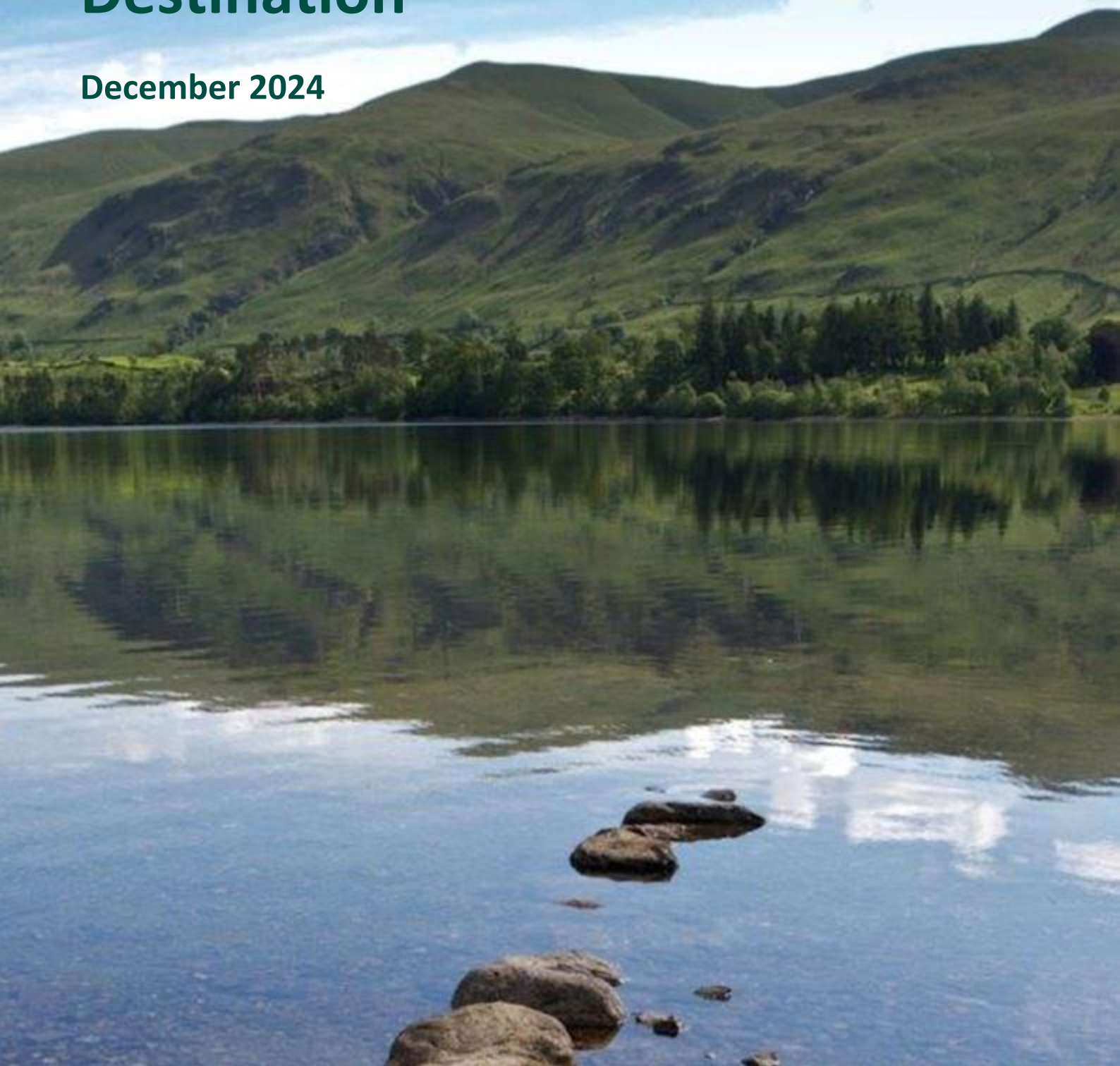


Final Water Resources Management Plan 2024

Technical Report - Environmental Destination

December 2024



Contents

1. Introduction.....	4
1.1 Changes from draft to revised draft WRMP	5
1.2 Changes from revised draft to Final WRMP.....	6
2. Regional group.....	7
2.1 Environmental destination workstream	7
3. WINEP and No Deterioration	8
3.1 Sustainability reductions (AMP8).....	8
3.2 No deterioration (AMP9)	16
3.3 Strategy for implementing sustainability reductions.....	20
3.4 Unused licences	20
3.5 AMP8 WINEP implementation schemes.....	24
4. Methodology for long term environmental destination	26
4.1 Environment Agency National Framework data analysis	26
4.2 Update for final WRMP (long term licence changes).....	29
4.3 Catchment prioritisation	37
5. Impact on deployable output.....	46
5.1 Strategic Resource Zone	46
5.2 Carlisle Resource Zone	47
5.3 North Eden Resource Zone	48
5.4 Barepot Resource Zone.....	48
6. Actions to reach our environmental destination	49
6.1 Wyre.....	50
6.2 Upper Mersey	51
6.3 Eden	52
6.4 Wales.....	53
7. Non-public water supply.....	55
8. Summary	56
9. References.....	57

Tables

Table 1 Changes made between draft and revised draft	5
Table 2 Changes made between revised draft and final	6
Table 3 Provisional details of licence changes from AMP7 WINEP investigations.....	12
Table 4 Deterioration risk category (FL = Fully Licensed, FP = Future Predicted, RA = Recent Actual).....	16
Table 5 Licence changes assumed for groundwater sources for no deterioration in AMP9	17
Table 6 AMP8 WINEP investigations for potential sustainability reductions.....	19

Table 7 SRZ AMP9 Sustainability reductions sensitivity testing	19
Table 8 Unused sources	20
Table 9 Summary of AMP8 WINEP implementation schemes in the North West and Wales	24
Table 10 Scenarios detailed in the Environment Agency's National Framework that has been carried forward for WRMP24.	27
Table 11 Reduction in Public Water Supply (PWS) licence volume under the different environmental destination scenarios	27
Table 12 Uncertainties and assumptions with the National Framework data	28
Table 13 Summary of known and potential licence changes from 2025-2050	30
Table 14 Ofwat Low scenario and comparison with BAU+ of sources where new potential licence volume is less than individual source baseline yield assumed in the supply forecast.	32
Table 15 Ranking of U UW catchments*	40
Table 16 Stakeholders engaged in the Wyre catchment.....	42
Table 17 Cumulative DO impacts for 1 in 500 EDO from licence reductions in the Strategic Resource Zone (separating out sustainability reductions in AMP8 and AMP9)	47
Table 18 SRZ Long term Environment Destination sensitivity assessment	47
Table 19 Detailed breakdown of known and potential licence changes from 2025-2050.....	57
Table 20 Waterbodies that are not supporting good (hydrology status) excluding reservoir sources.....	61
Table 21 Waterbodies at potential Band 3 flow compliance at 2050 and reasons for screening out licence reductions	63
Table 22 Outcome of AMP5/6 Heavily Modified Water Body investigation.....	69

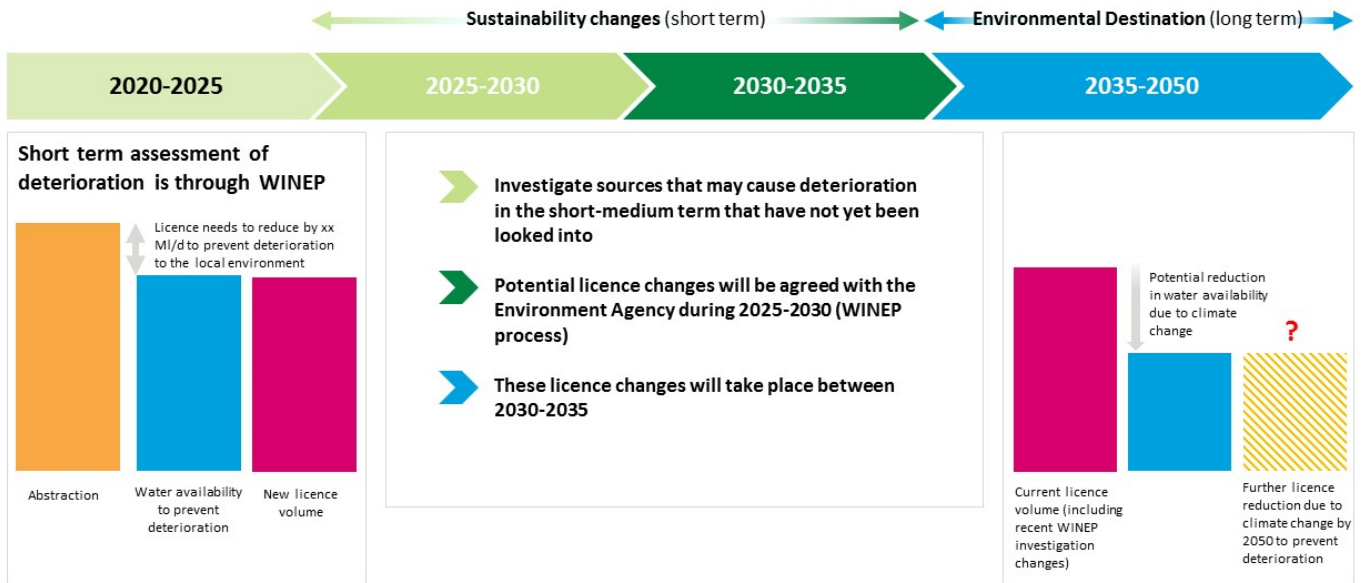
Figures

Figure 1 Environmental destination roadmap.....	4
Figure 2 Conceptual diagram of EFI.....	9
Figure 3 Conceptual diagram of the EFI approach	9
Figure 4 Percentage allowable abstraction from natural flows at different sensitivity bands	10
Figure 5 Impact of reservoir compensation in the wider catchment considering climate change	33
Figure 6 Change in annual groundwater recharge for various climate change scenarios (Manchester and East Cheshire Aquifer)	35
Figure 7 change in Q95 using the eFLaG dataset (GR6J model) for the River Dane at Rudheath.....	36
Figure 8 Number of RCM models within predicted decadal change categories	36
Figure 9 Regional Prioritisation of Catchments (England).....	39
Figure 10 Geographical locations of catchment-based approach (CaBA) groups, highlighting the 13 groups in U UW’s operating area.....	42
Figure 11 Tier 1 in-catchment characterisation and prioritisation process.	43
Figure 12 Tier 2 in-catchment characterisation and prioritisation process	44
Figure 13 Geographical locations of our water resource zones	46
Figure 14 Unconstrained options in the Wyre	51
Figure 15 Map of the Upper Mersey catchment	52

1. Introduction

This technical report sets out our approach to developing a roadmap for environmental destination, in collaboration with the regional group Water Resources West (WRW). By planning for potential licence reductions in both the short and long term (Figure 1), we are able to create solutions that are cost-effective and affordable, provide overall environmental improvement and good value for the environment and customers. We are also committed to do our part to meet the expectations from the governments Environment Improvement plan (2023).

Figure 1 Environmental destination roadmap



Our approach to developing our long-term environmental destination has been informed by the latest regulatory guidelines, engagement with our stakeholders and adheres to the principles outlined in the following guidance documents:

- Long-term water resources environmental destination – Environment Agency October 2020; and
- Long-term environmental destination – Natural Resources Wales 2021.

In previous Water Resource Management Plans, changes to abstraction have been primarily via the Water Industry National Environment Programme (WINEP). The 25-Year Environment Plan, published by Defra in 2018, set out an environmental agenda, including ambitious targets for sustainable abstraction. In March 2020, the Environment Agency published their expectations for sustainable abstraction in the National Framework for Water Resources. This set out catchment-scale abstraction targets under various protection scenarios.

For the first time, regional groups and water companies are required to develop a destination for sustainable water resources management for the long term – to 2050. Guidance highlights the need for abstraction pressure to be considered, but actions to reach the destination should be holistic and look at a range of measures that would benefit the environment and catchment as whole. In line with our Catchment Systems Thinking approach (CaST), we are seeking multiple benefits including increasing natural capital, biodiversity and social capital.

1.1 Changes from draft to revised draft WRMP

Table 1 Changes made between draft and revised draft

Change	Reason	Update(s)	Relevant section(s)
Re-organised the report in accordance with the time line set out in Figure 1 highlighting the need to address the short term issues as the initial highest priority	Environment Agency request for more information in how we address the short term known and potential issues	Updated report structure	Sections 3, 4 and 5. Provided additional information in section 3 and added new Table 19 Table 20, Table 21 and Table 22
Provided more detail on how we conduct no deterioration investigations	Environment Agency request to provide more detail on the assessment to prevent deterioration	Updated text on approach	Section 3
Undertaken a review of all current WFD hydrological status of waterbodies (excluding reservoirs) potentially affected by our abstractions and cross referenced against what investigations have concluded or are planned for	Environment Agency request to review WFD status of waterbodies potentially effected by our abstractions	Provided table presenting current (cycle 3) hydrological status of relevant waterbodies impacted by U UW abstractions	Table 21 in section 9
Developed strategy to implement short to medium term licence changes by 2027 (where feasible) in line with the River Basin Management Plans	Updated guidance requesting water companies to address known environmental problems (as consequence of our abstractions) at pace	New section in report	Section 3.3
Reviewed all previous and upcoming Heavily Modified Water Body assessments and associated agreed mitigation measure implementation (related to water resources)	Environment Agency request for more detail on what reservoir mitigation measures are required to ensure HMWB's reach it's ecological potential objectives set out in the RBMPs and any implications on the supply forecast	New table with breakdown of HWMB assessments	Table 22 in section 9
Provided further detail on differences in licence reductions between the National Framework BAU+ scenario and volumes included in the WRMP. Undertaken sensitivity testing of implementing long term licence reductions before 2040	Environment Agency recommendation to provide justification for differences in licence reductions between the National Framework 'business as usual' (BAU) scenario and the volumes included in the baseline supply forecast in the draft WRMP BAU+ scenario	New table outlining differences (and reasons for) between the National Framework and WRMP	Table 21 in section 9
Provided breakdown of all abstraction changes assumed in the WRMP at a licence level for both sustainability reductions and environmental destination	Environment Agency request to provide detailed breakdown of abstraction licence changes at an individual licence level	New table outlining all known and potential licence changes through the planning period	Table 17 in section 5.1

Change	Reason	Update(s)	Relevant section(s)
Provided further detail on AMP8 WINEP investigations and implementation schemes	General consultation feedback stating lack of detail in the report supporting our overall environmental ambition	New section outlining AMP8 WINEP schemes	Section 3.5

1.2 Changes from revised draft to Final WRMP

Table 2 Changes made between revised draft and final

Change	Reason	Update(s)	Relevant section(s)
Corrected new annual limit for Ecclestone Hill BH on the back of AMP7 no deterioration investigation	Error picked up in revised draft submission	Updated annual limit in report	Table 3, Table 13 and Table 19.
Provide clarity on future of unused licences, Ecclestone Hill borehole and South Egremont boreholes	Environment Agency request to provide more detail on future of Ecclestone Hill and Egremont boreholes	Updated text in Table 8	Section 3.4
Updated Table 8 to confirm the scheme at Blea tarn will now be completed in AMP8	Updated in light of updates required through WINEP submissions	Updated Table 8 to confirm the scheme at Blea tarn will now be completed in AMP8	Section 3.4
Removed sentence saying AMP8 WINEP no deterioration investigation for Langden/Hareden is unconfirmed	Confirmed with EA that investigation in AMP8 is going ahead	Removed sentence saying AMP8 WINEP no deterioration investigation for Langden/Hareden is unconfirmed	Section 3.2.1
Updated Supply Demand Balance numbers between 2030 and 2035 in light of updates to the WRMP24 tables	Changes to WRMP24 tables	Updated Supply Demand Balance numbers in Table 7 and Table 18 between 2030 and 2035 (and 2050) in light of updates to the WRMP24 tables	Section 3.2.1
Minor corrections to spelling and grammar and removed reference to revised draft	N/A	Minor corrections to spelling and grammar	Section 3, 4, 5 and 6

2. Regional group

In the recently published (March, 2020) National Framework for Water Resources, Defra confirmed their requirement for Regional Water Resources Plans to be produced to address the need for resilient and sustainable water supplies in a growing economy and changing climate. There are currently five regional groups across the UK, consisting of water companies, water industry regulators and stakeholders, working to address the requirement for Regional Plans.

We are member of the Water Resources West (WRW) regional group, along with Severn Trent Water, Dŵr Cymru Welsh Water, South Staffs Water, the Environment Agency and a number of associate members. Our 2024 Water Resource Management Plans (WRMP24) are being developed in collaboration with WRW, as the aim is for all individual company plans to align with the relevant Regional Plan. A key activity of the WRW Group, therefore, is to align all plans using consistent tools and methods to ensure that the overall Regional Plan is founded on a common approach. This consistent approach is especially important to ensure that all opportunities are captured and utilised for the best environmental outcome. There are synergies that can be realised through collaboration, particularly where water resources are cross-boundary such as the River Dee.

2.1 Environmental destination workstream

The long-term water resources environmental destination guidance document (Environment Agency, October 2020) states that the environmental destination is to be developed at the regional level and reflected in both the regional plan and water company WRMP24 plans. Therefore, an environmental destination workstream was created at the regional level, to lead the work across all water companies and ensure consistency and alignment. Meetings are held fortnightly between the abstractors, and monthly with wider stakeholders including the Environment Agency, Natural Resources Wales and Natural England.

3. WINEP and No Deterioration

3.1 Sustainability reductions (AMP8)

As part of the environmental destination roadmap, a crucial stepping stone is to ensure our abstraction licences do not cause deterioration to the environment in the short to medium term. This is key priority for us. Understanding what the current 'known' or 'likely' environmental issues from our abstractions are is investigated through the Water Industry National Environment Programme (WINEP), where potential solutions are implemented in the following AMP period. For example, investigations are undertaken in AMP7 (2020-2025) and solutions (i.e. licence changes) implemented in AMP8 (2025-2030).

The WINEP has historically looked at five-year periods (AMP cycle). For the AMP8 period, 2025–30, the WINEP is changing to look over a longer timeframe (10 years) and will include indicative measures out to 2050 with the AMP8 element representing confirmed schemes for delivery. In effect, WINEP for water resources will help to ensure potentially unsustainable abstraction licences are investigated and amended (if required) in order to meet current statutory and regulatory environmental requirements in the short term. Our environmental destination links into WINEP by investigating and planning for meeting requirements in the longer term; noting however, that those long-term licence changes will not be agreed before 2030.

With regards to the short term known issues, for our revised draft submission, we reviewed the hydrological status of all water bodies from which we currently abstract, and are confident that all current known issues (hydrology status not supporting good) are addressed in either AMP7 (2020-25) or AMP8 (2025-30) WINEP investigations. Waterbodies linked to our reservoirs have already been addressed from previous heavily modified waterbodies (HMWB) assessments and have been screened out from a WFD perspective accordingly. New or increased compensation flows have been implemented (or implemented by AMP8) as necessary. See Table 20 and Table 22.

3.1.1 Background to sustainability reduction investigations

When developing the requirement for WINEP investigations, the Environment Agency identifies where public water supply abstraction poses a risk of serious damage to the environment if used at full capacity on a particular waterbody. In this context, serious damage means deterioration in the quantitative water resources status of the groundwater body, or deterioration in ecological status of surface water bodies that are dependent upon groundwater discharge from the groundwater body, as assessed under the requirements of the European Water Framework Directive (Directive 2000/60/EC, commonly referred to as WFD). Deterioration under WFD is 'a change in the class of any one of the quality elements used to determine the status in a water body from its existing class to the class below, or any deterioration within the lowest class'.

The objective of the WFD is for water bodies to achieve 'Good Ecological Status (GES)/Potential' by 2027. For surface water bodies, sufficient flow is a supporting element to a waterbody achieving 'Good' WFD status. Groundwater abstraction may reduce flows in some streams and rivers and therefore has the potential to prevent the water body achieving 'Good' status. For groundwater bodies, having a positive balance between recharge to the water body, the requirement for natural discharge to rivers/streams and the amount of groundwater abstraction is one of the elements that is considered in the status assessment.

As a consequence, where there is a risk to the WFD objectives not being met, the EA would ask us to complete an investigation to identify the risk of deterioration. The objectives of these investigations are to:

- Investigate whether there is a risk the status of the water body (and dependent surface water bodies) could deteriorate under future abstraction scenarios; and
- Consider and evaluate options for avoiding risk of deterioration and show that abstraction will not cause deterioration in water body status.

3.1.2 Assessment of the risk of deterioration

When investigating the risk of deterioration impact on surface water bodies, the Ecological Flow Indicator (EFI) is used as the default assessment tool, where impacts of abstraction are considered across the full flow duration curve. The EFI is defined from a naturalised flow duration curve for a surface water body catchment outflow point. A certain reduction in flow from natural is used to define the EFI for higher and lower flows (Environment Agency, 2017). Figure 2 and Figure 3 show that the definition of the EFI depends upon the sensitivity of the water body to abstraction pressure – less reduction in flow is allowable in more sensitive water bodies. A greater proportional reduction in flow from natural is allowable at higher flows than lower flows.

Figure 2 Conceptual diagram of EFI

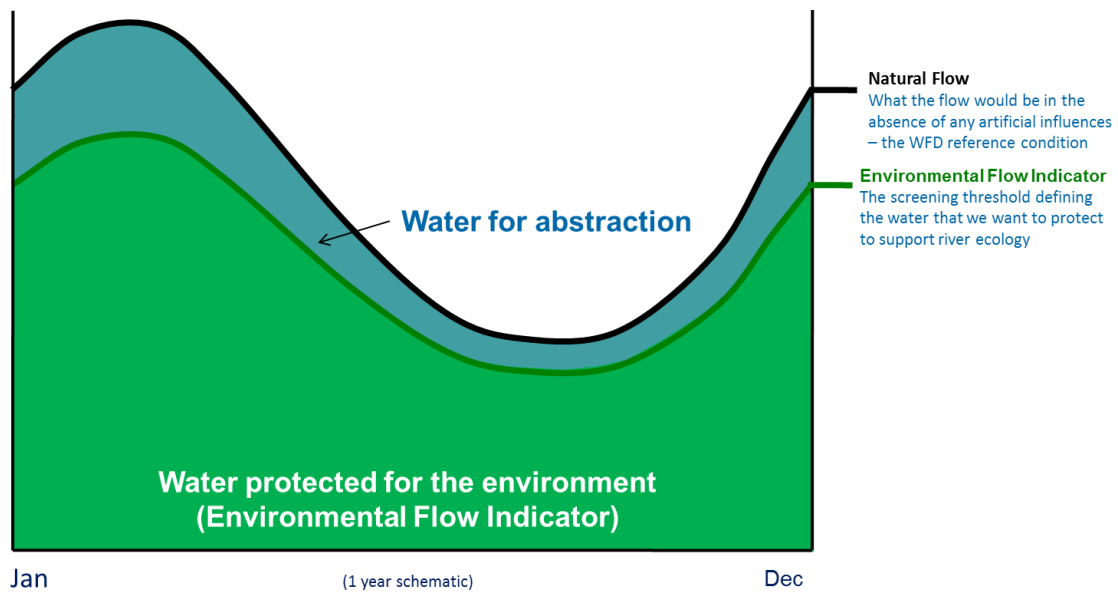
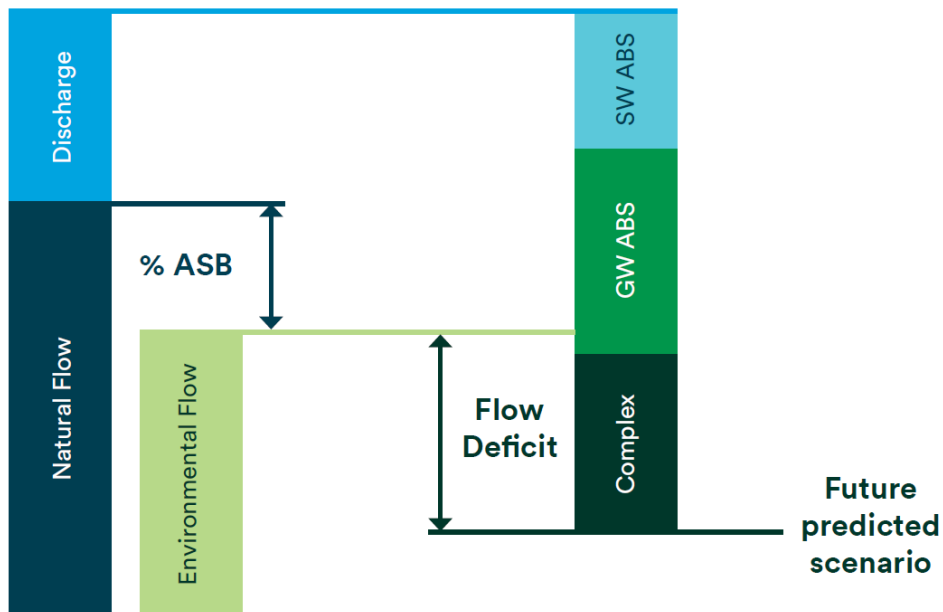


Figure 3 Conceptual diagram of the EFI approach



It is not entirely clear at this stage what the full benefits of flow reductions will be considering the specific local environmental needs. Catchment sensitivity bands (Figure 4) are applied across the whole catchment (i.e. Upper Mersey), however there will likely be areas which are more (or less) environmentally sensitive and therefore licence reductions may not provide the benefit as desired (or required). Furthermore, more detailed hydro-ecological assessment are likely to be needed in future WINEP investigations to demonstrate licence changes will

provide the environmental benefit we want to achieve. We will be looking to develop these type of assessments for the upcoming AMP8 WINEP investigations and beyond.

