

Monthly water situation report: Solent and South Downs Area

Summary - July 2023

Solent and South Downs (SSD) had above average rainfall in July, receiving 191% (90mm) of the Long Time Average (LTA) rainfall (47 mm). Monthly mean river flows across SSD ranged from **normal** to **exceptionally high**. Groundwater levels ranged from **normal** to **above normal**. Soils across Solent and South Downs ended the month drier than the average for July. End of month reservoir stocks at Ardingly Reservoir (Ouse) and at Arlington Reservoir (Cuckmere) were both below average.

1.1 Rainfall

SSD had above average rainfall in July, receiving 191% (90mm) of the (LTA) rainfall (47 mm). The rainfall pattern across SSD for July shows the largest totals in the west of the area (Hampshire and the Isle of Wight), which received more than double of the average rainfall. The Test Chalk areal unit received the most rainfall with 264% (126mm) of LTA (48mm), which is the 8th highest on its record. The Sussex areal units on the east received about 150% of the LTA. The Adur areal unit, had the least rainfall with 140% (64mm) of LTA (46mm). Despite the rainfall pattern, which showed more rain in the west than the east of the SSD, the highest daily total of 55mm was recorded at the Popeswood rain gauge (Ouse).

The weather across SSD was variable throughout the month, with alternating drier and wetter periods. The driest week of the month was between 15th and 21st of July, with less than 5% of the month's total rain. This was followed with the five wettest days, between the 22nd and 26th of July, with about 50% of the total rain.

1.2 Soil moisture deficit and recharge

Soils across Solent and South Downs ended the month drier than the average for July.

1.3 River flows

Monthly mean river flows across SSD ranged from **normal** to **exceptionally high**. Flows in the River Itchen at Allbrook & Highbridge were **exceptionally high**. The flows in the River Rother at Iping Mill, River Meon at Mislingford, River Wallington at North Fareham, River Adur at Sakeham, River Cuckmere at Cowbeech and River Lymington at Brockenhurst were **above normal**. The flows in the River Test at Broadlands, River Arun at Alfoldean, River Ouse at Goldbridge, River Medina at Blackwater and River Test at Chilbolton were in the **normal** category.

The River Itchen at Allbrook & Highbridge was the 2nd highest on their records for July and the River Rother at Iping Mill recorded its 9th highest July monthly mean flows.

1.4 Groundwater levels

End of month groundwater levels ranged from **normal** to **above normal**.

Clanville Gate (Test Chalk), West Meon (East Hampshire Chalk), Houndean Bottom (East Sussex Chalk) Youngwoods Copse (Isle of Wight), Catherington (East Hampshire Chalk), Beeding Hill (West Sussex Chalk), Cornish Farm (East Sussex Chalk), Chilgrove (West Sussex Chalk) and Preston Candover (East Hampshire Chalk) all had groundwater levels in the **above normal** category. Levels at Clanville Gate were the 5th highest on record for July (starting 1966).

Groundwater levels at Lopcombe Corner (Test Chalk) and Carisbrooke Castle (Isle of Wight) were **normal** category.

1.5 Reservoir stocks

End of month reservoir stocks were both below average at Ardingly Reservoir (Ouse) with 78.9% of total capacity (LTA 82%) and at Arlington Reservoir (Cuckmere) with 65% of total capacity (LTA 73.4%).

1.6 Environmental impact

Three licence restrictions were in place at the start of July. Two in the River Arun catchment which stayed in place till the last week, when it was lifted and one on the River Lymington (New Forest), which was only in force on the first two weeks of July. From the second week of July six licence restriction came into force on the Isle of Wight. Four cessations on the River Medina at Shide stayed in place for three weeks; and two licences on the Shepherds Chine at Atherfield GS, which were repeatedly on and off as the flows at this site were fluctuating around the Hands of Flow throughout the month.

No Flood Alert or Flood Warning was issued in July.

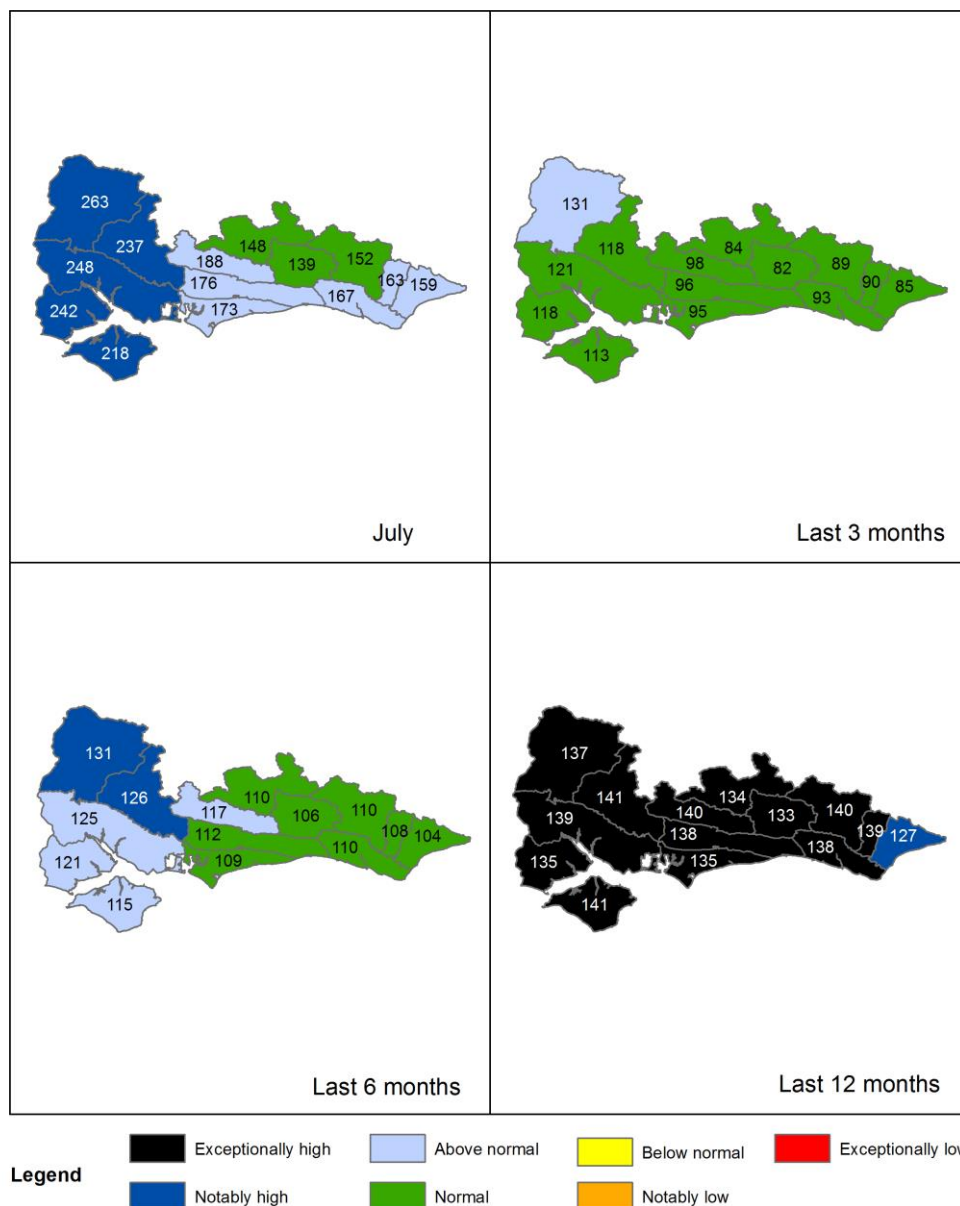
Author: [HydrologySSD](#)

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2. Rainfall

2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 July 2023), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

