Monthly water situation report: Devon and Cornwall Area

1 Summary - July 2024

Devon and Cornwall received 163% of the long term average (LTA) rainfall, which was above normal for the time of year. It was the wettest October to July period in a record starting in 1871. Soil moisture deficit (SMD) decreased overall in July and ended the month lower (wetter) than the LTA for the time of year. Monthly mean river flows ranged from normal to notably high for the time of year across the area. Groundwater levels at all sites receded overall in July, but still ended the month at normal to exceptionally high for the time of year. Total reservoir storage across Devon and Cornwall ended the month at 84% net storage, with Wimbleball, Colliford and Roadford reservoirs at 77%, 85% and 91% of net storage respectively at the end of July.

1.1 Rainfall

Devon and Cornwall received 114mm of rain during July (163% of the July LTA), which is classed as above normal for the time of year. It was the wettest October to July period in a record starting in 1871, with all hydrological catchments ranking within the top 5 wettest 10-month periods, in a record starting 1871. The most significant periods of rain occurred on 04 to 08 July, 12 to 15 July and 19 to 25 July, with very little rain in the remainder of the month.

In July, rainfall was above normal for the time of year in most hydrological areas apart from the Torridge and Hartland Streams, the Exe and the Taw and North Devon Streams hydrological areas where rainfall was normal for the time of year. In the last 6 and 12 months, cumulative rainfall totals were exceptionally high in all hydrological areas when compared to historic respective totals. In the last 3 months, cumulative rainfall totals were normal in all hydrological areas, except for the Otter, Sid, Axe and Lim, where cumulative rainfall was notably high for the time of year.

1.2 Soil moisture deficit

Soil moisture deficit decreased (soils became wetter) overall in July. By 30 July, the average deficit for Devon & Cornwall was 11 to 70mm, and was lower (soils were wetter) than the LTA for the time of year. The SMD was slightly higher (soils were drier) than the same time in 2023.

1.3 River flows

July monthly mean river flows were normal for the time of year across most sites. The Dart at Austins Bridge, East Dart at Bellever, Teign at Chudleigh Bridge and Otter at Dotton all recorded above normal monthly mean river flows for the time of year. Whitford on the River Axe recorded notably high monthly mean river flows for the time of year. All reporting stations experienced a downward trend in daily mean river flows towards the end of the month in response to the decreased rainfall. On 31 July, all reporting sites recorded normal or above normal daily mean flows for the time of year.

Due to missing data and accuracy concerns, Truro gauging station on the River Kenwyn excludes dates between 25 to 31 July.

1.4 Groundwater levels

Levels at all groundwater sites receded overall in July. On 31 July, groundwater levels were exceptionally high at the following sites:

- Branscombe Lane (monitoring the Dawlish Sandstone)
- Bussells No7A (monitoring the Dawlish Sandstone)
- Whitlands (monitoring the Upper Greensand)
- Woodbury Common No2 (monitoring the Budleigh Salterton Pebble Beds)

Levels at Winnards Perch (monitoring the Staddon Formation) were classed as normal, levels at Woodleys No1 (monitoring the Otterton Sandstone Formation) were classed as above normal and levels at Coleford Production (monitoring the Permian Breccias and Sandstones) were classed as notably high respectively on 31 July.

1.5 Reservoir stocks

Total reservoir storage was 84% at the end of July, which is a reduction of 5% of storage since the end of June. This is higher than total storage at the same time last year and in 2022. At the end of the month, storage at Wimbleball, Colliford and Roadford reservoirs was 77%, 85% and 91% of net storage respectively, compared to 75%, 57% and 57% this time last year.

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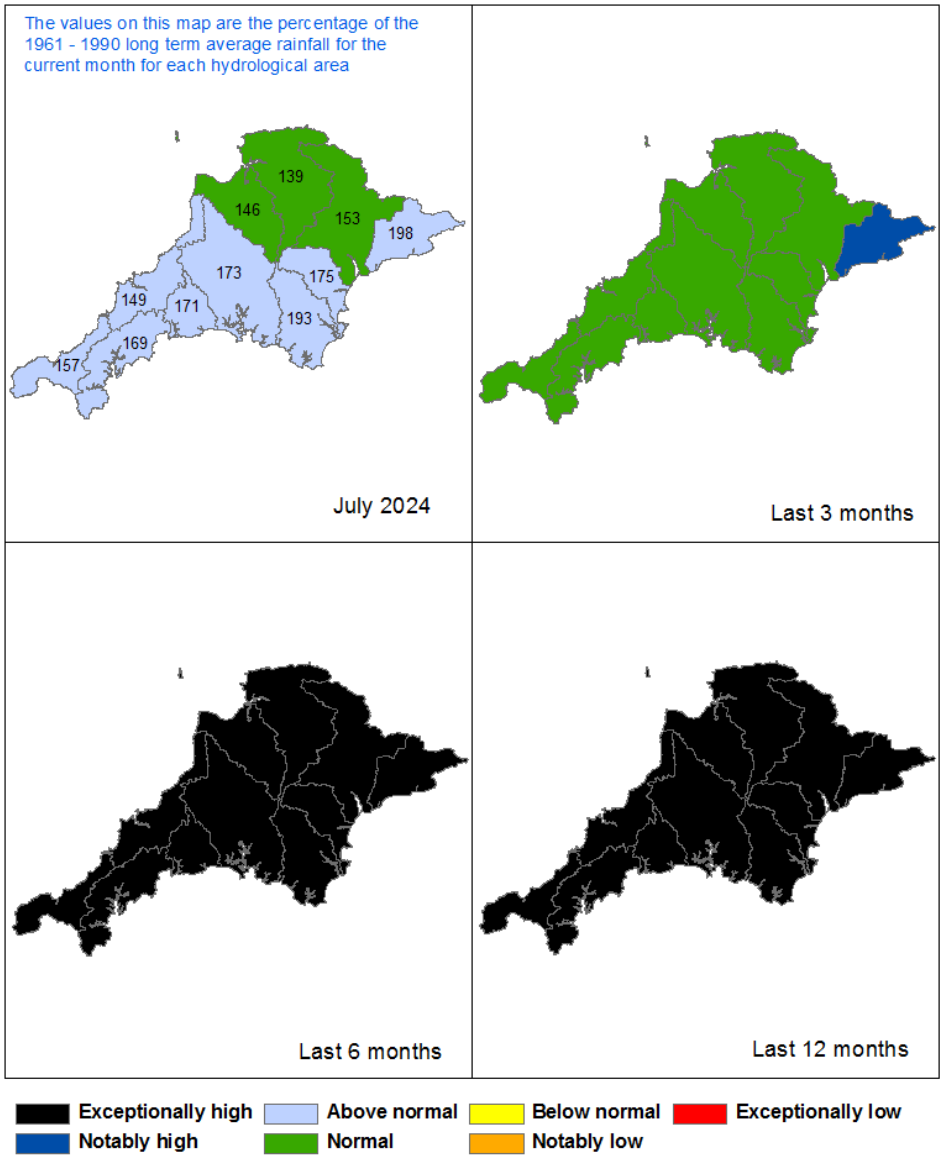
2 Rainfall

