

Annexe 9 – Embsay Reservoir, DP2022-22715045

A. 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 replace the conditions of the Skipton Water and Improvement Act 1904.

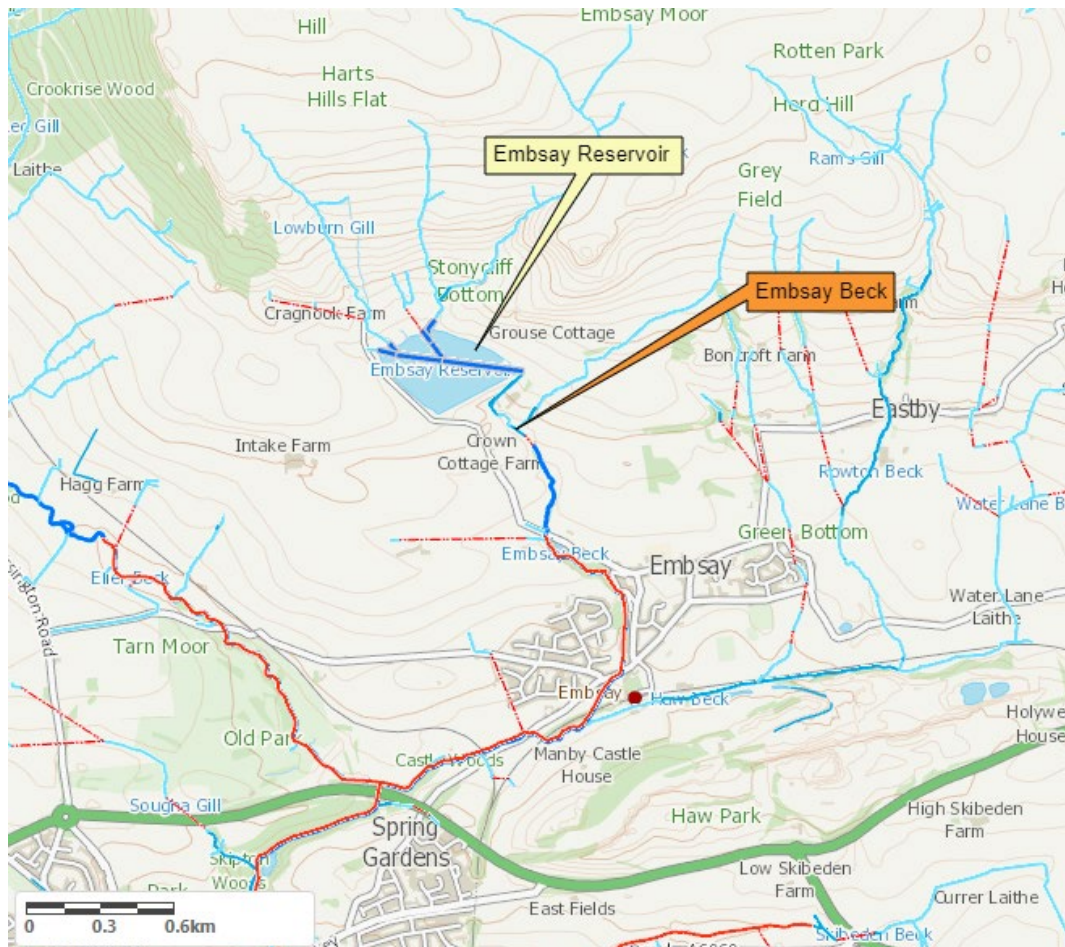


Figure 1: Embsay Reservoir (Compensation Water Source) and Embsay Beck (Receiving Watercourse)

YW are authorised to abstract water from Embsay Reservoir under the Skipton Water and Improvement Act 1904 and licence 2/27/15/45 for public water supply. Under the Act, YW must provide a compensation release from the reservoir to the Embsay Beck at a rate of 1.186 MI/day (261,000 gallons per day). Licence 2/27/15/45 states that a flow of not less than 0.273 MI/day (60,000 gallons per day) must remain in the Embsay Beck, immediately downstream of the abstraction point when abstraction takes place.

