Monthly water situation report: Midlands

1 Summary - September 2024

Please see Section 7.3 for a map detailing the Midlands regional coverage of this report.

Rainfall - During September, the majority of hydrological catchments in the Midlands received exceptionally high rainfall totals, ranging from 193% to 331% of the long term average (LTA).

Soil moisture deficit - By the end of September, soil moisture deficit (SMD) has decreased across majority of the Midlands area, meaning soils are wetter than they were in August. Compared to the LTA, the majority of soils in September are wetter than expected for the time of year.

River flows - In September, 4 flow monitoring sites recorded exceptionally high monthly mean flows compared to the LTA. A further 4 recorded notably high, 9 recorded above normal and 3 recorded normal monthly mean flows relative to the LTA. One site, Wedderburn Bridge, had no suitable data for September.

Groundwater levels - As of the end of September, 4 groundwater monitoring sites recorded exceptionally high groundwater levels compared to the LTA. Three sites recorded notably high and 1 site recorded normal groundwater levels compared to the LTA.

Reservoir stocks - As of the end of September, the majority of the Midlands reservoirs recorded above average storage for the time of year. Since August, storage levels for the majority of reservoirs have decreased.

1.1 Rainfall

During September, the majority of Midlands' hydrological catchments received exceptionally high rainfall totals, ranging from 193% to 331% of the LTA. The Welsh Mountains, situated in the west of the Midlands, was the only exception, receiving notably high rainfall totals of 149% of the LTA.

During the last 3 months, hydrological catchments in the Midlands received a variable amount of rainfall relative to the LTA. One hydrological catchment, the Lower Severn Estuary, received exceptionally high rainfall totals of 165% of the LTA. Three hydrological catchments received notably high rainfall totals compared to the LTA. These were the Shropshire Plains in the north-west of the Midlands and the Avon and Soar in the east of the Midlands. A further 6 hydrological catchments received above normal rainfall totals ranging from 122% to 148% of the LTA. These were the Derwent, Dove, Upper Trent, Tame, Mid-Severn and Lower Wye. Only 2 hydrological catchments in the Midlands received normal rainfall totals relative to the

LTA. These were the Welsh Mountains in the west and the Lower Trent in the east of the Midlands.

Over the past 6 months, 2 hydrological catchments received notably high rainfall totals relative to the LTA. These were the Severn Estuary in the south of the Midlands and Shropshire Plains in the north-west of the Midlands. The remaining hydrological catchments in the Midlands received above normal rainfall totals, ranging from 116% to 132% of the LTA.

Over the last 12 months, all of the Midlands hydrological catchments received exceptionally high rainfall totals relative to the LTA. These rainfall totals ranged from 134% to 159% of the LTA.

1.2 Soil moisture deficit and recharge

By the end of September, SMD has decreased across majority of the Midlands area, meaning soils are wetter than they were in August. The only exception to the decrease was a small region in the west of the Midlands where no change in SMD was recorded. This is due to soils in that region already being saturated since August. By the end of the month, the majority of the Midlands had a SMD of less than or equal to 10mm, meaning soils are saturated.

Compared to the LTA, the majority of soils in September are wetter than expected for the time of year. Only a small area in the north-west of the Midlands had a -5mm to 5mm difference from the LTA. This means that SMD was as expected in this area for the time of year.

1.3 River flows

In September, 4 flow monitoring sites in the Midlands recorded exceptionally high monthly mean flows ranging from 231% to 415% of the LTA. These were Kegworth, Walcot, Stareton and Evesham. Kegworth on the River Soar recorded its highest ever September monthly mean flows compared to the historic record. Four monitoring sites recorded notably high monthly mean flows ranging from 163% to 175% of the LTA. These were Worksop, North Muskham, Great Bridgeford and Ebley Mill. A further 9 flow monitoring sites in the Midlands recorded above normal monthly mean flows ranging from 109% to 176% of the LTA. Auckley, Whatstandwell and Derby St Marys situated in the north-east of the Midlands recorded normal monthly mean flows relative to the LTA.

After the intense rainfall in September, data from Wedderburn Bridge is currently being investigated. As a result, we have no suitable data available from this site for September.

1.4 Groundwater levels

As of the end of September, groundwater levels recorded at monitoring sites were normal or above compared to the LTA. Coxmoor, Rider Point, Weir Farm and Anthony’s Cross recorded exceptionally high groundwater levels compared to the LTA. Three sites recorded notably high groundwater levels compared to the LTA. These were Four Crosses, Ram Hall and Crossley

Hill in central, central-eastern and northern part of the Midlands, respectively. The remaining site, Southards Lane, recorded normal groundwater levels relative to the LTA.

1.5 Reservoir stocks

As of the end of September, the majority of the Midlands reservoirs recorded above average storage for the time of year. Elan, Charnwood and Derwent were the only reservoirs recording below average storage for the time of year.

Since August, storage levels for the majority of reservoirs have decreased. Storage levels for Vyrnwy, Blithfield and Charnwood have increased slightly and for the Dove, storage levels have remained the same since August.

1.6 River Severn operations

The River Severn is regulated to maintain a minimum flow at Bewdley gauging station. This ensures sufficient water flows along the river to support environmental and water supply requirements. Regulation is instigated when flows drop below a threshold.

The 2024 regulation season has seen only 7 days of river regulation, which commenced on 28 June 2024. The last day of regulation was 9 September 2024.

1.7 River Wye operations

For the majority of September, storage in the Elan Valley reservoirs were above the release control line and the flows at Redbrook gauging station were above the regulation threshold. However, regulation releases and environmental releases were still in operation for the majority of September due to the 'agreed 7-day delay to reducing releases to the licensed compensation rate'.

As of 1 October 2024, storage in the Elan Valley reservoirs are above the release control line and the flows at Redbrook gauging station are above the regulation threshold. Therefore, regulation releases are not in operation.

1.8 Water abstraction restrictions

As of 1 October 2024, there are no water abstraction licence restrictions in place across the Midlands.

Author: Midlands Hydrology, midlandshydrology@environment-agency.gov.uk

Contact Details: 03708 506 506

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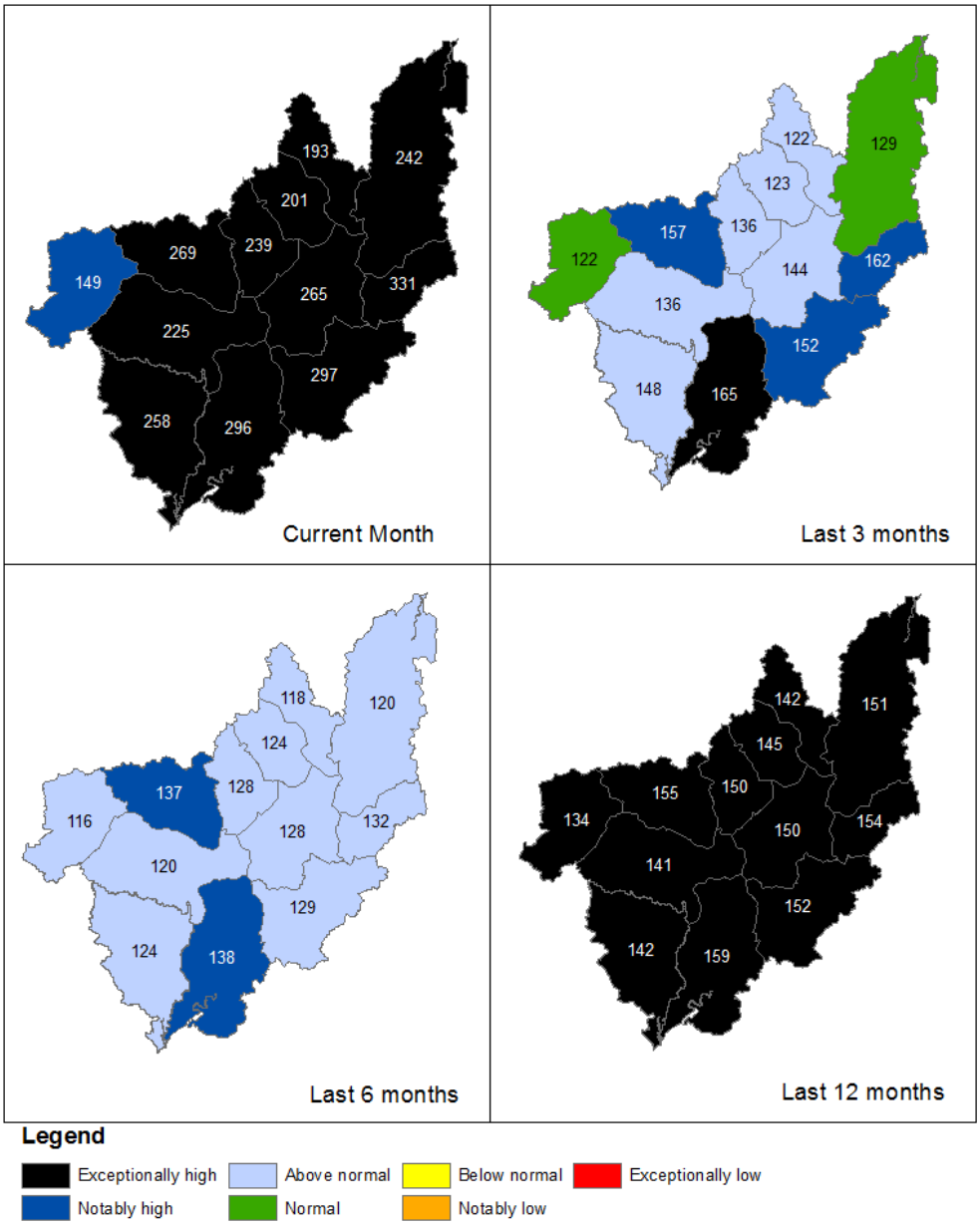
2 Rainfall

