Monthly water situation report

North East Area

Summary – October 2019

October was another wet month with monthly rainfall totals above the long term average resulting in elevated monthly mean flows across the North East. Soils throughout the area are classified as ‘wet’ and reservoir stocks, with the exception of Kielder, remain above average for the time of year. Groundwater levels in principal aquifers were ‘normal’ in the north while varying between ‘normal’ and ‘above normal’ in the south.

Rainfall

Monthly rainfall totals in October were classed as ‘normal’ in all catchments except the Tees and Seaham where it was classed as ‘above normal’. For the fifth consecutive month, monthly rainfall totals were above the long term average (LTA) across all catchments in the North East area, ranging from 105% of the LTA in the Tyne catchment to 193% of the LTA in the Seaham area. It is of interest to note that the six months to October has been the 3rd wettest since records began in 1891 in the Seaham Area.

Throughout the first half of October light but persistent rainfall was recorded across the area, with heavier downpours recorded on the 2nd, 3rd and 5th. This was followed by a several days of relatively little or no rainfall before persistent rainfall of moderate intensity returned during last week of the month. There were only a few dry days across the area during October.

Soil Moisture Deficit

All soils within the North East Area are now classified as ‘wet’.

River Flows

Monthly mean flows remained elevated at all indicator sites with flows within either the ‘above normal’ or ‘exceptionally high’ category, with the exception of the Tees catchment. Monthly flows across the area varied from 118% of the LTA at Middleton in Teesdale (Tees catchment) and 425% of the LTA at Hartford Bridge (Blyth catchment).

The daily mean flows at the beginning of the month at all indicator sites were ‘exceptionally high’, in response to the early October rainfall. The highest flows of the month were recorded in this first week at all sites, with the exception of Heaton Mill (River Till). Flows receded throughout the rest of the month, returning to ‘normal’ or ‘below normal’ by the end of October across the Area.

Groundwater Levels

The unconfined part of the Magnesian Limestone aquifer, represented by the typically responsive Aycliffe borehole, shows a sharp increase from September to ‘above normal’ status for October, in line with higher rainfall levels across the catchment for the month. Groundwater levels in the semi-confined and confined parts of the Magnesian Limestone, represented by West Hall Farm and Red Lion respectively, are classed as ‘normal’ and ‘above normal’, with decreases in levels at both boreholes from September. These boreholes show comparatively slower responses to rainfall, and ‘notably high’ rainfall across the associated catchments since August will be supplementing stocks in the semi-confined parts. Confined parts of the aquifer are still being recharged from heavier rainfall events throughout the early part of the year.

The groundwater level in the semi-confined part of the Fell Sandstone aquifer, represented by Royalty Observation, has increased since September in line with ‘above normal’ rainfall across the catchment over the last three months, but the level here remains within the normal range. The level in the unconfined part of the Fell Sandstone, represented by the typically responsive Townlaw borehole, has dropped since September but is still at a ‘normal’ level, with little change over recent months despite the high rainfall in the catchment.
Reservoir Storage
The majority of reservoir stocks remained at a similar level this month to September, with the exception of Derwent and the North Tynedale group which saw increases of 11% and 8% respectively. All the reservoir stocks, with the exception of Kielder, remain above average for the time of the year. Kielder levels have been deliberately drawn down to provide flood storage for the coming winter period.

<table>
<thead>
<tr>
<th></th>
<th>Current % Stocks</th>
<th>Previous Month % Stock</th>
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</thead>
<tbody>
<tr>
<td>Kielder</td>
<td>82.2</td>
<td>85.1</td>
</tr>
<tr>
<td>North Tynedale Group</td>
<td>87.8</td>
<td>79.1</td>
</tr>
<tr>
<td>Derwent</td>
<td>84.4</td>
<td>72.8</td>
</tr>
<tr>
<td>Durham Group</td>
<td>99.8</td>
<td>100</td>
</tr>
<tr>
<td>Lune Balder Group</td>
<td>97.7</td>
<td>99.4</td>
</tr>
<tr>
<td>Cow Green</td>
<td>94.9</td>
<td>96.8</td>
</tr>
</tbody>
</table>

Author: GWHCL
Rainfall

Total rainfall (as a percentage of the long term average) for hydrological areas across North East England for the current month, the last three months, the last six months, and the last twelve months, classed relative to an analysis of respective historic totals. HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office © Crown Copyright 2019). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges.
Above average rainfall

Below average rainfall

1-Month Period for Tweed

1-Month Period for Northumbria North Sea Tribs

1-Month Period for Tyne

1-Month Period for Wear

1-Month Period for Seaham Area

1-Month Period for Tees
Soil Moisture Deficit

Environment Agency - North East Area
Monthly MORECS SMD Levels

October 2019

SMD Conditions
- Wet
- Normal
- Dry
- Very Dry
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HEATON MILL, River Till
Ranking used data from 25/04/2002 to 31/12/2017
MEAN MONTHLY FLOW
15.2 cumecs
157% LTA

HARTFORD BRIDGE, River Blyth
Ranking used data from 01/10/1966 to 31/12/2017
MEAN MONTHLY FLOW
6.48 cumecs
425% LTA

HAYDON BRIDGE, River South Tyne
Ranking used data from 07/10/1974 to 31/12/2017
MEAN MONTHLY FLOW
25.7 cumecs
132% LTA

MITFORD, River Wansbeck
Ranking used data from 01/11/1968 to 31/12/2017
MEAN MONTHLY FLOW
9.64 cumecs
408% LTA

ROTHBURY, River Coquet
Ranking used data from 01/06/1972 to 31/12/2017
MEAN MONTHLY FLOW
9.61 cumecs
182% LTA

STANHOPE, River Wear
Ranking used data from 01/10/1958 to 18/09/2017
MEAN MONTHLY FLOW
6.48 cumecs
168% LTA

MIDDLETON IN TEESDALE, River Tees
Ranking used data from 01/05/1971 to 31/12/2017
MEAN MONTHLY FLOW
11.1 cumecs
118% LTA
Groundwater Levels

October 2019

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Reservoir Stocks – data from Water Company

Kielder

N Tyne Group

Derwent

Durham

Cow Green

Lune Balder
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Aquifer</td>
<td>A geological formation able to store and transmit water.</td>
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<tr>
<td>Areal average rainfall</td>
<td>The estimated average depth of rainfall over a defined area. Expressed in depth of water (mm).</td>
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<tr>
<td>Effective rainfall</td>
<td>The rainfall available to percolate into the soil or produce river flow. Expressed in depth of water (mm).</td>
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<tr>
<td>Groundwater</td>
<td>The water found in an aquifer</td>
</tr>
<tr>
<td>Recharge</td>
<td>The process of increasing the water stored in the saturated zone of an aquifer. Expressed in depth of water (mm).</td>
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<tr>
<td>Reservoir live capacity</td>
<td>The reservoir capacity normally usable for storage to meet established reservoir operating requirements. It is the total capacity less that not available because of operating agreements or physical restrictions. Only under abnormal conditions, such as a severe water shortage might this additional water be extracted.</td>
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<tr>
<td>Soil moisture deficit (SMD)</td>
<td>The difference between the amount of water actually in the soil and the amount of water that the soil can hold. Expressed in depth of water (mm).</td>
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### Categories

- **Exceptionally high**: Value likely to fall within this band 5% of the time
- **Noteably 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

### Units

- **cumeecs**: Cubic metres per second (m³ s⁻¹)
- **mAOD**: Metres Above Ordnance Datum (mean sea level at Newlyn Ordnance Datum).