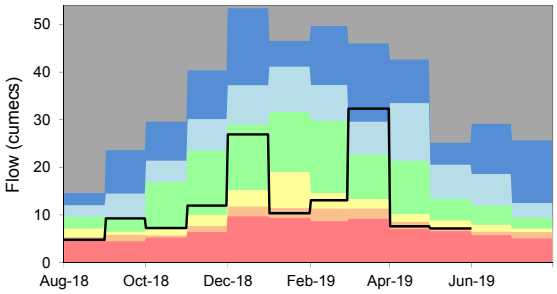
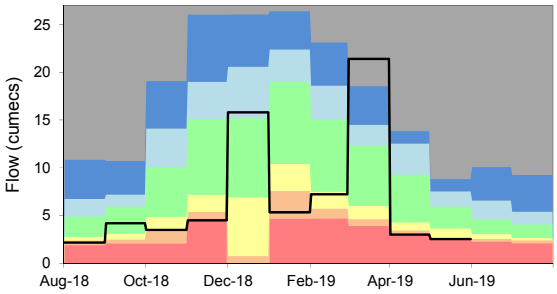


Doncaster,
Ranking derived from data for the period Jul-1959 to Dec-2017



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



Hunsingore,
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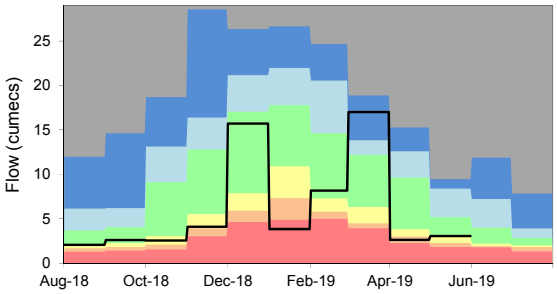

Kildwick,
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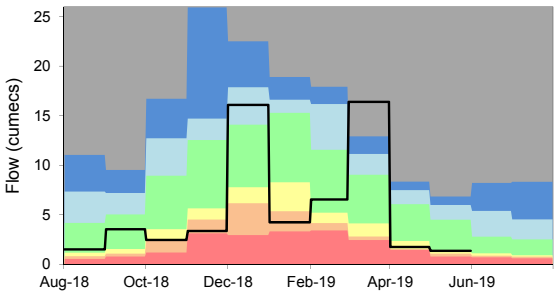
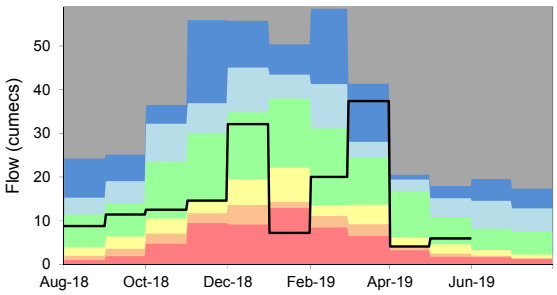
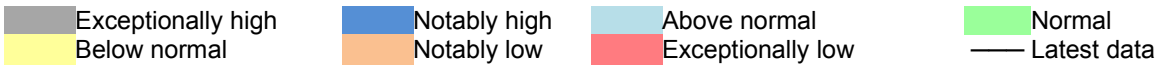


Kilgram Bridge,
Ranking derived from data for the period Aug-1971 to Dec-2017





Ness,
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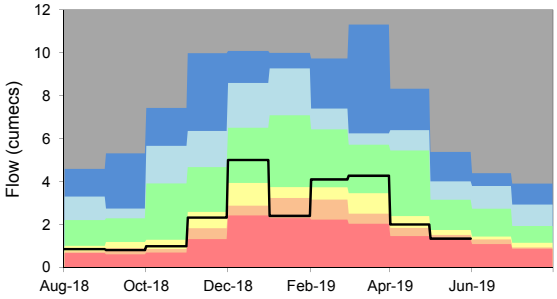

Skelton,
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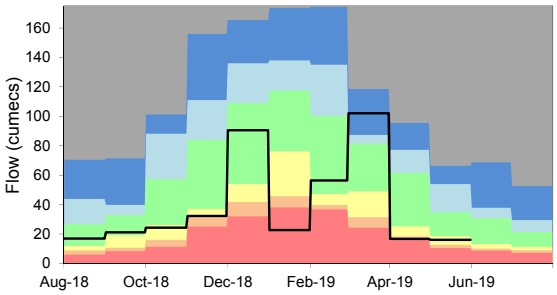

Tadcaster,
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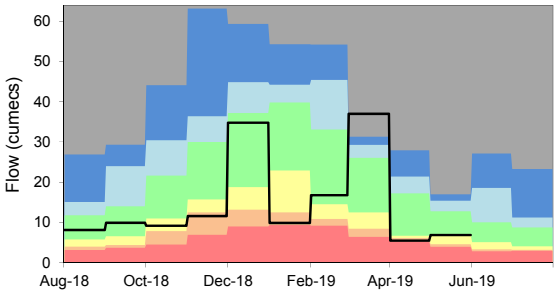

