

Monthly water situation report

Yorkshire Area

Summary – April 2020

A very dry month with well below average rainfall across the area. River flows declined steadily and were in the notably or exceptionally low range, apart from those rivers with greater support from groundwater inflows (the Rye, Went and Hull catchments). Soils dried out significantly, following the wet winter. Groundwater levels decreased across the area but remained in the normal range or higher. Reservoir stocks decreased gradually during the month.

Rainfall

April was a very dry month across the Yorkshire area. Settled, high pressure conditions dominated for much of the month. The less settled spells from the 1st to the 6th and the 11th to the 13th brought very small amounts of localised rainfall. As examples, by the 27th April rain gauges at Richmond in the Swale catchment and Lower Dunsforth in the lower Ure catchment had each recorded less than 1mm of rainfall.

Conditions changed with low pressure weather systems affecting the area from the 27th to the end of the month, but these brought barely 10mm of rainfall to most catchments.

Using the Met Office Had-UK data set, catchment averaged rainfall ranged between 14% and 26% of the long term average (LTA), classified in the notably low or exceptionally low category (see rainfall map below).

Soil Moisture Deficit (SMD)

At the end of March soils across Yorkshire were classified as wet. SMD increased steadily from the 1st to the 28th April at a rate of about 15mm per week. By the 7th April soil moisture conditions across the area were classified as normal. By the month end, soils were classified as dry, apart from the Pennine ridge in the west which remained in the normal category, and the upper Rother catchment in the south which was borderline normal to dry.

River Flows

The Pennine fed rivers and the River Derwent further east showed declining flows for the first three weeks of April, and then either steady low flows or a more gradual rate of decrease until the 27th. A limited increase in flow occurred in response to rainfall in the last two or three days of the month, but flows remained below the normal range for the time of year. In the majority of catchments, changes in flow in response to the few millimetres of rainfall up to the 27th of the month were not detectable. Artificial influences such as reservoir compensation releases and diurnal variations in wastewater treatment plant discharges had a more noticeable effect on flow hydrographs.

Monthly mean flows in these watercourses were in the notably low or exceptionally low range, between 26% and 48% of the LTA. The River Esk in the northeast of the area had mean flows in the notably low range up to the 19th April (22% of LTA), after which the flow monitoring equipment has been out of order.

In the River Went and the River Rye, flows also declined throughout most of the month, but were classified in the normal range for the Went (61% of LTA) and just one band below normal for the Rye (50% of LTA). In these catchments a higher contribution of baseflow from groundwater sources helped to support river flows, particularly as winter and early spring groundwater levels were high following the wet autumn and month of February. Similarly, in the groundwater-fed River Hull catchment on the East Yorkshire Chalk, flows were in the above normal range at the start of April, declining steadily through the month but remaining within the normal range from the 6th April to month end. Monthly mean flows on the West Beck in this catchment were above the LTA (113% LTA).

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Groundwater Levels

There was a decrease in groundwater levels throughout the area reflecting the dry weather conditions occurring during April (where data available).

Magnesian Limestone

No data available due to site visit restrictions in response to Covid-19.

Millstone Grit

No data available due to site visit restrictions in response to Covid-19.

Sherwood Sandstone

The groundwater level in the Sherwood Sandstone, measured at both Great Ouseburn and Riccal Approach, decreased this month. However, the levels at both of these sites were still above average for the time of year.

Corallian Limestone

The groundwater level at Sproxton decreased this month and had just slightly dropped below the average 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 at an average level for the time of year. At Dalton Estate in the south of the aquifer, the groundwater level had also decreased but remained above the average level for the time of year.

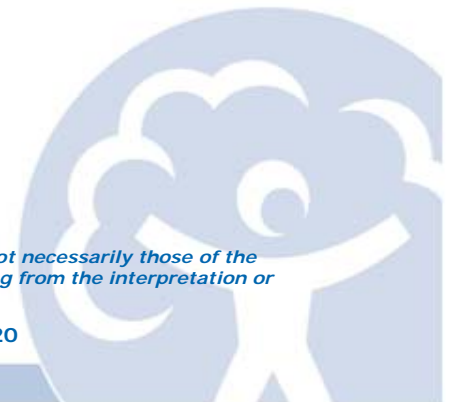
Reservoir Storage

Reservoir stocks decreased steadily through the month. By 27th April overall reservoir stocks were approximately 6% below the LTA for the time of year.

