

draft Drought Plan 2027  
**Appendix 6: Drought Permits**

May 2026

## Appendix 6 - Drought Permits

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# 1. Introduction

This Appendix provides a summary of the supporting information we have put together to facilitate a drought permit application. Due to drought permit applications being a complex process, it is important that water companies carry out as much of the preparation work as possible in advance of a drought event. This is more commonly known as being ‘drought permit application ready’.

The drought permit options created for the Anglian region are as follows:

- Lower Colne (Ardleigh Reservoir)
- Costessey (Heigham WTW)
- Wellington Wellfield (Stoke Ferry and Marham WTW)
- River Gt. Ouse (Grafham Water)
- River Nene (Rutland Water)
- River Nene (Pitsford Water)
- River Trent (Hall WTW)

All our drought permits have accompanying Environmental Assessment Reports (EARs) which assess the potential environmental impact of the drought permit and propose associated monitoring and mitigation requirements. These have been reviewed and updated for Drought Plan 2027.

In general, drought permits would initially cover a six-month period during winter or summer. Subsequent reapplication for a further six months may be considered if required, depending on the drought situation at the time. This would require a reapplication and additional environmental assessments.

However, we consider it to be unlikely that we would need to apply for a second six-month period. The WRMP24 demonstrated that the supply system is resilient to severe drought (approximately a 1-in-200 -year event) through the development of the strategic grid. We are confident that we can maintain supplies to customers during a severe drought event without needing to rely on drought permits. However, applications may still be required if forecasts are uncertain and it is agreed that implementing proactively is the most appropriate action to take to protect water supplies and to minimise environmental impact.

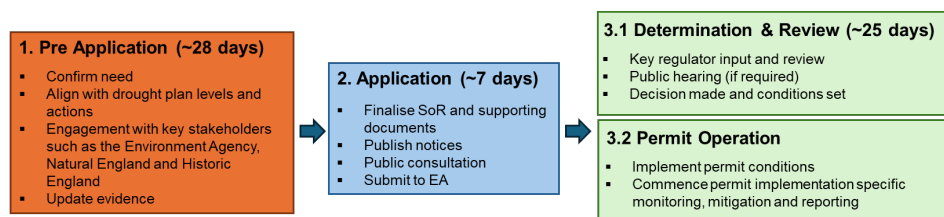
We have developed drought levels and triggers to guide us through the different stages of the drought permit application process, and these are detailed in **Appendix 3**.

In this Appendix, **Section 2** will set out the general drought permit application process and how we are ensuring our drought permit readiness. **Section 3** will summarise the Exceptional Shortage of Rain (ESoR) process and analysis required for an application. The following sections will then provide specific detail for each permit including the proposed licence condition amendments, ESoR catchments, environmental assessment and required monitoring and mitigation.

## 2. Drought Permit Application Ready

We maintain an “application-ready” position throughout the year, enabling us to prepare, submit, and support drought permit applications efficiently and with a robust, well-evidenced foundation. Our approach is structured around three stages: Pre-Application, Application, and Post-Application (formed of two phases ‘Determination & Review’ and ‘Post-Permit Operation’)([Figure 2.1](#)), with proactive stakeholder engagement, communication, and contingency planning embedded throughout. The majority of “application ready activities” are routed in the pre-application work.

Figure 2.1 The three stages of the drought permit application process with approximate timings



### 2.1 Pre-application

We undertake extensive preparation well in advance of any drought event to ensure that drought permit applications are, in most cases, fully developed and ready for submission before they are required. This proactive approach, supported by robust procedures and well-established internal processes, enables us to move quickly, efficiently, and confidently should drought conditions begin to develop.

Under baseline conditions, we carry out environmental and operational monitoring to build a detailed understanding of typical hydrological and system conditions across our catchments. This provides a strong and reliable reference against which any future changes, emerging trends, or early indications of drought can be identified and assessed. Operational teams continually collect data on outage, leakage and other key operational parameters, ensuring an up-to-date evidence base is always available.

We have a good knowledge of stakeholders who may be affected by a potential drought permit, including other abstractors, the Navigation Authority, recreational user groups, and other interested parties. Early engagement ensures they

understand the potential implications of a drought permit and provides an opportunity to address concerns well before any formal permit application is required.

#### 2.1.1 Early stakeholder engagement

During preparation of the Drought Plan 2027, we obtained pre-consultation advice from the Environment Agency, Natural England and Historic England on our Environmental Assessment Report (EAR) methodology, Habitats Regulation Assessment (HRA) methodology and Strategic Environmental Assessment (SEA) Scoping report. Comments raised through these processes have been addressed within the EARs, HRA and SEA. This foundation ensures that stakeholder viewpoints are already understood and that the need for a permit has been considered transparently within a recognised consultation framework.

#### 2.1.2 Drought levels and forecasting

As the water resources conditions deteriorate, we intensify monitoring of flows, levels, rainfall, and other indicators as well as increase the frequency of forecasting to help identify if and when a potential drought permit application might be needed. Assessments on whether there is evidence of an Exceptional Shortage of Rain (ESoR) are also carried out. These assessments are undertaken using data and interpretation from both our hydrology specialists and the Environment Agency to ensure the evidence base is technically robust. More information can be seen in [Section 3](#).

To support consistency and transparency, we have developed a standardised ESoR analysis template and associated reporting tools. These streamline the assessment process, ensure that all key metrics are evaluated using the same approach, and maintain full alignment with the drought levels set out in our Drought Plan.

#### 2.1.3 Drought actions and communications

In the period preceding the potential need for a drought permit we would be following our Drought Plan, which sets out a range of possible actions that we can implement to mitigate the impact of the dry weather and try to reduce the need for a permit ([Part 3, Main Plan](#)).

Customer and stakeholder communication is really important. This will be intensified in frequency and visibility to support early awareness of emerging drought conditions and help customers understand what actions they can take to reduce demand (**Appendix 8**).

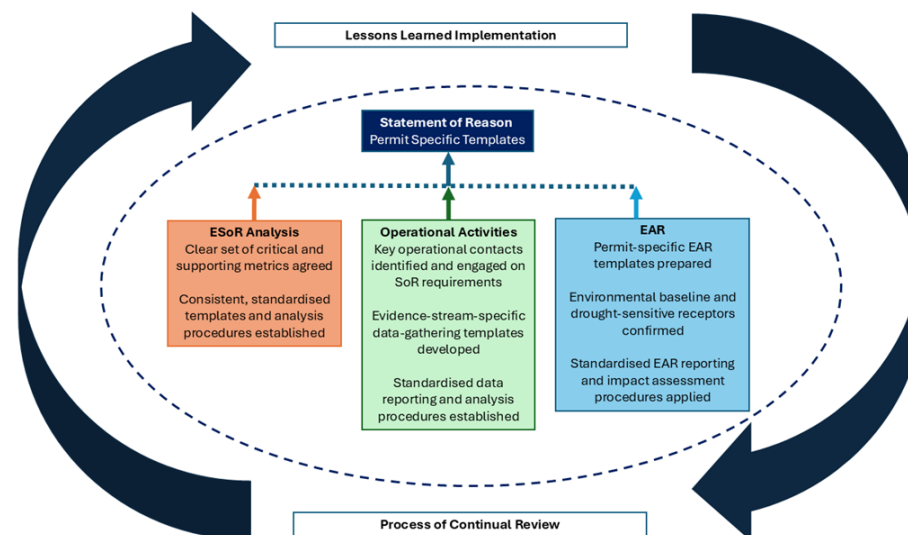
We maintain close and proactive communication with the Environment Agency, Natural England and Historic England as conditions develop. Pro-active discussions begin ahead of any formal application to ensure that any emerging technical issues can be resolved early. Because we operate on an “application-ready” basis, most issues should already have been addressed ahead of submission.

### 2.1.4 Preparation of drought permit documentation

During this phase, we prepare draft drought permit documentation and update all supporting evidence. We have developed bespoke Statement of Reasons (SoR) templates tailored to each permit. Alongside these, dedicated data-gathering templates streamline the process of collating operational information such as outage during the ESoR period, water resource zone conditions, and demand data.

These templates were originally developed in 2022 and subsequently updated in 2025, following pre-application experiences. A structured “step-back” review after each iteration enabled continuous improvement of documentation, data quality, and internal processes, as illustrated in [Figure 2.2](#).

Figure 2.2 Summary of the Anglian Water proactive drought permit readiness workflow, showing how activities are integrated into an ongoing cycle of review and learning to ensure we remain in an application ready position



## 2.2 Drought permit application

During the application stage, we would finalise the SoR and all supporting documentation so that everything is ready for submission to the Environment Agency and other key stakeholders. A typical application would include:

- The Statement of Reasons
- Updated Environmental Assessments
- ESoR Analysis
- Supporting data appendices
- Statutory notices
- Arrangements for public inspection

As detailed above, our recent pre-application experience has provided a practical run through of the full process, enabling us to refine templates and workflows. As a result, our application process is now streamlined, and well-rehearsed, ensuring that documents can be finalised quickly when required.

### 2.2.1 Advertising and public consultation

As part of the application process, we publish statutory notices to support public consultation. These notices are issued to the London Gazette and the relevant newspapers local to the permit area (e.g., Cambridgeshire News and The Hunts Post), with additional targeted social media updates considered in line with our communications strategy.

We would make application documents available on our website and in paper format for consultation. This consultation would build on the early stakeholder engagement undertaken, ensuring all relevant parties are already identified and informed.

For our full drought permit application we would include the following, as recommended by the guidance:

- Written consent from the Environment Agency;
- Comments from those consulted about the application;
- Details of any objections received or agreements reached with objectors;
- A copy of the notices and advertisements relating to our application; and
- A description of our arrangements for the public inspection of the application.

Following the close of the consultation window, the application is formally determined by the Environment Agency.

## 2.3 Post application

Upon submission, the post-application phase begins. During this stage the application is reviewed, if successful, the permit will be granted and becomes operational.

We are well positioned for the determination and review stage, as through the development of our templates we have already assembled a comprehensive and robust evidence base that aligns with key regulator expectations; supporting an efficient technical review. We are prepared to respond promptly to any queries and to provide supplementary information where required.

### 2.3.1 Planning for all outcomes

We plan for all possible outcomes, including the potential need for a public hearing. Where necessary, hearings could be held at regional Anglian Water offices or at alternative venues or online platforms as appropriate. We continue to liaise closely with the Environment Agency before and during any hearing process.

In the event of an unsuccessful permit application, we would likely have to consider alternative and potentially more severe demand or supply actions.

### 2.3.2 Ongoing review

We regularly review the need for drought permits and continue updating relevant datasets, to ensure assessments remain current. Any changes identified during this ongoing review process are fed back into the EARs and other supporting documentation.

## 3. Exceptional Shortage of Rain (ESoR)

For a drought permit to be granted, a compelling justification of need case needs to be provided. One of the most important parts of this is the legal requirement to demonstrate that ‘...by reason of an exceptional shortage of rain, a serious deficiency of supplies of water in any area exists or is threatened...’.

The Environment Agency guidance states that it is not appropriate to set a prescriptive approach to assessing an exceptional shortage of rain (ESoR), as each drought and each situation is unique. The guidance provides a range of evidence to consider when building an ESoR case. This section provides an overview of our process for demonstrating an ESoR, following the guidance. Evidence is split into critical metrics, which we would likely always include, and supporting metrics, which will be included as appropriate in support of the specific ESoR assessments.

### 3.1 Critical metrics

Rainfall is a key indicator in assessing drought conditions. Drought events vary in their duration, the time of year they commence and their magnitude (the extent of the rainfall deficit). The rainfall evidence that would be used to demonstrate an ESoR is summarised in [Table 3.1](#) and is used to support the definition and timescale of the ESoR period.

The rainfall data set used in all ESoR rainfall analysis is the HadUK areal rainfall, for the relevant hydrological areas (see permit specific sections below). This is provided by the Environment Agency under licence and updated monthly. HadUK data, produced by the Met Office, is a 1 km gridded product derived from the interpolation of observed rainfall. The data record covers the period from 1871 to present. In accordance with the guidance, either the entire record would be used or data covering the 1991-2020 long-term average (LTA) period as set out in [Table 3.1](#).

Table 3.1 Decision making evidence for rainfall

Decision making evidence	Evidence category	What we would look to include
Standard Precipitation Index (SPI)	Essential	SPI cumulative distribution plot over the ESoR period for all years in the historic record
Rainfall ranking	Essential	Ranking of relevant cumulative rainfall totals against the full historic record, presented as a cumulative distribution plot
Rainfall probability bands	Essential	Comparison of cumulative rainfall over the ESoR period against EA probability classifications, derived using Cunnane calculations from the full historic record
Percent of long-term average (LTA) rainfall	Recommended as supporting evidence	Monthly and cumulative rainfall over the ESoR period expressed as a percentage of the 1991-2020 LTA
Long duration rainfall frequency analysis	Recommended as supporting evidence	Statistical frequency analysis comparing specific lengths of observed cumulative rainfall for all years in the full historic record with fitted distributions such as skew normal, including goodness of fit tests and probability estimates for rainfall over the ESoR period

### 3.1.1 Standardised Precipitation Index (SPI)

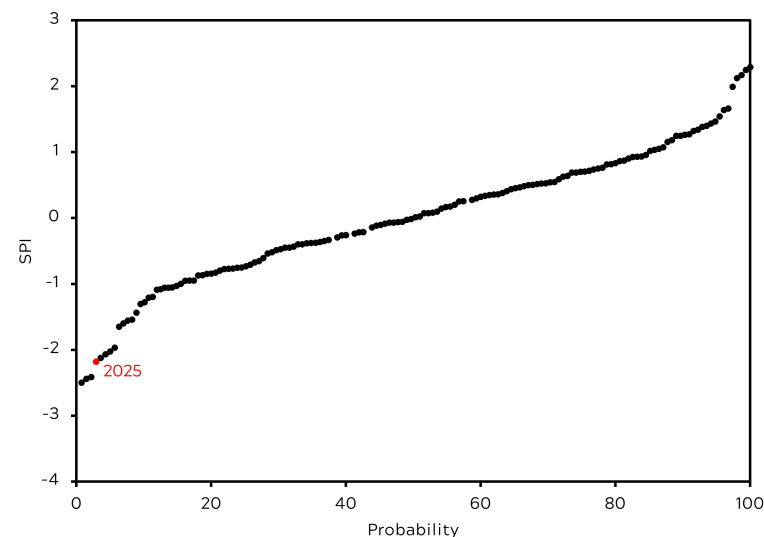
We use the SPI to indicate the severity of low rainfall and if a drought may be developing. The SPI is a measure of deviation from average values of rainfall, normalised according to the natural variability. Negative SPI values represent increasingly dry conditions, and a value of less than -2 indicates extremely dry conditions (Table 3.2).

Table 3.2 SPI Value

SPI Value	Rainfall scenario
2 and more	Extremely wet
1.5 to 1.99	Very wet
1.0 to 1.49	Moderately wet
-0.99 to 0.99	Near normal
-1.0 to -1.49	Moderately dry

An example of a SPI cumulative distribution plot, which would be used to show the SPI value for the drought period and where it ranks within the full historic record, can be seen in Figure 3.1. This type of plot enables comparison against previous drought years and helps identify how exceptional current rainfall deficits are.

Figure 3.1 Example SPI cumulative distribution plot to indicate the probability of a specific SPI metric value based on the full historic record. The example shows the SPI8, i.e. SPI for an 8 month period, for the month ending October, with the year highlighted in red

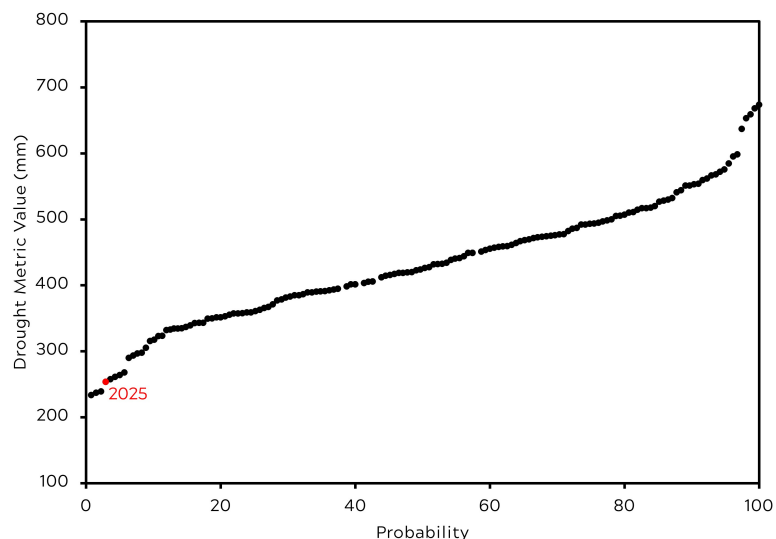


### 3.1.2 Rainfall ranking

Rainfall ranking provides a means to compare the ESoR period against the historic record to help contextualise the severity of an event.

To carry out the rainfall ranking analysis, we would calculate a timeseries of drought metrics from the full historic record of monthly precipitation. Each drought metric represents the cumulative precipitation for a given duration (e.g. 3-month, 6-month, or 12-month periods ending in a specified month). These cumulative totals would then be ranked against the entire historical dataset to determine how dry the ESoR period is relative to past conditions. An example of ranked drought metrics plotted as a cumulative distribution function can be seen in Figure 3.2.

Figure 3.2 Example cumulative distribution plot showing the ranking of a drought metric over the full historic record. The example shows the ranking of October for the 8-month drought metric, with the year highlighted in red



### 3.1.3 Rainfall probability bands

Rainfall probability bands are used to assess how observed rainfall over a given accumulation period compares with the statistical distribution of historic conditions. The probability bands are reproduced from the Environment Agency’s guidance note *Categorising hydrological data by probability ranking* (Environment Agency, 2011). A probability of less than 5% indicates exceptionally low rainfall.

By determining the probability band into which current cumulative rainfall falls, we can identify whether rainfall would be classified as consistently exceptionally low over the relevant period. The rolling rainfall accumulations allow the review of patterns and the magnitude of both annual and longer-term rainfall deficits (e.g. 1 or 2 dry winters) to be measured. An example of cumulative monthly rainfall probability bandings, which would be used to show how drought has developed over time, is shown in [Table 3.3](#).

Table 3.3 Example cumulative monthly rainfall probability bandings

Period (months) of Cumulative Rainfall	Periods ending in month							
	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25
1	NL	BN	NL	BN	N	NL	N	N
2	BN	EL	EL	NL	BN	NL	BN	N
3	N	NL	EL	EL	NL	NL	BN	BN
4	N	BN	EL	EL	EL	EL	NL	BN
5	N	BN	NL	EL	EL	EL	NL	NL
6	N	N	BN	EL	EL	EL	EL	NL
7	NH	N	BN	NL	NL	EL	EL	EL
8	AN	AN	N	BN	NL	EL	EL	EL
9	AN	N	N	BN	BN	EL	EL	EL
10	AN	N	N	N	BN	NL	EL	EL
11	N	N	N	N	N	NL	NL	EL
12	AN	N	N	N	N	N	NL	NL

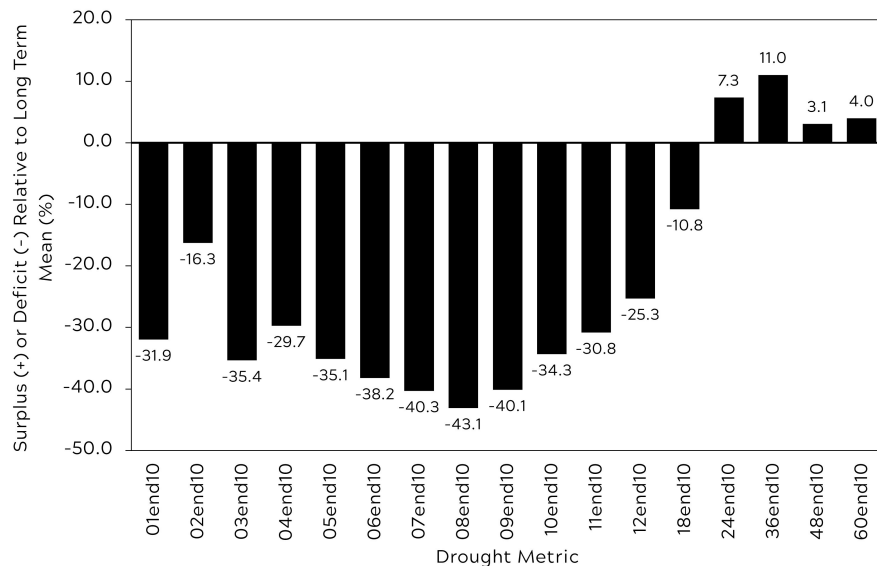
**Probability bands:** extremely low (EL), notably low (NL), below normal (BN), normal (N), above normal (AN), notably high (NH), exceptionally high (EH)

### 3.1.4 Percent of long-term average rainfall

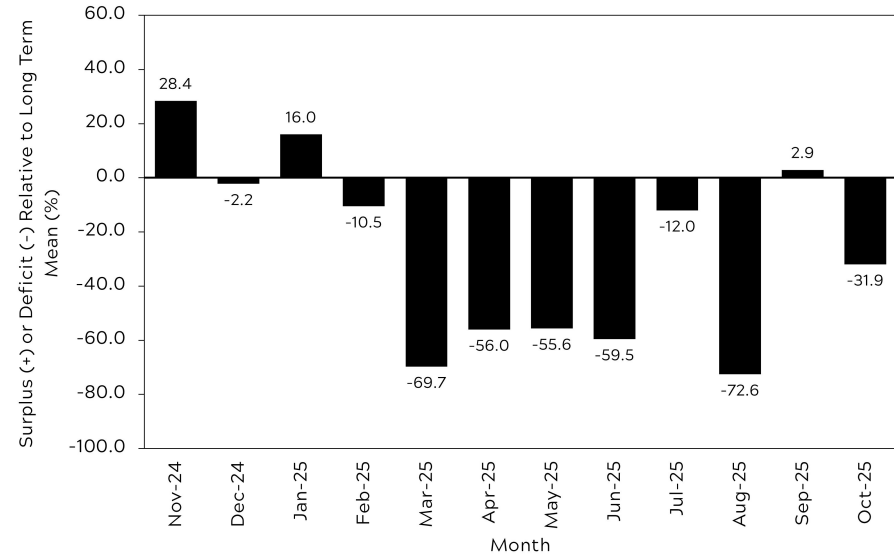
Percentage of Long-Term Average (LTA) rainfall provides a clear measure of how observed rainfall compares with typical conditions for specific accumulation periods (i.e. between 1 and 60 months as shown in [Figure 3.3](#)). Sustained negative values indicates elevated drought risk.