Walden Stubbs,
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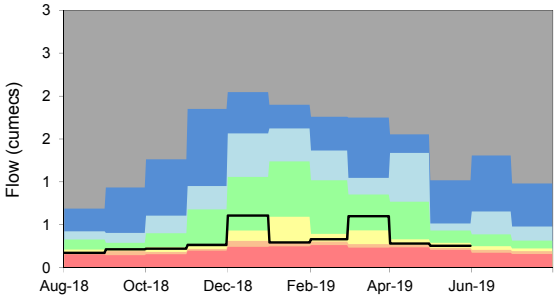
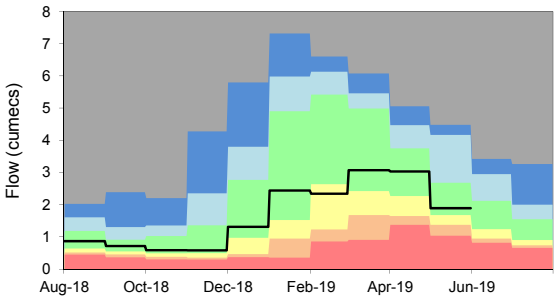
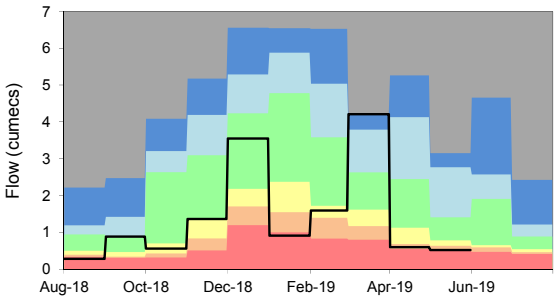


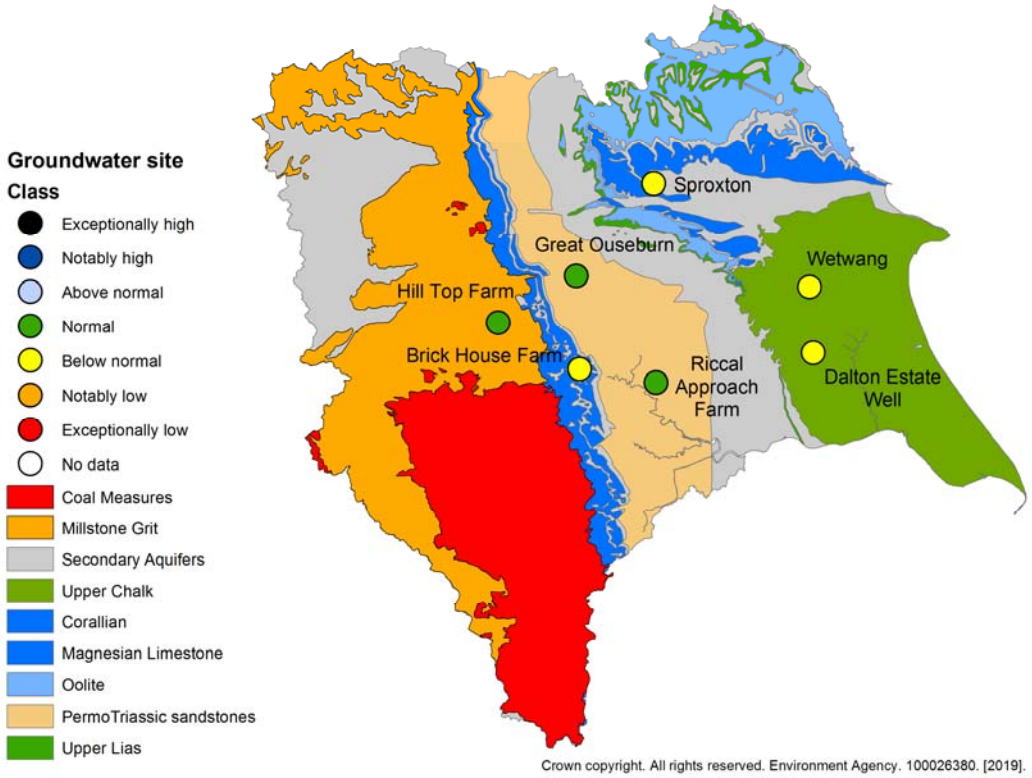
Wansford Snakeholm Lock - West Beck,
Ranking derived from data for the period Nov-1988 to Dec-2017