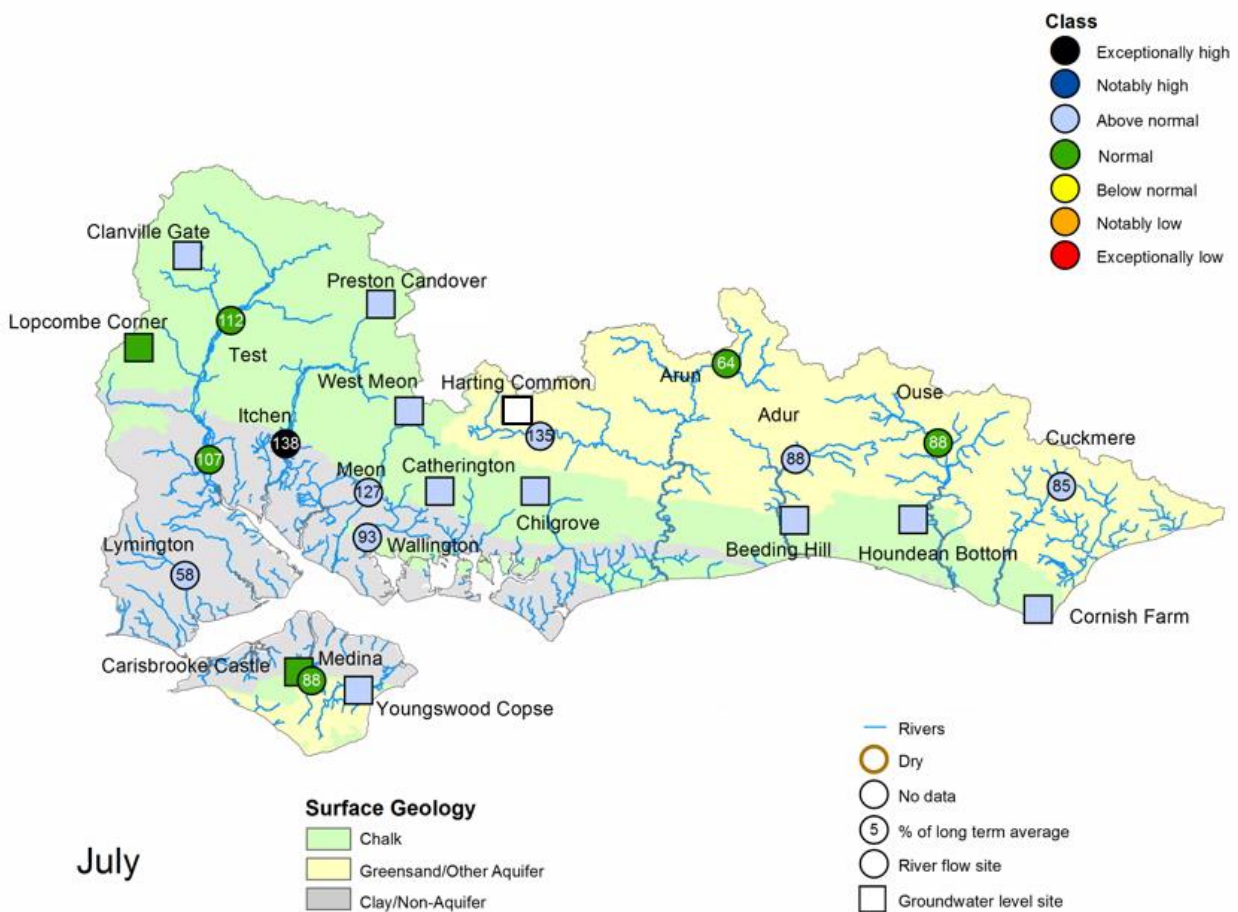


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2023). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100024198, 2023.

3 River flows and Groundwater levels

3.1 River flows and Groundwater level map

Figure 3.1: Monthly mean river flow and groundwater levels at our indicator sites for July 2023, expressed as a percentage of the respective long term average and classed relative to an analysis of historic July monthly means. Table available in the appendices with detailed information.



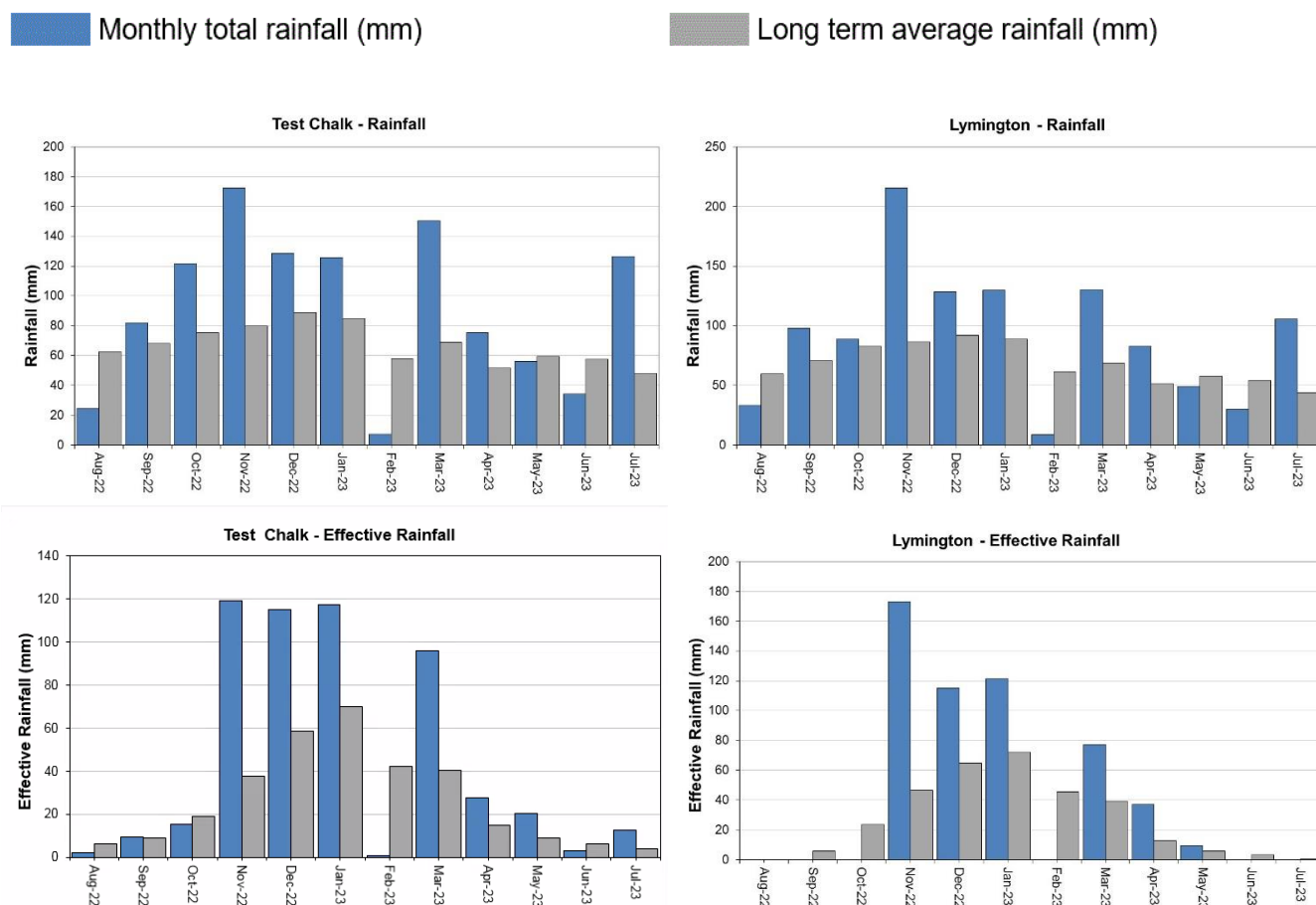
*no data available for Harting Common in July.

(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2023. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2023.