To assess these deficits, we would compare cumulative precipitation for a range of durations to the 1991-2020 LTA. We would also present the deviation for each month individually from the LTA ([Figure 3.4](#)). This approach enables identification of both short and long-term rainfall shortages contributing to drought development.

**Figure 3.3 Example deviations from the long-term average for drought metrics from 1 month to 60 months. The example shows data from the end of the ESoR period, October**



**Figure 3.4 Example deviations from the long-term average for 12 months**

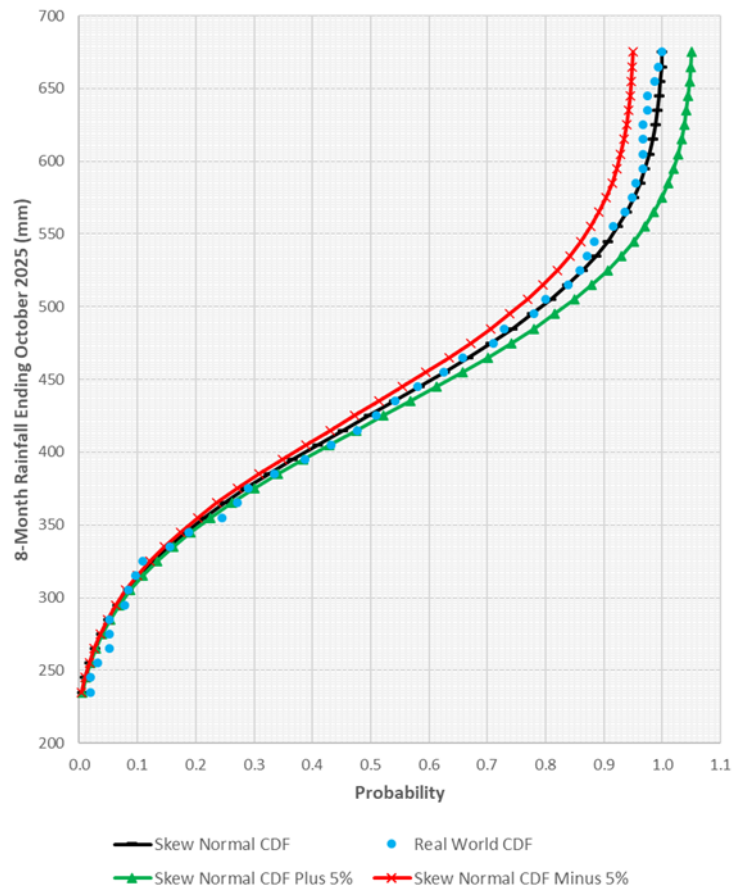


### 3.1.5 Long duration rainfall frequency analysis

Long duration rainfall frequency analysis is used to demonstrate how unusual the observed rainfall deficit is when compared to the full historic record. We would use the HadUK rainfall data to produce a probability density function for the analysis period, allowing the underlying distribution and statistical parameters of the data (skew, mean, median) to be identified. A chi-squared goodness-of-fit test would be applied to validate the selected distribution and ensure that it provides an accurate representation of the historical data.

Once a suitable distribution is confirmed, the probability of experiencing a rainfall accumulation equal to or less than the observed accumulation during the ESoR can be calculated and used to show how exceptional the event is within the context of the historical record. An example cumulative distribution function (CDF), illustrating how observed rainfall aligns with the fitted distribution and its corresponding probabilities, is shown in [Figure 3.5](#).

Figure 3.5 Example CDF plots of Skew-Normal CDFs with 95% confidence intervals and real-world data plotted



### 3.2 Supporting Metrics

We would support a case for ESoR by presenting other relevant non-rainfall variables. These may include groundwater levels, soil moisture deficit (SMD), river flows, temperature, reservoir storage, and standard precipitation evapotranspiration index (SPEI). For each measure, we would compare current conditions to long term averages and previous documented drought years. The current operational water supply situation would be described, including reservoir storage levels against drought levels. Any relevant system impacts or mitigation actions undertaken to maintain supply resilience would also be summarised. The supporting evidence that may be routinely used is summarised in [Table 3.4](#).

Additional supporting metrics, such as temporal variability in rainfall, short-term weather forecasts, effective rainfall, and potential evapotranspiration, may be included. However, these indicators are not required and will not be considered routinely. Their use will be limited to situations where they demonstrably enhance the evidence base and provide meaningful additional insight, rather than forming part of our core analytical approach.

**Table 3.4 Decision making evidence for non-rainfall variables**

Decision making evidence	Rational for inclusion	When we would include	What we would include
River flow	River flow data demonstrates how the rainfall deficit is affecting catchment runoff and water availability.	Included if the permit is linked to local rivers or reservoirs that abstract from the rivers.	Comparison of river flows for the ESoR period against other drought years and probability ranking categories.
Groundwater	Groundwater analysis provides evidence of how sustained rainfall deficits have affected deeper hydrological stores.	Included if the permit is linked to local groundwater sources.	Comparison of groundwater levels for the ESoR period against other drought years and probability ranking categories.
Reservoir storage	Reservoir data provides evidence of how the rainfall deficit is affecting the system's ability to maintain supply.	Included if the permit is linked to reservoir sources.	Comparison of reservoir levels for the ESoR period against other drought years and probability ranking categories.
Standard Precipitation Evapotranspiration Index (SPEI)	SPEI shows how both low rainfall and high evapotranspiration are jointly intensifying drought conditions. It captures the combined effect of dryness and heat, providing clearer evidence of how the exceptional lack of rain is impacting the catchment than rainfall only indices alone.	Potentially included if the drought has been concurrent with periods of hot weather or heatwaves.	SPEI cumulative distribution plot over the ESoR period for all years in the historic record.
Soil moisture deficit (SMD)	SMD indicates the dryness of the soil. High SMD indicates that a greater amount of rain is required to wet the soil before the rainfall can significantly impact upon runoff, river flows or groundwater recharge.	Potentially included if the drought has been concurrent with periods of hot weather or heatwaves.	Comparison of SMD for the ESoR period against the LTA or other drought years, based on MORECS data or Environment Agency water situation reports.
Temperature	High temperatures intensify the impacts of low rainfall by increasing evapotranspiration and SMD, reducing runoff and recharge, and often driving up water demand.	Potentially included if the drought has been concurrent with periods of hot weather or heatwaves.	Comparison of temperature for the ESoR period against the LTA temperature, presented alongside the demand over the ESoR period and the LTA demand.

## 4. Lower Colne (Ardleigh Reservoir)

### 4.1 Drought permit details

#### 4.1.1 Current licence

Our current abstraction licence for the Lower Colne allows us to abstract from the Balkerne, Aldham and Cook's Mill groundwater sources. The licence allows us to utilise this water to either augment the River Colne to support flows for downstream abstraction into Ardleigh Reservoir or to put directly into public water supply (PWS). All three sources can support augmentation, but only the Aldham and Cook's Mill sources are able to transfer water directly into PWS.

The key licence details are summarised in [Table 4.1](#). Please note that we work closely with the Environment Agency as licence conditions can change over time.

**Table 4.1** Lower Colne abstraction licence summary

Licence Condition	Maximum Volume
Instantaneous	70 l/s
Daily	6 MI/d
Annual	693 MI/yr for PWS 1,307 MI/yr* for Augmentation
Aggregate	32,400 MI over 6 years shared with Upper Colne sources

*\*Yearly equivalent of 5-year quantity assuming that we are maximising the PWS element of the licence*

#### 4.1.2 Proposed drought permit

The Lower Colne drought permit application would have two key parts to it - augmentation and PWS. The risk to water resources would dictate whether both parts or just one part were applied for at the time of need.

##### Augmentation

- Temporarily increase the licenced abstraction at Balkerne by 3 MI/d (from 6 MI/d to 9 MI/d) to provide additional augmentation to the River Colne. Associated increase also applied to the annual licence.

##### PWS

- Daily licence at Aldham and Cooks Mill remains at 6 MI/d but increase the PWS annual licence to allow for 6 MI/d abstraction at one of the abstraction points to continue for a maximum of 6 months.

For both parts of the permit the other licence conditions such as the instantaneous and aggregate conditions would also be amended to support the temporary permit conditions if appropriate. We would work the Environment Agency to agree on the exact licence conditions.

## 4.2 ESoR

The methodology set out in **Section 3** would be followed to create the ESoR case for any application.

For the Lower Colne (Ardleigh Reservoir) drought permit the ESoR analysis could be undertaken for the North Essex Environment Agency hydrological area (TPD\_A\_H07) (**Figure 4.2**). However, this would be reviewed and confirmed with the Environment Agency before any application.

To show an example of one of the critical ESoR metrics we have completed rainfall ranking analysis for the North Essex catchment using 2025 data. The 8-month drought metric ending in October 2025 was ranked and plotted as a cumulative distribution function (**Figure 4.1**). When the rainfall totals were ranked, the 2025 drought was identified as the eighth most severe over the full historic record (1871-2025).

More detail on the rainfall ranking metric is included in **Section 3.1.2**.

Figure 4.1 The rainfall ranking of October 2025 in North Essex for the 8-month drought metric compared against the full historic record, with 2025 highlighted in red

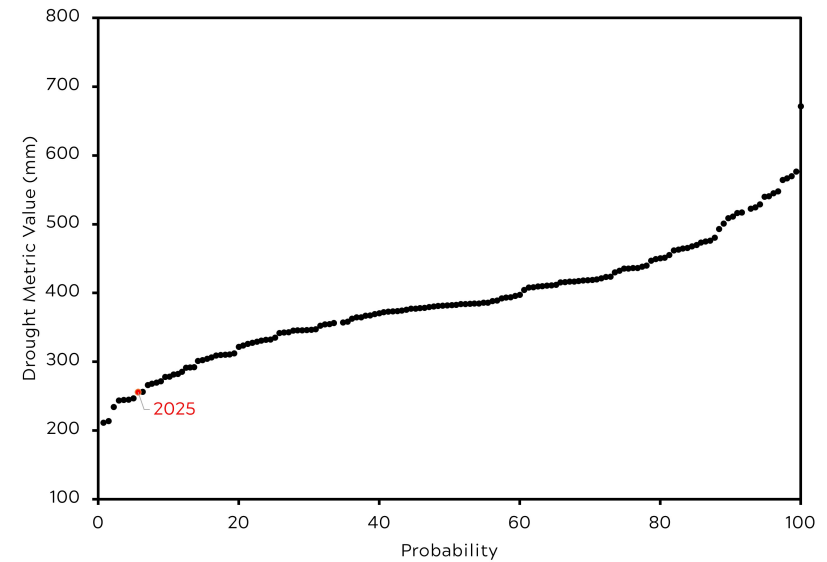
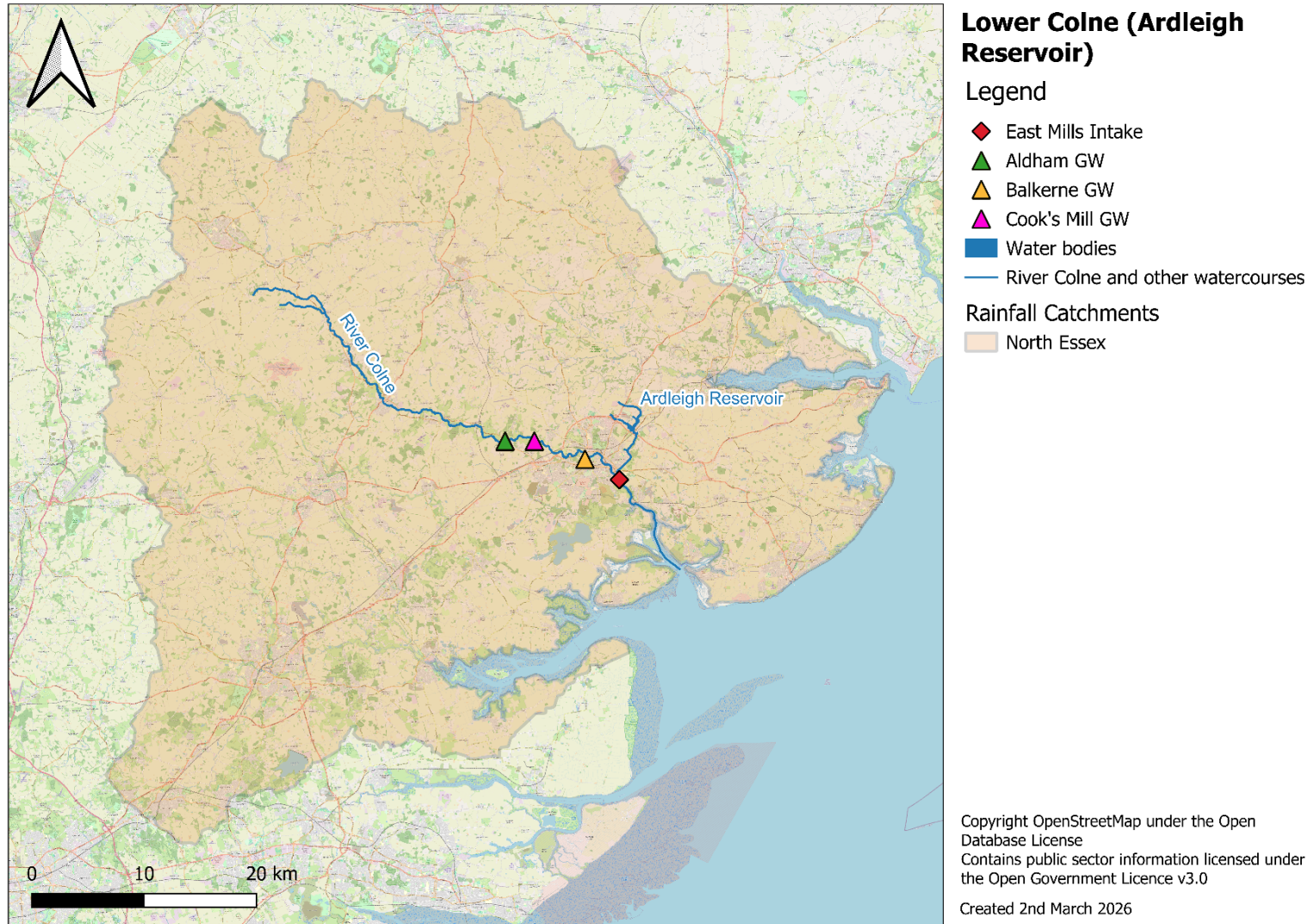


Figure 4.2 Lower Colne (Ardleigh Reservoir) drought permit potential ESoR rainfall assessment area



## 4.3 Environmental Assessment

An environmental assessment of the impact of the drought permit was carried out for Drought Plan 2027. This assesses the potential environmental impacts of implementing the proposed drought action, following Defra and Environment Agency guidance. The findings are detailed in a separate EAR and summarised in the section below.

The groundwater model has been updated and indicates the drought permit would have a Major/Moderate impact on the aquifer due to the long length of time it would take to recharge. However, the impacts on groundwater dependent terrestrial ecosystems are Negligible due to the confined nature of the aquifer. Across the three river reaches within the Zone of Influence, the physical environment assessment concludes that the drought permit would result in no flow changes to Reach 1 and Reach 3, so the hydrological, geomorphological, water quality impacts are Negligible, as well as the impact on other abstractors.

The flow augmentation in Reach 2 changes local conditions slightly, resulting in a Minor impact on the hydrology and geomorphology. Confidence in these assessments are medium to high.

Ecological impacts (macroinvertebrates, fish, macrophytes, phytobenthos) are not expected to be significant, with no meaningful deterioration predicted, these assessments were carried out with high confidence. A minor risk is noted for the spread of invasive macrophytes due to slightly increased flow, this assessment was carried out with medium to high confidence.

Finally, the Habitats Regulations Assessment (HRA) identifies Likely Significant Effects (LSE) at Stage 1 Screening for Abberton Reservoir SPA and Ramsar site, Colne Estuary (Mid-Essex Coast Phase 2) SPA and Ramsar site and Essex Estuaries SAC, however the Stage 2 Appropriate Assessment concludes no Adverse Effect on Integrity (AEoI) to the sites, either alone or in combination with other plans or projects.

A summary of the predicted impacts of the proposed drought permit is provided in [Table 4.2](#).

Table 4.2 Summary of the predicted impacts for Lower Colne (Ardleigh Reservoir) drought permit

River Reach (Impact)	Reach 1		Reach 2		Reach 3		Commentary
	Summer	Winter	Summer	Winter	Summer	Winter	
Groundwater	Major/Moderate						Based on the updated groundwater model, it is likely that the drought permit abstractions would have a Major/Moderate impact on the confined groundwater aquifer due to the long length of time it would take the aquifer to recharge. However, due to the aquifer being confined by London Clay and the low movement of groundwater between the confined chalk aquifer and the clay, the drought permit is likely to have a Negligible impact on Groundwater Dependant Terrestrial Ecosystems. There is high confidence in this assessment.
Hydrology	Negligible	Negligible	Minor	Minor	Negligible	Negligible	There are no flow changes in Reach 1 and Reach 3. The flow augmentation in Reach 2 causes a minor percentage increase in flows compared to the baseline conditions for the Q stats. The assessments were carried out with medium to high confidence.
Geomorphology	Negligible	Negligible	Minor	Minor	Negligible	Negligible	The limited increase in Reach 2 flow could lead to increases in velocity and possibly the wetted perimeter across the reach, although the presence of weirs is likely to mitigate the changes to depth and wetted perimeter. The assessments were carried out with medium to high confidence.
Water Quality	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	There are no available data points pertaining to water quality in Reach 2. However, given the minor hydrological impact with a flow increase in this reach, water quality is unlikely to deteriorate WFD status. The assessments were carried out with medium to high confidence.
Impact on other abstractors and discharges	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	The groundwater model has been used to determine impacts on other abstractors. This found that while the drawdown may result in pumping being slightly less efficient at other groundwater abstractor locations, the thickness of the saturated Chalk remains unchanged so there is negligible risk of the sources yielding no water. The assessments were carried out with medium to high confidence.
Macroinvertebrates	N/a	N/a	N/a	N/a	N/a	N/a	No significant adverse effects on the communities of macroinvertebrates present in the River Colne are predicted as a result of increased flows. The assessments were carried out with medium to high confidence.
Fish	N/a	N/a	N/a	N/a	N/a	N/a	N/a
Macrophytes	N/a	N/a	N/a	N/a	N/a	N/a	No significant adverse effects on the communities of macrophytes present in the River Colne are predicted as a result of increased flows. Confidence in this assessment is high.
Phytobenthos	N/a	N/a	N/a	N/a	N/a	N/a	No significant adverse effects on the communities of phytobenthos present in the River Colne are predicted as a result of increased flows.
Invasive Macrophyte	N/a	N/a	Minor	Minor	N/a	N/a	The identified species favour slow-moving water and can form dense growth that reduces habitat quality and oxygen availability, displacing native plant communities. These species are dispersed primarily via downstream drift of vegetative fragments. A minor increase in flows may facilitate limited downstream transport of propagules, particularly following periods of low flow associated with drought. The assessments were carried out with medium to high confidence.