Figure 4 Percentage allowable abstraction from natural flows at different sensitivity bands

Abstraction Sensitivity Band	high flow	—————→			low flow
	Q30	Q50	Q70	Q95	
ASB3. high sensitivity	24%	20%	15%	10%	
ASB2. moderate sensitivity	26%	24%	20%	15%	
ASB1. low sensitivity	30%	26%	24%	20%	

Comparison with the EFI at low flows is also used to determine WFD low flow compliance. Flows are assumed to be compliant if the scenario flow equals or exceeds the EFI, and non-compliant if it is less than the EFI. Flows are considered to support good ecological status if they are compliant with the EFI at Q95 whereas flows may not support good ecological status if Q95 flows are below the EFI. Three bands of non-compliance are defined on the extent to which the scenario flow at Q95 falls below the EFI as follows:

- Compliant: scenario flows above the EFI;
- Band 1 non-compliant: scenario flows up to 25% of natural below the EFI
- Band 2 non-compliant: scenario flows between 25% and 50% of natural below the EFI
- Band 3 non-compliant: scenario flows more than 50% of natural below the EFI.

As well as impact on flows with respect to the EFI, the investigation is also required to consider:

- Groundwater spatial impacts on surface waters
- Planned improvements to other pressures
- If there are other conservation drivers e.g. if it is a SSSI or there are salmon or other NERC priority species present
- Size of abstraction increase versus volume of flow / resource in the water body
- Seasonality and frequency/timing of abstraction especially where this may affect the ecology disproportionately
- Sensitivity of the relevant water bodies
- Previous evidence of impact due to abstraction, especially from WR WFD investigations

For groundwater bodies, risk of deterioration is assessed against the four quantitative tests that comprise the overall quantitative assessment under WFD (water balance test, saline intrusion test, dependent surface water body test and groundwater dependent terrestrial ecosystem test).

3.1.3 Options assessment to prevent deterioration

Where it cannot be demonstrated that the projected growth (up to the licence limit) in abstraction will not cause ecological deterioration, an options appraisal process is completed to identify and evaluate measures for avoiding the risk. The options appraisal process has four stages as follows:

(1) Identify options

During this stage, measures are identified to reduce or remove the risk of deterioration from projected future growth in abstraction. Such measures are reviewed alongside other measures being put in place in the water bodies of interest to ensure a Catchment Based Approach (CaBA) is applied to the process

(2) Appraisal of options

Options (solutions) that are put in place to prevent deterioration of ecological status are appraised in terms of the following aspects:

- Environmental and socio-economic benefits;

- Engineering feasibility;
- Risk
- Sustainability; and
- Intangible benefits.

(3) Select the preferred option

- After undertaking option appraisal, a preferred option is selected and put forward to the EA for consideration. The least cost option (or options) will also be identified.

(4) Agree the preferred option

- The preferred option must always be agreed with the EA

The likely effectiveness of solutions are reviewed in the context of other pressures and impacts. The measures should be cost effective to prevent deterioration, however the cost of the measure is not assessed against the environmental benefits provided

3.1.4 Options screening

In support of the AMP7 WINEP investigations, we have developed a screening and Multi-Criteria Assessment (MCA) approach. The purpose of the screening and MCA is to:

- Prepare a shortlist of options by screening the long list of options to remove those that will not meet the objectives of the WINEP investigation; and
- Provide a multi-criteria scheme where the costs and benefits of shortlisted options can be compared semi-quantitatively (a cost effectiveness analysis).

The process is split into five categories:

- **Category A: Feasibility and risk factors (screening).** If options will not avoid risk of deterioration under future abstraction scenarios or are not technically feasible, they can be screened out immediately. Similarly, options that are unlikely to be given regulatory approval or unlikely to be able to be implemented within the desired timescale can be screened out. Although cost can be considered within this screening stage, it has not been applied within the assessment completed as part of this investigation.
- **Category B: Solution performance against objectives (MCA).** Criteria under this category expand upon the Category A assessment by evaluating the risks associated with option implementation. This considers impacts that the solution may have on other elements of the WFD classification, the resilience of the option to future change and the flexibility of the solution with regards to water resources. Risks around acceptability to the EA and licensing constraints are also considered.
- **Category C: Environmental/sustainability/ecological and water resources factors (MCA).** The options proposed may have additional benefits to the environment beyond the core objective to avoid deterioration risk. These are assessed in this category, which considers wider environmental outcomes that may come from the proposed option. This category considers aspects such as climate regulation, water resources, flooding, water quality and ecology. With regards to effects on water flows, selected measures are intended to avoid risk of deterioration rather than a current impact. Flows will therefore not increase as a result of the measures being implemented. Where there is a potential impact from our current abstraction and measures need to be implemented to help increase river flow (stream support as an example), these will impact lower flows and therefore have a negligible impact to high flows and the risk of flooding.
- **Category D: Socioeconomic factors (MCA).** Cultural and socio-economic benefits may also be derived secondarily to the implementation of options to avoid deterioration risk. This category evaluates the performance of the option with respect to community aspects such as amenity and recreation, employment and business.
- **Category E: Uuw capital delivery, project management and operational factors (MCA).** The final category evaluates factors internal to us that may affect the feasibility of implementing the option. This includes a

consideration of the option cost as well as project complexity, land access and synergies with our other strategic projects.

The individual criteria have been developed based on guidance documents from the Environment Agency relating to WFD Water Appraisal Guidance, WINEP options development guidance, criteria applied during Strategic Environmental Assessment processes, criteria applied to Water Resource Management Plan options, and approaches adopted for other WINEP investigations.

The Environment Agency’s pre-WRMP WINEP for AMP8 includes licence changes arising from:

- Ongoing AMP7 investigations; time-limited licences due for renewal during the AMP8 period; unused licences; new non-compliant waterbodies (i.e. where associated river flows fail to meet their environmental flow indicator due to abstraction); review of measures identified during preparation of the AMP7 WINEP but that which did not make it through.

Licence changes and the impact on deployable output, for both WINEP and the environmental destination, are included in our draft WRMP24. In July 2021, the Environment Agency issued us with a pre-WRMP WINEP for AMP8, which we have subsequently reviewed and discussed with them. This has resulted in the inclusion of licence changes over the 2025–35 period in our draft WRMP24. Noting that no changes were made in the revised draft WRMP aside from the sensitivity testing of potential licence changes in the Southport and Wigan West BH groups. Licences may appear in both WINEP and the environmental destination; although, the scope of licence changes is likely to differ.

Anticipated licence changes from AMP7 WINEP investigations are shown in Table 3. With the exception of the Wirral and West Cheshire investigations (due to report in March 2023), the majority have been completed and agreed with the Environment Agency. Other measures through WINEP investigations include improving fish passage under the Salmon and Freshwater Fisheries Act. All other measures that do not constitute a licence change, will be assessed against any potential impact to our supply forecast. For example: our ability to abstract from a particular source including ensuring water remains treatable over the longer term through Drinking Water Protected Areas.

As a consequence of licence reductions, it is anticipated there will be an increase in river flows or groundwater; however, the degree of change is highly uncertain. From a groundwater perspective, assessment of deterioration is undertaken within the aquifer as a whole. The impacts on resource zone deployable output due to sustainability reductions are detailed in section 5.1 and shown in Table 18.

Table 3 Provisional details of licence changes from AMP7 WINEP investigations

Sources	CAMS ledger	Aquifer	Resource Zone	Surface water (SW) or groundwater (GW) impact	Water body at risk	Licence change to be modelled
Laneshaw, Corn Close boreholes and Trawden Springs	Ribble	Not known	SRZ	SW	GB112071065210 Colne Water (Laneshaw) GB31230377 Laneshaw Reservoir GB112071065190 Colne Water – Laneshaw to Trawden Bk GB112071065200 Colne Water – Trawden Bk to Wanless Water GB112071065150 Colne Water – Wanless Water to Pendle Water	New six-year aggregate rolling abstraction volume limit of 7,314 MI across the two Corn Close boreholes. This is a licence change to prevent deterioration and where practical will be implemented by 2027

Sources	CAMS ledger	Aquifer	Resource Zone	Surface water (SW) or groundwater (GW) impact	Water body at risk	Licence change to be modelled
<p>Fylde aquifer:</p> <p>2672408021 Franklaw B (P1-2 ad Q1-2)</p> <p>2672408015 Franklaw A (L1-2)</p> <p>2672408020 Franklaw A (L3-4 and M1-6)</p> <p>2672411002 Broughton B (K1-2)</p> <p>2672409004 Broughton B (EE1-2, G1-2, H1-2, J1-2)</p> <p>2672405010 Franklaw A (W2 and Z2)</p> <p>2672405006 Franklaw B (W1 and Z1)</p> <p>The following licences are not included in the investigation:</p> <p>2672410001 Broughton A (B1-4, C1-4 and D1-3)</p> <p>2672406022 Franklaw A (R1-4) (note R1/2 unused – no pumps)</p>	Wyre	Fylde	SRZ	SW	<p>Wyre at St Michaels</p> <p>GB112072066250 Wyre – confluence River Brock to tidal</p> <p>GB112072065770 Lords Brook</p> <p>GB112072065810 River Brock</p> <p>GB112072065822 Wyre DS Grizedale Brook confluence</p> <p>GB112072065822 Wyre – Upper</p>	<p>Concluded no impact to surface water bodies based on recent actual abstraction. AMP8 no deterioration investigation required to review impact to Fylde Aquifer. Therefore, no licence change has been modelled for AMP8.</p>
<p>Furness aquifer:</p> <p>Schneider Rd</p> <p>Thornclyffe Rd</p>	Leven, Crake and Duddon	Furness	SRZ	GW	<p>GB41201G101900 Furness Permo-Triassic sandstone aquifers</p>	<p>New six-year aggregate rolling abstraction volume limit of 15,987 Ml across the two licences.</p> <p>These are licence changes to prevent deterioration and where feasible, will be implemented by 2027</p>

Sources	CAMS ledger	Aquifer	Resource Zone	Surface water (SW) or groundwater (GW) impact	Water body at risk	Licence change to be modelled
<p>Wirral and West Cheshire Permo-Triassic Sandstone aquifers:</p> <p>2568001153 Eaton boreholes</p> <p>2568001155 Sandyford borehole</p> <p>2568001156 Cotebrook no.1 borehole</p> <p>2568001184 Cotebrook no.2 borehole</p> <p>2568001158 Delamere boreholes</p> <p>2568001159 Eddisbury borehole</p> <p>2568001180 Organsdale Farm borehole</p> <p>2568006082 Mouldsworth boreholes</p> <p>2568006088 Ashton borehole</p> <p>2568007014 Hooton borehole</p>	<p>Lower Mersey and Alt</p>	<p>Wirral and West Cheshire Permo-Triassic Sandstone aquifers</p>	<p>SRZ</p>	<p>Both</p>	<p>GB41101G202600 Wirral and West Cheshire Permo-Triassic Sandstone Aquifers</p> <p>GB112068060300 Salters Brook</p> <p>GB112068060320 Ashton Brook</p> <p>GB112068060350 Rivacre Brook</p> <p>AP5, Huxley GS (Upper Gowy)</p> <p>GB112068060280 Gowy and tribs (Source to Milton Brook)</p> <p>GB112068060250 Gowy (Milton Brook to Mersey)</p>	<p>Delamere group:</p> <p>New 10-year rolling abstraction volume limit of 23,521 ML.</p> <p>A rolling aggregate condition limiting total abstraction across all sources within the Delamere group: Eddisbury (2568001159), Cotebrook 1 (2568001156), Sandiford (2568001155), Organsdale Farm (2568001180), Cotebrook 2 (2568001184) and Delamere (2568001158).</p> <p>Relinquish Eaton BH.</p> <p>Wirral BHs</p> <p>Reduce annual limit for Newton and Grange (2568008030) reduced from 2,500 ML/a to 1,537 ML/a. No change to daily limit at Newton or Grange.</p> <p>Apply six-year rolling period to 20,166 ML to Prenton. No changes to annual or daily limits for Prenton. Relinquish Hooton and Springhill BHs (unused).</p> <p>Investigation has been extended to December 2024 to allow for time to undertake further model validation work. Agreed licence changes will be updated for WRMP29</p> <p>These are licence changes to prevent deterioration will be implemented by 2030 or potentially by 2027 (subject to outcome of stream support investigation at the start of AMP8)</p>
<p>Wirral and West Cheshire Permo-Triassic Sandstone aquifers:</p> <p>2568005009 Foxhill</p> <p>2568005011 Manley Quarry (Low Farm)</p> <p>2568006087 Manley Common (Four Lane Ends)</p> <p>2568003076 Newton Hollow</p> <p>2568005008 Helsby</p>	<p>Weaver and Dane</p>	<p>Wirral and West Cheshire Permo-Triassic Sandstone aquifers</p>	<p>SRZ</p>	<p>GW</p>	<p>GB41101G202600 Wirral and West Cheshire Permo-Triassic Sandstone Aquifers</p>	<p>New 10-year rolling abstraction volume limit of 52,961 ML. This includes Manley Common (Four Lane Ends) (2568006087), Manley Quarry (Low Farm) (2568005011), Five Crosses (licence 2568003091), Foxhill (2568005009) and Mouldsworth (2568006082).</p> <p>Conjunctive use aggregate for West Cheshire uses would be expanded to include the Mouldsworth licence.</p> <p>Relinquish Helsby, Newton Hollow and Ashton BHs.</p> <p>Investigation has been extended to December 2024 to undertake additional model validation to understand changes to annual abstraction.</p>

Sources	CAMS ledger	Aquifer	Resource Zone	Surface water (SW) or groundwater (GW) impact	Water body at risk	Licence change to be modelled
						<p>Future licence reductions will be refined and agreed with the EA and fed into WRMP29</p> <p>These are licence changes to prevent deterioration and will be implemented by March 2030. This is due to ongoing complexities in the project where additional data collection and analysis is required¹.</p>
Eccleston Hill borehole (2569025037) impact on Windle Brook	Lower Mersey and Alt	Lower Mersey Basin and North Merseyside Permo-Triassic	SRZ	SW impact	GB112069061210 Hardshaw (Windle) Brook	<p>Reduce annual licence limit from 1,161.526 Ml/yr to 276 Ml/yr and reduce daily limit from 3.182 Ml/d to 2.4 Ml/d. Set six-year rolling abstraction volume limit of 1,656 Ml.</p> <p>This is currently an unused source in our baseline, however investigations are still ongoing on the best solution for the source.</p> <p>This is a licence change to prevent deterioration and where feasible, will be implemented by 2027</p>
Bearstone boreholes	Shropshire Middle Severn	Shropshire Middle Severn – PT Sandstone East Shropshire	SRZ	Both	GB109054055130 Loggerheads Bk – source to conf R Tern GB109054055150 Tern – source to conf Loggerheads Bk	<p>Set six-year rolling abstraction volume limit of 3,197.4 Ml.</p> <p>This is a licence change to prevent deterioration and where feasible, will be implemented by 2027</p>
Pennington reservoir	Leven	n/a	SRZ	SW impact	n/a	<p>New compensation flow of 1.15 Ml/d.</p> <p>This is a WFD requirement and will be implemented before the end of AMP8. Specific compensation flow will be agreed subject to site specific investigation</p>

¹ Assumed reductions are currently provisional (for the Wirral and West Cheshire sources) until further model validation and stream support investigations have concluded. The total licence reduction we have assumed for WRMP24 includes the full allocation of the licence for stream support, and this will be refined for WRMP29. To note, impact on system DO as a consequence of the full licence reductions on the Wirral and West Cheshire sources is very minimal (2 Ml/d), therefore any issue around uncertainty for stream support feasibility is likely to be inconsequential on the overall deployable output if it is chosen not to be progressed.

3.2 No deterioration (AMP9)

The Environment Agency published WRMP24 supplementary guidance on preventing deterioration, which is underpinned by targets set out in the Abstraction Plan for 2027. This sets out how to assess the deterioration risk category (Table 4).

The WFD Regulations use the hydrological element to define high status surface-water bodies and it is a supporting element for achieving good ecological status. Flow and flow variability have an influence on the biology of a watercourse. As a result, reductions in flow from abstraction could cause a deterioration in status of the biological elements. The Environment Agency must therefore take action to prevent the hydrology element from deteriorating below (or further below if already below) the EFI (or other agreed local flow constraint) unless available evidence suggests that the deterioration in flow will not have an adverse effect on the biology. The guidance includes how the Environment Agency will change abstraction licences enabling us to plan ahead for these changes.

Table 4 Deterioration risk category (FL = Fully Licensed, FP = Future Predicted, RA = Recent Actual)

Deterioration risk category	Surface water	Groundwater
No risk	FL flow is > EFI	Groundwater body is at good quantitative status at FL
Lower risk	FL flow < EFI but RA and FP flows > EFI	Groundwater body is at good quantitative status at RA but moves to poor status at FL
Moderate risk	RA flow > EFI but both FP and FL flows are < EFI OR RA flow <EFI but FP flow remains same or <RA flow OR RA flow < EFI and FP flow falls further below EFI but ecology is good or abstraction is not the reason for the ecology being less than good status (i.e. RNAG)	Groundwater body is at good quantitative status but moves to poor status at FP OR Groundwater body is at poor quantitative status but there is no FP increase in abstraction
Higher risk	RA flow < EFI and FP flow falls further below EFI AND ecology is not at achieving good status and abstraction is a RNAG	Groundwater body is at poor status and FP increases in abstraction will make the groundwater body poorer

Using the above criteria, we have allocated each surface water body to a risk category of which 492 are considered no risk to surface water bodies, 30 lower risk, 25 moderate risk and zero high risk. The Environment Agency will implement the following ‘default actions’ for lower risk water bodies where full licensed abstraction is below the EFI (or local flow constraint) and groundwater bodies where the quantitative status would be poor at full licensed abstraction:

- Not normally grant unconstrained new or upwardly varied abstraction licences;
- Limit water rights trades to ‘recent actual’ quantities;
- Variations to change purposes or add aggregate conditions must not inadvertently allow abstractors to increase abstraction; and
- Pursue voluntary revocation and downward variations of licences that have not been used for four years in line with the protocols for that workstream.

In addition to the above default actions, unless an exception applies, the Environment Agency will:

- Cap licences in water bodies at a moderate risk of deterioration at maximum peak abstraction.

For the 25 surface water bodies at moderate risk, where a licence cap would be needed to prevent deterioration, we have identified if we have any associated abstraction licences. This process has identified four moderate risk waterbodies where maximum annual abstraction caps are needed on the associated licences. These licence changes are assumed to come into effect in AMP9 and will be modelled to determine their impact on deployable output as part of WRMP24 accordingly; however, final licence changes will be investigated and agreed through AMP8 WINEP investigations, where investigations will be very similar to the outgoing no deterioration investigations in AMP7 (as set out in section 3.1)

Licence caps have been assumed for Trawden Springs, Aughertree Springs/Longlands mine adit, and Broughton/Franklaw Borehole group (Table 5). Additional potential licence caps have been assessed for the Wigan West BH group and Southport BH group however the uncertainty is too high to include in the baseline and therefore we have undertaken sensitivity testing (see section 3.2.1).

Table 5 Licence changes assumed for groundwater sources for no deterioration in AMP9

Source	CAMS ledger	Aquifer	Resource Zone	Surface water (SW) or groundwater (GW) impact	Water body at risk	Licence change to be modelled
Franklaw/ Broughton BHs	Wyre	Fylde	SRZ	GW	Fylde Permo-Triassic Sandstone Aquifer	New six-year rolling limits based on recent actual abstraction volumes (2015–19 period) calculated for the Aquator model components 65,997 Ml six-year rolling limit applied across all BHs in line with Environment Agency no deterioration guidance. The above totals are equivalent to a daily average abstraction rate of 30.14 Ml/d; the recent actual abstraction over the 2015–19 period.
Trawden Springs BH		Douglas				Licence cap to 540 Ml/d based on recent actual abstraction volumes (2015–19 period). No impact on DO as licence cap is higher than WRMP24 baseline source yield.

Source	CAMS ledger	Aquifer	Resource Zone	Surface water (SW) or groundwater (GW) impact	Water body at risk	Licence change to be modelled
Rushton Spencer BH	Weaver/Dane	Manchester and East Cheshire	SRZ	GW & SW	River Dane (Clough Brook to Cow Brook)/Dane (Cow Brook to Wheelock)/Dane (Wheelock to Weaver)	909 MI/yr (same as licensed volume based on recent actual abstraction volumes (2015–19 period)).
Mow Cop BH	Weaver/Dane	Manchester and East Cheshire	SRZ	GW & SW	Wheelock (Source to Kidsgrove Stream)	Unused source (since 2002) therefore not in WRMP24 baseline. Licence cap to be agreed through AMP8 WINEP investigation.
Aughertree Springs/Longlands Mine Adit	Derwent and West Cumbria	Derwent and Cumbria West Lower Palaeozoic and Carboniferous Aq	SRZ	GW & SW	Ellen (upper)	730 MI/yr for Aughertree Springs (same as existing annual licence limit) and 102 MI/yr at Longlands Mine Adit. This is based on recent actual abstraction volumes (2015–19 period). Not modelled as currently, these sources are not included in our baseline Aquator model as the licences are being considered for revocation as part of the Thirlmere transfer project.

3.2.1 AMP8 WINEP investigations and assumed licence caps

Surface water sites that are flagged for licence capping, but already have an existing hands-off flow (which is being reviewed through AMP8 WINEP), will not have their licence capped. This is in line with the screening methodology for environmental destination where sources subject to recent WINEP investigations have a new or increased hands-off flow, and are considered sustainable (i.e. River Gelt). These sites are:

- Langden/Hareden system– currently there are three hands-off flows on the main intakes. These will be reviewed and increased if necessary and we will further investigate the potential of implementing hands-off flows on other, smaller intakes.
- River Dane – currently, in line with the current licence condition, abstraction is reduced below the hands-off-flow, however, does not cease. This will be reviewed in AMP8 to understand the level of deterioration downstream; however, we have assumed for WRMP24 modelling that no abstraction can occur below the current hands-off flow until the investigation has concluded. Stochastics are not available for the Aquator

component; therefore, a monthly abstraction profile (considering a new restrictive hands-off flow) was derived based on water availability during 1995 drought and was implemented within Aquator.

Specific licence changes as part of AMP8 WINEP investigations will be agreed with the EA in AMP8 and implemented in AMP9 (or by 2027 if feasible).

For licences that are at risk of causing deterioration, we have assumed no further growth in demand where abstraction volumes will remain at either recent actual or below. To note, we are planning for significant long-term reductions in demand through leakage and PCC management, therefore we are anticipating overall abstraction will decrease. AMP8 WINEP investigations related to sustainability reductions are set out in Table 6.

Table 6 AMP8 WINEP investigations for potential sustainability reductions

Investigation name	Main Driver
Wheelock (Source to Kidsgrove Stream)	Preventing deterioration from current WFD status (surface water)
Trawden Springs	Preventing deterioration from current WFD status (surface water)
Aughertree/Longlands	Preventing deterioration from current WFD status (surface water)
River Dane (Clough Brook to Cow Brook)/Dane (Cow Brook to Wheelock)/Dane (Wheelock to Weaver)	Preventing deterioration from current WFD status (surface water)
Langden/Hareden	Preventing deterioration from current WFD status (surface water)
Millingford (Newton) Brook	Preventing deterioration from current WFD status (surface water)
Downholland (Lydiate/Cheshire Lines) Brook	Achieving water body WFD status within a catchment (surface water)

As part of our plan, we have applied licence caps in line with EA guidance in our baseline forecast from AMP9. With regards to Millingford (Newton) and Downholland (Brook), the uncertainties in potential future licence caps are especially high as the potential risk of deterioration is much more local rather than at aquifer level. For that reason, we have excluded licence caps for sources in the Southport and Wigan West BH group from our baseline in AMP9, but we have undertaken sensitivity testing to understand the maximum impact on deployable output. We have applied the maximum potential cap (cap at average historic abstraction) in line with the EA guidance in order to assess the worse-case scenario. This results in a DO impact of 33 MI/d, however considering our final plan (with demand management measures in place), it is anticipated that there would be sufficient surplus to meet this potential impact should it materialise (Table 7).

Table 7 SRZ AMP9 Sustainability reductions sensitivity testing

Year	2030	2031	2032	2033	2034	2035
Sustainability reductions (DO reduction) – MI/d	-6.14	-6.14	-6.14	-7.88	-9.63	-11.37
Supply demand balance including sustainability reductions (final plan) – MI/d	13.83	27.41	36.23	41.72	48.85	62.04

3.3 Strategy for implementing sustainability reductions

The latest River Basin Management Plans (RBMP) state that where there is a ‘confirmed’ risk of environmental deterioration as a consequence of abstraction, there is a requirement to address this by 2027. Noting that confirmation of environmental deterioration (along with the solution) is set out in the WINEP. We have developed a strategy to implement solutions identified from WINEP investigations to address current and potential issues from some of our abstractions as soon as possible, and by 2027 where feasible.