4 West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

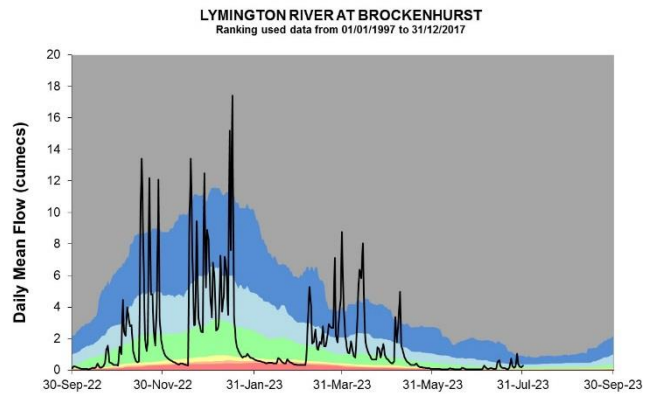
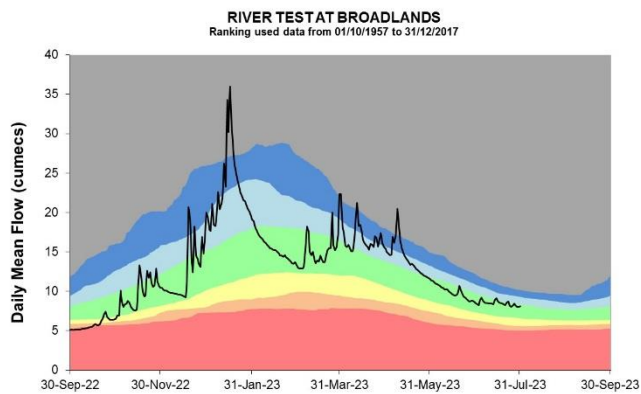
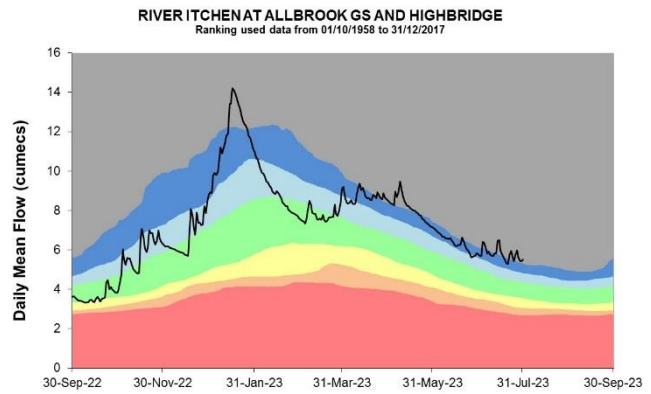
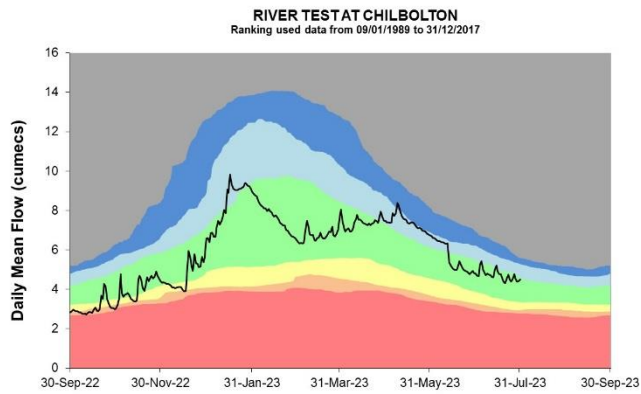
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

4.2 West Hampshire River flow charts

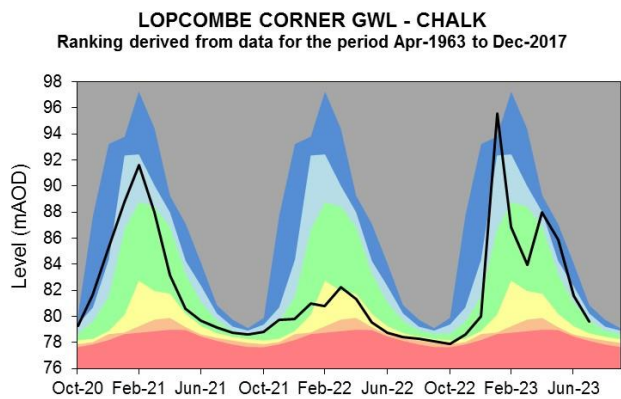
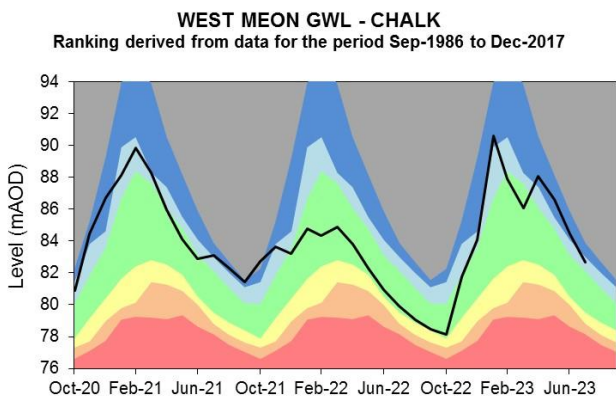
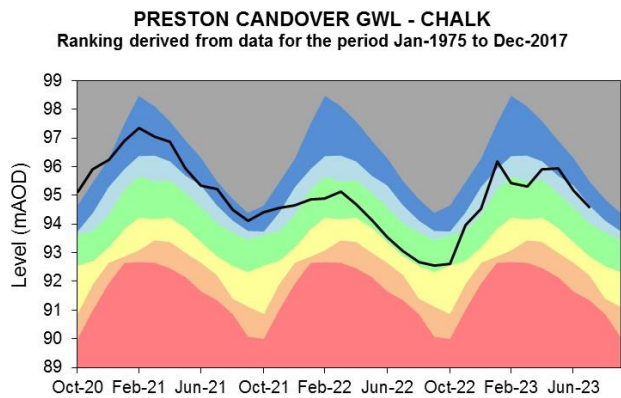
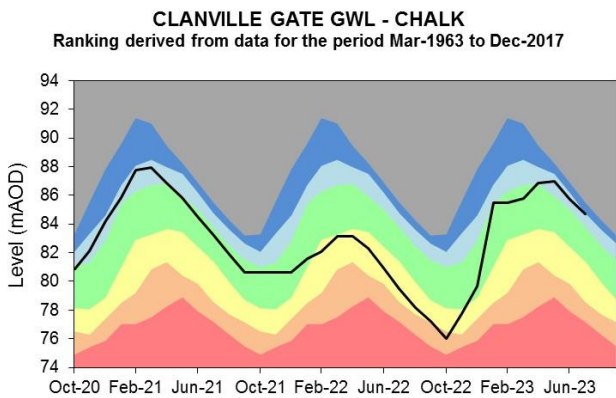
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