## 4.4 Environmental Monitoring and Mitigation

The environmental monitoring plan (EMP) draws together the findings of the EARs for the potential drought permit sites and outlines how environmental conditions will be monitored and protected throughout a drought. We intend to take on proactive monitoring and mitigation along-with reactive measures where required. The EMP sets out the routine baseline monitoring, the additional monitoring required during dry weather and drought conditions, the monitoring needed during the permit implementation period, and the recovery monitoring once the permit has ended. It also identifies the mitigation measures needed to avoid, reduce or compensate for any environmental impacts associated with drought permit actions. The EMP reflects the need to distinguish natural drought effects from those caused by drought management measures and takes account of the timing, availability and reliability of data as drought conditions evolve.

### Monitoring

[Table 4.3](#) outlines the baseline monitoring schedule which combines ecological, hydrological and water quality monitoring and outlines timings and responsibilities. No additional monitoring has been identified in the EAR for Drought Level 1 or for drought-permit implementation scenarios beyond baseline hydrological and ecological monitoring, as no moderate or major impacts on any environmental receptor are expected from the implementation of the drought permit. However, the frequency of groundwater level, water quality and macroinvertebrate monitoring during drought stages has been aligned to that of other drought permits. Please refer to the EAR for further details.

### Mitigation

No moderate or major impacts on any environmental receptor have been identified due to implementation of the drought permit, therefore no mitigation is specifically required. However, temporary reduction or cessation of drought permit abstraction would be the main mitigation measure in the event that the impact is more severe than anticipated.

Table 4.3 Summary of the recommended monitoring for the Lower Colne (Ardleigh Reservoir) drought permit

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
<b>Baseline Monitoring</b>				
River Abstraction	Continuous monitoring of river abstraction at the intake	Continuous	Continuous	AWS
Reservoir level	Continuous monitoring of reservoir water level	Continuous	Continuous	AWS
River Level	Continuous river level monitoring	Continuous	Continuous	EA / AWS
River flow	Continuous river flow monitoring	Continuous	Continuous	EA
Compensation and Augmentation	Continuous flow monitoring	Continuous	Continuous	AWS
Groundwater Abstraction (AWS)	Continuous monitoring of groundwater abstraction via telemetry	Continuous	Continuous	AWS
Groundwater Level (AWS)	Continuous monitoring of groundwater level at Balcerne	Continuous	Continuous	AWS
Groundwater Level (AWS)	Monitoring of groundwater level via Dips at a number of locations on the Colne	January to December	Monthly	AWS
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at a Water Feature Survey site	Continuous	Once per season download	AWS
Groundwater Level (EA)	Monitoring of groundwater levels at standard observation sources via Dips	January to December	Monthly	EA
			Every 4 months	
Water Quality (spot sample)	Water quality monitoring via in-situ spot samples and laboratory analysis of samples taken in the field	Spring, summer, autumn and winter	Once per season	AWS
Water Quality (supply)	Water quality monitoring via in-situ spot sampling and laboratory analysis of the augmentation source discharge	When in-use	Once on start-up	AWS
Macroinvertebrate Survey	Sampling of macroinvertebrate fauna using standard kick or sweep-sampling methodology at a number of locations	Spring, summer and autumn	Once per season	AWS
Fish Survey	Fish monitoring at a number of locations using standard fishing techniques (seine netting; electric fishing)	Summer	Once per season	AWS / EA
Macrophyte Survey	Macrophyte monitoring using standard methodology at a number of locations	Summer	Once per season	AWS
<b>Drought Level 1 (presents any changes in italics from <i>baseline</i> monitoring)</b>				
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at a Water Feature Survey site	<i>Drought Level 1 Status</i>	<i>Monthly downloads</i>	AWS
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
Macroinvertebrate Survey	Sampling of macroinvertebrate fauna using standard kick or sweep-sampling methodology at a number of locations	<i>Drought Level 1 Status</i>	<i>Every 2 months (Mar - Nov)</i>	AWS
<b>Drought Permit Implementation Monitoring (presents any changes in italics from <i>Drought Level 1</i> monitoring)</b>				
Groundwater Level (AWS)	Monitoring of groundwater level via Dips at specific locations on the Colne	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at a Water Feature Survey site	<i>Duration of drought permit</i>	<i>Fortnightly download</i>	AWS
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Duration of drought permit</i>	<i>Weekly</i>	AWS
Water Quality (supply)	Water quality monitoring of the augmentation source discharge	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
<b>Post Drought Permit Implementation Monitoring (as per <i>baseline</i> monitoring except for the changes in italics presented below)</b>				
Water Quality (spot sample)	Monitoring of key water quality sites via spot sampling.	<i>6 months post drought permit implementation</i>	<i>Monthly</i>	AWS

# 5. Costessey (Heigham WTW)

## 5.1 Drought permit details

### 5.1.1 Current licence

Our current abstraction licence for the Costessey groundwater sources is mainly used to support the Norwich PWS system through East Hills WTW.

The Costessey and Heigham abstraction licences contain a complex mix of licence conditions and aggregates, the key conditions are summarised in [Table 5.1](#). These licence conditions are also currently being reviewed with the Environment Agency and are therefore subject to change.

### 5.1.2 Proposed drought permit

The Costessey drought permit would be implemented to support the Norwich supply system, if river flows in the Wensum restricted output at Heigham WTW. The permit would allow an:

- Increase in the annual licence quantity for the Costessey groundwater source from 2000 MI/yr to 4800 MI/yr

The other licence conditions such as the aggregates would also be amended to support the temporary permit conditions if appropriate. We would work with the Environment Agency to agree on the exact licence conditions.

Table 5.1 Costessey and Heigham abstraction licence summary

Licence	Daily Quantity (MI/d)	Seasonal Limit (MI)	Annual Quantity (MI/yr)	Aggregates			Comments				
Costessey Pits	57.7	-	17,000	-	<b>NORPWS</b> 57.7 MI/d 17,000 MI/yr	<b>HEICOS</b> 57.7 MI/d 17,000 MI/yr	Abstraction from the Pits into PWS				
Heigham intake	57.7		-	-			-	-	Abstraction from the river at Heigham		
Heigham intake transfer to Pits	57.7				12,750 (April-October)	-			-	-	Abstraction from the river at Heigham to transfer to the Pits
Costessey intake	120.0	-	2000	<b>COSHIM</b> 120 MI/d 17,000 MI/yr			-	-			Abstraction from the river at Costessey with water transferred into the Pits
Costessey groundwater sources (Blend)	30.0				-	-			-	-	Abstraction from Costessey groundwater sources to transfer into the Pits for blending
Costessey groundwater sources (PWS)											<b>NORPWS</b> (as above)

*COSHIM, NORPWS and HEICOS are names of Anglian Water group licences*

## 5.2 ESoR

The methodology set out in **Section 3** would be followed to create the ESoR case for any application.

For the Costessey (Heigham WTW) drought permit, the ESoR analysis could be undertaken for the Broadlands Rivers Environment Agency hydrological area (TPD\_A\_H10) ([Figure 5.2](#)). However, this would be reviewed and confirmed with the Environment Agency before any application.

To show an example of one of the critical ESoR metrics, we have completed rainfall ranking analysis for the Broadlands Rivers catchment using 2025 data. The 8-month drought metric ending in October 2025 was ranked and plotted as a cumulative distribution function ([Figure 5.1](#)). When the rainfall totals were ranked, the 2025 drought was identified as the thirteenth most severe over the full historic record (1871-2025).

More detail on the rainfall ranking metric is included in **Section 3.1.2**.

Figure 5.1 The rainfall ranking of October 2025 in Broadlands Rivers for the 8-month drought metric compared against the full historic record, with 2025 highlighted in red

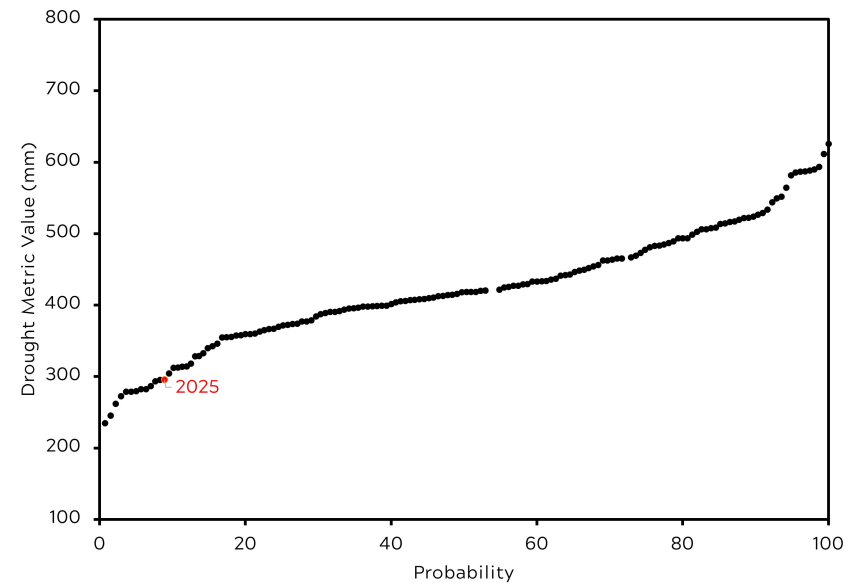
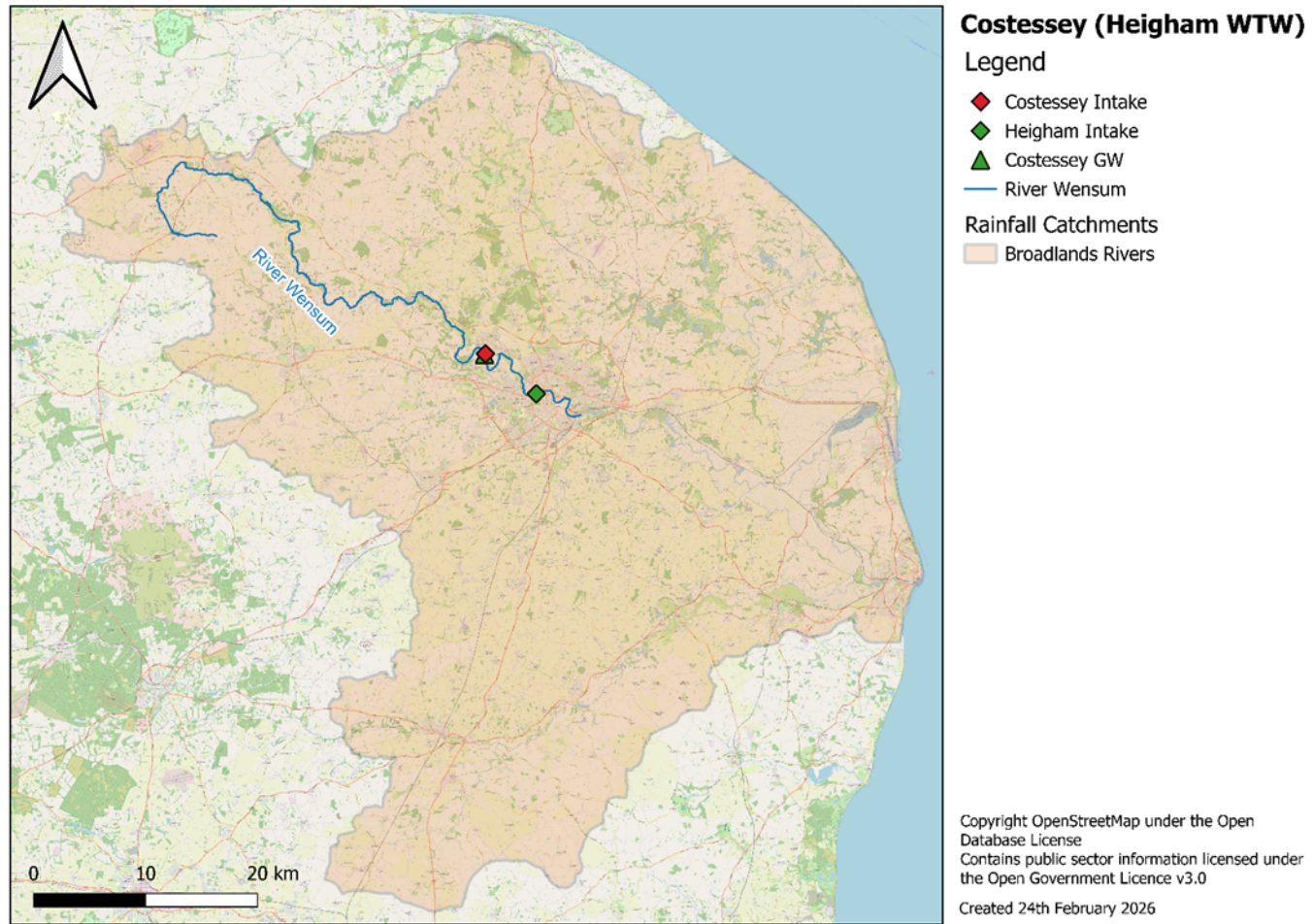


Figure 5.2 Costessey (Heigham WTW) drought permit potential ESoR rainfall assessment area



## 5.3 Environmental Assessment

An environmental assessment of the impact of the drought permit was carried out for Drought Plan 2027. This assesses the potential environmental impacts of implementing the proposed drought action, following Defra and Environment Agency guidance. The findings are detailed in a separate EAR and summarised in the section below.

Most notably from the assessment, the groundwater model shows a maximum drawdown of 4-5m around the sources, which would have a moderate impact on the groundwater level. In the Wensum, Reach 2 shows minor flow reductions in summer, with Negligible changes in the winter. Reach 3 shows Minor flow reductions in both summer and winter. The Tud and most of the Yare experience negligible impacts. Geomorphology has Minor impacts for Reach 2 in the summer and Reach 3 where flows are reduced, potentially altering the velocity regime. These assessments were carried out with low to high confidence.

For water quality, minor impacts are identified for orthophosphate levels in the Wensum for Reach 2 in the summer and Reach 3, where flows are reduced the most. Impacts on surface water abstractors are negligible, as no significant abstractions exceed 5% of Q95. Groundwater abstractors may experience Minor effects, with modelled groundwater level reductions up to 1.1 m in some locations. These assessments were carried out with low to high confidence.

Ecological impacts are generally minor for macroinvertebrates, fish, macrophytes, and phytobenthos. These groups are resilient to the small hydrological and water quality changes predicted. Fish migration and spawning may be modestly affected where flows are reduced, but impacts are assessed as low. No significant effects are expected in the Tud or Yare. These assessments were carried out with low to high confidence.

Finally, the HRA identifies LSE at Stage I Screening for one Habitats Site, the River Wensum SAC, however, with the implementation of mitigation and monitoring measures the Stage II Appropriate Assessment concludes no AEoI, either alone or in combination with other plans or projects.

A summary of the predicted impacts of the proposed drought permit is provided in [Table 5.2](#) and [Table 5.3](#).

Table 5.2 Summary of the predicted impacts for Costessey (Heigham WTW) drought permit for the River Wensum

River Reach (Impact)	River Wensum						Commentary
	Reach 1		Reach 2		Reach 3		
	Summer	Winter	Summer	Winter	Summer	Winter	
Groundwater	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	The groundwater model shows a maximum drawdown of 4-5m around the sources, which would have a moderate impact on the groundwater level. The assessments were carried out with medium confidence.
Hydrology	Negligible	Negligible	Minor	Negligible	Minor	Minor	The groundwater model has determined the amount of surface water flow reduction from drawdown on the river reaches. The flow reductions in Reach 2 during summer and Reach 3 have a minor percentage reduction in flows compared to the baseline conditions for the Q stats. The assessments were carried out with medium to high confidence.
Geomorphology	Negligible	Negligible	Minor	Negligible	Minor	Minor	The limited reduction in flow could cause changes in the velocity regime over Reach 2 in summer, and Reach 3, although the uniform flow in these reaches and the presence of weirs are likely to mitigate changes to depth and wetted perimeter. The assessments were carried out with medium confidence.
Water Quality	Negligible	Negligible	Minor (orthophosphate)	Negligible	Minor (orthophosphate)	Minor (orthophosphate)	Due to the sensitivity of orthophosphate to flow changes identified for the River Wensum, there is a minor risk of deterioration to orthophosphate during Drought Permit implementation for Reach 2 in the summer and Reach 3. The assessments were carried out with low to medium confidence.
Impact on other surface water abstractors	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	A review of the abstraction licences indicated that there were no significant surface water abstractions that were greater than 5% of summer Q <sub>95</sub> on the River Wensum, River Tud and River Yare. The assessments were carried out with medium confidence.
Impact on other groundwater abstractors	Minor	Minor	Minor	Minor	Minor	Minor	The groundwater modelling indicates that the maximum simulated reduction in groundwater levels at other licensed groundwater abstraction sites is up to 1.1m. There is no knowledge of the infrastructure and means of abstraction so this has potential for a Minor impact at the locations with the highest drawdown. The assessments were carried out with medium confidence.
Macroinvertebrates	N/a	N/a	Minor	N/a	Minor	Minor	Potential impact on ecological structure minimal given impacts on hydrology and water quality and baseline community characteristics present. These assessments were carried out with reduced to high confidence.
Fish	N/a	N/a	Minor	N/a	Minor	Minor	Potential impact on ecological structure including fish migration, passage and spawning behaviours minimal as a result of reduced river flow. These assessments were carried out with low to high confidence.
Macrophytes	N/a	N/a	Minor	N/a	Minor	Minor	Potential impact on ecological structure minimal given impacts on hydrology and water quality and baseline community characteristics present. These assessments were carried out with low confidence.
Phytobenthos	N/a	N/a	Minor	N/a	N/a	N/a	Potential impact on ecological structure minimal given impacts on hydrology and water quality. This assessment was carried out with low confidence.

Table 5.3 Summary of the predicted impacts for Costessey (Heigham WTW) drought permit for the River Tud and the River Yare

River Reach (Impact)	River Tud		River Yare		Commentary
	Reach 1		Reach 1		
	Summer	Winter	Summer	Winter	
Groundwater	Moderate	Moderate	Moderate	Moderate	The groundwater model shows a maximum drawdown of 4-5m around the sources, which would have a moderate impact on the groundwater level. The assessments were carried out with medium confidence.
Hydrology	Negligible	Negligible	Negligible	Negligible	The groundwater model has determined the amount of surface water flow reduction from drawdown on the river reaches. The flow reductions in Reach 2 during summer and Reach 3 have a minor percentage reduction in flows compared to the baseline conditions for the Q stats. The assessments were carried out with high confidence.
Geomorphology	Negligible	Negligible	Negligible	Negligible	The limited reduction in flow could cause changes in the velocity regime over Reach 2 in summer, and Reach 3, although the uniform flow in these reaches and the presence of weirs are likely to mitigate changes to depth and wetted perimeter. The assessments were carried out with low confidence.
Water Quality	Negligible	Negligible	Negligible	Negligible	Due to the sensitivity of orthophosphate to flow changes identified for the River Wensum, there is a minor risk of deterioration to orthophosphate during Drought Permit implementation for Reach 2 in the summer and Reach 3. The assessments were carried out with low to high confidence.
Impact on other surface water abstractors	Negligible	Negligible	Negligible	Negligible	A review of the abstraction licences indicated that there were no significant surface water abstractions that were greater than 5% of summer $Q_{95}$ on the River Wensum, River Tud and River Yare. The assessments were carried out with medium confidence.
Impact on other groundwater abstractors	Minor	Minor	Minor	Minor	The groundwater modelling indicates that the maximum simulated reduction in groundwater levels at other licensed groundwater abstraction sites is up to 1.1m. There is no knowledge of the infrastructure and means of abstraction so this has potential for a Minor impact at the locations with the highest drawdown. The assessments were carried out with medium confidence.
Macroinvertebrates	N/a	N/a	N/a	N/a	No significant adverse effects on the communities of macroinvertebrates present are predicted.
Fish	N/a	N/a	N/a	N/a	No significant adverse effects on the communities of fish present are predicted.
Macrophytes	N/a	N/a	N/a	N/a	No significant adverse effects on the communities of macrophytes present are predicted.
Phytobenthos	N/a	N/a	N/a	N/a	No significant adverse effects on the communities of phytobenthos present are predicted.

## 5.4 Environmental Monitoring and Mitigation

The environmental monitoring plan (EMP) draws together the findings of the EARs for the potential drought permit sites and outlines how environmental conditions will be monitored and protected throughout a drought. We intend to take on proactive monitoring and mitigation, and reactive measures where required. The EMP sets out the routine baseline monitoring, the additional monitoring required during dry weather and drought conditions, the monitoring needed during the permit implementation period, and the recovery monitoring once the permit has ended. It also identifies the mitigation measures needed to avoid, reduce or compensate for any environmental impacts associated with drought permit actions. The EMP reflects the need to distinguish natural drought effects from those caused by drought management measures and takes account of the timing, availability and reliability of data as drought conditions evolve.

### Monitoring

The assessment conducted in the EAR identified no moderate or major impacts to any receptors due to the implementation of the drought permit in either Reach 2 or 3 of the River Wensum. Regardless of this, further baseline monitoring has been suggested, as there are significant data gaps within the baseline data. Additional surveys have been suggested to expand the baseline data for fish and macroinvertebrates within both reaches, along with additional sites on the Reaches Wensum 1, Yare and Tud. [Table 5.4](#) below outlines the monitoring schedule. For further details please refer to the EAR.