2.1 Rainfall map

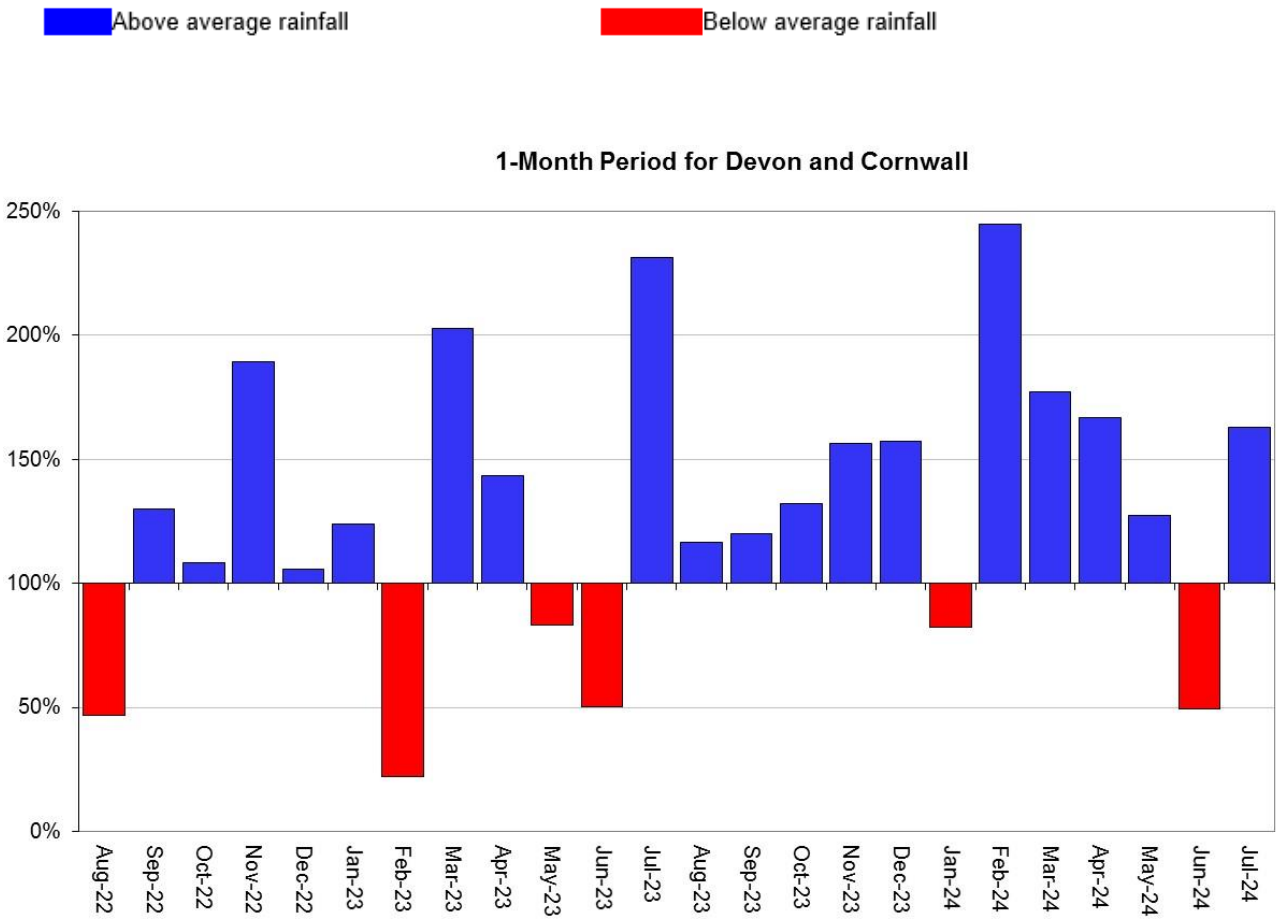
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 July 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). 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, 2024.

2.2 Rainfall charts

Figure 2.2: Monthly rainfall totals for the past 24 months as a percentage of the 1961 to 1990 long term average for Devon and Cornwall area.