2.1 Rainfall map

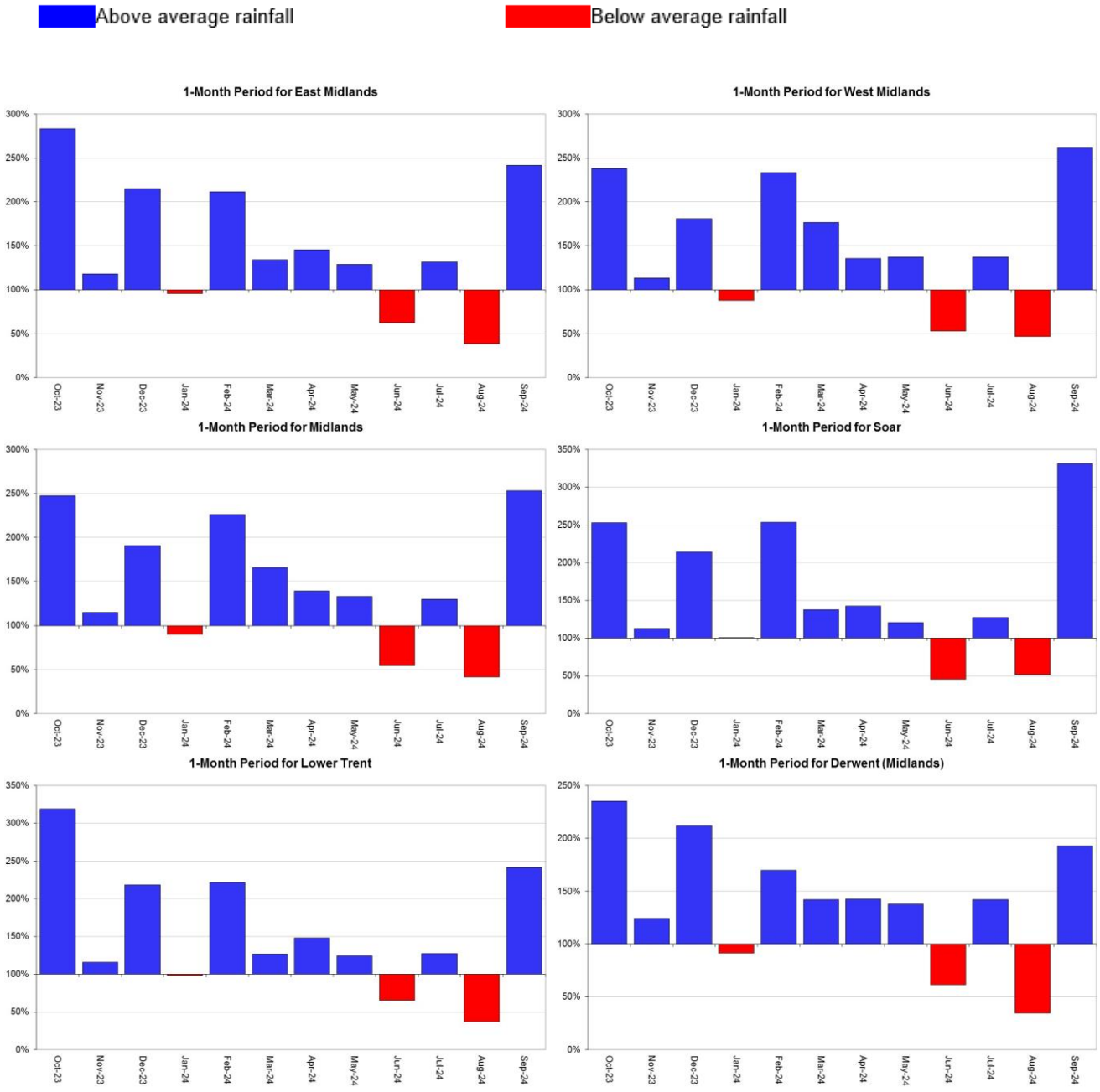
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 30 September 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information. Please see Section 7.4 for a map of the hydrological catchments for which rainfall is reported on.

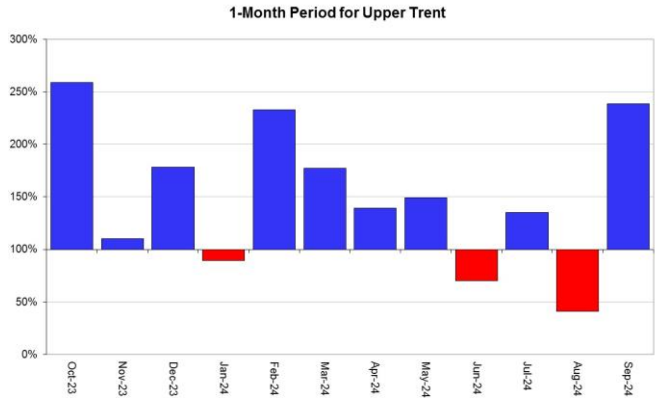


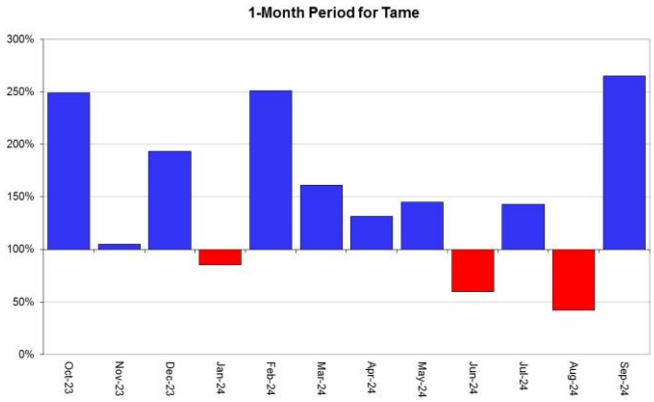
Rainfall data for 2023, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived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

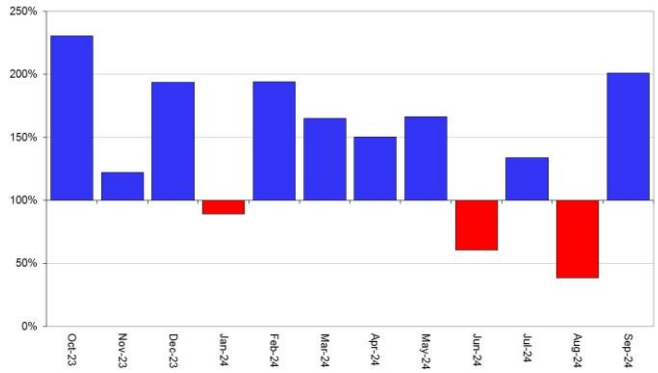
2.2 Rainfall charts

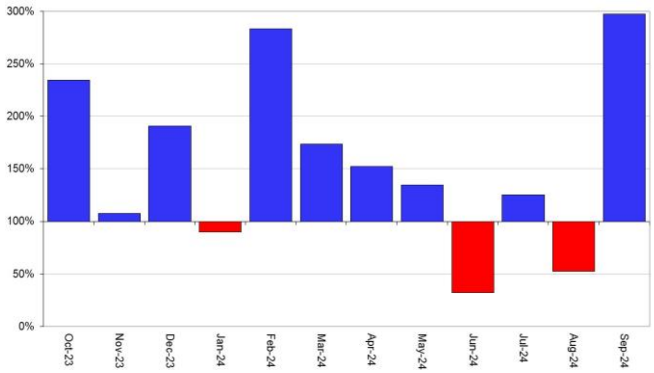
Figure 2.2: Monthly rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average for hydrological areas across the Midlands region.

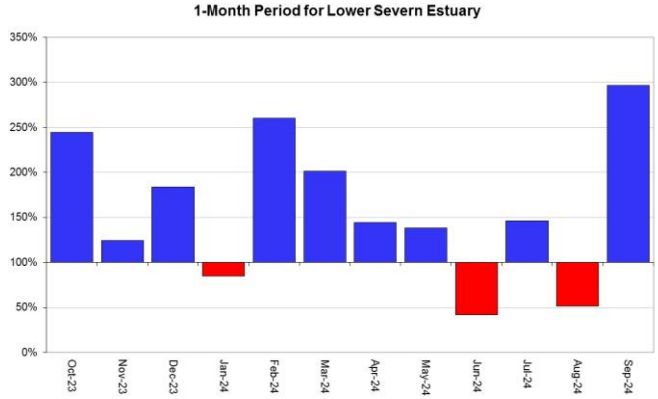


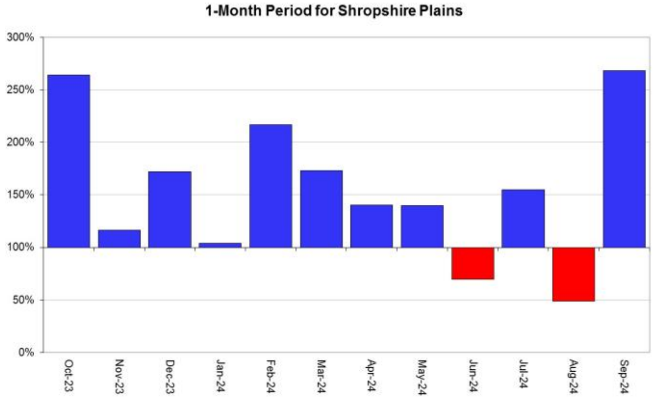

1-Month Period for Upper Trent
300%
250%
200%
150%
100%
50%
0%
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24