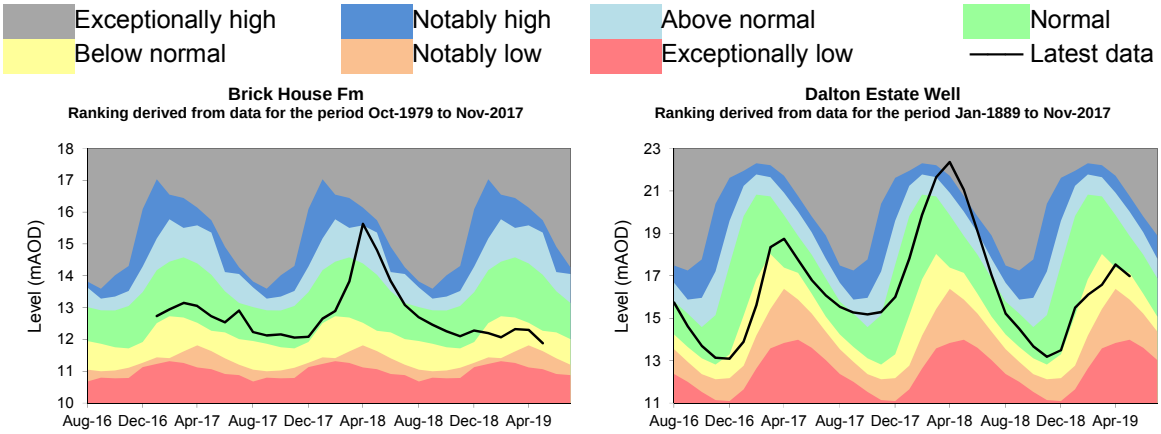


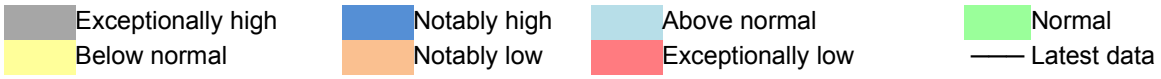
Whittington,
Ranking derived from data for the period Nov-1979 to Dec-2017



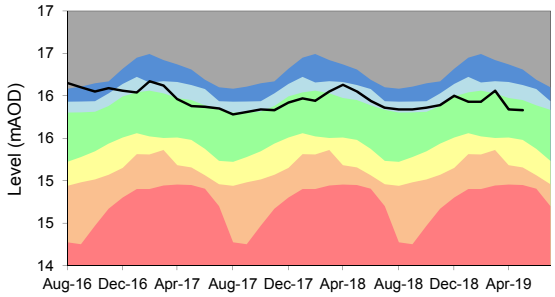
Groundwater Levels







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



Hill Top Fm
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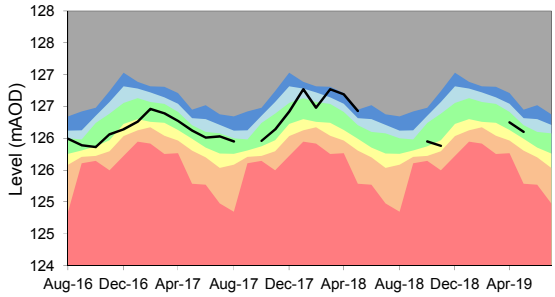

Riccall Approach Farm
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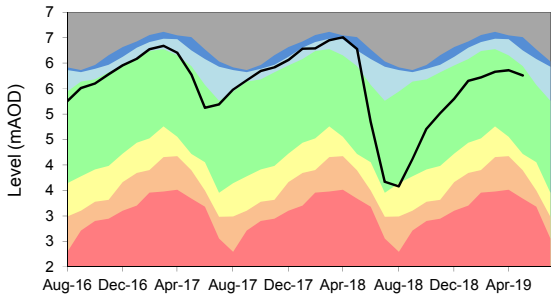

Sproxton
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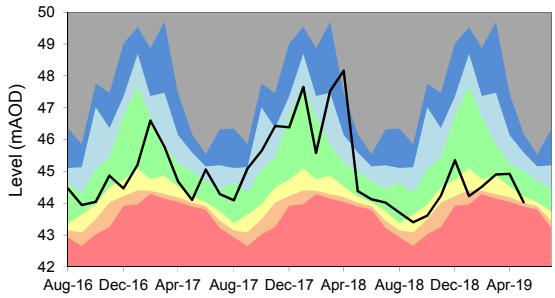

Wetwang
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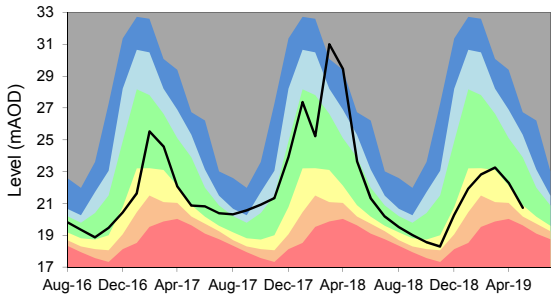
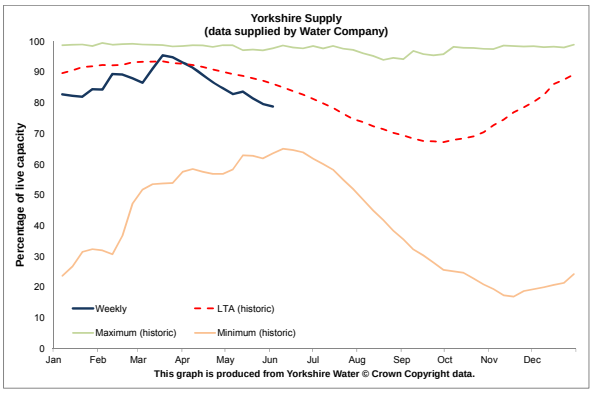


Reservoir Stocks – Data from Water Company



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