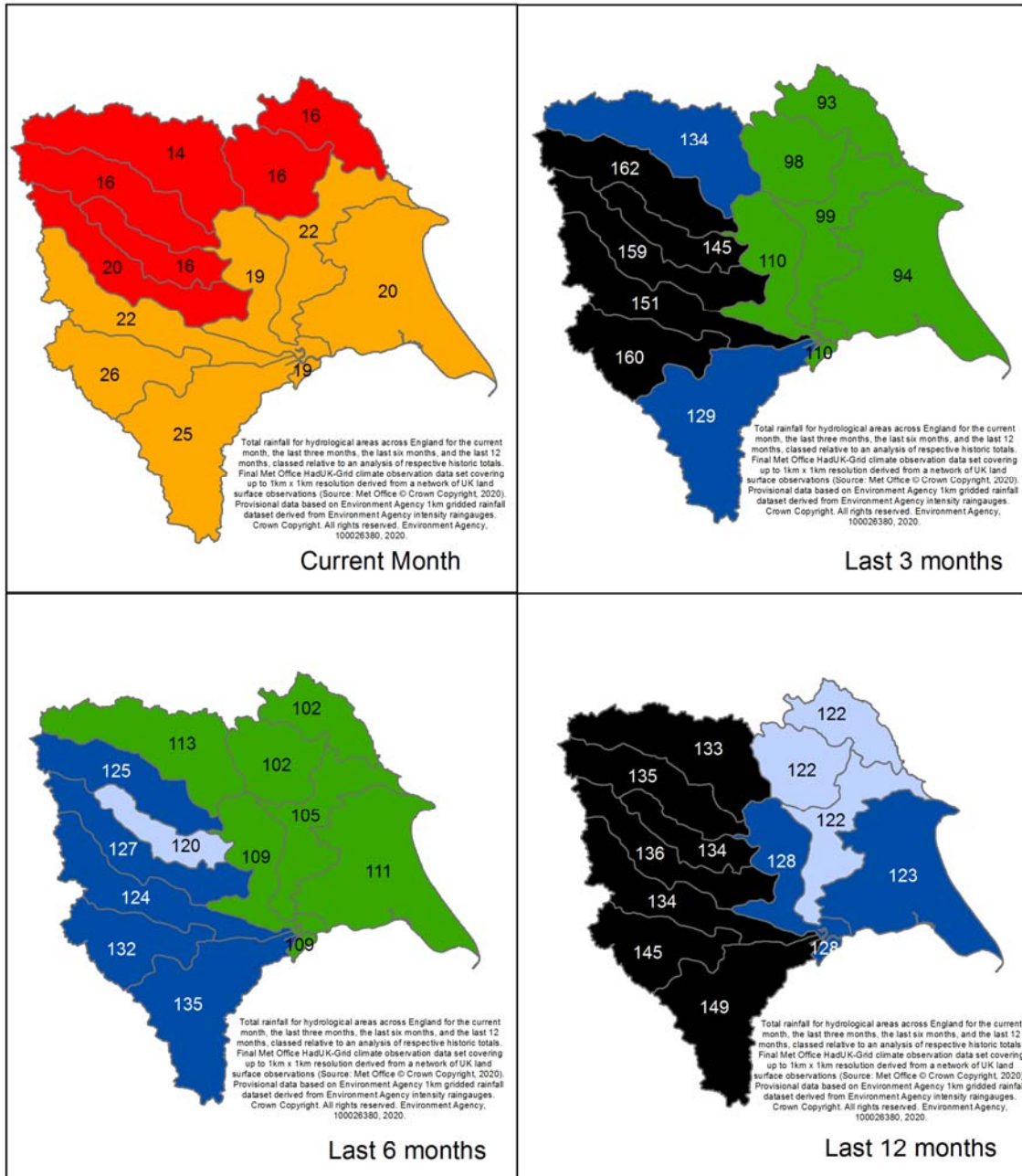
Environmental Impact

By the end of April five Hands off Flow (HoF) restrictions were in force. 42 licence holders had been issued with advance warning notifications that flows were low, although they were still able to abstract. The majority of these were linked to the advance warning threshold for the highest HoF on the River Derwent at Buttercrambe being crossed in mid April.

Author: [Yorkshire Hydrology](#)