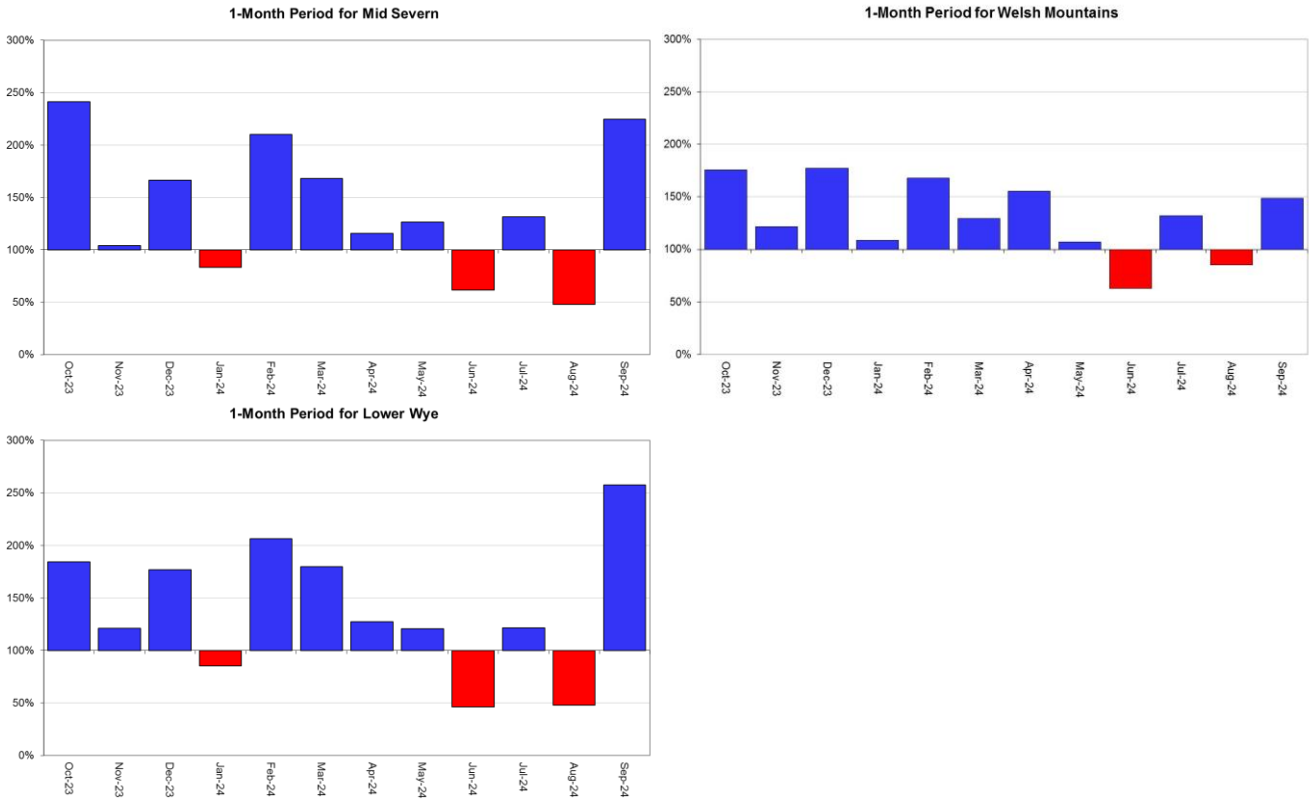

1-Month Period for Tame
300%
250%
200%
150%
100%
50%
0%
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


1-Month Period for Dove
250%
200%
150%
100%
50%
0%
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


1-Month Period for Avon to Evesham
300%
250%
200%
150%
100%
50%
0%
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


1-Month Period for Lower Severn Estuary
350%
300%
250%
200%
150%
100%
50%
0%
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


1-Month Period for Shropshire Plains
300%
250%
200%
150%
100%
50%
0%
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24

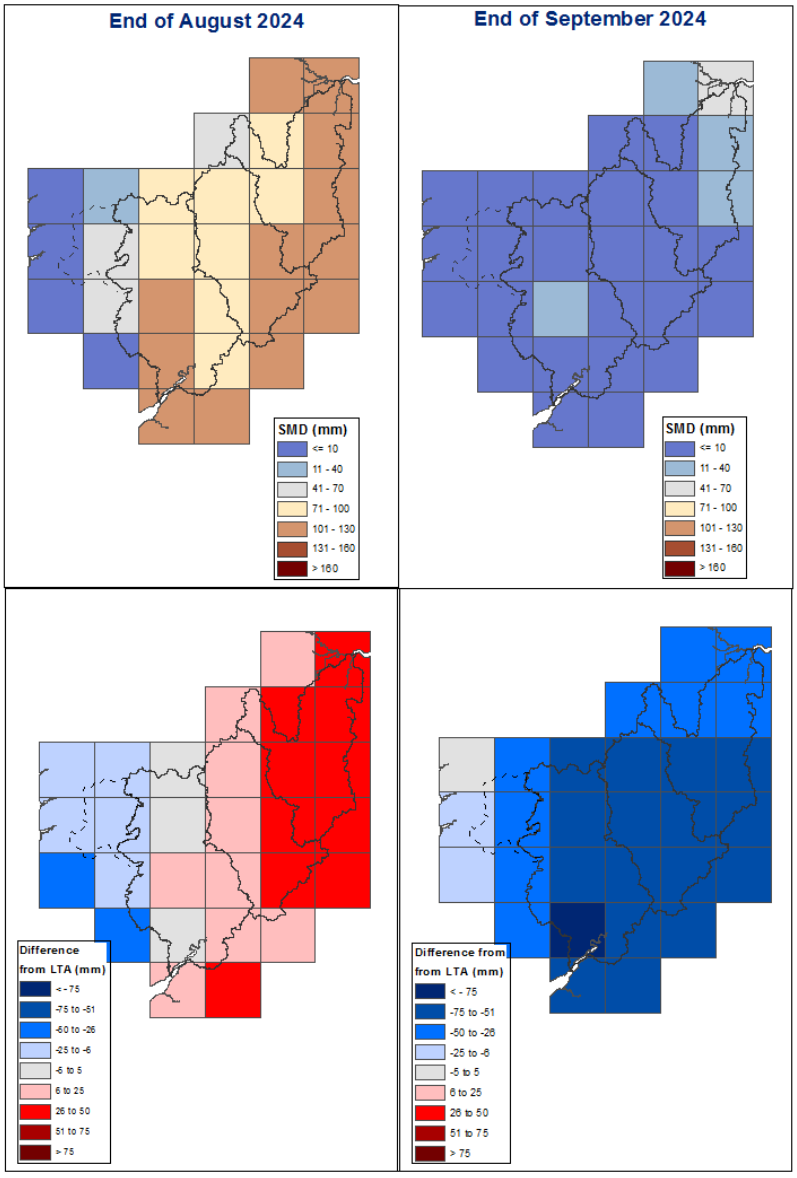


Rainfall data from 2023, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived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

3 Soil moisture deficit

3.1 Soil moisture deficit map

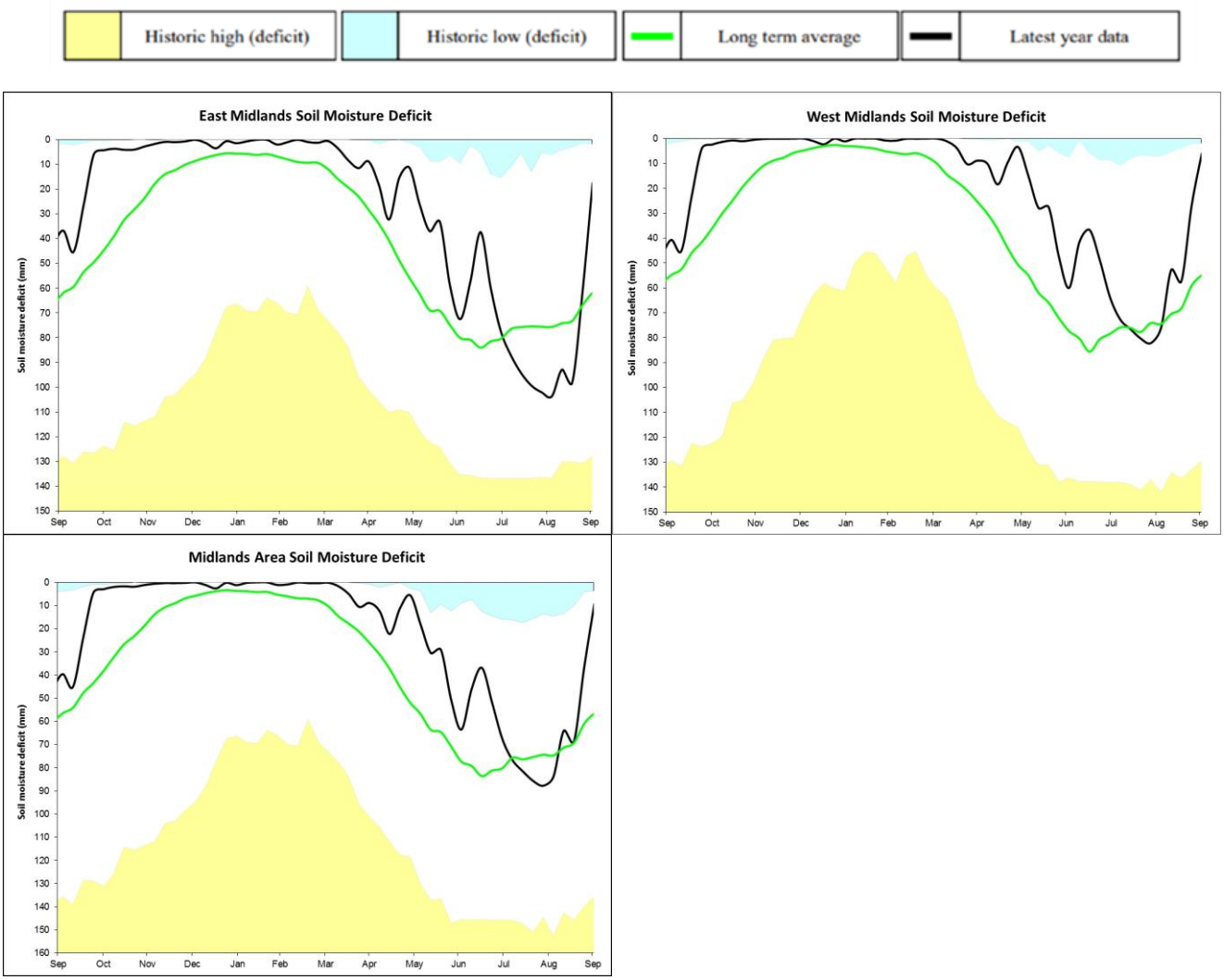
Figure 3.1: Soil moisture deficits for weeks ending 30 September 2024. Shows the difference (mm) of the actual soil moisture deficit from the 1961 to 1990 long term average soil moisture deficits. MORECS data for real land use.



