

Determination Report

REPORT OF AN APPLICATION FOR A DROUGHT PERMIT UNDER SECTION 79A OF THE WATER RESOURCES ACT 1991 (AS AMENDED)

Executive Summary

The Environment Agency has decided to grant this application with amendments and or restrictions.

In determining this application, the Environment Agency has exercised its duties and powers under the Water Resources Act 1991 (as amended) and the Environment Act 1995.

1. Summary of the proposal

Yorkshire Water Services Limited (YW) is applying for drought powers under the Water Resources Act 1991 (as amended by Environment Act 1995) to reduce compensation flows from 11 impounding reservoirs and to reduce one maintained flow on the River Worth.

All sites are located in the North West Area group and are located in the following catchments; Aire Upper catchments (Embsay and Silsden), Wharf Upper (Grimwith, Carr Bottom), Aire Lower (Reva, Weecher, Eldwick, Hewenden and Doe Park) and Worth (Leeming, Leeshaw and Springhead Weir).

This report covers overall assessment of all 12 sites and there are 12 annexes accompanying the report which cover technical information specific to that site. YW initially asked us to stagger the applications by prioritising 3 of the sites – Leeming, Leeshaw and Springhead Weir and then go on to making a decision on the remaining 9 permits. Before we were able to make a decision on any permits the application went to a hearing which took place on 12/10/2022 – see section 5.1 for further details.

Licence number or relevant Act	Abstraction point name	Compensation flow reservoir(s)	Annexe number
NE/027/0014/010	Leeming Reservoir	Leeming Water	1
NE/027/0014/011	Leeshaw Reservoir	Dunkirk Beck	2
Bradford Waterworks Act 1854	Doe Park Reservoir	Denholme Beck	3
Bradford Waterworks Act 1854	Hewenden Reservoir	Hewenden Beck	4
Shipley Waterworks and Police Act 1854	Eldwick Reservoir	Eldwick Beck and River Aire	5
Yeadon Waterworks Act 1916	Reva Reservoir	Hawksworth Beck Goit and River Aire	6
Baildon Local Water Act 1890	Weecher Reservoir	Weecher Brow Beck and River Aire	7

2/27/15/149	Silsden Reservoir	Silsden Beck and River Aire	8
Skipton Water and Improvement Act 1904 and licence 2/27/15/45	Embsay Reservoir	Embsay Beck	9
NE/027/0019/011 This reservoir is part of a flow trial agreement between YWS and EA	Grimwith Reservoir	River Dibb	10
Burley-in-Wharfedale Water Act 1899	Carr Bottom Reservoir	Carr Beck and River Wharfe	11
2/27/14/058 and 2/27/17/009	Springhead Weir maintained flow (Ponden and Lower Laithe reservoirs)	River Worth	12

Table 1: Reservoirs and their corresponding Licence numbers or relevant Acts and Annexe number

A map showing the location of all the sites can be found in the corresponding Annexe attached.

A summary of the proposed changes to each compensation flow are as follows:

Leeming

Reduce the compensation release required when the Leeming reservoir level is above the control line and Leeshaw reservoir level is below the control line to 2.63 megalitres per day (MI/d) and to reduce further when the reservoirs are both below the control lines to 1.625 MI/d. There would then be a further reduction to 1.75 MI/d when the Leeming reservoir level is above the control line and Leeshaw reservoir level is below the control line or 1.083 MI/d when both the Leeshaw and Leeming reservoir levels are below the control lines, if regional reservoir stocks were below the regional Drought Control Line (DCL) for four consecutive weeks or more. Control lines are explained in more detail in section 4.2.

Leeshaw

Reduce the compensation release required when the reservoir stocks are above the control line to 2.00 MI/d, or when the reservoir stocks are below the control line to 1.375 MI/d. There would then be a further reduction to 1.33MI/d when the reservoir level is above the control line or 0.92 MI/d if below the reservoir control line, if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Doe Park

Provide a release of 1.8 MI/d at all stock levels, which could be reduced to 1.2 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Hewenden

Reduce the compensation release required to 3.15 MI/d and provide a continuous release of 3.15 MI/d, which could be reduced to 2.10 MI/d if regional reservoir

stocks were below the regional Drought Control Line for four consecutive weeks or more.

Eldwick

Reduce the compensation release required to 0.50 MI/d. The drought permit application for Eldwick Reservoir is to provide a continuous compensation release of 0.50 MI/d, which could be reduced to 0.33 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Reva

Reduce the compensation release required to 0.396 MI/d. There would be a further reduction to 0.264 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Weecher

Reduce the compensation release required to 0.215 MI/d. There would be a further reduction to 0.143 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Silsden

Reduce the Silsden Reservoir compensation requirement to 1.20MI/d. There would be a further reduction to 0.80 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more. (See section 4.5 for further site specific information regarding Silsden)

Embsay

Reduce the compensation release required to 0.593 MI/d. There would be a further reduction to 0.395 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Grimwith

Reduce the compensation release requirement to: 7.55 MI/d from 1st January to 19th April; 3.90 MI/d from 20th April to the 10th May; 1.90 MI/d from 11th May to 11th October; 3.90 MI/d from 12th to 31st October; 7.55 MI/d from 1st November to 31st December. There would be a further reduction to 5.03 MI/d MI/d from 1st January to 19th April; 2.60 MI/d from 20th April to the 10th May; 1.27 MI/d from 11th May to 11th October; 2.60 MI/d from 12th to 31st October; 5.03 MI/d from 1st November to 31st December if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

A drought permit is not currently required for the above drought action, however if the flow trial conditions are formalised a permit will be required. The action will be dependent on the time of year it is required, and the text will be amended to reflect this.

YW are also required to release a regulating flow from Grimwith Reservoir to support two abstraction points on the River Wharfe: Lobwood (under the terms of licence 2/27/19/129/R01) and Arthington (under the terms of licence 2/27/20/196/R01). YW have drought options to temporarily reduce the regulatory flow and a further option to increase the annual volume abstracted from the River Wharfe at Lobwood. Both options require a drought permit and details are provided in the River Wharfe supporting document.

Carr Bottom

Reduce the compensation release required to 0.0425 MI/d. There would be a further reduction to 0.028 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Springhead Weir maintained flow

Reduce the maintained flow at Springhead Weir when regional stocks are at or approaching the drought control line. The maintained flow would reduce to 3.00 MI/d if either Leeshaw or Leeming reservoirs are above the control lines and to 4.00 MI/d providing Leeshaw and Leeming reservoirs are below the control lines. There would then be a further reduction further to 2.00 MI/d if either Leeshaw and Leeming reservoirs are above their control lines and to 2.67 MI/d if both Leeshaw or Leeming are below the control lines, if regional reservoir stocks are below the regional Drought Control Line for four consecutive weeks or more, as defined in the Yorkshire Water Drought Plan.

1.1 Departures from application forms

On 16/09/2022 YW were asked for the following and supplied the requested information on 16/09/2022 and 20/09/2022:

- Copies of the letters with notice attached sent to Local authorities. of the Supporting information document and if these sent recorded delivery.
- Proofs of the adverts placed in the local publications.
- Further information relevant to impacts on water users and the environment - impacts on protected rights, amenity, recreation and other landowners.
- An overall conclusion to the Environmental Assessment Report (EAR).

Further information was requested on 21/09/2022 in relation to the following, which was supplied by YW on 22/09/2022:

- The Water efficiency campaign
- Leakage reduction activity
- Contact with Inset Water companies (NAVs)
- Contact with Internal Drainage Boards

Following receipt of all information above we were able to validate the application with effect from 15/09/2022.

The National Grid References initially supplied for the compensation flow receiving watercourses by YW were inaccurate. We queried the NGR's and YW clarified them on 11/10/2022. The changes can be seen below.

Reservoir	Discharge NGRs originally supplied by YW in draft permits	Updated NGRs supplied by YW
Leeming Reservoir	SE 03698 34382	SE 03698 34382
Leeshaw Reservoir	SE 01654 35157	SE 01654 35157
Doe Park Reservoir	SE 07779 34112	SE 07685 34191
Heweneden Reservoir	SE 07400 35600	SE 07456 35732
Eldwick Reservoir	SE 12200 41300	SE 12227 41189
Reva Reservoir	SE 15100 42600	SE 15267 42546

Weecher Reservoir	SE 13600 42100	SE 13819 41994
Silsden Reservoir	SE 04600 47600	SE 04449 47482
Embsay Reservoir	SD 99907 54562	SE 00082 54459
Grimwith Reservoir	SE 05770 63936	SE 05770 63936
Carr Bottom Reservoir	SE 1465 4460	SE 14732 44559
Springhead Weir	SE 02608 37753	SE 02608 37753

1.2 Details of proposal

Administrative details	
Drought permit numbers	Leeming - DP2022-NE0270014010 Leeshaw - DP2022-NE0270014011 Doe Park - DP2022-NE0270016027 Hewenden - DP2022-NE0270016028 Eldwick - DP2022-NE0270016029 Reva - DP2022-NE0270016030 Weecher - DP2022-NE0270016031 Silsden - DP2022-22715149 Embsay - DP2022-22715045 Grimwith - DP2022-NE0270019011 Carr Bottom - DP2022-NE0270016032 Springhead Weir - DP2022-22714058
Existing licence number	See Table 1
Application reference number	N/A
Applicant name and address	Yorkshire Water Services Limited Western House Halifax Road Bradford West Yorkshire BD6 2SZ
Application contact details	Mr Granville Davies 07790 617428 Granville.Davies@yorkshirewater.co.uk
Catchments	<ul style="list-style-type: none"> • Aire Upper C027009 (Embsay and Silsden) • Wharf Upper C027016B (Grimwith and Carr Bottom), • Aire Lower C027011A (Reva, Weecher, Eldwick, Hewenden and Doe Park) • Worth C027010 (Leeming, Leeshaw and Springhead Weir)
Agency Area	Yorkshire
Application received as complete date	15/09/2022
Determination date	30/09/2022 – for Leeming, Leeshaw and Springhead 06/10/2022 – for all other permits
Date of hearing	12/10/2022

Date Inspector's report received	18/10/2022
Revised determination date	24/10/2022
Applicant Entitled to apply	Yes - Only public water supply companies are able to apply for drought permits. Therefore, the standard declaration is not required.
Supplementary reports	See drought permit checklist below.

There are further details about the individual drought permit proposals in the annexes referenced in Table 1.

The applicant has submitted all the required information to enable us to determine the application.

Validation checklist:

Information	Check
Draft drought permit, to include description of proposals and proposed schedule of conditions	✓
Statement of reasons for the application, to include: <ul style="list-style-type: none"> Monthly rainfall figures for relevant period, with LTA figures; Effect of shortage of rain on relevant sources; Population impacted by deficiency of supply; Daily water demand by population and how it is supplied by source(s); Measures taken to reduce demand and their effects; Operation of any relevant water resource management agreements; Any proposed changes to operational policies or practices to alleviate future drought problems; Other steps to conserve resources; Other options considered and reasons for rejection; Consequences of the drought permit application being rejected. 	✓
Location map, to provide position of relevant sources and watercourses/wetlands	✓
Consent of navigation authority, if not required application must state this	Canal and River Trust (CRT) confirmed on 15/09/2022 that they have no concerns
Notice(s) on local authorities, copy	✓
Notice(s) on specified protected bodies, if permit relates to suspending or modifying any statutory obligations, copy, if applicable	✓
Notice(s) on other water undertakers, copy, if applicable	✓

Notice(s) on navigation authorities, copy, if applicable	✓
Notice(s) on internal drainage boards, copy, if applicable	N/A
Advertisement in local newspaper, actual page if possible	✓
Advertisement in London Gazette, copy	✓
Description of public inspection arrangements, to include where and when this happened	✓
Existing abstraction or impounding licence, copy	✓
Existing statutory instrument or local act of parliament governing the abstraction restrictions	✓
Water shortage strategy, for dealing with water shortage throughout the WR zone, to include information on strategic measures and timings, publicity and liaison with other authorities and water users	✓
Environmental report	✓
Water quality information, if proposals use water from a new source	N/A
Comments received from any consultees, if applicable	CRT – see above
Objections received, and any agreements made with objectors	✓

2. Case history

Date	Event
22/08/2022	Pre-application submission made
14/09/2022	Formal application submitted
15/09/2022	YW advertised Drought Permit proposal
15/09/2022	Application formally accepted as valid
23/10/2022	Representation received
23/09/2022	Representation window closed
30/09/2022	Confirmed by Planning Inspectorate that the proposal would be going to a hearing

Some of the drought permits applied for are to amend an act of parliament rather than a current abstraction or impoundment licence. There is ongoing work between the EA and YW to formalise these acts into a licence.

YW Supply System

The Yorkshire supply region is divided into two water resource zones, shown in Figure 1 below. These are the Grid Surface Water Zone (Grid SWZ) and the East Surface Water Zone (East SWZ). The majority of the YW region is within the Grid SWZ, with 1% of customers in the East SWZ. The Grid SWZ has an integrated supply network dominated by the operation of lowland rivers and Pennine reservoirs. The East SWZ, is a much smaller zone covering Whitby and the surrounding area. No drought permits are being applied for in the East SWZ. The Grid SWZ includes five interconnected operating areas. These surface water areas are referred to as North, North West, South and South West. The East area, which is not included in reservoir regional stock levels, is predominantly groundwater.



Figure 1: YW water supply resource zones

YW operate the Grid SWZ to balance river, groundwater and reservoir resources across all five areas. Reservoirs are managed by balancing the four surface water operating areas rather than drawing down individual reservoir groups in each area. An overview of the integrated network in the Grid SWZ is shown in Figure 2 below.



Figure 2: Grid SWZ integrated network

The map displays the Yorkshire Water network in the Bingley area. The River Aire is shown in red, flowing from the north towards the south. The River Worth is shown in blue, flowing from the north towards the south. The Moorhouse Beck is shown in green, flowing from the north towards the south. The Bridgehouse Beck is shown in orange, flowing from the north towards the south. The Leeming Water is shown in purple, flowing from the north towards the south. The Springhead Weir is marked with a black dot. The Ponden Lower Laithe is marked with a blue dot. The map also shows the location of the Springhead Weir and the Ponden Lower Laithe. The map includes a legend for Yorkshire Water, identifying features like the YW Impounding Reservoir, Sladen Beck, River Aire, River Worth, Moorhouse Beck, Bridgehouse Beck, Leeming Water, Flow Gauging Station, Weir, Hewenden Reach, and Denholme Beck. Key locations marked include Bingley, Shipley, and Calverley. The map also shows the location of the Springhead Weir and the Ponden Lower Laithe.

Contains Ordnance Survey data © Crown copyright and database right 2019

The map displays the Yorkshire Water network in the Leeds area. The River Aire is shown in red, flowing from the south towards the city center. The Elbow Reach is shown in blue, flowing from the north towards the city center. The Weirer Reach is shown in green, flowing from the north towards the city center. The Rea Reach is shown in orange, flowing from the north towards the city center. The map includes a legend for 'YW Impounding Reservoir' and 'YorkshireWater'. The map also shows various locations such as Burley Woodhead, Menston, Elwick, Baidon, Tong Park, Esholt, Westfield, Henshaw, Yeadon, Rawdon, Lane Ends, West End, and Horsforth. The map is copyrighted by Yorkshire Water.

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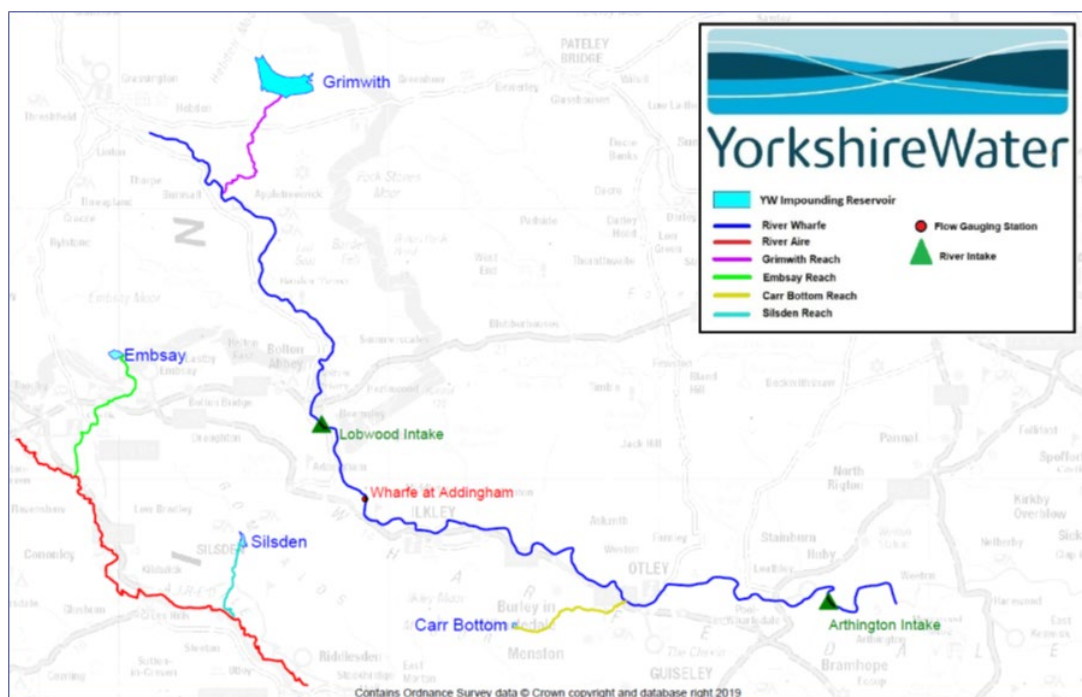


Figure 5: Map of Embsay, Silsden, Carr Bottom and Grimwith reservoir permit sites in the North West Area

The reservoirs in the North West Area provide water to water treatment works at Chellow Heights, Graincliffe, Oldfield, Sladen Valley and Embsay, and supply Bradford, Keighley, Skipton, and surrounding areas. The reservoirs in this area are operated conjunctively with the River Wharfe abstraction at Lobwood, which also supplies Chellow Heights Water treatment works via Chelker Reservoir. This area can be supported from YW's Central Area (Eccup to Graincliffe transfer), from either the Washburn reservoirs or the River Ouse abstraction at Moor Monkton. Figure 6 shows a high level schematic of the north west area.