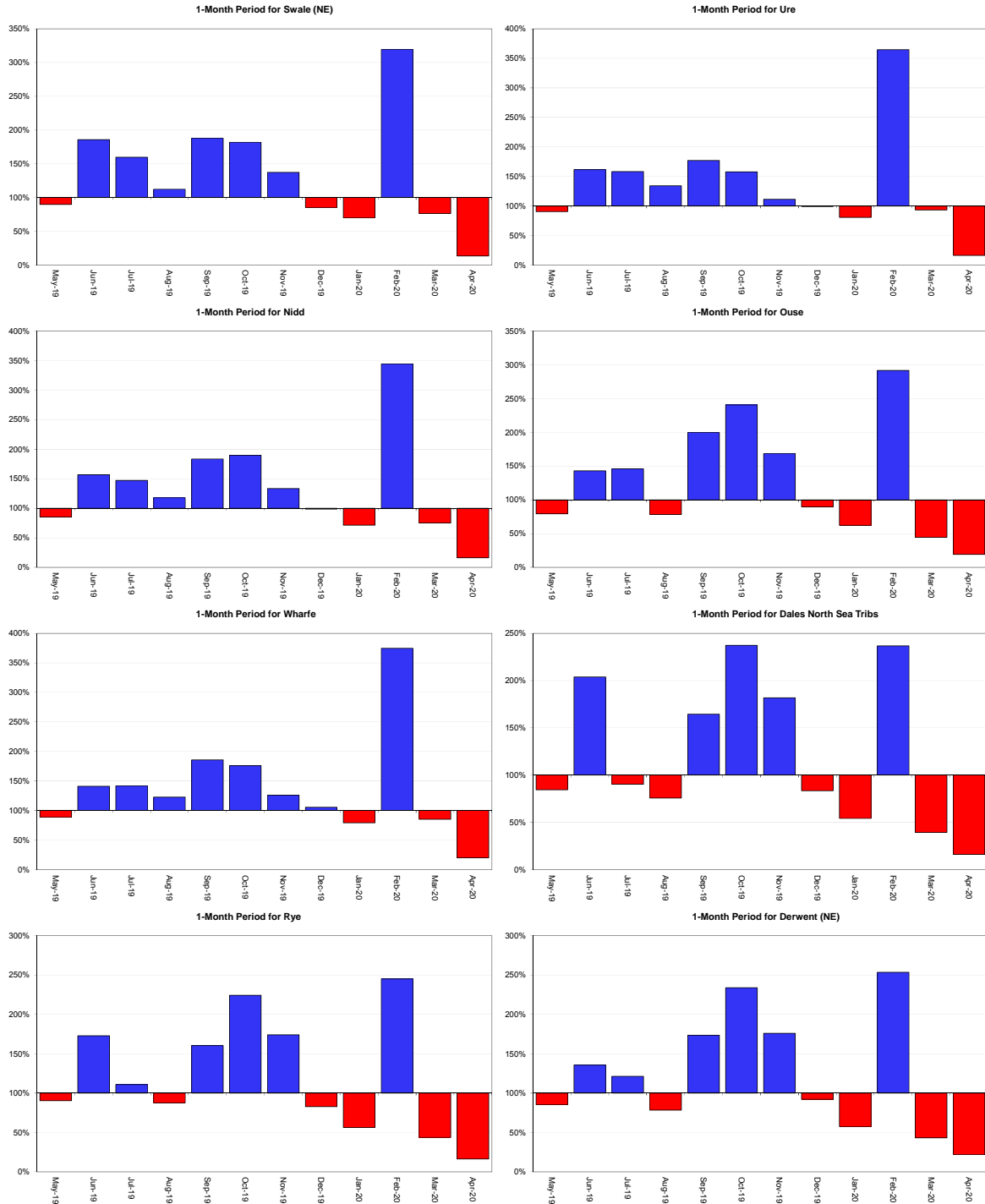


Rainfall



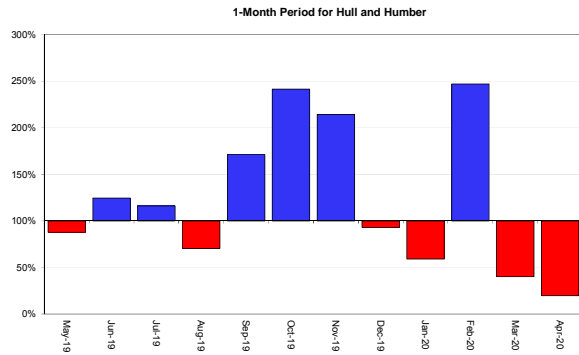
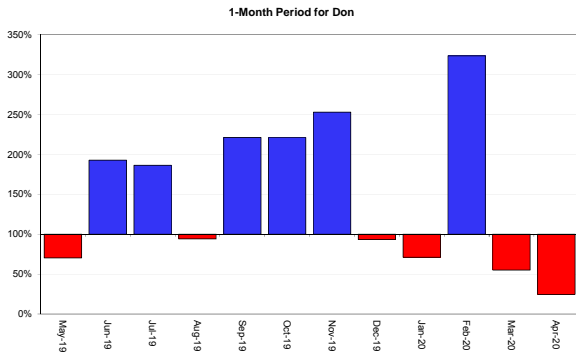
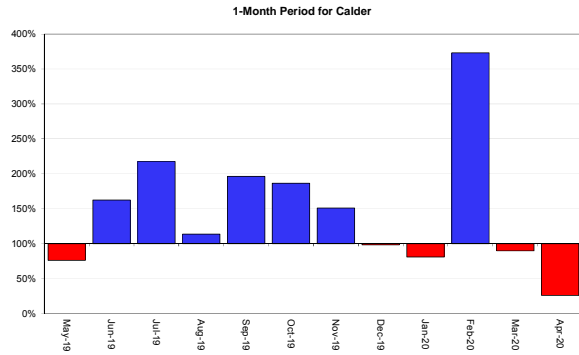
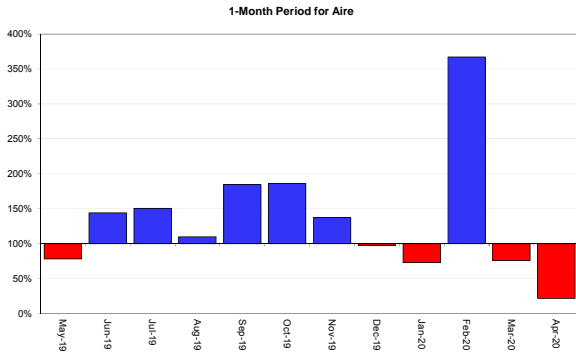
Above average rainfall