For AMP8 sustainability reductions (that were investigated in AMP7 WINEP), we will accelerate as many as is feasible by 2027. We aim to implement licence changes at Schneider Road and Thorncliffe Road BHs, Corn Close BHs and Bearstone BH by 2027. However, it will not be possible to accelerate sustainability reductions as part of the Wirral and West Cheshire no deterioration investigation. This is because further environmental assessment (AMP8 WINEP) for the stream support solution is required. Therefore it is not possible to undertake the additional assessments and implementation of solutions by 2027. Whilst we plan to accelerate licence changes as much as possible, in the unlikely scenario there is a short term local or wider supply resilience issue, then we may need to push back licence changes to 2030 (which is in line with WINEP guidance requirements). We will report on this in through the Water Resources Management Plan Annual Review.

It is not possible to accelerate all AMP9 sustainability reductions (licence capping) by 2027, because the investigations have not yet started nor concluded. We have made provision in the plan to quantify what the potential impact is on the deployable output (based on EA licence capping guidelines), but we will not know what solution is required until the investigations have concluded in 2026. However, if the solution from the investigation to prevent environmental deterioration is a 'no regrets' solution, we will look to accelerate the changes by 2027 whereby there is:

- No impact to local or wider customer supply resilience; and,
- Sufficient time to implement the solution without causing a supply/demand deficit

No regrets solutions may include the revocation of unused sources, or a licence cap which is equal or higher than its historical peak abstraction rate (but lower than the licence limit). However, where solutions from the AMP8 WINEP investigations require significant investment: i.e. any option that would lead to any risk in the disruption of customers water supply or requires significant new groundworks (e.g. new river intake); the solution would need to be fully planned and costed for to be implemented in the following AMP9 period (2030-35).

3.4 Unused licences

We have assessed our unused licences and where they pose a moderate or high risk of deterioration (considering fully licensed water availability), we will undertake more detailed investigations. Where the outcome of these investigations is the risk of deterioration is material, we will surrender these licences as soon as is feasible. For licences with a long term risk of deterioration (where current risk is low or has waterbody has deteriorated since 2015), we will undertake specific investigations in AMP8 and beyond to better understand which sources (used and unused) are at higher risk of causing deterioration by 2050 due to climate change. Table 8 provides details of our unused sources that are not included in the baseline supply forecast.

Table 8 Unused sources

Source name	Licence no.	Source type	Resource Zone	Annual licence (MI/d)	Surrender/Retain	Justification
Saddleside Farm and Saddle Fell (Chipping Springs)	2671317005	GW	Strategic	1.247	Retain	Part of LCUS (Lancashire Conjunctive Use Scheme) aggregate licence group

Source name	Licence no.	Source type	Resource Zone	Annual licence (MI/d)	Surrender/Retain	Justification
Blackmoss reservoirs (Upper and Lower)	2671322033	SW: Reservoir	Strategic	0.021	Retain	Licence was varied in 2014 to reduce annual quantity to the minimum possible of 7.5 MI/year (equates to 20 cubic meters per day). Licence needs to be retained as it is where the compensation flow requirement is set (otherwise it defaults to the Nelson Local Board Act 1888 which has a higher flow requirement)
Rivington gathering grounds	2670201001 & 2670210001	SW: River	Strategic	0.071	Surrender	Properties connected to mains water. No requirement to retain licence
River Lune at Lower Halton weir	2672526021	SW: River	Strategic	1.868	Retain	Licence retained as is believed to be a legal requirement of the Act of Parliament for the main River Lune LCUS abstraction licence to provide emergency water to local industrialists. Licence volumes were reduced (with effect from 13 June 2019) from 5170 MI/yr; 51.7 MI/d, 2.5 MI/hr to 681.9 MI/yr, 6.819 MI/d, 0.330 MI/hr due to the closure (and hence revocation of their own abstraction licences) of several named industrialists
Gorstons and Lees Lane boreholes	2467100064	GW	Strategic	1.557	Surrender	No requirement to retain licence
Eaton borehole	2568001153	GW	Strategic	4.982	Surrender (unconfirmed)	Decision on hold until conclusion of AMP7 WINEP investigation. Part of an aggregate group
Mow Cop borehole	2568002146	GW	Strategic	1.364	Retain	Development of trading option
Hough Lane (Walton) borehole	2568004008	GW	Strategic	3.413	Retain	Awaiting outcome of North West Transfer option development
Daresbury borehole	2568004016	GW	Strategic	3.414	Retain	Awaiting outcome of North West Transfer option development
Helsby boreholes	2568005008	GW	Strategic	1.246	Surrender (unconfirmed)	Decision on hold until conclusion of AMP7 WINEP investigation.

Source name	Licence no.	Source type	Resource Zone	Annual licence (MI/d)	Surrender/Retain	Justification
						Part of an aggregate group
Ashton borehole	2568006088	GW	Strategic	2.274	Surrender (unconfirmed)	Decision on hold until conclusion of AMP7 WINEP investigation
Hooton boreholes	2568007014	GW	Strategic	5.916	Surrender (unconfirmed)	Decision on hold until conclusion of AMP7 WINEP investigation
Springhill boreholes	2568008021	GW	Strategic	3.908	Surrender (unconfirmed)	Decision on hold until conclusion of AMP7 WINEP investigation
Swineshaw, Glossop, reservoir	2569010038	SW: Reservoir	Strategic	3.487	Retain	Trial of mobile treatment technology
Torside Goyt	2569010039	SW: River	Strategic	4.500	Surrender	No requirement to retain licence
Landside borehole	2569016049	GW	Strategic	6.850	Retain	Awaiting outcome of North West Transfer option development/AMP8 WINEP 'no deterioration' investigation. Part of an aggregate group
London Road boreholes	2569018049	GW	Strategic	1.121	Retain	Aggregate limit with Tytherington borehole (operational source)
Eccleston Hill boreholes	2569025037	GW	Strategic	3.182	Retain	Potential option for development, however in any eventuality the source is brought back on line, future abstraction would align to the licence caps agreed in the AMP7 WFD no deterioration investigation.
Lightshaw no.1 boreholes	2569025043	GW	Strategic	3.805	Retain	Awaiting outcome of North West Transfer option development/AMP8 WINEP 'no deterioration' investigation
Greensbridge Lane boreholes	2569028014	GW	Strategic	4.110	Retain	Awaiting business decision on licence future. Part of an aggregate group
Knowsley boreholes	2569031016	GW	Strategic	5.682	Retain	Awaiting outcome of North West Transfer option development/AMP8 WINEP 'no deterioration' investigation. Part of an aggregate group
Randles Bridge boreholes	2569031024	GW	Strategic	7.959	Retain	Awaiting outcome of North West Transfer option

Source name	Licence no.	Source type	Resource Zone	Annual licence (MI/d)	Surrender/Retain	Justification
						development/AMP8 WINEP 'no deterioration' investigation. Part of an aggregate group
Mill Brow and Primrose Hill boreholes	2670101003	GW	Strategic	9.092	Retain	Awaiting outcome of North West Transfer option development/AMP8 WINEP 'no deterioration' investigation
Worthington reservoir system (comprising Arley, Adlington and Worthington reservoirs) including Buckow Brook feeder	2670202010	SW: Reservoir and SW: River	Strategic	12.729	Retain	WRMP24 option development
Eller Brook	2670211023	SW: River	Strategic	2.491	Retain	Linked to Worthington Reservoir
Watsons Farm borehole, Rivington	2670210005	GW	Strategic	0.037	Retain	Awaiting business decision on licence future however abstracted water can only be used on the farms named in the licence
Grindleton and Clitheroe Springs	2671309027	GW	Strategic	4.546	Retain	WRMP24 option development. Aggregate limit with Waddington Fell
Waddington Fell	2671309029	GW	Strategic	1.993	Retain	WRMP24 option development. Aggregate limit with Grindleton and Clitheroe Springs
Damas Gill reservoir	2672403014	SW: Reservoir	Strategic	3.363	Retain	Awaiting business decision on licence future. Aggregate limit with Lancaster Fells licence no. 2672401001
South Egremont boreholes	NW/074/0005/003	GW	Strategic	10.0	Surrender	Planning for licence surrender in FY25 due to Thirlmere transfer
Blea Water	2776005004	SW: Reservoir	Strategic	7.728	Surrender	No requirement to retain licence. AMP8 WINEP scheme to remove dam
Roughton Gill mine adit	2776014008	GW	Strategic	1.868	Retain	WRMP24 option development
Sail Beck	2775012032	SW: River	Strategic	0.125	Retain	Awaiting signoff from DWI regarding new source of supply for

Source name	Licence no.	Source type	Resource Zone	Annual licence (MI/d)	Surrender/Retain	Justification
						customers previously supplied by Sail Beck

3.5 AMP8 WINEP implementation schemes

We have a strong track record of delivering environmental improvement projects and are committed to undertaking significant further investigations and implementation of schemes in AMP8 and beyond. In AMP8 alone, we have put forward 50 schemes for implementation in the North West and in Wales related to water resources drivers for our 2024 Business Plan. This also includes improvements to 10,667 hectares of SSSIs supporting our overall target to achieve 100% of our owned SSSIs in favourable or unfavourable recovering condition by 2030. A summary of the schemes we have put forward which have been agreed with the Environment Agency (over and above investigations) are shown in Table 9.

Table 9 Summary of AMP8 WINEP implementation schemes in the North West and Wales

Strategy Drivers based on Environmental priorities	Underpinning legislative requirements	Number of Schemes	Description of actions
Water Framework Directive (WFD)	Water Environment (Water Framework Directive) Regulations 2017	30	<p>Schemes (changes to licenced volume, licence revocations, data improvements and environmental measures) to protect/ensure no deterioration in status (see section 3.2)</p> <p>Schemes to address barriers to the passage of fish.</p> <p>Schemes (compensation flow, weir removal and habitat improvements) and gravel re-introduction to meet WFD objectives in heavily modified water bodies.</p> <p>Further 24 investigations put forward in AMP8.</p>
Drinking Water Protected Areas	Schedule 1 of the Water Supply (Water Quality) Regulations 2016	4	<p>Expenditure on actions to protect and improve the quality of water abstracted for water supply.</p> <p>Includes catchment schemes to prevent deterioration or make improvements following a deterioration in water quality.</p> <p>Further 22 investigations put forward in AMP8.</p>

Strategy Drivers based on Environmental priorities	Underpinning legislative requirements	Number of Schemes	Description of actions
Habitat Regulations (European Sites)	Conservation of Habitats and Species Regulations 2017 Water Industry Act 1991	5	Expenditure on actions to implement water company duty to contribute towards restoration of European sites to favourable conservation status. Actions Includes infrastructure removal at water reservoirs and improvements at a SSSI site designated as a special area of conservation.
Eels	The Eels (England and Wales) Regulations 2009	3	Expenditure on actions to ensure structures meet requirements of eel legislation. Schemes implemented at two high priority intakes. 6 investigations at medium priority intakes to confirm eel entrainment
Invasive non-native species (INNS)	Invasive Alien Species Regulations (IAS Regulations) The Wildlife and Countryside Act 1981 Invasive Alien Species (Enforcement and Permitting) Order 2019	1	Expenditure on actions to contribute to achieving improvement objectives. Additional 4 investigations, to understand the risk of spread and impacts of INNS.
SSSI	Wildlife and Countryside Act 1981 Water Industry Act 1991	3	Expenditure on actions to implement water company duty to contribute to restoration of a SSSI to favourable condition. Includes improvement measures at SSSI sites.
NERC biodiversity priority	Natural Environment and Rural Communities Act 2006 (Environmental Act 2021 strengthens Section 40 of NERC Act)	4	Expenditure on actions that contributes towards biodiversity duties, requirements and priorities to conserve and enhance biodiversity (including catchment improvements). Investigation into the impact structure on fish productivity and sustainability

4. Methodology for long term environmental destination

As part of our environmental destination, our aim is to deliver our long-term ambition to improve the water environment in the North West in conjunction with Water Resources West. The methodology for delivering environment destination can be summarised in two main elements:

- Developing catchment solutions to gain more immediate benefits in priority catchments (in England) and opportunity catchments (in Wales). This is set out in section 4.3 which shows the iterative process that has been developed in collaboration through the WRW environmental destination workstream;
- Environmental protection. This element of work is looking to prevent environmental deterioration under the Water Framework Directive. In this sense, we would be looking to implement licence caps in both the short (2025-2035) and long term (2035-2050) in order to protect the environment. This is set out in section 4.2. Noting we have treated the short term licence caps within section 3 as these need to be addressed first.

With the exception of the National Framework data analysis and modelling work, other work including the stakeholder engagement and catchment prioritisation have been delivered through a single piece of consultancy work supported by APEM and Stantec.

4.1 Environment Agency National Framework data analysis

The Environment Agency National Framework, published in March 2020, explored England's water needs in the long term. It set out the scale of action needed to ensure resilient water supplies are available to meet the needs of all users in the future and a greater level of ambition for restoring, protecting and improving the environment. The framework sets out abstraction reduction targets (Table 11) at whole catchment level (rather than for individual licences) for different sectors (e.g. agriculture and public water supply), under various scenarios covering different levels of environmental protection. In order to understand the impact on individual abstraction licences, and thus impact on deployable output (DO), these catchment-scale reductions were translated to a licence scale (Catchment prioritisation and constrained list of options – Water Resources West August 2021). These licence reductions were modelled to understand potential impact on the supply/demand balance for inclusion in our plan. For further information on the impacts on the supply forecast, please refer to our *Revised Draft Technical Report – Supply Forecast*.

The National Framework sets out scenarios with differing levels of environmental protection (Table 10). There are also two different abstraction rates to consider: future predicted and fully licensed. Future predicted was determined by looking at recent actual use of abstraction licences and applying a growth factor. Under fully licensed, all abstraction licences would be utilised to their maximum capacities. All abstractors utilising all their licences at their full rate is a situation that would never occur in reality, as they are in place for contingency only in certain areas.

Table 10 Scenarios detailed in the Environment Agency's National Framework that has been carried forward for WRMP24.

Scenario	Description
Business as usual	The regulatory approach will remain the same. Continued protection at the same percentage of natural flows for the environment. Flow and groundwater balance tests evolve as a proportion of natural flows, flexing with climate change impacts. In this way, the environment adapts to climate impacts on river flow and groundwater resources. Within this scenario, the volume of water that would need to be recovered to restore groundwater bodies that have been classed as uneconomic to recover has been explored. This is called 'Business as usual including uneconomic water bodies'.
Enhanced	Sees greater environmental protection for protected areas, SSSI rivers and wetlands, and principal salmon and chalk rivers. In these water bodies, the enhanced scenario applies the most sensitive flow constraint appropriate, increasing the proportion of natural flow that is protected for the environment. Flow and groundwater balance tests evolve as a proportion of natural flows are altered by climate change.

The catchment-level reductions identified by the Environment Agency for the different scenarios are shown in Table 11.

Table 11 Reduction in Public Water Supply (PWS) licence volume under the different environmental destination scenarios

Catchment Area	Business as Usual (MI/d)		Enhanced (MI/d)	
	Future Predicted	Fully Licensed	Future Predicted	Fully Licensed
Wyre	31.5	53.8	31.5	53.8
Leven, Crake and Duddon	0.2	0.2	0.2	0.2
Waver and Wampool	0.7	1.0	0.7	1.0
Northern Manchester	1.9	14.8	1.9	14.8
Eden and Esk	6.6	8.0	10.6	12.1
Ribble	2.1	3.8	2.1	3.8
Weaver and Dane (shared with Severn Trent Water)	10.6	51.1	11.1	51.7
Upper Mersey	14.8	37.3	14.8	37.3
Derwent and West Cumbria	0.0	0.0	0.0	27.1
Lower Mersey and Alt	5.9	18.9	5.9	18.9
Shropshire Middle Severn (shared with Severn Trent Water)	20.4	35.9	22.3	37.9
Crossens	0.0	0.0	0.0	0.0

Catchment Area	Business as Usual (MI/d)		Enhanced (MI/d)	
	Future Predicted	Fully Licensed	Future Predicted	Fully Licensed
Douglas	0.0	0.0	0.0	0.0
Kent	0.0	0.0	0.0	0.0
Lune	0.0	0.0	0.0	0.0

Waterbodies that are non-compliant under these scenarios were identified and the catchment-level reductions were then apportioned across individual abstraction licences associated with the non-compliant waterbodies. In many cases, the reductions were not fully applied, for example where we were aware that a recent scheme has been implemented to address unsustainable abstraction following a site-specific investigation or where we suspected the accuracy of the data. In some cases, the licence changes we modelled were significantly lower than the catchment abstraction reduction targets identified by the Environment Agency (Table 9). The Environment Agency’s National Framework data is based on their water resources GIS (WRGIS) model, which incorporates various assumptions and uncertainties, and where site-specific knowledge is available this can be used in preference. The abstraction licence reductions were then modelled to understand the impact on deployable output (DO). The results are detailed in section 5 of this report.

As well as considering changes to licence volumes, we have also considered hands-off flow and compensation flow requirements in the development of our environmental destination. We have revisited previous outcomes, for example the need for licence changes at Geltsdale in Carlisle. There are many uncertainties and assumptions within the National Framework data that have been acknowledged by the Environment Agency, including those in Table 12:

Table 12 Uncertainties and assumptions with the National Framework data

Uncertainties and assumptions with the National Framework data	Likely impact on estimate of abstraction sustainability changes
The Environmental Flow Indicator (EFI) should only be used as a screening tool (see further details in section 3.2) and thus it is not suitable for confirming with any certainty that abstraction reductions are needed. The EFI is a percentage deviation from the natural river flow represented using a flow duration curve. This percentage deviation is different at different flows and is dependent on the ecological sensitivity of the river to changes in flow.	Likely overestimate; depending on sensitivity of river
Application of climate change impacts from the AFIXK ensemble member in the 2080s and applied this ensemble to the 2050 natural flows	Potential overestimate if impacts from climate change on natural river flow are deemed greater in 2080 than in 2050
The analysis is based on achieving Common Standards Monitoring Guidance (CSMG) targets in ‘Enhance’ catchments, but these targets have not yet been formally agreed. CSMG is similar to EFI; however, it is applied to more sensitive catchments where flow targets are more stringent, e.g. closer to natural flows.	Likely underestimate
It uses UKCP09 climate change scenario (not UKCP18) and only uses one ensemble member (AFIXK), which is one of two driest ensemble members.	Likely overestimate, but consistent with WRMP24 planning assumptions

Uncertainties and assumptions with the National Framework data	Likely impact on estimate of abstraction sustainability changes
It includes estimates for unlicensed abstractions, many of which are soon to come under the licencing regime; this will result in reduced uncertainty in the future.	If unlicensed volume is overestimated, potential licence reductions will be overestimated, mainly for groundwater sources
Groundwater abstractions will have varied impacts on nearby surface waterbodies, which are difficult to quantify and contains significant uncertainty.	Uncertain; further source level investigations required
The impact of previous WINEP sustainability investigations and schemes may not have been included or the local knowledge gained from them has not been used to override the National Framework outcomes.	Likely overestimate if previous WINEP investigations have not been included
Of the seven AMP7 WINEP investigations into groundwater sustainability, four will inform licence changes and have been modelled in the WRMP, and three will require further investigation through the WINEP in AMP8.	Dependent on AMP8 WINEP investigation outcomes

The National Framework data covers abstraction licences in England only. Natural Resources Wales has not completed a similar exercise for Wales; instead, the guidance for Wales asks companies to consider all pressures on the environment, not specifically water resources, in line with Welsh environmental policy and legislation.

4.2 Update for final WRMP (long term licence changes)

The Environment Agency completed a longer-term environmental water needs assessment in 2020 as part of the Water Resources National Framework, establishing the potential licence reductions required by 2050 to meet the Environmental Flow Indicators (EFI) so that a good ecological status is achieved or maintained. Further information on the definition of the EFI can be found in section 3.1

Through the National Framework for Water Resources, the Environment Agency estimated the deficits in 2050 for each catchment per scenario, but did not provide detailed granularity to understand deficits at a water body level. For WRMP24, recent actual abstraction data (including licence limits) was transferred to a new spreadsheet tool (Waterbody Abstraction Tool) designed to automatically derive the required sustainability reductions to remove the deficit at Q95 in 2050 in all waterbodies within the WRW region. This provided the source-level licence reductions required to remove the deficit.

The Waterbody Abstraction Tool calculates the water balance at the outlet of each waterbody, for four flow quantiles (Q30, Q50, Q70 and Q95) using the following steps:

- Start with the predicted natural flow in 2050 based on ensemble AFIXK of the Future Flows Hydrology project, extrapolate to the outflow point of the integrated waterbodies in the Environment Agency WRGIS database;
- Add the future predicted discharge to each waterbody modifying the recent actual value with a growth factor based on water company demand projections;
- Subtract the future predicted surface water abstractions based on the recent actual value with growth factors according to the sector;

- Subtract the future predicted impact of groundwater abstractions based on the recent actual value with growth factors according to the sector, and the spatial and temporal impact factors included in WRGIS that have been calculated using regional groundwater models;
- Incorporate complex impacts associated with reservoirs, transfers or augmentation schemes; and
- Compare the resulting future predicted flow in the river with the EFI, the latter calculated by applying the maximum allowed abstraction as indicated in Figure 3 where less water is available for abstraction in more environmentally sensitive rivers.

As part of the updates for WRMP24 from the National Framework dataset, three scenarios (based on fully licensed reductions) have been analysed:

- Business as usual plus (BAU+): the same percentage of natural flows for the environment that currently applies continues for the future. Uneconomic waterbodies, where reducing abstraction would imply a significant investment, were initially discarded. A further assessment was made for CSMG catchments as whether additional specific licence reductions would need to be made by 2050. This scenario will form our baseline draft WRMP24 supply forecast;
- Enhance: a greater level of environmental protection for protected areas and Sites of Special Scientific Interest (SSSI) rivers and wetlands, and principal salmon and chalk rivers, is achieved by applying the most restrictive ASB; and
- Ofwat low: removal of the highly uncertain licence reductions from BAU+ scenario. Retain licence reductions that are predicted to fall within Band 3 compliance level at Q95 by 2050. This was discussed with local Environment Agency staff and changes made if necessary; for example, one source in a waterbody with Band 2 compliance by 2050 was more certain than one in Band 3 and therefore was swapped in.

In line with WRW, we modelled ‘Fully Licensed’ BAU +, ‘Enhance’ and ‘Ofwat low’ scenarios for our revised draft plan. However the BAU+ scenario is our starting point in the baseline supply forecast for our preferred plan to ensure we comply with current statutory and regulatory requirements in the future. For a detailed breakdown of what licence changes we have put forward ‘at an individual licence level’, and when; please refer to Table 19 in section 9. Table 13 includes a summary of licence changes between 2025 and 2050.

Table 13 Summary of known and potential licence changes from 2025-2050

AMP Period	Sources	Type	Year of delivery ²	Driver	Summary of change applied in baseline
AMP8 (2025-30)	Pennington reservoir	SW	2027	HMWB	New compensation flow
	Corn Close BHs (1 & 2)	GW	2027	WINEP WFD 'no deterioration' implementation (surface water)	6 year rolling limit of 7314 MI
	Schneider Road	GW	2027	WINEP WFD 'no deterioration' implementation (groundwater)	6 year rolling limit of 15'984 MI
	Thornccliffe Road	GW	2027	WINEP WFD 'no deterioration' implementation (groundwater)	
	Eccleston Hill	GW	2027	WINEP WFD 'no deterioration' implementation (surface water)	6 year rolling limit of 1656 MI and reductions of annual limit to 276 MI/year
	Bearstone	GW	2027	WINEP WFD 'no deterioration' implementation (surface water and groundwater)	6 year rolling limit of 3197.4 MI

² Known licence changes are for delivery in AMP8. For further information on our strategy for delivering sustainability reductions, please refer to section 3.3. Subject to the outcome of the AMP8 no deterioration investigations, we will look to accelerate licence reductions by 2027 (where feasible).