4.3 West Hampshire Groundwater level charts

Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

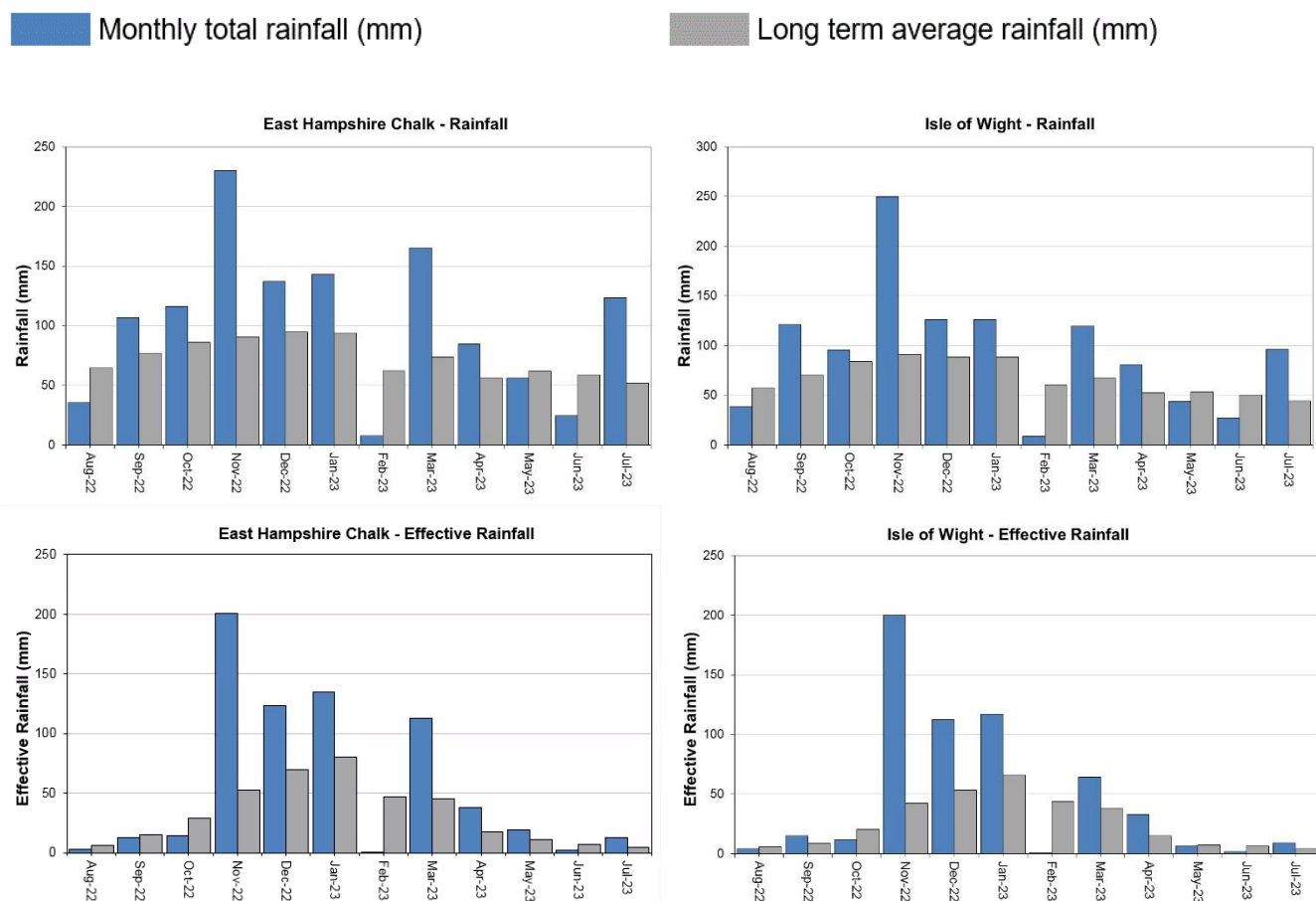


Source: Environment Agency, 2023.

5 East Hampshire and Isle of Wight

5.1 East Hampshire and Isle of Wight Rainfall and Effective rainfall charts

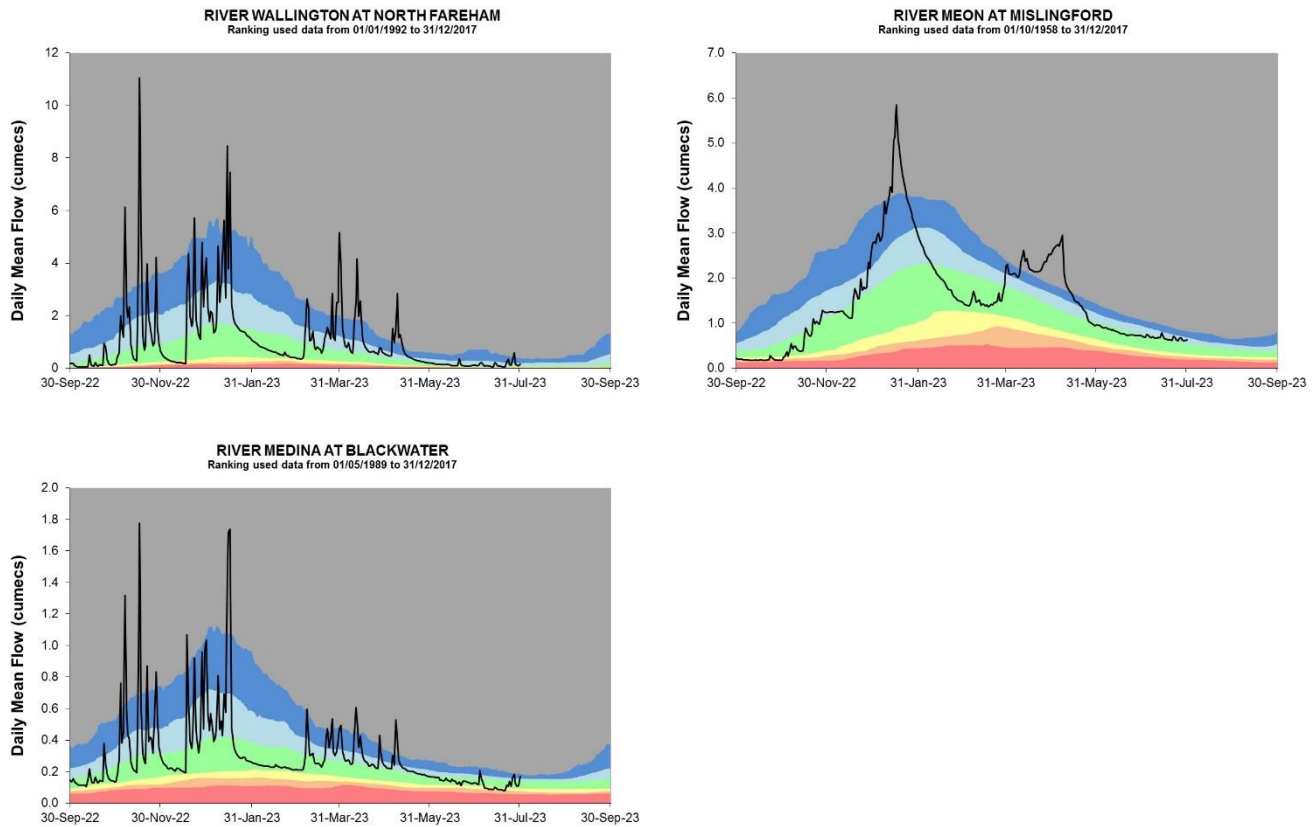
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

5.2 East Hampshire and Isle of Wight River flow charts

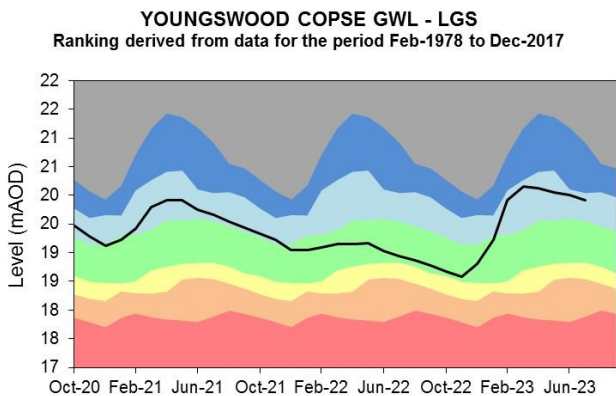
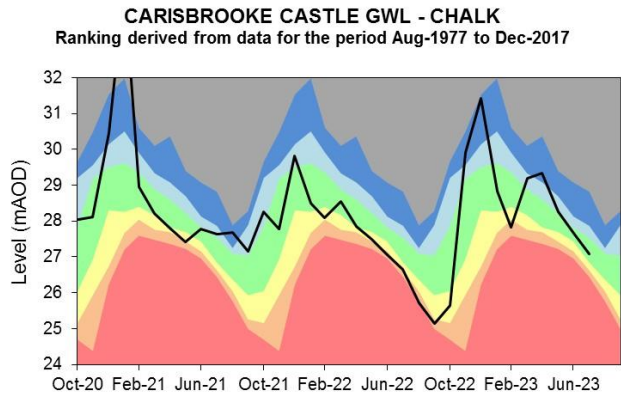
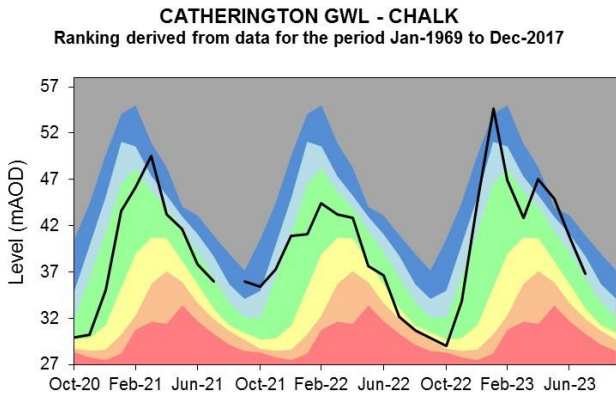
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