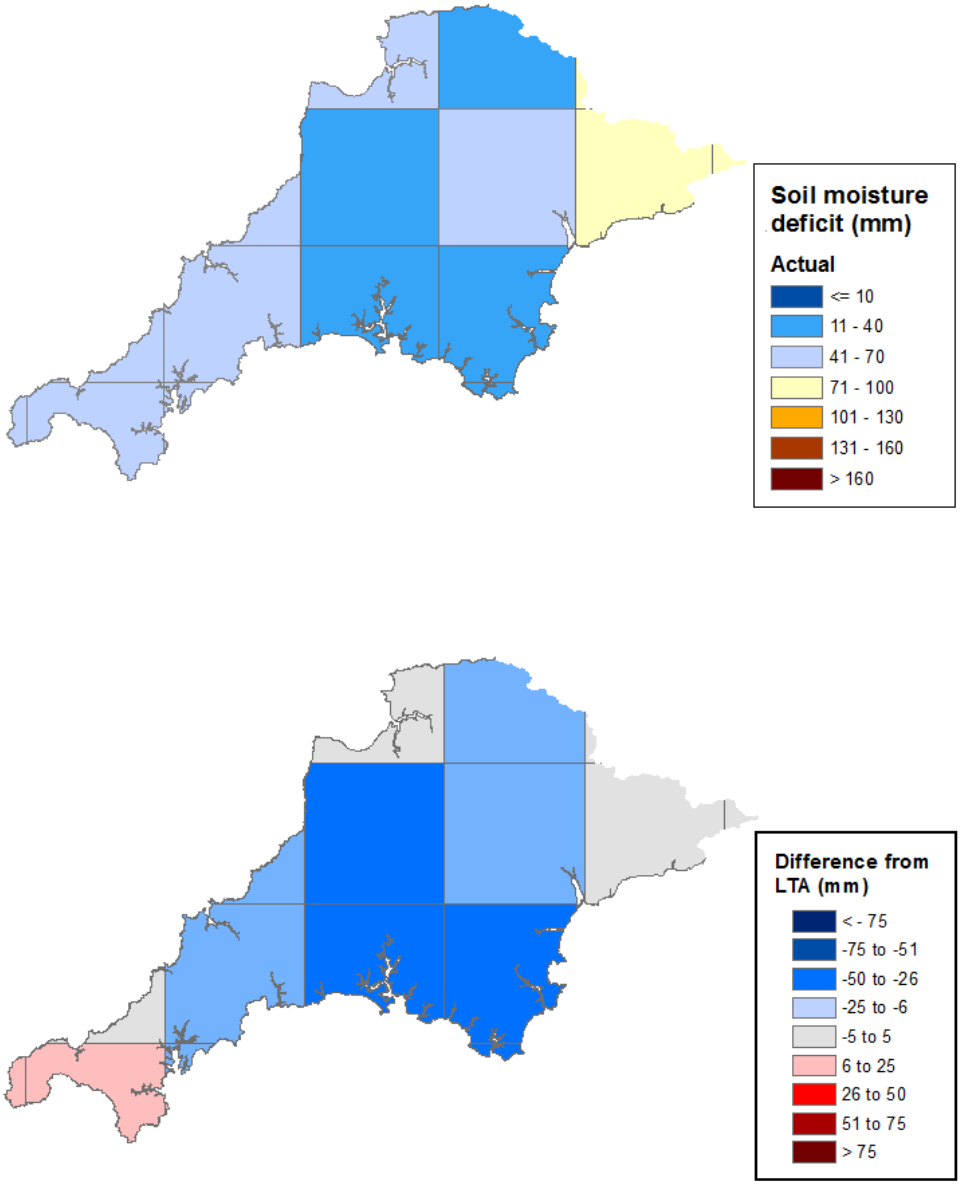


Rainfall data for 2023, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 2024).

3 Soil moisture deficit

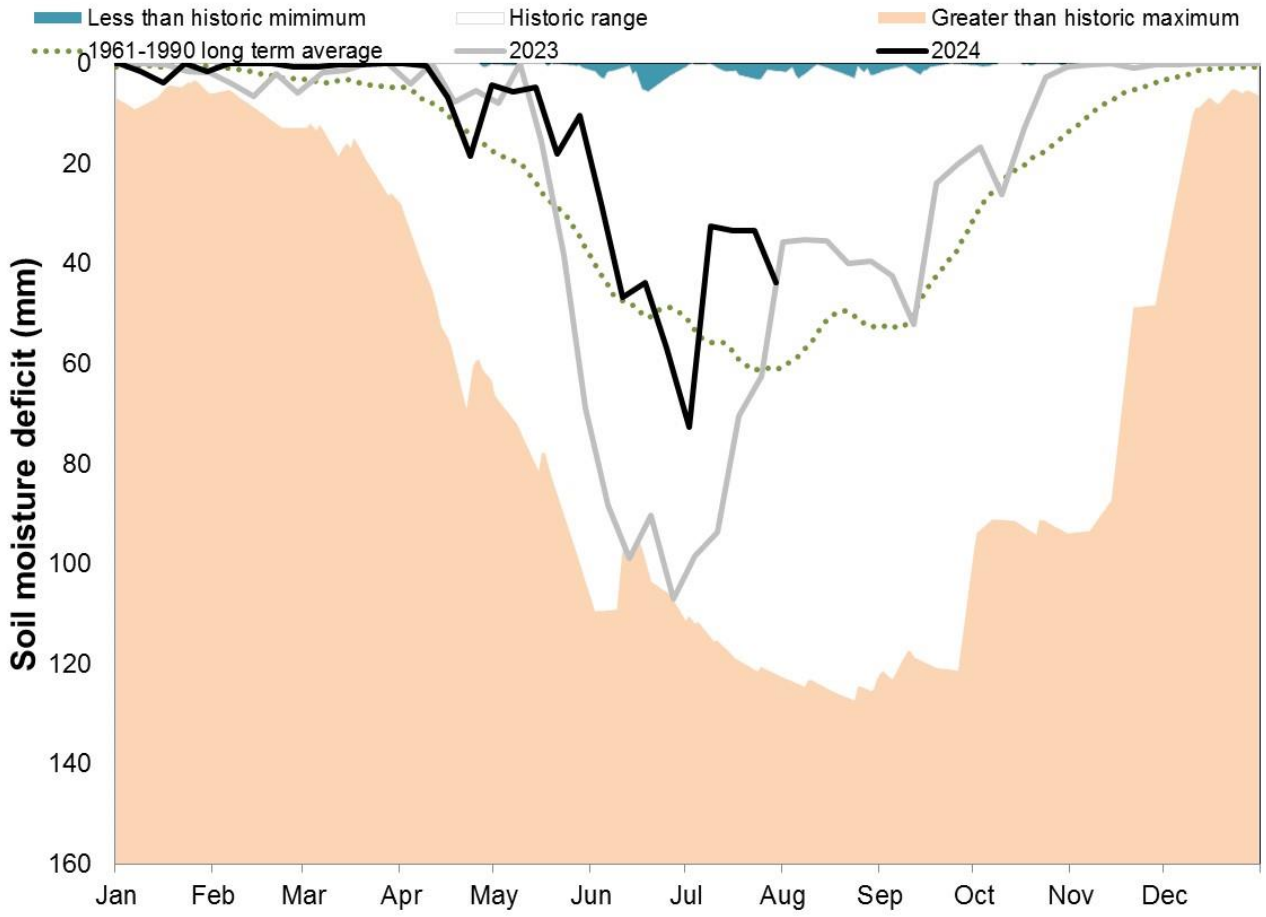
3.1 Soil moisture deficit map

Figure 3.1: Top map shows soil moisture deficit for week ending 31 July 2024. Bottom map shows the difference (mm) between the actual soil moisture deficit and the 1961 to 1990 long term average soil moisture deficits. MORECS data for real land use.