### Mitigation

Where impacts are predicted to be of moderate or higher significance, the related mitigation measures and their proposed triggers are outlined in [Table 5.5](#).

The assessment in the EAR concluded that implementing the proposed drought permit could have a minor detrimental effect on environmental receptors. Mitigation methods are however recommended on a precautionary basis, should drought conditions and implementation of the scheme have an impact greater than predicted within the assessment. It is recommended that mitigation measures are pre-identified and preparation for their implementation made.

Table 5.4 Summary of the recommended monitoring for the Costessey (Heigham WTW) drought permit

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
<b>Baseline Monitoring</b>				
River Abstraction	Continuous monitoring of river abstraction at the intakes	Continuous	Continuous	AWS
Surface Water Level (AWS)	Continuous monitoring of surface water level at Costessey Pits (telemetry sites)	Continuous	Continuous	AWS
Surface Water Level (WFS)	Continuous monitoring of surface water level at Water Feature Survey site	Continuous	Once per season download	AWS
River Level	Continuous river level monitoring (standard gauging)	Continuous	Continuous	EA / AWS
River Flow	Continuous river flow monitoring (standard gauging)	Continuous	Continuous	EA
Groundwater Abstraction	Monitoring of groundwater abstraction via telemetry at Costessey supply sources	Continuous	Continuous	AWS
Groundwater Level (AWS)	Monitoring of groundwater level via Dips at Costessey supply sources	January to December	Monthly	AWS
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at Water Feature Survey sites (Costessey)	Continuous	Once per season download)	AWS
Groundwater Level (EA)	Monitoring of groundwater level via Dips	January to December	Monthly	EA
Water Quality (spot sample)	Water quality monitoring via in-situ spot samples and laboratory analysis of samples taken in the field	Spring, summer, autumn and winter	Once per season	AWS
Macroinvertebrate Survey	Sampling of macroinvertebrate fauna using standard kick or sweep-sampling methodology at a number of locations	Spring, summer and autumn	One per season	AWS
Fish Survey	Fish monitoring at a number of locations using standard fishing techniques (seine netting; electric fishing)	Summer	Once per season	AWS
Ranunculus & Macrophyte Survey	Macrophyte monitoring using standard methodology at a number of locations	Summer	Once per season	AWS
Floatover	River Wensum between Costessey intake and River Yare confluence to confirm presence, extent and locations of Ranunculus	Summer every two years	Once per season	AWS
Walkover Survey	Walkovers to determine habitat quality and identification of drought sensitive habitats. Riverbed substrate composition, in situ water quality, habitat connectivity, fish barrier assessments and habitat fragmentation will all be recorded during each walkover survey using River Habitat Condition form	Summer	Once every five years	AWS
<b>Drought Level 1 (presents any changes in italics from <i>baseline</i> monitoring)</b>				
Surface Water Level (WFS)	Continuous monitoring of surface water level at Water Feature Survey sites	<i>Drought Level 1 Status</i>	<i>Monthly download</i>	AWS
River Flow (ACDP)	Monitoring of river flow sites via Acoustic Doppler Current Profilers (ADCP) spot measurements	<i>Drought Level 1 Status</i>	<i>Monthly (Apr to Sept); Every two months (Oct to Mar).</i>	AWS
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at Water Feature Survey sites (Costessey)	<i>Drought Level 1 Status</i>	<i>Monthly download</i>	AWS
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
Macroinvertebrate Survey	Sampling of macroinvertebrate fauna using standard kick or sweep-sampling methodology at a number of locations	<i>Drought Level 1 Status (Mar - Nov)</i>	<i>Every two months (Mar - Nov)</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline monitoring sites including fish, macrophytes & phytobenthos and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly (Apr to Sept); Every two months (Oct-Mar)</i>	AWS
<b>During Drought Permit Implementation Monitoring (presents any changes in italics from <i>Drought Level 1</i> monitoring)</b>				
Surface Water Level (WFS)	Continuous monitoring of surface water level at Water Feature Survey sites	<i>Duration of drought permit</i>	<i>Fortnightly download</i>	AWS
Groundwater Level (AWS)	Monitoring of groundwater level via Dips at Costessey supply sources.	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at Water Feature Survey sites (Costessey).	<i>Duration of drought permit</i>	<i>Fortnightly download</i>	AWS

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Duration of drought permit</i>	<i>Weekly</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline/drought level 1 monitoring sites	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
<b>Post Drought Permit Implementation Monitoring</b> <i>(as per baseline monitoring except for the changes in italics presented below)</i>				
River Flow (ADCP)	Spot flow measurements using standard flow monitoring techniques. Method used is dependent on river depth	<i>6 months post drought permit implementation</i>	<i>Monthly</i>	AWS
Water Quality (spot sample)	Monitoring of existing water quality sites via spot sampling		<i>Monthly</i>	AWS

Table 5.5 Summary of the recommended mitigation for Costessey (Heigham WTW) drought permit

Mitigation	Description	Potential Impact identified in EAR	Trigger to inform mitigation action	Receptor(s)
<b>In-drought (During Drought Option Implementation)</b>				
<b>Abstraction adjustment</b>	Gradual or temporary adjustments to abstraction or compensation flows to prevent stranding, displacement, or stress in sensitive aquatic species.	Sudden changes in flow can leave fish, macroinvertebrates and crayfish stranded in isolated pools or dry areas, especially in low flow conditions. Gradual adjustments help maintain connectivity.	River flow, level or water quality guide thresholds and/or fish stress reporting.	Fish, macroinvertebrates
<b>Aeration</b>	Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration. (Aerators are however considered a last resort, as they only have local effects and can disrupt fluvial sediment).	During drought conditions river flows reduce and solar radiation may increase, resulting in less mixing of the water column and increased water temperatures reducing levels of dissolved oxygen.	As above.	Fish, macroinvertebrates
<b>Screen inspection</b>	Regular inspection and clearing of screens to ensure they retain their correct working function.	During low flows, screens and barriers can become clogged with debris, impeding the passage of fish and potentially leading to stranding or stress.	Informed by walkover surveys and local knowledge/reports.	Fish
<b>Relocation of individuals</b>	<p>Due to the predicted hydrological impacts to the reaches being classified as negligible /minor, along with the characteristics of the river channel being generally fairly deep and wide, it is unlikely that fish will need to be relocated.</p> <p>Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts. Relocation of individuals is however considered a last resort, as relocation can be particularly stressful for fish, particularly when using netting or electrofishing methodologies. There are also likely to be few receptor locations within the catchment during the drought conditions.</p> <p>Walkover surveys should include the checking of marginal habitat for notable species (bullhead and lamprey) individuals. If fish are stranded then individuals should be move back into deeper sections of the channel.</p>	There is potential for fish to become stranded in disconnected sections or marginal areas of the watercourse under lower flows or experience increased stress or mortality due to reduced water quality.	River flow, level or water quality guide thresholds and/or fish stress reporting.	Fish
<b>Post-drought (Drought Options Removed)</b>				
<b>Barrier and flow modification</b>	Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles.	Physical barriers may become more significant during low flows, preventing fish passage and movement between suitable habitats.	Informed by walkover surveys and local knowledge / reports.	Fish
<b>Restocking</b>	Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment.	Low flow events can result in population decline due to increased mortality, reduced breeding success, and loss of juveniles.	Restocking will be post -drought permit as appropriate, in dialogue / agreed with EA.	Fish

## 6. Wellington Wellfield (Stoke Ferry and Marham WTW)

### 6.1 Drought permit details

#### 6.1.1 Current licence

Our current abstraction licence for the Wellington Wellfield and Denton Lodge groundwater sources is mainly used to support the Stoke Ferry and wider supply system in the Fenland WRZ.

The Wellington Wellfield and Denton Lodge abstraction licences contain a complex mix of licence conditions and aggregates, the key conditions are summarised in [Table 6.1](#). Please note that we work closely with the Environment Agency as licence conditions can change over time.

#### 6.1.2 Proposed drought permit

The Wellington Wellfield drought permit would be implemented to support the Stoke Ferry WTW, Marham WTW and the wider Fenland WRZ as appropriate. The permit would allow an:

- Increase to the daily licenced abstraction of the Wellington Wellfield and Denton Lodge sources by a maximum of 2.726 MI/d to 25 MI/d output

The maximum that each group of sources could be increased to make up the 25 MI/d is:

- Wellington Wellfield - from 15 MI/d to 17.726 MI/d
- Denton Lodge - from 7.274 MI/d to 10 MI/d

However, in reality the extra 2.726 MI/d will likely come from a combination of the Wellington Wellfield and Denton Lodge sources.

The other licence conditions such as the annual, aggregates and seasonal limits would also be amended to support the temporary permit conditions if appropriate. We would work the Environment Agency to agree on the exact licence conditions.

Table 6.1 Wellington Wellfield and Denton Lodge abstraction licence summary

Licence	Daily Quantity (MI/d)	Annual Quantity (MI/yr)	90 Day Limit (MI)	Seasonal Limit (MI)	Aggregates		
Wellington Wellfield 1	5.0	1000	1000	1000 (April-October)	<b>WELDEN</b> 3655 MI/yr	<b>WELING</b> 15 MI/d 1500 MI/yr	<b>STOKEF</b> 6570 MI/yr (also includes Stoke Ferry river intake)
Wellington Wellfield 2	5.0	1000					
Wellington Wellfield 3	5.0	1000					
Wellington Wellfield 4	5.0	1000					
Wellington Wellfield 7	1.91	697.15					
Denton Lodge	7.274	2655	-	-	-	-	

*WELDEN, WELING and STOKEF are names of Anglian Water group licences*

## 6.2 ESoR

The methodology set out in **Section 3** would be followed to create the ESoR case for any application.

For the Wellington Wellfield (Stoke Ferry and Marham WTW) drought permit the ESoR analysis could be undertaken for the North West Norfolk and Wissey Environment Agency hydrological area (TPD\_A\_H11) (**Figure 6.2**). However, this would be reviewed and confirmed with the Environment Agency before any application.

To show an example of one of the critical ESoR metrics we have completed rainfall ranking analysis for the North West Norfolk and Wissey catchment using 2025 data. The 8-month drought metric ending in October 2025 was ranked and plotted as a cumulative distribution function (**Figure 6.1**). When the rainfall totals were ranked, the 2025 drought was identified as the fourth most severe over the full historic record (1871-2025).

More detail on the rainfall ranking metric is included in **Section 3.1.2**.

**Figure 6.1** The rainfall ranking of October 2025 in North West Norfolk and Wissey for the 8-month drought metric compared against the full historic record, with 2025 highlighted in red

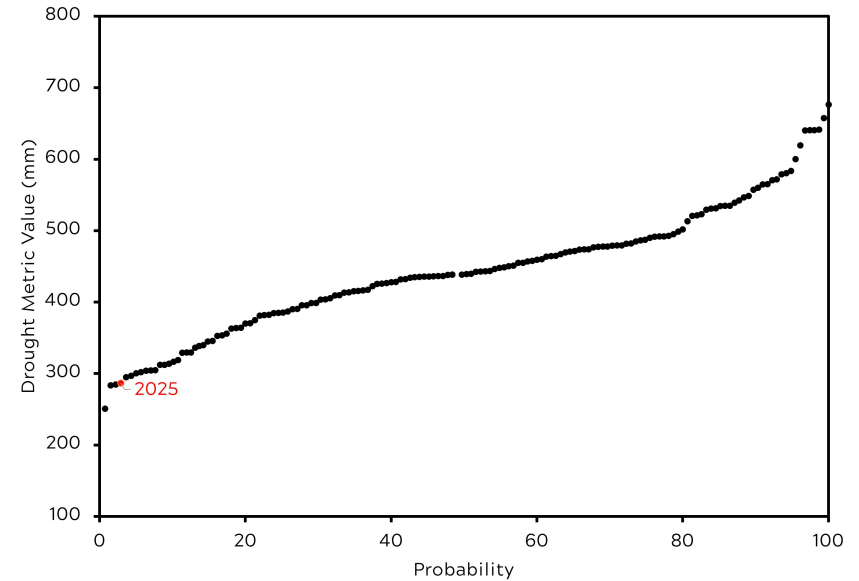
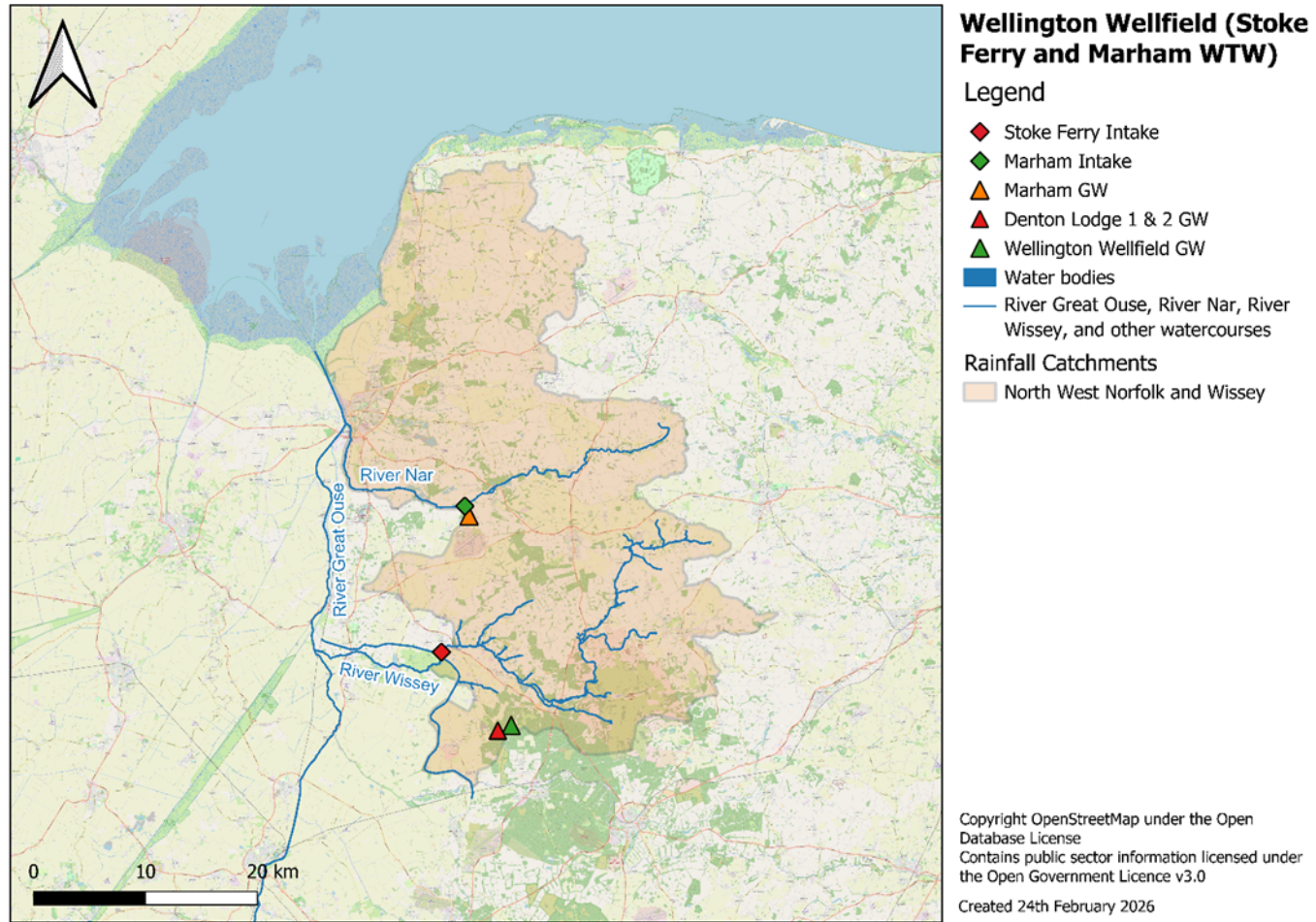


Figure 6.2 Wellington Wellfield (Stoke Ferry and Marham WTW) drought permit potential ESoR rainfall assessment area



## 6.3 Environmental Assessment

An environmental assessment of the impact of the drought permit was carried out for Drought Plan 2027. This assesses the potential environmental impacts of implementing the proposed drought action, following Defra and Environment Agency guidance. The findings are detailed in a separate EAR and summarised in the section below.

Based on the groundwater model, there could be potential negative impacts at selected groundwater dependant sites and, while the potential impacts on flow and groundwater levels are shown to decline rapidly away at Wellfield, there would be a delay to the restoration of baseline groundwater levels after the cessation of a drought permit. This assessment was carried out with high confidence.

The Zone of Influence covers three rivers, these are: the River Wissey, Little Ouse and the Cut Off Channel. Hydrological, geomorphological and water quality impacts to river reaches are negligible, except for the Cut Off Channel, where the flow reduction is minor. Impacts on both surface water and groundwater abstractors remain negligible. Water quality impacts are Negligible in all reaches with available data, noting that there is no available data for the Cut-off Channel. These assessments were carried out with low to high confidence.

Ecological impacts (macroinvertebrates, fish, macrophytes, phytobenthos) are not expected to be significant, with no meaningful deterioration predicted, these assessments were carried out with high confidence.

The HRA Stage I identified potential for LSE resulting from the drought permit on Breckland SAC and Norfolk Valley Fens SAC. The Stage II Appropriate Assessment concluded that there would be no AEoI and no residual effects from the drought permit alone or in-combination with other plans or projects for the Norfolk Valley Fens SAC. With the implementation of proposed mitigation measures no AEoI on groundwater dependent qualifying features of the Breckland SAC are anticipated.

A summary of the predicted impacts of the proposed drought permit is provided in [Table 6.2](#).

Table 6.2 Summary of the predicted impacts for Wellington Wellfield (Stoke Ferry and Marham WTW) drought permit

Zol Impact	Groundwater Zol	River Wissey								River Little Ouse				Cut-Off Channel		Commentary
		Reach 1		Reach 2		Reach 3		Reach 4		Reach 1		Reach 2		Reach 1		
		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	
Hydrogeology	Major to Minor	N/a		N/a		N/a		N/a		N/a		N/a		N/a		Based on the groundwater model, there could be negative impacts at selected groundwater dependant sites and, while the potential impacts on flow and groundwater levels are shown to decline rapidly away from the wellfield, there would be a delay to the restoration of baseline groundwater levels after the cessation of a drought permit. There is high confidence in these assessments since it is based on an updated groundwater model.
Hydrology	N/a	Negligible		Negligible		Negligible		Negligible		Negligible		Negligible		Minor		The groundwater model has determined the amount of surface water flow reduction from drawdown on the river reaches. The flow reductions in the Cut-Off Channel have a minor percentage reduction in flows compared to the baseline conditions for the Q stats. The assessments were carried out with medium to high confidence.
Geomorphology	N/a	Negligible		Negligible		Negligible		Negligible		Negligible		Negligible		Negligible		The heavily modified nature and uniformity of the Cut-Off Channel is likely to mitigate changes to flow hydraulics for the slightly reduced flows. These assessments were carried out with high confidence with respect to the impact of abstraction on geomorphology by hydrology change and low to medium confidence with respect to geomorphological information availability.
Water Quality	N/a	Negligible		Negligible		Negligible		Negligible		Negligible		Negligible		No data		There is no water quality data available for the Cut-Off Channel. All other reaches have a negligible flow change which is reflected in the water quality assessment. The assessments were carried out with low to medium confidence.
Impact on other surface water abstractors	N/a	Negligible		Negligible		Negligible		Negligible		Negligible		Negligible		Negligible		The hydrological impacts are considered to be negligible due to the minor/negligible hydrological impacts. The assessments were carried out with medium to high confidence.
Impact on other groundwater abstractors	N/a	Negligible														While the drawdown may result in pumping being slightly less efficient at these locations, the thickness of the saturated Chalk indicates that the increase in drawdown is comparably small. Therefore, the model suggests that there is Negligible change in the risk of the sources yielding no water. The assessments were carried out with high confidence.
Macroinvertebrates	N/a	N/a		N/a		N/a		N/a		N/a		N/a		N/a		No significant adverse effects on the communities of macroinvertebrates present are predicted.
Fish	N/a	N/a		N/a		N/a		N/a		N/a		N/a		N/a		No significant adverse effects on the communities of fish present are predicted.
Macrophytes	N/a	N/a		N/a		N/a		N/a		N/a		N/a		N/a		No significant adverse effects on the communities of macrophytes present are predicted.
Phytobenthos	N/a	N/a		N/a		N/a		N/a		N/a		N/a		N/a		No significant adverse effects on the communities of phytobenthos present are predicted.

## 6.4 Environmental Monitoring and Mitigation

The environmental monitoring plan (EMP), draws together the findings of the EARs for the potential drought permit sites and outlines how environmental conditions will be monitored and protected throughout a drought. We intend to take on proactive monitoring and mitigation, along-with reactive measures where required. The EMP sets out the routine baseline monitoring, the additional monitoring required during dry weather and drought conditions, the monitoring needed during the permit implementation period, and the recovery monitoring once the permit has ended. It also identifies the mitigation measures needed to avoid, reduce or compensate for any environmental impacts associated with drought permit actions. The EMP reflects the need to distinguish natural drought effects from those caused by drought management measures and takes account of the timing, availability and reliability of data as drought conditions evolve.