Figure 7 and Figure 8 show the Water Resource Allocation Plan (WRAP) schematic for the North West Area. As well as the supply reservoir groups, it shows the transmission network, and the demand zones supplied by these reservoirs. The system is highly interconnected, with most zones being able to be supported from sources other than their primary source. YW operate the system by considering the demands in the area as a whole and adjusting water treatment works flows and source use to balance stocks as much as possible.

YW run their WRAP model each week to optimise supplies and balance stocks. They also use their WRAPsim simulation model to plan for medium term scenarios (using the 1995/96 drought as the worst historic drought but looking at all historic years to consider a range of scenarios).

YW have continued to run the WRAPsim model weekly during the spring and summer of 2022, and used it to identify where to protect stocks, and when to reduce flows to do so. By doing this they have tried to balance stocks both within areas and across the region, although asset availability and differences in rainfall has meant this process and these decisions are constantly reviewed.

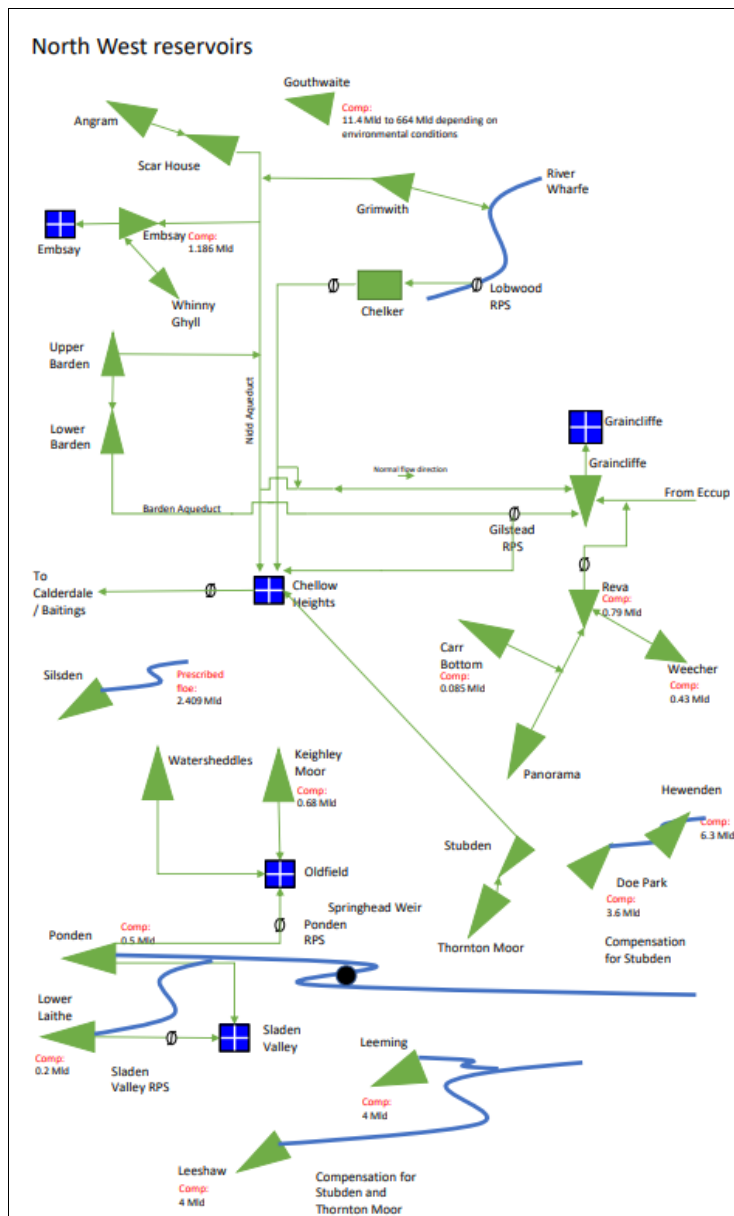


Figure 6: North West Area schematic

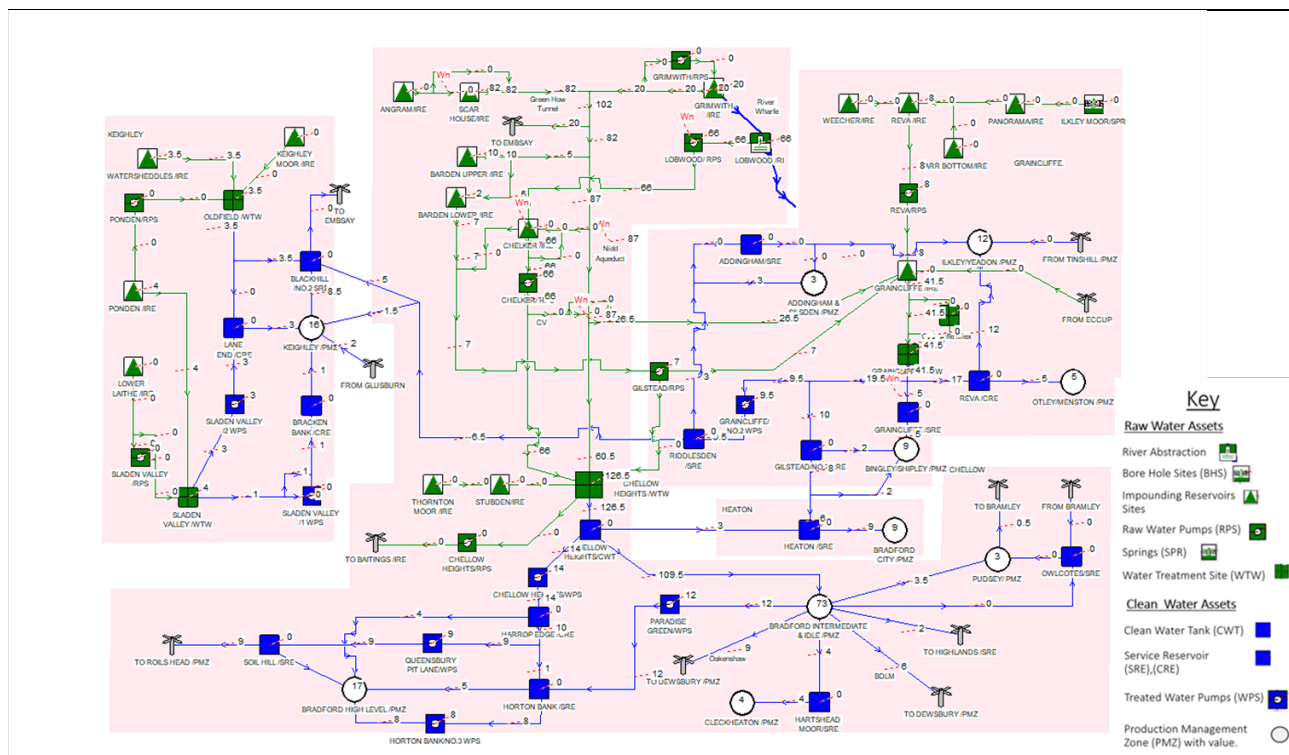


Figure 7: WRAP Schematic of the central North West Area

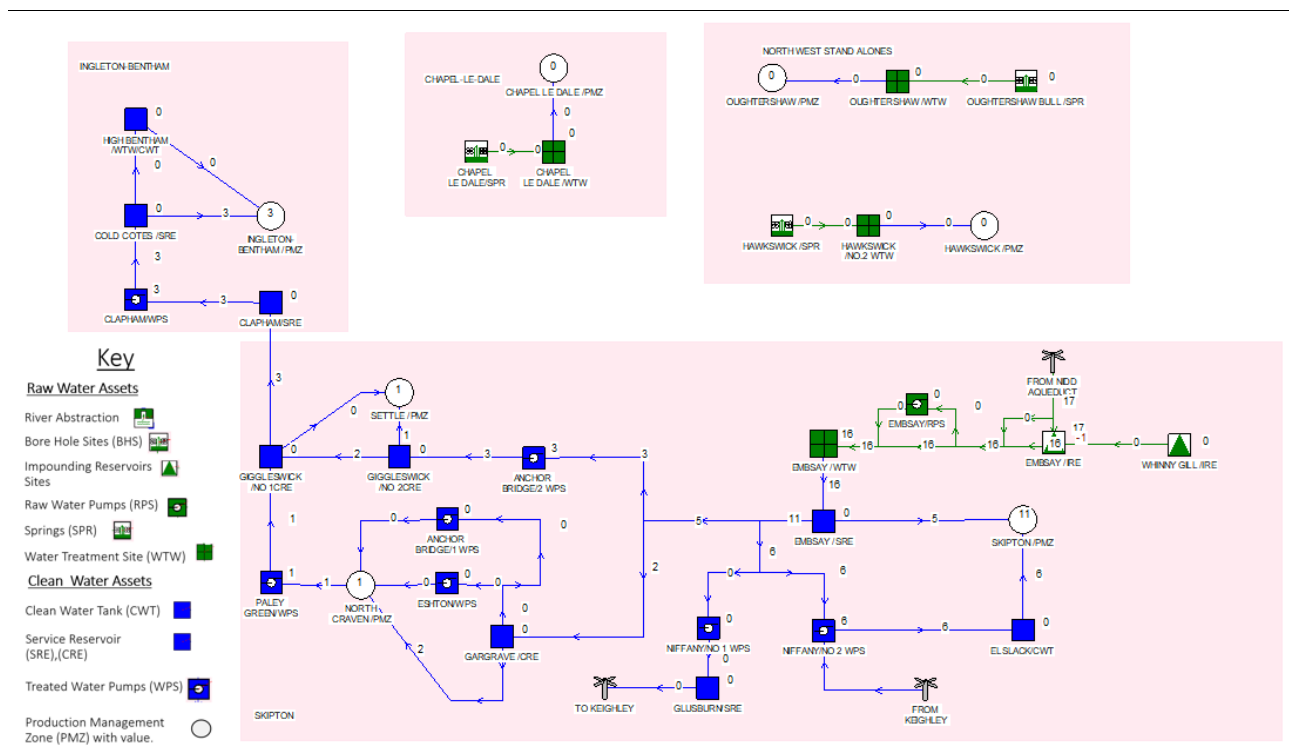


Figure 8: WRAP Schematic of the rural North West Area

Events preceding application

This drought permit application has been deemed necessary due to the reservoir levels across the Yorkshire North West Area currently being lower than normal due to below average rainfall during 2022, as well as periods of high summer demand, particularly in June and July, during prolonged hot dry weather. YW have explained that during most years there is sufficient rainfall for their reservoirs to refill over winter which ensures they have sufficient stocks to meet customer demand and maintain compensation releases over the autumn. However, if dry weather continues there is a risk the reservoirs will not fill over winter. This represents a threat to supplies in 2023 if this is the case.

Further details of the conditions leading to the drought, the water resource situation, reservoir stocks and YW's actions to date are provided in section 4.

Previous drought permit applications

The following events have been recorded in YW's '*Drought Triggers and Worked Examples of drought scenarios*' Yorkshire Water 29/04/2022 report available at [Drought Plan 2022 \(yorkshirewater.com\)](https://www.yorkshirewater.com/drought-plan-2022).

- **1929:** A significant drought that had major impacts on local supply systems but minor impacts on groundwater and national water resources.
- **1933/34:** A significant two-season drought event that affected the North of England.
- **1975/76:** A two-season drought event that particularly affected the north including the Pennines. YW's concept of 'grid management' followed on from the events of this drought.
- **1995/96:** A two-season drought event that affected the north of England. YW made applications for drought permits and orders and carried out extensive monitoring to support 26 drought order applications. It highlighted YW's reliability on the surface water reservoirs in the Pennines and led to investment to increase the resilience of their system by laying a major raw water transmission pipeline.
- **2003 and 2006:** - drought events occurred however these were not as severe as previous ones. YW did not apply for any drought provisions in these years.
- **2010 and 2011:** - Yorkshire experienced uncharacteristically dry springs, leading to earlier than usual reservoir drawdowns. In both years, the spring was preceded by an unusually cold winter. At the end of 2011, YW recalculated their control lines using the latest data. They changed the way they dealt with the issue of supporting compensation reservoirs from supply reservoirs when deriving control lines, making them more conservative. YW did not apply for any drought provisions.
- **2018:** - Exceptionally dry weather led to a prolonged period of high demand across YW region and in reaction to falling reservoir stocks they implemented parts of their Drought Plan and the Environment Agency classified the region as "in drought" from November 2018 to February 2019. YW started the process of applying to the Environment Agency for drought permits for the first time since 1996. Significant rainfall occurred in late 2018 which meant reservoirs recovered and two of the drought permit applications progressed. These were to modify abstraction licences on the River Wharfe and River Derwent to increase total abstraction from 1 April 2018 to 31 March 2019: both permits were granted. As the winter demand was not exceptional, YW did not implement the permits.

- **2020:-** Drought permits were prepared due to a fall in reservoir stocks as a result of high demand during spring and summer as a result of hot dry weather and Covid-19 lockdown behaviours. Rainfall in June and July meant reservoir stocks increased and the drought process was stopped.

Further details on each of these events and how YW model and plan for droughts can be found in YW's 'Drought Triggers and Worked Examples of drought scenarios' Yorkshire Water 29/04/2022 report available at [Drought Plan 2022 \(yorkshirewater.com\)](https://www.yorkshirewater.com).

3. Water Resources (Environmental Impact Assessment Regulations) 2003 as amended by the Water Resources (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2006.

The applicant has consulted the Environment Agency and it has confirmed that the proposal is not a "relevant project", as defined by the Regulations. No environmental statement is therefore required by the Environment Agency to be submitted in respect of this application and project proposal.

4. Justification of requirements and water efficiency

The Agency's ability to grant a drought permit is set out in section 79A of the Water Resources Act 1991. In order for the Agency to grant a drought permit, we need to be satisfied that a serious deficiency of supplies of water in an area exists or is threatened and that the reason for the deficiency is an exceptional shortage of rain.

The information in the following sections has been taken from the Statement of Need report provided by YW in support of this application followed our conclusions in section 4.13.

4.1 Has there been an exceptional shortage of rain in the resource zone?

An exceptional shortage of rainfall (ESoR) assessment has been produced by Yorkshire Water (YW) as evidence of the need for a drought permit for the North West (NW) Area reservoirs. We have summarised in this report the ESoR assessment completed by the water company and included details of the Environment Agency's review, including any additional analysis or checks undertaken by the Environment Agency. Reference should be made to the water company's assessment, 'YW Exceptional shortage of rain evidence_13-09-2022' and 'YW NW Area Drought Permits Supporting Information' saved on our Document Management System.

The legal criteria that must be met in granting a drought permit or order *include: "If the Secretary of State / Agency is satisfied that, by reason of an exceptional shortage of rain, a serious deficiency of supplies of water in any area exists or is threatened..."*

There is no prescriptive approach or set definition for assessing an ESoR. This review makes reference to guidance within the Environment Agency's supplementary guidance on drought permits and drought orders. This is available internally on our Document Management System and externally it will be shared with water companies by request from the [Water-Company-Plan](#) mailbox.

Rainfall data

The 'YW Exceptional shortage of rain evidence_13-09-2022' report has analysed the HadUK-Grid monthly rainfall from January 1891 to August 2022. Covering the Yorkshire region, the major Yorkshire river catchments, and individual catchments for the Nidd group, Grimwith, Ponden and Lower Laithe, and Leeming and Leeshaw reservoirs specific to the NW Area.

Period of analysis

Rather than concentrating on below average rainfall since March 2022, YW's written description begins in autumn 2021. The rainfall in February 2022 ensured reservoir stocks were either full or near full, so analysis of conditions prior to March 2022 has little relevance to the current threat to supplies. Analysis for rainfall ranking and rainfall probability bands cover the twelve-month periods ending August 2022, and the ten-month period for percentage of LTA have been provided in graphical form. However, extending the analysis to cover September 2021 to August 2022 does not alter the result. YW have provided the analysis for the six-month period March to August 2022, and we will focus on this period for evidence of ESoR.

Geographical extent of analysis

Analysis has been provided for the Yorkshire region, the main river catchments of the Wharfe and Aire, and reservoir sub-catchments for the Nidd group, Grimwith, Ponden and Lower Laithe, and Leeming and Leeshaw. Using these catchments provide a broad enough overview of the NW Area reservoirs.

Technical rainfall analysis methods

The assessment completed by YW uses the following technical analysis methods:

- Rainfall percentage of Long Term Average
- Rainfall ranking
- Rainfall probability bands
- Standardised Precipitation Index (SPI) calculations and SPI maps from CEH Water Resources Portal
- Soil Moisture Deficit maps over time
- River flow plus maps and graphs from CEH Water Resources Portal
- Reservoir Stocks
- Weather forecast

Rainfall percentage of Long Term Average

Section 5, page 6, of the ESoR report analyses the percentage of LTA between October 2021 to August 2022 only for the Yorkshire region. In this section YW state "In both June and July, much of the rainfall occurred in the last 10 days of the month." June was only wetter during the last week of the month while July was wet for the last ten days of the month. However, this inaccuracy in description has no material bearing on the case for ESoR.

Figure 2 on page 6 (shown as Figure 9 below) of the ESoR report provides the regional monthly rainfall totals as a percentage of the LTA. Although YW have

calculated the regional rainfall themselves rather than using the HadUK-Grid data for Yorkshire, without justification why this is a better method, the graph looks sensible and essentially matches the HadUK-Grid data. Below LTA monthly rainfall occurred between March to August 2022 and are showing virtually the same figure when compared to that calculated by the EA. Figure 9 shows the YW analysis calculated for Yorkshire while Figure 10 shows the EA analysis on the HadUK-Grid data for Yorkshire.