3.2 Soil moisture deficit charts

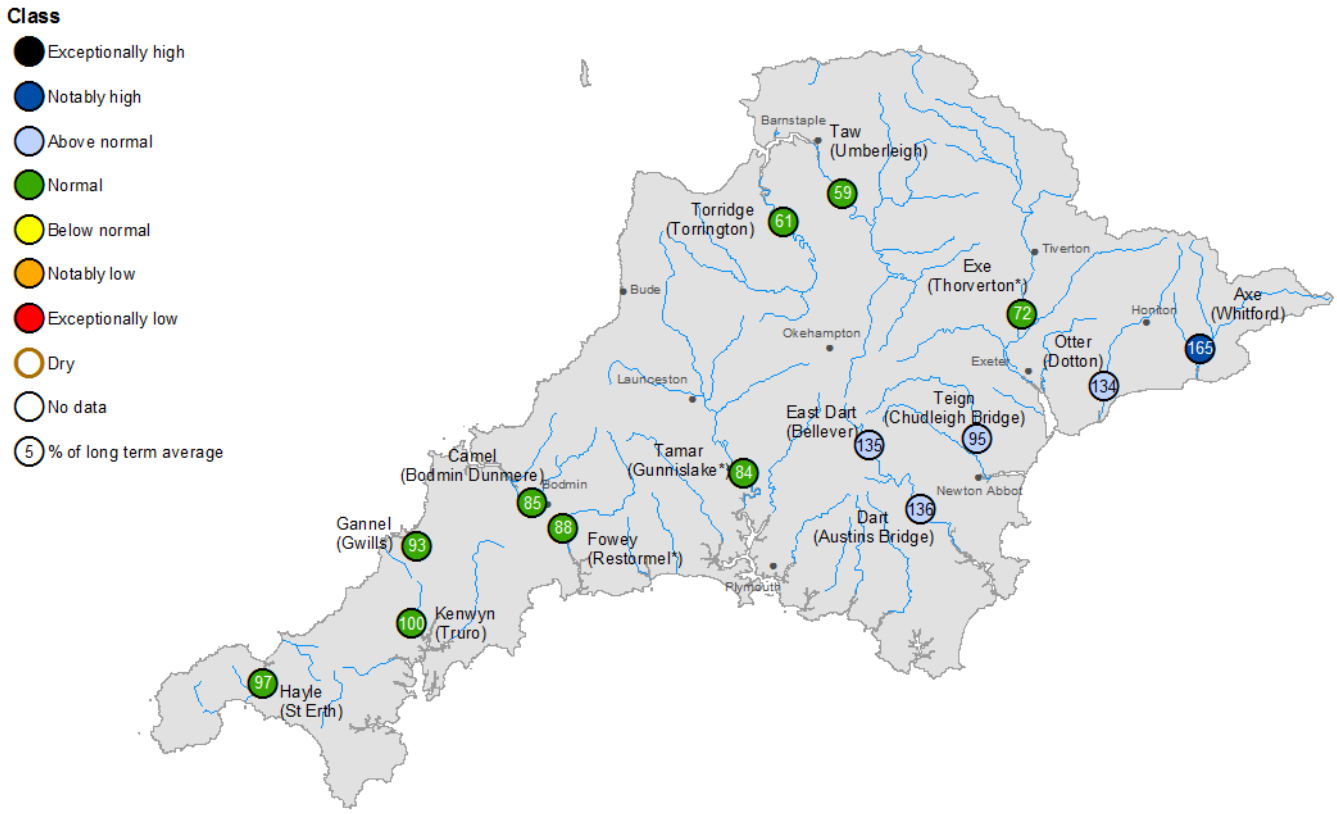
Figure 3.2: Latest soil moisture deficit compared to previous year, maximum, minimum, and 1961 to 1990 long term average. Weekly MORECS data for real land use.