(Source: Met Office. Crown copyright, 2024). All rights reserved. Environment Agency, 100024198, 2024.

3.2 Soil moisture deficit charts

Figure 3.2: Latest soil moisture deficit charts for selected areas across the Midlands.

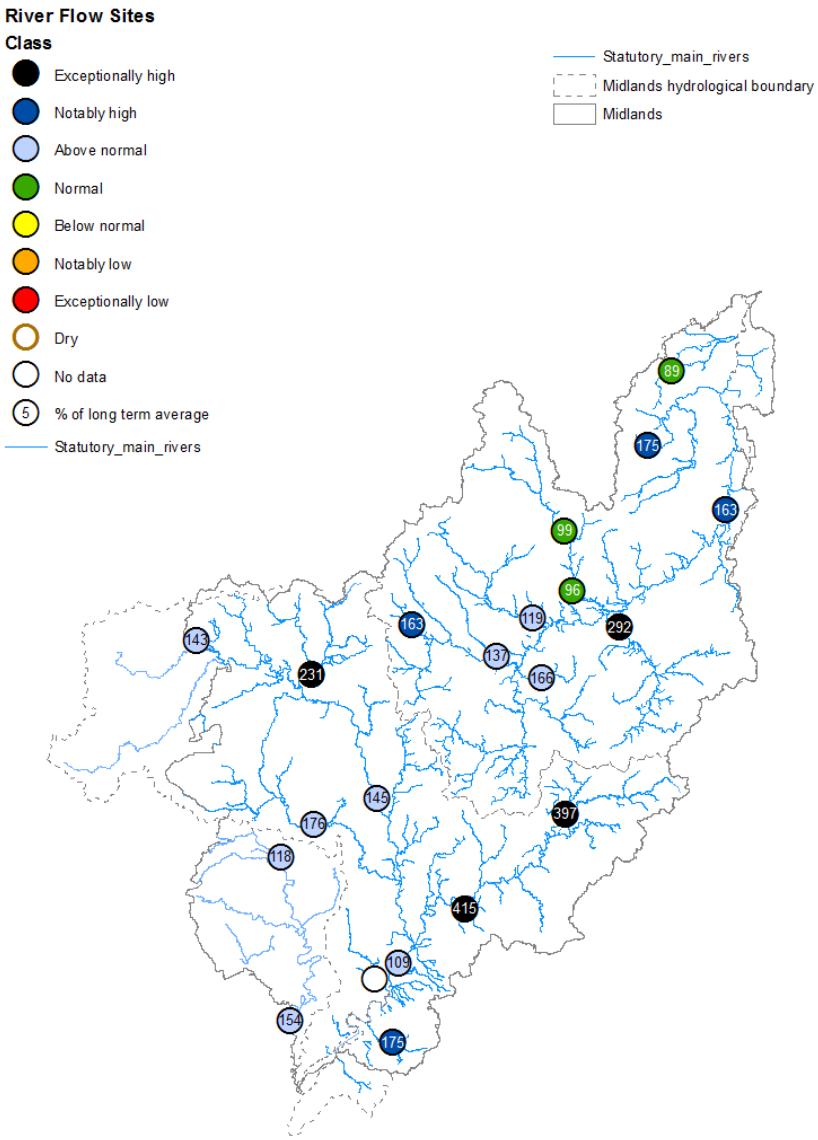


(Source: Met Office. Crown copyright, 20244). All rights reserved. Environment Agency, 100024198, 2024

4 River flows

4.1 River flows map

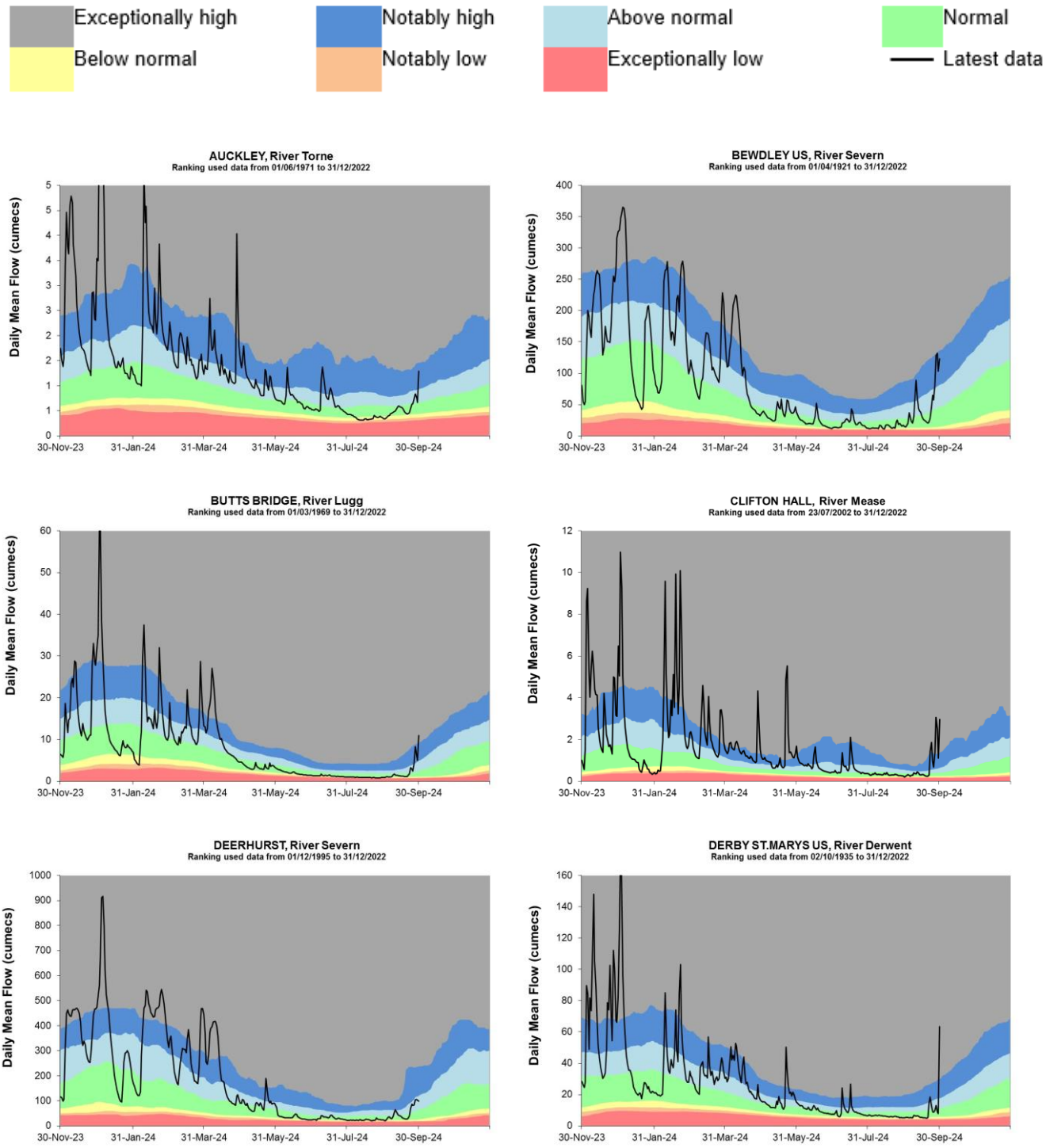
Figure 4.1: Monthly mean river flow for indicator sites for September 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic September monthly means. Table available in the appendices with detailed information.



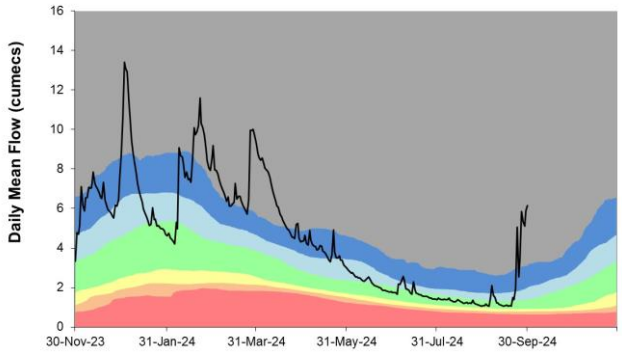
(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

4.2 River flow charts

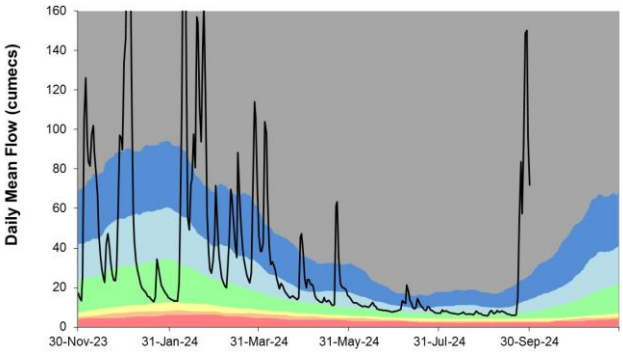
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