Below average rainfall



Above average rainfall

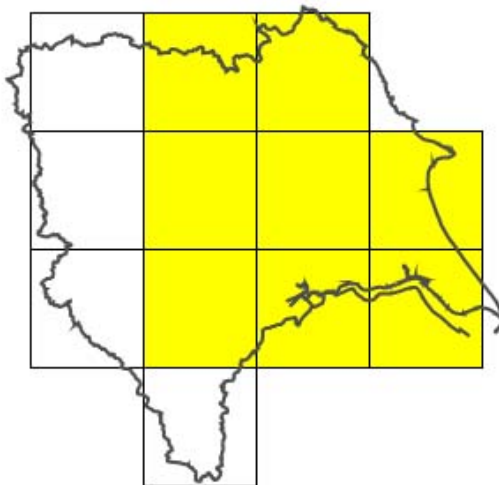
Below average rainfall



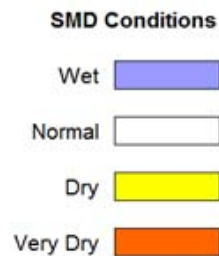
Soil Moisture Deficit

Environment Agency - Yorkshire Area

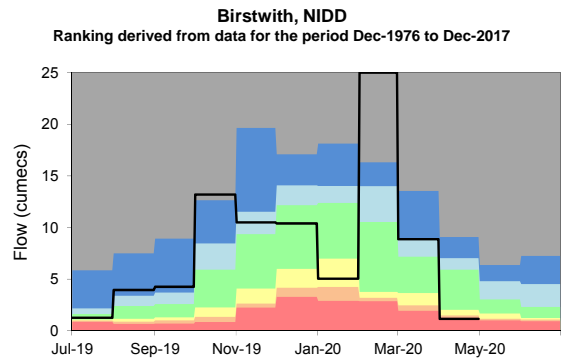
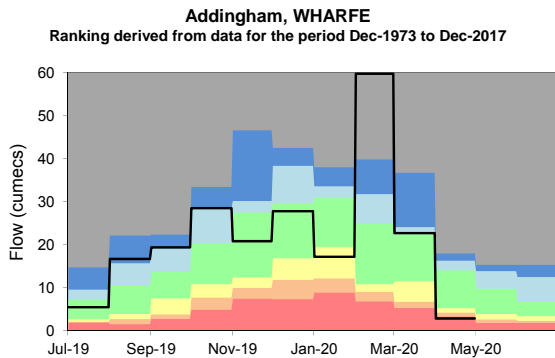
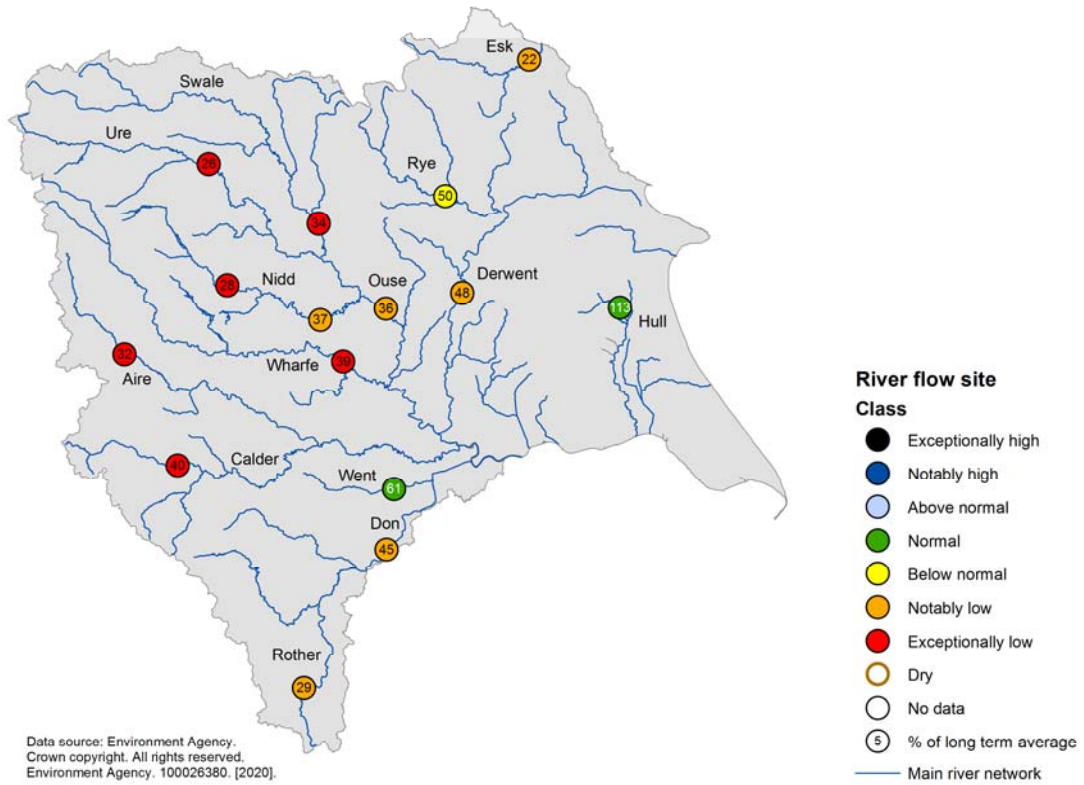
Monthly MORECS SMD Levels