5.3 East Hampshire and Isle of Wight Groundwater level charts

Figure 5.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

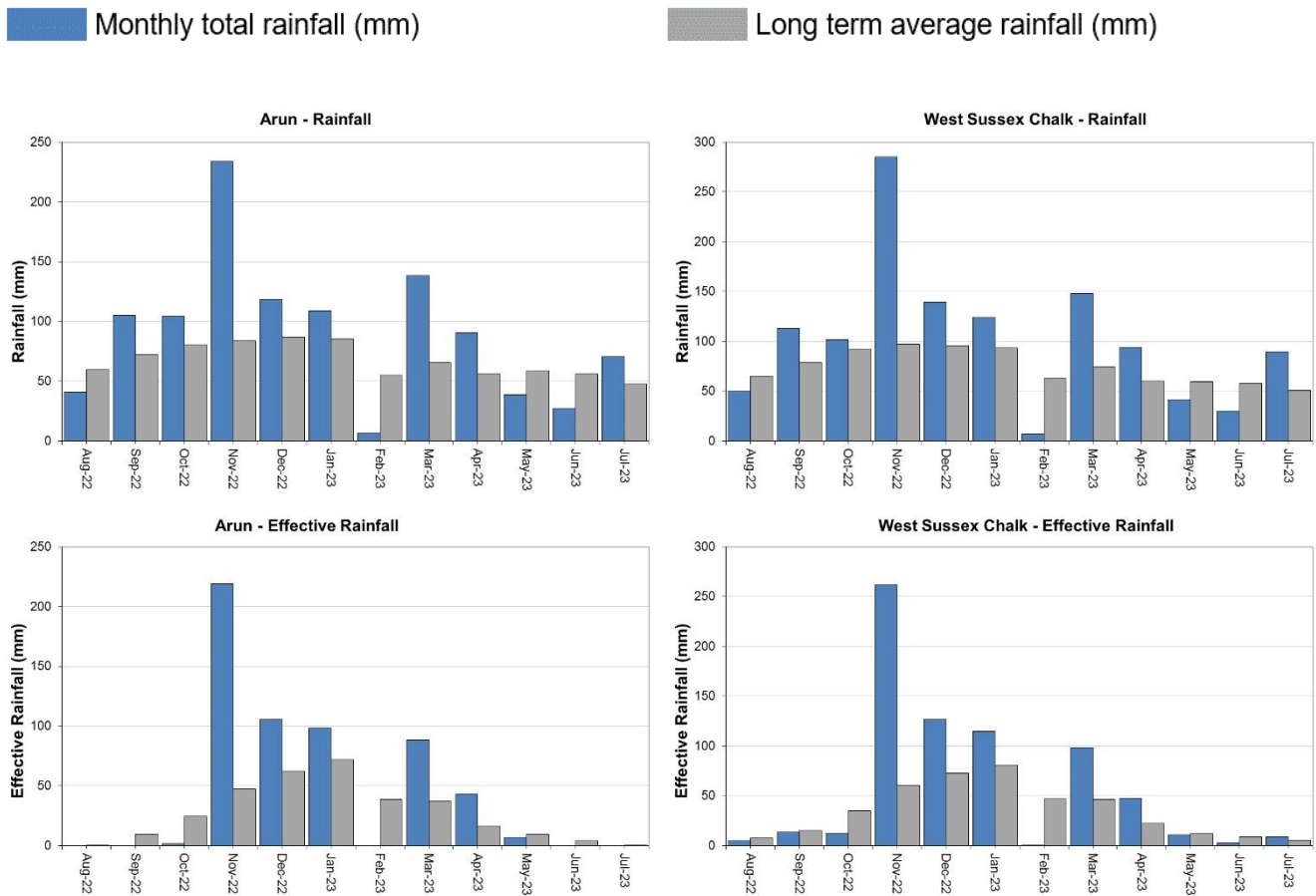


Source: Environment Agency, 2023.

6 West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.

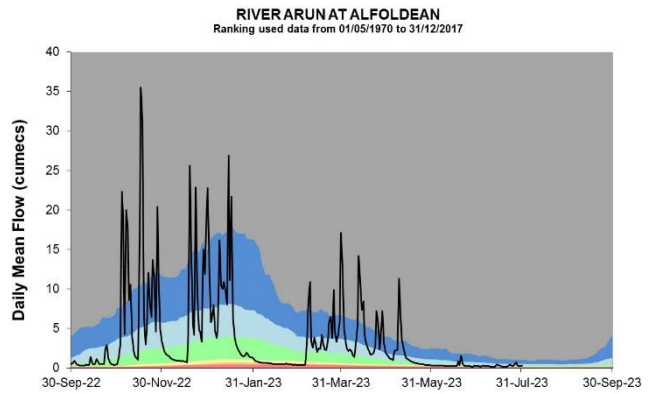
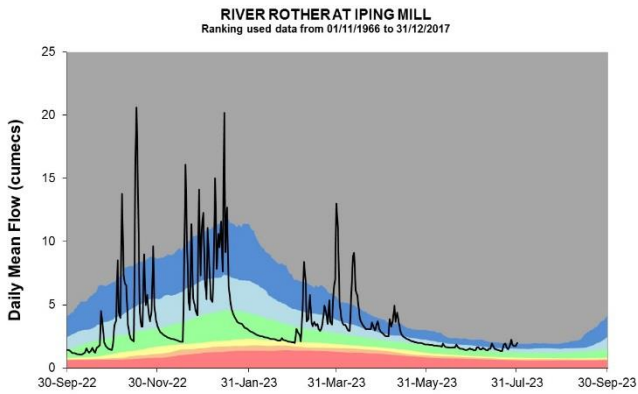


HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

6.2 West Sussex River flow charts

Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.

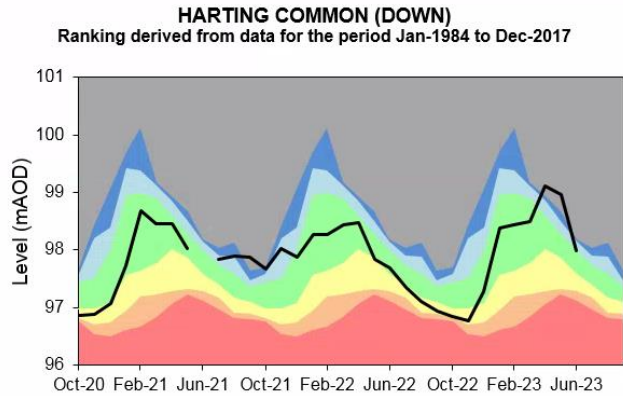
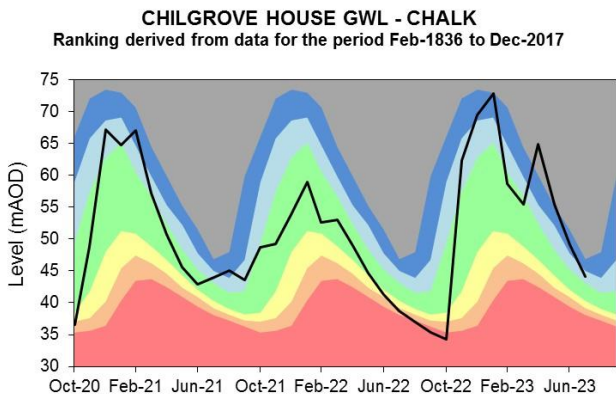




Source: Environment Agency, 2023.