4 River flows

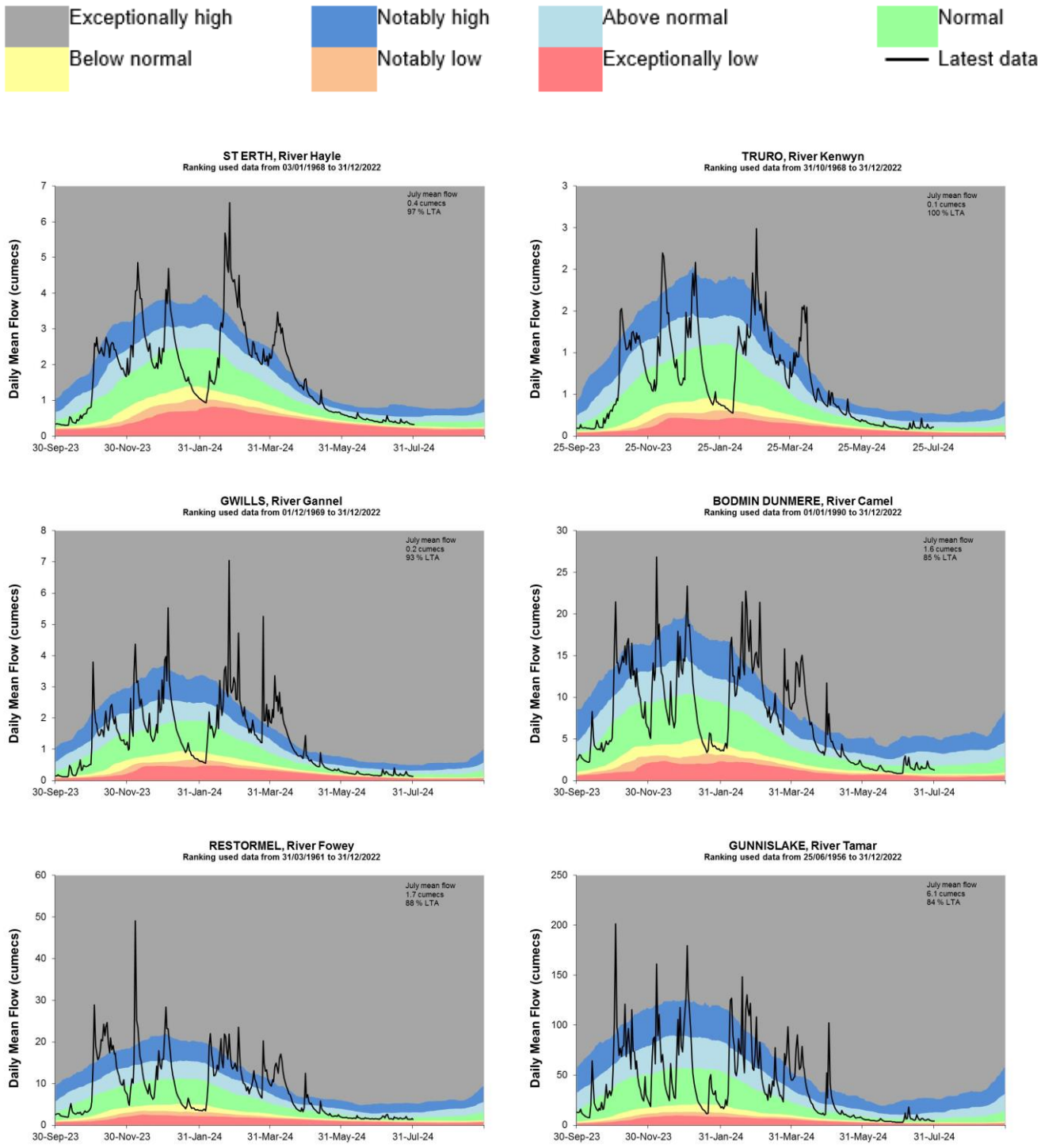
4.1 River flows map

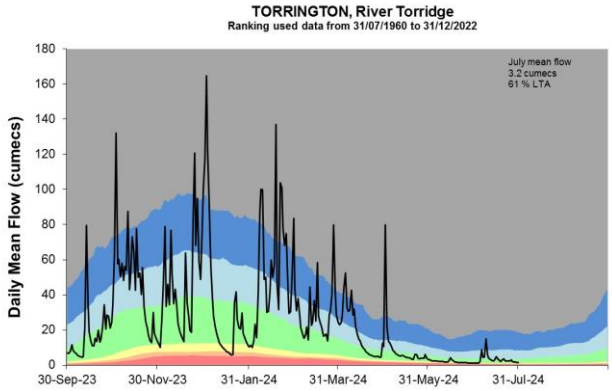
Figure 4.1: Monthly mean river flow for indicator sites for July 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic July monthly means. Table available in the appendices with detailed information.

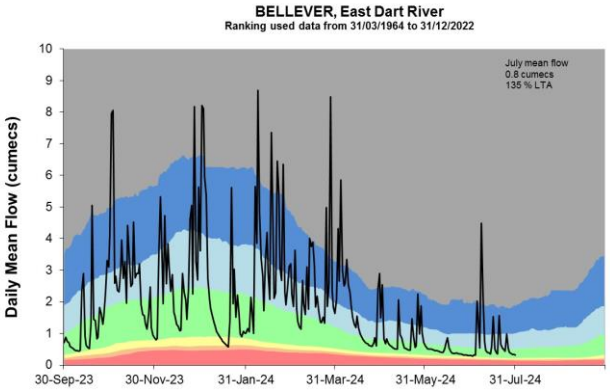


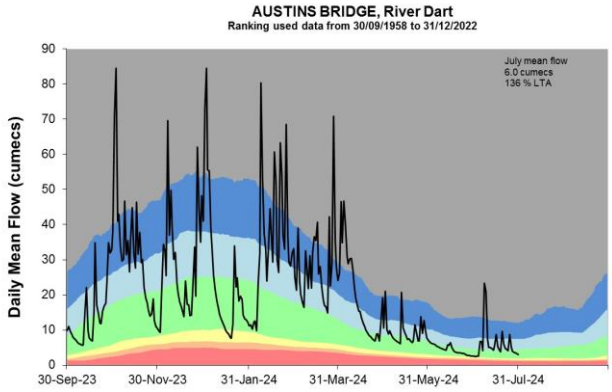
4.2 River flow charts

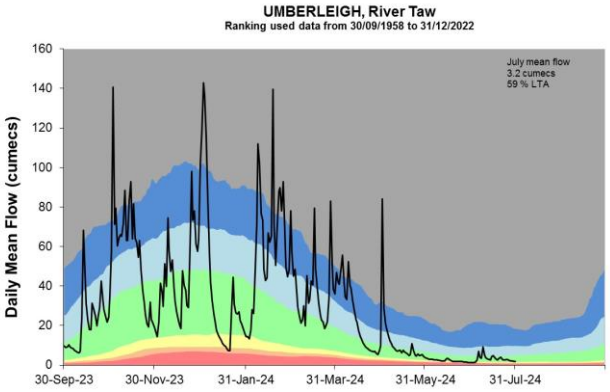
Figure 4.2: Daily mean river flow for indicator sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.