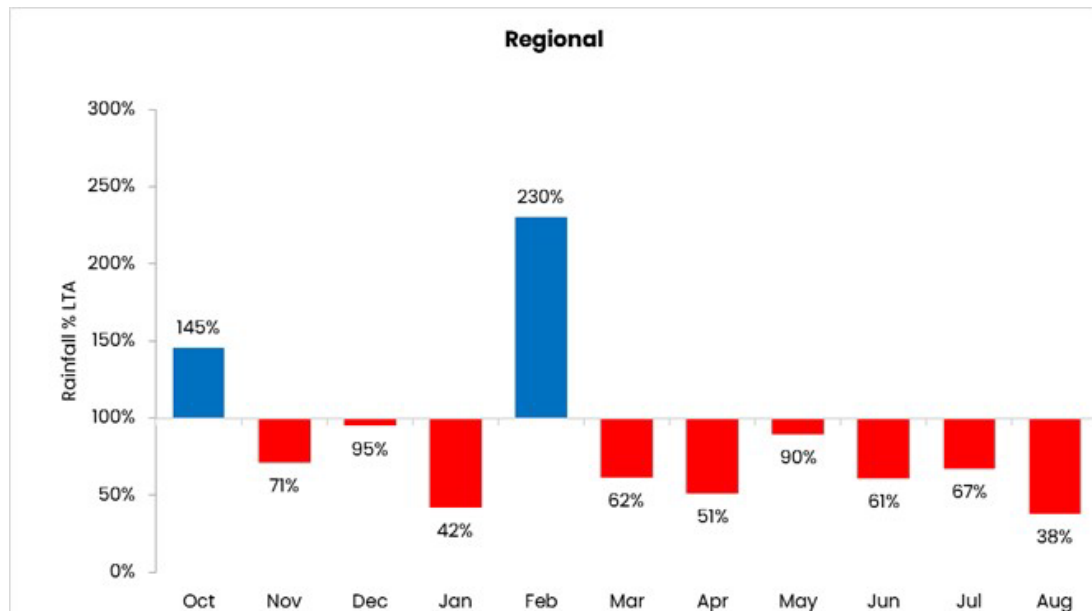


Figure 9: YW calculated monthly rainfall as % of LTA for Yorkshire. October 2021 to August 2022.

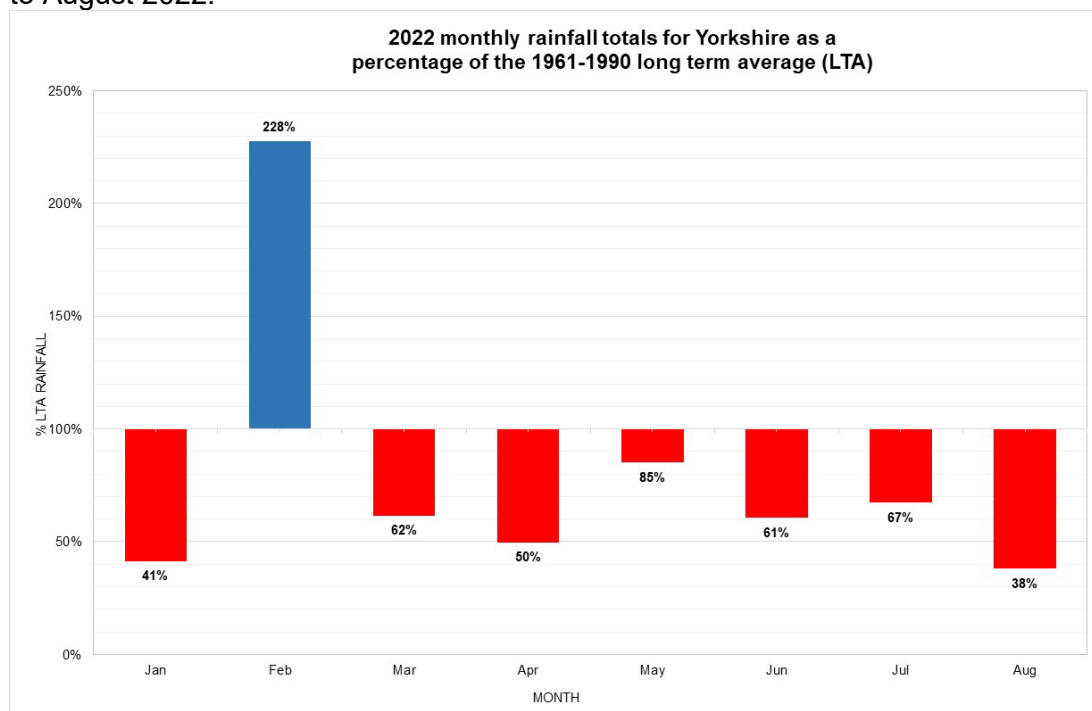


Figure 10: EA analysis on the HadUK-Grid monthly rainfall as % of LTA for Yorkshire. January to August 2022.

Appendix 1 in YW's ESoR document provides the graphs for monthly rainfall totals as a percentage of the LTA between October 2021 to August 2022 for Yorkshire, the River Aire and River Wharfe catchments, plus the smaller reservoir catchments for the Nidd group, Grimwith, Ponden and Lower Laithe, and Leeming and Leeshaw

specific to the NW Area. These look correct. There is also the table for percentage of the LTA for the six-month period ending August 2022. This matches analysis carried out by the EA which is summarised in Table 2.

Catchment	Yorkshire Water analysis six-month rainfall ending Aug 2022 as % LTA	Environment Agency analysis six-month rainfall ending Aug 2022 as % LTA
Aire	58%	58%
Wharfe	63%	63%
Nidd group	65%	65%
Grimwith	63%	63%
Ponden-Lower Laithe	54%	54%
Leeming-Leeshaw	55%	55%

Table 2: Comparison of YW's and EA's six-month rainfall as % of the LTA for the NW area drought permit.

We are satisfied with YW's assessment of the monthly rainfall as a percentage of the LTA.

Rainfall ranking and rainfall probability bands

Section 6, page 7, of the ESoR report analyses the ranking of monthly rainfall and its probability using the Cunnane method since 1891 for the Yorkshire region only. The results show the four-months ending July 2022, and five- and six-months ending August 2022 are the fifth, fourth, and third driest periods respectively and are classed as exceptionally low. These are correct and demonstrate the low cumulative rainfall totals for the Yorkshire region since March 2022.

Appendix 2a in YW's ESoR document provides the ranking and Cunnane analysis for up to twelve months ending August 2022. And includes the River Aire and River Wharfe catchments, plus the smaller reservoir catchments for the Nidd group, Grimwith, Ponden and Lower Laithe, and Leeming and Leeshaw specific to the NW Area. The six-month cumulative rainfall ending August 2022 are all classed as exceptionally low using the Cunnane method. Ranking sixth driest for Grimwith; fifth driest for the Nidd group; fourth driest for the River Wharfe; and second driest for the River Aire, Ponden and Lower Laithe, and Leeming and Leeshaw.

Analysis already carried out by the EA agrees with YW's results. Exceptionally low rainfall has occurred over the six-month period ending August 2022. Ranking sixth driest for Grimwith; fifth driest for the Nidd group; fourth driest for the River Wharfe; and second driest for the River Aire, Ponden and Lower Laithe, and Leeming and Leeshaw. These were calculated using the EA's rainfall ranking macro and using the Cunnane plotting position methodology. We are satisfied with YW's assessment of the rainfall ranking and probability bands.

Appendix 2b and 2c are supplementary analysis, looking at the driest year on record and the last year that was drier than 2022 over the twelve-month period ending August 2022. The EA has not already completed this analysis so cannot confirm the results. But given they are supplementary analysis and not vital to the proof of ESoR, no additional analysis work is required.

There is an error in Appendix 2c. The caveat states "Cells are highlighted if the last year drier than this year was before 1995." But there are many cells highlighted in red that are showing as 1995 and 1996. This is not critical to the case for ESoR.

Standardised Precipitation Index (SPI) calculations

Section 8, page 10, of the ESoR report analyses the SPI. The macro tool used by the EA to calculate the SPI was provided to YW, but it did not run on their systems. Therefore, YW developed their own calculations.

YW have provided the one-, three-, and six-month results for Yorkshire, the major Yorkshire river catchments, plus all the smaller sub-catchments for the drought permit areas. The result for their six-month SPI is classed as extremely dry for the River Wharfe, the River Aire, Ponden and Lower Laithe, and Leeming and Leeshaw. The Nidd group and Grimwith reservoir catchments are classed as severely dry.

The EA has checked YW's SPI results for six-months ending August 2022, except for the Yorkshire region, to ensure their technique used to calculate SPI matches. Both sets of results show the same result and are summarised in Table 3.

Catchment	Yorkshire Water six-month SPI ending August 2022	Environment Agency six-month SPI ending August 2022	Category
Aire	-2.45	-2.446	Exceptionally low
Wharfe	-2.2	-2.181	Exceptionally low
Nidd group	-1.81	-1.805	Severely dry
Grimwith	-1.89	-1.89	Severely dry
Ponden-Lower Laithe	-2.76	-2.764	Exceptionally low
Leeming-Leeshaw	-2.59	-2.591	Exceptionally low

Table 3: Comparison of YW's and EA's six-month SPI results for the NW area drought permit.

Appendix 3 provides the SPI maps from the UK Centre for Ecology & Hydrology (CEH) Water Resources Portal for accumulation period one-, three-, and six-months. This is additional SPI evidence along with YW's calculations. The six-month accumulation period ending August 2022 graph highlights extremely dry for the Wharfe and Aire catchments.

We are satisfied with YW's assessment of the SPI over the six-month period ending August 2022.

Soil Moisture Deficit maps over time

Section 7, page 8, of the ESoR report provides the soil moisture deficit maps (SMD) from the Met Office Rainfall and Evaporation Calculation System (MORECS) for the Yorkshire region. And show the drying of soils over a six-month period. This is supporting evidence for ESoR.

The EA also receives the MORECS data but has assigned different colour schemes and bandings to the data. The EA has no concern on how YW have shown the data as it demonstrates how widespread dry soils became since April 2022.

River flow plus maps and graphs from CEH Water Resources Portal

Section 9, page 11, of the ESoR report provides YW's flow data for the River Derwent, Hull, Ouse, Ure, and Wharfe. The EA agree that the River Wharfe graph,

specific to the NW Area, demonstrates declining baseflow in the river since March 2022 except during short-lived rises in flow in response to any rainfall. The EA has been monitoring the daily mean flows at a number of locations throughout Yorkshire, including Tadcaster on the River Wharfe. Figure 11 provides the daily mean flow covering ten months ending August 2022 at Tadcaster along with the flow banding expected for the time of year i.e. normal flow, below normal flow, etc. Periods of below normal flows started to occur in late March, with below normal or lower flows dominating the majority of August 2022.

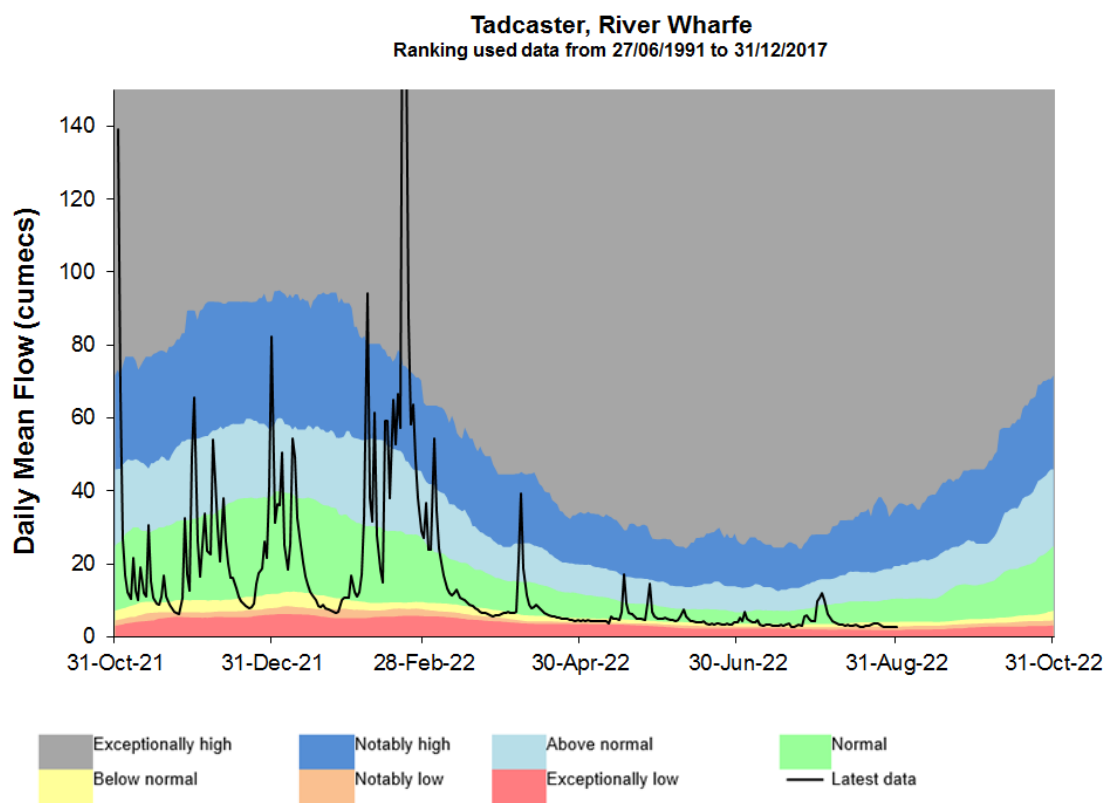


Figure 11: Daily mean flow at Tadcaster (black Line) against flow banding for the last ten months ending August 2022.

Appendix 4, page 57, of the ESoR report provides graphs from the CEH Water Resources portal for the Ure at Kilgram Bridge, Wharfe at Addingham, Derwent at Buttercrambe, and Ouse at Skelton. These are supporting evidence for ESoR.

Weather forecast

At the time of YW writing the ESoR report, section 11, page 17, provides a forecast for September. This is additional information, and we would not expect there to be anything further. What is written in the ESoR is reasonable.

Summary

A summary of the ESoR analysis is provided in section 3.3, page 28, of the 'YW NW Area Drought Permits Supporting Information'. It states:

- 1 month SPIs are moderately dry or severely dry
- 3 month SPIs moderately, severely or extremely dry
- 6 month SPIs are severely or extremely dry

- The 6 months March-August is ranked 2-6 for relevant catchments, with between 54% and 65% of the LTA over this period. These are all classified as exceptionally low according to the Cunnane classification.
- Ponden and Lower Laithe (54%) and Leeming and Leeshaw (55%) have the lowest LTAs, and are both the 2nd driest 6 months ending in August in the period of record, with only 1995 being drier.
- The SMD analyses show high SMDs for most areas of Yorkshire from early July, with SMDs especially high in the east of the county, and only remaining below 100 in the north and west areas.

YW have included the analysis essential to considering ESoR, which matches the EA's analysis, and provided enough additional evidence. And have included enough catchment analysis to provide a broad overview of the NW Area reservoirs.

Based on the above, rainfall over the assessed period is considered to constitute an ESoR.

4.2 Potential drought permit sites must be identified in water company drought plans.

The Yorkshire Water Drought Plan was published on 29 April 2022. Yorkshire Water monitor their reservoir stocks comparing them to control lines calculated using historical reservoir inflow sequences from 1920 onwards. They operate against a marginal storage line (30 days' supply), a Drought Control Line (DCL) and Normal Control Line (NCL). Further detail on how these are calculated is available in Yorkshire Water's [Drought Triggers document](#) published in April 2022.

Yorkshire Water determine the need for drought management action by the DCL for groups of reservoirs in their supply region (North West, Central/North, South West and South).

Yorkshire Water's drought plan incorporates lessons and measures identified during the 2018 drought. It takes a staged approach to drought response, with demand and supply measures preceding communications, temporary use bans and then the initial (compensation release conservation) round of drought permit applications. The water company has followed its drought plan in these respects.

For the North West area the following triggers and actions apply in the drought plan:-

Reservoir No.	Triggers	Actions in Drought Plan	Dates Control Lines crossed and action taken by YW in 2022
North West Area Reservoir 1	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.	<u>Stocks crossed NCL:</u> Reduce reservoir output	<u>Regional reservoir stocks crossed the NCL on 28th March 2022.</u> At this point YW reduced use of reservoir supplies in the Grid SWZ and increased use of river and groundwater abstractions to meet demand. This included increased abstraction from the River Derwent at
North West Area Reservoir 2	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.	Maximise all river abstractions <u>Stocks 10 weeks from crossing DCL:</u>	Loftsome Bridge to reduce abstraction from reservoirs across the region. YW
North West Area Reservoir 3	Risk of shortage of supply established:	Increase active leakage control.	

	Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.	Prepare for TUBs	operated the Worth Valley reservoirs at or below yield since they dropped below the group NCL in the week commencing 18th April.
North West Area Reservoir 4	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.	Prepare for Drought Permits Prepare environmental assessments and contact NE on any protected sites.	<u>Stocks were 10 weeks from DCL on 25th July 2022.</u>
North West Area Reservoir 5	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.	<u>Stocks 8 weeks from DCL:</u> Advertise on TUBs.	At this point YW prepared for TUBs, drought permit templates, increased leakage control and imported water from the Keighley area. YW also re-zoned the following:-
North West Area Reservoir 6	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.	Continue preparation for permits. <u>Stocks 4 weeks from DCL:</u>	0.5MI/d import from Chellow WTW to Keighley. 1.5MI/d import from Riddlesden into Bracken Bank distribution from Graincliffe WTW 2.0MI/d additional from Riddlesden to Blackhill SRE from Graincliffe WTW & Embsay WTW (1.0MI/d to 1.5MI/d of this links into Blackhill SRE). Leakage control was increased and leakage in locality reduced by 30%.
North West Area Reservoir 7	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.	Apply for drought permits.	<u>Stocks were 8 weeks from DCL on 12th August.</u>
North West Area Reservoir 8	Risk of shortage of supply established: Individual reservoir stocks – NCL crossed and will reach DCL within 1 to 2 weeks. Individual reservoir stocks have crossed DCL and remain below for 4 weeks.		YW ramped up their drought permit application work and TUBs were in place on 26 th August. Following the implementation of TUBs on 26 th August 2022 YW saw an estimated 2% reduction in Distribution Input (DI) resulting in a demand reduction of 88MI/d on the network.
North West Area Reservoir 9	Risk of shortage of supply established: Individual reservoir stocks – NCL crossed and will reach DCL within 1 to 2 weeks. Individual reservoir stocks have crossed DCL and remain below for 4 weeks.		<u>12th September 2022:</u> YW's Water Situation Report shows that regional reservoir stocks are at approximately 29% capacity. The DCL is reached at 26% capacity.
North West Area Reservoir 10	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.		Drought permit applications submitted on 14 th September 2022.
North West Area Reservoir 11	Risk of shortage of supply established: Regional Stocks – NCL crossed and will reach DCL within 1 to 2 weeks.		