AMP Period	Sources	Type	Year of delivery ²	Driver	Summary of change applied in baseline
	Delamere group ³	GW	2030	WINEP WFD 'no deterioration' implementation (surface water and groundwater)	10 year rolling limit of 23521 MI
	West Cheshire (Simmonds Hill) group	GW	2030	WINEP WFD 'no deterioration' implementation (surface water and groundwater)	10 year rolling limit of 52961 MI
	Wirral group	GW	2030	WINEP WFD 'no deterioration' implementation (surface water and groundwater)	6 year rolling limit of 20166 MI at Prenton and reduction of annual limit to 1537 MI at Newton and Grange
AMP9 (2030 – 2035)	Broughton/Franklaw group	GW	by 2035	WINEP WFD 'no deterioration' implementation (groundwater)	6 year rolling limit of 65'996 MI
	Trawden	GW	by 2035	WINEP WFD 'no deterioration' implementation (surface water)	Annual licence cap of 540 MI
	Langden/Hareden system	SW/GW	by 2035	WINEP WFD 'no deterioration' implementation (surface water)	Hands off flow review/implementation
	River Dane	SW/GW	by 2035	WINEP WFD 'no deterioration' implementation (surface water)	Hands off flow review/implementation
	Old Water (Gelt)	SW/GW	by 2035	HMWB	Hands off flow review/implementation
	Wigan West group	GW	by 2035	WINEP WFD 'no deterioration' implementation (surface water)	Potential licence cap (very uncertain) - not in baseline - sensitivity assessment
	Southport group	GW	by 2035	WINEP WFD 'no deterioration' implementation (surface water)	Potential licence cap (very uncertain) - not in baseline - sensitivity assessment
AMP10 (2035-40)	Millbrook	GW	by 2040	Long term Environment Destination	Annual licence cap of 110.5 MI (BAU+)
	Scales	GW	by 2040	Long term Environment Destination	Annual licence cap of 273 MI (BAU+)
AMP11 (2040-45)	Butterworth Hall	GW	by 2045	Long term Environment Destination	Annual licence cap of 597.3 MI (BAU+)
	Woodford	GW	by 2045	Long term Environment Destination	Annual licence cap of 166.4 MI (BAU+)
AMP12 (2045-50)	Wigan West group	GW	by 2050	Long term Environment Destination	Annual licence cap of 1463.7 MI (BAU+)
	Eccleston Hill	GW	by 2050	Long term Environment Destination	Annual licence cap of 58.1 MI (BAU+)
	Macclesfield group ⁴	GW	by 2050	Long term Environment Destination	Annual licence cap of 2576.4 MI (BAU+)
	Lymm	GW	by 2050	Long term Environment Destination	Annual licence cap of 165.9 MI (BAU+)
	Daresbury/Houghton Green	GW	by 2050	Long term Environment Destination	Annual licence cap of 3423.8 MI (BAU+)
	Bearstone	GW	by 2050	Long term Environment Destination	Annual licence cap of 181.5 MI (Enhance)
	West Cheshire (Simmonds Hill) group	GW	by 2050	Long term Environment Destination	Annual licence cap of 2471 MI (Enhance)

³ Delamere/West Cheshire and Wirral group AMP7 WINEP investigation still ongoing and due for completion by December 2024

⁴ Excludes London Road BH which was flagged as no required licence reduction by 2050. Further investigation in AMP8 WINEP

4.2.1 Screening approach

We are committed to applying ambitious reductions to our licence volumes by 2050, noting that there is significant uncertainty to the presented licence reductions that would need further specific investigation, which will be undertaken in AMP8 and beyond. As part of the process, we have reviewed the Waterbody Abstraction Tool outputs and have discussed with the Environment Agency our approach to screening out certain reductions where we believe we are already meeting (or contributing) to environmental destination requirements.

We have agreed our screening approach with the Environment Agency on the condition that we undertake more detailed source level investigations in AMP8 and beyond. Reasons of screening out reductions in specific waterbodies are included in Table 21, in section 9. These investigations may lead to the re-inclusion of source licence reductions for our next plan (WRMP29) that were previously screened out for this one; especially where our sources may impact specific river or wetland sites that are more vulnerable to the impacts of climate change. Potential licence reductions identified are currently only a signpost, and we are not committing to specific licence changes at this stage, as these will be need to be investigated and agreed through the WINEP process.

4.2.1.1 Ofwat Low scenario

As part of the Ofwat low scenario, we have excluded further long term licence reductions at certain sources which are currently considered most uncertain. In this case, we have excluded further licence reductions at 2050 at Lymm borehole, Rushton Spencer borehole and Wigan West borehole group. For those other sources where licence reductions are lower than baseline source yield, we have pushed back the licence reduction into the following AMP period. Table 14 highlights the difference between the Ofwat Low and BAU+ scenarios at a licence level and impacts on deployable out are shown in Table 18.

Table 14 Ofwat Low scenario and comparison with BAU+ of sources where new potential licence volume is less than individual source baseline yield assumed in the supply forecast.

Scenario	Source and licence reduction MI/d					
	2035–40		2040–45		2050	
Ofwat Low			Scales	-0.3	Woodford	-8.7
			Millbrook	-1.7	Butterworth Hall	-9.3
BAU+	Scales	-0.3	Woodford	-8.7	Rushton Spencer	-0.3
	Millbrook	-1.7	Butterworth Hall	-9.3	Lymm	-8.6
					Wigan West BH group	-31.4

4.2.1.2 Reservoir sources

Reducing our annual abstraction licence for reservoir sources will not provide the benefit to the associated waterbody to “remove the deficit at Q95 in 2050 in all waterbodies”. The only outcome of reducing the annual abstraction licence will be the increase in reservoir spills, which would mainly occur during the winter months, when the natural Q95 is not under threat.

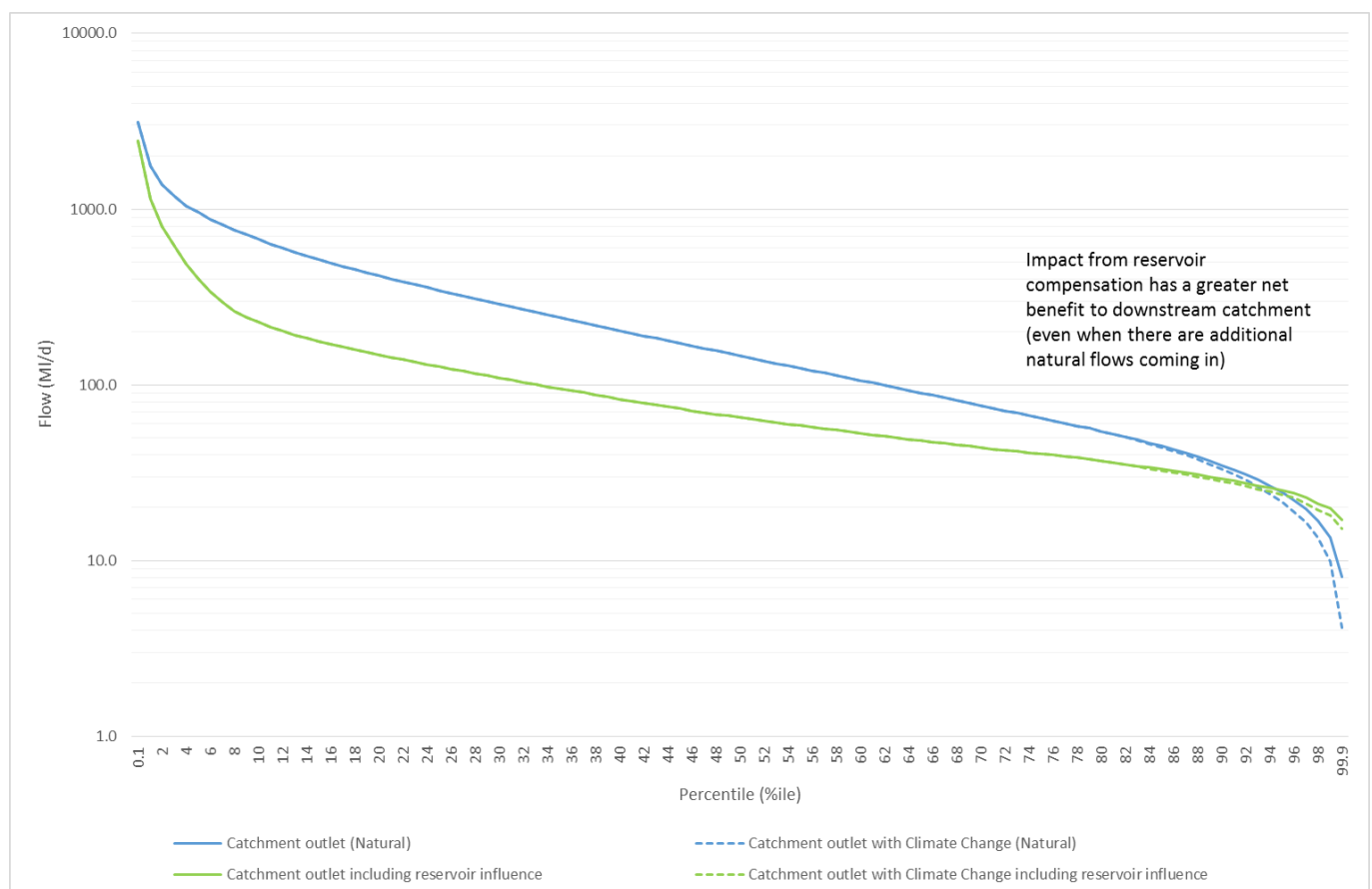
Historically, reservoir compensation flows have been agreed through specific Acts of Parliament when the reservoir was originally approved. These compensation flows (which were also provided to ensure a minimum flow for the environment), were predominantly designed to provide water to downstream industries (e.g. Cotton Mills) which, in turn, was then re-abstracted further down the catchment. Most of these downstream industries have now closed; however, the agreed statutory compensation flow remains. As a consequence, the compensation flow in most of our reservoirs (particularly in our Pennine sources) is higher than the equivalent

natural flow at Q95 (by varying degrees) and these have been assessed through the Heavily Modified Water Body (HMWB) investigations. The conclusions were that these flow arrangements are generally considered sustainable, which means they provide sufficient environmental protection to the downstream waterbody. Where this is not the case, compensation flows have been changed in recent AMPs.

We believe reservoir compensation flows will continue to provide protection in the long term and will provide a net benefit to the wider downstream catchment (Figure 5). For that reason, we are screening out increases in compensation flows for reservoirs flagged for licence reductions through the environmental destination. Whilst this screening-out approach is the basis of our long-term environmental destination, we will still investigate particular sources in the future where necessary through collaboration with local Environment Agency and Natural England teams where there are local concerns that relate solely to our abstraction. This principle also applies to our groundwater and river sources.

For further details on the outcomes of the previous HMWB assessments, see Table 22 within section 9. As part of our AMP8 WINEP development, we discussed with the Environment Agency regarding whether there were any missing mitigation measures that were not fully captured in previous HMWB investigations. It was concluded that only Pennington and Longdendale had missing mitigation measures (related to water resources). In these two cases, a new compensation flow is to be implemented in AMP8 at Pennington and an investigation is to be conducted at Longdendale to understand the feasibility of implementing a variable compensation flow using adaptive management.

Figure 5 Impact of reservoir compensation in the wider catchment considering climate change



4.2.1.3 River sources

Several of our river sources have been flagged for licence reductions through the environmental destination. These include: the River Gelt (Carlisle), Langden and Hareden system, Musbury Brook, River Dane, Lancaster Fell sources and River Duddon at Ulpha.

There are uncertainties around whether existing and new prescribed flows are sufficient to ensure the waterbody status remains good. For example, recent WINEP investigations have led to a significant increase of prescribed

flows in the Gelt catchment. We have discussed with the Environment Agency whether our AMP6 investigation is sufficient to meet environment destination objectives. It was assumed by the Environment Agency, within the National Framework, that prescribed flow constraints were sufficient to support good (hydrological status) in the associated waterbody. Therefore, we have screened out specific licence reductions that are constrained by local hands off flows; however, we will look to apply future hands off flows (where feasible) for abstractions within a licence that does not have one. For example: for the Old Water tributary in the Gelt catchment in Carlisle Resource Zone.

Some other licence reductions have been screened out altogether (e.g. Ulpha on the River Duddon). This is because the current flow requirements (and associated prescribed flows) on the licence for this example are highly complex and we believe the Environment Agency Waterbody tool output is too simplified to consider licence changes.

4.2.1.4 Groundwater sources

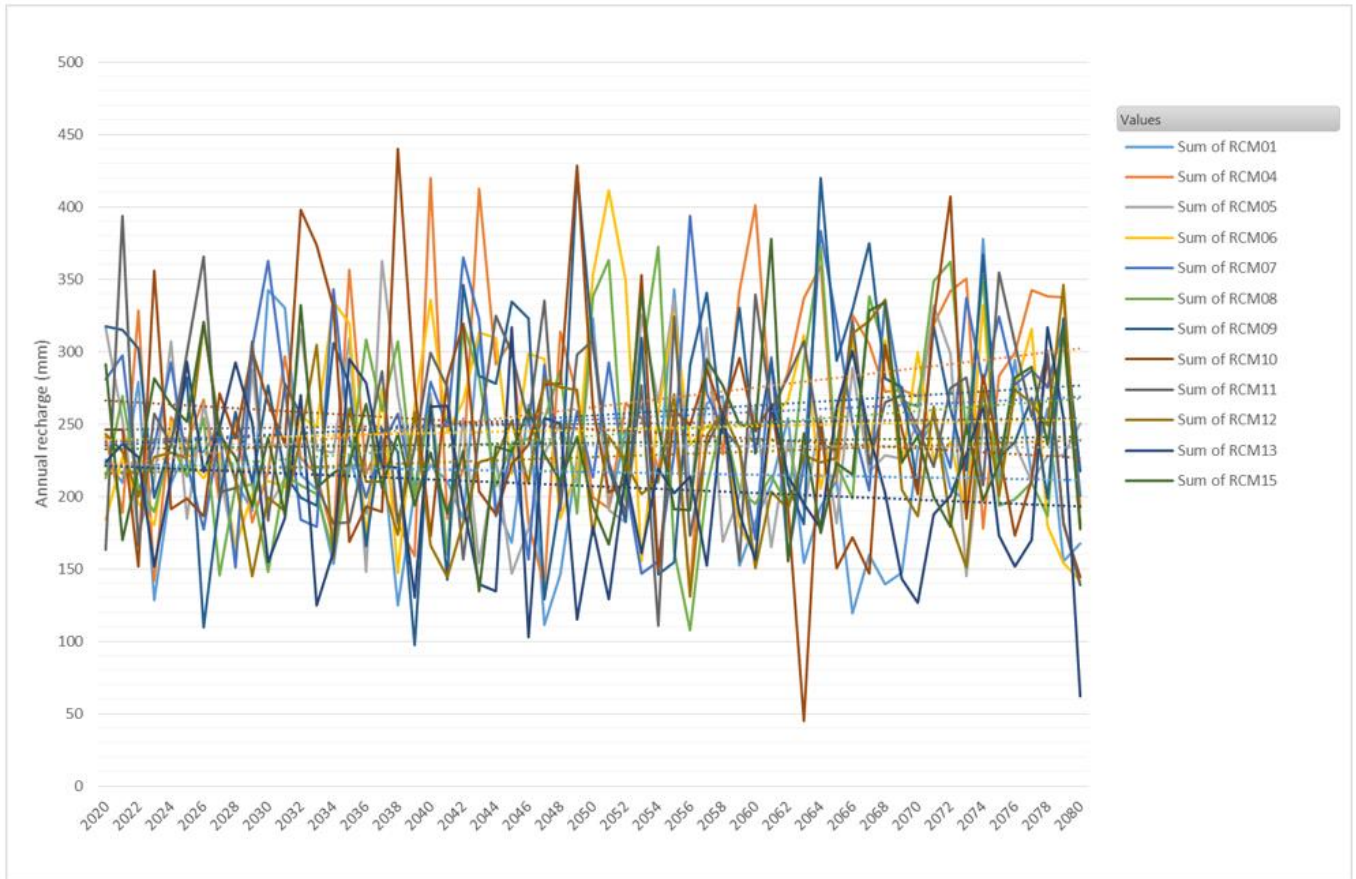
Several of our groundwater sources have been flagged for environmental destination reductions. The specific licence reduction identified from the Environment Agency Waterbody tool are uncertain and the impact on baseline deployable output is considerably smaller than the total licence reduction. This is because in most cases the yield of the borehole source is applied rather than the licence limit. The yield may be either the maximum abstraction in a historical drought and limited by pumping or WTW capacities.

When mapping reductions to our water resources model, if the new 'group licence' after reduction is greater than the current yield, then we will retain the current yield in our plan. If the new 'group licence' after reduction is less than the yield, then this new volume will supersede the current yield. In these cases, a new six-year rolling limit will be applied to these sources as we still need to retain flexibility to abstract at higher rates at times of peak demand.

Recent AMP7 WINEP investigations have been conducted with the aim of looking at potential licence changes in order to improve the associated waterbody status and to ensure there is no deterioration in the environment. These were implemented in our draft plan and retained in our revised draft and final plan where six-year rolling limits have been applied in all cases. For specific licences that are to be significantly capped through the AMP7 WINEP investigation (implemented in AMP8), no further longer-term licence reductions will be made given the high level of uncertainty of predicted licence reductions out to 2050. For example, the impact on surface water bodies is highly variable across our region, while for many of our groundwater sources the link to surface water is weak and, therefore, the risk from climate change is likely to be low.

Recent evidence from research by the Centre of Ecology and Hydrology highlights that annual groundwater recharge due to climate change is likely to change very little in the North West. Figure 6 presents a range of potential groundwater recharge changes using different climate scenarios between 2020 and 2080. For this reason, further long-term licence reductions due to climate change are particularly uncertain for our groundwater sources.

Figure 6 Change in annual groundwater recharge for various climate change scenarios (Manchester and East Cheshire Aquifer)



Outputs from the latest eFLaG river flow dataset (which uses UKCP18 data) show the reduction in natural Q95 under various climate change scenarios (Figure 7). Flow data assessment is important as the National Framework assessment explicitly links the long term deterioration risk from groundwater abstraction on the impact to surface waterbodies. From a WFD perspective, if the natural flow considering fully licenced abstraction at Q95 varies more than the EFI, but:

- by less than 25%, band 1 non-compliance is given;
- between 25-50% deviation (band 2) and
- over 50% deviation (band 3).

For more sensitive catchments, the compliance banding is narrower (i.e. smaller ranges between band 1 and 3). Figure 7 highlights the change in Q95 over time between 2000 and 2080 under various RCM scenarios on the River Dane at Rudheath gauging station which is considered low sensitivity (ASB1).

Figure 8 expands on this and highlights the number of RCM scenarios that exceed particular flow change categories. Outputs show no RCM scenarios exhibited a Q95 flow reduction greater than 25% before 2050. This suggests the potential change in river flow due to climate change on the River Dane catchment would lead only to potentially band 1 non-compliance (when considering the default EFI assessment approach). This supports our suggestions that long term deterioration risk is potentially lower in catchments in the south of our region when compared to the National Framework dataset (which uses UKCP09). We acknowledge that uncertainties are very high and further investigations in AMP8 and beyond would be required to assess the long term deterioration risk from our groundwater licences (see section 4.2.2).

Figure 7 change in Q95 using the eFLaG dataset (GR6J model) for the River Dane at Rudheath

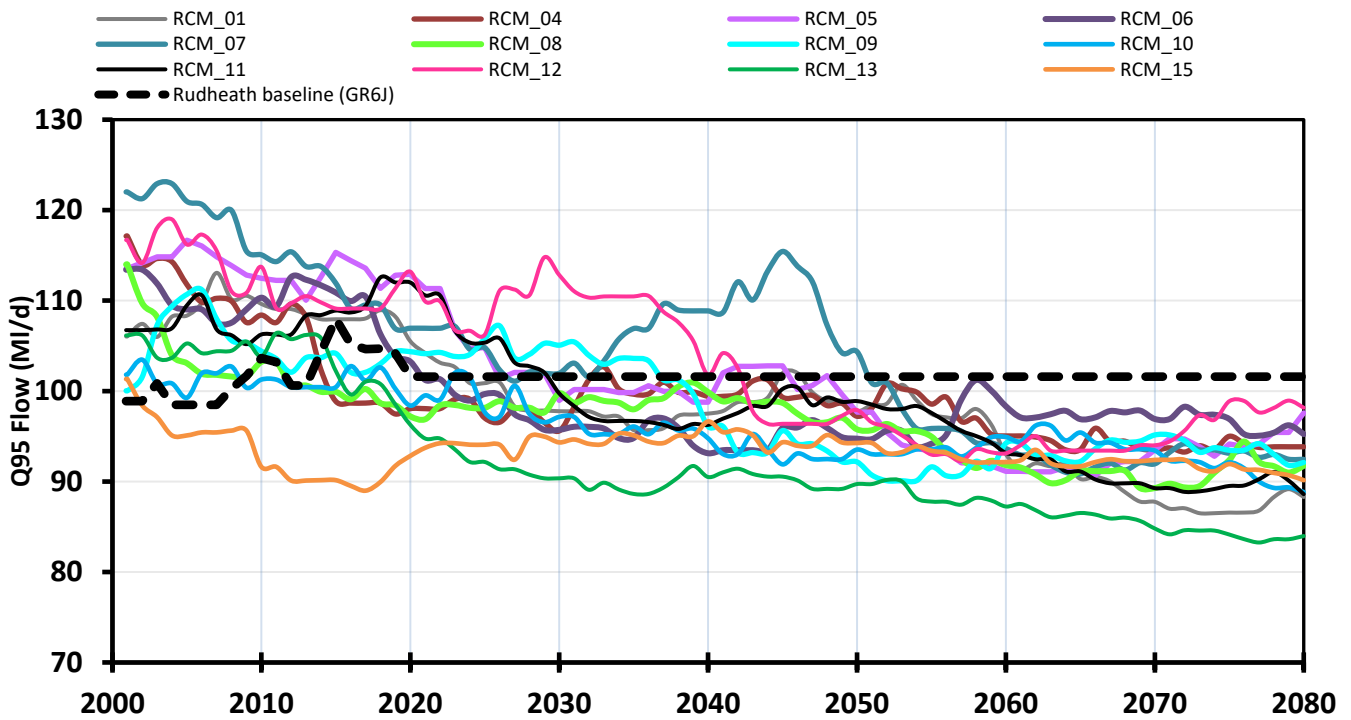
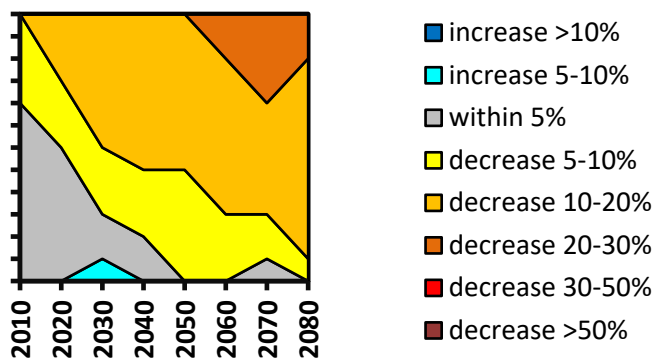


Figure 8 Number of RCM models within predicted decadal change categories



4.2.2 AMP8 WINEP investigations related to environmental destination

As part of AMP8 WINEP, we will be looking to better quantify the uncertainty (that is significant) associated with the environmental destination in AMP8 and beyond. Through further investigations, we want to ensure we have confidence in the benefits of abstraction changes, i.e. they will meet the environmental objectives we set out to achieve, but also to ensure the best net possible overall benefit to the catchment. This will include understanding potential cost-benefit impacts considering various climate change scenarios.

For example, we will look to understand which of our groundwater sources in each aquifer are at highest risk of causing deterioration to both surface and groundwater bodies considering climate change. This may include sensitivity testing of different climate change scenarios on groundwater recharge as an example. The key aim of the investigations is to assess whether our sources remain sustainable in the long term.

In AMP8, the focus of investigations will be on sources that we have screened out for additional licence reductions over and above recent AMP7 WINEP investigations (and licence cap assumptions for no deterioration). These will include groundwater sources from:

- Wirral and Cheshire West Permo-Triassic Sandstone Aquifer;
- Fylde Permo-Triassic Sandstone Aquifer;
- Furness Permo-Triassic Sandstone Aquifer; and
- Manchester and Cheshire East Carboniferous Aquifer.

Sources in the Mersey Basin Lower and Merseyside North Permo-Triassic Sandstone Aquifer, and Manchester and Cheshire East Permo-Triassic Sandstone Aquifer (e.g. Woodford) will be investigated in conjunction with the North West Transfer (NWT) gate 3 option appraisal process. This is to reduce uncertainty in the current Environment Agency Abstraction Licensing Strategy (ALS) and better quantify short and long-term risk to environmental deterioration. This will also ensure solutions put forward to prevent deterioration of our used sources is consistent with the development of SRO's in the area.

For surface water licences that will be taken forward for AMP8 (i.e. River Dane abstraction), the focus will be on risk of deterioration (short term); however, we will include further analysis in the AMP8 WINEP scope to better understand long-term risks of deterioration to help support our screening assumptions used in this plan.

As part of AMP8 WINEP, we have also put forward four pilot investigations for the Wyre catchment to better understand the benefits of nature-based solutions. This was flagged through catchment stakeholder workshops in 2022 where it was identified that there is very little evidence to quantify the benefit on water resources and other elements from nature-based solutions. Outputs from these investigations will be joined with the wider environmental destination investigations in AMP8, which will seek to identify and develop environmentally focused solutions to prevent our licences causing deterioration in the long term and improve the wider catchment.

We will discuss and agree the scope and timetable of these investigations with the Environment Agency and Natural England as part of our WINEP program. All investigations will be done in conjunction with other WINEP schemes (where relevant) including natural flood risk management and impoundment removal projects in order to achieve a multi-faceted benefit for the environment. For example, water quality improvement that, in turn, may affect water availability or help to achieve carbon targets.

Investigating and planning for licence changes in the long term (alongside other measures) will ensure the most cost effective and sustainable solutions (options) are put in place as a result of abstraction reductions at a particular source. Early planning for licence reductions will enable us to access alternative water sources that do not compromise environmental objectives and reduce the overall cost of the resulting intervention. This would represent best value for customers, noting that the specific timescale for delivering required environmental improvement will impact what solution is chosen and the associated cost.

- As part of WRW, we have also committed to carrying out further investigations in AMP8 WINEP of the environmental destination option appraisal. Whilst the scopes have not been finalised at the time of writing, the objective of the appraisal will be to develop and assess the feasibility of options to deliver environment destination as quickly as possible. These may include:
 - solutions to improve the resilience of catchments through nature-based solutions/habitat restoration;
 - solutions to reduce abstraction within catchments to generate additional water for abstraction downstream;
 - solutions to move abstractions to discharge rich reaches of a river (i.e. downstream of STW); or,
 - solutions to replace existing sources (that may cause deterioration) that don't cause deterioration

This appraisal will complement the more specific local long term no deterioration investigations as well as the pilot investigations on the Wyre.