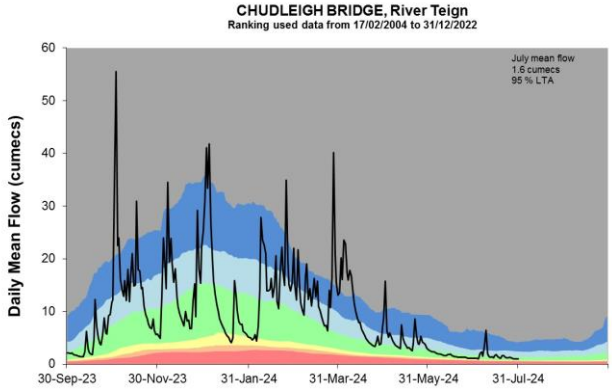


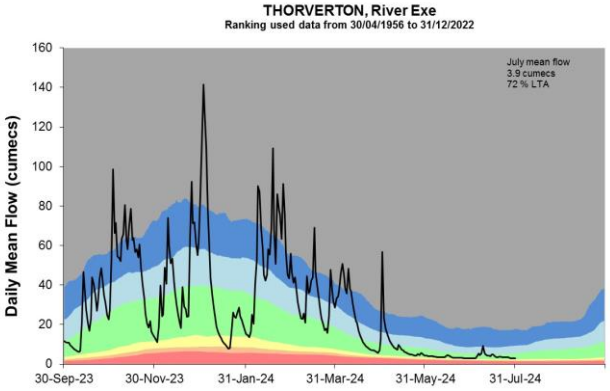


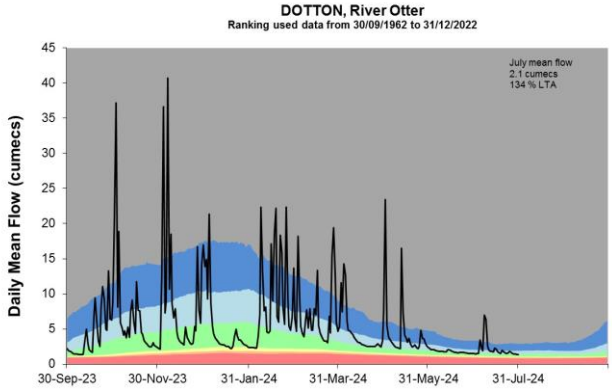


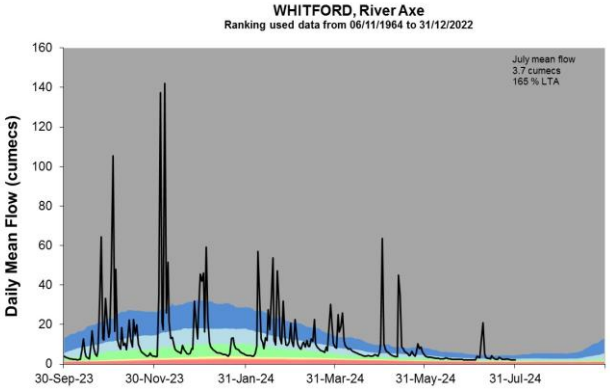










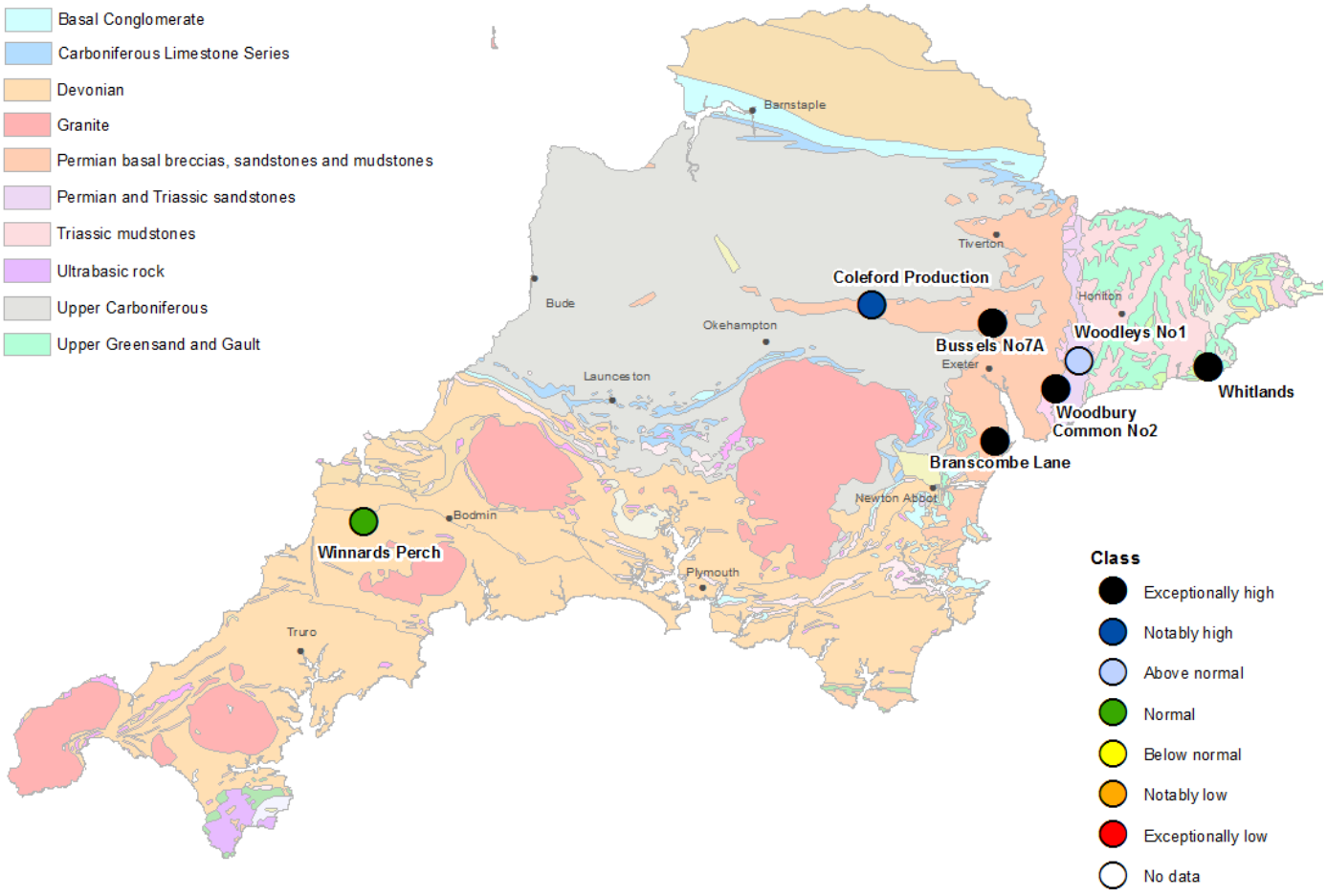


Source: Environment Agency.