North West Area Reservoir 12	Individual reservoir stocks – NCL crossed and will reach DCL within 1 to 2 weeks.		
	Individual reservoir stocks have crossed DCL and remain below for 4 weeks.		

Table 4: North West Area drought triggers and actions

4.3 Does a serious deficiency of supplies or water exist (or is threatened) in the resource zone?

Section 10, page 14, of the ESoR report provides YW's data for the regional reservoir group, North West group, South West group, North group, South group, and East group for the last 12 years and selected other dry years of 2003, 1995 and 1996 (the latter being the worst historic drought YW use in planning). These are supporting evidence for a deficiency of supply, demonstrating declining stocks since March 2022. The 'North West group' graph below (Figure 12) is applicable to the NW area drought permits. The EA agree the graph demonstrates declining stocks since March 2022.

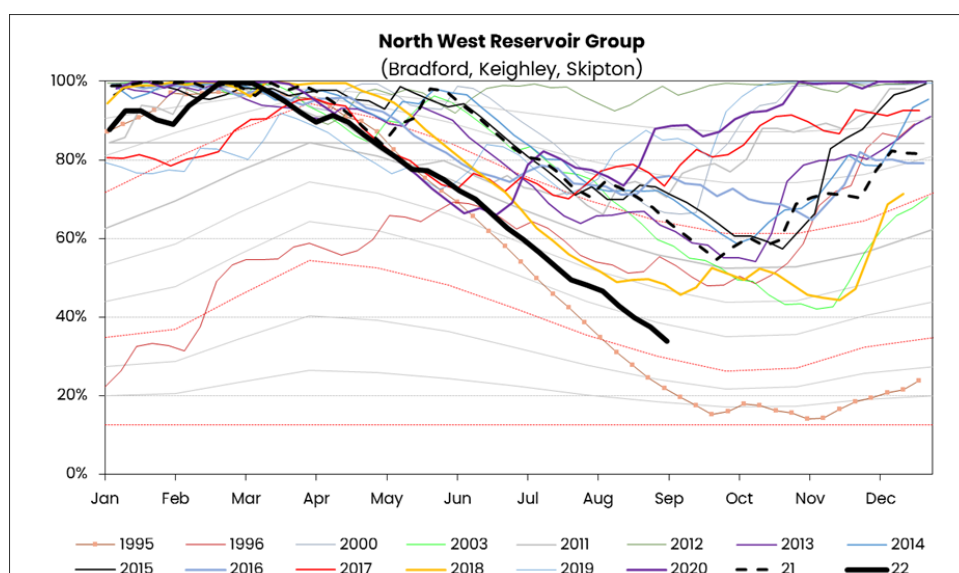


Figure 12: YW North West Reservoir Group Data

As well as the exceptional shortage of rain, the water stocks situation has been exacerbated by exceptionally high temperatures, which resulted in very high demand for water during summer 2022. There are specific hot-spots (e.g. Worth valley), where stock levels are declining more rapidly than the average regional level and this is resulting in higher levels of risk which are a cause for increased concern.

The potential threat to water supplies is a direct result of the weather conditions during this spring and summer.

Yorkshire Water state they have considered not applying for these drought permits and the modelling of past events shows that they could maintain supplies through most historic years without permits, however to adequately ensure supplies are maintained in some of the modelled worst drought years, permits are required.

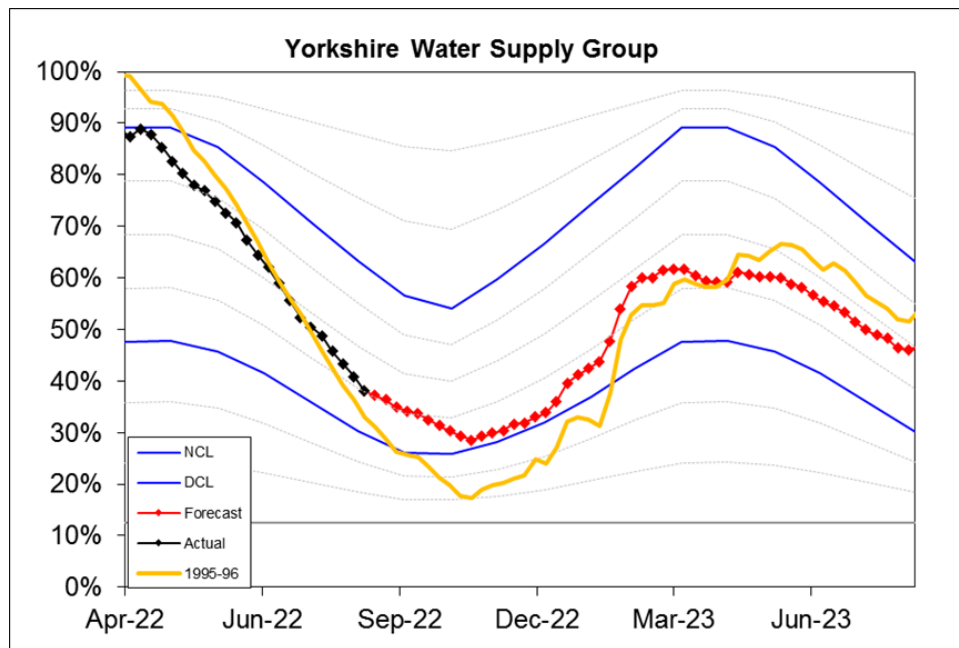


Figure 13: Actual and forecast Reservoir stocks

Figure 13 above shows regional reservoir stocks as part of Yorkshire Water's Water Resources Planning Report (WRPR). It is used to forecast expected reservoir stocks based on current and future asset availability. This shows the results for a repeat of 1995/96 inflows, at an annual average demand of 1295MI/d. This forecast does not show regional stocks crossing the Drought Control Line (DCL), but stocks do fall below the DCL in some areas, and some of YW previous model runs showed regional stocks falling below the DCL.

4.4 Water companies must prepare environmental reports addressing the anticipated effects of the proposal.

The water company have submitted an environmental report to support their application.

The shelf-copy environmental assessment report was reviewed during the development of Yorkshire Water's drought plan 2022. Following an initial consultation, a draft of the North West Area Environmental Assessment Report (EAR) was received by the Environment Agency on 07/09/2020 and reviewed internally. The documents were then subsequently amended based on their comments and accepted as shelf-copy EARs in March 2021. Natural England have also been engaged by Yorkshire Water throughout the environmental assessment process.

The environmental assessment comprises the following components:

- an assessment of the likely changes in hydrology (flow/level regime) due to implementing the proposed drought options;
- identification of the key environmental features that are sensitive to these changes and an assessment of the likely impacts on these features;
- identification of mitigation that may be required to prevent or reduce impacts on sensitive features; and

- recommendations for baseline, in-drought and post-drought order monitoring requirements.

The environmental assessment focuses on the potential changes to water availability (levels and flows) and any consequent implications for geomorphology, water quality, ecology and other relevant environmental receptors, for example, landscape, navigation, recreation and heritage.

The full EAR can be found saved on our document management system. Specific impact, monitoring and mitigation summary information can be found in the drought permit site annexes of this determination report.

4.5 Other supply side drought management options

The NW Reservoir Group is one of five interconnected areas, all within the Grid Surface Water Zone (Grid SWZ), which also includes the North, South, South West and East Areas. YW's 2022 Drought Plan details the action plan for drought which includes triggers for the NW Reservoir Group, as described in section 4.2 above. Each action is triggered relative to control lines that correspond to reservoir stock levels. As reservoir stock levels fall, successive measures are initiated. In addition to promoting actions for water saving with their customers, YW have also taken measures to reduce leakage (see section 4.7 below) and maximise river abstraction, where possible, to conserve reservoir stocks. The company have also taken measures to minimise the supply to reservoir-fed water treatment works in order to conserve reservoir stocks.

In the North West Area, YW have increased abstractions on the River Wharfe at Lobwood (and Arthington in the North Area) when river flows have allowed. River flows have been low for the time of year for much of the time, so authorised unsupported abstractions have been limited.

YW have advised that additional staffing and standby provision have been employed across all areas of Yorkshire to mobilise earliest intervention in the event of any interruptions due to mechanical failures so that these are resolved as soon as possible.

YW intend to apply for drought permits to increase allowed abstractions on the Rivers Ure and Ouse, to reduce the regulating release in the lowest flow band for abstractions from the River Wharfe at Lobwood, and to reduce compensation flows for the South, North and South West Area reservoir groups.

The interconnected nature of the Grid SWZ allows conjunctive use of water resources. During dry weather, YW maximise use of river sources as a measure to conserve reservoir stocks. However, the exceptionally low rainfall during 2022 as well as periods of very high demand has led to greater draw down of reservoirs, and the below average rainfall has meant reservoirs have not refilled. Reservoir stocks crossed the 'Normal Control Line' in mid-March 2022. This triggered additional activity to manage water resources and to abstract, treat and distribute more water from rivers to reduce the draw on reservoir stocks. This activity continued during the summer and will continue into autumn and winter until the water resources position recovers. YW have used the interconnected grid system to move water up to 70 miles from river sources to areas in the south and west of the region which are usually supplied by local reservoirs. Throughout this period, YW have been managing reservoir levels to ensure, as far as possible, that stocks are drawn down evenly across all areas.

YW will continue to closely monitor the water resources position and take appropriate measures to alter operational activities and preserve stocks across the region.

YW plan to apply for additional drought permits and orders in accordance with the 2022 drought plan. These are listed in Table 5 below.

Permit application	Drought Action
River Ouse at Moor Monkton	Increase permitted abstraction at lower flows.
North West Area	Reduce compensation releases
River Ure at Kilgram	Allow abstraction below Hands Off Flow (HOF)
River Wharfe at Lobwood	Reduce regulating release from Grimwith in the lowest flow band
South Area	Reduce compensation releases
North Area	Reduce compensation releases
River Derwent at Loftsome Bridge	Transfer abstraction licence permissions from Elvington abstraction point on the River Derwent to Loftsome Bridge abstraction point downstream.
South West	Reduce compensation releases
River Wharfe	Increase annual licence (if licence increase application not received)
River Hull	Alter hands off flow requirements

Table 5: YW's planned drought actions

Should a severe shortage of rainfall continue this year, YW may make drought permit applications in addition to those listed in the table above.

Regarding Silsden reservoir

YW do not currently abstract from Silsden Reservoir, however under normal operations they would release the prescribed flow volume to compensate the downstream watercourse as specified on their current licence. YW have a current drought action for Silsden Reservoir to reduce the compensation release to 1.20 MI/d. There would be a further reduction to 0.80 MI/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

This action does not require a drought permit unless YW are abstracting from the reservoir. YW would only use the reservoir for public water supply if they implemented a long-term drought action, which requires additional infrastructure to be installed. YW have advised that they are not currently implementing this drought action therefore do not require a drought permit to reduce the compensation releases, however the advertising notice includes reference to this permit in case it is required.

4.6 Additional demand management

In February 2022, the regional reservoir stocks were recorded at above 95% capacity overall. At that time, normal water efficiency measures were in place. Since March however, the below average rainfall has resulted in a steady decrease in reservoir stocks.

In response to falling reservoir stocks and in line with the 2022 Drought Plan triggers, YW has implemented additional demand management actions. Customer-use demand reduction actions have also been implemented in response to crossing drought control lines. YW have made public appeals employing a number of media platforms to encourage voluntary reductions in water use. See section 4.10 for more information on YW's publicity campaign.

Elevated temperatures in June led to peaks in demand of 1413 and 1434 MI/d on the 17th and 22nd July, respectively. Further elevated temperatures in July led to demands of 1505MI/d and 1573 on the 11th and 19th of July.

As a result of the peak demand and lower than average rainfall, reservoir stocks further reduced to lower than average levels, the Normal Control Line was crossed and also the Environment Agency early warning trigger control line. In line with the YW Drought Plan we implemented demand management actions to reduce demand and conserve available water resources in reaction to crossing these triggers.

Also, in accordance with their Drought Plan, YW moved to imposing Temporary Use Bans on all their customers, as measure which became effective on August 26.

Metering

YW promote metering to their customers as a means of saving water and money. YW routinely provide comparative costs to their customers to allow them to make informed decisions when making the choice of having a meter installed or not. Currently, the proportion of domestic customers in YW's supply area that receive water via a metered supply is 58%. Most commercial properties are metered, with the exception of some small water users where metering is not practical. All new build properties receive a metered supply and unmetered households can opt to have a meter installed free of charge. The YW region is not classified by the Environment Agency as a severely water stressed area, therefore YW are not able to compulsorily install meters in domestic customers' properties.

Temporary Use Bans (Hosepipe bans)

YW moved to impose Temporary Use Ban on all customers on August 26. This was widely publicised through the mainstream media and explained on the YW website.

Non-essential use bans

The trigger for this action has not been met.

4.7 Leakage control

YW have reported that they met their leakage target for the 2021-22 reporting year. Leakage was reported as 283.08 MI/day, which is 3MI/day less than the Ofwat in-year target of 286.3 MI/day. This represents a reduction of 7.9% over the AMP7 period. YW have invested in monitoring infrastructure to facilitate detection and repair.

During hot, dry weather customer demand increases significantly, and the pattern of customer demand changes, making it more difficult to determine where leakage is occurring and when increasing flows can be attributed to leaks or increased customer demand. YW report an increase in breakout of leaks this summer, which has been caused by the hot, dry weather causing an increase in ground movement thereby causing pipe fractures. Ordinarily, ground movement is the cause of

approximately 50% of leaks, but the change in soil moisture this year is such that the number of burst mains has increased by 33%.

Enhanced leakage reduction is included as a drought option in YW's Drought Plan for implementation when reservoir stocks are predicted to be 10 weeks from crossing the DCL. In their NW Area Supporting Information, YW have advised that in addition to retaining numbers of leakage inspectors to meet the 2025 leakage target, this year they have employed additional staff to fix leaks and bursts across the region. This additional activity includes leakage reduction through the integration of 'smart technology'. Figure 14 below shows the daily leakage reported by YW, the increase in the July heatwave and attempts to reduce further leakage.

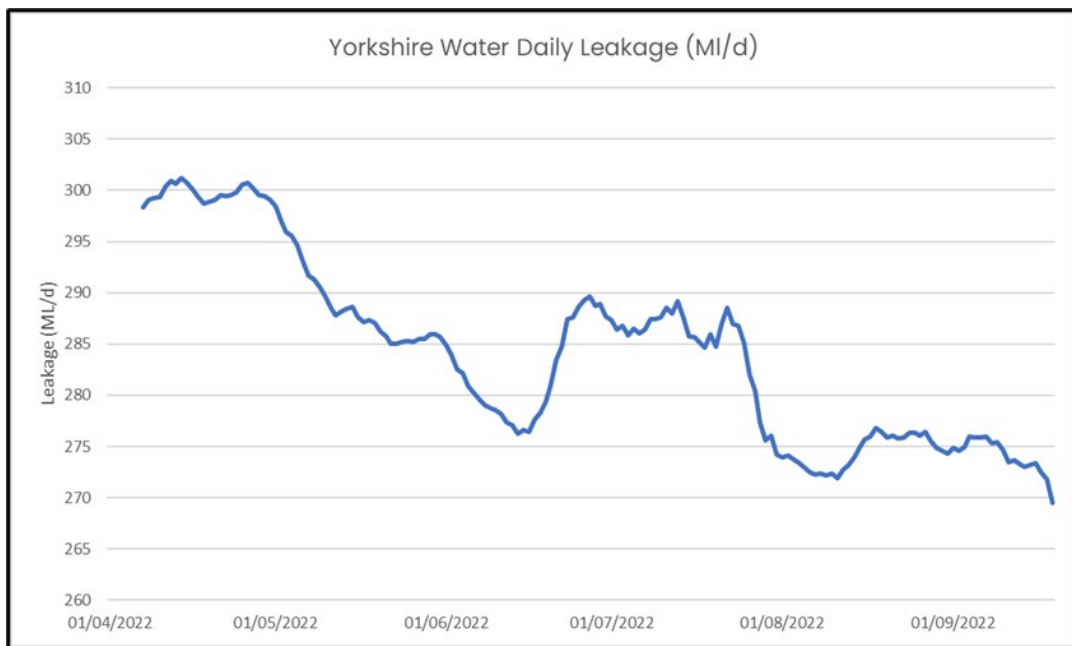


Figure 14: Yorkshire Water Daily Leakage Reported Leakage

The graph below, Figure 15 illustrates YW regional District Meter Area (DMA) leakage for the same period, reported by number of DMAs with increasing and decreasing leakage in each month. We would expect the number of DMAs with reducing trends to be consistently higher than the number increasing. The impact of the hot weather can be more clearly seen in July, where more DMAs increased than decreased.

