

# Hydrometry and Telemetry

## H&T summary heavy rainfall event 26<sup>th</sup> to 29<sup>th</sup> October 2021

### Summary of Hydrometry & Telemetry network

#### Overview

Heavy and persistent rainfall fell over Cumbria and Lancashire between the 26<sup>th</sup> and 29<sup>th</sup> October 2021, significant rainfall totals fell over Central and Western Cumbria in particular. As a result Flood warnings were issued at a number of locations and unfortunately a number of communities and properties were flooded.

#### Rainfall

Significant rainfall totals were recorded across Cumbria and Lancashire for the 72 hour period between the 26<sup>th</sup> and 29<sup>th</sup> October with some sites receiving more than a months' worth of rainfall within this 3 day period. The table below summarises the 72 hour total rainfall and comparison with the LTA (1961-1990) monthly rainfall for October at a few selected sites and catchments across CLA that had either Flood Warning Areas activated or any notable totals.

Raingauge	Nearby active FW area	Oct LTA – (mm)	72hr total (09:00 26th Oct - 09:00 29th) - mm	72hr period % of LTA
<b>Ennerdale</b>	River Ehen at Egremont, Bleach Green, Ennerdale Mill, Bridge End, Vale View, Wood Bank, Rugby Club	212	165.2	<b>77.9</b>
<b>Ennerdale Black Sail</b>	River Ehen at Egremont, Bleach Green, Ennerdale Mill, Bridge End, Vale View, Wood Bank, Rugby Club	310	276	<b>89.0</b>
<b>Summergrove</b>	River Ehen at Egremont, Bleach Green, Ennerdale Mill, Bridge End, Vale View, Wood Bank, Rugby Club	148.2	130	<b>87.7</b>
<b>Dalehead</b>	River Greta at Keswick, Keswick Campsite, Rugby Club and Quinta	246	240.4	<b>97.7</b>
<b>Honister Pass</b>	River Greta at Keswick, Keswick Campsite, Rugby Club and Quinta	388.4	399.2	<b>102.8</b>
<b>Seathwaite Farm</b>	River Greta at Keswick, Keswick Campsite, Rugby Club and Quinta	364	340.8	<b>93.6</b>
<b>Thirlmere</b>	River Greta at Keswick, Keswick Campsite, Rugby Club and Quinta	247.5	206	<b>83.2</b>
<b>Kentmere</b>	River Kent at Burneside, Steels Row and Carling steps	215.2	171	<b>79.5</b>
<b>Tower Wood</b>	Windermere (Lake levels)	176.4	117.27	<b>66.5</b>

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<b>Mickleden</b>	River Rothay at Grasmere, White Bridge and Stock Lane	315	258.6	<b>82.1</b>
<b>Brathay Hall</b>	River Rothay at Grasmere, White Bridge and Stock Lane	220.5	177.6	<b>80.5</b>

\* no active Flood Warning area but notable rainfall amounts

<b>Coniston Coppermines</b>	Crake	279.3	322	<b>115.3</b>
<b>Ulpha</b>	Duddon	234.9	202.8	<b>86.3</b>
<b>Brotherswater</b>	Eden	276.3	256	<b>92.7</b>

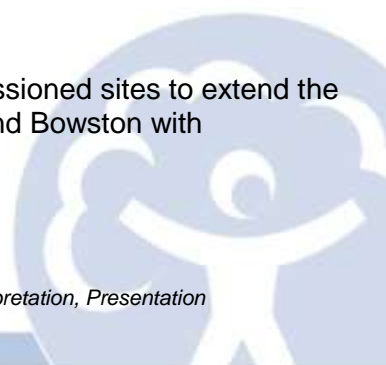
Rainfall total comparisons for previous flood incidents can be seen below for selected sites against two of the major floods to affect the area in 2009 and 2015 to give an illustration of the magnitude of the recent incident:

Raingauge	72hr total (09:00 26th - 09:00 29 <sup>th</sup> Oct 2021) - mm	72hr total from Storm Desmond – 09:00 3rd to 09:00 6th Dec 2015 (mm)	72hr total from 09:00 17th to 09:00 20th Nov 2009 (mm)
Ennerdale	165.2	98	181.6
Ennerdale Black Sail	276	282.4	364.8
Summergrove	130	60.6	81.2
Dalehead	240.4	376.8	292.8
Honister Pass	399.2	427.8	454.4
Seathwaite Farm	340.8	277.8	456.4
Thirlmere	206	450.2	265.8
Kentmere	171	225.8	202.2
Tower Wood	117.27	174	160.7
Mickleden	258.6	231.2	309.2
Brathay Hall	177.6	273.6	238.6
Ulpha	202.8	103	230.4
Brotherswater	256	419.1	293.2

## River Levels and Flows

A number of catchments across South, central and western Cumbria recorded significant high river levels in the top 10 on record. In particular in the Derwent, Cocker, Ehen, Leven, Duddon and Crake catchments appear to have experienced the top 5 highest levels/flows ever, which is highlighted in the table below showing selected sites.