4.3 Catchment prioritisation

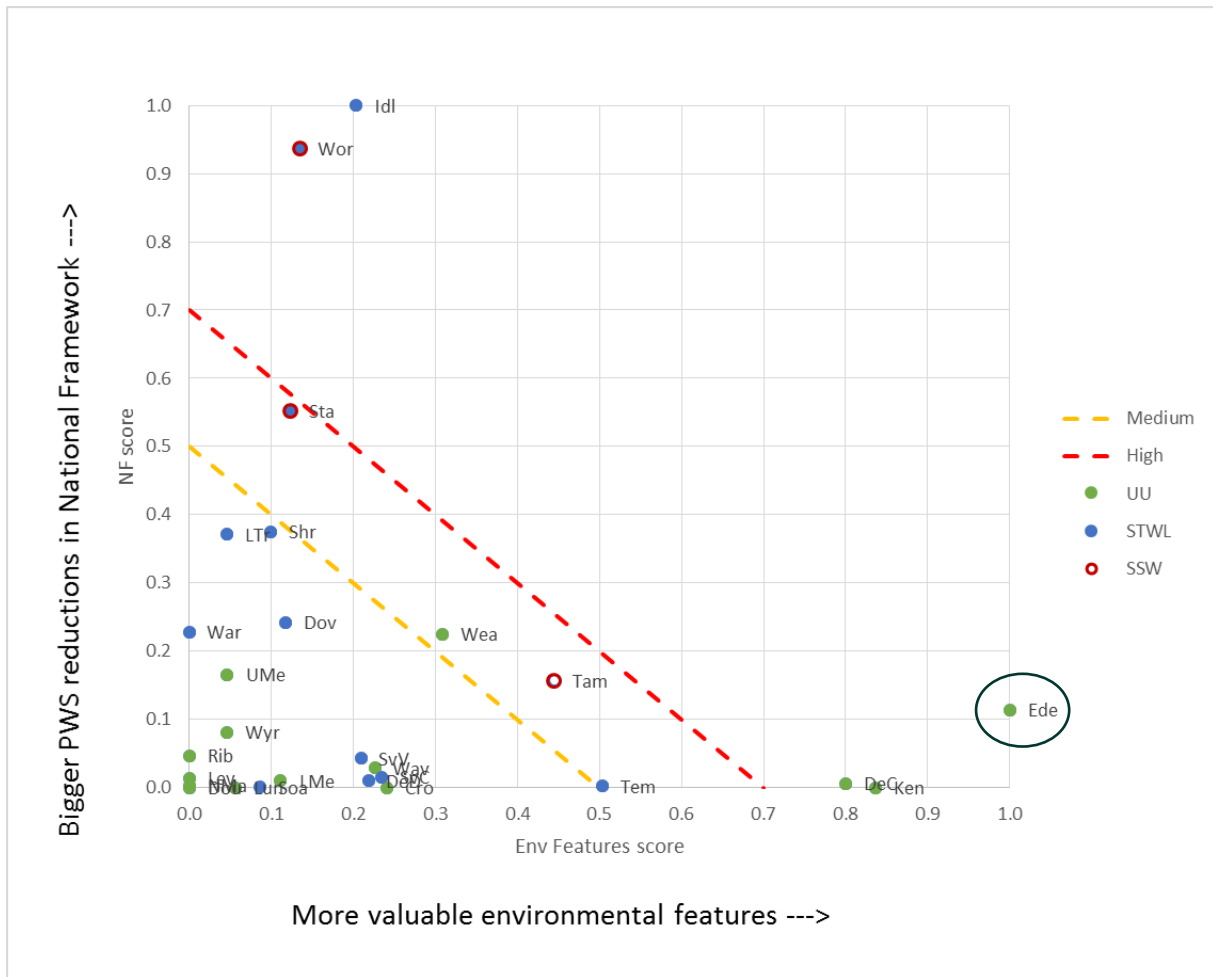
Following the assessment (section 4.2) to determine impacts on abstraction licences and deployable output, catchments across the region went through a prioritisation process. This process covered regional catchment prioritisation in England and 'opportunity catchments' in Wales.

Regional catchment prioritisation involved high level characterisation and prioritisation of all catchments in the Water Resources West region. This was undertaken at a Water Framework Directive (WFD) and Catchment-Based Approach (CaBA) catchment scale, as opposed to water resource zone scale. This was in order to build on the existing integrated catchment planning framework for the purposes of stakeholder engagement. However, initially, only water resources related environmental features were used to aid the prioritisation process.

An initial prioritisation task was carried out to identify areas where stakeholder engagement could be started and trialled, and the Wyre catchment was taken forward for our supply area. The Wyre was selected as one of our highest priority catchments based on several factors including:

- It has the highest reduction in the National Framework data (Table 11);
- Potential issues with the impact of groundwater abstraction on surface waters have been investigated in AMP7 WINEP and concluded no impact;
- Potential issues with the sustainability of groundwater abstraction are proposed to be investigated under WINEP in AMP8 and beyond;
- Issues with surface water flooding in the wider catchment;
- The above two factors coupled together suggest there is scope for a groundwater recharge scheme, which could be proposed as an interim solution (requiring further investigation and trials) rather than licence changes through the AMP8 WINEP;
- Reservoirs in the catchment (Barnacre and Grizedale) have a high rate of deterioration for dissolved organic carbon coming from degraded peatlands. There is a peatland restoration project in progress through our Green Recovery and Nature for Climate programmes that will start to address this;
- There are raw water quality issues in the river related to diffuse agricultural pollution (bacteria, ammonia and herbicides) that are currently being addressed through a partnership approach between ourselves, Environment Agency, catchment sensitive farming and the Wyre Rivers Trust (CaBA group). This work is also being augmented by the U UW Green Recovery programme to increase the pace of delivery and bring about the benefits sooner; and
- Under Phase 4 of the EU LIFE funded [Natural Course](#) project, a [Fylde Hub](#) will be established as a collaborative vehicle for overseeing catchment improvement works in the Wyre. Organisations represented on the Hub will include United Utilities, Wyre Rivers Trust, Environment Agency, Natural England, Ribble Rivers Trust and the Rivers Trust. Wyre, Blackpool, Fylde and Lancashire councils will be kept informed of progress and may be brought into the Hub depending on where activities are focused.

Figure 9 Regional Prioritisation of Catchments (England)



For the above reasons, the Wyre is one of three strategic catchments in our AMP8 business plan where we are piloting a place-based approach to planning across all investment needs

Figure 9 shows an output of the catchment prioritisation work, which plots the National Framework reduction against environmental sensitivity. For the catchments in UUW’s area that are most sensitive (i.e. Eden), it is clear that these issues have already been addressed through previous AMPs through projects to restore sustainable abstraction.

4.3.1 Final regional catchment prioritisation

In addition to the datasets listed below, information was gathered through stakeholder input via interviews, workshops and surveys. The catchments were prioritised based on a numerical scoring assessment of datasets weighted to give a ranking (Table 15). A moderation exercise then allowed stakeholder input to support or override the numerical results. The data sets used were:

- Water sensitive features (protected areas, Sites of Special Scientific Interest, Groundwater Dependent Terrestrial Ecosystems, Salmonid Rivers);
- Environment Agency National Framework (NF) scenario data with some initial adjustments following review by water companies;
- Climate change risk assessment data for Welsh catchments;
- Existing water resource priority/opportunity catchments;
- WFD reasons for failure – RNAG 2015, Public Water Supply (water levels/flows, physical modifications); and
- Heavily modified water bodies (HMWB) (PWS).

Data was not held for water-related protected species, priority habitats or locally important features. This data will be collected for the prioritised catchments as the evaluation progresses; however, the weighting of these factors was reviewed in a workshop with a range of stakeholders.

Table 15 Ranking of UUW catchments*

CAMS ledger	Water Company	NF score_PWS	EnvFeat score_scaled	RNAG score_flow	TOTAL score_scaled	UUW priority order after moderation	Reasons for change
Eden and Esk	UUW	0.11	1.00	0.10	0.50	4	Reduced due to lower abstraction reductions compared to other UUW catchments (Wyre/Upper Mersey/Weaver & Dane) plus recent Habitats Regulation Review of Consent at Geltsdale
Derwent & West Cumbria	UUW	0.01	0.80	0.29	0.48	7	High original score due to being a SAC river, however many of the abstraction issues are already being addressed (e.g. revocation of Ennerdale/Crummock licences)
Northern Manchester	UUW	0.00	0.00	1.00	0.44	6	High RNAG score due to physical modification rather than abstraction pressures
Kent	UUW	0.00	0.84	0.16	0.44	11	No National Framework reductions
Upper Mersey	UUW	0.17	0.05	0.76	0.42	2	Second largest abstraction reduction in National Framework. However most are reservoir sources which we've subsequently agreed to screen out for WRMP24 due to compensation flows providing long term protection
Ribble	UUW	0.05	0.00	0.56	0.26	9	Unsustainable abstraction already been address (e.g. Brennand and Whitendale, new Dean Clough compensation low)
Shropshire Middle Severn	STWL/UUW	0.38	0.10	0.12	0.26	8	AMP7 WINEP groundwater sustainability investigation for Bearstone boreholes (UUW driver)
Weaver and Dane	STWL/UUW	0.23	0.31	0.05	0.25	3	Increased rank as has higher National Framework reductions and potential increase in abstraction from option development for Severn Thames Transfer scheme
Crossens	UUW	0.00	0.24	0.00	0.25	12	No National Framework reductions
Wyre	UUW	0.08	0.05	0.22	0.15	1	AMP7 and AMP8 WINEP investigations for Fylde BH group
Douglas	UUW	0.00	0.00	0.32	0.14	14	No National Framework reductions
Lower Mersey & Alt	UUW	0.01	0.11	0.03	0.14	5	Large National Framework reductions
Waver & Wampool	UUW	0.03	0.23	0.00	0.11	13	No National Framework reductions
Leven, Crake & Duddon	UUW	0.01	0.00	0.24	0.11	10	AMP7 WINEP groundwater sustainability investigation for Schnieder Road/Thornccliffe Road and new compensation flow at Pennington at AMP8
Lune	UUW	0.00	0.06	0.00	0.02	15	No National Framework reductions



*_NF score = National Framework: potential licence reductions; EnvFeat = Environmental Features; RNAG = Reason for Not Achieving Good.

Number coding scale: RNAG rank of 1 means it contains the highest proportion of waterbodies that are failing WFD compared to all other waterbodies in WRW.

EnvFeat of 1 = highest number of environmental features

NF rank of 1 = highest amount of potential licence reductions (based on the National Framework dataset)

Of the ten water resources priority catchments set out by the Environment Agency/Defra Water Abstraction Plan published in 2017, just one is located in our area of operation – the Alt and Crossens. Extensive water level management is the primary reason for this catchment being a priority for the Environment Agency. However, the prioritisation method followed here for the environmental destination did not result in the Alt and Crossens ranking highly. We participated in a meeting held in July 2021 with the Environment Agency and the non-public water supply lead for Water Resources West to outline the reasons for the differences and it was agreed that the Alt and Crossens would not be taken forward as a priority for environmental destination at this stage. This was because no long-term abstraction licence reductions were flagged in the two catchments.

4.3.2 Stakeholder engagement

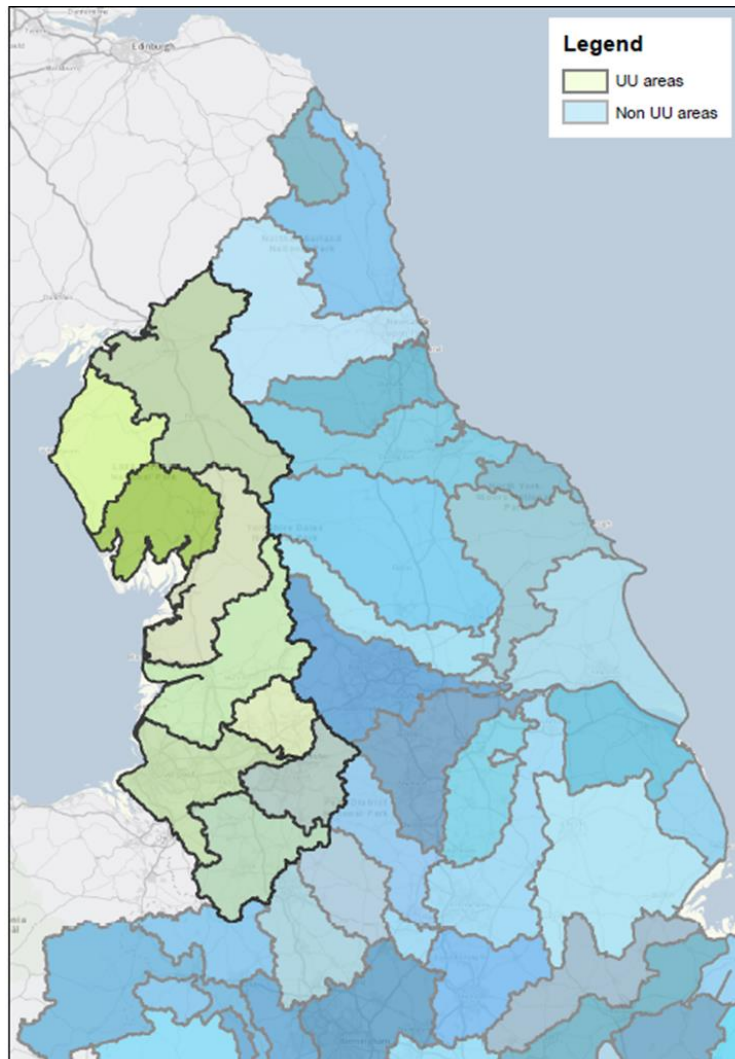
Prior to commencing the environmental destination work stream, a consultation was carried out to engage stakeholders early in the process to incorporate local knowledge, expertise and existing catchment plans in the regional planning process. The first stage of the consultation took place during December 2020 and January 2021.

Once the priority catchments had been agreed, further stakeholder engagement took place from April to August 2021. The aim of engagement was to identify opportunities to improve water resources management and align with existing catchment projects and partnerships to maximise benefits. Through workshops, interviews and surveys, we have identified a range of measures to protect and enhance water resources specific to the catchment.

The outputs of this work have been categorised into two levels of detail (Figure 10 and Figure 11), which set out water resources features, pressures and an unconstrained list of actions that could be implemented through future WINEP schemes to improve the catchment and make it more resilient to the impacts of climate change.

In line with the guidance, stakeholder engagement has been carried out using the boundaries of the catchment-based approach (CaBA) groups, established by Defra in 2012. Figure 7 shows how these groups relate to the WRZs and Figure 10 shows their geographic spread.

Figure 10 Geographical locations of catchment-based approach (CaBA) groups, highlighting the 13 groups in UUW’s operating area



Further stakeholder engagement was carried out to reach an unconstrained and then a constrained list of options for the Wyre catchment. This is described in section 6 below. The stakeholders engaged in the Wyre catchment are included in Table 16.

Table 16 Stakeholders engaged in the Wyre catchment

Organisation	Area of expertise
Environment Agency	Water resources, integrated environment planning, groundwater and contaminated land, catchment operations
Natural England	Catchment-sensitive farming
Wyre Borough Council	Coast and countryside manager
United Utilities Water	Catchment planning, water resources
Wyre Rivers Trust	CaBA host (representing the members of the Wyre catchment partnership)

Figure 11 Tier 1 in-catchment characterisation and prioritisation process.

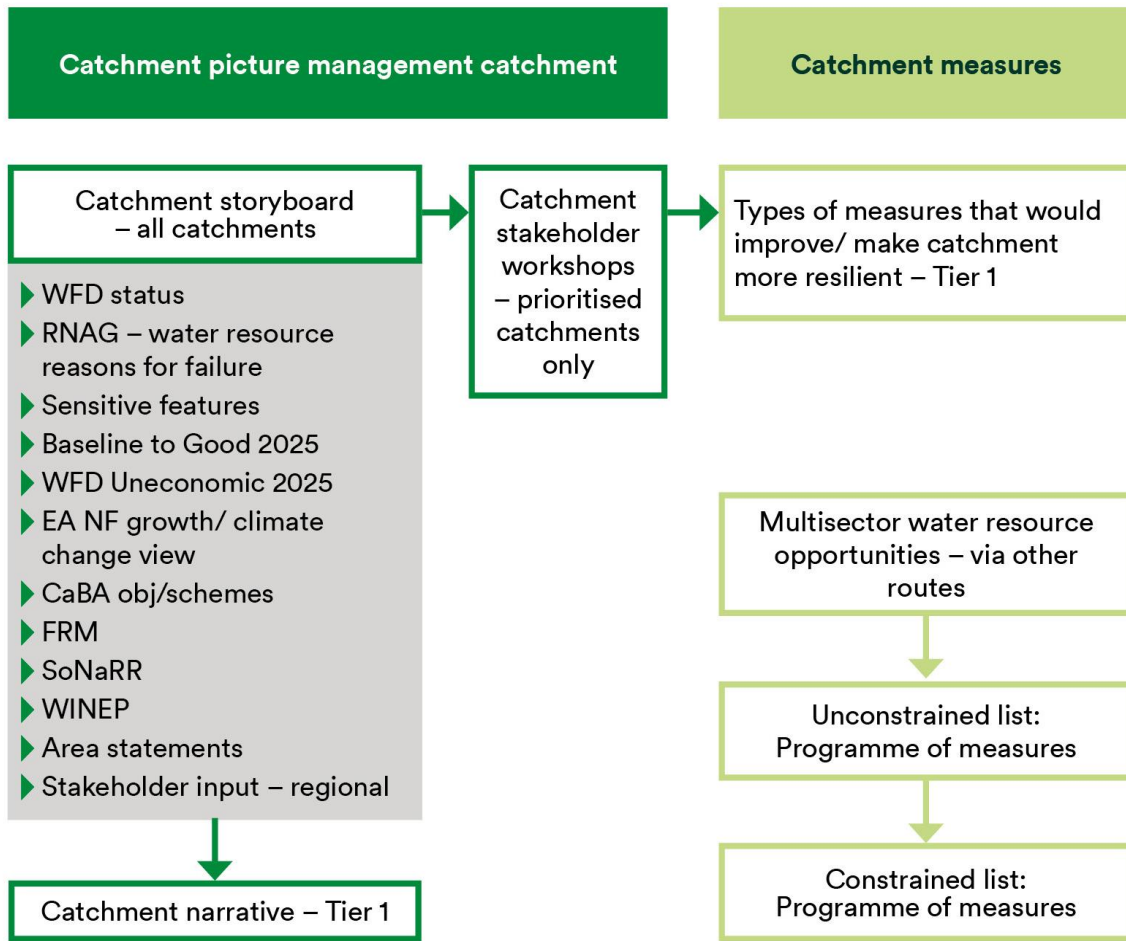
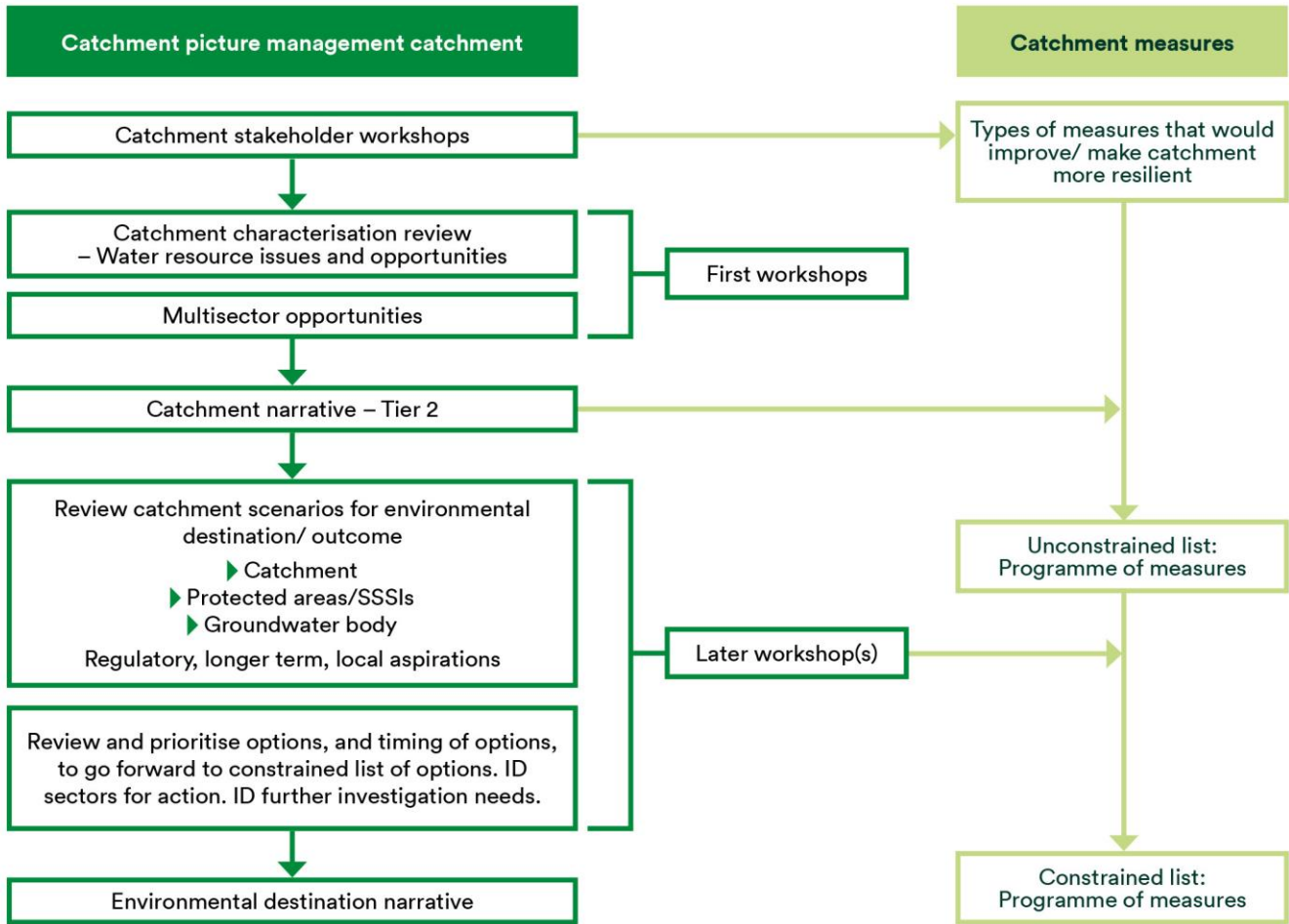


Figure 12 Tier 2 in-catchment characterisation and prioritisation process



Tier 1 assessments (Figure 7), which are currently available for the Upper Mersey and Weaver Dane catchments (Technical Note: WRW environmental destination: Stakeholder data review), comprise:

- a map showing designated sites and WFD waterbodies considered as sensitive to abstraction features;
- locations of planned catchment measures;
- a table of environmental pressures and measures considered appropriate to address them (asset intervention, in-stream, riparian and catchment management activities); and
- measures have been assigned short, medium and long-term delivery timescales.

Tier 2 assessments (Figure 12), which is currently available for the Wyre catchment (Technical Note: WRW environmental destination: Stakeholder data review), comprise the information from Tier 1 plus stakeholder narrative around:

- issues, opportunities and constraints;
- longer-term aspirations;
- areas for future investigation;
- unconstrained options;
- benefits assessment; and
- constrained options.

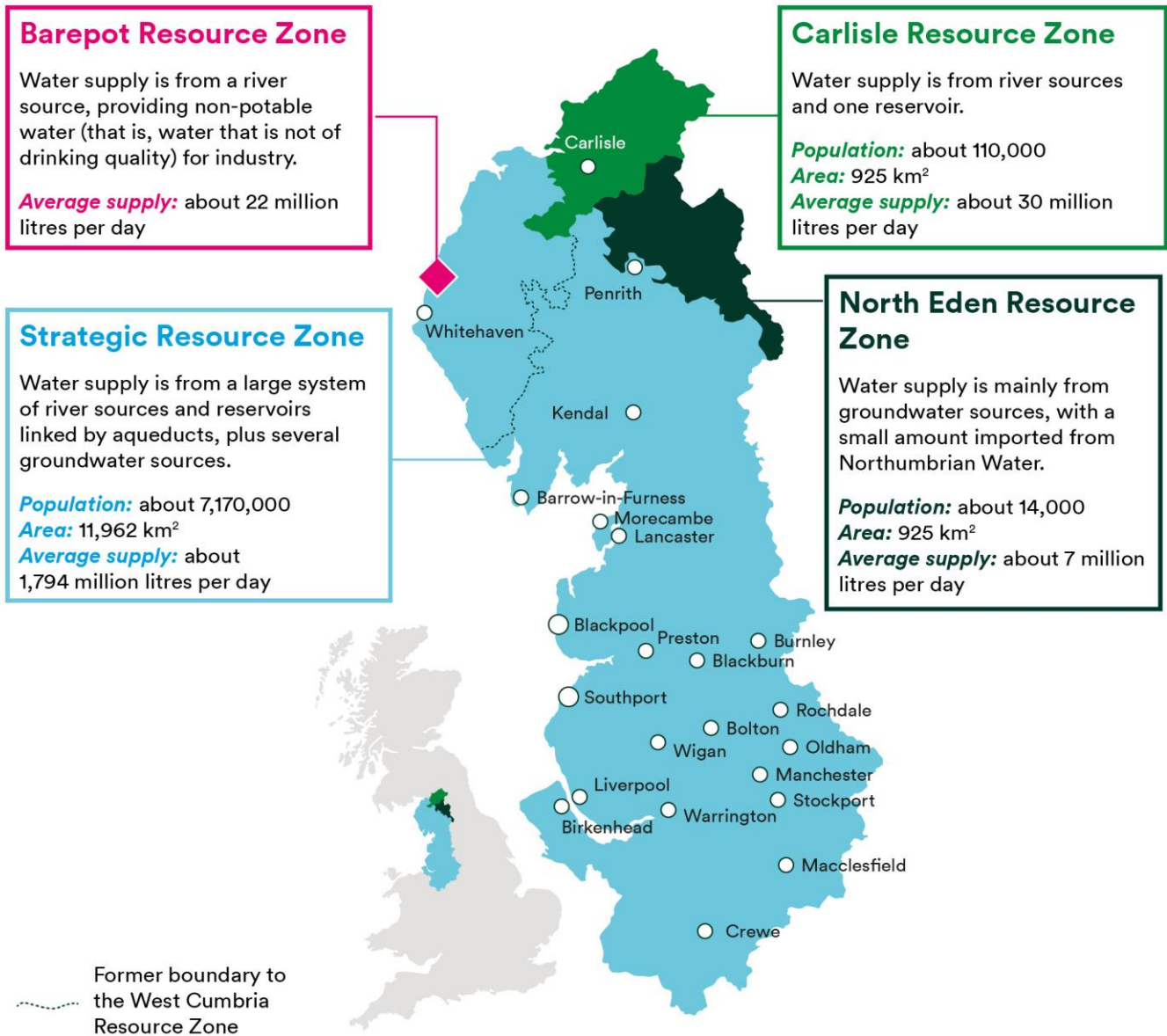
Tier 1 assessments were completed for all catchments, whereas Tier 2 assessments were considered only for the highest priority catchments to inform the AMP8 business plan.