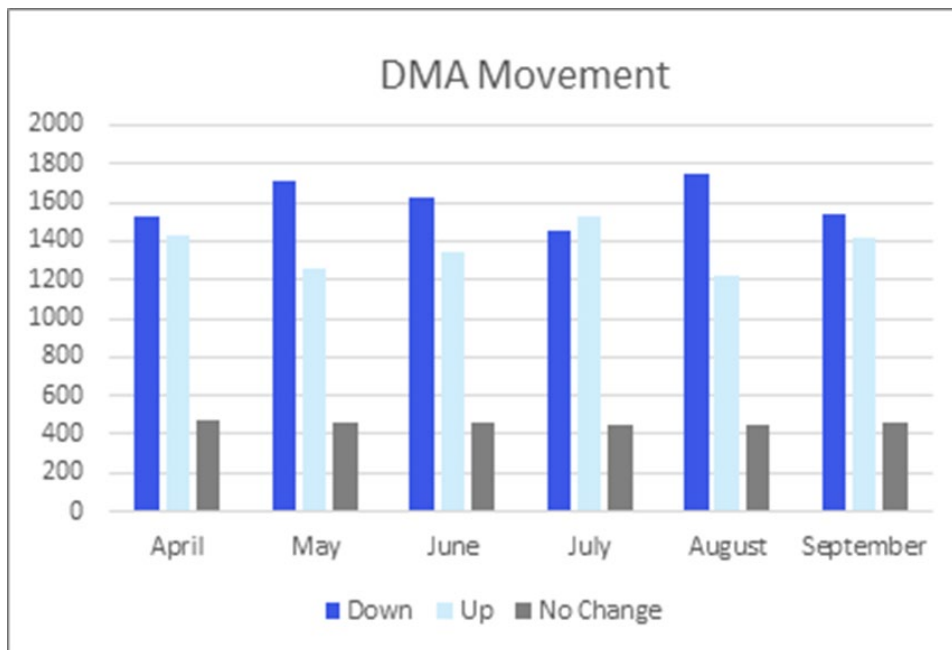


Figure 15: YW regional District Meter Area (DMA) leakage

4.8 Mains pressure reduction

Yorkshire Water have experienced increased leaks in summer 2022, which they attribute to ground movement increasing in the hot, dry weather. One route to reduce it is to optimise mains pressure on parts of the system. YW state that 295 pressure reducing valves (PRVs) have been maintained and/or optimised in the last four weeks (August – September 2022) to reduce bursts and leakage.

4.9 Re-zoning Supplies

YW has re-zoned supplies to address demand. River sources were used strategically to support each area of the Grid SWZ as much as possible and balance the drawdown of reservoirs across the region to ensure no area was unnecessarily exposed to a greater reduction in available resources.

The following re-zoning has been carried out over August/September:

- 0.5MI/d import from Chellow Water Treatment Works (WTW) to Keighley.
- 1.5MI/d import from Riddlesden into Bracken Bank distribution from Graincliffe WTW
- 2.0MI/d additional from Riddlesden to Blackhill service reservoir (SRE) from Graincliffe WTW & Embsay WTW.
- An additional 1.0MI/d to 1.5MI/d into Blackhill SRE.

All the above re-zoning combined will reduce WTW output to around 8.5-9.0MI/d. This is just above 50% of yield of the Worth Valley reservoirs.

Figure 16 below shows total abstractions for the YW supply area and shows the proportion of those abstractions supplied by the different source types for the licensing years April to March. The figures for 2022/23 are based only for the period until July 2022, so do not include any additional winter demand or the usual increase in the use of reservoir sources when reservoir levels tend to be high in the winter but do include the higher summer demands to date.

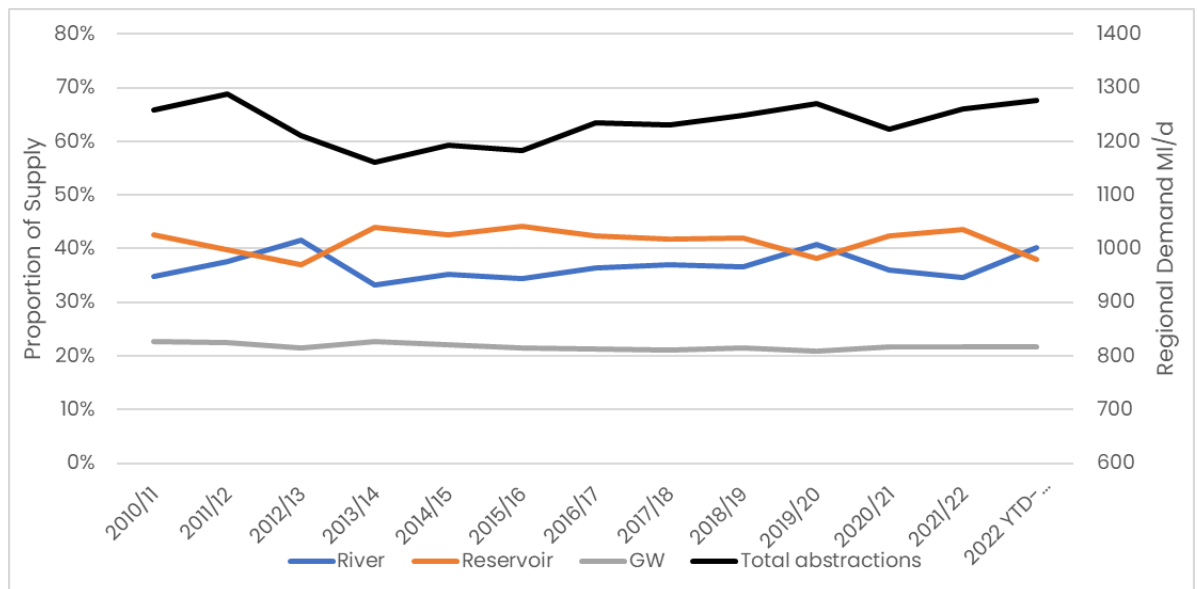


Figure 16: Total abstractions in YW supply area by source type.

YW's Drought Plan states that they must maximise permitted river abstractions once they cross the Normal Control Line (NCL). This is in concurrence with demand reduction and leak reduction measures as discussed in this report.

Figure 16 shows that river abstractions (blue line) have increased in 2022 ahead of reservoir abstraction (orange line) in order to conserve storage in the latter.

YW state in their supporting application that due to low river flows and asset availability maximising abstraction was limited at times. They state that they maximised abstractions on the River Ouse at Moor Monkton to Eccup and Wetherby when assets and river levels allowed. The River Wharfe abstraction at Lobwood was also increased when river flows allowed to provide preservation of Grimwith reservoir stocks and stocks in the Nidd reservoirs.

However, we consider overall action taken by YW to be reasonable in re-zoning supplies and maximising abstraction where possible.

In addition to river abstraction, YW have carried out the following to increase supply:-

- Maximised groundwater abstractions within licence constraints.
- Normally YW aim to release approximately 10% above their required compensation flow releases, to ensure that we are meeting their statutory obligations for compensation. This summer, to help preserve reservoir stocks, YW reduced this tolerance on compensation releases from 10% to 5% where an assessment identified this was feasible.

4.10 Publicity Campaign

Promoting water efficiency to customers is part of YW's day-to-day operations during all weather conditions. Additionally, each summer the YW Brand and Communications Team delivers a water efficiency campaign, which educates customers on ways to save water in their homes and gardens and encourages customers to find out more information about water conservation via the YW website.

This involves a media plan of activity such as ‘paid for’ social media advertising, digital display ads, a detailed content plan for organic social activity and customer emails, along with a mixture of other paid for advertising such as: radio (traditional and digital), press, digital out of home adverts and TV advertising. This year’s campaign was developed from the insight and learning YW gained after the 2018 drought, after carrying out research on customer’s views on water efficiency and TUBs.

This research showed YW’s customers were more likely to change their behaviours when the advice feels achievable, and they can understand why there is a need for change. The research also showed for some segments of customers, a financial benefit is more likely to make them change too. YW developed the ‘Use less. Save more’ campaign. Some of the more dynamic channels in their media plan, such as social and digital advertising allowed the flexibility to be able to switch the messaging on ads depending on the weather, for instance: YW referred to ‘There’s not been much rain lately’ or ‘No need to water the lawn, there’s been a bit of rain.’ This was to help customers understand the link between rainfall, the impact on reservoir levels and how they can help.

Communications to YW’s customers during the hot, dry weather this year has been at a regional level aimed at targeting all YW customers. The North West Area is part of the Grid SWZ and in line with YW’s Drought Plan, they implement water saving messages at a zonal level. In total YW estimate that to date their campaign this year has created over 82 million opportunities for customers to see water saving messages, which averages at around 16 opportunities per person across the 5.1m population of Yorkshire.

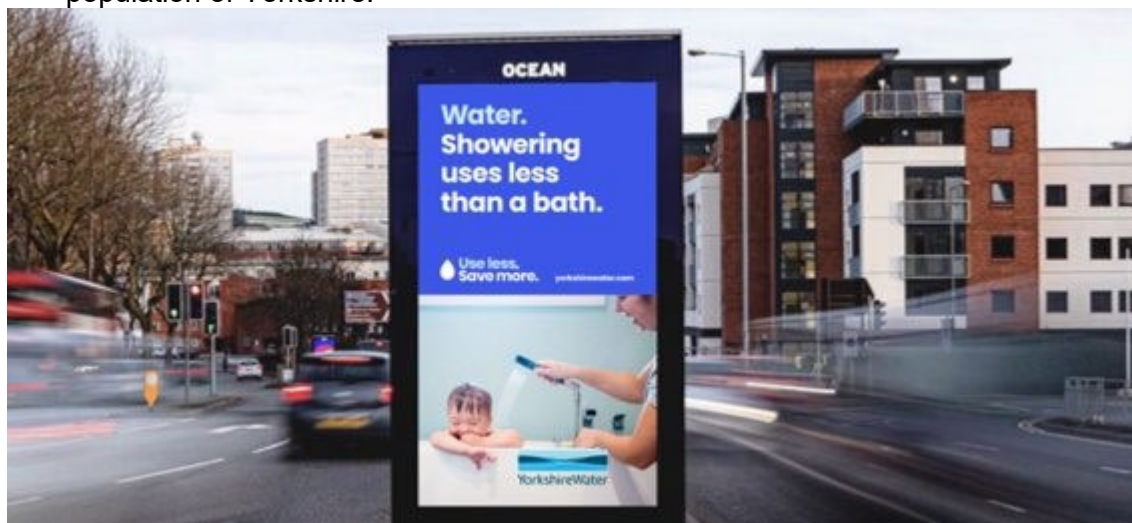


Figure 17: Example of YW’s water saving communications

Water Saving Customer Communications		W/C 20 th June	W/C 27 th June	W/C 4 th July	W/C 11 th July	W/C 18 th July	W/C 25 th July	W/C 1 st August	W/C 8 th August	W/C 15 th August
MEDIUM	PLATFORM	REACH / IMPRESSIONS	REACH / IMPRESSIONS	REACH / IMPRESSIONS	REACH / IMPRESSIONS	REACH / IMPRESSIONS	REACH / IMPRESSIONS	REACH / IMPRESSIONS	REACH / IMPRESSIONS	REACH / IMPRESSIONS
ONLINE	Facebook ‘paid for’ Adverts	Impressions: 1,406,328	Impressions: 895,032	Impressions: 1,144,058	Impressions: 1,021,400	Impressions: 1,261,645	Impressions: 1,354,586	Impressions: 1,552,557	Impressions: TBC	Impressions: TBC

	Programmatic/Digital Display Advertising	Impressions: 271,828	Impressions: 252,118	Impressions: 503,115	Impressions: 1,212,554	Impressions: 714,940	Impressions: 478,719	Impressions: 505,055	Impressions: TBC	Impressions: TBC
RADIO ADS	Traditional Radio Digital Audio 'Instream'	Impressions: 3,234,500	Impressions: 3,234,500	Impressions: 4,737,500	Impressions: 4,737,500	Impressions: 4,737,500	Impressions: 4,737,500	Impressions: 3,182,395	Impressions: 3,931,375	Impressions: 3,931,375
		Impressions: 130,000	Impressions: 130,000	Impressions: 312,500	Impressions: 312,500	Impressions: 312,500	Impressions: 312,500	Impressions: 312,500	Impressions: 312,500	Impressions: 312,500
LOCAL NEWSPAPERS	Metro Yorkshire Yorkshire Post	N/A	N/A	N/A	N/A	N/A	N/A	N/A	98,889	98,889
		N/A	N/A	N/A	N/A	N/A	N/A	N/A	49,229	49,229
OUT-DOOR	Digital 6 Sheet Bus	Impressions: 9,260	Impressions: 41,372	Impressions: 120,064	Impressions: 116,284	Impressions: 44,839	Impressions: 67,877	Impressions: 145,967	TBC	TBC
		N/A	N/A	N/A	N/A	N/A	Impressions: 1,083,333	Impressions: 1,083,333	Impressions: 1,083,333	TBC
TV / YouTube	All 4 Sky Go YouTube	N/A	N/A	N/A	N/A	N/A	Impressions: 52,102	Impressions: 52,102	Impressions: 122,237	TBC
		N/A	N/A	N/A	N/A	N/A	Impressions: 43,215	Impressions: 43,215	Impressions: 47,907	TBC
		N/A	N/A	N/A	N/A	N/A	Impressions: 80,856	Impressions: 80,856	Impressions: 47,907	TBC
							Impressions: 55,138		Impressions: 47,907	
MEDIA	Media reach	Reach: 407,112	Reach: 8,169	Reach: 20,650,458	Reach: 370,117,387	Reach: 80,600,000	Reach: 19,300,000	Reach: 104,000,000	Reach: 1,100,000,000	TBC
IN HOUSE	Customer Emails YW	N/A	N/A	N/A	N/A	Impressions: 29,755	N/A	N/A	N/A	Impressions: 51,000
	Website: Save water page YW	Hits: 815	Hits: 678	Hits: 794	Hits: 1,802	Hits: 2,612	Hits: 1,515	Hits: 2,465	Hits: 4,103	Hits: TBC
	Website: Hosepipe page	Hits: 25	Hits: 11	Hits: 70	Hits: 657	Hits: 761	Hits: 422	Hits: 2,858	Hits: 38,431	Hits: TBC

Organic Social Channels : Facebook , Instagram & Twitter	Reach: 19,982	Reach: 16,628	Reach: 33,758	Reach: 45,070	Reach: 75,688	Reach: 42,000	Reach: 41,846	Reach: 47,452	Reach: TBC
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Table 6: Communication activity carried out by YW to raise awareness of dry weather situation showing the reach statistics.

We requested additional information from YW with regard to the efficacy of their publicity campaign in reducing demand. YW advised they are currently working on an updated dashboard with their Data Science team to allow them to estimate this information while ‘in flight’ during a dry weather campaign.

YW are confident a proportion of customers who see messages via different channels will act upon those messages, but quantifying this is a complex activity. An assessment of their 2021 campaign, which was much lower level spend and across far fewer channels than this year’s, showed an estimated 0.5 l/h/day saving at the end of an 8-week campaign. YW hope that this year’s campaign will have had a far greater impact but they are not able to estimate this with any certainty for the permit application at this stage.

We are satisfied by YW’s response given the future development of data science to enable YW to understand the efficacy of and improve their annual water efficiency campaigns, which will be increasingly important in future years.

4.11 Other options considered

Alternative drought permit options are discussed in section 4.5 of this report. YW have considered their options and have planned to apply for additional permits.

YW have so far managed the dry weather situation through the demand management measures discussed in section 4.6 and 4.10 of this report and increasing supply by maximising abstraction as discussed in section 4.9.

In addition to these measures, additional staffing and standby provision have been employed in case of mechanical failures and to ensure resolution as soon as possible.

YW state that they have considered not applying for these permits as an alternative route, and their modelling of past events shows that we could maintain supplies through most of their historic years without permits, but to adequately ensure supplies are maintained in some of the worst modelled drought years, permits are required.

We are satisfied that while YW could maintain supplies through most of the historic droughts modelled, They are following their Drought Plan and applying for drought permits to help preserve stocks to potential threats to water supplies.

4.12 What will happen if the permit is not granted?

YW's grid network supplies a considerable area of West Yorkshire including Bradford, Keighley, and Skipton. Although not all the reservoirs provide water for public water supply. The NW Area can also receive supply from river sources in the region as it is connected to YW's grid system.

If these permits are granted, YW will be able to manage their system in a more resilient way. If these permits are not granted (or the decision to grant them occurs too late for YW to manage supplies as if it were granted), YW will have to operate according to the current licence conditions, and this may result in the overdrawn of reservoirs.

If YW had a repeat of 1995 inflows and these permits were in place, reservoir stocks in the North West Area supply reservoirs could be increased by up to 12% and by 3% regionally if the changes associated with the application are applied in full. The actual benefit of the drought permits would depend on river flows and reservoir inflows during the period, and how much and where reservoir stocks had recovered.

If these permits are not granted, (or the decision to grant them occurs too late to manage supplies as if it were granted), YW face the risk of entering winter with the reservoir stocks below the drought control line throughout the North West Area. In respect of specific hot-spots (the Worth Valley), there is also heightened risk in that public water supply could be impacted due to the higher rate of decline of stocks in this area. Additional mitigation measures are being developed to reduce the risk of this situation materialising, though these measures alone shall not alleviate the risk to the public water supply.

4.13 Conclusion

We are satisfied that YW have been following their drought plan and have made a sufficiently compelling case for needing these drought permits, also separately detailed in the annexes attached to this report. This is in terms of meeting the legal tests around exceptional shortage of rainfall and a serious deficiency of supplies, together with the measures YW have already taken over this period to effectively and efficiently conserve water stocks throughout its water supply system.

The threat of a serious deficiency of supplies comes from the position of currently low reservoir stocks within the North West Area, coupled with a continuation of dry conditions as we enter autumn and, if these conditions were to continue, the possibility of a dry winter preventing refill of reservoirs ahead of the 2023 drawdown season. The present low reservoir levels are deemed to have resulted from the exceptionally dry weather and high demands principally during the summer of 2022.

YW are requesting to conserve water stocks by reducing the compensation releases. This is deemed a justified requirement and an appropriate action until the reservoirs are filled.

5. **Advertising**

The water company must advertise the proposal and serve notice on specified bodies before the formal application is sent to us.

They published the statutory press notice in the Bradford Telegraph and Argus, Ilkley Gazette, Wharfedale Observer and the London Gazette on 15 September 2022.

The notice complied with the requirements in Schedule 8 of the Water Resources Act 1991.