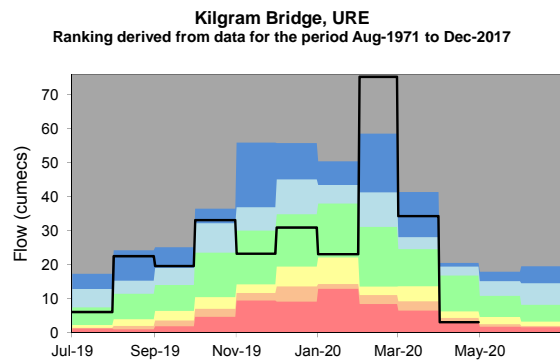
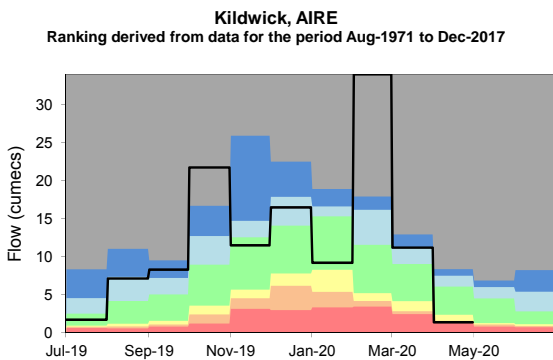
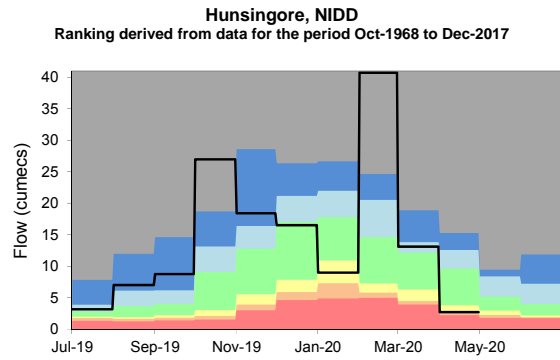
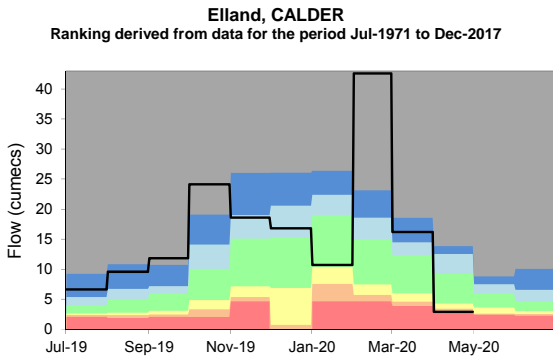
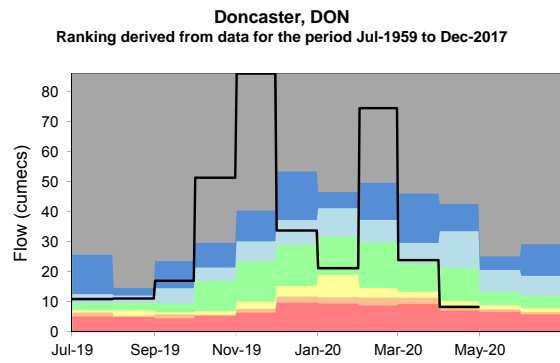
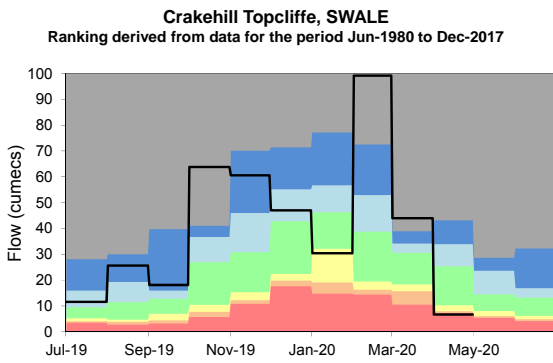
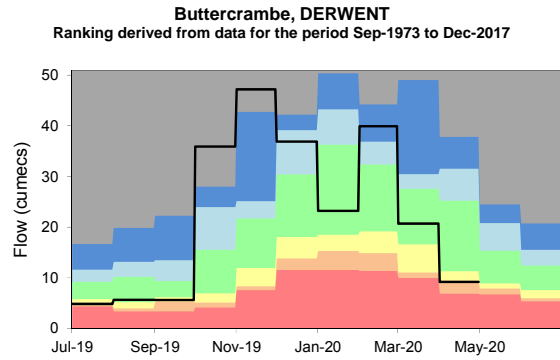
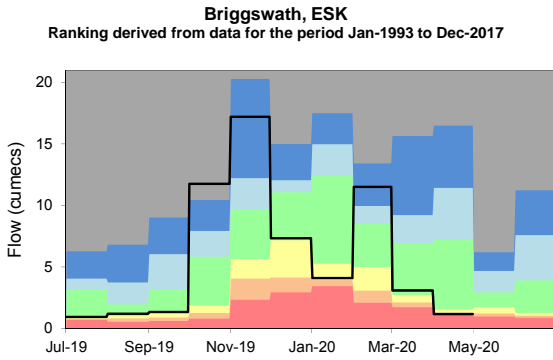
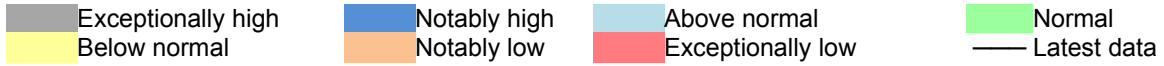