Prior to undertaking more detailed investigations for licence changes and other catchment management measures, we will confirm through discussion with stakeholders that our environmental ambition considers (and meet targets) set out in regulatory work streams that have yet to be delivered. This includes updates to river basin management plans (likely state of environment by 2027), Environment Bill and WINEP.

5. Impact on deployable output

Our supply area is divided into four separate water resource zones (WRZs), with limited connectivity between them. One of these consists solely of a non-potable water supply to an industrial customer (Barepot WRZ) (Figure 13).

Figure 13 Geographical locations of our water resource zones



The abstraction licence scale reductions detailed in section 3.1 were modelled in our water resources models to understand their impacts on Deployable Output (DO) per water resource zone. These impacts are detailed in sections 4.1 to 4.4. Assessments were completed on 1 in 20 Temporary Use Bans (TUBs) (or 5% annual chance), 1 in 40 TUBs (2.5% annual chance) and 1 in 500 Emergency Drought Order (0.2% annual chance) level of service and, therefore, the impact on DO for each for these level of services will be different. Further information of technical modelling approach and impact on the supply forecast can be found in our *Draft Technical Report – Supply forecast*.

5.1 Strategic Resource Zone

We have profiled licence reductions between 2035–50 (see Table 18 and Table 19). These are based on the likely order of impacts (i.e. apply reductions with highest potential uncertainty out to 2050). DO impact was modelled

within our Aquator water resources model at 2050 and includes all licence reductions for AMP7 WINEP, no deterioration (licence capping) and the environmental destination. For DO impacts at 2035–40 and 2040–45, this was calculated by proportioning out the DO impact at 2050 by the specific licence reduction for the specific AMP period (over and above impacts from WINEP and no deterioration). The profile for potential licence reductions is an initial indicator only and will be refined for our next plan (WRMP29).

Table 17 Cumulative DO impacts for 1 in 500 EDO from licence reductions in the Strategic Resource Zone (separating out sustainability reductions in AMP8 and AMP9)

Scenario	DO impact MI/d (cumulative)				
	2025–30 ⁵	2030–35	2035–40	2040–45	2050
Sustainability reductions (AMP8/9)	-6.1	-11.4	-11.4	-11.4	-11.4
Ofwat Low			N/A	-11.8	-119.2
BAU+			-3.9	-39.5	-119.2
Enhanced			-3.5	-35.5	-117.6

We have discussed with local Environment Agency teams which licences are more likely to cause environmental deterioration first to inform our profiling approach. This is highly subjective and we've agreed at this stage that due to high uncertainties in the data, the timing of deterioration risk will be investigated further in AMP8 WINEP and therefore not explored further for WRMP24. We have undertaken sensitivity analysis looking into how much licence reduction could be fast tracked considering our preferred plan supply demand balance and more accelerated impacts from climate change (Table 18). Based on our preferred supply demand balance, there is sufficient surplus to accelerate potential earlier long term licence reductions into AMP9 and all reductions into AMP10. This will be investigated further in AMP8 WINEP

Table 18 SRZ Long term Environment Destination sensitivity assessment

	2025-26 (start of AMP8)	2029-30 (end of AMP8)	2034-35 (end of AMP9)	2039-40 (end of AMP10)	2044-45 (end of AMP11)	2049-50 (end of AMP12)
Supply demand balance including sustainability and environmental destination reductions, MI/d (preferred plan)	12.21	88.65	48.85	110.98	157.07	132.11
Potential to accelerate	No	No	No	Yes (into AMP9)	Yes (into AMP9)	Yes (into AMP10)

5.2 Carlisle Resource Zone

As part of our environment destination for Carlisle, we have screened out licence capping on the basis that mitigation measures are currently in place, and those planned for the future, provide the necessary environmental protection in the long term. As a consequence, a hands-off flow (HoF) of 2.5 MI/d on Old Water tributary of the River Gelt will be implemented by 2050 leading to a 0.06 MI/d reduction in DO. For our revised draft plan, we accelerated the implementation of a new HoF to 2035 (compared to 2050 at draft). This was previously screened out as part of the 2015-20 WINEP due to cost-benefit reasons however we will revisit this

with the aim to implement the HoF in 2030-35. We will assess the feasibility of HoF implementation (or other mechanisms to provide the flow protection) higher up the catchment to ensure a longer reach of river is protected.

5.3 North Eden Resource Zone

No licence reductions were flagged for the environmental destination.

5.4 Barepot Resource Zone

There is a current AMP7 WINEP investigation looking at the improvement of the fish passage at Yearl Weir (to be implemented in AMP8). Options include a downstream rock ramp or complete weir removal; however, the final option decision will be made in 2023. Currently, we are not planning for any licence reductions at Barepot through the environmental destination.

6. Actions to reach our environmental destination

In line with our approach to piloting place-based planning, which is explained in Section 2.6 of the Main Report, we are taking an integrated approach to water planning in three key catchments. Whilst this area of work is very much linked to the sustainability of our abstraction licences (presented in sections 3 and 4), this section sets out how we look at catchment wide interventions in order to achieve wider benefits to the environment. For further information on the specific investigations we are putting forward for AMP8 WINEP related to environmental destination, please see section 3.5.

We are recognised within the UK water industry as being at the forefront of catchment management having implemented a Sustainable Catchment Management Programme (SCAMP) since 2005, which aimed to secure multiple benefits at a landscape scale. Since 2015, we have supported the 3 CaBA groups in Cumbria by funding project officer roles where the purpose of these roles are to increase the uptake of catchment and nature-based solutions. We plan to continue this in our next funding cycle from 2025-2030. For example, we have supported the West Cumbria Rivers Trust to undertake work at Ennerdale and Thirlmere (i.e. tree planting to help reduce catchment erosion). We have also supported the South Cumbria Rivers Trust and Eden Rivers Trust to work with stakeholders across areas of land that are not owned by us such as the Petteril, Upper Duddon valley, Poaka Beck and Windermere catchments. In the Petteril catchment, the project looked to engage and influence farmers to implement solutions to help reduce phosphorus pollution. We are further developing our delivery in this area, taking in the wider needs of catchments across our business and beyond through our Catchment Systems Thinking (CaST) approach. This approach relies heavily on working in partnership with other land-owners and stakeholders to promote the principles of sustainable catchment management.

During AMP7, we are trialling place-based planning within the Eden, Wyre and Upper Mersey catchments. These align to the priority catchments identified for the environmental destination as well as aligning to a number of other significant business risks and opportunities. The aim of the trial is to bring together all core stakeholders that have an influence over planning, development and management of water within the catchment. This will provide an opportunity to listen and share the activities, initiatives, opportunities and challenges faced in managing the water environment. A shared vision for how the catchment should be managed can then be developed, which will inform future decision making. The learning from the pilots will help develop a framework and provide case studies to inform and support the next company business plan (PR24). The measures of success will be whether there is stable governance created to ensure catchment plans are co-owned, that the approach helps to identify a pipeline of co-funded projects and that it supports regulator influencing.

The catchments are ideal trial areas since we already have a significant experience of partnership working and driving innovation with organisations including the Rivers Trusts, Natural Course, IGNITION and Moors for the Future. This will be strengthened by the recently established strategic partnerships with the Rivers Trust and the Greater Manchester Combined Authority and the Environment Agency, focused on enhancing natural capital. Through enhancing natural capital, there will be further opportunity to implement schemes such as peatland restoration and river restoration, which will help to improve raw water quality and availability among other wider benefits.

Place-based planning aligns well to the objectives of the environmental destination and will help to support the delivery of our CaST (Business as Usual) approach to managing catchments in a holistic, integrated manner. Through Catchment Systems Thinking we are seeking to drive a new way of thinking across catchments, which understands and aligns the needs of United Utilities Water and other stakeholders to identify opportunities and deliver interventions, which meet multiple drivers, encouraging partnership working and driving greater delivery and efficiencies. Catchment Systems Thinking will drive a place-based planning approach to catchments that ensures the activities, which are prioritised and delivered, are aligned to long-term plans for the area, leaving a legacy for the North West. By working collaboratively with partners and delivering interventions that meet multiple objectives we will increase the uptake of catchment and nature-based solutions to maximise value for customers, but moreover we will deliver solutions that achieve greater resilience across catchments, protecting the services the customers expect from catchments as well as our assets. By working with local authorities and planning agencies, we will be better equipped to manage water close to where it falls and tackle issues at source.

For example, When CaST was launched in 2020, charitable organisations were invited to bid for funding to deliver projects totalling £30,000. In Cumbria, the Eden Rivers Trust and South Cumbria Rivers Trust were among those successful. For further information on CaST, please see our website⁶.

6.1 Wyre

A stakeholder workshop was held in July 2021 to present the national framework data, analysis of environmental pressures and to seek contributions from organisations in the catchment to identify further pressures.

Stakeholders included the Wyre Rivers Trust (CaBA host), Environment Agency and Wyre County Council. Natural England Catchment Sensitive Farming and Canal and Rivers Trust representatives were also invited to contribute.

Subsequently, a list of unconstrained options has been produced based on the data and information provided by the stakeholders. This list was shared with the same group of stakeholders in April 2022. Consensus was sought to move on to assessing the costs and benefits of the options and development of detailed delivery plans for the short-term actions that will be taken forward on the constrained list. Figure 14 shows the location of the options in relation to the Wyre catchment and also the phasing of the activities in terms of the short, medium and long-term nature of the environmental destination.

In terms of wider risks and opportunities in the Wyre catchment, one of the key challenges is related to the flashy nature of the catchment meaning that flooding in the lower part is common following a period of heavy rain. Soil compaction from agricultural practices, impermeable land cover from development and a below-national average tree cover all contribute to the impact of flooding because the land's ability to slow the flow and increase infiltration to ground could be enhanced.

Another key challenge is diffuse pollution from sources in the catchment, which increases the risk to the quality of water in the Wyre, including that abstracted for public supply. By addressing the sources of pollution through catchment management, not only will this reduce the power and chemicals needed to treat the water to potable standards, but it will also deliver benefits for the wider environment and people.

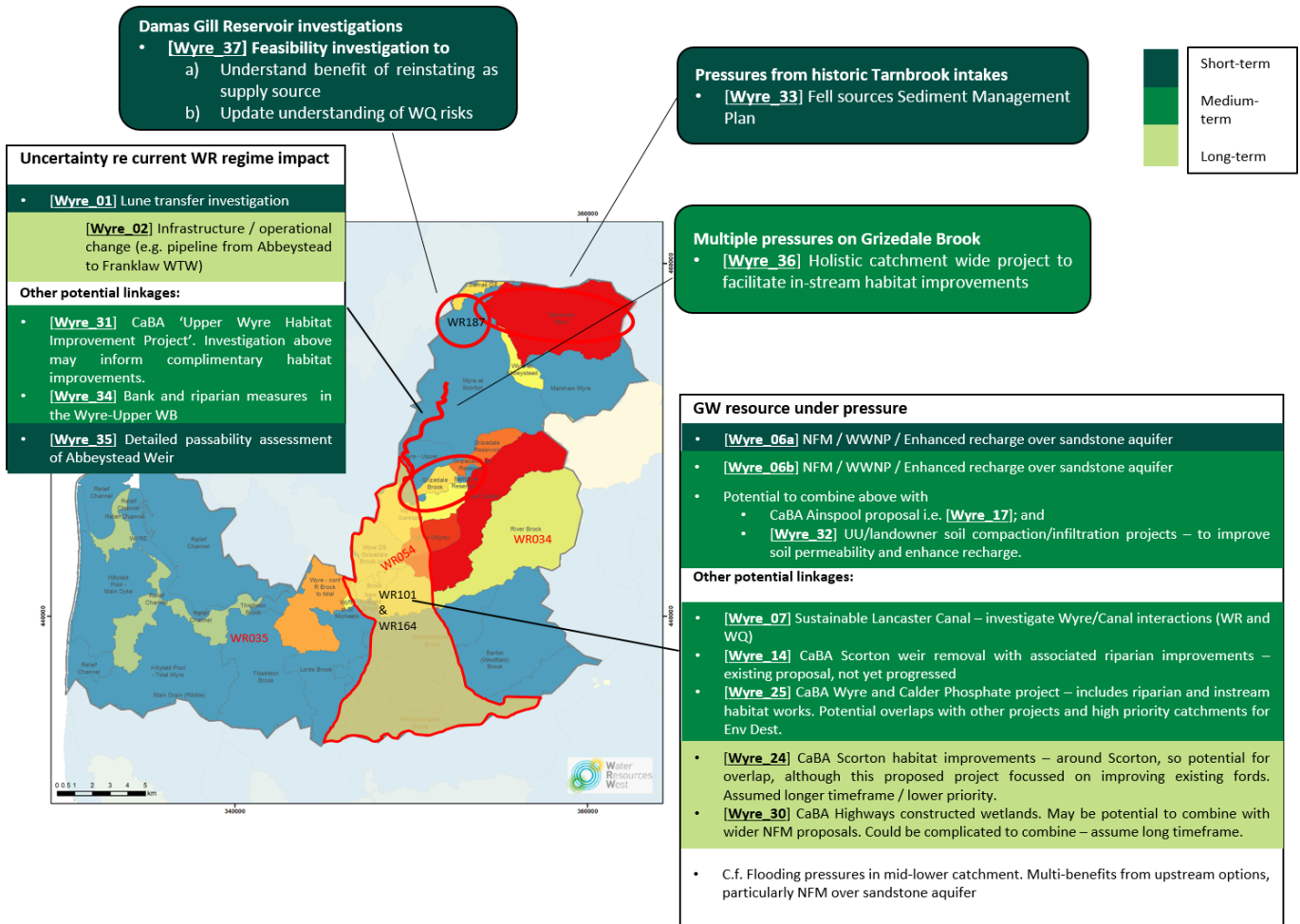
The unconstrained options in Figure 14 show a range of catchment investigations and nature-based solutions that build on the work already delivered by us in partnership with the Environment Agency and Wyre Rivers Trust. One of these options is an investigation into the potential for aquifer recharge. This is a concept that could be applied at a range of scales and levels of complexity – from working with farmers to improve infiltration to ground with good soil management practices, to pumped storage options of raw/treated/partially treated water. The aim is to reduce the flooding risk while benefiting water quality and water resources. Other options in the AMP8 WINEP for the Wyre will include a continuation of work with the farming community to reduce agricultural pollution, investigation of the impacts of the Lune/Wyre transfer and riparian habitat improvements.

Existing stakeholder engagement in the Wyre catchment is mature and the implementation of future catchment management (whether environmental destination driven or otherwise) will continue to be part of the existing frameworks, including the CaBA group, Wyre Natural Flood Management Community Interest Company, Natural Course Fylde Hub and Lancashire Peat Partnership.

For further information regarding our pilot studies on the Wyre catchment in AMP8 WINEP, please refer to section 4.2.2.

⁶ <https://www.unitedutilities.com/corporate/responsibility/stakeholders/catchment-systems-thinking>

Figure 14 Unconstrained options in the Wyre



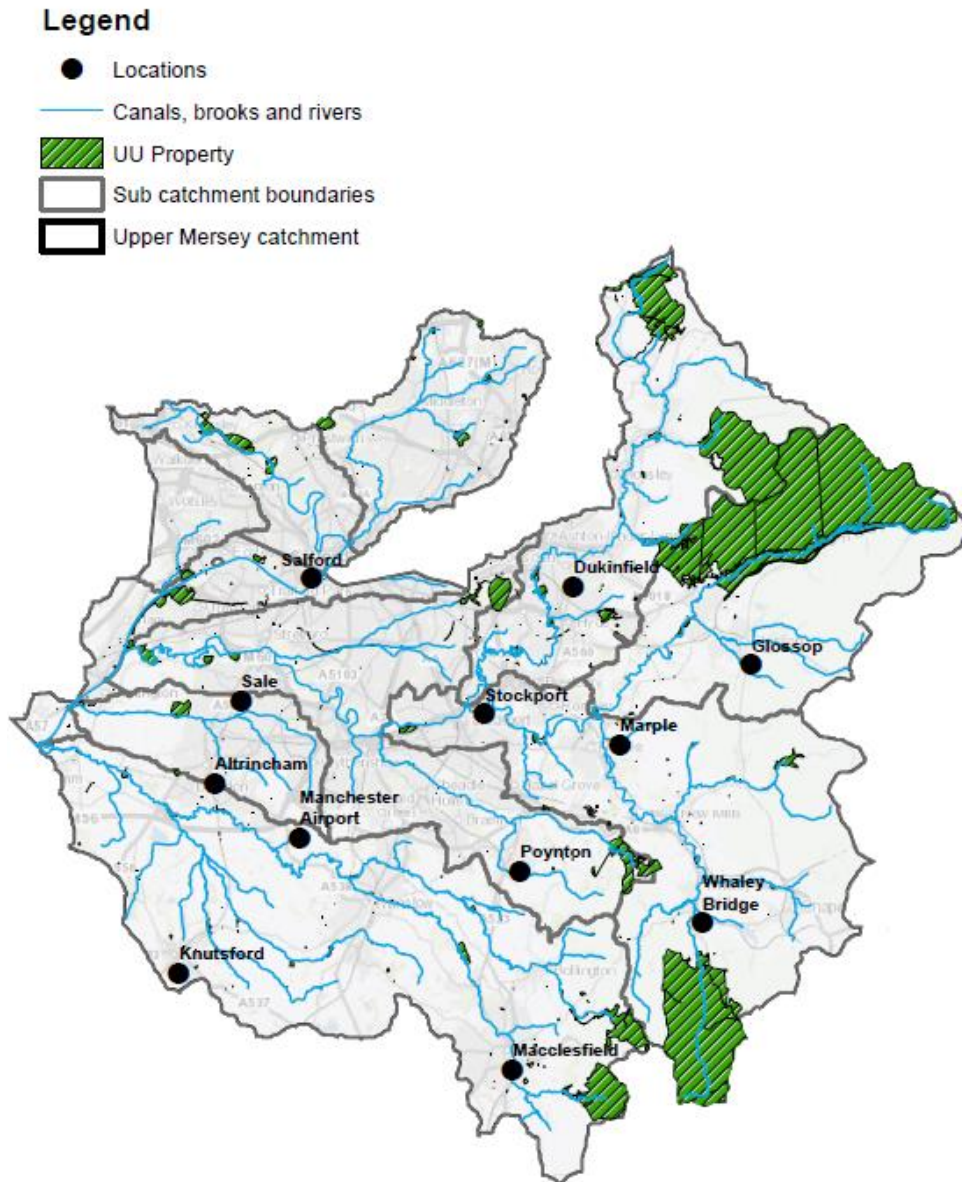
Following initial engagement with partners on the environmental destination, we have acted on feedback and continued engagement using existing forums to optimise the use of partner’s time. For example, in the Wyre catchment, there are several existing partnerships where similar groups of stakeholders meet to plan and deliver activities in the catchment to improve the environment. Collaborative projects will be delivered via the existing partnerships, and actions that sit with us will be progressed through AMP8 planning.

The focus of our environmental destination over and above the CaST approach is on water licence abstraction changes where most stakeholders have been primarily focused on water quality and flooding. Potential environmental impacts in the Wyre catchment due to abstraction pressures are considered equally important, where we need to ensure our abstractions remain sustainable in the long term.

6.2 Upper Mersey

The Upper Mersey catchment (Figure 15) is a large strategic catchment, which covers the sub-catchments of the Rivers Tame, Goyt, Etherow, Bollin, Mersey and their associated tributaries. The Upper Mersey has a significant population due to covering a large proportion of the Greater Manchester conurbation and surrounding areas of Cheshire and Derbyshire. The Upper Mersey catchment includes the catchments of the River Tame, Goyt, Etherow, Bollin, Mersey and their associated tributaries.

Figure 15 Map of the Upper Mersey catchment



We are engaging with stakeholders in the Upper Mersey catchment as part of an integrated approach to developing our future plans across the water, wastewater and bioresources business areas. The pressures on water resources are mainly driven by demand from population in urban areas, from modifications to the water bodies as a legacy of the industrial past, and from environmental designations in the upper reaches of the catchment. We will continue our approach of working in partnership to deliver activities in the catchment to improve raw water quality, and identify where these activities may offer a longer term benefit to water resources. For instance, working with farmers to reduce nutrient inputs to land to address taste and odour issues associated with algae in raw water. A reduction in algae will help to maintain the capacity of water treatment works to deal with demand during periods of prolonged dry weather. Similarly we will continue to work in partnership to deliver habitat restoration, such as peatland restoration. There are expected to be long term resilience benefits of this both for water quality and availability because a healthy blanket bog habitat will absorb more water in periods of heavy rainfall and hold it back, enabling reservoirs to be replenished at a slower rate. Short, medium and long-term activities in the Upper Mersey will feature in the AMP8 WINEP and beyond.

6.3 Eden

We are engaging with stakeholders in the Eden catchment as part of an integrated approach to developing our future plans across the water, wastewater and bioresources business areas. We will build on the success of the

River Petteril integrated catchment project, which is taking place in a sub-catchment of the River Eden. On the Petteril specifically, we have been working with partners on a three year trial to improve the water quality of the river through new trials which saw phosphorus levels in the Calthwaite Beck (one of the main tributaries of River Petteril) reduced by 63% in 2022. In order to reduce the phosphorus level, we had to not only look at our own processes, but work with partners to take a look at the wider catchment as a whole. We implemented innovative methods at the local treatment works to improve the treatment process. We also worked with partners to deploy wider catchment measures such as hedges, buffer strips of vegetation and sediment ponds. We subsequently expanded this across three further wastewater treatment works, and also continued to work alongside the farming community and other stakeholders to transform the health of the River Petteril.

The pressures on water resources are mainly driven by environmental designations, with the River itself designated as a Special Area of Conservation. We will continue our approach of working in partnership with organisations such as the Eden Rivers Trust and the North Pennines Area of Outstanding Natural Beauty to deliver activities in the catchment to improve raw water quality, and identify where these activities may offer a longer-term benefit to water resources. For instance, working with farmers to reduce nutrient inputs to land to address taste and odour issues associated with algae in raw water. A reduction in algae will help to maintain the capacity of water treatment works to deal with demand during periods of prolonged dry weather. Similarly, we will continue to work in partnership to deliver habitat restoration, such as riparian woodland. There are expected to be long-term resilience benefits of this both for water quality and availability because trees establish roots that help to slow the flow of water. Woodland corridors are important for biodiversity, nature connectivity, carbon storage, reducing erosion and improving water quality. Short, medium and long-term activities in the Eden will feature in the AMP8 WINEP and beyond.

6.4 Wales

Our abstractions from Wales supply a significant number of our customers, therefore ensuring abstraction from these sources is sustainable is essential to meet the expectation from the sustainable management of natural resources and well-being goals set out in the Environment (Wales) Act in 2016. This states: “A public authority must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions”. We are keenly aware of our duty as an abstractor and strive to ensure our activities meet these expectations.

In the Dee River Basin Management Plan 2021⁷, Natural Resources Wales advocated a place-based planning approach in order to best align stakeholders’ priorities. We will work with partners to identify where the greatest environmental improvements can be made, which will provide the most benefit to everyone. This is in line with the aims for the environmental destination in Wales.

Through catchment management delivered to date we have a good working relationship with our stakeholders in Wales at all levels, from a strategic relationship through the River Dee River Basin Liaison Panel, to working with Farming Connect and the Welsh Dee Trust to engage with farmers on an individual basis. We are committed to working in partnership in Wales and cross-border to England with the Environment Agency, Natural Resources Wales and wider partners, including River Trusts, Wildlife Trusts, Farming Unions and local colleges, to deliver the broad range of social and environmental benefits (e.g. public goods) that are generated from a cleaner water environment.