### Monitoring

[Table 6.3](#) below summarises the recommended monitoring in relation to this assessment and at which stage of the drought it is required. Please refer to the EAR for further details of the impact assessment results.

### Mitigation

The assessment concluded that implementing the proposed drought permit might have a moderate or major detrimental effect on certain GWDTE receptors (see the EAR for further detail). Therefore, it is recommended that mitigation measures are pre-identified and preparation for their implementation is made. [Table 6.4](#) summarises the mitigation measures and schedule.

Table 6.3 Summary of the recommended monitoring for Wellington Wellfield (Stoke Ferry and Marham WTW) drought permit

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
<b>Baseline Monitoring</b>				
River abstraction	Continuous monitoring of river abstraction at the intakes	Continuous	Continuous	AWS
River Level	Continuous river level monitoring	Continuous	Continuous	AWS / EA
River Level (fish pass)	Continuous monitoring of river level at fish pass	Continuous	Once per season download	AWS
River Flow	Continuous river flow monitoring (standard gauging)	Continuous	Continuous	EA
Compensation and Augmentation	Continuous monitoring of compensation flow at cut off channel (compensation flow for Wissey)	Continuous	Continuous	AWS
Groundwater abstraction (AWS)	Monitoring of groundwater abstraction via telemetry	Continuous	Continuous	AWS
Groundwater Level (AWS)	Monitoring of groundwater level via Dips at supply sources	January to December	Monthly	AWS
Groundwater Level (EA)	Monitoring of groundwater levels at standard observation sources	January to December	Monthly dips	EA
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at Water Feature Survey sites	Continuous	Once per season download	AWS
Water Quality (spot sample)	Water quality monitoring via in-situ spot samples and laboratory analysis of samples taken in the field	Spring, summer, autumn and winter	Once per season	AWS
Walkover Survey (fish pass)	Walkovers to determine habitat quality and identification of drought sensitive habitats. Riverbed substrate composition, in situ water quality, habitat connectivity, fish barrier assessments and habitat fragmentation will all be recorded during each walkover survey using River Habitat Condition form	Summer	Once every five years	AWS
UK Habitat Classification (UKHab) Survey	Baseline survey using UKHab condition assessments to identify potential changes to the physical environment, map extent of feature and species composition, and identify specific water features where water level monitoring would be appropriate	Summer	Once every five years	AWS
<b>Drought Level 1 Monitoring (presents any changes in italics from <i>baseline</i> monitoring)</b>				
River Level (fish pass)	Continuous monitoring of river level at fish pass	<i>Drought Level 1 Status</i>	<i>Monthly download</i>	AWS
Groundwater level (WFS)	Continuous monitoring of groundwater level via downloads at Water Feature Survey sites	<i>Drought Level 1 Status</i>	<i>Monthly download</i>	AWS
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
Walkover Survey (fish pass)	Walkover surveys to detect any changes from baseline monitoring sites and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly (Apr to Sep); Every two months (Oct-Mar)</i>	AWS
UKHab Survey	UKHab surveys to detect changes to sensitive features from baseline, provide qualitative information, determine if pre-emptive mitigation is required and allow decisions to be taken quickly	<i>Drought Level 1 Status</i>	<i>Monthly (Apr to Sep); Every two months (Oct-Mar)</i>	AWS
<b>Drought Permit Implementation Monitoring (presents any changes in italics from <i>Drought Level 1</i> monitoring)</b>				
River Level (fish pass)	Continuous monitoring of river level at fish pass	<i>Duration of drought permit</i>	<i>Fortnightly download</i>	AWS
Groundwater Level (WFS)	Continuous monitoring of groundwater level via downloads at Water Feature Survey sites	<i>Duration of drought permit</i>	<i>Fortnightly download</i>	AWS
Groundwater Level (AWS)	Monitoring of groundwater level via Dips at key supply sources	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Duration of drought permit</i>	<i>Weekly</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline/drought level 1 monitoring sites	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
UKHab Survey	UKHab surveys to detect changes to sensitive features from baseline/drought level 1, provide qualitative information, determine if mitigation is required and allow decisions to be taken quickly	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
<b>Post Drought Permit Implementation Monitoring (as per <i>baseline</i> monitoring except for the changes in italics presented below)</b>				

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
Water Quality (spot sample)	Monitoring of key water quality sites via spot sampling	<i>6 months post drought permit implementation</i>	<i>Monthly</i>	AWS
UKHabs Survey	Provides a quantitative dataset to enable an assessment of any long-term effects on groundwater dependent terrestrial ecology resulting from implementation of the drought permit	<i>6 months - 12 months post drought (depending on site)</i>	<i>Once per season</i>	AWS

Table 6.4 Summary of the recommended mitigation for Wellington Wellfield (Stoke Ferry and Marham WTW) drought permit

Mitigation	Description	Potential Impact identified in EAR	Trigger to inform mitigation action	Receptor(s)
<b>In-drought (During Drought Option Implementation)</b>				
<b>Abstraction adjustment</b>	Gradual or temporary adjustments to abstraction or compensation flows to prevent long term impacts on GWDTE within designated sites.	Reduction in water level or water quality can lead habitat quality and ecological stress and, over extended periods of time can result in changes/ loss in habitat present, mortality of species (amphibians) and reduction in wetland bird populations.	Signs of stress on receptors/ changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground. Changes in water levels and physical/ chemical features.	Statutory designated sites/ Local wildlife sites/ NERC habitats and vegetation/ NERC and Notable Species (Amphibians/ Wetland Birds)/ INNS & scrub
<b>Relocation of individuals</b>	Rescue of individuals and relocation to suitable habitat, where they are seen to be in distress or where artificially high densities are likely to result in significant impacts - in consultation with the EA or NE as appropriate. Relocation of individuals is however considered a last resort, as relocation can be stressful. There are also likely to be few suitable receptor locations within the catchment during the drought conditions. Measures will be taken to ensure biosecurity at all times.	There is potential for amphibians, particularly aquatic larval stages to become stranded in marginal areas of the waterbodies caused by reduced water levels, increasing stress or mortality due to reduced water quality.	Signs of stress on receptors/ changes to environmental features, water levels and physical/ chemical features.	Amphibians
<b>Habitat enhancement</b>	Habitat enhancement work (e.g. planting of wetland species) which may have beneficial effects over the long term (but note can lead to short term disturbance when receptors may already be stressed).	Loss of marginal habitats and succession events, where wetland habitats may transition to drier terrestrial habitats such as grasslands presents sub-optimal habitat to wetland birds and can lead to reductions in local, regional or international populations due to a reduction in feeding and/or breeding opportunity.	Changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground.	Wetland Birds
<b>Post-drought (Drought Options Removed)</b>				
<b>Wetland compensation</b>	In areas identified where a drawdown of greater than 0.1m is predicted to occur for more than 3 months, compensation/top up of water levels should be considered to maintain wetland habitat.	When conditions of the wetland remain dry for extended periods of time, succession of wetland species to species more tolerant of dry conditions is likely to occur, resulting in changes in habitat present. By topping-up wetland water levels post drought, it will prevent this change in habitat.	Post drought wetland walkover and water levels.	Statutory designated sites/ Local wildlife sites/ NERC habitats and vegetation/ NERC and Notable Species (Amphibians/ Wetland Birds)/ INNS and scrub
<b>Wetland vegetation management</b>	In areas where a drawdown of greater than 0.1m is predicted to occur for more than 3 months, vegetation management may be required to maintain the habitat within the designated sites. This may include removal of certain species, including INNS and scrub.	When conditions of the wetland remain dry for extended periods of time, succession of wetland species to species more tolerant of dry conditions is likely to occur, resulting in changes in habitat present. By removing and replant specific species, designated habitat can be maintained.	Post drought wetland walkover and water levels - where UKHab scores remain below baseline consider need for replanting.	Statutory designated sites/ Local wildlife sites/ NERC habitats and vegetation/ NERC and Notable Species (Amphibians/ Wetland Birds)/ INNS and scrub

# 7. River Gt. Ouse (Grafham Water)

## 7.1 Drought permit details

### 7.1.1 Current licence

Our current abstraction licence at Offord is used to abstract water from the River Gt. Ouse in order to fill Grafham Water.

The key licence details are summarised in [Table 7.1](#). Please note that we work closely with the Environment Agency as licence conditions can change over time.

**Table 7.1 Offord abstraction licence summary**

Licence Condition	Detail
Daily	485 MI/d
Annual	150,000 MI/yr
MRF	No abstraction must take place when the net flow at Offord Sluice is equal to or less than 136.4 MI/d (the Minimum Residual Flow (MRF)). Abstraction is permissible for 75% of flow in excess of the MRF.
Level	No abstraction if the river level at Offord Sluice is less than 11.05 maOD
Seasonal	During the period 1 June - 30 September if the average flow rate over a week (Fri-Fri) is less than 227.305 MI/d then no water can be abstracted during the following weekend

### 7.1.2 Proposed drought permit

The Grafham Water drought permit would be considered for the River Gt. Ouse abstraction in the following two stages:

- **Stage 1** - Existing MRF, abstraction at up to 100% of the flow in excess of the MRF
- **Stage 2** - 50% reduction in the MRF to 68 MI/d, abstraction at up to 75% of the flow in excess of the MRF

Under the most likely scenario, a winter drought permit would be applied for to enable Grafham Water to refill following a prolonged dry period.

Stage 2 allows greater abstraction at lower flows so would likely be used in later stages of the drought. Usage would be expected to revert to Stage 1 when sufficient reservoir recovery has occurred.

It has been assumed that daily and annual totals would remain unchanged from those currently licenced.

## 7.2 ESoR

The methodology set out in **Section 3** would be followed to create the ESoR case for any application.

For the River Gt. Ouse (Grafham Water) drought permit the ESoR analysis could be undertaken for the Upper and Lower Bedford Ouse Environment Agency hydrological areas (TPD\_A\_H08 and TPD\_A\_H09) ([Figure 7.1](#)). However, this would be reviewed and confirmed with the Environment Agency before any application.

To show an example of one of the critical ESoR metrics we have completed rainfall ranking analysis for the Upper and Lower Bedford Ouse catchments using 2025 data. The 8-month drought metric ending in October 2025 was ranked and plotted as a cumulative distribution function ([Figure 7.2](#)). When the rainfall totals were ranked, the 2025 drought was identified as the fifth most severe over the full historic record (1871-2025).

More detail on the rainfall ranking metric is included in **Section 3.1.2**.

Figure 7.1 The rainfall ranking of October 2025 in the Upper and Lower Bedford Ouse for the 8-month drought metric compared against the full historic record, with 2025 highlighted in red

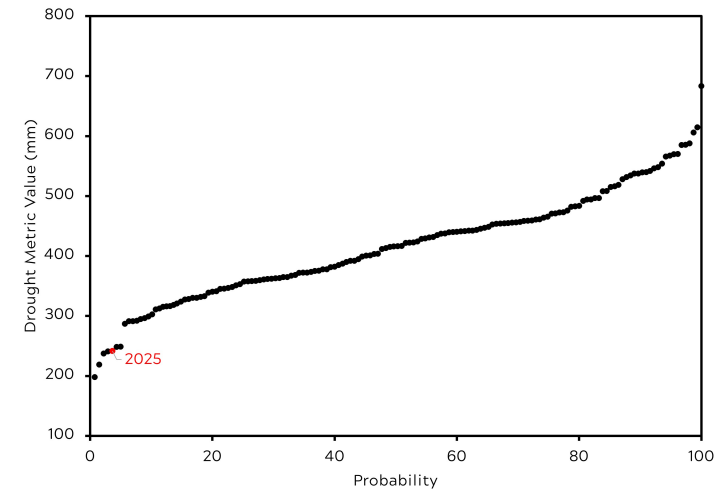
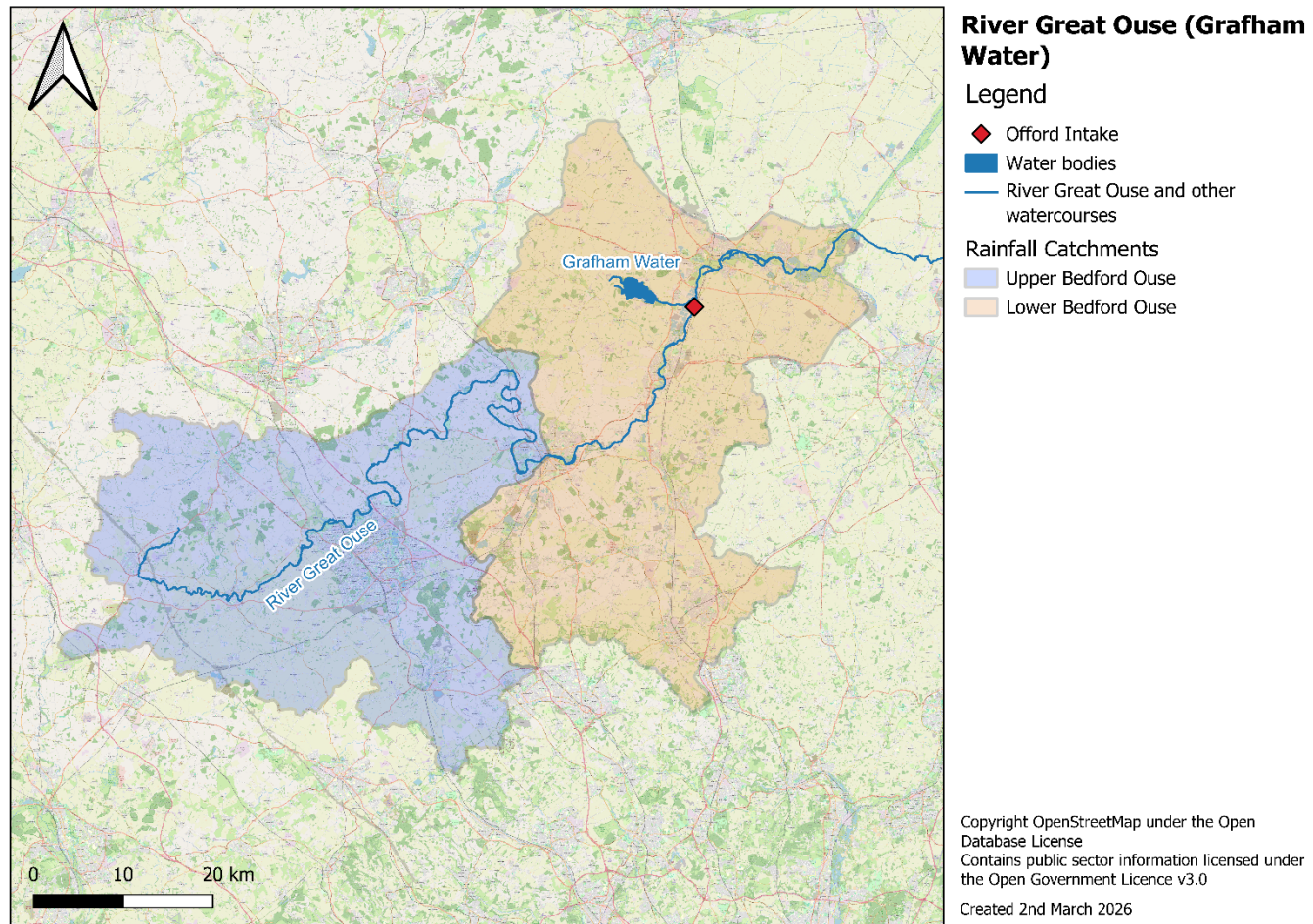


Figure 7.2 River Gt. Ouse (Grafham Water) drought permit potential ESoR rainfall assessment area



## 7.3 Environmental Assessment

An environmental assessment of the impact of the drought permit was carried out for Drought Plan 2027. This assesses the potential environmental impacts of implementing the proposed drought action, following Defra and Environment Agency guidance. The findings are detailed in a separate EAR and summarised in the section below.

Hydrological impacts range from major to minor, depending on the drought permit stage and reach. For a Stage 1 drought permit, there are moderate reductions in Reach 1 and minor reductions in Reach 2, while for a Stage 2 drought permit, there are major impacts in Reach 1 and Reach 2 during the summer due to more substantial flow reductions, with a moderate impact in Reach 1 during the winter. The assessments were carried out with medium to high confidence.

Geomorphological responses reflect these hydrological shifts with minor to moderate impacts occurring, including changes to flow velocities, sediment transport and habitat availability. These are most pronounced during a Stage 2 drought permit when environmental flows reduce further below the baseline. There is also a moderate impact on abstractors during the summer season of the Stage 2 drought permit, where the reduced flows may mean that the freshwater requirements from the IDB's cannot be met. The assessments were carried out with medium confidence.

Water quality impacts, notably for orthophosphates, have moderate to major impacts, particularly during a Stage 2 drought permit, while ammonia and dissolved oxygen show mainly Minor impacts. Macroinvertebrate, fish, macrophyte and phytobenthos communities may experience moderate impacts where water quality deteriorates or flows fall significantly. During summer low flows, risks include stagnation of backchannels, reduced habitat availability and increased predation risk. Fish communities are particularly susceptible to the combination of low flows and degraded water quality. The assessments were carried out with medium to high confidence.

Stage 1 Screening identified LSE for Ouse Washes (SAC/SPA/Ramsar). Stage 2 Appropriate Assessment concluded that with the implementation of mitigation and monitoring there would be no AEoI on the Ouse Washes Habitats site resulting from the drought permit both alone and in-combination with other plans or projects.

A summary of the predicted impacts of the proposed drought permit is provided in [Table 7.2](#).

Table 7.2 Summary of the predicted impacts for River Gt. Ouse (Grafham Water) drought permit

River Reach	Reach 1				Reach 2				Commentary
	Stage 1		Stage 2		Stage 1		Stage 2		
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	
Hydrology	Moderate	Minor	Major	Moderate	Minor	Minor	Major	Minor	The percentage reduction in flows from the drought permit compared to the baseline conditions for the Q stats range from major to minor depending on the flows and the drought permit stage to be implemented. The assessments were carried out with medium to high confidence.
Geomorphology	Minor	Minor	Moderate	Minor	Negligible	Negligible	Minor	Minor	There are expected to be impacts on flow hydraulics, sediment dynamics and habitats depending on the flow change. The assessments were carried out with medium confidence.
Water Quality	Moderate (Orthophosphate)	Minor (all)	Major (Orthophosphate)	Moderate (orthophosphate)	Minor (Orthophosphate and ammonia)	Minor (Orthophosphate and ammonia)	Major (Orthophosphate only)	Minor (Orthophosphate and ammonia)	The orthophosphate assessments are due to the sensitivity presented to changes in flows at these reaches. The ammonia assessments for a minor impact are due to the less sensitivity presented by ammonia to changes in flows at these reaches. The dissolved oxygen assessments for a minor impact are due to the lack of sensitivity presented to changes in flows at these reaches which would be not enough to cause a change in WFD status. The assessments were carried out with medium to high confidence.
	Minor (Ammonia and DO)		Minor (Ammonia and DO)	Minor (ammonia and DO)	Negligible (DO)	Negligible (DO)	Minor (Ammonia and DO)	Negligible (DO)	
Impact of artificial influences	Negligible	Negligible	Negligible	Negligible	Moderate (ammonia)	Moderate (ammonia)	Moderate (ammonia)	Moderate (ammonia)	Wastewater discharges from Huntingdon and Godmanchester WRC into the River Great Ouse may present specific water quality pressures locally downstream in Reach 2. The assessments were carried out with high confidence.
Impact on other abstractors	Negligible	Negligible	Negligible	Negligible	Moderate	Negligible	Moderate	Negligible	In Reach 2 during the summer months, the EA transfers water from the Tidal River into the Counter Drain at the Old Bedford Sluice, with freshwater flows also abstracted by the IDBs and the Counter Drain. Reduced flow may mean the IDB's demands cannot be met and therefore the predicted impacts of the proposed drought permit on other abstractors in this reach are considered to be moderate for summer for both stages of the permit. These assessments were carried out with medium to high confidence.
Macroinvertebrates	Moderate	Minor	Moderate	Minor	Minor	Minor	Moderate	Minor	Reduction in water quality may impact communities and rare species. Stagnation in backchannels could be significant in summer, though flows may not decrease substantially. These assessments were carried out with medium to high confidence.
Fish	Moderate	Minor	Moderate	Moderate	Minor	Minor	Moderate	Minor	Deterioration in water quality may impact fish communities. Effects are more pronounced in summer. These assessments were carried out with medium to high confidence.
Macrophytes	Moderate	Minor	Moderate	Minor	Minor	Minor	Moderate	Minor	Prolonged reduction in flows may impact macrophyte communities. These assessments were carried out with medium to high confidence.
Phytobenthos	Moderate	Minor	Moderate	Minor	Minor	Minor	Moderate	Minor	Algal blooms possible risk in summer These assessments were carried out with medium confidence.