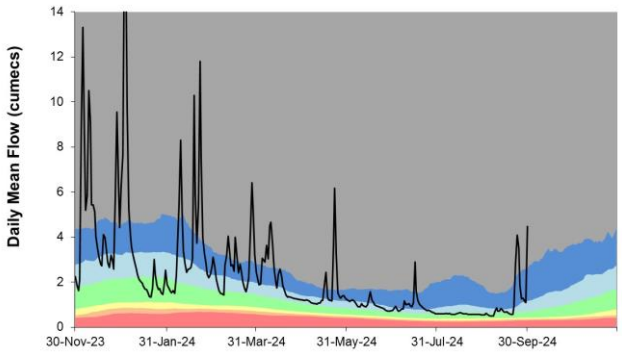
EBLEY MILL, River Frome
Ranking used data from 01/04/1969 to 31/12/2022



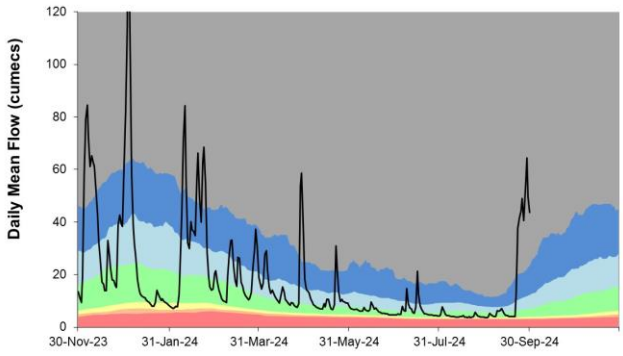
EVESHAM, River Avon
Ranking used data from 01/12/1936 to 31/12/2022



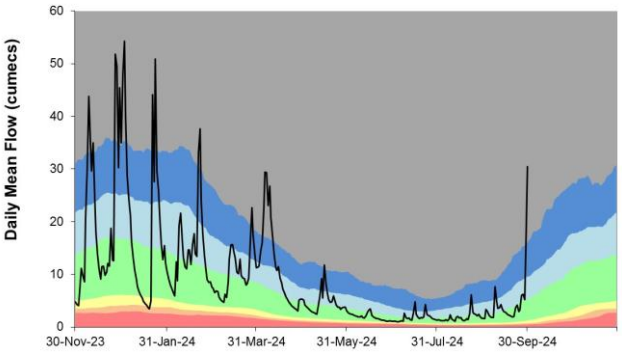
GREAT BRIDGFORD, River Sow
Ranking used data from 18/01/1971 to 31/12/2022



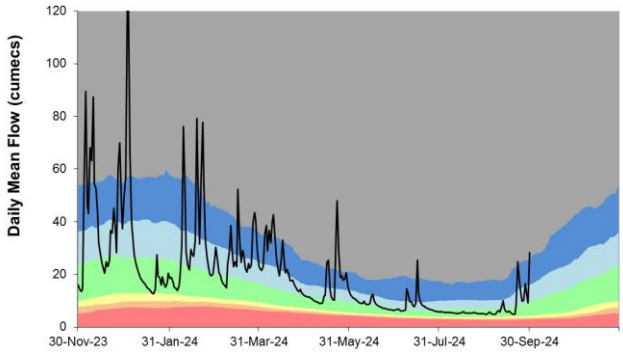
KEGWORTH US, River Soar
Ranking used data from 01/12/1978 to 31/12/2022



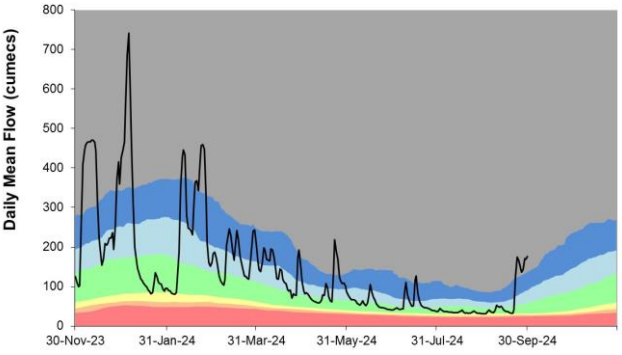
LLANYBLODWEL, Afon Tanat
Ranking used data from 01/06/1973 to 31/12/2022



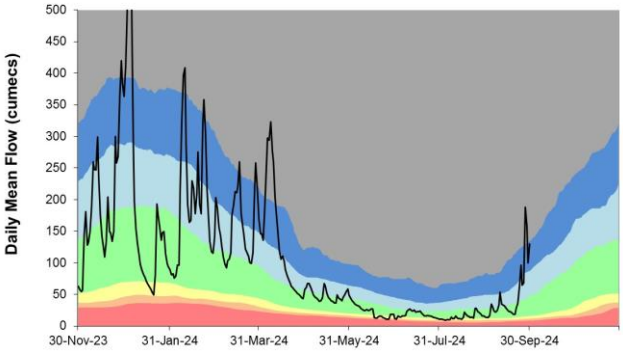
MARSTON ON DOVE, River Dove
Ranking used data from 01/07/1965 to 31/12/2022