5 Groundwater levels

5.1 Groundwater levels map

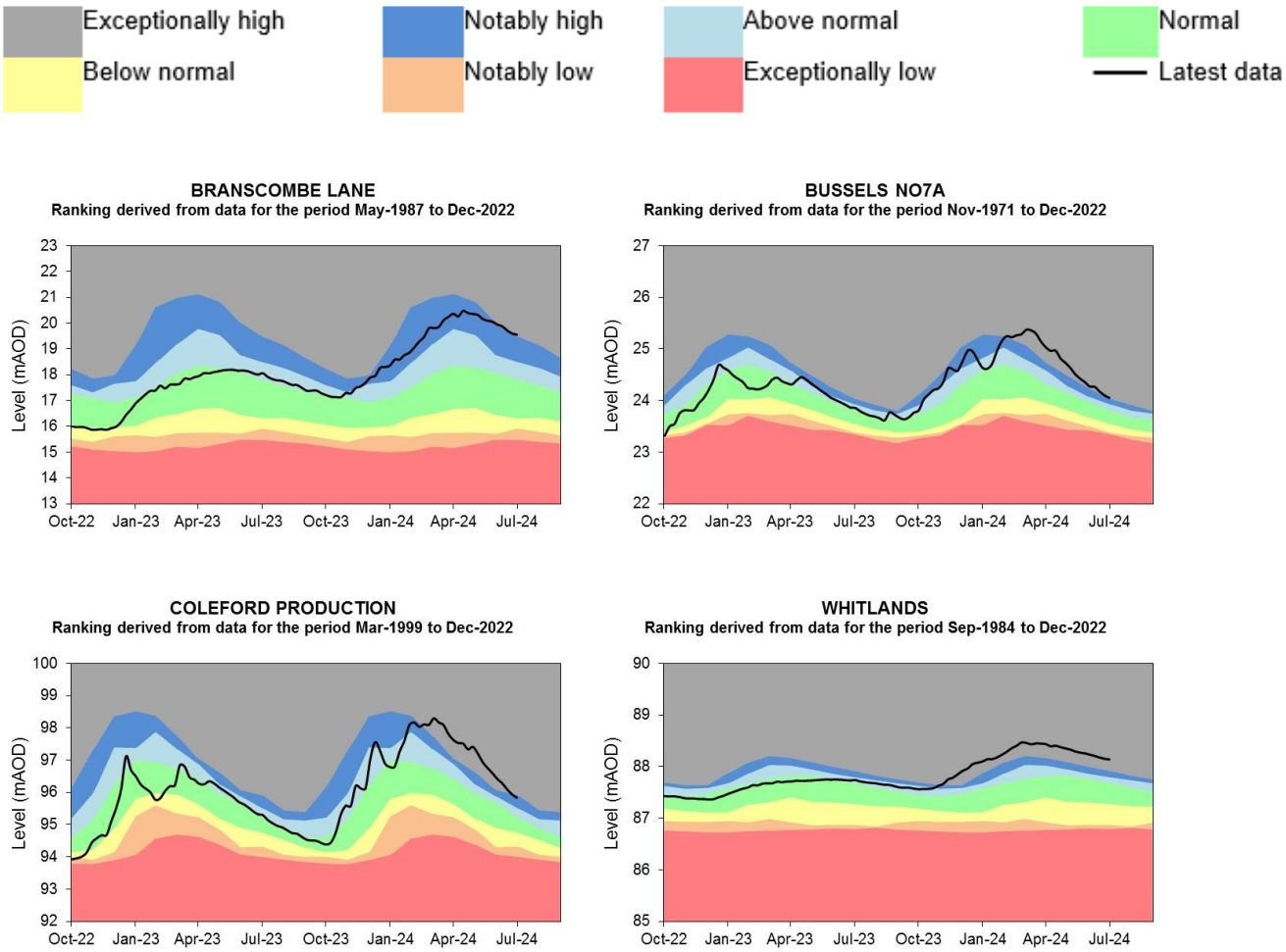
Figure 5.1: Groundwater levels for indicator sites at the end of July 2024, classed relative to an analysis of respective historic July levels. Table available in the appendices with detailed information.

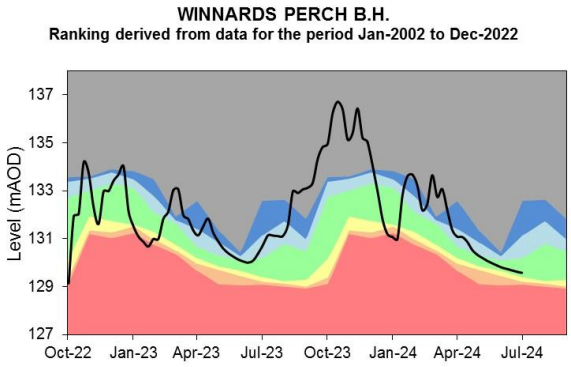


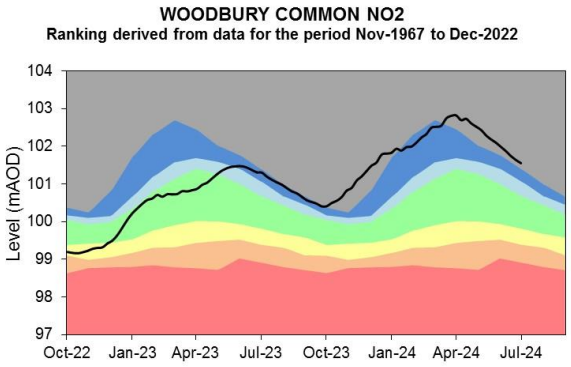
(Source: Environment Agency). Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

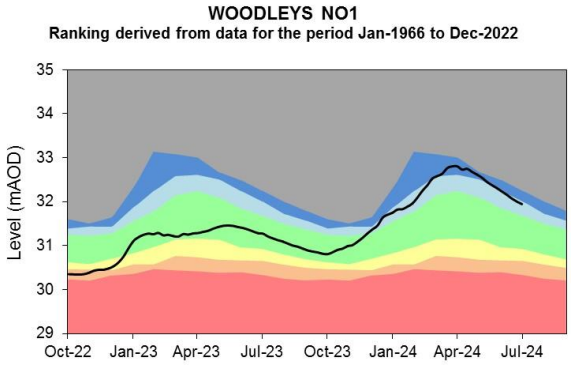
5.2 Groundwater level charts

Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.