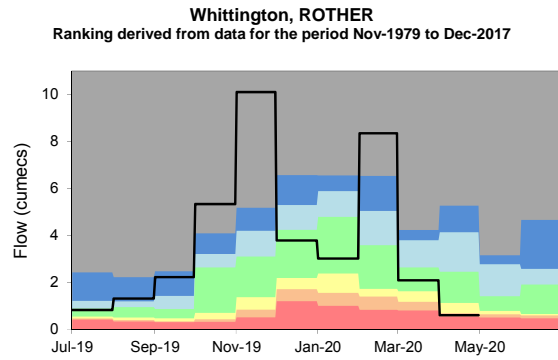
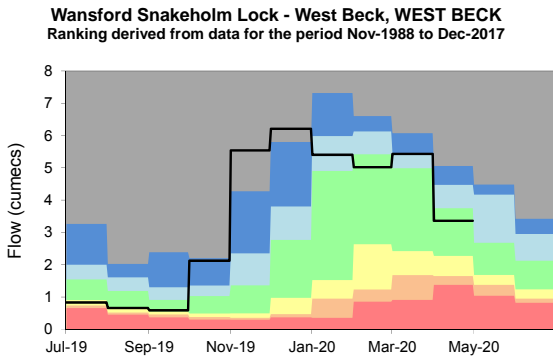
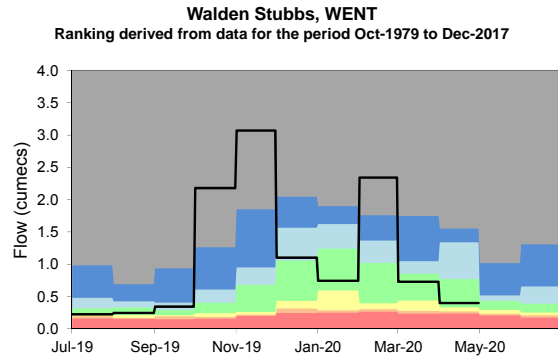
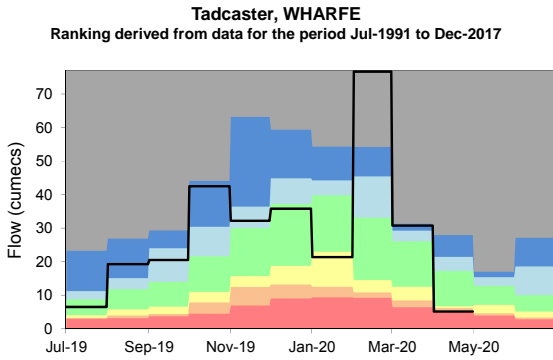
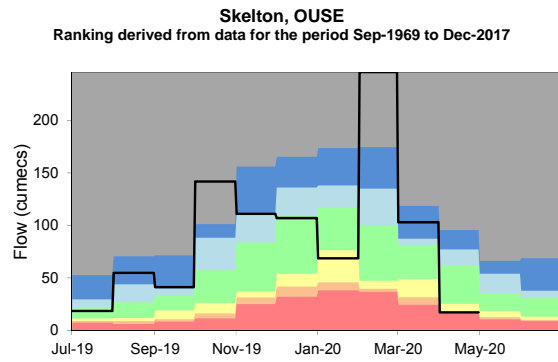
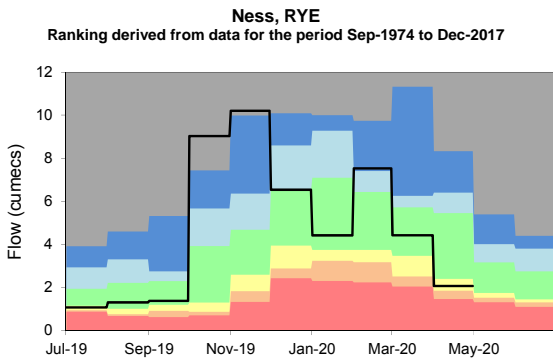
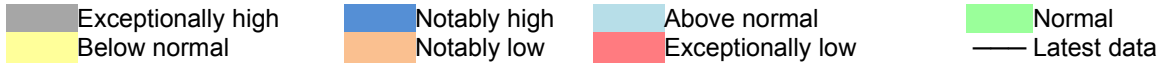
April 2020