## 7.4 Environmental Monitoring and Mitigation

The environmental monitoring plan (EMP) draws together the findings of the EARs for the potential drought permit sites and outlines how environmental conditions will be monitored and protected throughout a drought. We intend to take on proactive monitoring and mitigation along-with reactive measures where required. The EMP sets out the routine baseline monitoring, the additional monitoring required during dry weather and drought conditions, the monitoring needed during the permit implementation period, and the recovery monitoring once the permit has ended. It also identifies the mitigation measures needed to avoid, reduce or compensate for any environmental impacts associated with drought permit actions. The EMP reflects the need to distinguish natural drought effects, from those caused by drought management measures and takes account of the timing, availability and reliability of data as drought conditions evolve.

### Monitoring

[Table 7.3](#) below summarises the recommended monitoring in relation to this assessment and at which stage of the drought it is required. Please refer to the EAR for further details of the impact assessment results.

### Mitigation

Where impacts are predicted to be of moderate or higher significance, the related mitigation measures and their proposed triggers are outlined in [Table 7.4](#).

Table 7.3 Summary of the recommended monitoring for River Gt. Ouse (Grafham Water) drought permit

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
<b>Baseline Monitoring</b>				
Reservoir abstraction	Continuous monitoring of reservoir abstraction	Continuous	Continuous	AWS
Reservoir Level	Continuous monitoring of reservoir levels	Continuous	Continuous	AWS
River Abstraction	Continuous monitoring of river abstraction	Continuous	Continuous	AWS
River Level	Continuous river level monitoring	Continuous	Continuous	EA
River Flow	Continuous river flow monitoring	Continuous	Continuous	EA
River Level (fish passes)	Continuous river level monitoring at fish passes	Continuous	Once per season download	AWS
Water Quality (spot sample)	Water quality monitoring via in-situ spot samples and laboratory analysis of samples taken in the field	Spring, summer, autumn and winter	Once per season	AWS
Macroinvertebrate Survey	Sampling of macroinvertebrate fauna using standard kick or sweep-sampling methodology at a number of locations	Spring, summer and autumn	Once per season	AWS
Fish Survey	Fish monitoring at a number of locations using standard fishing techniques (seine netting; electric fishing)	Summer	Once per season	AWS
Macrophyte Survey	Macrophyte monitoring using standard methodology at a number of locations	Summer	Once per season	AWS
Phytobenthos Survey	Phytobenthos monitoring using standard methodology at a number of locations	Spring and autumn	Once per season	AWS
Walkover Survey	Walkovers to determine habitat quality and identification of drought sensitive habitats. Riverbed substrate composition, in situ water quality, habitat connectivity, fish barrier assessments and habitat fragmentation will all be recorded during each walkover survey using River Habitat Condition form	Summer	Once every five years	AWS
UK Habitat Classification (UKHab) Survey	Baseline survey using UKHab condition assessments to identify potential changes to the physical environment, map extent of feature and species composition, and identify specific water features where water level monitoring would be appropriate	Summer	Once every five years	AWS
<b>Drought Level 1 Monitoring</b> ( <i>presents any changes in italics from baseline monitoring</i> )				
River Flow (ACDP)	Monitoring of river flow sites via Acoustic Doppler Current Profilers (ADCP) spot measurements	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
River Level (fish passes)	Continuous river level monitoring at fish passes	<i>Drought Level 1 Status</i>	<i>Monthly download</i>	AWS
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
Macroinvertebrates	Macroinvertebrate monitoring at a number of locations	<i>Drought Level 1 Status</i>	<i>Every two months (Mar - Nov)</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline monitoring sites including fish, macrophytes & phytobenthos and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
UKHab Survey	UKHab surveys to detect any changes from baseline monitoring sites and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
<b>Drought Permit Implementation Monitoring</b> ( <i>presents any changes in italics from Drought Level 1 Monitoring</i> )				
River Level (fish passes)	Continuous river level monitoring at fish passes	<i>Duration of drought permit</i>	<i>Fortnightly download</i>	AWS
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Duration of drought permit</i>	<i>Weekly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde	<i>Duration of drought permit</i>	<i>Continuous sondes</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline/drought level 1 monitoring sites	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
UKHab Survey	UKHab surveys to detect any changes from baseline monitoring sites and determine if pre-emptive mitigation is required	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
<b>Post Drought Permit Implementation Monitoring</b> ( <i>as per baseline monitoring except for the changes in italics presented below</i> )				

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
River Flow (ACDP)	Monitoring of river flow site via ADCP spot measurements	<i>6 months post drought permit implementation</i>	<i>Monthly</i>	AWS
Water Quality (spot sample)	Continued monitoring of key water quality sites via spot sampling		<i>Monthly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde		<i>Continuous</i>	AWS

Table 7.4 Summary of the recommended mitigation for River Gt. Ouse (Grafham Water ) drought permit

Mitigation	Description	Potential Impact identified in EAR	Trigger to inform mitigation action	Receptor(s)
<b>In-drought (During Drought Option Implementation)</b>				
<b>Abstraction adjustment</b>	Gradual or temporary adjustments to abstraction or compensation flows to prevent stranding, displacement, or stress in sensitive aquatic species.	Reduction in water level or water quality can lead habitat quality and ecological stress and, over extended periods of time can result in changes/ loss in habitat present, mortality of species (amphibians) and reduction in wetland bird populations.	Signs of stress on receptors/ changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground.	East of New Bedford/Hundred Foot River, Portholme SSSI
		Sudden changes in flow can leave fish, macroinvertebrates, and crayfish stranded in isolated pools or dry areas, especially in low flow conditions. Gradual adjustments help maintain connectivity.	River flow, level or water quality guide thresholds and/or fish stress reporting.	Fish, macroinvertebrates
<b>Aeration</b>	Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration (Aerators are however considered a last resort, as they only have local effects and can disrupt fluvial sediment).	Reduced river levels cause less mixing and hence lower dissolved oxygen levels.	As above.	Fish, macroinvertebrates
<b>Refuge Creation</b>	Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep-water habitat or high densities of fauna in refuges.	There is potential for the loss of deep-water habitat under low flow conditions, leading to high densities of fish, and water vole within remaining refuges, which may increase stress, competition, and the risk of mortality.	Informed by walkover surveys and local knowledge/reports.	Fish, water vole
<b>In stream structures</b>	Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation.	There is potential for reduced habitat inundation and loss of in-stream flow diversity during low flows, which may impact macroinvertebrates, fish, water vole, and otter by reducing the availability of functional refuges and increasing vulnerability to predation and desiccation.	Informed by walkover surveys and local knowledge/reports.	Macroinvertebrates, fish
<b>Screen inspection</b>	Regular inspection and clearing of screens to ensure they retain their correct working function.	During low flows, screens and barriers can become clogged with debris, impeding the passage of fish and potentially leading to stranding or stress.	Informed by walkover surveys and local knowledge/reports.	Fish
<b>Relocation of individuals</b>	Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish). Measures will be taken to ensure biosecurity at all times. Relocation of individuals is however considered a last resort, as relocation can be particularly stressful for fish, particularly when using netting or electrofishing methodologies. There are also likely to be few receptor locations within the catchment during the drought conditions.	There is potential for fish to become stranded in disconnected sections of the watercourse under lower flows or experience increased stress or mortality due to reduced water quality.	River flow, level or water quality guide thresholds and/or fish stress reporting.	Fish
<b>Habitat enhancement</b>	Habitat enhancement work (e.g. planting of wetland species) which may have beneficial effects over the long term (but note can lead to short term disturbance when receptors may already be stressed).	Loss of marginal habitats and succession events, where wetland habitats may transition to drier terrestrial habitats such as grasslands presents sub-optimal habitat to wetland birds and can lead to reductions in local, regional or international populations due to a reduction in feeding and/or breeding opportunity.	Changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground.	CWS, LWS, birds
<b>Post Drought Permit Implementation Mitigation</b>				
<b>Habitat enhancement</b>	Enhancement of habitat beyond the impacted reach.	During drought, reduced water levels can degrade habitats by exposing sediment, reducing wetted area, and altering flow dynamics.	Informed by walkover surveys and local knowledge / reports.	Macroinvertebrates, fish, water vole
<b>Barrier and flow modification</b>	Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles.	Physical barriers may become more significant during low flows, preventing fish passage and movement between suitable habitats.	Informed by walkover surveys and local knowledge / reports.	Fish
<b>Restocking</b>	Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment.	Low flow events can result in population decline due to increased mortality, reduced breeding success, and loss of juveniles.	Restocking will be post -drought permit as appropriate, in dialogue / agreed with EA.	Fish

## 8. River Nene (Rutland Water)

### 8.1 Drought permit details

#### 8.1.1 Current licence

Our current abstraction licence at Wansford is used to abstract water from the River Nene in order to fill Rutland Water.

The key licence details are summarised in [Table 8.1](#). Please note that we work closely with the Environment Agency as licence conditions can change over time.

**Table 8.1 Wansford abstraction licence summary**

Licence Condition	Detail
Daily	763 MI/d
Annual	180,000 MI/yr
Winter MRF (December-April)	No abstraction must take place when the river flow is less than 125 MI/d
Summer MRF (May-November)	No abstraction must take place when the river flow is less than 150 MI/d

#### 8.1.2 Proposed drought permit

The Rutland Water drought permit would be considered for the River Nene abstraction in the following way:

- **Winter (December-April)** - 50% reduction in the MRF to 62.5 MI/d
- **Summer (May-November)** - 50% reduction in the MRF to 75 MI/d

Under the most likely scenario, a winter drought permit would be applied for, to enable Rutland Water to refill following a prolonged dry period.

It has been assumed that daily and annual totals would remain unchanged from those currently licenced.

## 8.2 ESoR

The methodology set out in **Section 3** would be followed to create the ESoR case for any application.

For the River Nene (Rutland Water) drought permit the ESoR analysis could be undertaken for the Upper Welland and Nene Environment Agency hydrological area (TPD\_A\_H03) (**Figure 8.2**). However, this would be reviewed and confirmed with the Environment Agency before any application.

To show an example of one of the critical ESoR metrics we have completed rainfall ranking analysis for the Upper Welland and Nene catchment using 2025 data. The 8-month drought metric ending in October 2025 was ranked and plotted as a cumulative distribution function (**Figure 8.1**). When the rainfall totals were ranked, the 2025 drought was identified as the fourth most severe over the full historic record (1871-2025).

More detail on the rainfall ranking metric is included in **Section 3.1.2**.

**Figure 8.1** The rainfall ranking of October 2025 in Upper Welland and Nene for the 8-month drought metric compared against the full historic record, with 2025 highlighted in red

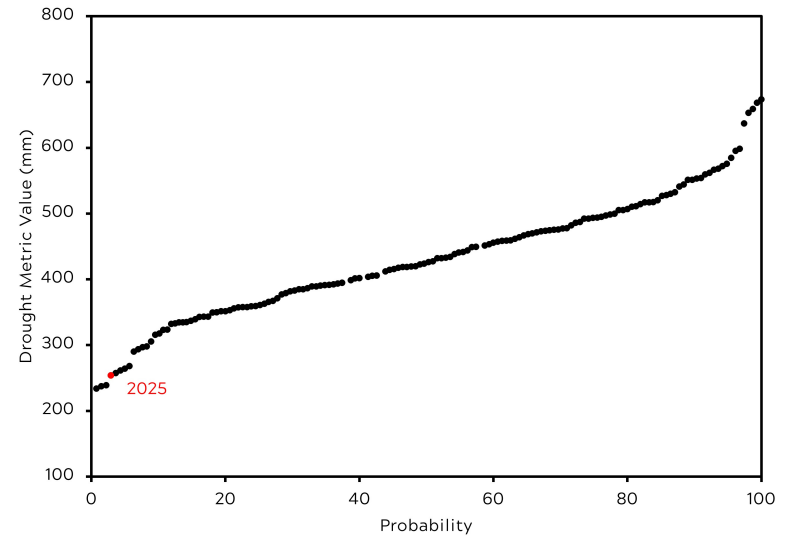
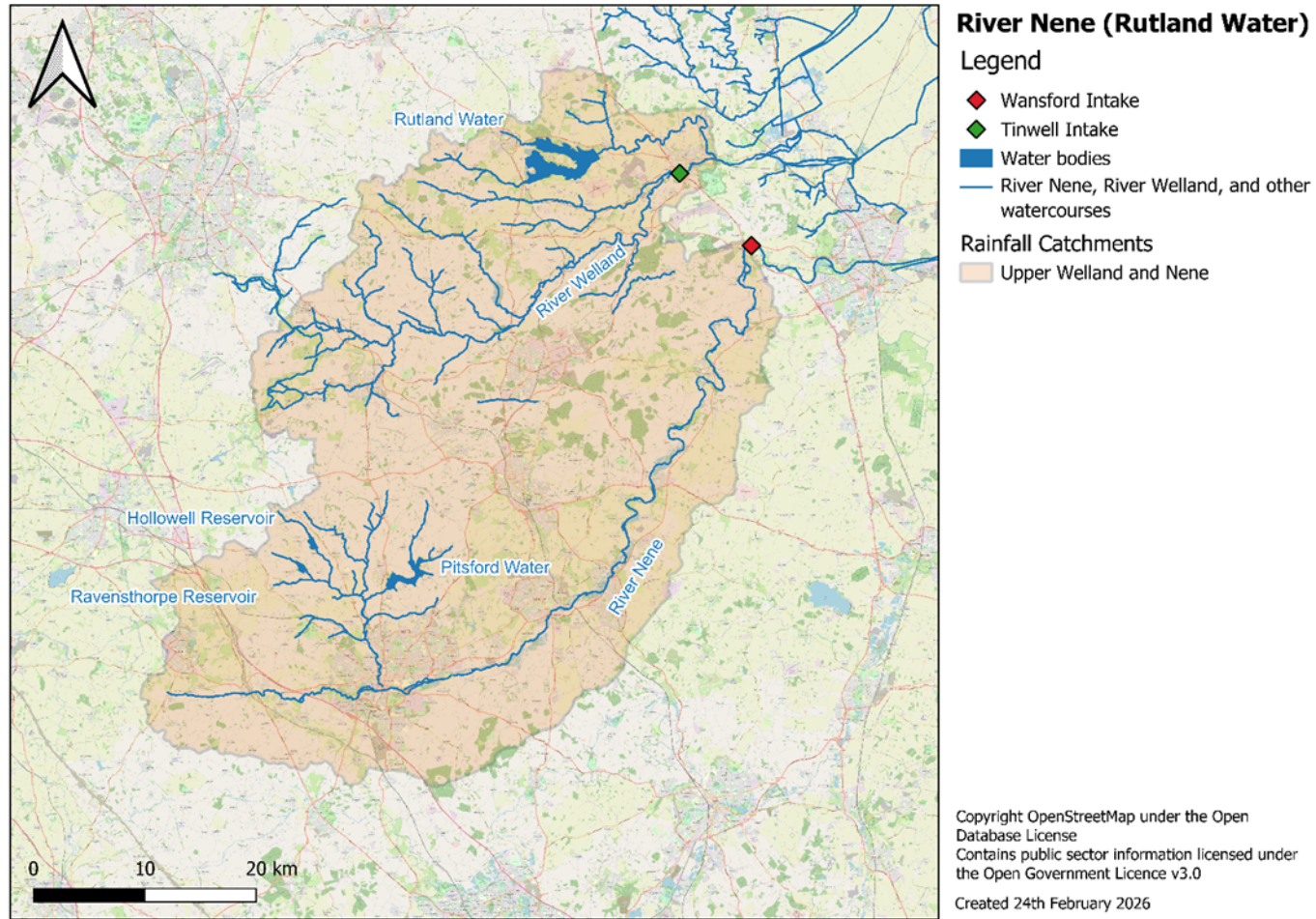


Figure 8.2 River Nene (Rutland Water) drought permit potential ESoR rainfall assessment area



## 8.3 Environmental Assessment

An environmental assessment of the impact of the drought permit was carried out for Drought Plan 2027. This assesses the potential environmental impacts of implementing the proposed drought action, following Defra and Environment Agency guidance. The findings are detailed in a separate EAR and summarised in the section below.

Significant decreases in flow are expected throughout the seasons, so the drought permit is predicted to cause Major hydrological impacts across both reaches, significantly reducing flows.

Geomorphological impacts are Minor, with modest changes to sediment and flow dynamics. Water quality impacts were found to be Major for orthophosphate due to high baseline concentrations and substantial flow reductions. This leads to a Major impact in summer and a Moderate impact in winter, although this can be mitigated with management processes and close working partnerships in place. These assessments were carried out with medium to high confidence.

Effects on other abstractors range from minor to major depending on location. Ecologically, macroinvertebrates, fish, macrophytes and phytobenthos may experience moderate to major effects, driven by reduced habitat availability, lower flows, and declining water quality. These assessments were carried out with low to high confidence.

HRA Stage I Screening identified LSE resulting from the drought permit on Nene Wash SAC, SPA and Ramsar, and Rutland Water SPA and Ramsar. Stage II Appropriate Assessment was carried out, and concluded that robust monitoring protocol and mitigation measures will ensure no AEol on the integrity of the Habitats Sites.

A summary of the predicted impacts of the proposed drought permit is provided in [Table 8.2](#).

Table 8.2 Summary of the predicted impacts for the River Nene (Rutland Water) drought permit

River Reach	Reach 1		Reach 2		Commentary
	Summer	Winter	Summer	Winter	
Hydrology	Major	Major	Major	Major	There is a major percentage reduction in flows from the drought permit compared to the baseline conditions for the Q stats. The assessments were carried out with medium to high confidence.
Geomorphology	Minor	Minor	Minor	Minor	There are expected to be minor impacts on flow hydraulics and sediment dynamics due to the flow changes. The assessments were carried out with medium confidence.
Water Quality	Major (Orthophosphate) Moderate (dissolved oxygen) Negligible (ammonia)	Major (Orthophosphate) Minor (ammonia, dissolved oxygen)	Major (Orthophosphate) Moderate (dissolved oxygen) Negligible (ammonia)	Major (Orthophosphate) Minor (dissolved oxygen) Negligible (ammonia)	Due to the high background concentrations of orthophosphate and the significant flow reduction in this reach, orthophosphate is considered to have a major impact. Dissolved oxygen saturation appears slightly sensitive to river flows, determining the impact classification. The assessments were carried out with high confidence.
Impact on other abstractors	Moderate	Minor	Major	Moderate	Abstraction requirements from different water users increase in Reach 2 as abstractors will need to limit the desired amount of water they can abstract during a drought. With management processes in place and close working partnerships implemented, the impacts will be reduced with the available water distributed between users. The assessments were carried out with high confidence.
Macroinvertebrates	Moderate	Moderate	Moderate	Moderate	Reduced water quality flows and level may impact the macroinvertebrate community over the duration. Reduced habitat availability for macroinvertebrates may reduce the diversity of the community. These assessments were carried out with high confidence.
Fish	Major	Major	Major	Major	Reduced flows, level and subsequently wetted width may reduce availability of habitats for fish. Secondary effects include reduction in water quality which could further reduce availability of habitat. Increased potential for settlement of fine sediments as a result of decreased river flow. Increased risk of predation during periods of low flow. These assessments were carried out with low to medium confidence.
Macrophytes	Moderate	Moderate	Moderate	Moderate	Prolonged reduction in flows may impact macrophyte communities. These assessments were carried out with low to medium confidence.
Phytobenthos	Moderate	Moderate	Moderate	Moderate	Reducing flows may increase the levels of sedimentation within the watercourse, resulting in a reduction in light availability from the baseline conditions. These assessments were carried out with low to medium confidence.

## 8.4 Environmental Monitoring and Mitigation

The environmental monitoring plan (EMP), draws together the findings of the EARs for the potential drought permit sites and outlines how environmental conditions will be monitored and protected throughout a drought. We intend to take on proactive monitoring and mitigation along-with reactive measures where required. The EMP sets out the routine baseline monitoring, the additional monitoring required during dry weather and drought conditions, the monitoring needed during the permit implementation period, and the recovery monitoring once the permit has ended. It also identifies the mitigation measures needed to avoid, reduce or compensate for any environmental impacts associated with drought permit actions. The EMP reflects the need to distinguish natural drought effects from those caused by drought management measures and takes account of the timing, availability and reliability of data as drought conditions evolve.

### Monitoring

The EAR identified impacts to receptors due to the implementation of the drought permit in Reach 1 and 2 of the River Nene. Further baseline monitoring has been suggested, as there are data gaps within the baseline data. Additional surveys have been suggested to expand the baseline data for fish, macroinvertebrates within both reaches.

[Table 8.3](#) below summarises the recommended monitoring in relation to this assessment and at which stage of the drought it is required. Please refer to the EAR for further details of the impact assessment results.

### Mitigation

Where impacts are predicted to be of moderate or higher significance, the related mitigation measures and their proposed triggers are outlined in [Table 8.4](#).