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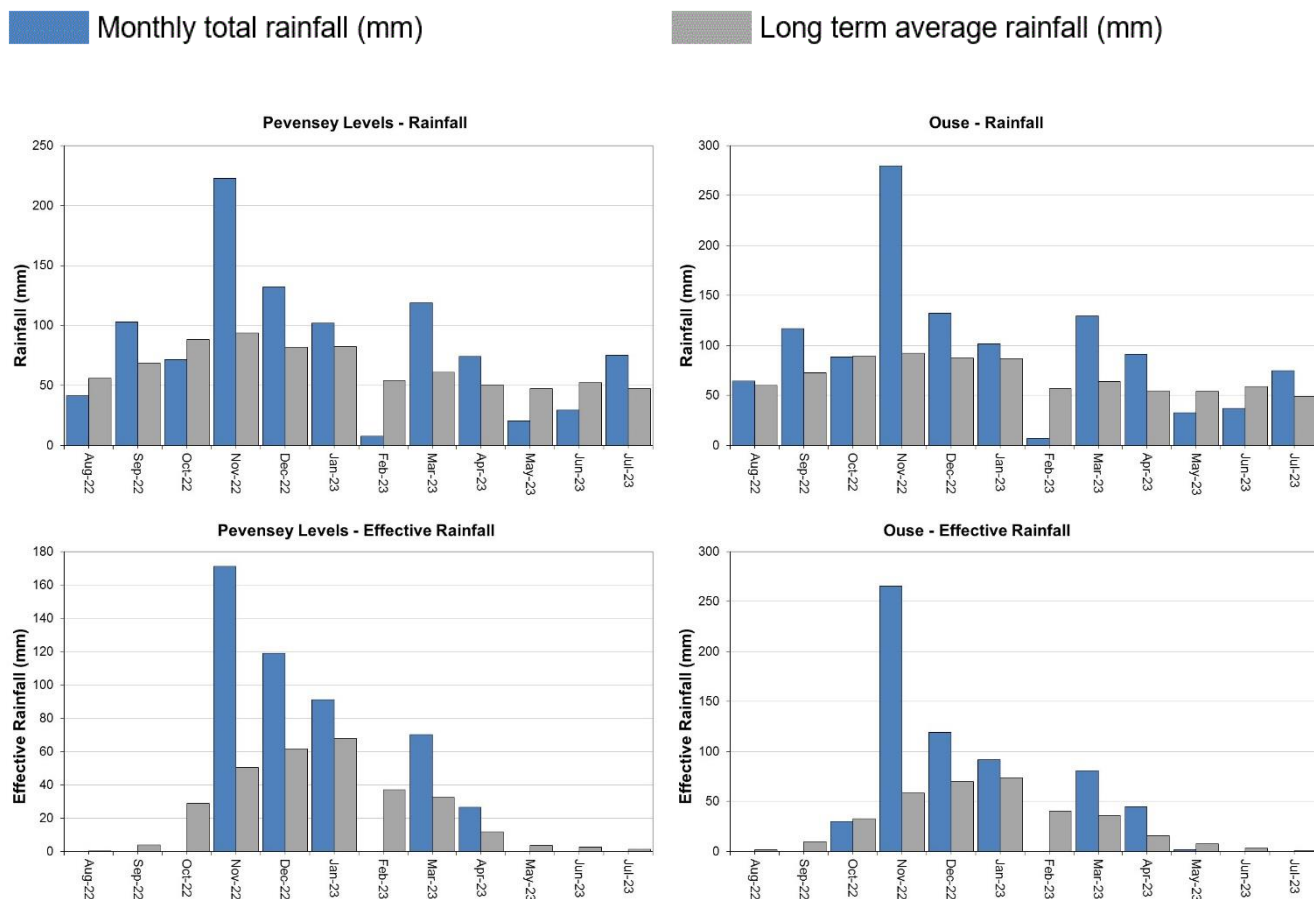


Source: Environment Agency, 2023.

7 East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

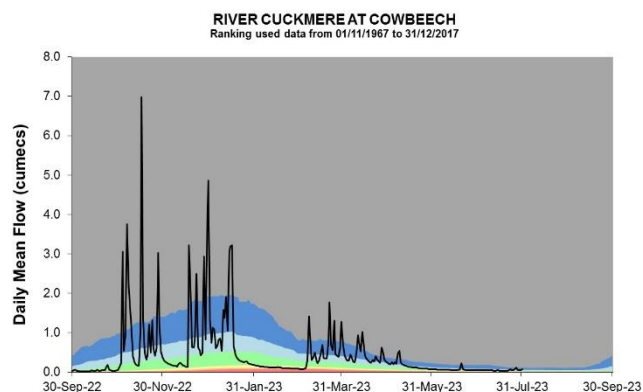
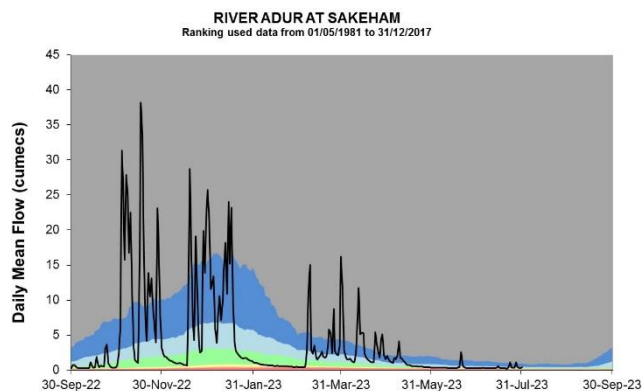
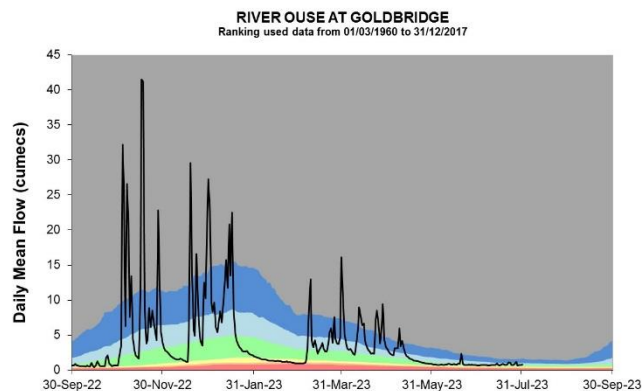
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

7.2 East Sussex River flow charts

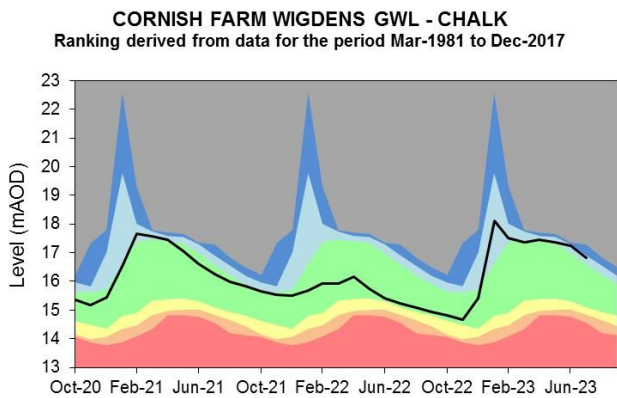
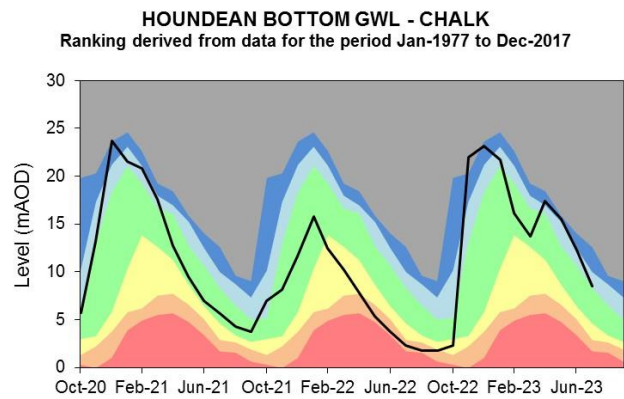
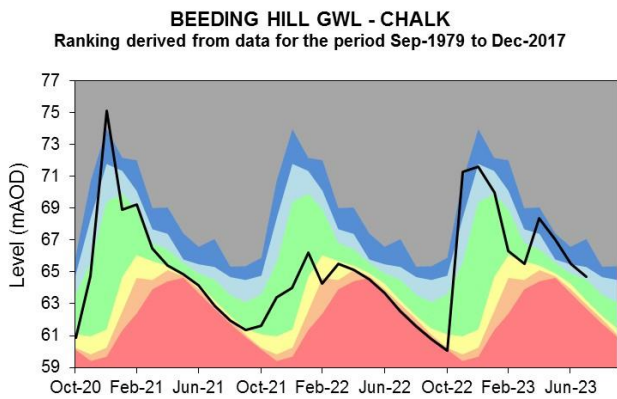
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Source: Environment Agency, 2023.