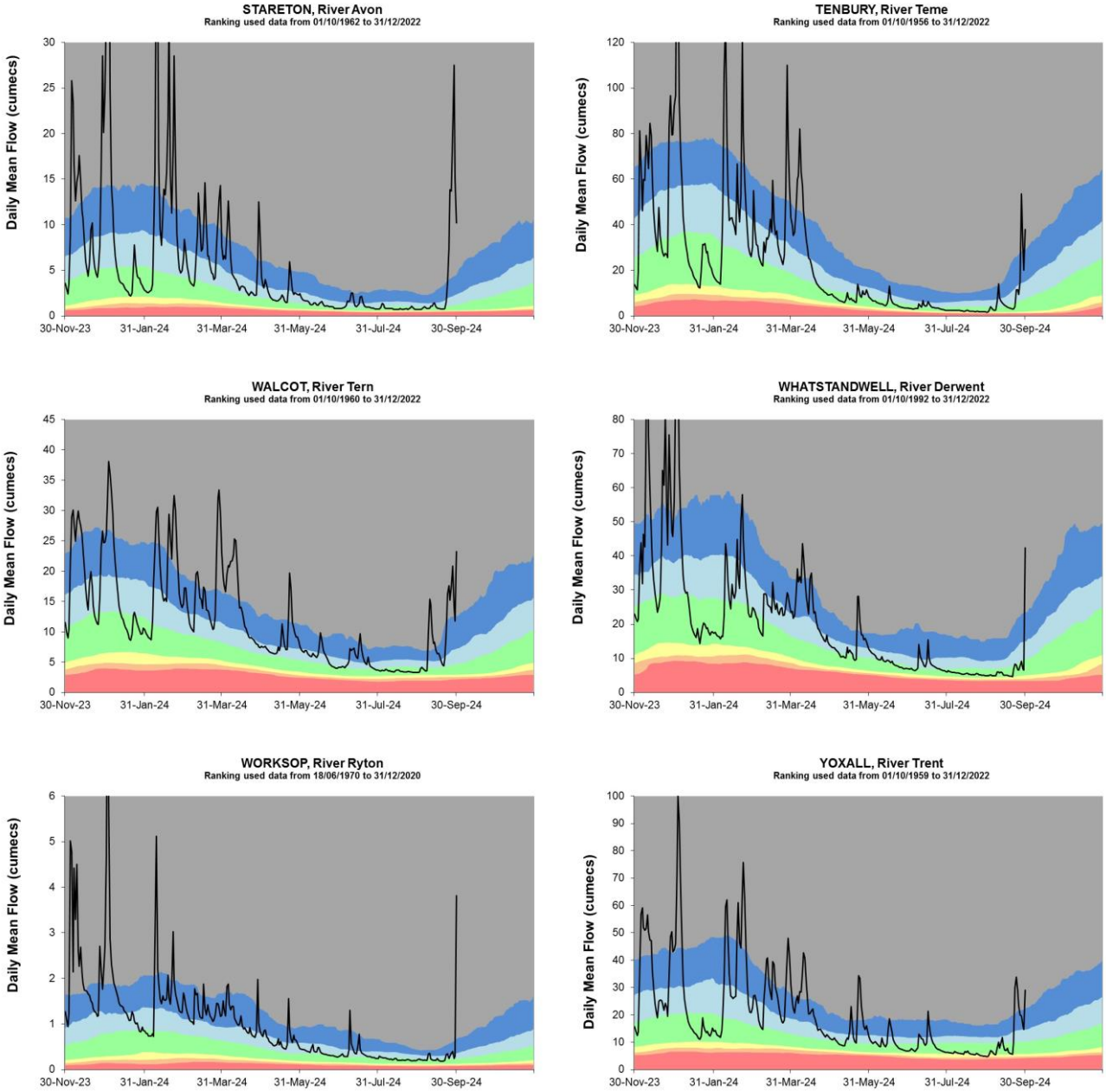


NORTH MUSKHAM, River Trent
Ranking used data from 03/10/1969 to 31/12/2022



REDBROOK, River Wye
Ranking used data from 01/10/1969 to 31/12/2022



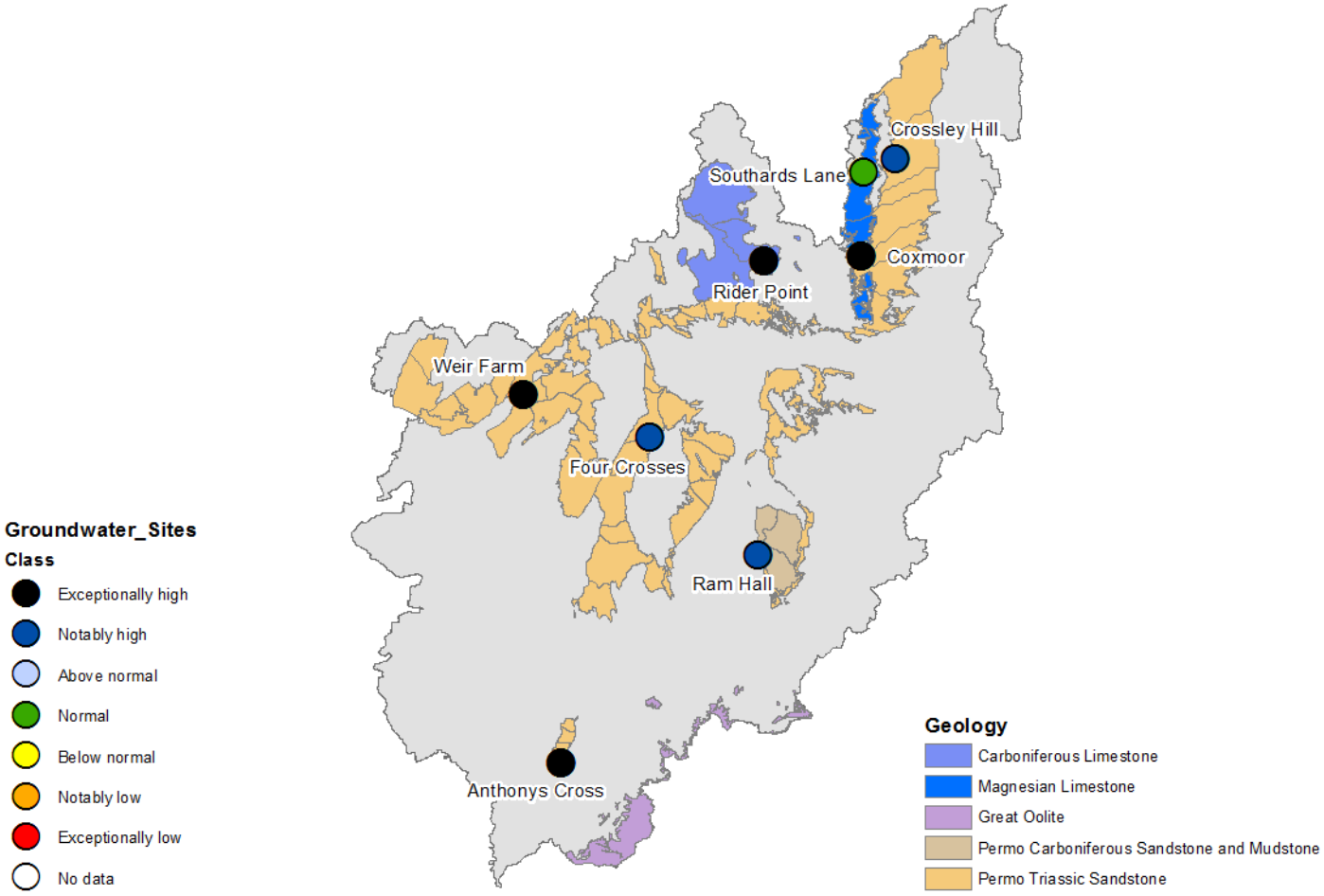


Source: Environment Agency.

5 Groundwater levels

5.1 Groundwater levels map

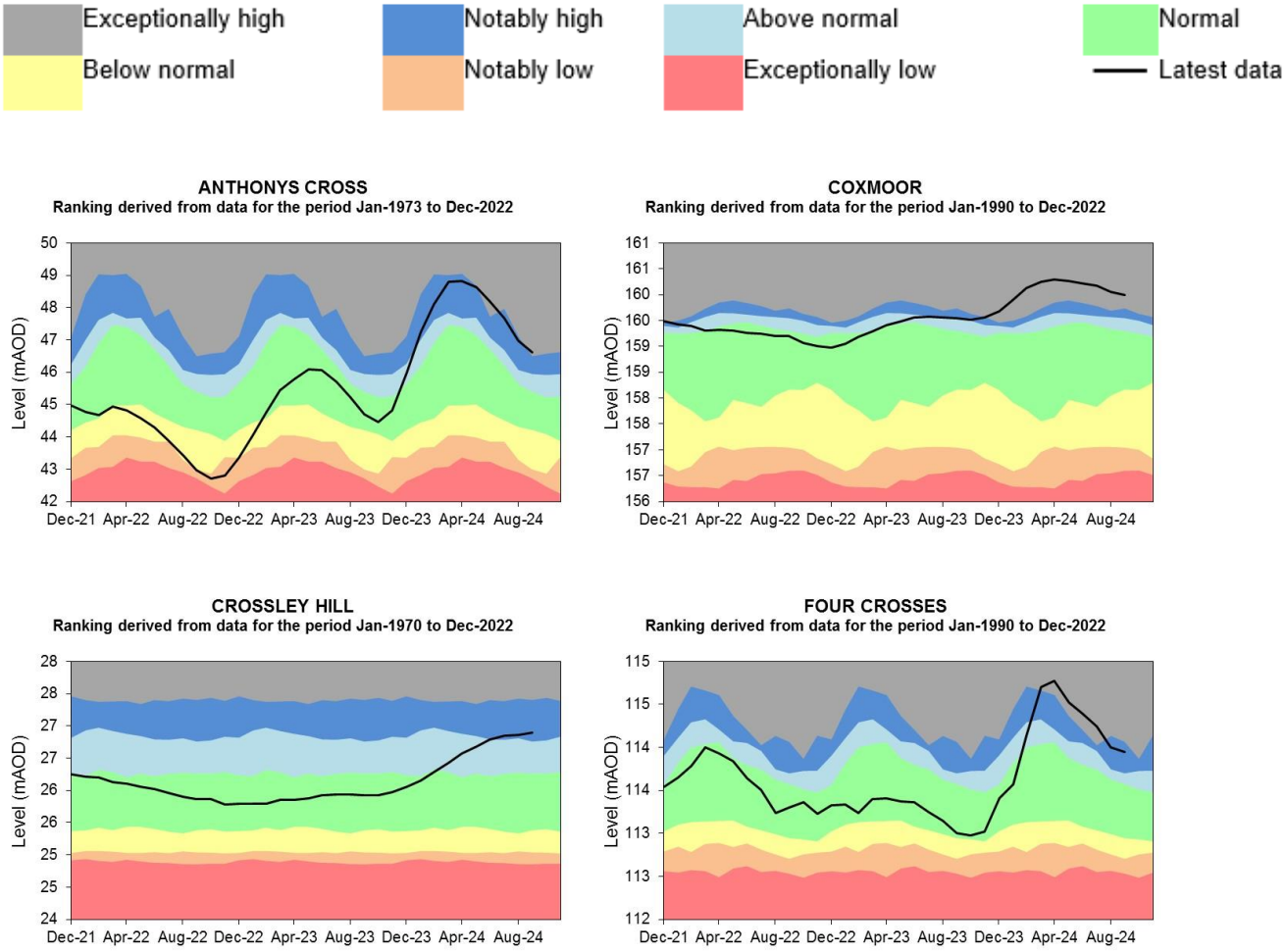
Figure 5.1: Groundwater levels for indicator sites at the end of September 2024, classed relative to an analysis of respective historic September levels. Table available in the appendices with detailed information.

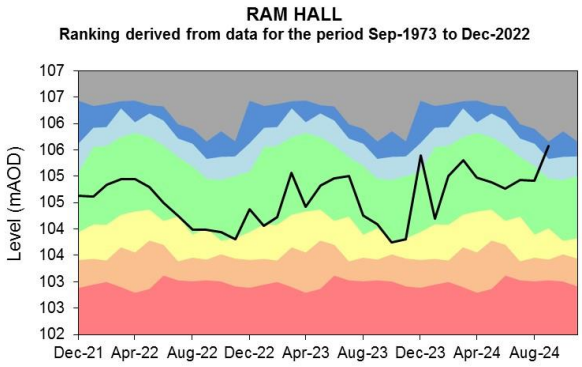


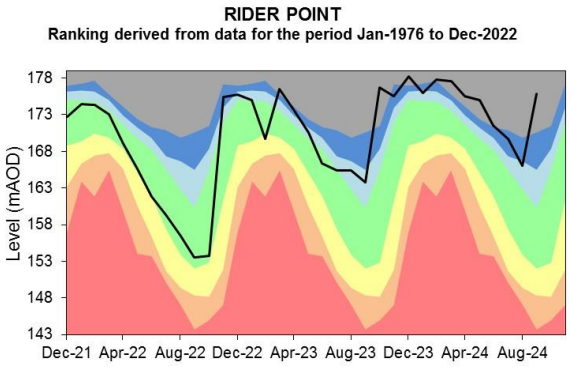
(Source: Environment Agency). Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

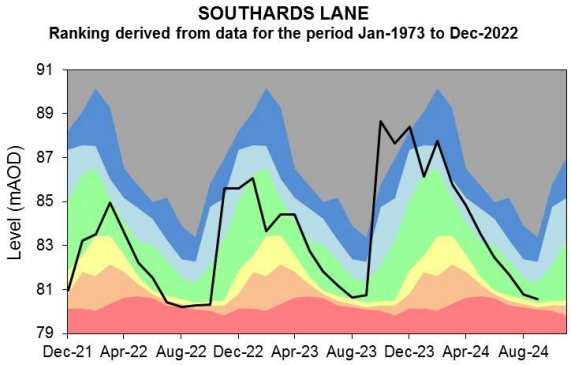
5.2 Groundwater level charts

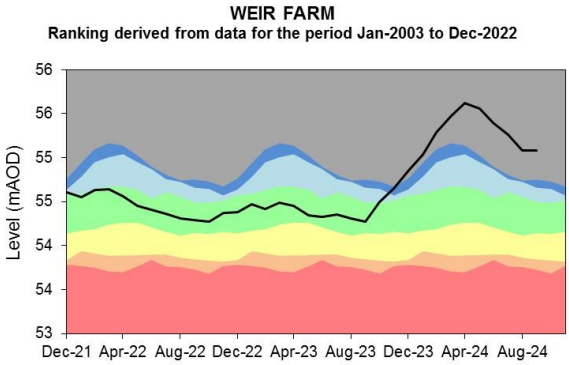
Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels.