YW are applying to reduce the compensation release to 0.593 MI/day. 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, as defined in the Yorkshire Water Drought Plan. The proposed reduced compensation flows are

greater than the compensation flow required under licence 2/27/15/45 and therefore there are no changes required to the existing licence.

The Drought Permit has been applied for due to an exceptional shortage of rainfall in the area. The proposed reduction of the compensation release will help to conserve water levels in the Reva Reservoir to maintain public water supply during winter 2022 – 23 and increase the chance of returning to normal reservoir levels by April 2023.

The proposed reduction in compensation release has been requested until 31 March 2023.

B. Details of proposal

A summary of the conditions of the Skipton Water and Improvement Act 1904 has been included here. There are no proposed changes to the existing licence (number 2/27/15/45).

Compensation release details	Existing details	Drought permit application changes
Location of discharge	Embsay Reservoir	No change
Duration of drought permit	N/A	Up to and including 31 March 2023
Point of discharge	SE 00082 54459	No change
Rate of compensation release	1.186 Ml/day	0.593 Ml/day <u>If reservoir levels below Drought Control Line:</u> 0.395 Ml/day

Drought permit further conditions

See section G for recommendations of the drought permit.

C. Quantities

There are no abstraction quantities associated with this application for a drought permit. Please see sections A and B for details of the existing and proposed compensation release quantities.

D. WFD

This application is outside the Abstraction Licensing Strategy process. This is because it relies on drought powers to address exceptional circumstances. However, the proposal still needs to be Water Framework Directive (WFD) compliant.

The proposal will be assessed against the WFD statuses, including identifying the risk of any temporary deterioration of status.

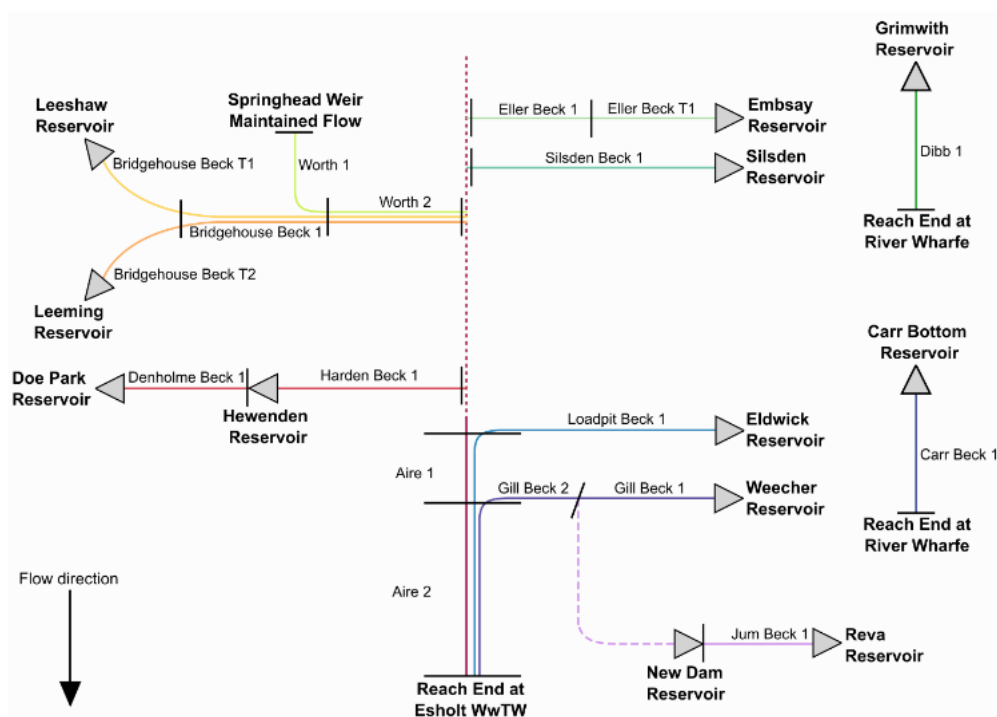


Figure 2: North West Area reservoirs drought permits reach schematic

The WFD waterbodies that are within the downstream area affected shown on Figure 4.1 provided with YW's application are:

- Eller Beck T1 - Haw Beck from Source to Eller beck, GB104027063060
- Eller Beck 1 - Eller Beck from Haw Beck to River Aire GB104027063020

Although Aire 1 and Aire 2 have been assessed with some of the reservoirs, we have followed Table 4.2 in YW's EAR which states that this drought permit does not significantly influence flow in those reaches.

Haw Beck from Source to Eller beck, GB104027063060

The Haw Beck from Source to Eller beck, (GB104027063060) and Eller Beck from Haw Beck to River Aire (GB104027063020) are classed as heavily modified. These are water bodies where there is a significant risk of failing to achieve a good ecological status because of modifications to their hydro-morphological characteristics. Therefore they have a target of achieving Good Ecological Potential (GEP) rather than Good Ecological Status (GES). For heavily modified water bodies, flow is the first element assessed as part of the classification. If flow standards are passed, then potential is based on a combination of mitigation measures and 'non-sensitive' quality elements. For river water bodies, these consist of the physico-chemical, specific pollutants and phytobenthos elements. If flow standards fail, then potential is based on the worst-result of either the mitigation measures assessment or any of the quality element assessments.

Consideration	Status		
	Baseline status (2015)	Cycle 2 current status (2019)	Cycle 2 Objective
Overall WB status	Moderate	Moderate (Quite Certain)	Good by 2027
Ecological potential	Moderate	Moderate	Good by 2027
Fish	Poor (Very Certain)	High	Good by 2027
Invertebrates	Good	Good	Good by 2015
Macrophytes	Moderate (Quite Certain)	Moderate (Quite Certain)	Not assessed
Phytobenthos	No data	Moderate (Quite Certain)	Not assessed
Hydrological regime	No data	Not assessed	Not set
Mitigation measures	Moderate/Less	Good	Good by 2027
Physico-chemical	Good	Good	Good by 2015
Chemical	Good	Fail (Uncertain)	Good by 2015

Table 1: Haw Beck from Source to Eller beck, GB104027063060 (Heavily Modified)

Reasons For Not Achieving Good:

Ecological Potential – The ecological potential is at moderate status and does not meet Good WFD status due to several contributing factors explained below.

Macrophytes and Phytobenthos – The WFD status for macrophytes and phytobenthos is moderate (quite certain), but the reasons for this are pending investigation.

Hydrological regime – The hydrological regime element is not assessed for this surface water body, and therefore classification follows the pathway of flow conditions fail. Certain heavily modified waterbodies are no longer classified for hydrological regime where the hydrological regime test is not sufficient due to the nature of the waterbody. In this instance, ecological potential is based on the worst result of either the mitigation measures assessment or any of the quality elements.

Chemical – The chemical status is Fail (uncertain). This is due to the failed WFD status of mercury and its compounds, which are awaiting measures to address the reasons for failure and also the failed WFD status of Perfluorooctane sulphonate (PFOS) and Polybrominated diphenyl ethers (PBDE), which are also pending investigation.

WFD objectives assessment:

- The objective for hydrology regime has not been set as the waterbody has not been assessed for flow.

- The objectives of Good by 2027 indicates the long-term ambition for the waterbodies as it is technically feasible to fix the issues, but these were not funded in the Cycle 2 plan. In the Cycle 3 plan these objectives will be revised and if the required fixes are still not funded the deadline could be extended again.
- Where we have a baseline (2015) status of 'Good' then our objective has been set as Good by 2015. This is because the waterbody is already meeting its default objectives, and nothing less than good can be predicted as this would go against the directive.