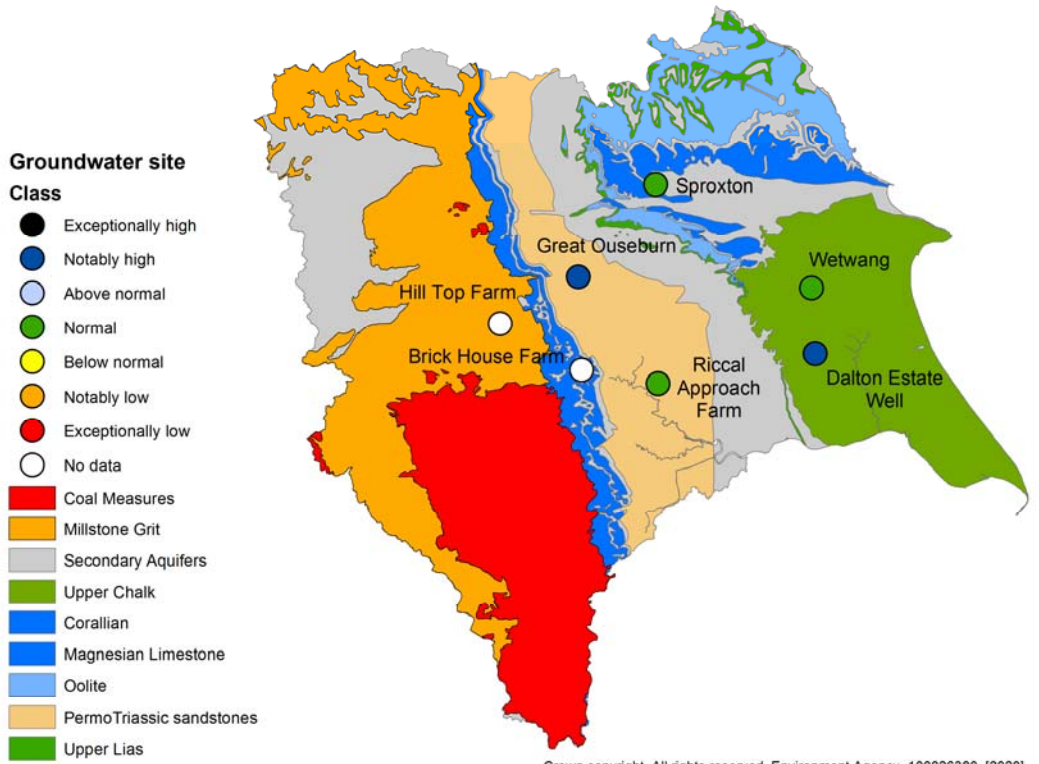
River Flow



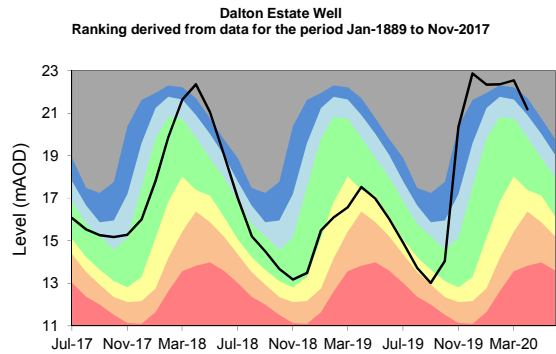
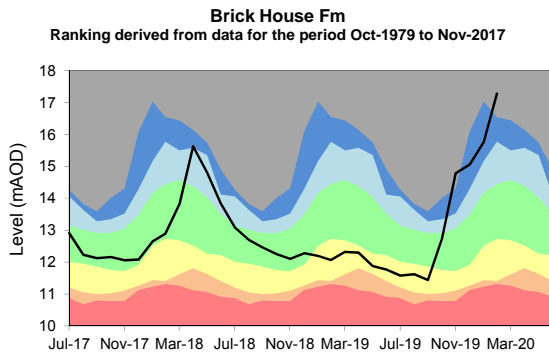
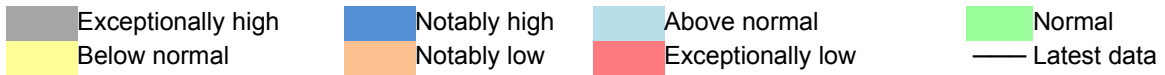