Sites with \* denote when data have been combined with decommissioned sites to extend the period of record, Seaton Mill has been combined with Camerton and Bowston with Burneside.



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Site with \*\* denote that there is no 'Peaks over Threshold (POT) timeseries available on WISKI so ranking has been calculated from analysis of DayMax data.

Station	Nearby active FW area	Date/time	Stage (m)	FQ (m3/s)	Start of record (Combined EA and NRFA holdings)	Flow rank (Combined EA and NRFA holdings)
Scalehill	River Cocker at Southwaite Bridge	28/10/21 @ 04:00	3.069	148	Mar-74	3
Southwaite Br	River Cocker at Southwaite Bridge	28/10/21 @ 06:00	2.778	180	Jun-67	3
Ouse Bridge	Rivers Cocker and Derwent at Cockermouth, Cricket Ground and Trout Hotel Car Park	29/10/21 @ 03:13	2.844	172	Feb-68	5
Bleach Green	River Ehen at Egremont, Bleach Green, Ennerdale Mill, Bridge End, Vale Vieww, Wood Bank, Rugby Club	28/10/21 @ 06:45	2.236	84.5	Oct-73	2
Seaton Mill	River Derwent at Workington, Seaton Mill and Barepot	28/10/21 @ 16:45	2.182	393	Feb-11	3*
Bowston	River Kent at Burneside, Steels Row and Carling steps	27/10/21 @ 21:45	1.664	71.8	Oct-99	24*
Jeffy Knotts	River Rothay at Grasmere, White Bridge and Stock Lane	28/10/21 @ 04:00	3.562	116	Jul-70	10
Miller Bridge House	River Rothay at Grasmere, White Bridge and Stock Lane	28/10/21 @ 04:45	3.143	129	Jan-76	5**
Newby Bridge	River Leven at Newby Bridge and Backbarrow	28/10/21 @ 14:45	2.063	129	Jan-39	5

## Site with no active Flood Warning

Low Nibthwaite	River Crake*	28/10/21 @ 19:45	1.42	36.8	Aug-62	2
Duddon Hall	River Duddon*	27/10/21 @ 23:30	2.384	219	Dec-67	3

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The table below shows the comparison between stage and flow at a selection of sites from the October 21 peak and the historic peak values from the stations to give an idea of the magnitude of this recent incident.

	Oct-21			Historic Flood Peak		
Station	Stage (m)	FQ (m <sup>3</sup> /s)	Flow rank (EA and NRFA holdings)	Peak Stage (m) - using POT data	Peak FQ (m <sup>3</sup> /s)	Date of peak value
Scalehill	3.069	148	3	3.538	192	Nov-09
Southwaite Br	2.778	180	3	3.12	201	Nov-09
Ouse Bridge	2.844	172	5	3.891	448	Dec-15
Bleach Green	2.236	84.5	2	2.458	102	Nov-09
Seaton Mill	2.182	393	3*	2.67	700*	20/11/2009*
Jeffy Knotts	3.562	116	10	4.5	200	Nov-09
Miller Bridge House	3.143	129	5**	3.714	173	Dec-15
Newby Bridge	2.063	129	5	2.541	209	Nov-09
Low Nibthwaite	1.42	36.8	2	1.701	60	Nov-09
Duddon Hall	2.384	219	3	2.61	268	Nov-09

Photo below: Flood flow at Ouse Bridge Gauging station on the River Derwent taken at 15:20 (GMT) on Thursday 28<sup>th</sup> October. Stage was approximately 2.7m and corresponding flow approximately 130m<sup>3</sup>/s





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Photo below: Of out of bank flow at Bleach Green Gauging station on the River Ehen, taken at 13:30 (GMT) on Thursday 28<sup>th</sup> October. Stage was 2.188m and corresponding flow was 80m<sup>3</sup>/s



Photo below: Newby Bridge Gauging weir on the River Leven taken at 13:15 on Monday 1<sup>st</sup> November 2021. Stage was 1.728m and the corresponding flow is 84m<sup>3</sup>/s.



**\*\*\* Please be aware that all data provided in this report has not been validated and therefore subject to change following the validation process\*\*\***

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*Hydrometry and Telemetry, part of the Monitoring & Reporting community: Collection, Interpretation, Presentation*