Risk of deterioration of elements

Eller Beck T1 - Haw Beck from Source to Eller beck, GB104027063060

Fish – The classification for fish is currently at High WFD status. YW's EAR states that reductions in wetted width, depth and flow velocity may lead to stranding of individuals. Spawning and juvenile nursery habitat is considered likely to be present, the integrity of these important habitats identified as potentially present may become compromised (e.g. siltation of spawning gravels), the significance of barriers may become more significant and higher densities of fish will attract increased predation. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a moderate risk to the WFD status of the waterbody GB104027063060 Haw Beck from Source to Eller Beck (associated with Eller Beck T1). Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be **major**.

Invertebrates – The classification status for invertebrates is currently at Good. YW's EAR states that the potential changes to river flows is likely to result in major reduction in flow and will lead to a major reduction in wetted width and depth which will directly reduce the overall habitat availability within the reach. The macroinvertebrate community shows a good to high level of diversity, and consequently, loss of habitat may reduce the diversity of the community as a result of habitat loss for certain species. Furthermore, the increased friction between flow and channel bed may reduce flow velocity, as the macroinvertebrate community is sensitive to flow velocity reductions, as indicated by high LIFE scores. This may reduce the suitability of the reaches to species which require high flow velocities. Ammonia and dissolved oxygen status in the reach are considered to be at a low risk of deteriorating respectively, the community is considered sensitive to water quality deterioration due to good WFD classifications. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a major risk to the macroinvertebrate component of the GB104027063060 Haw Beck from Source to Eller beck (associated with Eller Beck T1). The duration of impacts could be up to 6 months. However, the macroinvertebrate community recovery is expected to be relatively quick due to effective re-colonisation strategies in macroinvertebrates. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be **moderate**.

Macrophytes and Phytobenthos – This element is screened out of the impact assessment as neither are deemed to be impacted by changes in flow. Wetted width reduction would not result in a deterioration of status due to the way monitoring is carried out. Reduced dilution of phosphate caused by drought option implementation may have an impact if P deterioration is predicted but would be

temporary and unlikely to impact on either status. We don't believe this drought option poses any risk to the deterioration of macrophyte or phytobenthos status.
Hydrological Regime – Not assessed

Mitigation Measures – The drought permit will not exacerbate this particular classification as it will not result in changes to the physical modification structures.

Physico – Chemical – YW's EAR states that One water quality monitoring location is present in Embsay Beck Above Confluence with Haw Bk (NE49400334). The average pH between 2010-2020 was 7.96 with a maximum temperature of 16.3oC for the same period. There are no significant continuous or intermittent discharges either within Eller Beck T1 or at risk from changes in flow in the reach. The EAR summaries that this drought option presents a minor risk to water quality.

Chemical – The EAR has not assessed the specific chemical parameters that are the cause of failure in the EA's catchment planning system. However as there is a risk to physico-chemical parameters then it is reasonable to state there may be a risk to chemical parameters due to the same pathway. Although there is a risk of potential further deterioration to this element, it's considered that the mitigation measures will be sufficient to protect against this.

Eller Beck from Haw Beck to River Aire GB104027063020

Eller Beck from Haw Beck to River Aire GB104027063020 is classed as a heavily modified waterbody. The implications of this in relation to the waterbody's ecological status are explained above in 'Haw Beck from Source to Eller beck, GB104027063060'.

Consideration	Status		
	Baseline status (2015)	Cycle 2 current status (2019)	Cycle 2 Objective
Overall WB status	Poor	Moderate	Moderate by 2021
Ecological potential	Poor	Moderate	Moderate by 2021
Fish	Poor	Poor	Good by 2027
Invertebrates	Good	Good	Good by 2015
Macrophytes	Good	Moderate	-
Macrophytes and Phytobenthos combined	Good	Not assessed	Good by 2015
Hydrological regime	Does not support Good	Supports Good	Supports Good by 2021
Mitigation measures	Moderate/ less	Moderate/ less	Good by 2027
Physico-chemical	Moderate	Moderate	Moderate by 2015
Chemical	Good	Fail	Objective not set

Table 2: Eller Beck from Haw Beck to River Aire (GB104027063020)

Reasons For Not Achieving Good:

Ecological Potential – The ecological status is moderate (very certain), which is attributed to the poor status of biological quality elements, including fish, and failed chemical status.