We have recently completed a natural capital baseline for the North West region, including the water supplied from sources originating in Wales. For the River Dee and Lake Vyrnwy, this equates to 28% of the total amount of water abstracted by UUW. We hope to use this baseline as a point of engagement with stakeholders and to inform a target for a national natural capital baseline, with an ambition to increase overall natural capital. The baseline will help to form a basis from which change can be tracked, as we believe measuring benefits in terms of

⁷ <https://ymgyngori.cyfoethnaturiol.cymru/evidence-policy-and-permitting-tystiolaeth-polisi-a-thrwyddedu/dee-river-rbmp/>

natural capital is key if we are to ensure our plans in the future are optimised across ecosystem services. This is important because treating them in silos leads to suboptimal plans.

We are represented on many forums associated with water management in Wales, and many of our investments in improving the water quality in the River Dee are referenced in the River Basin Management Plan 2021-2027. In addition, we work in partnership with RSPB Wales and Hafren Dyfrdwy at Vyrnwy. We will continue to actively participate in the existing forums and partnerships, as well as new partnerships, and we will continue to help improve the water environment in line with the objectives of the environmental destination. At Vyrnwy as an example, we are undertaking (alongside Hafren Dyfrdwy), a sediment management scheme during AMP8 WINEP. This will look to improve 13km of fish spawning grounds by re-gravelling the downstream reach of the reservoir.

We will build on the success of our catchment management activities in the Dee and at Vyrnwy. We already share our raw water quality monitoring data, much of which is collected in collaboration with Natural Resources Wales and the Environment Agency in relation to the River Dee pollution protocol. Based on our water quality monitoring data, the priorities for action are related to diffuse and point source pollution including the usage of chemicals (pesticides), suspended sediment and nutrients. As a result, we are proposing collaborative catchment management activities in the River Dee and Upper Severn catchments through the WINEP. In the River Dee, this will involve working with Dŵr Cymru Welsh Water, Hafren Dyfrdwy, Severn Trent Water and other stakeholders to address diffuse pollution to improve raw water quality. In the Upper Severn, this will involve working with Hafren Dyfrdwy, Severn Trent Water and other Welsh Stakeholders to improve the resilience of the catchment, in particular to flooding.

We have also completed an assessment for the Dee and Upper Severn that considered the priorities, risks and opportunities highlighted within the Area Statements. We considered in the broadest sense how these could relate to the environmental destination and how collaborative actions could result in improved outcomes for people and the environment. We will continue our approach of working in partnership with organisations such as the Welsh Dee Trust and RSPB Wales to deliver activities in the catchment to improve raw water quality and identify where these activities may offer a longer-term benefit to water resources and biodiversity. For instance, working with farmers in the Dee catchment to reduce sediment inputs to land to address turbidity spikes in raw water. A reduction in sediment will help to increase the resilience of the water treatment works, particularly following storm events. There are many nature-based solutions to reducing sediment inputs including riparian woodland. There are expected to be long-term resilience benefits of this both for water quality and availability because trees establish roots that help to slow the flow of water. Woodland corridors are important for biodiversity, nature connectivity, carbon storage reducing erosion and improving water quality. Similarly, we will work with Hafren Dyfrdwy and RSPB Wales at Vyrnwy to support measures that will help to increase the resilience of the catchment to ensure the protection of drinking water quality is considered in the management of site. Short, medium and long-term activities in the Dee and Vyrnwy will feature in the AMP8 WINEP and beyond.

From a WRW perspective, we have identified the upper reaches of the River Severn as a priority area as it supports regional significant abstractions for both PWS and non-PWS abstractors, and is the location for a number of Strategic Resource Options. The Upper Severn Catchment is also upstream of a European designated SAC and enhancement of functionally linked habitats will benefit our region. We will work with stakeholders, including the River Severn Partnership, to promote catchment resilience solutions in this area.

7. Non-public water supply

Environmental destination for non-public water supply (PWS) is largely dependent upon modification of abstraction licences by the Environment Agency. Through WRW, we have used the EA Waterbody Abstraction Tool to calculate the licence reductions for PWS and non-PWS necessary to achieve EFIs in 2050 for the whole region. However, we have not communicated the detail of individual licence reductions to non-PWS abstractors as this is a matter for the Environment Agency.

The defining feature of non-PWS abstraction is that a business often relies upon a single licence for its water needs, where non-PWS abstractors cannot share or amalgamate licences in the same way that water companies can. Our sector stakeholders have indicated a strong desire to engage with the Agency at a local level to understand what may happen to their licences over the coming years.

We estimate that the Environment Agency will need to modify around 2,400 non-PWS licences across WRW before 2050 in order to secure the environmental benefit associated with reductions to water company licences.

The main fundamental uncertainty in non-PWS data is the age of the dataset we are using – mostly 2010-15. While water company abstractions are relatively stable, non-PWS use can change significantly from year to year. For example, over the period 2016-22, a number of coal-fired power stations across the region have been closed. While the licences may remain in some cases, recent actual abstraction has decreased greatly. The COVID-19 pandemic has also significantly impacted upon many businesses across the region, which has likely affected the pattern of abstraction in some areas. The view from stakeholders through discussion with WRW, is that any changes to abstraction licences will need to be based upon very recent data to accurately reflect real water use.

8. Summary

Our target is to achieve our long-term environmental destination by 2050 in line with the national framework, and this will require a number of short, medium and long-term actions including abstraction licence changes and environmental improvements to our catchments. There are a number of possible scenarios under consideration relating to the degree of environmental protection provided, and the assumptions relating to abstraction rates. We will apply the BAU+ (Business as Usual plus) scenario in our preferred plan, with Ofwat low and Enhance Future Potential scenarios to be used in our adaptive plan. Further details on the specific scenarios and our wider plan for our environmental destination are provided in our *Draft Technical Report – Deciding on future options*.

We have discussed and agreed our screening out approach with the Environment Agency. These include:

- Reservoirs – licence reductions will have very limited benefit to the downstream environment. Compensation flows will have a net benefit to the wider catchment considering climate change;
- River sources – locally agreed new or recently reviewed hands-off flow conditions will provide a net benefit to the wider catchment considering climate change; and
- Groundwater sources – sources that have been subject to licence capping from recent WINEP investigations will not be reduced further to 2050 due to the very high uncertainties attached to groundwater licence reductions from the EA Waterbody abstraction tool (subject to investigations).

We have assessed both the BAU+, Enhanced and Ofwat low scenarios using our water resources models to determine the impact of these environmental ambitions on supply availability. The scale of the potential abstraction reductions from implementing the Business as Usual plus (BAU+) scenario into our baseline supply forecast is significant: currently, we estimate that the impact is a reduction of 131 Ml/d in our company deployable output by 2050 (this impact is inclusive of sustainability reductions over the period 2025–35).

In order to give a more realistic indication of when licence reductions could occur, we have profiled licence reductions over the period from 2035–50. These are based on likely order of impacts, i.e. reductions with highest potential uncertainty considering environmental impacts applied by 2050. The profile for potential licence reductions is an initial indicator only and will be refined for our next Water Resources Management Plan (WRMP29). Due to significant uncertainty about the detail of the catchment priorities and abstraction licence changes, further site-specific investigations need to be undertaken. We will work with the Environment Agency to confirm the necessary actions to achieve the environmental ambitions. Until this work is complete, we are incorporating the BAU+ scenario in our baseline supply-demand balance for our preferred plan, while the Enhance Future Potential and Ofwat low scenarios are included in our adaptive plan.

9. References

Long-term water resources environmental destination – Environment Agency October 2020

Long term Environmental Destination – Natural Resources Wales May 2021

Catchment prioritisation and constrained list of options – Water Resources West August 2021

Technical Note: WRW Environmental Destination: Stakeholder data review

Wirral and West Cheshire Permo-Triassic Sandstone No Deterioration Investigation: Investigation and options appraisal report 2022

Hannaford, J. et al: Hydrological projections for the UK, based on UK Climate Projections 2018 (UKCP18) data, from the Enhanced Future Flows and Groundwater (eFLaG) project

Table 19 Detailed breakdown of known and potential licence changes from 2025-2050

Sources	GW / SW	WRZ	Licence number	CAMs catchment	Current licence (MI/yr)	SUSTAINABILITY REDUCTIONS		LONG TERM ENVIRONMENT DESTINATION			
						2025-30 (MI/yr)	2030-35 (MI/yr)	2035-40 (MI/yr) BAU+	2040-45 (MI/yr) BAU+	2050 - (MI/yr) BAU+	2050 - (MI/yr) ENHANCED
Sources	GW/SW	WRZ	Licence number	CAMs catchment	Current licence (MI/yr)	2025-30 (MI/yr)	2030-35 (MI/yr)	2035-40 (MI/yr) BAU+	2040-45 (MI/yr) BAU+	2050 - (MI/yr) BAU+	2050 - (MI/yr) ENHANCED
Scales	GW	SRZ	NW/075 /0004/006	Eden and Esk	365			273			
Schneider Road	GW	SRZ	2674811008	South Cumbria	4779	2664				Screened out due to low risk to SW body	
Thornclyffe Road	GW	SRZ	2674811009	South Cumbria	1659						
Old Water (Gelt)	SW/GW	Carlisle		Eden and Esk	1000/2.5		HoF (2.5 MI/d) implementation (no licence cap)				
Pennington reservoir	SW	SRZ		South Cumbria		New compensation flow (no licence cap)					
Langden/Hareden system	SW	SRZ	2671315001	Ribble, Douglas and Crossens	20741		HoF review and implementation (Q95) (no licence cap)				
	SW	SRZ	2671315002	Ribble, Douglas and Crossens							
	SW	SRZ	2671315003	Ribble, Douglas and Crossens							
	SW	SRZ	2671315004	Ribble, Douglas							

				and Crossens							
	SW	SRZ	2671315005	Ribble, Douglas and Crossens							
	SW	SRZ	2671338012	Ribble, Douglas and Crossens							
	SW	SRZ	2671338013	Ribble, Douglas and Crossens							
	GW	SRZ	2671315006	Ribble, Douglas and Crossens			17				
Trawden	GW	SRZ	2671321022	Ribble, Douglas and Crossens	996		540				
Corn Close BHs (1 & 2)	GW	SRZ	2671321024/2671321040	Ribble, Douglas and Crossens	2164	1219*					
Broughton A & B group	GW	SRZ	2672410001	Lune and Wyre	5797		10999		Screened out due to minimal impact to SW from AMP7 WINEP investigation		
	GW	SRZ	2672409004	Lune and Wyre							
	GW	SRZ	2672411002	Lune and Wyre							
Franklaw A L1-M6 group	GW	SRZ	2672408015	Lune and Wyre	6627						
	GW	SRZ	2672408020	Lune and Wyre							
Franklaw A R1-4 and W2 group	GW	SRZ	2672406022	Lune and Wyre	2155						
	GW	SRZ	2672405010	Lune and Wyre							
Franklaw B group	GW	SRZ	2672408021	Lune and Wyre	4840						
	GW	SRZ	2672405006	Lune and Wyre							
	GW	SRZ	2672405010	Lune and Wyre							
River Dane	SW/GW	SRZ	2568002138	Weaver and Dane	2728		HoF review and implementation (70 MI/d) (no licence cap)				
Southport BH group	GW	SRZ	2569031017	Lower Mersey	16104		Potential licence cap (very uncertain)		No long term licence reductions flagged		
	GW	SRZ	2569031024	Lower Mersey							

	GW	SRZ	2569031 016	Lower Mersey			sensitivity tested				
	GW	SRZ	2569031 021	Lower Mersey							
	GW	SRZ	2569031 019	Lower Mersey							
	GW	SRZ	2569031 020	Lower Mersey							
	GW	SRZ	NW/069 /0031/0 11	Lower Mersey							
	GW	SRZ	NW/069 /0031/0 08	Lower Mersey							
	GW	SRZ	2670101 003	Lower Mersey	3317						
Wirral BH group	GW	SRZ	2568007 014	Lower Mersey	2159	Revoked				Screened out due to suspect data	
	GW	SRZ	2568008 018	Lower Mersey	3982	3361					
	GW	SRZ	2568008 020	Lower Mersey	2500	1537					
	GW	SRZ		Lower Mersey							
Delamere BH group	GW	SRZ	2568001 155	Weaver and Dane	546	2352.10				Screened out due to suspect data	
	GW	SRZ	2568001 156	Weaver and Dane	455						
	GW	SRZ	2568001 158	Weaver and Dane	3274						
	GW	SRZ	2568001 159	Weaver and Dane	909						
	GW	SRZ	2568001 180	Weaver and Dane	820						
	GW	SRZ	2568001 184	Weaver and Dane	1272						
	GW	SRZ	2568006 088	Lower Mersey	830						
	GW	SRZ	2568001 153	Lower Mersey	1818						
West Cheshire (Simmonds Hill) group	GW	SRZ	2568006 082	Lower Mersey	2728	5296.1				Screened out due to suspect data	4422.2
	GW	SRZ	2568005 009	Lower Mersey	2728						
	GW	SRZ	2568003 091	Weaver and Dane	1365						
	GW	SRZ	2568003 076	Weaver and Dane	1705						
	GW	SRZ	2568005 008	Weaver and Dane	455						
	GW	SRZ	2568006 087	Weaver and Dane	1818						
	GW	SRZ	2568005 011	Weaver and Dane	1246						

Wigan West group	GW	SRZ	2569016039	Lower Mersey	2500		Potential licence cap (very uncertain) - sensitivity tested			0.0	
	GW	SRZ	2569016048	Lower Mersey	1637					0.0	
	GW	SRZ	2569016049	Lower Mersey	2500					0.0	
	GW	SRZ	2569016050	Lower Mersey	2500					875.1	
	GW	SRZ	2569023003	Lower Mersey	2496					0.0	
	GW	SRZ	2569023005	Lower Mersey	1659					0.0	
	GW	SRZ	2569025036	Lower Mersey	1090					272.6	
	GW	SRZ	2569025043	Lower Mersey	1389					0.0	
	GW	SRZ	2569025044	Lower Mersey	1053					316.0	
Eccleston Hill BH	GW	SRZ	2569025037	Lower Mersey	1162	276				58.1	
Rushton Spencer	GW	SRZ	2568002156	Weaver and Dane	909					818.0	
Bearstone	GW	SRZ	18/54/04/0119	Shropshire Middle Severn	1818	532.9					181.5
Mow Cop	GW	SRZ	2568002146	Shropshire Middle Severn	498					124.5	
Butterworth Hall	GW	SRZ	2569002206	Northern Manchester	3982				597.3		
Macclesfield group	GW	SRZ	2569018050	Upper Mersey	1302					846.3	
	GW	SRZ	2569019044	Upper Mersey	2164					1730.1	
Millbrook	GW	SRZ	2569019036	Upper Mersey	737			110.5			
Woodford	GW	SRZ	2569019040	Upper Mersey	3328				166.4		
Lymm	GW	SRZ	2569020037	Lower Mersey	3319					165.9	
Winwick group	GW	SRZ	2568004016	Lower Mersey	1245					1183.8	
	GW	SRZ	2569023004	Lower Mersey	4978					2240.0	

Table 20 Waterbodies that are not supporting good (hydrology status) excluding reservoir sources

Waterbody	Hydrology status	UU licences	Investigation
Trawden Brook	Not supporting good	Trawden springs	AMP8 WINEP 'no deterioration' investigation - solution to prevent deterioration delivered in AMP9 or sooner
Langden Brook	Not supporting good	Langden/Hareden system	AMP8 WINEP 'no deterioration' investigation - solution to prevent deterioration delivered in AMP9 or sooner
Dane (Clough Brook to Cow Brook)	Not supporting good	Rushton Spencer/River Dane abstractions	AMP8 WINEP 'no deterioration' investigation - solution to prevent deterioration delivered in AMP9 or sooner
Salters Brook	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation (ongoing) - solution to prevent deterioration delivered in AMP8
Ashton Brook	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation (ongoing) - solution to prevent deterioration delivered in AMP8
Valley Brook (Source to Englesea Brook)	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation (ongoing) - solution to prevent deterioration delivered in AMP8
Brock	Not supporting good	Broughton/Franklaw BHs	AMP7 WINEP 'no deterioration' investigation concluded no impact to surface water. Expect hydrology status to be moved to 'good' at next cycle
Wyre DS Grizedale Brook confl	Not supporting good	Broughton/Franklaw BHs	AMP7 WINEP 'no deterioration' investigation concluded no impact to surface water. Expect hydrology status to be moved to 'good' at next cycle
Wyre - conf R Brock to tidal	Not supporting good	Broughton/Franklaw BHs	AMP7 WINEP 'no deterioration' investigation concluded no impact to surface water. Expect hydrology status to be moved to 'good' at next cycle
Downholland (Lydiate/Cheshire Lines) Brook	Not supporting good	Royal Oak group	AMP8 WINEP 'no deterioration' investigation - solution to prevent deterioration delivered in AMP9 or sooner
Darley Brook	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation (ongoing) - solution to prevent deterioration delivered in AMP8
Gowy (Milton Brook to Mersey)	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation (ongoing) - solution to prevent deterioration delivered in AMP8
Gowy and tribs (Source to Milton Brook)	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation

			(ongoing) - solution to prevent deterioration delivered in AMP8
Salters Brook	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation (ongoing) - solution to prevent deterioration delivered in AMP8
Stanney Mill Brook	Not supporting good	Wirral and West Cheshire BHs	AMP7 WINEP 'no deterioration' investigation - Wirral and West Cheshire investigation (ongoing) - solution to prevent deterioration delivered in AMP8
Calder (Wyre)	Not supporting good	Calder intake	New hands off flow in AMP6 - hydrology status not updated

Table 21 Waterbodies at potential Band 3 flow compliance at 2050 and reasons for screening out licence reductions

EA Waterbody ID	Waterbody name	Catchment	Type	Flow Compliance after licence change ⁸ (2050)	Reason for screening out long term licence reductions
AP6, Lower Hodder	Lower Hodder	Ribble	CAMS AP Waterbody	BAND3	No UU licences in waterbody - however upstream waterbodies contain UU licences (Stocks Reservoir/Brennand & Whitendale/Langden & Hareden system). Screened out licence reductions due to HoFs and compensation flows within upstream waterbodies.
GB112071065210	Colne Water (Laneshaw)	Ribble	River waterbody	BAND3	Compensation flow (reviewed in HMWB investigation) in place at Laneshaw reservoir. Screened out licence reduction
GB112068055340	Rookery Brook, Burland and Brindley Bk. to Weaver	Weaver and Dane	River waterbody	BAND3	Abstraction from Llangollen Canal (not river) - screened out licence reduction
AP8, River Calder	River Calder	Wyre	CAMS AP Waterbody	BAND3	New HoFs in place - screened out licence reduction
GB31232136	Rhodeswood Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Bottoms (Longdendale) reservoir. Screened out licence reduction as undertaking AMP8 WINEP feasibility study to apply variable compensation
GB31230591	Swinden Higher Reservoir	Ribble	Lake waterbody	BAND3	Compensation flow (reviewed in HMWB investigation) delivered from Swinden reservoir. Screened out licence reduction
GB531207212200	WYRE	Wyre	Transitional waterbody	BAND3	No UU licences - though UU abstract from upstream waterbodies
GB31233043	Errwood Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Fernilee reservoir. Screened out licence reduction
GB112069061180	Sankey Brook (Hardshaw Brook to Rainford Brook)	Lower Mersey & Alt	River waterbody	BAND3	No UU licences
GB31231027	Holden Wood Reservoir	Northern Manchester	Lake waterbody	BAND3	Compensation flow (reviewed in HMWB investigation) delivered from Holdenwood reservoir. Screened out licence reduction
GB112068060300	Salters Brook	Lower Mersey & Alt	River waterbody	BAND3	Licence caps being applied from Wirral and West Cheshire AMP7 WINEP investigation in AMP8. Uncertainty in further long term licence reductions are especially uncertain in this catchment and therefore have been screened

⁸ No licence reductions have been confirmed beyond AMP8 at this stage however we have planned in WMP24 for potential licence caps in AMP9 to prevent environment deterioration. Potential long term licence caps due to climate change are highly uncertain and will be investigated further in AMP8

					out. Further investigations will be undertaken in AMP8 and fed into WRMP29
GB531206908100	Relief Channel	Lower Mersey & Alt	River waterbody	BAND3	Mersey estuary
GB31231405	Hanging Lees Reservoir	Northern Manchester	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Bottoms (Longdendale) reservoir. Screened out licence reduction as undertaking AMP8 WINEP feasibility study to apply variable compensation
GB31231454	Crook Gate Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from New Years Bridge reservoir.
AP16, Dummy AP Crummock	Dummy AP Crummock	Derwent & West Cumbria	CAMS AP Waterbody	BAND3	Crummock licence revoked
GB102076073970	Brunstock Beck	Eden and Esk	River waterbody	BAND3	No UU licences
GB102076074010	New Water	Eden and Esk	River waterbody	BAND3	Existing HoF on New Water will remain in place and provide increased protection in the long term - screened out of WRMP
GB112075070530	Dash Beck	Derwent & West Cumbria	River waterbody	BAND3	Dash Beck licence to be revoked
GB112072066240	Tarnbrook Wyre	Wyre	River waterbody	BAND3	New U/S HoFs in place for SW abstractions. No impact to SW from Flyde BHs therefore screened out further reductions from assumed AMP9 licence caps. AMP8 WINEP to look at no deterioration risk on GW waterbody's and long term risk to SW
GB31232166	Arnfield Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Ogden (Milnrow) reservoir. Screened out licence reduction
GB112072066220	Calder (Wyre)	Wyre	River waterbody	BAND3	New HoFs in place - screened out licence reduction
GB102076074020	Old Water	Eden and Esk	River waterbody	BAND3	New compensation flow set up from GW springs investigated and implemented in AMP9 WINEP ⁹
GB31229599	Harlock Reservoir	Leven, Crake & Duddon	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Poaka Beck reservoir. Screened out licence reduction
GB111067052120	Aldford Brook	Dee	River waterbody	BAND3	No UU licences
GB112069064650	Ogden	Northern Manchester	River waterbody	BAND3	No UU licences

⁹ Subject to approval

GB212074070190	Relief Channel	Leven, Crake & Duddon	River waterbody	BAND3	Licence caps being applied from Furness Aquifer AMP7 WINEP investigation in AMP8. Uncertainty in further long term licence reductions are especially uncertain in this catchment and therefore have been screened out. Further investigations will be undertaken in AMP8 and fed into WRMP29
AP2, Wyre at Garstang	Wyre at Garstang	Wyre	CAMS AP Waterbody	BAND3	HoFs already in place - screened out licence reductions
GB102076073900	Trout Beck (Cairn Beck)	Eden and Esk	River waterbody	BAND3	No UU licences
GB31230025	Damas Gill	Wyre	Lake waterbody	BAND3	Unused reservoir - screened out licence reductions
GB112072065822	Wyre DS Grizedale Brook confl	Wyre	River waterbody	BAND3	New U/S HoFs in place for SW abstractions. No impact to SW from Flyde BHs therefore screened out further reductions from assumed AMP9 licence caps. AMP8 WINEP to look at no deterioration risk on GW waterbody's and long term risk to SW
AP13, Sutton Brook	Sutton Brook	Lower Mersey & Alt	CAMS AP Waterbody	BAND3	No licence change flagged for WRMP24. AMP8 WINEP investigation to look at long term deterioration risk
GB31229000	Crummock Water	Derwent & West Cumbria	Lake waterbody	BAND3	Crummock licence revoked
GB112069061210	Hardshaw (Windle) Brook	Lower Mersey & Alt	River waterbody	BAND3	Only one UU licence in catchment and this is unused. Licence cap in place to be implemented due to AMP7 WINEP no deterioration investigation
GB112072066250	Wyre - conf R Brock to tidal	Wyre	River waterbody	BAND3	New U/S HoFs in place for SW abstractions. No impact to SW from Flyde BHs therefore screened out further reductions from assumed AMP9 licence caps. AMP8 WINEP to look at no deterioration risk on GW waterbody's and long term risk to SW
GB31232499	Kinder Reservoir	Upper Mersey	Lake waterbody	BAND3	Compensation flow (reviewed in HMWB investigation) delivered from Kinder reservoir. Screened out licence reduction
GB31231025	Calf Hey Reservoir	Northern Manchester	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Holdenwood reservoir. Screened out licence reduction
GB31229183	Wast Water	Derwent & West Cumbria	Lake waterbody	BAND3	No UU licences
AP18, Dummy AP Wast Water	Dummy AP Wast Water	Derwent & West Cumbria	CAMS AP Waterbody	BAND3	No UU licences
GB31231042	Roddlesworth Upper Reservoir	Ribble	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from the Goit. Screened out licence reduction