The application and associated documents were made available for public inspection at the following locations during the period specified in the statutory press notice (deadline for comments was 22 September 2022):

- Yorkshire Water, Western House, Halifax Road, Bradford, BD6 2SZ
- Environment Agency, Lateral, 8 City Walk, Leeds, LS11 9AT
- Haworth Post Office, 98 Main Street, Haworth, Keighley, BD22 8DP
- Denholme Post Office, 54 Main Road, Denholme, Bradford, BD13 4BL
- Eldwick Post Office, 90 Otley Road, Eldwick, Bingley, BD16 3EE
- Menston Post Office, 52 Cleasby Road, Menston, Ilkley, LS29 6JA
- Silsden Post Office, 39 Kirkgate, Silsden, Keighley, BD20 0AJ
- Skipton Post Office, 11 Swadford Street, Skipton, BD23 1RD
- Grassington Post Office, 15 Main Street, Grassington, Skipton, BD23 5AD

It is confirmed that the notice appeared in all papers on the date specified and that the wording was satisfactory to the Environment Agency.

Application was advertised	
Date when advertised	15/09/2022
Representations were received and these are addressed in section 5.2.	
As the application was advertised Statutory Notification was served to:	
Navigation Authority (NA) – Canal and River Trust	

The water company has served notice, where appropriate, on the following bodies in accordance with the Defra guidance 'Drought permits and drought orders' (May 2011) (these are only notified when an application is advertised):

Notifiable Bodies	Yes / No / Not applicable	Comments
Internal Drainage Board (IDB)	Yes	Airedale Drainage Commissioners and York Consortium of Drainage Boards
Navigation Authority (NA)	Yes	Notice was given to CRT on 14/09/2022 as there is a statutory requirement under Schedule 8 paragraph 1(2)(c) of the Water Resources Act 1991 (the Act) to serve notice upon the relevant navigation authority. CRT replied on

		15/09/2022 confirming they have no concerns with the proposal.
Harbour Authority (HA)	N/A	
Conservancy Authority (CA)	N/A	
Statutory Water Undertaker (SWU)	Yes	YW confirmed that the following NAVs were notified of the proposal; Independent Water Networks (IWNL), Leep Utilities and ESP Water Limited
Local authorities BC = Borough Council DC = District Council		Craven District Council Local Authority Bradford City Council Local Authority Leeds Council North Yorkshire Council

In addition to the above bodies, YW confirmed that notice was also served on the following organisations (in Table 7) by email where they had a valid email address, and by recorded delivery where they did not have an email address. In addition, downstream abstractors were informed (Eagerlux Ltd, Dalton Dyeworks and Dunkirk Mill), also by special delivery. YW also notified the relevant flooding departments of local authorities so that they were aware that YW may need in-river works in their ordinary rivers.

Organisation	Category
ShIPLEY Golf Course	Abstractor
Otley Golf Club	Abstractor
Eagerlux Ltd	Abstractor
J Dewhurst & Co	Abstractor
Atkinson Dyeing Co Ltd	Abstractor
Skipton Angling Trust	Angling
Bingley Angling Club	Angling
Leeds and District Amalgamated Society of Anglers	Angling
Angling Trust	Angling
Keighley Angling Club	Angling
Four Members of parliament (MP) were consulted	MP
RSPB	Non Government Organisation (NGO)
Yorkshire Wildlife Trust	NGO
National Trust	NGO
NFU	NGO
CLA	NGO
Wildfish	NGO
Denholme Sailing Club	Sailing
Yorkshire Dales Sailing Club	Sailing
Craven Sailing Club	Sailing

Ponden Watersports Club	Sailing
Friends of the River Worth	NGO
Hewenden Angling Club	Angling
Keighley and District Model Engineering Society Ltd	Other
Ponden Mill	Abstractor/business

Table 7: Organisations that YW served notice to

5.1 Representations

Two objections were received within time. (No other objections were received outside the representation period.)

Objections were received from;
The Aire Rivers Trust (ART), and,
Individual G ('G').

The following 'reasonable' objections are set out in the Table of Objections.

Under the terms of a Drought Permit or Order application, *A reasonable objection will:*

- *clearly relate to the drought permit proposal*
- *be about something the drought permit could affect, or*
- *suggest feasible alternatives to the drought permit that the company does not seem to have considered*

We have not considered objections that did not meet the above terms of a 'reasonable' objection.

The first objection from ART was clearly marked, 'not an objection,' but noted some points of concern, which are set out below. As it stated 'not an objection' we have not treated it as a duly made, or 'reasonable' objection.

The second objection from Individual 'G' raised a point we deemed 'reasonable' around the effect on dilution of sewage treatment and combined sewer overflow (CSO) discharges into watercourses with less water in them from the proposed drought permit conditions. This is addressed below. The remainder of Individual 'G's' objection was around wider Water Company operations; including commitment of year on year resources and planning and investment for strategic issues, which have been deemed not 'feasible alternatives' to the drought permit in hand.

ART - The Aire Rivers Trust sent an email on 21/09/22 in response to the notice. Their email was not considered an objection as they stated in it that it was, 'not an objection.' They raised concerns about the reduction in compensation flows from Leeming Reservoir, Leeshaw Reservoir, Springhead Weir Maintained Flow, Doe Park Reservoir, Hewenden Reservoir, Eldwick Reservoir, Reva Reservoir, Weecher Reservoir, Silsden Reservoir and Embsay Reservoir as they thought these reduced levels would impact both the wildlife and hydrology of the affected watercourses. They explain that they *'recognise that this is being done both to ensure drinking water supplies and that compensation flow from the reservoirs to the watercourses can be provided for longer than if the compensation releases continued at the current rates. We support their stated aim of limiting the risk of reducing*

compensation flows in spring and summer of 2023. Here, they would have greater impact. Therefore, we do not wish to object to the drought permit application.'

They go on to say that they noted in the press that a pipeline is being installed to allow water to be pumped from the Calder catchment into Leeshaw Reservoir and asked that YW reassure them that biosecurity has been considered as part of this plan to avoid introducing any additional invasive non-native species into the upper Worth catchment. YW were sent ART's email as a 'not duly made' objection for information only to respond to ART directly, as they saw fit.

'G' - Individual 'G' sent in an email with an attached letter on 22/09/22 in response to the notice. We deemed the duly made section of the objection as follows; *'Reservoirs such as Rava [Reva] are providing compensation water to the River Aire just upstream of Esholt sewage works and as such dilute the outflow from such. They also dilute the outflow when YW cause pollution by allowing sewage to flow directly into the river after what they call a storm event.'* The entire objection was sent to YW noting the duly made part for them to resolve with 'G' to avoid a Hearing being required. 'G' declined to respond to YW's emails and a letter sent by registered post, but responded to the Agency on 29/09/22 that they would like their objection heard by an Inspector at a Hearing.

YW asked the Agency's opinion if 'G's' objection only affected the application for Reva Reservoir, or all the reservoirs and sites applied for under the North West Group of applications? The Agency noted that only one reservoir was specifically mentioned in the duly made part, but prefaced by the words, 'reservoirs such as...' And the opening paragraph of the objection letter included the phrase, *'but this objection is not only concerned with Rave [Reva] but the entire Yorkshire Water (YW) estate.'* From this, we were of the opinion the objection was intended to cover the whole NW Group, but took advice from the Planning Inspectorate (PINS) as the authority charged with presiding over the Hearing. PINS asked for clarity from the Objector themselves and 'G' confirmed to the Agency on 29/09/22 that their objection applied to all sites where compensation flows were being reduced e.g. the whole NW Group. PINS and YW were advised accordingly.

As Yorkshire Water were unable to get the reasonable objection resolved or withdrawn prior to the planned Hearing date of 12th October, a Hearing was duly held.

Hearing.

The Hearing was hosted by the Agency at Lateral House, Leeds and virtually via Microsoft Teams on 12th October 2022 in front of a Planning Inspector from the Planning Inspectorate (PINS.) The Inspector's report was received on 18th October 2022. The report sets out the background to the application, Yorkshire Water's case for applying for a drought permit, details of the objection received and the Inspectors conclusions, which we agree with.

Sections 1 to 16 of the Inspector's report are concerned with Hearing procedural matters, overview of the application (as set out in section 1. above), background of the situation (section 2. above), the exceptional shortage of rainfall case (section 4.1 above), the actions taken to reduce demand and conserve supply (sections 4.5 to 4.11 above) and the environmental implications of operating under the permits (section 4.4 above.)

Hearing – Objections.

Sections 17 to 20 of the Inspector's report set out Individual 'G's' background (17) and specific objections in 18 and 19, as set out below.

18. *Firstly, ['G'] contend[s] that these drought measures would not have been required if Yorkshire Water had undertaken adequate and sufficient steps over the years to reduce leakage in the system.*

19. *Secondly, there is the concern that with reduced river flows there would not be as much water in the river network to flush out pollution from sewage treatment works, or from combined sewer outfalls that occurred soon after storm events (citing the effects of Reva Reservoir on discharge from Esholt sewage works as an example). Based on anecdotal observation and a simple logic, river pollution would increase as a result.*

The Inspector considered the objection in 18 in sections 23 and 24, noting that YW had followed its Drought Plan to step up leakage reduction as part of this drought event, was ahead of its current Ofwat leakage target and that refusal of the Permits on based on leakage performance would not overcome the need to conserve water for public supply use. Therefore, the Inspector concluded that YW had acted appropriately in relation to leakage reduction. The Agency did not deem 'G's' comments on leakage as a duly made part of their objection, but like the Inspector accept the case put forward by YW on leakage (as set out in section 4.7) is appropriate (as indicated in section 4.15 above.)

The Inspector considered the objection in 19 in section 27 (with the need to reference points made in section 26 for the background detail.) The Inspector accepted that the proposed monitoring and mitigation – as to be conditioned in any Permit granted – would identify any impact on water quality and would ensure the appropriate action to respond and/or mitigate for it. Therefore, the Inspector concluded that the necessary balance of need for the Permits against the protection of the environment was met. The Agency deemed 'G's' comments on dilution effect as a duly made part of their objection. We have fully considered this in our assessment of the proposal, generally in section 7 and specifically in section 7.2 water quality. Any Permits granted will include monitoring and mitigation obligations, as at least proposed by YW in their submitted monitoring and mitigation plan, to include baseline (pre-Permit) monitoring, within Permit monitoring and within and post-Permit mitigation, which will include water quality elements. We consider this adequately covers off 'G's' objection and concurs with the Inspector's conclusions on this matter.

In section 20 of the report, the Inspector clarified with 'G' that 'G' thought the Permits were necessary and accepted that they should be granted and wanted assurances that leakage would be tackled. As stated by the Inspector in section 23, it is down to others to deal with operational Water Company leakage (Ofwat) and under Drought Permit applications the Agency to ensure Drought Plan actions to address leakage are undertaken at that time. We agree the case put forward by YW on leakage (as set out in section 4.7) is appropriate (as indicated in section 4.15 above.)

Inspector's Conclusions.

The Inspector's conclusions (sections 21 to 29) are set out in *italics* in full below with Agency responses in normal font;

(In my conclusions, the numbers in square brackets [] indicate the paragraphs above where the supporting information and facts can be found)

- *Having regard to the records before me I am satisfied that the correct notification procedures were followed in relation to these applications. Agency - as set out in section 5. Advertising above.*
- *The Company relies significantly on reservoirs for its water supply [5]. However, the data submitted shows that this has been an exceptionally dry summer, the effects of which have been exacerbated by the very hot weather in July and August, and the high soil moisture deficit [6-7]. I have no reason to question that the stocks in the reservoirs subject of these permit orders are as low as stated, in both absolute terms and relative to what would be expected at this time of year [8]. I also find that the Company has followed the requirements of its Drought Plan since the onset of this dry period, in terms of acting at appropriate times to undertake media campaigns, increase public awareness, introduce a hosepipe ban, engage with the Environment Agency, reduce compensation flows as much as practicable, transfer water, and act proactively in advance of trigger points being passed [9-11]. Agency – as set out in section 4. above.)*
- *With regard to the objectors' specific concern about leakage reduction in the water system, it is not for me to pass comment on how effective Yorkshire Water has been in addressing this matter over the years preceding the dry spell, or to impose commitments on the Company concerning its future approach. Those tasks fall to others to consider. Indeed, to conclude the permits should not be granted on that basis would do nothing to overcome any immediate need that exists, and would not deliver the additional water stocks within the timescales the permits are seeking to achieve. Nonetheless, it is a requirement of the Company's own Drought Plan to respond to early triggers of potential drought events by increasing active leakage control, as a Level 1 activity, over and above that expected under the Ofwat targets set for each water company. Agency – as dealt with under Hearing – Objections immediately above.*
- *I have noted that the Company says it is currently ahead of its leakage reduction target for the 2020-2025 period that has been set with Ofwat. Although I have limited data in this regard, I also have no reason to question that leakage reduction has been stepped up over the dry period in line with the requirements in the Drought Plan [10], and note especially the benefits of focussing such activity on the North West Area, where leakage rates are relatively low in any event [10]. Therefore, in relation to this current drought event, I find that the Company has acted appropriately in relation to leakage reduction. Agency – as dealt with under Hearing – Objections immediately above.*
- *Accordingly, I conclude that there has been considerable pressure on the water supply situation in the Yorkshire Water area and measures must be considered to address future demand. If the dry weather were to continue and rainfall did not occur to re-stock the reservoirs, there could be real difficulties in continuing to meet supply commitments, and serving consumers while maintaining river levels. Agency – as set out in section 4. above.*
- *Environmentally, it is accepted there could be some harm arising from the inevitable reductions in water flow, depth, and quality associated with the drought order permits [12-14], and I have no basis to conclude otherwise. I have noted though that there is baseline monitoring of the affected reaches, as well as intended monitoring immediately before the reduction in flow*

occurs, to establish precisely the condition of each individual reach. Furthermore, there are also a tailored variety of proposed monitoring and mitigation measures that would be implemented after the flow reductions were instigated, and which would be secured within conditions on each drought order permit. Although the triggers for the mitigation works include a certain degree of subjectivity, to my mind that is inevitable given the uncertainty at this stage regarding the timing, scale, and impact of the flow reduction. I conclude they offer enough structure to ensure appropriate action is delivered. Moreover, when taken with the baseline monitoring, the post event mitigation should allow for suitable re-instatement and restoration. Agency – as dealt with under Hearing – Objections immediately above.

- *Turning specifically to the issue of dilution of discharges, I accept such matters have been taken into account in considering the environmental impact of the permit measures, and conclude the approach [15] to be reasonable and practical. This would include conditions on the respective permits and would appropriately balance the effects of, and the need for, the reduced compensation flows against a protection of the river environment.* Agency – as dealt with under Hearing – Objections immediately above.
- *Finally, the draft permit for Grimwith Reservoir includes modified compensation flows into late spring and summer next year. However, as the permit is to modify compensation flows from now until 31 March 2023, it should be amended accordingly.* Agency – we note this point and agree that this reservoir was applied for with an expiry date of 31/03/2023, which is shorter than the 6 months duration possible under a Drought Permit application from the date of grant. Whilst we do not expect that YW will apply to extend the Permit beyond the end of March 2023, it is an option and a possibility. As there isn't the ability to vary a Drought Permit and any extension would be on the terms of the Permit issued, we see an unnecessary risk for maintaining reservoir storage from removing the post-March compensation flow rates as recommended by the Inspector. The compensation flow under the Permit that would be in effect should the Permit be extended would be 7.55 MI/day. From April 20th this would fall to 3.9 MI/day, but if we remove this period from the condition, it is a possibility that 7.55 MI/day would need to be provided, emptying the reservoir unnecessarily. To this end, whilst we understand the Inspector's point, we do not think the possibility of Permit extension was considered by the Inspector and we intend to retain the condition as drafted to cover any potential extension.
- *Accordingly I conclude*
 - a) *There has been an exceptional shortage of rainfall that, coupled with hot summer temperatures and a high soil moisture deficit, has resulted in reservoir stocks being very low in absolute terms and relative to what is expected at this time of year, and as a result there is an immediate threat to water supplies which would justify the issuing of the drought order permits;*
 - b) *Yorkshire Water has undertaken the necessary actions outlined in its Drought Plan in advance of these drought order permit applications being lodged, including an increase in addressing leakage reduction;*
 - c) *Whilst some harm could potentially occur in the reaches downstream of the reservoirs and weir as a result of reduced flows, the agreed monitoring and mitigation that would be undertaken before, during and*

after the drought measures are undertaken, that are attached to each draft permit would be a sufficient response that would appropriately safeguard the river environment, and

- d) *The draft drought order permit for Grimwith Reservoir should be amended in line with the timescales sought by the application. Agency – we agree with the Inspector’s conclusions set out in a) to c), but under d) for the reasons set out under Inspector’s Conclusions number 28 above, we propose to retain the condition as drafted to cover any potential extension of the Permit post-March 2023.*

In summary, the Agency agrees with the Inspector’s findings and conclusions set out above and is of the opinion that Objector ‘G’s’ concerns have been appropriately addressed and will be covered off through including the necessary monitoring and mitigation conditions in the Permits. But, for the reasons set out under Inspector’s Conclusions number 28 above, we propose to retain the Grimwith Reservoir condition as drafted to cover any potential extension of the Permit post-March 2023.

6. External consultation

The Environment Agency are not required to formally consult any external bodies (except under Habitats Directive/Wildlife and Countryside Act 1981 obligations) as part of the pre-application or determination process.

Consultation Bodies (name, date and summary of comments)
Natural England (NE)/Countryside Council for Wales (CCW)
Date: 15/09/2022
NE were sent a HRA1 and an Appendix 4. Both were sent for consultation – see section 7.5 for full comments.

YW consulted the Canal & River Trust on 14/09/2022. The Canal & River Trust confirmed by email to YW that *‘the Trust has no concerns regarding this proposal for drought permits and reduced compensation feeds, as the compensation reductions are either very small (like in the case of Embsay, which we have already liaised with you on) or are associated with reservoirs and watercourses that do not interact with the Trust’s network.’*

7. Technical assessment of the proposal

Drought permit proposals do not fit strictly into the CAMS process therefore the licensing strategy where these sites are situated is not referred to in this report. However, all proposals need to be WFD compliant. The WFD assessments are available in the site specific annexes to this report.