Fish – The WFD status for fish is poor (very certain), due to the poor Biological Oxygen Demand attributed to point sources of sewage pollution and physical modifications of the channel for flood protection and urbanisation.

Macrophytes and phytobenthos – The WFD status for Macrophytes and Phytobenthos is moderate (quite certain) due to diffuse sources of pollution attributed to poor soil management from agriculture and rural land and point sources of pollution from sewage treatment.

Mitigation measures – The mitigation measures are classed as being at moderate/less due to physical modifications of the channel for urban and transport reasons.

Physico – chemical – The physico-chemical status is at moderate (very certain) status due to the moderate status of phosphate attributed to diffuse and point sources of pollution from poor nutrient management from agriculture and sewage discharge.

Chemical – The chemical status is Fail (uncertain) due to the failed status of mercury and its compounds, Perfluorooctane sulphonate (PFOS) and Polybrominated diphenyl ethers (PBDE), which are awaiting measures to address the reasons for failure.

WFD objectives assessment:

- The objectives of Good by 2027 indicates the long-term ambition for the waterbodies as it is technically feasible to fix the issues, but these were not funded in the Cycle 2 plan. In the Cycle 3 plan these objectives will be revised and if the required fixes are still not funded the deadline could be extended again.
- Where we have a baseline (2015) status of 'Good' then our objective has been set as Good by 2015. This is because the waterbody is already meeting its default objectives, and nothing less than good can be predicted as this would go against the directive.
- Where we have an objective of 'Moderate by 2015' this particular waterbody cannot reach good status, only moderate. As the objective is already at moderate for physico-chemical it has an objective of 'Moderate by 2015'. This means the Ecological Potential and Overall Waterbody objectives are 'Moderate by 2015' as, because of the physico-chemical status, they cannot achieve higher than moderate.

Risk of deterioration of elements:

Eller Beck 1 - Eller Beck from Haw Beck to River Aire GB104027063020

Fish – Considering the hydrological impacts and the risk of water quality deterioration in the reach, the risk to the WFD status the fish elements of

GB104027063020 Eller Beck from Haw Beck to River Aire (associated with Eller Beck 1) is considered to be **moderate**.

Invertebrates – YW's EAR states that the combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a major risk to the macroinvertebrate component of the GB104027063020 Eller Beck from Haw Beck to River Aire (associated with Eller Beck 1). The duration of impacts could be up to 6 months. However, the macroinvertebrate community recovery is expected to be relatively quick due to effective re-colonisation strategies in macroinvertebrates. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be **moderate**.

Macrophytes & Phytobenthos – This element is screened out of the impact assessment as neither are deemed to be impacted by changes in flow. Wetted width reduction would not result in a deterioration of status due to the way monitoring is carried out. Reduced dilution of phosphate caused by drought option implementation may have an impact if P deterioration is predicted but would be temporary and unlikely to impact on either status. We don't believe this drought option poses any risk to the deterioration of macrophyte or phytobenthos status.

Mitigation Measures – The drought permit will not exacerbate this particular classification as it will not result in changes to the physical modification structures.

Hydrological Regime – Not assessed.

Physico-chemical – Two water quality monitoring points are present in Eller Beck 1. For this assessment the second sample in the reach, Eller Beck at Confluence with River Aire (NE-49400308), was used due to data quality. The average pH between 2010-2020 was 8.1 with a maximum temperature of 17.6°C for the same period. There are no significant continuous discharges into Eller Beck 1. There is one frequently spilling CSO potential presenting an environmental risk in the reach. There is a moderate risk from this drought option in combination with the CSO discharge for total ammonia and oxygen. There is a **moderate** risk from drought options associated with change in dilution of diffuse pollution pressures.