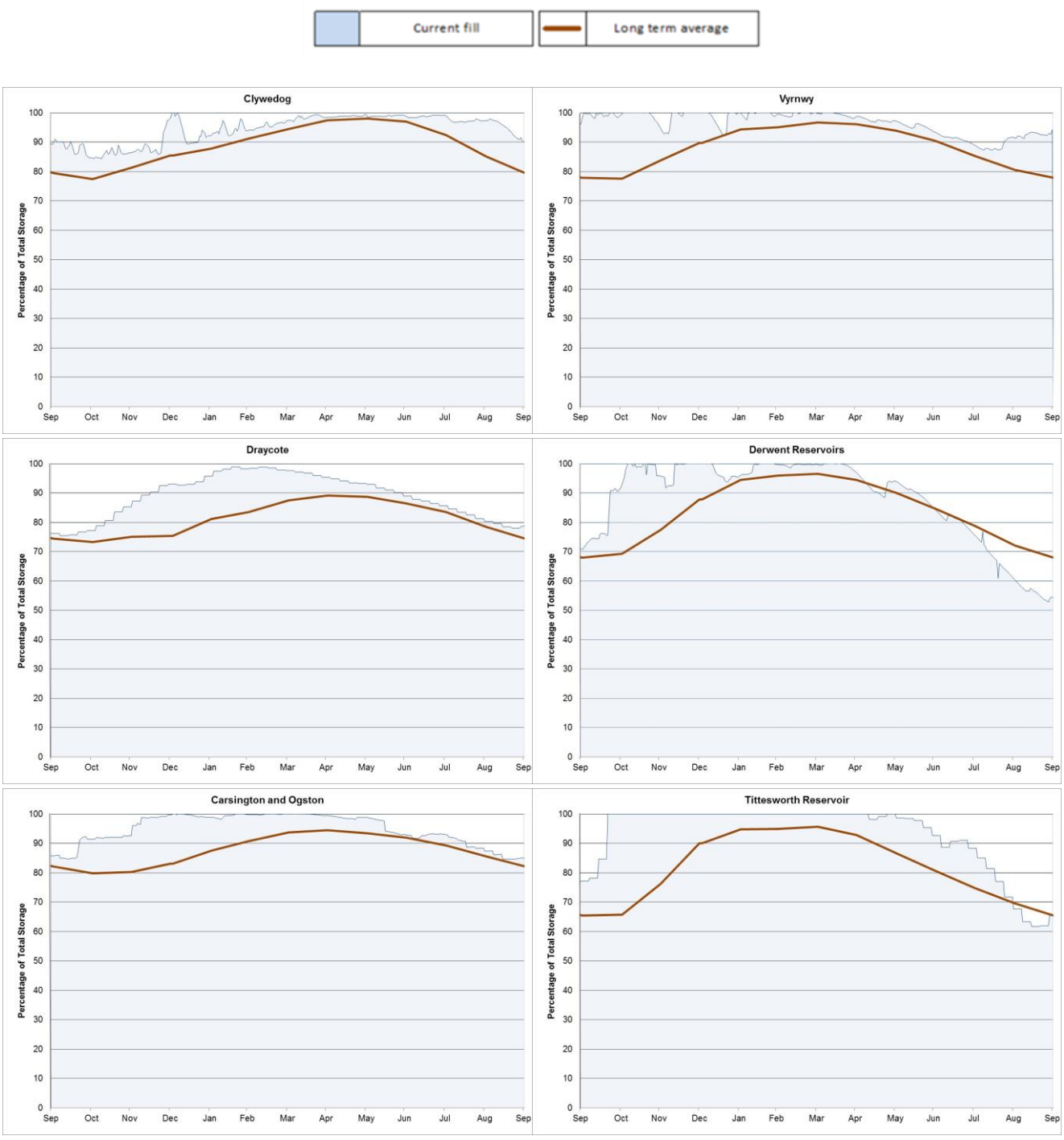


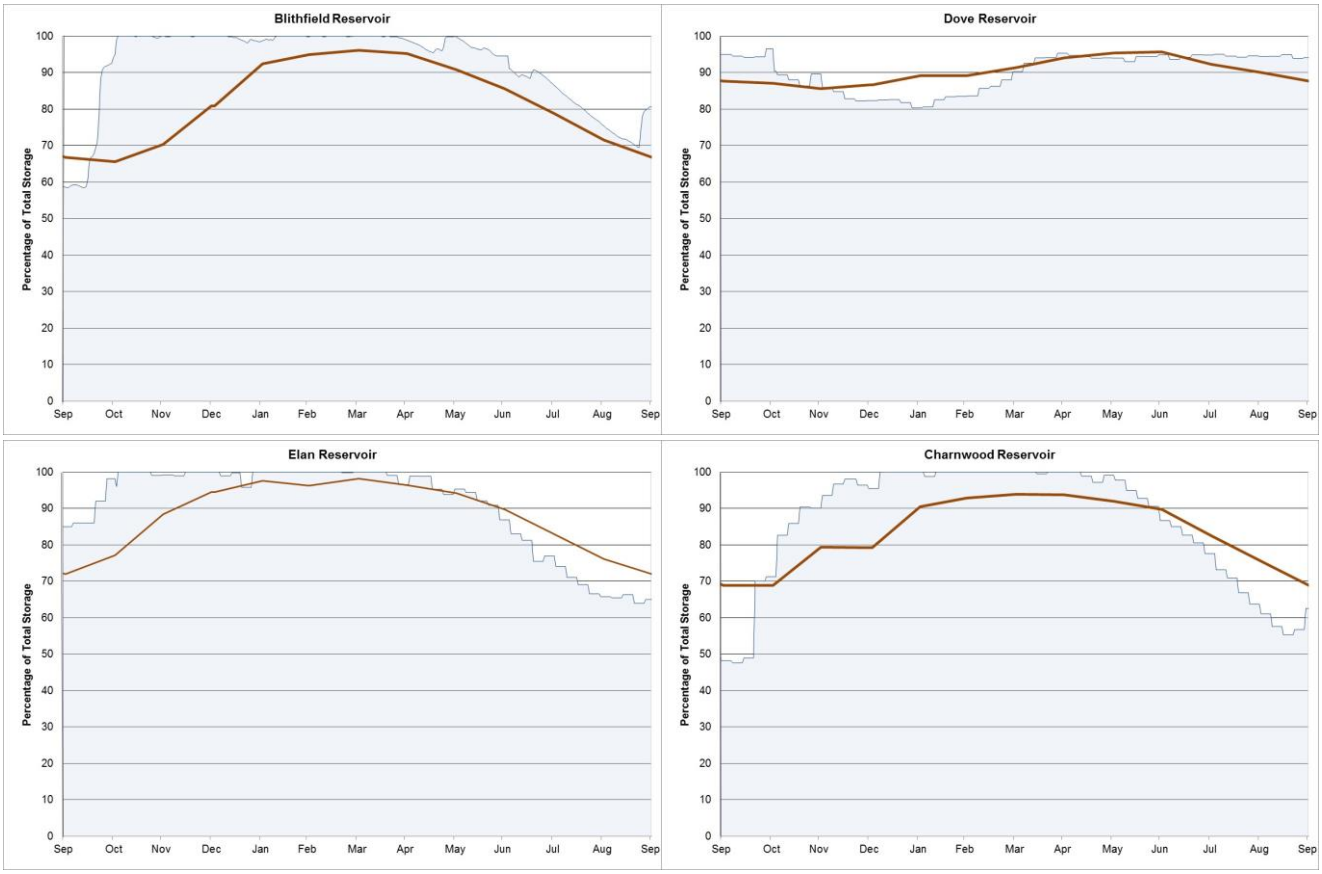


Source: Environment Agency, 2024.

6 Reservoir stocks

Figure 6.1: End of month regional reservoir stocks compared to long term average stocks. Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length. Please see Section 7.5 for a map detailing the locality of the Midlands reservoirs reported on.





(Source: water companies).

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

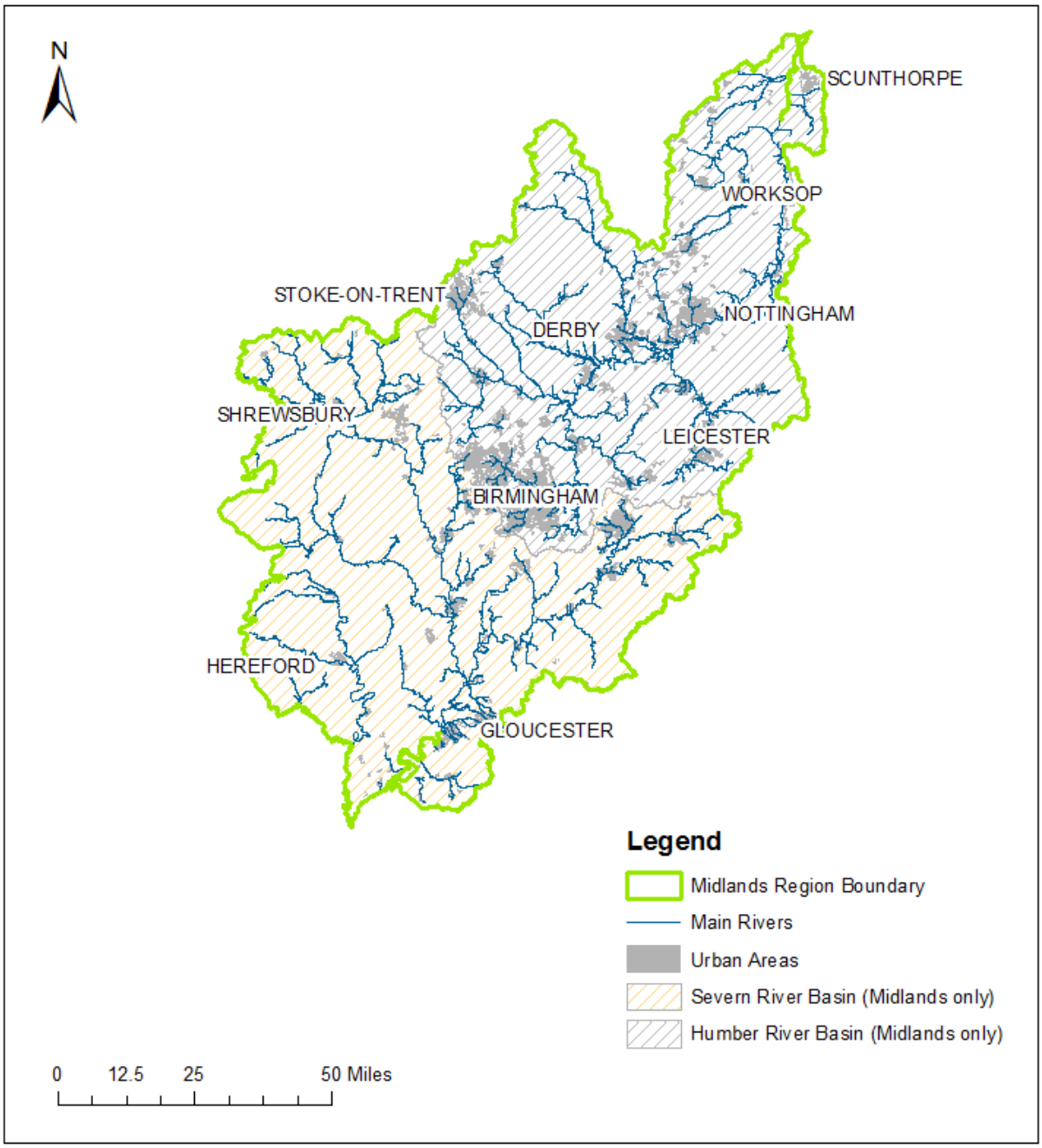
Value likely to fall within this band 8% of the time.