Table 8.3 Summary of the recommended monitoring for the River Nene (Rutland Water) drought permit

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
<b>Baseline Monitoring</b>				
River Abstraction	Continuous monitoring of river abstraction	Continuous	Continuous	AWS
Reservoir Level	Continuous monitoring of reservoir levels	Continuous	Continuous	AWS
River Level	Continuous river level monitoring	Continuous	Continuous	EA
River Flow	Continuous river flow monitoring	Continuous	Continuous	EA
Water Quality (spot sample)	Water quality monitoring via in-situ spot samples and laboratory analysis of samples taken in the field	Spring, summer, autumn and winter	Once per season	AWS
Macroinvertebrates Survey	Sampling of macroinvertebrate fauna using standard kick or sweep-sampling methodology at a number of locations	Spring, summer and autumn	Once per season	AWS
Fish Survey	Fish monitoring at a number of locations using standard fishing techniques (seine netting; electric fishing)	Summer	Once per season	AWS
Macrophyte Survey	Macrophyte monitoring using standard methodology at a number of locations	Summer	Once per season	AWS
Phytobenthos Survey	Phytobenthos monitoring using standard methodology at a number of locations	Spring and autumn	Once per season	AWS
Walkover Survey	Walkovers to determine habitat quality and identification of drought sensitive habitats. Riverbed substrate composition, in situ water quality, habitat connectivity, fish barrier assessments and habitat fragmentation will all be recorded during each walkover survey using River Habitat Condition form	Summer	Once every five years	AWS
UK Habitat Classification (UKHab) Survey	Baseline survey using UKHab condition assessments to identify potential changes to the physical environment, map extent of feature and species composition, and identify specific water features where water level monitoring would be appropriate	Summer	Once every five years	AWS
<b>Drought Level 1 Monitoring (presents any changes in italics from <i>baseline</i> monitoring)</b>				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
Macroinvertebrates	Macroinvertebrate monitoring at a number of locations	<i>Drought Level 1 Status</i>	<i>Every two months (Mar - Nov)</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline monitoring sites including fish, macrophytes & phytobenthos and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
UKHab Survey	UKHab surveys to detect any changes from baseline monitoring sites and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
<b>Drought Permit Implementation Monitoring (presents any changes in italics from <i>Drought Level 1</i> monitoring)</b>				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Duration of drought permit</i>	<i>Weekly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde	<i>Duration of drought permit</i>	<i>Continuous sondes</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline/drought level 1 monitoring sites	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
UKHab Survey	UKHab surveys to detect any changes from baseline monitoring sites and determine if pre-emptive mitigation is required	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
<b>Post Drought Permit Implementation Monitoring (as per <i>baseline</i> monitoring except for the changes in italics presented below)</b>				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>6 months post drought permit implementation</i>	<i>Monthly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde		<i>Continuous</i>	AWS

Table 8.4 Summary of the recommended mitigation for the River Nene (Rutland Water) drought permit

Mitigation	Description	Potential Impact identified in EAR	Trigger to inform mitigation action	Receptor(s)
<b>During Drought Permit Implementation Mitigation</b>				
<b>Abstraction adjustment</b>	Gradual or temporary adjustments to abstraction or compensation flows to prevent stranding, displacement, or stress in sensitive aquatic species (Aerators are however considered a last resort, as they only have local effects and can disrupt fluvial sediment).	Reduction in water level or water quality can lead habitat quality and ecological stress and, over extended periods of time can result in changes/ loss in habitat present, mortality of species (amphibians) and reduction in wetland bird populations.	Signs of stress on receptors/ changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground. River flow, level or water quality guide thresholds and/or fish stress reporting.	Nene Washes SPA and Ramsar, Castor Meadows SSSI, Woodston Ponds LNR and The Boardwalks LNR. River Nene, CWS (Sutton / Sibson Flood Meadows, Dog-in-a-Doublet Drain, Northey Gravel Pit, Sutton Meadows South, The Boardwalks, Woodston Ponds, Water Newton Meadows, Stibbington Pits and Embankment End Marsh) Fish, macroinvertebrates, macrophytes
		Sudden changes in flow can leave fish, macroinvertebrates stranded in isolated pools or marginal shallows, especially in low flow conditions.		
		Macrophyte populations within the channel may experience stress and drying out when areas of the channel become exposed during low flow conditions. Gradual adjustments help maintain connectivity within the channel.		
<b>Aeration</b>	Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration.	During drought conditions river flows reduce and solar radiation may increase, resulting in less mixing of the water column and increased water temperatures reducing levels of dissolved oxygen.	As above.	Fish, macroinvertebrates
<b>Screen inspection</b>	Regular inspection and clearing of screens to ensure they retain their correct working function.	During low flows, screens and barriers can become clogged with debris, impeding the passage of fish and potentially leading to stranding or stress.	Informed by walkover surveys and local knowledge/reports.	Fish
<b>Relocation of individuals</b>	Due to the predicted hydrological impacts to the reaches being classified as negligible /minor, along with the characteristics of the river channel being generally fairly deep and wide, it is unlikely that fish will need to be relocated.	There is potential for fish to become stranded in disconnected sections or marginal areas of the watercourse under lower flows or experience increased stress or mortality due to reduced water quality.	River flow, level or water quality guide thresholds and/or fish stress reporting.	Fish
	Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts. Relocation of individuals is however considered a last resort, as relocation can be particularly stressful for fish, particularly when using netting or electrofishing methodologies. There are also likely to be few receptor locations within the catchment during the drought conditions.			
	Walkover surveys should include the checking of marginal habitat for notable species (bullhead and lamprey) individuals. If fish are stranded then individuals should be move back into deeper sections of the channel.			
<b>Habitat enhancement</b>	Habitat enhancement work (e.g. planting of wetland species) which may have beneficial effects over the long term (but note can lead to short term disturbance when receptors may already be stressed).	Loss of marginal habitats and succession events, where wetland habitats may transition to drier terrestrial habitats such as grasslands presents sub-optimal habitat to wetland birds and can lead to reductions in local, regional or international populations due to a reduction in feeding and/or breeding opportunity.	Changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground.	As per list of sites in EAR
<b>Post drought Permit Implementation Mitigation</b>				
<b>Barrier and flow modification</b>	Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles.	Physical barriers may become more significant during low flows, preventing fish passage and movement between suitable habitats.	Informed by walkover surveys and local knowledge / reports.	Fish
<b>Restocking</b>	Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment.	Low flow events can result in population decline due to increased mortality, reduced breeding success, and loss of juveniles.	Restocking will be post -drought permit as appropriate, in dialogue / agreed with EA.	Fish
<b>Wetland compensation</b>	In areas identified where a drawdown of greater than 0.1m, or reduction of flows affecting overtopping is predicted to occur for more than 3 months, compensation/top up of water levels should be considered to maintain wetland habitat.	When conditions of the wetland remain dry for extended periods of time, succession of wetland species to species more tolerant of dry conditions is likely to occur, resulting in changes in habitat present. By topping-up wetland water levels post drought, it will prevent this change in habitat.	Post drought wetland walkover and water levels.	As per list of sites in EAR
<b>Wetland vegetation management</b>	In areas where a drawdown of greater than 0.1m is predicted to occur for more than 3 months or reduction of flows affecting overtopping, vegetation management may be required to maintain the habitat within the designated sites. This may include removal of certain species, including INNS and scrub, and replanting of native wetland species.	When the conditions of the wetland remain dry for extended periods of time, excessive or non-native vegetation may grow impacting or changing the habitat.	Post drought wetland walkover and water levels.	As per list of sites in EAR

# 9. River Nene (Pitsford Water)

## 9.1 Drought permit details

### 9.1.1 Current licence

Our current abstraction licence at Duston Mill is used to abstract water from the River Nene in order to fill Pitsford Water.

The key licence details are summarised in [Table 9.1](#). Please note that we work closely with the Environment Agency as licence conditions can change over time.

**Table 9.1** Duston Mill abstraction licence summary

Licence Condition	Detail
Daily	181.8 MI/d
Annual	38,500 MI/yr
MRF	No abstraction must take place when the river flow is less than 34.096 MI/d

### 9.1.2 Proposed drought permit

The Pitsford Water drought permit would be considered for the River Nene abstraction the following way:

- 50% reduction in the MRF to 17.05 MI/d

Under the most likely scenario, a winter drought permit would be applied for to enable Pitsford Water to refill following a prolonged dry period.

It has been assumed that daily and annual totals would remain unchanged from those currently licenced.

## 9.2 ESoR

The methodology set out in **Section 3** would be followed to create the ESoR case for any application.

For the River Nene (Pitsford Water) drought permit the ESoR analysis could be undertaken for the Upper Welland and Nene Environment Agency hydrological area (TPD\_A\_H03) ([Figure 9.2](#)). However, this would be reviewed and confirmed with the Environment Agency before any application.

To show an example of one of the critical ESoR metrics we have completed rainfall ranking analysis for the Upper Welland and Nene catchment using 2025 data. The 8-month drought metric ending in October 2025 was ranked and plotted as a cumulative distribution function ([Figure 9.1](#)). When the rainfall totals were ranked, the 2025 drought was identified as the fourth most severe over the full historic record (1871-2025).

More detail on the rainfall ranking metric is included in **Section 3.1.2**.

Figure 9.1 The rainfall ranking of October 2025 in Upper Welland and Nene for the 8-month drought metric compared against the full historic record, with 2025 highlighted in red

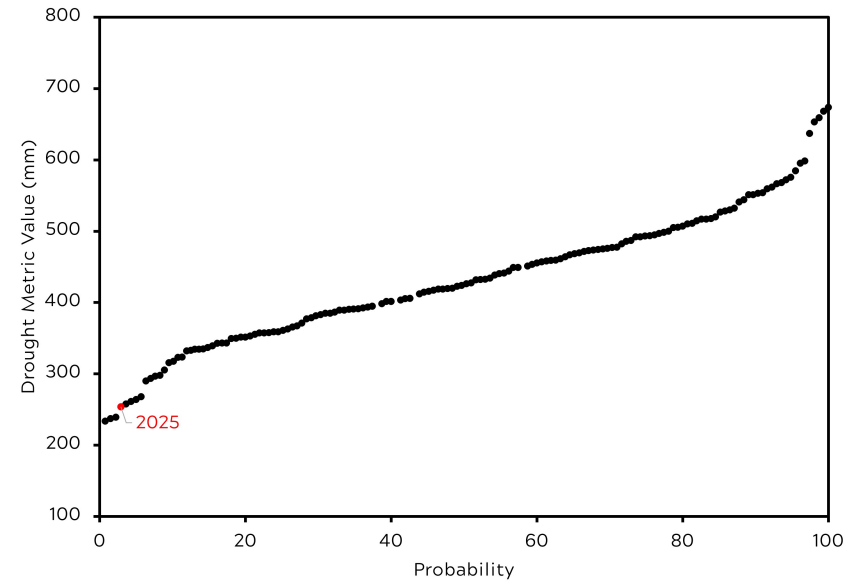
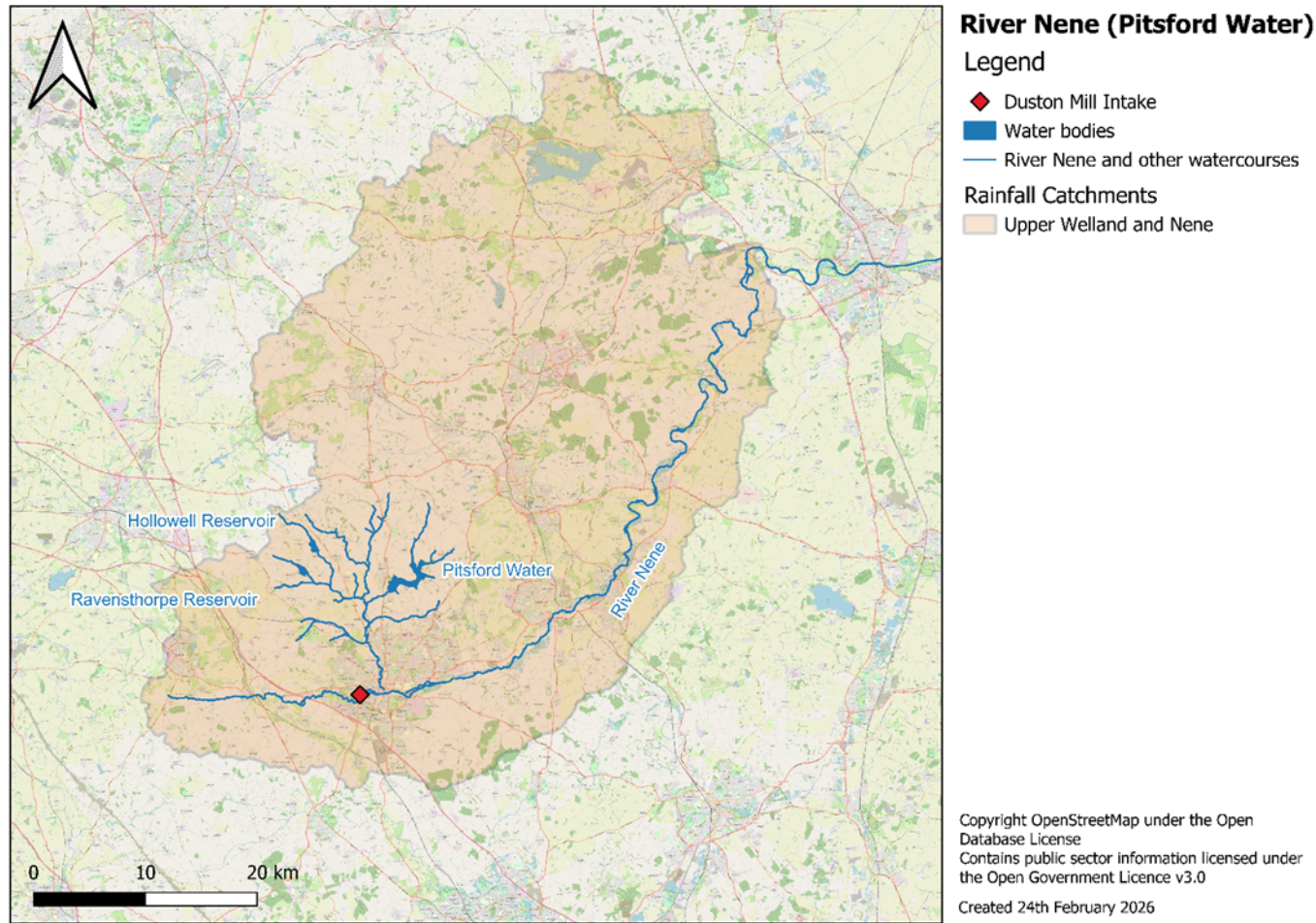


Figure 9.2 River Nene (Pitsford Water) drought permit potential ESoR rainfall assessment area



## 9.3 Environmental Assessment

An environmental assessment of the impact of the drought permit was carried out for Drought Plan 2027. This assesses the potential environmental impacts of implementing the proposed drought action, following Defra and Environment Agency guidance. The findings are detailed in a separate EAR and summarised in the section below.

Hydrological impacts vary from major in upstream reaches to negligible in the downstream reaches, with the geomorphological impacts following a similar pattern. These assessments were carried out with low to high confidence.

There is a major impact in the upstream reach from increased orthophosphate concentrations, as well as increased potential for algal blooms, this water quality assessment was carried out with high confidence. This may impact upon fish communities, macroinvertebrates, macrophytes, navigation, and aesthetics. However, the impacts are considered temporary, with intermittent periods of higher flows expected, as well as higher flows in the recovery period, flushing nutrients and other pollutants out. The assessments were carried out with medium confidence.

The HRA Stage I Screening concluded that there would be no LSE resulting from the drought permit alone on any Habitats Sites, however there was potential for non-significant residual effects on the Nene Washes SAC, SPA and Ramsar, Upper Nene Valley Gravel Pits SPA and Ramsar which required an in-combination assessment. The in-combination assessment did not identify potential in-combination effects upon Upper Nene Valley Gravel Pits SPA and Ramsar. However, projects brought forward under the Cambridge and Peterborough Combined Authority Local Transport Plan may result in in-combination effects through water quality (i.e. orthophosphates) upon Nene Washes SAC, SPA and Ramsar. Further details about those projects would be required to ascertain no in-combination effects.

A summary of the predicted impacts of the proposed drought permit is provided in [Table 9.2](#).

Table 9.2 Summary of the predicted impacts for the River Nene (Pitsford Water) drought permit

River Reach	Reach 1		Reach 2		Reach 3		Reach 4		Reach 5		Reach 6		Commentary
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	
Hydrology	Major	Major	Moderate	Moderate	Negligible	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Negligible	The percentage reduction in flows from the drought permit compared to the baseline conditions for the Q stats range from major to negligible, with a higher percentage flow change occurring upstream closer to the abstraction. The assessments were carried out with medium to high confidence.
Geomorphology	Moderate	Moderate	Minor	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	There are expected to be impacts on flow hydraulics, sediment dynamics and habitats in the upstream reaches linked to the larger flow changes. The assessments were carried out with low to medium confidence.
Water Quality*	Major (Orthophosphate) Moderate (Dissolved Oxygen and ammonia)	Major (Orthophosphate) Moderate (Dissolved Oxygen and ammonia)	Moderate (Orthophosphate) Minor (Dissolved Oxygen)	Moderate (Orthophosphate) Minor (Dissolved Oxygen)	Negligible	Negligible	Negligible	Negligible	Negligible (All)	Minor (Orthophosphate & Dissolved Oxygen)	Negligible	Negligible	Concentrations of orthophosphate display some sensitivity to river flows which determines its classification. Oxygen saturation and ammonia did not appear as sensitive to river flows for these reaches. The assessments were carried out with high confidence.
Impact on other abstractors	Minor	Minor	Minor	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Negligible	The licensed abstractions from the River Nene between Duston Mill and Wansford may be impacted when there is a major to minor hydrological impact on the river. The assessments were carried out with high confidence.
Macroinvertebrates	Moderate	Moderate	Moderate	Moderate	Negligible	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Negligible	Reduction in water quality may impact communities via a decrease in suboptimal habitat. The assessments were carried out with medium confidence.
Fish	Major	Major	Moderate	Moderate	Negligible	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Negligible	Deterioration in water quality may impact fish communities via a decrease in sub-optimal habitat. There is also the potential for increased predation by birds during periods of low flow. The assessments were carried out with medium confidence.
Macrophytes	Moderate	Moderate	Moderate	Moderate	Negligible	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Negligible	Water quality deterioration may alter community via a decrease in suboptimal habitat. The assessments were carried out with medium confidence.
Phytobenthos	Minor	Minor	Minor	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Minor	Negligible	Negligible	Water quality deterioration may alter community via a decrease in suboptimal habitat. The assessments were carried out with medium confidence.

## 9.4 Environmental Monitoring and Mitigation

The environmental monitoring plan (EMP), draws together the findings of the EARs for the potential drought permit sites and outlines how environmental conditions will be monitored and protected throughout a drought. We intend to take on proactive monitoring and mitigation along-with reactive measures where required. The EMP sets out the routine baseline monitoring, the additional monitoring required during dry weather and drought conditions, the monitoring needed during the permit implementation period, and the recovery monitoring once the permit has ended. It also identifies the mitigation measures needed to avoid, reduce or compensate for any environmental impacts associated with drought permit actions. The EMP reflects the need to distinguish natural drought effects from those caused by drought management measures and takes account of the timing, availability and reliability of data as drought conditions evolve.

### Monitoring

The EAR identified impacts to receptors due to the implementation of the drought permit in Reach 1 or 2. Further baseline monitoring has been suggested to address gaps within the existing baseline data. Additional surveys have been suggested to expand the baseline data for fish, macrophytes and phytobenthos within Reaches 1 and 2.

[Table 9.3](#) below summarises the recommended monitoring in relation to this assessment and at which stage of the drought it is required. Please refer to the EAR for further details of the impact assessment results

### Mitigation

Where impacts are predicted to be of moderate or higher significance, the related mitigation measures and their proposed triggers are outlined in [Table 9.4](#).