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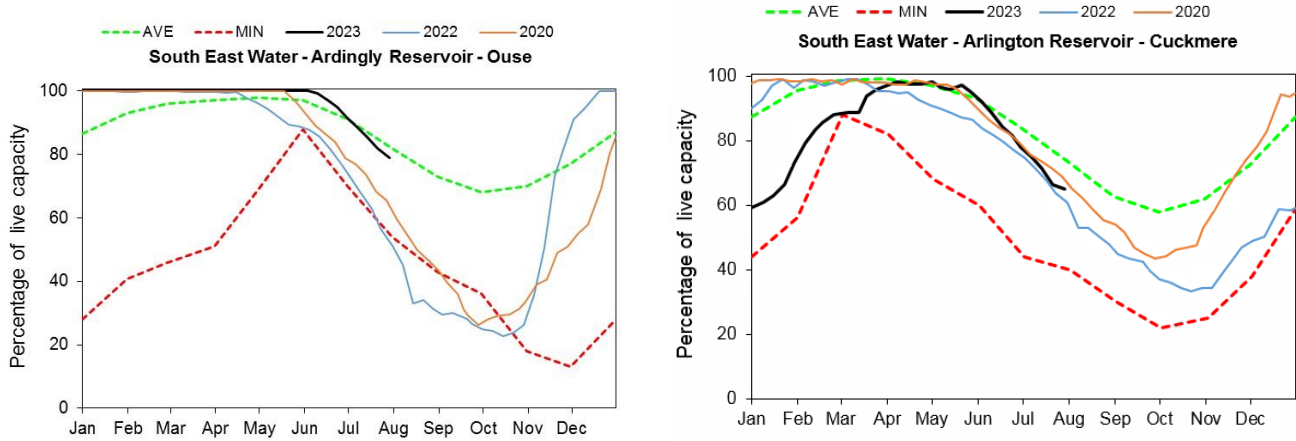
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2023.

8 Reservoir stocks

Figure 8.1: End of month reservoir stocks compared to long term maximum, minimum and average stocks. Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length.



(Source: water companies).

9 Glossary

9.1 Terminology

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 and 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 to 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 by 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 (for example, 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).

9.2 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.

10 Appendices

10.1 Rainfall, effective rainfall and soil moisture deficit table

(Source: Met Office. Crown copyright, 2023). All rights reserved. Environment Agency, 100024198, 2023

Figure 10.1: This is areal rainfall, effective rainfall (percolation or runoff) and soil moisture deficit for the hydrological areas across the Solent and South Downs. There may be significant variation within each area which must be considered when interpreting these data. When additional meteorological data is available estimates are revised which will affect the period totals in section 10.2

| Hydrological Area | Rainfall (mm) 31 day Total | Rainfall July as %LTA | Effective Rainfall (mm) 31 day Total | Effective Rainfall July as %LTA | Soil Moisture Deficit (SMD) Day 31 | SMD End of July LTA |
|------------------------------|----------------------------|-----------------------|--------------------------------------|---------------------------------|------------------------------------|---------------------|
| Test Chalk | 126 | 264% | 13 | 314% | 78 | 84 |
| East Hampshire Chalk | 124 | 239% | 12 | 251% | 84 | 80 |
| West Sussex Chalk | 90 | 177% | 9 | 164% | 91 | 79 |
| East Sussex Chalk | 82 | 168% | 7 | 135% | 87 | 81 |
| Isle of Wight | 96 | 217% | 9 | 221% | 94 | 89 |
| Western Rother Greensand | 95 | 189% | 9 | 183% | 92 | 80 |
| Hampshire Tertiaries | 110 | 248% | 0 | 0% | 89 | 85 |
| Lymington | 105 | 243% | 0 | 0% | 86 | 80 |
| Sussex Coast | 73 | 174% | 0 | - | 106 | 89 |
| Arun | 70 | 149% | 0 | 0% | 101 | 78 |
| Adur | 64 | 140% | 0 | 0% | 98 | 77 |
| Ouse | 75 | 153% | 0 | 0% | 84 | 74 |
| Cuckmere | 80 | 165% | 0 | 0% | 78 | 75 |
| Pevensey Levels | 75 | 159% | 0 | 0% | 88 | 81 |
| Solent & South Downs Average | 90 | 191% | 4 | 174% | 90 | 81 |

10.2 Seasonal summary table of rainfall and effective rainfall

Summer season: 01/04/2023 to 30/09/2023

| Hydrological Area | Seasonal Rainfall (mm) Total | Seasonal Rainfall as % LTA | Seasonal Effective Rainfall (mm) Total | Seasonal Effective Rainfall as % LTA |
|------------------------------|---------------------------------|----------------------------|---|--------------------------------------|
| Test Chalk | 291 | 135% | 60 | 176% |
| East Hampshire Chalk | 289 | 126% | 66 | 162% |
| West Sussex Chalk | 254 | 111% | 62 | 129% |
| East Sussex Chalk | 231 | 109% | 43 | 110% |
| Isle of Wight | 247 | 123% | 47 | 145% |
| Western Rother Greensand | 261 | 113% | 63 | 132% |
| Hampshire Tertiaries | 268 | 131% | 39 | 233% |
| Lymington | 269 | 130% | 42 | 192% |
| Sussex Coast | 210 | 110% | 26 | 151% |
| Arun | 226 | 104% | 42 | 141% |
| Adur | 219 | 103% | 38 | 131% |
| Ouse | 236 | 109% | 38 | 135% |
| Cuckmere | 221 | 107% | 25 | 102% |
| Pevensey Levels | 201 | 102% | 20 | 106% |
| Solent & South Downs Average | 244 | 115% | 44 | 143% |

10.3 Rainfall banding table

| Hydrological area | July 2023 band | May 2023 to July 2023 cumulative band | Feb 2023 to July 2023 cumulative band | Jun 2022 to July 2023 cumulative band |
|--------------------------|----------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Test Chalk | Notably high | Above normal | Notably high | Exceptionally high |
| East Hampshire Chalk | Notably high | Normal | Notably high | Exceptionally high |
| West Sussex Chalk | Above normal | Normal | Normal | Exceptionally high |
| East Sussex Chalk | Above normal | Normal | Normal | Exceptionally high |
| Isle of Wight | Notably high | Normal | Above normal | Exceptionally high |
| Western Rother Greensand | Above normal | Normal | Above normal | Exceptionally high |
| Hampshire Tertiaries | Notably high | Normal | Above normal | Exceptionally high |
| Lymington | Notably high | Normal | Above normal | Exceptionally high |
| Sussex Coast | Above normal | Normal | Normal | Exceptionally high |
| Arun | Normal | Normal | Normal | Exceptionally high |
| Adur | Normal | Normal | Normal | Exceptionally high |
| Ouse | Normal | Normal | Normal | Exceptionally high |
| Cuckmere | Above normal | Normal | Normal | Exceptionally high |
| Pevensey Levels | Above normal | Normal | Normal | Notably high |