7.1.1 Hydrology and impact on flows

The upper most River Aire catchment draining the eastern flank of the Pennines is a rapid responding catchment containing numerous reservoirs. Yorkshire Water’s grid network supplies a considerable area of West Yorkshire including Bradford, Keighley, and Skipton. The headwaters are predominantly rural, with considerable urbanisation in the middle to lower catchment. Geology is mostly Carboniferous Limestone in the headwaters, and Millstone Grit and Lower Coal Measures.

The upper most River Wharfe is a rapid responding, predominantly natural catchment, on Lower Carboniferous Limestone and Shales. Below Grimwith reservoir, around Addingham, the catchment comprises Lower Carboniferous Grits and Sandstones.

A summary of YW's drought permit applications and their water supply system is provided in section 2 of this determination report. This summary also shows the location of the 12 drought permit sites.

The area of impact of the drought permits on the hydrological effects of the associated downstream reaches is referred to as the 'zone of influence' in Yorkshire Water's Environmental Assessment report. Section 3.4 of YW's Drought Plan 2022 Environmental Assessment Methodology sets out this approach in detail. The reaches for the North West Area drought permits have been defined previously during the environmental assessment of YW's past drought plans.

The reaches that have been included in the zone of influence and assessed in YW's Environmental Assessment are shown in the schematic below in Figure 18. The drought options are in bold text with the reaches illustrated as coloured lines and labelled.

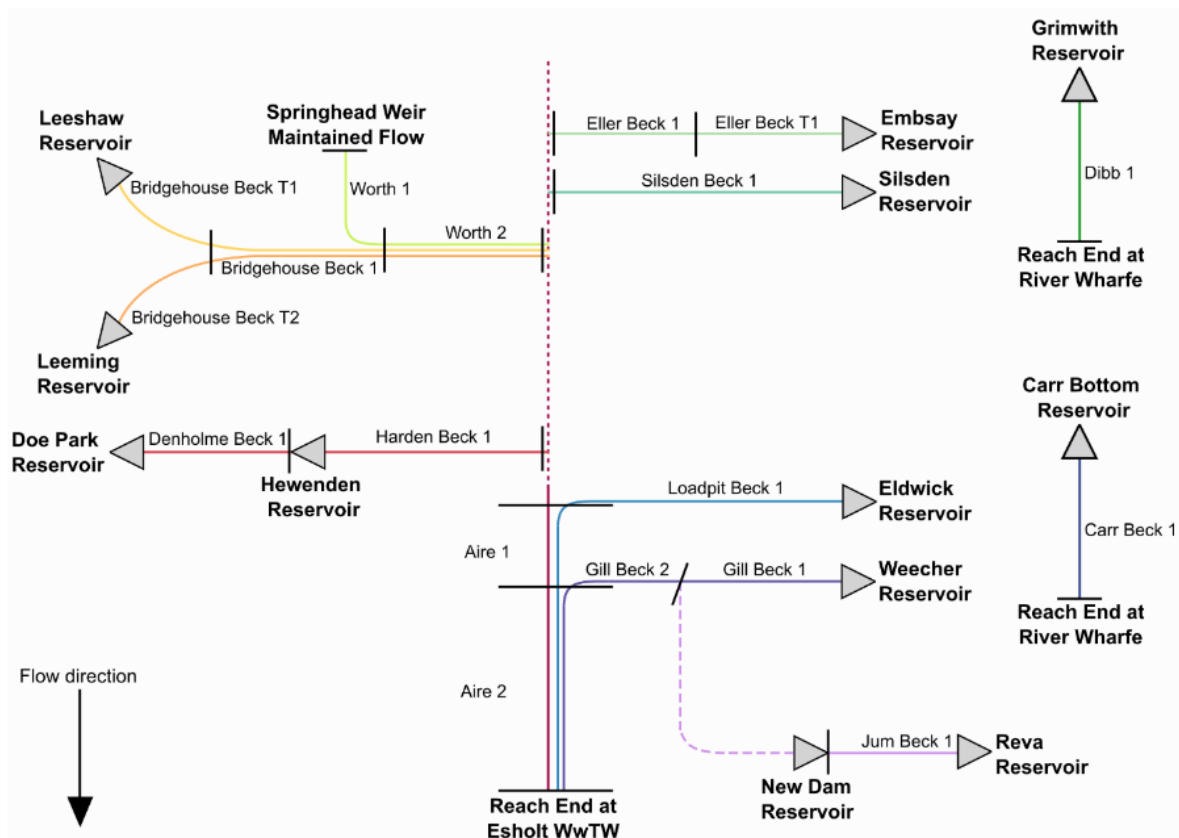


Figure 18: Schematic of the zone of influence

Compensation water source	Compensation flow reduction	Receiving watercourse	River Flow impact
Embsay reservoir	A reduction of up to 0.80MI/d in the statutory compensation release rate of 1.19MI/d.	Eller Beck T1	The reduction represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.

			<p>There are no flow depleted reaches within Eller Beck T1.</p> <p>The reduction in flow to very low flows will change the energy, habitat availability and connectivity of the system. The EAR represents this as a major risk.</p>
Embsay reservoir	The maximum flow reduction of flow passed forward from Eller Beck T1 during implementation of the drought options is 0.80MI/d.	Eller Beck 1	<p>This represents a reduction of 16% and 22% in the summer Q95 and Q99 flow statistics, which is assessed as a moderate hydrological impact on this reach in summer and autumn months.</p> <p>The reduction in year-round Q95 and Q50 is 14% and 3.7% respectively, which is assessed as a minor hydrological impact during winter months associated with winter refill periods.</p> <p>~5m flow depleted reach with potential for periods of time with zero flow without mitigation. Major risk.</p> <p>The moderate summer/ autumn and minor winter reduction in flow will present moderate changes to the energy of the system</p>
Silsden Reservoir	A reduction of up to 1.61MI/d in the statutory compensation release rate of 2.41MI/d.	Silsden Beck 1	<p>The reduction represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Silsden Beck 1.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat.</p>
Leeshaw Reservoir	A reduction of up to 1.84MI/d in the statutory compensation release rate of 2.75MI/d represents a 67% reduction in the flow at the upstream end of the reach regardless of the time of year.	Bridgehouse Beck T1	<p>The reduction represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Bridgehouse Beck T1.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat.</p>
Leeming reservoir	A reduction of up to 2.18MI/d in the statutory compensation release rate of 3.25MI/d represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.	Bridgehouse Beck T2	<p>The reduction represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Bridgehouse Beck T2.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat.</p>
Leeming & Leeshaw	The maximum flow reduction flow passed forward from Bridgehouse	Bridgehouse Beck 1	This represents a reduction of 52% and 59% in the summer Q95 and Q99 flow

reservoirs (cumulative)	Beck T1 and T2 during implementation of the drought options is 4.02MI/d.		statistics, which is assessed as a major hydrological impact on this reach in summer and autumn months. The reduction in year-round Q95 and Q50 is 49% and 26% respectively, which is assessed as a major hydrological impact during winter months associated with winter refill periods.
Springhead Weir Maintained Flow	The minimum flow which must normally be maintained at Springhead Weir is 6.00MI/d, increasing to 8.00MI/d when Leeming and Leeshaw reservoirs are below their control lines (so that their combined compensation flow is 6.00MI/d). Under this drought permit the maintained flow at Springhead Weir is reduced from a reference value of 8.00MI/d to 4.00MI/d, and further reduced to 2.67 MI/d. The maximum flow reduction is therefore 5.33 MI/d in this reach.	Worth 1	<p>The reduction represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Worth 1.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat.</p>
Leeming & Leeshaw reservoirs, Springhead Weir Maintained Flow (cumulative)	<p>River flow in Worth 2 is influenced by the Leeshaw Reservoir and Leeshaw Reservoir influenced flows of Bridgehouse Beck 1 and Spring Head Weir Maintained flow influenced flows of Worth 1. As such limited flow variability would be apparent during the implementation of North West Area drought options.</p> <p>The maximum combined flow reduction on the River Worth downstream of the Bridgehouse Beck 1 confluence, with all three drought permits in place, is therefore 9.35MI/d.</p>	Worth 2	<p>Based on the estimated flow statistics for this reach, this represents a reduction of 51% and 58% in the summer Q95 and Q99 flow statistics, which is assessed as a major hydrological impact on this reach in summer and autumn months. The reduction in year-round Q95 and Q50 is 48% and 27% respectively, which is assessed as a major hydrological impact during winter months associated with winter refill periods.</p> <p>There are no flow depleted reaches within Worth 2.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat.</p>
Doe Park Reservoir	A reduction of up to 0.60MI/d in the statutory compensation release rate of 1.80MI/d	Denholme Beck 1	<p>Represents a 33% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Denholme Beck 1.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat.</p>
Hewenden reservoir	A reduction of up to 4.22MI/d in the statutory compensation release rate of 6.3MI/d	Harden Beck 1	<p>Represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Harden Beck 1.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat</p>

Eldwick reservoir	A reduction of up to 0.67MI/d in the statutory compensation release rate of 1.0MI/d.	Loadpit Beck 1	<p>Represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Loadpit Beck 1.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat</p>
Weecher reservoir	A reduction of up to 0.29MI/d in the statutory compensation release rate of 0.43MI/d.	Gill Beck 1	<p>Represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within Gill Beck 1.</p> <p>A major reduction in flow will change the energy of the system, this is a major risk to river habitat</p>
Weecher & New Dam reservoirs (cumulative)	The maximum flow reduction flow passed forward from Gill Beck 1 during implementation of the drought options is 0.29MI/d.	Gill Beck 2	<p>This represents a reduction of 14% and 18% in the summer Q95 and Q99 flow statistics, which is assessed as a moderate hydrological impact on this reach in summer and autumn months. The reduction in year-round Q95 and Q50 is 13% and 3.7% respectively, which is assessed as a minor hydrological impact during winter months associated with winter refill periods.</p> <p>There are no flow depleted reaches within Gill Beck 2.</p> <p>A moderate reduction in flow will change the energy of the system.</p>
Reva reservoir	A reduction of up to 0.53MI/d in the statutory compensation release rate of 0.79MI/d.	Jum Beck 1	<p>This represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year.</p> <p>There are no flow depleted reaches within JumBeck 1.</p> <p>The major reduction in flow to very low flows will change the energy, habitat availability and connectivity of the system.</p>
Cumulative influence of 7 drought permits (downstream of confluence – see schematic)	<p>The maximum combined flow reduction on the River Aire downstream of the Loadpit Beck 1 confluence, with all seven drought permits in place, is 16.65MI/d.</p> <p>(Doe Park Compensation 0.6 MI/d is excluded as compensation only results in a reduction in flow in the watercourse between it and Hewenden)</p>	Aire 1	<p>This represents a reduction of 13% and 19% in the summer Q95 and Q99 flow statistics, which is assessed as a moderate hydrological impact on this reach in summer and autumn months. The reduction in year-round Q95 and Q50 is 12% and 3.1% respectively, which is assessed as a minor hydrological impact during winter months associated with winter refill periods.</p> <p>There are no flow depleted reaches within Aire 1. The moderate summer/autumn and minor winter reduction in flow will change the energy of the system.</p>
Cumulative influence of 8	The maximum combined flow reduction on the River Aire	Aire 2	Based on the estimated flow statistics for this reach, this represents a reduction of

drought permits (downstream of confluence – see schematic)	downstream of the Gill Beck 1 confluence, with all nine drought permits in place is 17.47MI/d. (Doe Park Compensation 0.6 MI/d is excluded as compensation only results in a reduction in flow in the watercourse between it and Hewenden)		12% and 17% in the summer Q95 and Q99 flow statistics, which is assessed as a moderate hydrological impact on this reach in summer and autumn months. The reduction in year-round Q95 and Q50 is 11% and 2.8% respectively, which is assessed as a minor hydrological impact during winter months associated with winter refill periods. There are no flow depleted reaches within Aire 2. The moderate summer/autumn and minor winter reduction in flow will change the energy of the system.
Grimwith reservoir	The maximum flow reduction is 4.98MI/d during the autumn period of 12 October to 31 October, or is 10.12MI/d during the winter period of 1 November to 19 April.	Dibb 1	Reductions of up to 67% in river flows throughout the reach at any time of year that drought options implemented. There are no flow depleted reaches within Dibb 1. The major reduction in flow will change the energy of the system.
Carr Bottom reservoir	A reduction of up to 0.06MI/d in the statutory compensation release rate of 0.09MI/d.	Carr Beck 1	represents a 67% reduction in the flow at the upstream end of the reach, regardless of the time of year. There are no flow depleted reaches within Carr Beck 1. The major reduction in flow will change the energy of the system.

Table 8: Summary table of the compensation flows and their River Flow Impacts

As Table 8 above shows, within the River Aire catchment reducing the compensation for the nine reservoirs plus the maintained flow at Springhead weir will have a significant impact on the flow immediately downstream of the reservoirs. However, the impacts will become less significant moving downstream on the River Aire. It has been identified in Yorkshire Water's EAR that the impact on the River Aire at Esholt Wastewater Treatment Works (WwTW), at national grid reference SE1893238757 and catchment area of 623km², and immediately downstream of the lowest reservoirs in the area, will be negligible. Even without consideration of flow accretion along the reach, Esholt WwTW discharge alone adds a dry weather flow of 130MI/d, or approximately 1.5m³/s.

This is similar for Grimwith and Carr Bottom reservoirs in the River Wharfe catchment. The impact immediately downstream of the reservoirs are significant. However, once the flow reaches the River Wharfe, the impacts will be negligible. In Yorkshire Water's EAR for Grimwith, it identifies "*WRAPsim modelling has shown there is imperceptible change to flow in the River Wharfe when the drought option is in use.*" And for Carr Bottom, "*.....the reduction in flow statistics for the Wharfe at Addingham would be less than 10%. The potential hydrological impact of the drought option on the River Wharfe, following the confluence of the River Wharfe with Carr Beck, is considered to be negligible.*"

For the waterbodies immediately downstream of the reservoirs where significant impact is expected YW will be required to undertake mitigation and monitoring to assess and react to the impact on ecology. Details of which can be found in YW's EAR and summarised in the site specific annexes of this report.

Hands-Off Flows (HoFs)

There are only three licences that contain HoF conditions within the zone of influence of the North West Area drought options identified in the Environmental Assessment Report and these are all Canal and River Trust licences issued under the transitional regulations for New Authorisations. As a result, the threshold for their HoF conditions is set at 75% Qn99 in line with the legislation. Two of the licences are tied to Bingley gauging station and the other Skipton Eller Beck gauging station. As of today (23/09/2022) none of these HoFs are in force though it is worth reiterating that as the thresholds are so low this is in no way indicative of healthy river flows.

It is worth noting that licence NE/027/0015/021 which allows the Canal and Rivers Trust to abstract from Eller Beck and has a HoF condition of 2 Ml/d at Skipton Eller Beck, has already received an advance warning notification and is close to reaching the HoF threshold. As a result, a 50% reduction in compensation flow from Embsay Reservoir is likely to impact on the operation of this Canal and River Trust Licence. However, CRT replied on 15/09/2022 confirming they have no concerns with the proposal.

Navigation Authority Consent

The use of the feeder from Eller Beck under licence NE/027/0015/021 may be impacted due to the HoF. However, the CRT navigations themselves are not expected to be significantly impacted and CRT have confirmed they have no concerns.

7.1.2 Hydrogeology and impact on groundwater/flows

The reservoirs and their receiving watercourses are predominantly situated on Secondary Aquifers; the Millstone Grit in the north-west transitioning to Coal Measures in the south-east of the area. The hydraulic properties of these geological formations (and any overlying superficial deposits) are highly variable, consequently they are considered capable of supporting water supplies at a local rather than strategic scale, hence the relatively low number of public water supply boreholes in this region in comparison to surface water abstractions. In some cases, Secondary Aquifers such as these are a source of base flow to rivers, lakes or wetlands.

The proposal in the drought permit is to alter flows from reservoirs into surface water therefore it will not impact on groundwater. The currently low groundwater levels will mean there is less baseflow in surface waters thus low groundwater is impacting on surface water resulting in a need for a drought permit, rather than the other way around.

7.2 Impact on water quality

The proposed drought permits in each case seek to reduce either compensation flows or maintained flows to each of the respective watercourses which, when in operation, will act to lower flow volumes in the downstream watercourses. As shown in section 7.1 this will have a significant effect on the flow immediately downstream of the compensation reservoirs. This has the potential to impact upon water quality, which may be altered through reduced dilution of point and diffuse discharges.

The impacts on water quality through operating under the proposed drought permits are set out for each drought permit application in Appendix A – Physical Environment of the Environmental Assessment Report (EAR) submitted in support of the applications by YW.

The approaches/methodologies used for making these impact assessments are detailed in YW's Drought Plan 2022 Environmental Assessment Methodology, upon which the Environment Agency were consulted and agreed. The Environment Agency agree with these assessments and the methodology used.

Monitoring and mitigation

Where possible the baseline monitoring program for water quality will continue during the onset, in drought and post drought option implementation periods in order to provide robust data on environmental conditions during and after the implementation of drought options.

In addition to the baseline monitoring YW will conduct walkover surveys of water quality and ecological stress local to 'significant water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flow. It will include a mapped record of channel parameters and fixed-point photos.

Measures for mitigating water quality issues are as follows:

- Improving the effluent quality from Yorkshire Water WwTWs presenting 'significant' impacts to sensitive features, thereby reducing the water quality pressure (ammonia and oxygen balance) on the impacted features. Detailed in YWSL WwTW optimisation plan
- Artificial freshet release to dilute/displace water quality reduction
- Aeration of discharge from third party facility identified as a 'significant' water quality pressure

The specific monitoring and mitigation for sites is included in the annexes to this report. Further detail can also be found in Appendix C of Yorkshire Water's EAR.

7.3 Impact on geomorphology

The impacts that the proposed drought permits will have on geomorphology are set out in the Drought Plan: Environmental Assessment Report – North West Area Reservoirs Final Report for Yorkshire Water Services (dated 7 September 2022), referred to as the EAR.