Chemical – The EAR has not assessed the specific chemical parameters that are the cause of failure in the EA's catchment planning system. However as there is a moderate risk to physico-chemical parameters then it is reasonable to state there may be a risk to chemical parameters due to the same pathway. Although there is a risk of potential further deterioration to this element, it's considered that the mitigation measures will be sufficient to protect against this.

Risk of Deterioration: A summary for all Reaches

Although YW EAR identifies that there is a possible moderate or major risk to certain WFD elements as a result of this drought option (Fish, Invertebrates, Physico-chemical, Chemical), we are satisfied that the monitoring and mitigation conditions included within the drought permit mitigates any possible risk of deterioration in the status of WFD elements (Fish, Invertebrates, Physico-chemical, Chemical). If the monitoring schedule identifies any impacts to the WFD elements as a result of this drought permit, then reactive mitigation will be carried out, dependent on the problems identified. Additionally, should any environmental problems be identified, YW will increase their compensation flows as laid out in the relevant permit.

E. Impact on ecology and conservation sites

Conservation sites

The sites, species and habitats listed in the table below are within the 5.6 km reach from the point of the compensation release at Embsay Reservoir to the cumulative reach of the River Aire.

The River Aire downstream of that confluence has potential to be cumulatively affected by reservoirs in YW's North West area reservoir group. Please refer to the main determination report for this group of reservoirs for further details.

Nearest conservation sites (distance searched – 5.6 km downstream)			
Designation types	Name of site	Distance downstream	Potential Impact
Special Areas of Conservation (SACs)	None	N/A	N/A
Ramsar sites	None	N/A	
Special Protection Areas (SPAs)	None	N/A	N/A
Sites of Special Scientific Interest (SSSIs)	None	N/A	N/A
Groundwater Dependent Terrestrial Ecosystems (GWDTEs) that are not designated as SSSIs	N/A as surface water application	N/A	N/A
National Nature Reserves (NNRs)	None	N/A	N/A
Local Nature Reserves (LNRs)	None	N/A	N/A
Ancient Woodland	Castle Wood	2 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors.
Scheduled Ancient Monuments (SAMs)	None	N/A	N/A
Local Wildlife Sites (LWSs)	Castle Wood	2 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors.
National Parks	Yorkshire Dales	Within site	The permit is unlikely to impact on the protected

			landscape of the National Park.
Areas of Outstanding Natural Beauty (AONBs)	None	N/A	N/A
Heritage Coast	None	N/A	N/A
Restoring Sustainable Abstraction (RSA) Programmes	None	N/A	N/A
Protected Species	Brown/Sea Trout*	0.1 km	Impact on this species has been assessed in YW's EAR and appropriate monitoring and mitigation has been included in Appendix A.2.
	Bullhead*	0.39 km	Impact on this species has been assessed in YW's EAR and appropriate monitoring and mitigation has been included in Appendix A.2.
	Brook Lamprey*	1.1 km	Impact on this species has been assessed in YW's EAR and appropriate monitoring and mitigation has been included in Appendix A.2.
	Code 2	0.5 km	The record on Easimap is an unconfirmed record of this species, without a specific location (only a 4-figure grid reference has been supplied). For the duration of the permit this species will be primarily occupying its terrestrial habitats and so risk of impact from reduced flows is low.
	European Eel Migratory Route	2.15 km	Eel are not included in EAR. This is based on the historic capture of one eel in surveys of Embsay Beck. Habitat downstream of the reservoir is not suitable for eel and therefore does not need further

			consideration in the EAR.
Protected Habitats	Deciduous woodland*	0.5 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors.
Invasive Non-native Species	Himalayan Balsam	1.1 km	The implementation of this drought option is not anticipated to increase the spread of Invasive non-native species.
	Signal Crayfish	3.4 km	
	Japanese Knotweed*	4.6 km	
	Northern River Crangonyctid	5.5 km	
	Giant Hogweed	5.53 km (At River Aire)	

Table 3: Conservation screening results

* Please note that there are several records of this features within the screening distance but only the closest feature to the site has been included in this report.