10.4 River flows table

| Site name | River | Catchment | July 2023 band | June 2023 band |
|-------------------------|-------------|---------------|--------------------|-------------------|
| Alfoldean Gs | Arun | Arun | Normal | Normal |
| Allbrook Gs+ Highbridge | Itchen (so) | Itchen | Exceptionally high | Notably high |
| Blackwater | Medina | Isle of Wight | Normal | Normal |
| Broadlands | Test | Test Lower | Normal | Normal |
| Brockenhurst GS | Lymington | New Forest | Above normal | Exceptionally low |
| Chilbolton GS | Test | Test Upper | Normal | Normal |
| Cowbeech Gs | Cuckmere | Cuckmere | Above normal | Normal |
| Goldbridge Gs | Ouse [so] | Ouse Sussex | Normal | Normal |
| Iping Mill Gs | Rother | West Rother | Above normal | Above normal |
| Mislingford GS | Meon | Meon | Above normal | Normal |
| North Fareham GS | Wallington | Wallington | Above normal | Normal |
| Sakeham GS | Adur | Adur | Above normal | Normal |

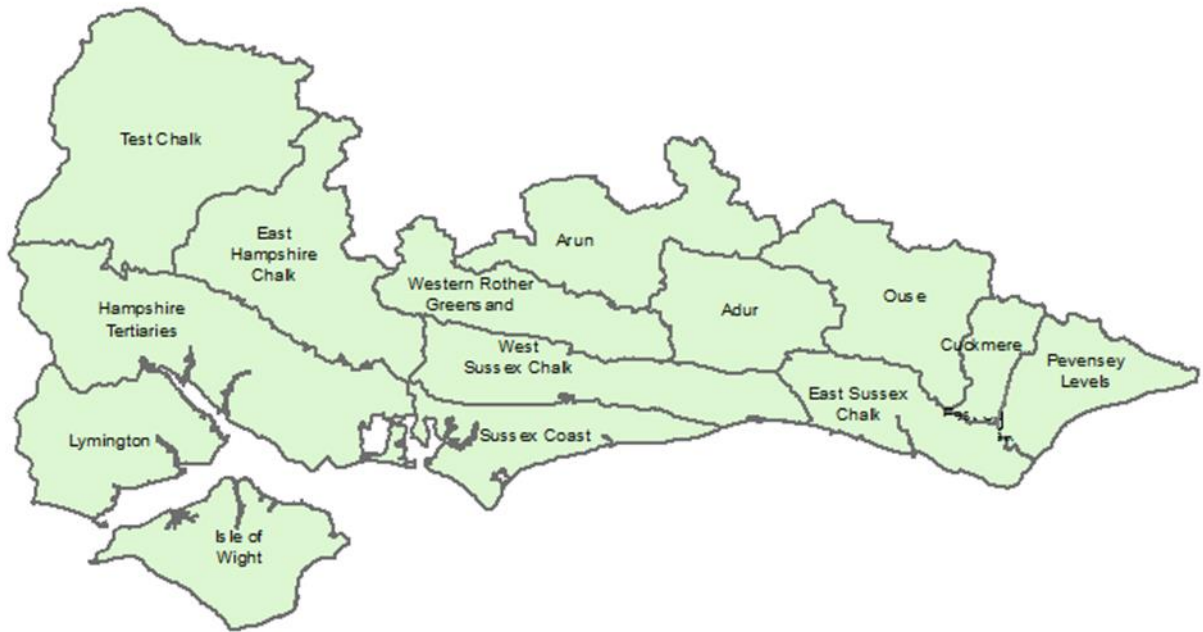
10.5 Groundwater table

| Site name | Aquifer | End of July 2023 band | End of June 2023 band |
|----------------------|-------------------------------------|---------------------------|-----------------------|
| Houndean Bottom Gwl | Brighton Chalk Block | Above normal | Above normal |
| Chilgrove House Gwl | Chichester-Worthing-Portsdown Chalk | Above normal | Notably high |
| Carisbrooke Castle | Isle Of Wight Central Downs Chalk | Normal | Normal |
| West Meon Hut Gwl | River Itchen Chalk | Above normal | Notably high |
| Clanville Gate Gwl | River Test Chalk | Above normal | Above normal |
| Lopcombe Corner Gwl | River Test Chalk | Normal | Above normal |
| Beeding Hill Gwl | Brighton Chalk Block | Above normal | Notably high |
| Catherington | River Meon Chalk | Above normal | Above normal |
| Cornish Wigdens Gwtr | Eastbourne Chalk Block | Above normal | Above normal |
| Harting Common Down | Western Rother Lower Greensand | No data available in July | Normal |
| Preston Candover | River Itchen Chalk | Above normal | Above normal |
| Youngwoods Copse | Isle of Wight Lower Greensand | Above normal | Above normal |

10.6 Abstraction licence flow constraints

| Number of flow constraints in force between 1 to 3 July 2023 | Number of flow constraints in force between 4 to 10 July 2023 | Number of flow constraints in force between 11 to 17 July 2023 | Number of flow constraints in force between 18 to 24 July 2023 | Number of flow constraints in force between 25 to 31 July 2023 |
|--|---|--|--|--|
| 3 | 9 | 6 | 8 | 2 |

10.7 SSD Areal Rainfall Units Map



10.8 SSD Areal Rainfall Monthly Long Term Averages

| Hydrological Area | Jan LTA mm | Feb LTA mm | Mar LTA mm | Apr LTA mm | May LTA mm | Jun LTA mm | Jul LTA mm | Aug LTA mm | Sep LTA mm | Oct LTA mm | Nov LTA mm | Dec LTA mm |
|------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Test Chalk | 85 | 58 | 69 | 52 | 59 | 58 | 48 | 63 | 68 | 75 | 78 | 89 |
| East Hampshire Chalk | 94 | 63 | 74 | 56 | 62 | 59 | 52 | 65 | 77 | 86 | 90 | 95 |
| West Sussex Chalk | 93 | 63 | 74 | 60 | 60 | 58 | 51 | 65 | 79 | 92 | 97 | 95 |
| East Sussex Chalk | 87 | 57 | 65 | 54 | 52 | 58 | 49 | 60 | 73 | 93 | 98 | 89 |
| Isle of Wight | 88 | 60 | 67 | 52 | 53 | 50 | 44 | 58 | 70 | 84 | 91 | 88 |
| Western Rother Greensand | 100 | 65 | 76 | 61 | 63 | 57 | 51 | 66 | 79 | 91 | 95 | 100 |
| Hampshire Tertiaries | 86 | 59 | 67 | 50 | 57 | 53 | 45 | 59 | 70 | 79 | 83 | 87 |
| Lymington | 89 | 61 | 68 | 52 | 58 | 54 | 44 | 60 | 71 | 83 | 87 | 92 |
| Sussex Coast | 77 | 51 | 61 | 50 | 50 | 48 | 42 | 53 | 64 | 77 | 81 | 79 |
| Arun | 85 | 55 | 66 | 56 | 58 | 56 | 48 | 59 | 72 | 81 | 84 | 87 |
| Adur | 85 | 55 | 64 | 55 | 56 | 56 | 46 | 60 | 72 | 86 | 89 | 86 |
| Ouse | 87 | 56 | 64 | 54 | 54 | 59 | 49 | 60 | 73 | 89 | 93 | 88 |
| Cuckmere | 85 | 55 | 62 | 51 | 50 | 58 | 49 | 60 | 72 | 91 | 94 | 85 |
| Pevensey Levels | 82 | 54 | 61 | 51 | 47 | 52 | 47 | 56 | 69 | 88 | 94 | 82 |
| Solent & South Downs Average | 87 | 58 | 67 | 54 | 56 | 55 | 47 | 60 | 72 | 85 | 90 | 89 |