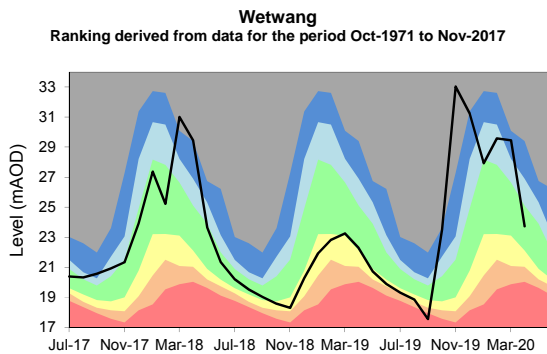
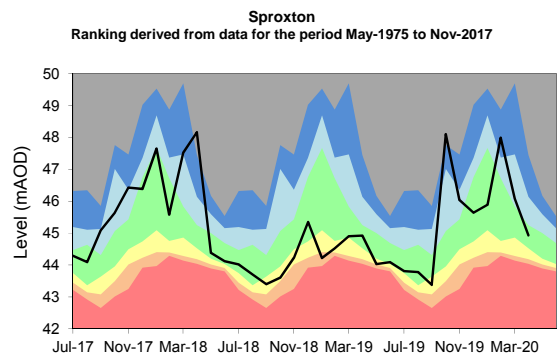
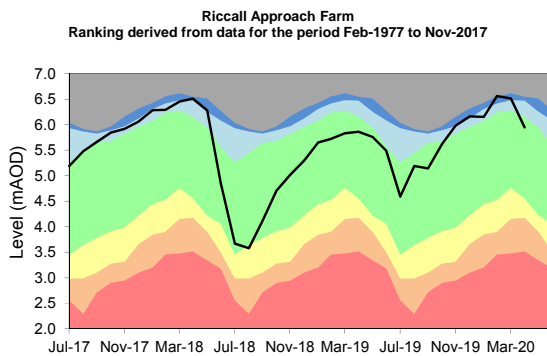
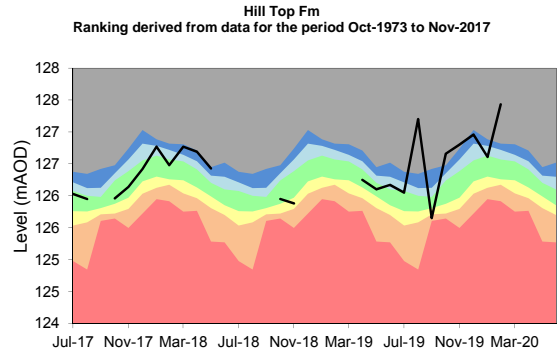
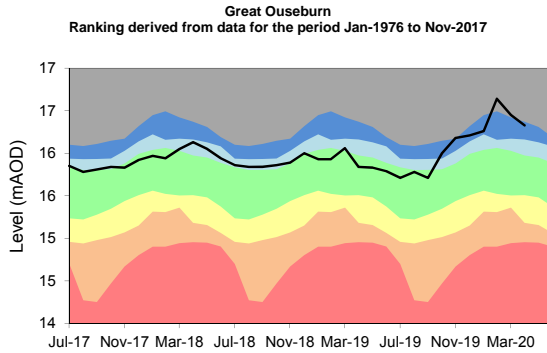


Groundwater Levels

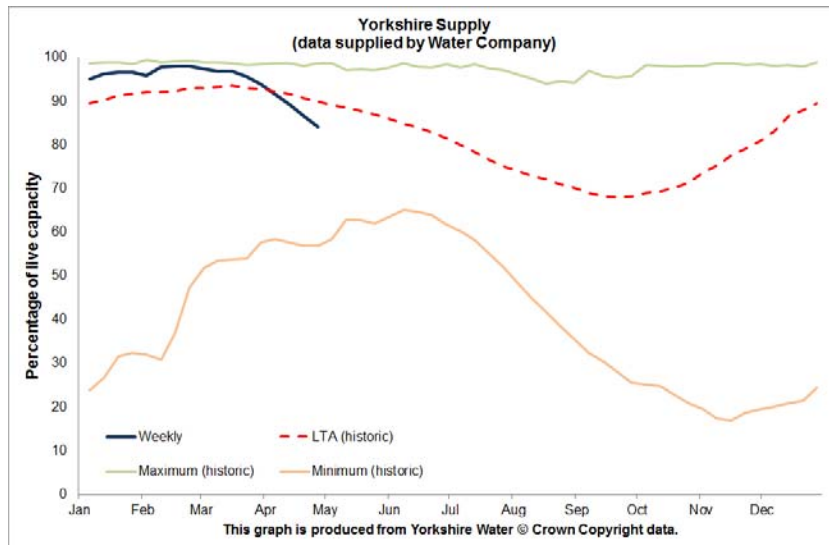


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Reservoir Stocks – Data from Water Company



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