The EAR Section A4 addresses the physical environmental effects, including for each reach an assessment of impacts on river habitats. Within section A4, the River Habitats section provides a description of the physical habitats for each reach. It also describes the potential impacts within each reach from the proposed reduction in flow.

In summary, taken from the EAR, the proposed reduced flows could lead to several potential impacts in each affected reach (or downstream waterbody):

- Changes in the energy of the system associated with reduction in flow for the duration of the drought options
- Risk of reduction in wetted width with increasing exposure of channel margins, the margins or within-channel features (such as channel bars and islands) and protrusion of bedrock outcrops and bed elements (such as larger

particles) through the flow surface for duration of drought option at very low flows.

- risk of change in available aquatic habitat (flow velocity reduction and depth reduction) for duration of drought option, with changes to the range and abundance of flow types.
- risk to longitudinal connectivity, particularly where weirs and culverts are present.

- risk of changes in sediment dynamics for duration of drought option. Reductions in discharge will lead to reductions in velocity and could lead to increased potential for the deposition of any fine sediment in transport noting that land based sources will be largely dormant during environmental drought. During winter refill periods, overland flow processes that add fine sediment to the channel during rainfall events will increase in-channel flows and increase velocities. Coarse sediment dynamics are unlikely to be affected.

The scale of the risk and potential impacts varies with each impacted reach and we are satisfied that YW have assessed the risk and impacts adequately. Monitoring and Mitigation is set out in Drought Plan 2022 Updated Environmental Monitoring Plan (2022 Version) including Appendix A.2 Monitoring Plan for Impacted Reaches NW Area Reaches.

There are a number of mitigation options that involve altering the physical nature of the river habitats including:

- IDMIT_10 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 (fish, white-clawed crayfish, water vole)
- IDMIT_11–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 (macro-invertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_12 –Artificial channel narrowing to provide functional refuges and support habitat requirement for species, enabling a quick natural recolonisation of the reach post-drought (fish, macroinvertebrates, white-clawed crayfish, fine-lined pea mussel, otter, water vole)
- IDMIT_16 –Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- PDMIT_3–Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish).

As stated in the EMP, many of the mitigation measures will require permits or approvals prior to implementation as summarised in Table 3.1 of the EMP. The design of all planned mitigation measures that impact on physical river habitats should be discussed and agreed with EA Geomorphologists in advance of implementation. If necessary, any in-channel interventions should be designed to be temporary (removable to reduce post-drought negative impacts), or be designed to mimic natural processes (e.g. woody material to provide cover and varied flow patterns, depths etc.).

Appendix D Mitigation Measures Guidance for Ecological Actions, sets out that some mitigation options may be permitted under flood risk activity exemptions

- IDMIT_10 exemption FRA18 Placing stones or logs in a main river to enhance habitats
 - Note that it states “all material should be removed within 1 month of the expiry of the drought permit/order”.
- IDMIT_11 exemption FRA15 Provision of in-stream structures

- Note that it states “all structures should be removed within 1 month of the expiry of the drought permit/order”.

If these measures are put in place under a flood risk activity exemption, the need for their removal should be discussed and agreed with EA before removal.

7.4 Impact on ecology and conservation sites

Each site has been screened for immediate downstream conservation features from the point of compensation release from the reservoir to the confluence with a main river. Please refer to each annexe for details and assessment of this screening.

YW screened for downstream conservation features as part of the Drought Plan. It was concluded that any impacts of the proposed drought permits beyond the Esholt Wastewater Treatment Works discharge on the River Aire would be negligible (for reservoirs at Leeming, Leeshaw, Doe Park, Reva, Weecher, Embsay, Silsden and Springhead Weir). For Carr Bottom Reservoir, impacts of the proposed drought permits were considered negligible beyond the confluence of the Carr Beck with the River Wharfe. For Grimwith Reservoir, impacts were considered negligible beyond the confluence of the River Dibb with the River Wharfe.

YW's Drought Plan and Environmental Monitoring Plan (EMP) include monitoring and mitigation measures. These measures were reviewed by the Agency as part of agreement of the Drought Plan and are considered to be appropriate as part of these applications for Drought Permits. Therefore, no further screening of conservation features has been carried out as part of these applications and there are no concerns regarding the proposed monitoring and mitigation.

7.5 Habitats Directive Regulations and Countryside and Rights of Way Act

The Environment Agency is of the opinion that the proposals are not likely to have a significant effect on any sites designated under the Habitats Directive or CROW Act for the reasons given below and is not directly connected with the management of the site for nature conservation.

Natural England have been consulted via a Habitats Regulations Assessment 1 (HRA 1) and an Appendix 4 on 15 September 2022. They have confirmed that they agree with our assessment on 27 September 2022 and their full response has been saved to DMS under reference DP2022- NE0270014010. The HRA 1 concluded that no likely significant effect could be shown alone and in-combination and the Appendix 4 concluded that the proposal is not likely to damage the site. The HRA 1 and Appendix 4 documents should be referred to for full details but a summary of the key points is given below.

Carr Bottom Reservoir is located within the South Pennine Moors SAC/SPA/SSSI site boundary. There is no hydrological continuity between the site and the Carr Bottom Reservoir or Carr Brook, particularly during dry periods. Therefore, we concluded that there is no likely significant effect on the site as a result of the proposed drought permits.

Trench Meadows SSSI is located approximately 2.8 km downstream of Eldwick Reservoir. Although water levels downstream of the compensation release may be reduced under the proposed drought permit, the Trench Meadows SSSI is located

above the level of the Eldwick Beck watercourse and therefore we have concluded that the proposal is not likely to damage the site.

7.6. Other considerations & consents

Consideration	Impact Yes/No	Comments
Flood Defence Consent & Flooding	No	Not applicable to this application. There are no concerns.
Reservoir Act	No	Not applicable to this application. There are no concerns.
Recreation/amenity	No	National walking trails by the associated water bodies and angling groups were identified in YW's EAR and all were assessed to have low or no sensitivity to the impact of the drought permits. The navigation authority CRT was consulted and had no concerns about the proposals.
Subsidence and desiccation	No	See section 7.3.

8 Cost benefits and environmental mitigation or gain

Options considered		1. Refuse 2. Issued as applied for 3. Issue with changes
Preferred option		3. Issued with changes. We have decided to grant the proposals, but with amendments to the draft permits submitted at the pre-application stage. The amendments and changes to the monitoring and mitigation conditions are detailed within the determination report and associated annexes.
Reason for choosing preferred option		YW have demonstrated a clear justification of need and the application accords with the measures drawn up in their 2022 drought plan.
Assessment of likely benefits and costs of proposed option to:		
Water Resources/ The Environment	There is a major to moderate risk to environmental features in reducing the compensation flow in the waterbodies immediately downstream of the compensation reservoirs. The inclusion of monitoring and mitigation conditions will ensure risk of environmental damage occurring as a result of this proposal is minimised as Yorkshire Water will be required to take action to reduce and resolve any temporary damage resulting from the use of their drought permits.	
The Applicant	The applicant will benefit from the availability of water for their operation. The applicant will be recharged for the EA's costs involved with determining the permits.	

Environment Agency	<p>The Environment Agency will incur the cost of determining the application and enforcing the licence. These costs will be recovered through the drought permit cost recovery process and recharged to the water company.</p> <p>In determining the licence in accordance with local and national policy, the Environment Agency is fulfilling its duties as a regulator.</p>
Rural Community	<p>No adverse effects upon on the social and economic well being of local communities in the rural area are perceived as a result of this proposal due to the conditions associated with the drought permit and the responses received from the advertisement.</p>

9. Biodiversity and sustainable development

This application is for a drought permit and therefore sustainable development will not be considered in detail due to the short term nature of proposal. Biodiversity has been considered and is embedded within the conditions of the drought permit.

If granted the drought permit will recognise the needs of society by providing the applicant with a reliable water source to supply potable water to the public, improving the security of supply set against the background of exceptional shortage of rainfall.

10 Time limit

Unless revoked, or YW were successful in any application to extend the expiry date, the permits will expire on 31 March 2023, or until reservoir stocks recover to YW's Normal Control Line as specified in their drought plan. Once the permit expires, the licences and section of the acts will be reactivated. If conditions do not improve by the Spring, YW will follow the procedures set out in its Drought Plan to secure supplies over the following months.

11. Measurement of water abstracted

Permits created by licences being modified

YW will be required to use the current methods of measurement specified in the licences to measure the reduced compensation flow specified under the permits. See Annexes 1-12 for further specific information about each permit.

Permits created by Acts of parliament being modified

YW will be required to use the current methods of measurement specified in the acts to measure the reduced compensation flow specified under the permits. These sites are covered by the act that authorises the abstraction/impoundment and any non-compliance would be considered a contravention of the enforcement provisions within that act rather than a non-compliance of the Water Resources Act 1991 which would be the case for abstraction/impoundment licences.

As noted in section 2. Above there is ongoing work between the EA and YW to formalise these acts into a licence which would make enforcement of these operations more straight forward.

12. Special agreements

None

13. Duties arising under legislation

Section 4 Environment Act 1995 (pursuit of sustainable development).

Consideration has been given to whether additional requirements should be imposed in relation to the Agency's principal aim to contribute to attaining the objective of sustainable development under section 4 of the Environment Act 1995, but it is felt that existing requirements are sufficient in this regard and no other appropriate requirements have been identified.

The Agency has had regard to Government guidance issued under section 4(2) of the Act, namely 'The Environment Agency's Objectives and Contribution to Sustainable Development: Statutory Guidance (December 2002)'. Regarding the exercise of its water resources functions, this requires the Agency:

*'To plan to secure the proper use of water resources by using strategic planning and effective resource management which takes into account environmental, social and economic considerations, and in particular:
' to ensure that the abstraction of water is sustainable, and provides the right amount of water for people, agriculture, commerce and industry and an improved water-related environment; and
to develop and maintain a framework of integrated water resources planning for the Agency and water users.'*

Section 6(1) Environment Act 1995 (conservation duties with regard to water)

Consideration has been given to the Agency's duty to promote the conservation and enhancement of the natural beauty and amenity of inland and coastal waters and the land associated with such waters, and the conservation of flora and fauna which are dependent on an aquatic environment. It is felt that the conditions of the licence as a whole will be sufficient in this regard and no other appropriate requirements have been identified.

The Agency has had regard to these factors.

Section 6(2) Environment Act 1995

In reaching this determination the Agency has taken all such action as it considers necessary or expedient for the purposes of conserving, redistributing or otherwise augmenting water resources, and securing their proper and efficient use.

The Agency has had regard to these factors.

Section 6(6) Environment Act 1995

It is the duty of the Agency to maintain, improve and develop fisheries of salmon, trout, eels, lampreys, smelt and freshwater fish.

The Agency has had regard to these factors.

Section 7 Environment Act 1995 (pursuit of conservation interests)

Section 7(1)(c) of the Environment Act 1995 places a duty on the Agency, when

considering any proposal relating to its functions, to have regard amongst others to any effect which the proposals would have on sites of archaeological, architectural, or historic interest; the economic and social well-being of local communities in rural areas; and to take into account any effect which the proposals would have on the beauty or amenity of any rural or urban area.

The Agency has had regard to these factors.

Section 8 Environment Act 1995 and Sections 28G and 28I Wildlife and Countryside Act 1981

Under section 28G of the Wildlife and Countryside Act 1981, as inserted by CROW, the Agency has a duty to take reasonable steps to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which a site is of special scientific interest (SSSI). Under section 28I the Agency has to assess whether any permission is likely to damage the special interest features for which a site is designated as a SSSI.

The Agency has applied this duty as indicated in section 7.5 above.

Section 39 Environment Act 1995

The Agency has a duty under section 39 of the Environment Act 1995 to take into account the likely costs and benefits of granting the applications ('costs' being defined as including costs to the environment as well as any person.).

The Agency has taken these factors into account as indicated in section 8 above.

The Conservation of Habitats and Species Regulations 2017

Under regulation 63 of these Regulations, the Agency must, before granting any abstraction or impoundment licence, assess whether it is likely to have a significant effect on a European site (Special Areas of Conservation or Special Protection Area), either alone or in combination with other projects; and if so assess the implications of the abstraction upon that site in light of its conservation objectives. In the light of the conclusions of the assessment (and subject to regulation 64) the Agency shall grant the applications only after having ascertained that they will not adversely affect the integrity of the European site.

The Agency has applied this duty as indicated in section 7.5 above.

Section 85 Countryside and Rights of Way Act 2000

Section 85 places a duty on Agency to have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty (AONB) when exercising or performing any of our functions in relation to, or so as to affect, land in an such an area.

The Agency has applied this duty as indicated in section 7.4 above.

Section 40 Natural Environment and Rural Communities Act 2006

Section 40 of the Natural Environment and Rural Communities Act 2006 places a duty on the Agency to have regard, so far as is consistent with the proper exercise of its functions, to conserving biodiversity. 'Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population

or enhancing a population or habitat.

The Agency has applied this duty as demonstrated through the relevant sections and considerations within this report.

Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

As required by regulations 3 and 33 of these Regulations, in reaching these determinations the Agency has exercised its water resources functions so as to secure compliance with the Water Framework Directive and has had regard to the River Basin Management Plan for this river basin district which has been approved under regulation 31 of these Regulations.

As stated in section 7 above the WFD assessments for each are set out in each site specific annex.

Section 15 Water Resources Act 1991 (particular regard to duties of water and sewerage undertakers imposed by Parts II-IV of the Water Industry Act 1991)

In considering this application the Agency must have particular regard to the duties imposed upon water undertakers under Parts II –IV of this Act, which include the water supply duties in Part III, and specifically the section 37 duty imposed on every water undertaker *‘to develop and maintain an efficient and economical system of water supply within its area, and to ensure that all such arrangements have been made for providing supplies of water to premises in that area and for making such supplies to persons who demand them....’*

The Agency has applied this duty as demonstrated through the relevant sections and considerations within this report.

Marine and Coastal Access Act 2009

Section 58 of this Act requires us to act in accordance with appropriate marine policy documents, unless relevant considerations indicate otherwise.

Section 125 of this Act requires that, so far as is consistent with their proper exercise, we exercise our functions in a manner that we consider best furthers the conservation objectives stated for Marine Conservation Zone(s) (MCZs) certain features of which are capable of being affected by our determination (to more than an insignificant degree) or else, where this is not possible, which least hinders the achievement of those objectives.

Section 126 of this Act requires that, before granting a Permit capable of affecting certain features of a MCZ(s) (to more than an insignificant degree), we consult with Natural England and that we are satisfied that there is no significant risk of the operation hindering the achievement of the conservation objectives stated for any relevant MCZ(s).

Marine Strategy Regulations 2010

In relation to Regulation 9 of the Marine Strategy Regulations 2010 we have had regard to the marine strategy (in so far as it has been developed and published to

date) and consider that there is nothing in it which would lead us to any different conclusions from those we have already reached through our other marine assessments.

Section 108 Deregulation Act 2015 – Growth duty

We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this licence.

Paragraph 1.3 of the statutory guidance issued by the Department of Business, Energy and Industrial Strategy in March 2017 says:

“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”

We have addressed the legislative requirements and environmental standards to be set for this abstraction in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.

We consider the requirements and standards we have set in this permit are reasonable

14. Conclusion and recommendation

Conclusion

This application is for 12 drought permits in North West Area group. The permits are to reduce compensation flows from 11 impounding reservoirs and reduce one maintained flow on the River Worth. The permits will expire on 31 March 2023.

YW's supporting information and our analysis have demonstrated that there has been an exceptional shortage of rainfall. We are satisfied with the case put forward by YW and conclude that a serious deficiency of supplies is threatened. We are also satisfied that, in accordance with their drought plan, YW has implemented measures to reduce loss and consumption through implementing the relevant section of their drought plan.

We have considered the potential impacts arising through implementing the drought permits and have concluded that monitoring and mitigation is required in accordance with the Environmental Management Plan and additional monitoring as detailed in this report and the annexes attached.

Full and due consideration has been given to any comments or representations made, and due regard has been taken of protected rights and other lawful interests.

The conditions incorporated on the permits are considered to be necessary and reasonable in the light of the available and presented evidence. The conditions are also considered to be consistent with appropriate standards for enforcement by the Environment Agency.

Recommendations:

Please see Annexes 1-12 for our recommendations for the conditions of the 12 drought permits.

15. Authorisation

Applicant :	Yorkshire Water Services Limited
Application References:	Leeming - DP2022-NE0270014010 Leeshaw - DP2022-NE0270014011 Doe Park - DP2022-NE0270016027 Hewenden - DP2022-NE0270016028 Eldwick - DP2022-NE0270016029 Reva - DP2022-NE0270016030 Weecher - DP2022-NE0270016031 Silsden - DP2022-22715149 Embsay - DP2022-22715045 Grimwith - DP2022-NE0270019011 Carr Bottom - DP2022-NE0270016032 Springhead Weir - DP2022-22714058

Report by: Teresa Johnstone, Vicki Hobbs, Polly Booth, Stephen Smith and Roisin Griffin Position: Senior Permitting Officer/Permitting Officer	Date: 20/10/2022	Signed: T.J, V.H, P.B, S.S, R.G
Peer Review (Audit) by: Adam Korzeniowski Position: Senior Permitting Officer I have reviewed all permitting documents in line with appropriate regime specific check lists and I hereby approve the proposed permit for issue. A record of this has been saved to EDRM and named Peer review sign off".	Date: 24/10/2022	Signed: A.K
Audit by: Aden Biddle Position: IEP - Area Drought Lead	Date: 24/10/2022	Signed: Aden Biddle
Audit by: R.Halliday Position: OCS – Area Drought Lead	Date: 21/10/22	Signed: R.M.H

Authorised by: Victoria Slingsby Position: Area Drought Manager	Date: 24 October 2022	Signed: V. Slingsby
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Area agreement was confirmed on 24 October 2022 by:

Name: Victoria Slingsby

Position: Area Drought Manager

Area: Yorkshire

A record of this has been saved to EDRM and named “Final Area Agreement”