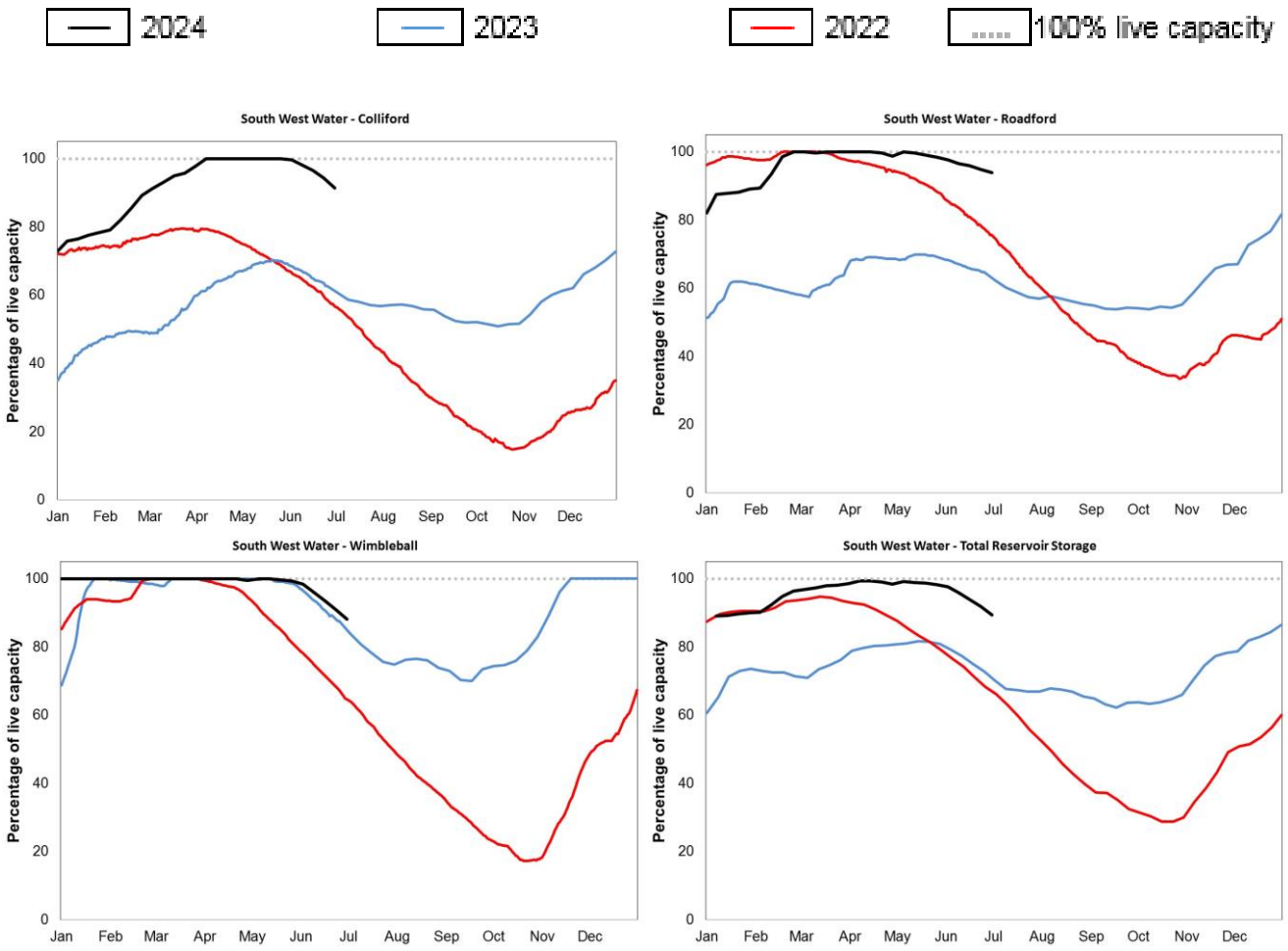




Source: Environment Agency, 2024.

6 Reservoir stocks

Figure 6.1: End of month reservoir storage compared to previous year and a historic drought year. Note: Historic records of individual reservoirs vary in length.



(Source: South West Water).

7 Glossary

7.1 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).

7.2 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.

8 Appendices

8.1 Rainfall table

Hydrological area	Jul 2024 rainfall % of long term average 1961 to 1990	Jul 2024 band	May 2024 to July cumulative band	Feb 2024 to July cumulative band	Aug 2023 to July cumulative band
Avon Dart And Erme	193	Above Normal	Normal	Exceptionally high	Exceptionally high
Exe	153	Normal	Normal	Exceptionally high	Exceptionally high
Fal And St Austell	169	Above Normal	Normal	Exceptionally high	Exceptionally high
North Cornwall	149	Above Normal	Normal	Exceptionally high	Exceptionally high
Otter Sid Axe And Lim	198	Above Normal	Notably high	Exceptionally high	Exceptionally high
Seaton Looe And Fowey	171	Above Normal	Normal	Exceptionally high	Exceptionally high
Tamar	173	Above Normal	Normal	Exceptionally high	Exceptionally high
Taw And North Devon Streams	139	Normal	Normal	Exceptionally high	Exceptionally high
Teign And Torbay	175	Above Normal	Normal	Exceptionally high	Exceptionally high

Torridge And Hartland Streams	146	Normal	Normal	Exceptionally high	Exceptionally high
West Cornwall	157	Above Normal	Normal	Exceptionally high	Exceptionally high

8.2 River flows table

Site name	River	Catchment	Jul 2024 band	Jun 2024 band
Austins Bridge	Dart	Dart	Above normal	Normal
Bellever	East Dart	Dart	Above normal	Normal
Bodmin Dunmere	Camel	Camel	Normal	Below normal
Chudleigh Bridge	Teign	Teign Upper	Above normal	Normal
Dotton	Otter	Otter	Above normal	Normal
Gunnislake	Tamar	Tamar Lower	Normal	Normal
Gwills	Gannel	Gannel	Normal	Normal
Restormel	Fowey	Fowey	Normal	Normal
St Erth	Hayle	Hayle	Normal	Normal
Thorverton	Exe	Exe Lower	Normal	Normal
Torrington	Torridge	Torridge Middle	Normal	Normal
Truro	Kenwyn	Tresillian Trevella Kenwyn	Normal	Normal
Umberleigh	Taw	Taw Middle	Normal	Below normal
Whitford	Axe	Axe Devon Middle	Notably high	Normal

Groundwater table

Site name	Aquifer	End of Jul 2024 band	End of Jun 2024 band
Branscombe Lane	Dawlish Sandstone	Exceptionally high	Notably high
Bussels No7a	Dawlish Sandstone	Exceptionally high	Exceptionally high
Coleford Production	Permian Breccias And Sandstones	Notably high	Exceptionally high
Whitlands	Upper Greensand	Exceptionally high	Exceptionally high
Winnards Perch B.h.	Staddon Formation	Normal	Normal
Woodbury Common No2	Budleigh Salterton Pebble Beds	Exceptionally high	Exceptionally high
Woodleys No1	Otterton Sandstone Formation	Above normal	Above normal