Exceptionally low

Value likely to fall within this band 5% of the time.

7.3 Midlands regional coverage

Figure 7.1: The Midlands regional boundary and the hydrological boundaries of the River Severn and River Trent.



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7.4 Midlands hydrological areas

Figure 7.2: The 12 hydrological areas that make up the Midlands region. Natural Resources Wales are not currently producing a monthly water situation report.

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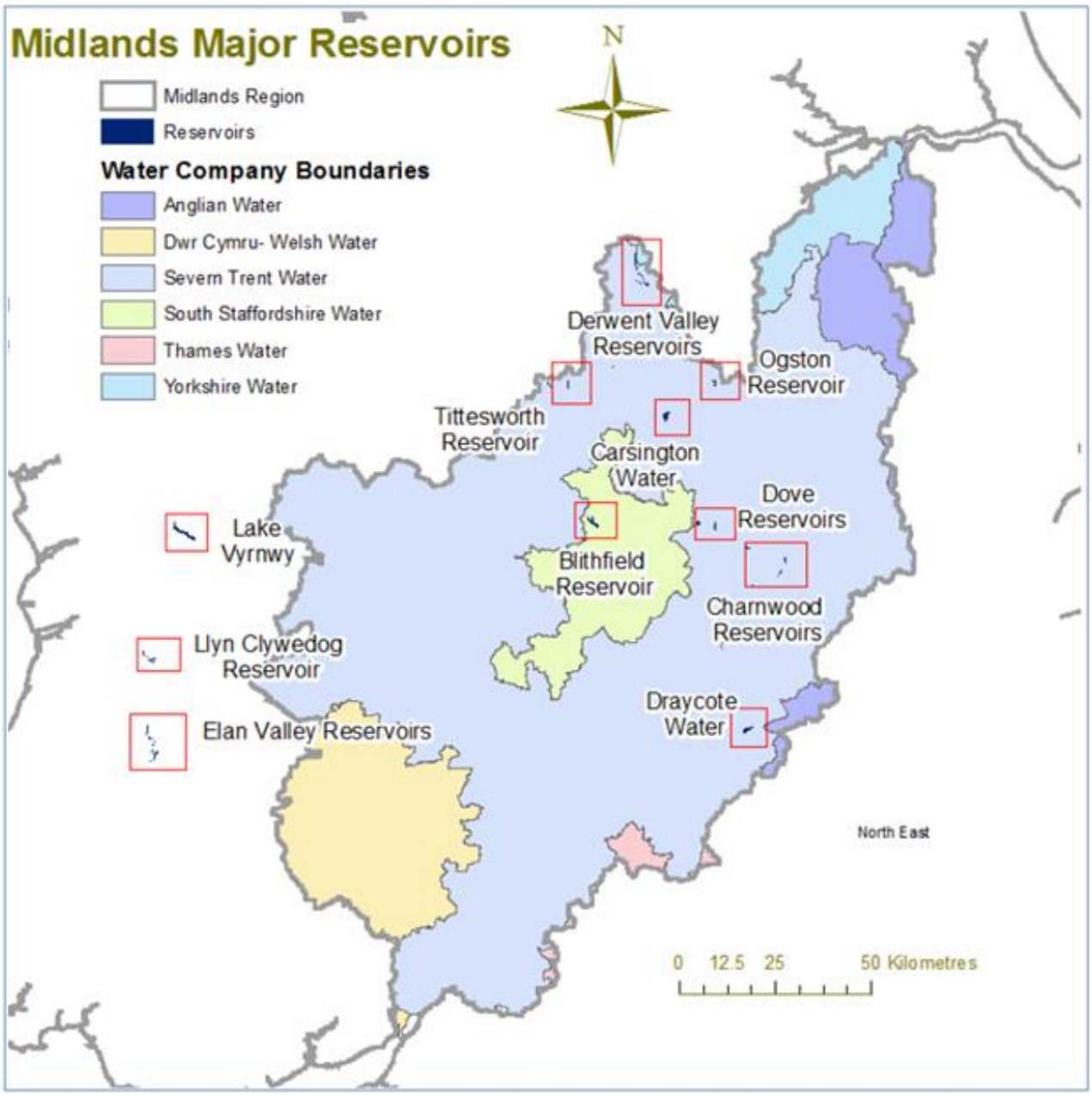
7.5 Midlands major reservoirs

Figure 7.3: Location of major reservoirs in the Midlands.



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8 Appendices

8.1 Rainfall table

Hydrological area	Sep 2024 rainfall % of long term average 1961 to 1990	Sep 2024 band	Jul 2024 to September cumulative band	Apr 2024 to September cumulative band	Oct 2023 to September cumulative band
Avon To Evesham	297	Exceptionally High	Notably high	Above normal	Exceptionally high
Derwent (Midlands)	193	Exceptionally High	Above normal	Above normal	Exceptionally high
Dove	201	Exceptionally High	Above normal	Above normal	Exceptionally high
Lower Severn Estuary	296	Exceptionally High	Exceptionally high	Notably high	Exceptionally high
Lower Trent	242	Exceptionally High	Normal	Above normal	Exceptionally high
Lower Wye	258	Exceptionally High	Above normal	Above normal	Exceptionally high
Mid Severn	225	Exceptionally High	Above normal	Above normal	Exceptionally high
Shropshire Plains	269	Exceptionally High	Notably high	Notably high	Exceptionally high
Soar	331	Exceptionally High	Notably high	Above normal	Exceptionally high

Tame	265	Exceptionally High	Above normal	Above normal	Exceptionally high
Upper Trent	239	Exceptionally High	Above normal	Above normal	Exceptionally high
Welsh Mountains	149	Notably High	Normal	Above normal	Exceptionally high

8.2 River flows table

Site name	River	Catchment	Sep 2024 band	Aug 2024 band
Auckley	Torne	Torne	Normal	Below normal
Bewdley	Severn	Severn Lower Mid	Above normal	Normal
Butts Bridge	Lugg	Lugg	Above normal	Below normal
Clifton Hall	River Mease	Mease	Above normal	Normal
Deerhurst	Severn	Severn Lower	Above normal	Below normal
Derby St.Marys	Derwent	Derwent Der to Markeaton confl.	Normal	Normal
Ebley Mill	Frome (Gloucs.)	Frome Gloucs.	Notably high	Normal
Evesham	Avon (Midlands)	Avon Warwks. Lower	Exceptionally high	Normal
Great Bridgford	Sow	Sow Upper	Notably high	Normal
Kegworth	Soar	Soar to Kingston Brook confl.	Exceptionally high	Below normal
Llanyblodwel	Tanat	Severn Upper River Tanat	Above normal	Normal
Marston On Dove	Dove (Midlands)	Dove Derb to Hilton Br confl.	Above normal	Normal

North Muskham	Trent	Trent to Cromwell	Notably high	Below normal
Redbrook	Wye (Herefordshire)	Wye H and W d s Lugg	Above normal	Normal
Stareton	Avon (mi)	Avon Warwks. Upper	Exceptionally high	Normal
Tenbury	Teme	Teme	Above normal	Normal
Walcot	Tern	Tern	Exceptionally high	Normal
Wedderburn Bridge	Leadon	Leadon	No Data	Normal
Whatstandwell	Derwent	Derwent Derb to Amber confl.	Normal	Normal
Worksop	Ryton	Ryton Upper to Oldcoates Dyke	Notably high	Normal
Yoxall	Trent	Trent to Tame Mease confl.	Above normal	Below normal

8.3 Groundwater table

Site name	Aquifer	End of Sep 2024 band	End of Aug 2024 band
Anthony's Cross	Severn Vale Permo Triassic Sandstone	Exceptionally high	Notably high
Coxmoor	Permo Triassic Sandstone	Exceptionally high	Exceptionally high
Crossley Hill	Permo Triassic Sandstone	Notably high	Notably high
Four Crosses	Grimsby Ancholme Louth Limestone	Notably high	Notably high
Ram Hall, Meriden	Grimsby Ancholme Louth Limestone	Notably high	Normal
Rider Point Via Gellia	Carboniferous Limestone	Exceptionally high	Above normal
Southards Lane, Bolsover	Magnesian Limestone	Normal	Normal
Weir Farm	Bridgnorth Sandstone Formation	Exceptionally high	Exceptionally high