Table 9.3 Summary of the environmental monitoring for the River Nene (Pitsford Water) drought permit

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
<b>Baseline Monitoring</b>				
River Abstraction	Continuous monitoring of river abstraction	Continuous	Continuous	AWS
Reservoir Level	Continuous monitoring of reservoir levels	Continuous	Continuous	AWS
River Level	Continuous river level monitoring	Continuous	Continuous	EA
River Flow	Continuous river flow monitoring	Continuous	Continuous	EA
Water Quality (spot sample)	Water quality monitoring via in-situ spot samples and laboratory analysis of samples taken in the field	Spring, summer, autumn and winter	Once per season	AWS
Macroinvertebrates Survey	Sampling of macroinvertebrate fauna using standard kick or sweep-sampling methodology at a number of locations	Spring, summer and autumn	Once per season	AWS
Fish Survey	Fish monitoring at a number of locations using standard fishing techniques (seine netting; electric fishing)	Summer	Once per season	AWS
Macrophyte Survey	Macrophyte monitoring using standard methodology at a number of locations	Summer	Once per season	AWS
Phytobenthos Survey	Phytobenthos monitoring using standard methodology at a number of locations	Spring and autumn	Once per season	AWS
Walkover Survey	Walkovers to determine habitat quality and identification of drought sensitive habitats. Riverbed substrate composition, in situ water quality, habitat connectivity, fish barrier assessments and habitat fragmentation will all be recorded during each walkover survey using River Habitat Condition form	Summer	Once every five years	AWS
UK Habitat Classification (UKHab) Survey	Baseline survey using UKHab condition assessments to identify potential changes to the physical environment, map extent of feature and species composition, and identify specific water features where water level monitoring would be appropriate	Summer	Once every five years	AWS
<b>Drought Level 1 Monitoring (presents any changes in italics from <i>baseline</i> monitoring)</b>				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
Macroinvertebrates	Macroinvertebrate monitoring at a number of locations	<i>Drought Level 1 Status</i>	<i>Every two months (Mar - Nov)</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline monitoring sites including fish, macrophytes & phytobenthos and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
UKHab Survey	UKHab surveys to detect any changes from baseline monitoring sites and determine if pre-emptive mitigation is required	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
<b>Drought Permit Implementation Monitoring (presents any changes in italics from <i>Drought Level 1</i> monitoring)</b>				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Duration of drought permit</i>	<i>Weekly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde	<i>Duration of drought permit</i>	<i>Continuous sondes</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from baseline/drought level 1 monitoring sites	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
UKHab Survey	UKHab surveys to detect any changes from baseline monitoring sites and determine if pre-emptive mitigation is required	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
<b>Post Drought Permit Implementation Monitoring (as per <i>baseline</i> monitoring except for the changes in italics presented below)</b>				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>6 months post drought permit implementation</i>	<i>Monthly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde		<i>Continuous</i>	AWS

Table 9.4 Summary of the environmental mitigation for the River Nene (Pitsford Water) drought permit

Mitigation	Description	Potential Impact identified in EAR	Trigger to inform mitigation action	Receptor(s)
<b>During Drought Permit Implementation Monitoring</b>				
<b>Abstraction adjustment</b>	Gradual or temporary adjustments to abstraction or compensation flows to prevent stranding, displacement, or stress in sensitive aquatic species.	Reduction in water level or water quality can lead habitat quality and ecological stress and, over extended periods of time can result in changes/ loss in habitat present, mortality of species (amphibians) and reduction in wetland bird populations.	Signs of stress on receptors/ changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground. River flow, level or water quality guide thresholds and/or fish stress reporting.	Storton's Pits LNR and LWS Fish, macroinvertebrates, macrophytes, phytobenthos
		Sudden changes in flow can leave fish, or macroinvertebrates stranded in isolated pools or dry areas, especially in low flow conditions.		
		Macrophyte populations within the channel may experience stress and drying out when areas of the channel become exposed during low flow conditions.		
		Gradual adjustments help maintain connectivity within the channel.		
<b>Aeration</b>	Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration (Aerators are however considered a last resort, as they only have local effects and can disrupt fluvial sediment).	During drought conditions river flows reduce and solar radiation may increase, resulting in less mixing of the water column and increased water temperatures reducing levels of dissolved oxygen.	As above.	Fish, macroinvertebrates
<b>Screen inspection</b>	Regular inspection and clearing of screens to ensure they retain their correct working function.	During low flows, screens and barriers can become clogged with debris, impeding the passage of fish and potentially leading to stranding or stress.	Informed by walkover surveys and local knowledge/reports.	Fish
<b>Relocation of individuals</b>	Due to the predicted hydrological impacts to the reaches being classified as negligible /minor, along with the characteristics of the river channel being generally fairly deep and wide, it is unlikely that fish will need to be relocated.	There is potential for fish to become stranded in disconnected sections or marginal areas of the watercourse under lower flows or experience increased stress or mortality due to reduced water quality.	River flow, level or water quality guide thresholds and/or fish stress reporting.	Fish
	Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts. Relocation of individuals is however considered a last resort, as relocation can be particularly stressful for fish, particularly when using netting or electrofishing methodologies. There are also likely to be few receptor locations within the catchment during the drought conditions.			
	Walkover surveys should include the checking of marginal habitat for notable species individuals. If fish are stranded then individuals should be move back into deeper sections of the channel.			
<b>Habitat enhancement</b>	Habitat enhancement work (e.g. planting of wetland species) which may have beneficial effects over the long term (but note can lead to short term disturbance when receptors may already be stressed).	Loss of marginal habitats and succession events, where wetland habitats may transition to drier terrestrial habitats such as grasslands presents sub-optimal habitat to wetland birds and can lead to reductions in local, regional or international populations due to a reduction in feeding and/or breeding opportunity.	Changes to environmental features such as reduction in overall extent of habitats and natural features, change in species composition, loss of tree cover, increase in bare ground.	LNR, LWS, birds
<b>Post Drought Permit Implementation Mitigation</b>				
<b>Barrier and flow modification</b>	Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles.	Physical barriers may become more significant during low flows, preventing fish passage and movement between suitable habitats.	Informed by walkover surveys and local knowledge / reports.	Fish
<b>Restocking</b>	Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment.	Low flow events can result in population decline due to increased mortality, reduced breeding success, and loss of juveniles.	Restocking will be post -drought permit as appropriate, in dialogue / agreed with EA.	Fish
<b>Wetland compensation</b>	In areas identified where a drawdown of greater than 0.1m is predicted to occur for more than 3 months, compensation/top up of water levels should be considered to maintain wetland habitat.	When conditions of the wetland remain dry for extended periods of time, succession of wetland species to species more tolerant of dry conditions is likely to occur, resulting in changes in habitat present. By topping-up wetland water levels post drought, it will prevent this change in habitat.	Post drought wetland walkover and water levels.	LNR, LWS, birds
<b>Wetland vegetation management</b>	In areas where a drawdown of greater than 0.1m is predicted to occur for more than 3 months, vegetation management may be required to maintain the habitat within the designated sites. This may include removal of certain species, including INNS and scrub, and replanting of native wetland species.	When the conditions of the wetland remain dry for extended periods of time, excessive or non-native vegetation may grow impacting or changing the habitat.	Post drought wetland walkover and water levels.	LNR, LWS, birds

# 10. River Trent (Hall WTW)

## 10.1 Drought permit details

### 10.1.1 Current licence

Our current abstraction licence at Newton on Trent is used to abstract water from the River Trent in order to be transferred to Hall WTW and then directed into PWS.

The key licence details are summarised in [Table 10.1](#). Please note that we work closely with the Environment Agency as licence conditions can change over time.

**Table 10.1** Newton on Trent abstraction licence summary

Licence Condition	Detail
Daily	64 MI/d
Annual	7,503 MI/yr
HoF	No abstraction must take place when the river flow is equal to or less than 1700 MI/d (Hands off Flow)
HoL	No abstraction must take place when the river level is equal to or less than 2 maOD

### 10.1.2 Proposed drought permit

The drought permit would be utilised for the River Trent intake in the following ways:

- Reduction of the HoF from 1700 MI/d to 1450 MI/d
- Reduction of the daily abstraction rate when river flows are below 1700 MI/d to 40 MI/d instead of 64 MI/d

The HoL would remain in place and it has been assumed that the annual total would remain unchanged from that currently licenced.

## 10.2 ESoR

The methodology set out in **Section 3** would be followed to create the ESoR case for any application.

For the River Trent (Hall WTW) drought permit the ESoR analysis could be undertaken for the full Trent catchment (**Figure 10.2**) including the following Environment Agency hydrological areas:

- Upper Trent (TPD\_M\_H09)
- Tame (TPD\_M\_H10)
- Dove (TPD\_M\_H11)
- Derwent (Midlands) (TPD\_M\_H12)
- Soar (TPD\_M\_H13)
- Lower Trent (TPD\_M\_H14)

However, this would be reviewed and confirmed with the Environment Agency before any application.

To show an example of one of the critical ESoR metrics we have completed rainfall ranking analysis for the full Trent catchment using 2025 data. The 8-month drought metric ending in October 2025 was ranked and plotted as a cumulative distribution function (**Figure 10.1**). When the rainfall totals were ranked, the 2025 drought was identified as the tenth most severe over the full historic record (1871-2025).

More detail on the rainfall ranking metric is included in **Section 3.1.2**.

Figure 10.1 The rainfall ranking of October 2025 in the full Trent catchment for the 8-month drought metric compared against the full historic record, with 2025 highlighted in red.

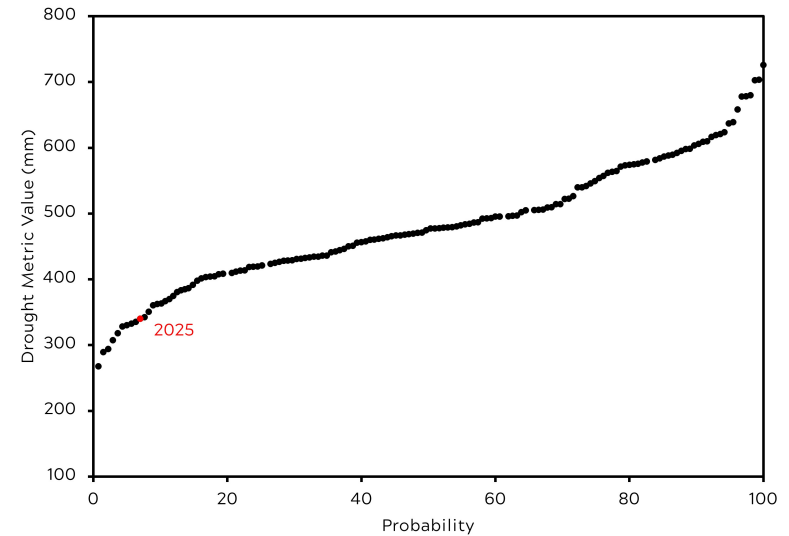
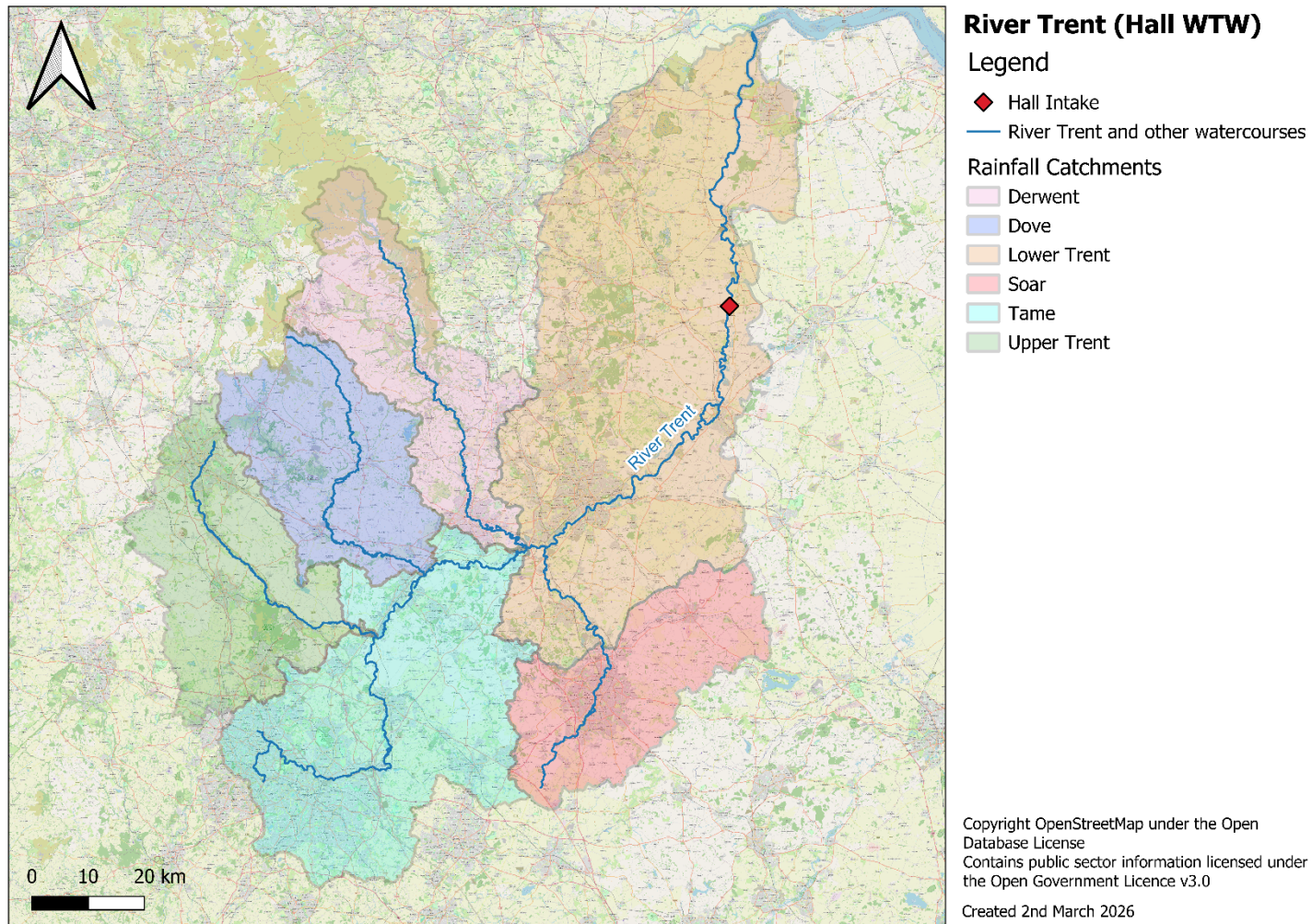


Figure 10.2 River Trent (Hall WTW) drought permit potential ESoR rainfall assessment area



## 10.3 Environmental Assessment

An environmental assessment of the impact of the drought permit was carried out for Drought Plan 2027. This assesses the potential environmental impacts of implementing the proposed drought action, following Defra and Environment Agency guidance. The findings are detailed in a separate EAR and summarised in the section below.

When the standard methodology was applied to the Trent drought permit, no flow changes were observed. This is due to the flows usually being higher than the Hands Off Flow (HOF) condition when the drought permit would be implemented. To fully assess the impact of the drought permit, we conducted an assessment to show the worst case scenario of the permit as well as showing the frequency that the River Trent flows fall below the HOF.

Since the HoF for the drought permit is 1,450 Ml/d, the maximum flow reduction that could occur within this drought permit is a reduction of 40 Ml/d when the River Trent flows are at 1,490Ml/d at the North Muskham gauging station. This would cause a flow reduction of 2.7%. With this reduction, the hydrological impacts of the permit are Negligible, as well as the geomorphological and water quality impacts. There is considered to be medium-high confidence in the assessment.

No significant adverse effects on macroinvertebrates, fish, macrophytes or phytobenthos are anticipated.

The HRA Stage I Screening assessment concluded no LSE resulting from the drought permit on Humber Estuary SAC, Humber Estuary SPA and Ramsar site. AEol was ruled out and no mitigation was required.

A summary of the predicted impacts of the proposed drought permit is provided in [Table 10.2](#).

Table 10.2 Summary of the predicted impacts for the River Trent (Hall WTW) drought permit

Physical environment feature	Permit season		Commentary
	Summer	Winter	
Hydrology	Negligible	Negligible	Flow changes from the drought permit only occur at extremely low flows with a negligible percentage flow change. This assessment was carried out with high confidence.
Geomorphology	Negligible	Negligible	With negligible reductions in flow, there will be negligible impacts on sediment and flow dynamics, connectivity and habitats within the reach. This assessment was carried out with medium confidence.
Water Quality	Negligible	Negligible	With negligible reductions in flow, the risk in water quality deterioration is negligible. This assessment was carried out with high confidence.
Impact of artificial influences	Negligible	Negligible	With negligible reductions in flow, the effect of artificial influences will be negligible. This assessment was carried out with high confidence.
Impact on other abstractors	Negligible	Negligible	With negligible reductions in flow, there would be a negligible impact on surface water abstractors. There is no hydrological connectivity between the aquifer and the river so there is no impact on groundwater abstractors. This assessment was carried out with high confidence.
Macroinvertebrates	Not assessed	Not assessed	No significant adverse effects on the communities of macroinvertebrates present in the River Trent are predicted.
Fish	Not assessed	Not assessed	No significant adverse effects on the communities of fish present in the River Trent are predicted.
Macrophytes	Not assessed	Not assessed	No significant adverse effects on the communities of macrophytes present in the River Trent are predicted.
Phytobenthos	Not assessed	Not assessed	No significant adverse effects on the communities of phytobenthos present in the River Trent are predicted.

## 10.4 Environmental Monitoring

The environmental monitoring plan (EMP), draws together the findings of the EARs for the potential drought permit sites and outlines how environmental conditions will be monitored and protected throughout a drought. We intend to take on proactive monitoring and mitigation, along-with reactive measures where required. The EMP sets out the routine baseline monitoring, the additional monitoring required during dry weather and drought conditions, the monitoring needed during the permit implementation period, and the recovery monitoring once the permit has ended. It also identifies the mitigation measures needed to avoid, reduce or compensate for any environmental impacts associated with drought permit actions. The EMP reflects the need to distinguish natural drought effects from those caused by drought management measures and takes account of the timing, availability and reliability of data as drought conditions evolve.

### Monitoring

As negligible impacts upon receptors from drought permit implementation are anticipated, no further monitoring above the baseline monitoring would be recommended at drought level 1 or during and post drought permit implementation. However, further water quality and ecological monitoring have been proposed to gather additional data and align with that of other AWS drought permits, this monitoring is set out in [Table 10.3](#).

### Mitigation

No moderate or major impacts on any environmental receptor have been identified due to implementation of the River Trent (Hall WTW) drought permit. Therefore, no mitigation is specifically identified or required. However, AWS have included additional monitoring (water quality sondes during drought permit implementation, walkover surveys and a one-off lamprey habitat surveys).

In addition, if impacts were to arise during implementation of the drought permit, the primary mitigation action would be temporary reduction or cessation of abstraction. Temporary reductions or stops in abstraction must balance protecting the river environment with maintaining public water supply. AWS can manage short-term reductions using stored supplies or alternative sources, but prolonged changes risk creating wider system shortfalls. Therefore, any temporary abstraction reduction or cessation should be implemented cautiously, increasing restrictions only if environmental concerns intensify. For further details please see the EAR.

Table 10.3 Environmental monitoring for the River Trent (Hall WTW) drought permit

Monitoring	Monitoring Surveys	Timing	Frequency	Responsibility
<b>Baseline Monitoring</b>				
River Abstraction	Continuous monitoring of river abstraction	Continuous	Continuous	AWS
River Level	Continuous river level monitoring	Continuous	Continuous	EA
River Flow	Continuous river flow monitoring	Continuous	Continuous	EA
Water Quality (spot sample)	Water quality monitoring via in-situ spot samples and laboratory analysis of samples taken in the field	Spring, summer, autumn and winter	Once per season	AWS
Fish Survey	Fish monitoring at a number of locations using standard fishing techniques (seine netting; electric fishing)	Summer	Once per season	AWS
<b>Drought Level 1</b> ( <i>presents any changes in italics from <b>baseline</b> monitoring</i> )				
Water Quality -spot sample	Monitoring of water quality sites via spot sampling	<i>Drought Level 1 Status</i>	<i>Monthly</i>	AWS
Walkover Survey	Walkovers to determine habitat quality. Riverbed substrate composition, in situ water quality, habitat connectivity, fish barrier assessments and habitat fragmentation will all be recorded during each walkover survey using River Habitat Condition form	<i>Drought Level 1 Status</i>	<i>Monthly (Apr-Sep); Every two months (Oct-Mar)</i>	AWS
<b>During Drought Permit Implementation Monitoring</b> ( <i>presents any changes in italics from <b>Drought Level 1</b> monitoring</i> )				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>Duration of drought permit</i>	<i>Weekly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde	<i>Duration of drought permit</i>	<i>Continuous sondes</i>	AWS
Walkover Survey	Walkover surveys to detect any changes from drought level 1 monitoring sites	<i>Duration of drought permit</i>	<i>Fortnightly</i>	AWS
Lamprey Habitat Survey	One-off lamprey habitat survey at sites upstream and downstream of Newton-on-Trent river abstraction point	<i>Duration of drought permit</i>	<i>One Off Survey (Next time flows go below 1700 MI/d)</i>	AWS
<b>Post Drought Permit Implementation Monitoring</b> ( <i>as per <b>baseline</b> monitoring except for the changes in italics presented below</i> )				
Water Quality (spot sample)	Monitoring of water quality sites via spot sampling	<i>6 months post drought permit implementation</i>	<i>Monthly</i>	AWS
Water Quality (continuous sonde)	Monitoring of key water quality sites via continuous sonde		<i>Continuous</i>	AWS
Walkover Survey	Provides a quantitative dataset to enable an assessment of any longer-term effects resulting from implementation of the drought permit		<i>Monthly</i>	AWS



Anglian Water Services Limited

Lancaster House

Lancaster Way

Ermine Business Park

Huntingdon

Cambridgeshire

PE29 6XU

[anglianwater.co.uk](http://anglianwater.co.uk)