Protected fish species

There is a pathway for the drought permit to impact on fish species in the identified impacted reach. This has been assessed in YWs EAR and we agree with this assessment and the proposed monitoring and mitigation plan. Mitigation is set out in YW's EAR Appendix A.2 and this will be included on the drought permit.

Monitoring and mitigation

YW will be required to carry out the following monitoring and mitigation measures (which will be included in Appendix 1 and 2 of the Drought Permit):

Monitoring:

- IDMON_1: Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems at two sites:
 - Eller Beck between National Grid References (NGR) SD 98429 50828 and SD 98471 50315.
 - 500m located within SE 00302 53934 to SE 00539 53768
- IDMON_3: Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
 - Carleton Road, Skipton CSO at NGR SD 98444 50748
- Upon finding any signs of environmental problems the water company shall:
 - i) notify the Agency in writing and by telephone on 0800 80 70 60 and shall provide details of the signs of distress and the location;
 - ii) the water company shall undertake a remedial course of action to address the signs of environmental problems, as directed in writing by the Agency.

Mitigation:

- If, upon being notified of any signs of environmental problems, the Agency gives written notice that there is a disruption to the ecology, the water company shall increase compensation flow from Embsay Reservoir to Embsay Beck at NGR SE 00082 54459 to a rate of not less than 1,186 cubic metres per day, or a lesser quantity if agreed in writing by the Agency.

- The increase in compensation flow to Embsay Beck shall continue until the Agency serves a subsequent written notice stating that the reduction in compensation flow in accordance with conditions of this drought permit may be resumed.
- The changes to the compensation water specified in the conditions of this drought permit shall be made in a steady and controlled manner at a rate so as not to cause any flooding of land or disturbance to water users downstream or any adverse effects on the quality of water in the inland water or any adverse impacts on the ecology of the inland water or dependent ecosystems.
- **Freshet flows condition:**
If, upon being notified by the Agency, or upon discovering through environmental monitoring, or through other evidence that an increase in compensation flow is needed to support riverine ecology and/or support trout and salmon species, as identified in the Water Company Environmental Monitoring Plan North West Area Appendix, termed IDMIT_9 and IDMIT_17, the Water Company shall increase compensation flow at a time, to a rate and for a duration as agreed in writing by the Agency, and release from Embsay Reservoir to the Embsay Beck at National Grid Reference SE 00082 54459, or other location as agreed in writing by the Agency.

F. Measurement

The discharge from Embsay Reservoir is authorised under the Skipton Water and Improvement Act 1904. There will be no change to the way the discharge is measured as part of this drought permit.

G. Recommendations

Based on the conclusions of the main determination report (section 14), the Agency has decided to grant a drought permit under section 79A of the Water Resources Act 1991 subject to conditions, as drafted and attached to this report. The drought permit will suspend the provisions of the Skipton Water and Improvement Act 1904 during any period in which YW can abstract under the conditions of the drought permit.

The drought permit will be time limited to 31 March 2023 and will include the following conditions along with appendices detailing the monitoring and mitigation requirements.

Condition	Source of the condition wording
1.1 (i) Compensation Flow	Compensation flow reduced. Condition has been legally approved.
1.1 (ii) Compensation Flow	Compensation flow when regional reservoir stocks are below the Drought Control Line (as defined in YW Drought Plan 2022) for more than four consecutive weeks. Condition has been legally approved.
The following conditions will be included for environmental monitoring and mitigation. They have all been legally approved.	
2.1	Condition requiring YW to follow the monitoring set out in Appendix 1 of drought permit.

2.2	Mitigation actions to be undertaken by YW if environmental problems identified.
2.2.1 (i)	YW must notify Agency of any environmental problems.
2.2.1 (ii)	YW must formulate remedial course of action to address problems.
2.2.2	YW must increase compensation flow.
2.3	All changes to compensation flow must be made in a steady and controlled manner.
2.4	Freshet flows condition.
2.5	Combined Sewers Overflow condition.
3.1	Drought permit only relied upon if Temporary Use Ban restrictions imposed and in force.

Table 4. Recommendations of drought permit conditions