GB112071065160	Trawden Brook	Ribble	River waterbody	BAND3	AMP8 WINEP investigation - significant licence cap applied for implementation in AMP9 (or sooner) however uncertainty is too high to plan for further licence reductions at this stage. Long term risk of deterioration to be investigated as part of AMP8 WINEP and implemented in WRMP29
GB212073071500	Relief Channel	Leven, Crake & Duddon	River waterbody	BAND3	Carter Pool, Ullveston WwTW- Industrial (non-PWS: transportation of screening and washing down) - very small abstraction
GB112074069970	Kirk Beck (Ehen)	Derwent & West Cumbria	River waterbody	BAND3	Egremont BHs planned to be surrendered in FY25
GB31230422	Ogden Lower Reservoir	Ribble	Lake waterbody	BAND3	Compensation flow delivered from Blackmoss reservoir. Screened out licence reduction
GB31247005	Horse Coppice Reservoir	Upper Mersey	Lake waterbody	BAND3	New compensation flow at Horse Coppice reservoir in AMP6. Screened out licence reduction
GB112068060390	Peover Eye	Weaver and Dane	River waterbody	BAND3	No UU licences
GB112075070370	Cocker - Crummock Water to conf Whit Beck	Derwent & West Cumbria	River waterbody	BAND3	Crummock licence revoked
GB112073071170	Newland Beck	Leven, Crake & Duddon	River waterbody	BAND3	Ullveston WwTW- Industrial (transportation of screening and washing down)
GB112071065360	Dunsop	Ribble	River waterbody	BAND3	Upstream HoFs on Brennand and Whitendale catchments. Screened out licence reduction
GB112071065370	Langden Brook	Ribble	River waterbody	BAND3	AMP8 WINEP no deterioration investigation to review HoFs in Langden/Hareden system. Screened out licence reduction
GB31233250	Ridgegate Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Bottoms (Macclesfield) reservoir. Screened out licence reduction
GB112074070100	Irt u/s Bleng	Derwent & West Cumbria	River waterbody	BAND3	No UU licences
GB102075073390	Wiza Beck	Waver & Wampool	River waterbody	BAND3	No UU licences
GB31231791	Yeoman Hey Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from Dovestones reservoir. Screened out licence reduction
GB31231476	Adlington Reservoir	Douglas	Lake waterbody	BAND3	Compensation flow (reviewed in HMWB investigation) delivered from Worthington reservoir. Compensation only reservoir and screened out licence reduction
GB112071065700	Duddel Brook	Ribble	River waterbody	BAND3	AMP8 WINEP no deterioration investigation to review HoFs in Langden/Hareden system. Screened out licence reduction
GB31230600	Dean Clough Reservoir	Ribble	Lake waterbody	BAND3	New compensation flow at Dean Clough reservoir in AMP6. Screened out licence reduction

GB212074064390	Relief Channel	Leven, Crake & Duddon	River waterbody	BAND3	No UU licences
GB112072065821	Wyre - Upper	Wyre	River waterbody	BAND3	AMP8 WINEP investigation - significant licence cap applied for implementation in AMP9 (or sooner) however uncertainty is too high to plan for further licence reductions at this stage. Long term risk of deterioration to be investigated as part of AMP8 WINEP and implemented in WRMP29
AP3, Wyre at Scorton	Wyre at Scorton	Wyre	CAMS AP Waterbody	BAND3	AMP8 WINEP investigation - significant licence cap applied for implementation in AMP9 (or sooner) however uncertainty is too high to plan for further licence reductions at this stage. Long term risk of deterioration to be investigated as part of AMP8 WINEP and implemented in WRMP29
GB31230958	Pickup Bank Reservoir	Ribble	Lake waterbody	BAND3	Compensation flow delivered from Hoddlesden reservoir. Screened out licence reduction
GB112071065560	Hodder - conf Easington Bk to conf Ribble	Ribble	River waterbody	BAND3	No UU licences - however upstream waterbodies contain UU licences (Stocks Reservoir/Brennand & Whitendale/Langden & Hareden system). Screened out licence reductions due to HoFs and compensation flows within upstream waterbodies
GB31231482	Dowry Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) delivered from New Years Bridge reservoir.
GB31231036	Rake Brook Reservoir	Ribble	Lake waterbody	BAND3	Compensation flow delivered from the Goit. Screened out licence reductions
GB112071065420	Whitendale river	Ribble	River waterbody	BAND3	HoF in place at Whitendale intake therefore screened out further licence reductions
AP1, Wyre at St Michaels	Wyre at St Michaels	Wyre	CAMS AP Waterbody	BAND3	AMP8 WINEP investigation - significant licence cap applied for implementation in AMP9 (or sooner) however uncertainty is too high to plan for further licence reductions at this stage. Long term risk of deterioration to be investigated as part of AMP8 WINEP and fed into WRMP29
GB112068060480	Cuddington Brook (Source to Crowton Brook)	Lower Mersey & Alt	River waterbody	BAND3	Licence caps being applied from Wirral and West Cheshire AMP7 WINEP investigation in AMP8 (Delamere group) are lower than potential long term licence reductions. Suspect data
GB112068060450	Darley Brook	Lower Mersey & Alt	River waterbody	BAND3	Licence caps being applied from Wirral and West Cheshire AMP7 WINEP investigation in AMP8 (Delamere group) are lower than potential long term licence reductions. Suspect data
GB112068060320	Ashton Brook	Lower Mersey & Alt	River waterbody	BAND3	Licence caps being applied from Wirral and West Cheshire AMP7 WINEP investigation in AMP8 (West Cheshire group). Uncertainty in further long term licence reductions are especially uncertain in this catchment and therefore BAU+ scenario been screened out however enhanced scenario applied in adaptive plan. Further investigations will be undertaken in AMP8 and fed into WRMP29

AP10, Grizedale Brook	Grizedale Brook	Wyre	CAMS AP Waterbody	BAND3	New restrictive HoF (Q65) at the Calder Intake
AP4, Wyre at Abbeystead	Wyre at Abbeystead	Wyre	CAMS AP Waterbody	BAND3	New U/S HoFs in place for SW abstractions. No impact to SW from Flyde BHs therefore screened out further reductions from assumed AMP9 licence caps. AMP8 WINEP to look at no deterioration risk on GW waterbody's and long term risk to SW
GB31230199	Grizedale Reservoir	Wyre	Lake waterbody	BAND3	Compensation flow screened out at Grizedale reservoir from AMP7 investigation
GB212071065753	Relief Channel	Wyre	River waterbody	BAND3	No UU licences
GB102076073870	Cairn Beck	Eden and Esk	River waterbody	BAND3	No UU licences
GB31232150	Valehouse Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) at Bottoms (Longdendale) reservoir. Screened out licence reduction as undertaking AMP8 WINEP feasibility study to apply variable compensation
AP9, Langden Brook	Langden Brook	Ribble	CAMS AP Waterbody	BAND3	AMP8 WINEP no deterioration investigation to review HoFs in Langden/Hareden system. Screened out licence reduction
GB31231312	Springs Reservoir	Northern Manchester	Lake waterbody	BAND3	Compensation flow delivered from Belmont reservoir. Screened out licence reduction
GB31233247	Trentabank Reservoir	Upper Mersey	Lake waterbody	BAND3	Part of reservoir chain. Compensation flow (reviewed in HMWB investigation) at Bottoms (Macclesfield) reservoir. Screened out licence reduction
GB31229419	Ghyll Head Reservoir	Leven, Crake & Duddon	Lake waterbody	BAND3	No UU licences
GB112069060780	Etherow (Woodhead Res. to Glossop Bk.)	Upper Mersey	River waterbody	BAND3	Compensation flow (reviewed in HMWB investigation) at Longdendale (bottoms) reservoir. Screened out licence reduction as undertaking AMP8 WINEP feasibility study to apply variable compensation flow
GB212072066460	Relief Channel	Lune	River waterbody	BAND3	No UU licences

Further investigation undertaken by EA (no further actions for UU)
Low risk to WFD status
Medium risk to WFD status
High risk to WFD status
Driver addressed by other mechanisms (i.e. WFD/RSA)
No further actions required

Table 22 Outcome of AMP5/6 Heavily Modified Water Body investigation

Regional Catchment	Waterbodies	Reservoirs in waterbody	Specific Mitigation Measures					How outcome of investigation captured in WRMP	Implementation period
			1: Fish passage / migration	2: Downstream flow	3: Downstream habitat / morphology	4: Downstream water quality	5: Lake / reservoir habitats		
Derwent	1. Overwater GB31228806	Overwater reservoir						Not in baseline - licence to be revoked	AMP7
	2. Chapelhouse Reservoir GB31228796	Chapelhouse reservoir						Not in baseline - licence to be revoked	AMP7
	3. River Ellen (lower) GB11207507 3640	Ennerdale reservoir						Not in baseline - licence revoked	AMP7
	4. River Ellen (upper) GB11207507 3630	Ennerdale reservoir						Not in baseline - licence revoked	AMP7
	5. River Ellen (middle) GB11207507 3650	Ennerdale reservoir						Not in baseline - licence revoked	AMP7
	1. St John's Beck GB11207507 0430	Thirlmere reservoir						New compensation flow profile	AMP6
	2. Thirlmere GB31229021	Thirlmere reservoir						New compensation flow profile	AMP6
	3. Glenderamac kin (Greta) GB11207507 0460	No UU reservoirs						No UU sources in catchment	N/A
	4. River Derwent US Bassenthwaite GB11207507 3561	Thirlmere reservoir						New compensation flow profile	AMP6
	5. River Derwent GB11207507 0410	Thirlmere reservoir						New compensation flow profile	AMP6
	6. River Derwent DS Bassenthwaite Lake GB11207507 3562	Thirlmere reservoir						New compensation flow profile	AMP6
	1. River Cocker GB11207507 0350	Crummock reservoir						Not in baseline - licence revoked	AMP7
	2. Crummock Water GB31229000	Crummock reservoir						Not in baseline - licence revoked	AMP7
	3. River Cocker GB11207507 0370	Crummock reservoir						Not in baseline - licence revoked	AMP7
	4. River Cocker GB11207507 0400	Crummock reservoir						Not in baseline - licence revoked	AMP7
	1. River Derwent GB11207507 0520	None - however influenced by upstream UU reservoirs (Crummock/Thirlmere)						No further action required related to flow	N/A

Eden & Esk	1. River Lowther	Wet Sleddale/Swindale & Keld river intake (Haweswater)					No further action required related to flow	N/A
	2. Swindale Beck (Lowther) GB10207607 0690	Swindale river intake (Haweswater)					New intake and Hands Off Flows	AMP6
	3. River Lowther Swindale Beck to Haweswater Beck GB10207607 0780	River Swindale Intake Wet Sleddale					New intake and Hands Off Flows	AMP6
	4. Blea Water GB30229146	Blea Water					AM8 WINEP weir removal - Not in baseline - licence planned to be revoked	AMP7
	5. Haweswater Beck GB10207607 0720	Haweswater reservoir					No further action required related to flow	N/A
	6. Lowther lower GB10207607 1010	Haweswater reservoir					No further action required related to flow	N/A
	7. Haweswater Reservoir GB30229073	Haweswater reservoir					No further action required related to flow	N/A
	1. Castle Carrock GB30228476	Castle Carrock reservoir					No further action required related to flow	N/A
	1. Hayeswater GB30229125	Hayeswater reservoir					Not in baseline - licence revoked	AMP6
	1. River Eamont (upper) GB10207607 1020	Ullswater					No further action required related to flow	N/A
SW Lakes	1. River Ehen (upper including Liza) GB11207407 0010	Ennerdale reservoir					No further action required related to flow	N/A
	2. Ennerdale Water GB31229062	Ennerdale reservoir					Not in baseline - licence revoked	AMP7
	3. River Ehen (lower) GB11207406 9980	Ennerdale reservoir					No further action required related to flow	N/A
	1. Seathwaite Tarn (Tarn Beck) GB11207406 9920	Seathwaite Tarn					No further action required related to flow	N/A
	1. Mill Beck (Poaka Beck) GB11207406 9790	Poaka Beck reservoir					No further action related to flow required at this time	N/A
	2. Poaka Beck reservoir GB31229615	Poaka Beck reservoir					New compensation flow	AMP6
	3. Harlock reservoir GB31229599	Harlock reservoir					No further action related to flow required at this time	N/A
1. River Kent GB11207307 1460	N/A					No UU sources in catchment	N/A	

	2. Dubbs Reservoir GB31229254	Dubbs reservoir					No further action related to flow required at this time	N/A
	1. Blelham Tarn Gb31229270	N/A					No UU sources in catchment	N/A
	2. River Leven GB11207307 1420	Windermere					No further action related to flow required at this time - (removal of drought permit - level 2)	N/A
	3. Windermere GB31229233	Windermere					No further action related to flow required at this time - (removal of drought permit - level 2)	N/A
	4. Ghyll Head Reservoir GB31229419	N/A					No UU sources in catchment	N/A
	1. Levers Water GB31229285	Levers Water reservoir					No further action related to flow required at this time	N/A
	1. Pennington Reservoir GB31229607	Pennington Reservoir					New compensation flow	AMP8
	1. Simpson Ground Reservoir GB31229488	Simpson Ground Reservoir					Not in baseline - revoked	AMP5
Lune	1. Langthwaite Reservoir	Langthwaite reservoir					No further action related to flow required at this time	N/A
Ribble	1. Rake Brook Reservoir GB31231036	Rake Brook reservoir					No further action related to flow required at this time	N/A
	2. Roddlesworth reservoir (upper) GB31231033	Roddlesworth reservoir (upper)					No further action related to flow required at this time	N/A
	3. Roddlesworth Reservoirs (lower) GB 31231042	Roddlesworth reservoir (lower)					No further action related to flow required at this time	N/A
	4. Earnsdale Reservoir GB31231039	Earnsdale reservoir					No further action related to flow required at this time	N/A
	5. Darwen - headwaters to conf Davy Field Bk GB11207106 5240	Earnsdale reservoir					No further action related to flow required at this time	N/A
	6. Sunnyhurst Hey Reservoir GB31231043	Sunnyhurst Hey reservoir					No further action related to flow required at this time	N/A
	7. Fishmoor reservoir GB31230883	Fishmoor reservoir					No further action related to flow required at this time	N/A
	8. Guide reservoir GB31230893	Guide reservoir					No further action related to flow required at this time	N/A

9. Pickup Bank Reservoir GB31230958	Pickup Bank reservoir						No further action related to flow required at this time	N/A
1. Hodder - headwaters to Stocks Reservoir GB11207106 5430	Stocks reservoir						No further action related to flow required at this time	N/A
2. Bottoms Beck GB11207106 5440	Stocks reservoir						No further action related to flow required at this time	N/A
3. Hodder - Stocks Reservoir to conf Croasdale Bk GB11207106 5390	Stocks reservoir						No further action related to flow required at this time	N/A
4. Stocks reservoir GB31230030	Stocks reservoir						No further action related to flow required at this time	N/A
5. Hodder - conf Croasdale Bk to conf Easington Bk GB11207106 5350	Stocks reservoir						No further action related to flow required at this time	N/A
1. Mitchell's House reservoir 1 GB31230833	Mitchells House reservoir 1						No further action related to flow required at this time	N/A
2. Mitchell's House reservoir 2 GB31230812	Mitchells House reservoir 2						No further action related to flow required at this time	N/A
1. Colne water (Laneshaw) GB11207106 5210	Laneshaw reservoir						No further action related to flow required at this time	N/A
2. Laneshaw reservoir GB31230377	Laneshaw reservoir						No further action related to flow required at this time	N/A
1. Pendle Water GB11207106 5230	Pendle Water						No further action related to flow required at this time	N/A
2. Ogden Reservoir (upper) GB31230422	Ogden reservoir (upper)						No further action related to flow required at this time	N/A
3. Ogden Reservoir (lower) GB31230431	Ogden reservoir (lower)						No further action related to flow required at this time	N/A
4. Black Moss Reservoirs GB31230390	Black Moss reservoir						No further action related to flow required at this time	N/A
1. Walverden reservoir GB31230515	Walverden reservoir						No further action related to flow required at this time	N/A
2. Coldwell Reservoirs (upper) GB31230523	Coldwell reservoir (upper)						No further action related to flow required at this time	N/A

	3. Coldwell Reservoirs (lower) GB31230533	Coldwell reservoir (lower)						No further action related to flow required at this time	N/A
	4. Walverden Water GB11207106 5130	Walverden reservoir						No further action related to flow required at this time	N/A
	1. Brun - headwaters to conf Don Water GB11207106 5090	Cant Clough reservoir Hurstwood reservoir Swinden reservoirs						No further action related to flow required at this time	N/A
	2. Cant Clough GB31230663	Cant Clough reservoir						No further action related to flow required at this time	N/A
	3. Hurstwood reservoir GB31230625	Hurstwood reservoir						No further action related to flow required at this time	N/A
	4. Swinden reservoir GB31230591	Swinden 2 reservoir						No further action related to flow required at this time	N/A
	5. Lee Green reservoir GB31230585	Lee Green reservoir						No further action related to flow required at this time	N/A
	6. Swinden No. 1 GB31230590	Swinden 1 reservoir						No further action related to flow required at this time	N/A
	1. Churn Clough Reservoir GB31230459	Churn Clough reservoir						No further action related to flow required at this time	N/A
	1. Calder - Pendle Water to conf Ribble GB11207106 5490	Dean Clough reservoir						No further action related to flow required at this time	N/A
	1. Dean Clough Reservoir GB31230600	Dean Clough reservoir						New compensation flow	AMP7
	1. Alston Reservoirs 1 GB31230522	Alston reservoir 1						No further action related to flow required at this time	N/A
	2. Alston Reservoirs 2 GB31230519	Alston reservoir 2						No further action related to flow required at this time	N/A
	3. Alston Reservoirs GB31230531	Alston reservoir						No further action related to flow required at this time	N/A
Wyre	1. Tarnbrook Wyre GB11207206 6240	Tarnbrook Wyre intakes						New hands off flows	AMP6
	1. Damas Gill GB31230025	Damas Ghyll						Not in baseline - licence unused	N/A
	1. River Calder GB11207206 6220	Calder intakes						New hands off flows	AMP6
	2. Grizedale Lea GB31230203	Grizedale reservoir						No further action related to flow	N/A

								required at this time	
	1. River Wyre GB11207206 5780	Barnacre reservoirs						No further action related to flow required at this time	N/A
	2. Grizedale Reservoir GB31230199	Grizedale reservoir						No further action related to flow required at this time	N/A
	3. River Wyre DS Grizedale Brook confl GB11207206 5822	Barnacre reservoirs						No further action related to flow required at this time	N/A
Upper Mersey	1. River Tame (source to Diggle Brook) GB11206906 4740	New Years Bridge reservoir group Upper and Lower Castleshaw reservoirs						No further action related to flow required at this time	N/A
	2. Readycon Dean Reservoir GB31231404	Readycon Dean reservoir						New compensation flow	AMP6
	3. Crook Gate Reservoir GB31231454	Crook Gate reservoir						No further action related to flow required at this time	N/A
	4. Dowry GB31231482	Dowry reservoir						No further action related to flow required at this time	N/A
	5. New Years Bridge reservoir GB31231508	New Years Bridge reservoir						No further action related to flow required at this time	N/A
	6. Upper and Lower Castleshaw GB31231531	Upper and Lower Castleshaw reservoir						No further action related to flow required at this time	N/A
	7. River Tame (Diggle Brook to Chew Brook) GB11206906 1290	Dovestone reservoir group						No further action related to flow required at this time	N/A
	Chew Brook	Chew reservoir						No further action related to flow required at this time	N/A
	1. Chew Reservoir GB31231942	Chew reservoir						No further action related to flow required at this time	N/A
	2. Dovestone reservoir GB31231829	Dovestone reservoir						No further action related to flow required at this time	N/A
	3. Yeoman Hey GB31231791	Yeoman Hey reservoir						No further action related to flow required at this time	N/A
	4. Greenfield GB31231778	Greenfield reservoir						No further action related to flow required at this time	N/A

1. River Tame (Chew Brook to Mersey) GB11206906 110	Walkerwood /Brushes/Swineshaw reservoirs						No further action related to flow required at this time	N/A
2. Higher Swineshaw GB31232066	Higher Swineshaw reservoir						No further action related to flow required at this time	N/A
3. Lower Swineshaw GB31232094	Lower Swineshaw reservoir						No further action related to flow required at this time	N/A
4. Brushes GB31232108	Brushes reservoir						No further action related to flow required at this time	N/A
5. Walkerwood GB31232112	Walkerwood reservoir						No further action related to flow required at this time	N/A
1. Micker (Norbury) Brook GB11206906 0920	Horse Coppice/Bollinghurst reservoirs						No further action related to flow required at this time	N/A
2. Bollinghurst reservoir GB31247004	Bollinghurst reservoir						No further action related to flow required at this time	N/A
3. Horse Coppice GB31247005	Horse Coppice reservoir						New compensation flow	AMP6
1. River Sett GB11206906 0970	Kinder reservoir						No further action related to flow required at this time	N/A
2. Kinder reservoir GB31232499	Kinder reservoir						No further action related to flow required at this time	N/A
1. Audenshaw reservoir GB31232183	Audenshaw reservoir						No further action related to flow required at this time	N/A
1. River Goyt (source to Randall Carr Brook) GB11206906 0850	Fernilee and Errwood reservoirs						No further action related to flow required at this time	N/A
2. Fernilee reservoir GB31232950	Fernilee reservoir						No further action related to flow required at this time	N/A
3. Errwood Reservoir GB31233043	Errwood reservoir						No further action related to flow required at this time	N/A
1. River Dean (Lamaload to Bollington) GB11206906 0650	Lamaload reservoir						No further action related to flow required at this time	N/A
2. Lamaload reservoir GB31233063	Lamaload reservoir						No further action related to flow required at this time	N/A
1. River Bollin (source to Dean) GB11206906 1320	Ridgegate and Trentabank reservoirs						No further action related to flow required at this time	N/A

	2. Trentabank reservoir GB31233247	Trentabank reservoir						No further action related to flow required at this time	N/A
	3. Ridgegate reservoir GB31233250	Ridgegate reservoir						No further action related to flow required at this time	N/A
	4. Teggs Nose res GB31233236	Teggs Nose reservoir						No further action related to flow required at this time	N/A
	5. Bottoms reservoir Macclesfield GB31233243	Bottoms (Macclesfield) reservoir						No further action related to flow required at this time	N/A
	1. Etherow (Woodhead res to Crowden gt Brook) GB11206906 0750	Longdendale reservoir group						No further action related to flow required at this time	N/A
	2. River Etherow (Crowden Great Brook to Glossop Brook) GB11206906 0780	Longdendale reservoir group						No further action related to flow required at this time	N/A
	3. Arnfield res GB31232166	Arnfield reservoir						No further action related to flow required at this time	N/A
	4. Woodhead res GB31232065	Woodhead reservoir						No further action related to flow required at this time	N/A
	5. Torside res GB31232111	Torside reservoir						No further action related to flow required at this time	N/A
	6. Rhodeswood GB31232136	Rhodeswood reservoir						No further action related to flow required at this time	N/A
	7. Valehouse res GB31232150	Valehouse reservoir						No further action related to flow required at this time	N/A
	8. Bottoms (Longdendale)	Bottoms (Longdendale) reservoir						AMP8 WINEP feasibility assessment for variable compensation. Implementation on hold until decision on Hydropower lease	AMP8/9
	1. Upper Swineshaw (Glossop) Reservoir GB31232242	Upper Swineshaw reservoir						No further action related to flow required at this time	N/A
	2. Swineshaw Reservoir (Glossop) GB31232245	Lower Swineshaw reservoir						No further action related to flow required at this time	N/A
Weaver Goway	1. Appleton Res GB31232665	Appleton Reservoir						No further action related to flow required at this time	N/A

Douglas	1. Douglas GB11207006 4780	Worthington reservoir						No further action related to flow required at this time	N/A
	2. Worthington reservoir GB31231496	Worthington reservoir						No further action related to flow required at this time	N/A
	3. Adlington GB31231476	Adlington reservoir						No further action related to flow required at this time	N/A
	1. Douglas GB11207006 4850	Rivington reservoirs						No further action related to flow required at this time	N/A
	2. Rivington reservoirs (Upper and Lower) GB31231288	Rivington reservoirs						No further action related to flow required at this time	N/A
	3. Yarrow reservoir GB31231266	Yarrow reservoir						No further action related to flow required at this time	N/A
	4. Anglezarke GB31231190	Anglezarke reservoir						No further action related to flow required at this time	N/A
	5. High Bullock reservoir GB31231232	High Bullock reservoir						No further action related to flow required at this time	N/A
Irwell	1. Scout Moor Reservoir GB31231130	Scout Moor reservoir						No further action related to flow required at this time	N/A
	1. Calf Hey Reservoir GB31231025	Calf Hey reservoir						No further action related to flow required at this time	N/A
	2. Ogden Reservoir GB31231013	Ogden reservoir (Grane)						No further action related to flow required at this time	N/A
	3. Holden Wood Reservoir GB31231027	Holden Wood reservoir						No further action related to flow required at this time	N/A
	4. River Ogden GB11206906 4650	Holden Wood, Ogden (Grane) and Calf Hey reservoirs						No further action related to flow required at this time	N/A
	1. Clowbridge reservoir GB31230769	Clowbridge reservoir						New variable compensation flow	AMP7
	2. Limy Water GB11206906 4680	Clowbridge reservoir						No further action related to flow required at this time	N/A
	1. Clough Bottom Reservoir GB31230858	Clough Bottom reservoir						No further action related to flow required at this time	N/A
	2. Whitewell Brook GB11206906 4670	Clough Bottom reservoir						No further action related to flow required at this time	N/A

1. River Irwell (source to Whitewell Brook) GB11206906 4660	Cowpe reservoir						No further action related to flow required at this time	N/A
2. Cowpe reservoir GB31231115	Cowpe reservoir						No further action related to flow required at this time	N/A
1. Turton and Entwistle reservoir GB31231202	Turton and Entwistle reservoir						No further action related to flow required at this time	N/A
2. Bradshaw Brook GB11206906 4580	Turton and Entwistle & Wayoh reservoirs						No further action related to flow required at this time	N/A
3. Jumbles reservoir GB31231306	Jumbles reservoir						No further action related to flow required at this time	N/A
4. Wayoh Reservoir GB31231200	Wayoh reservoir						No further action related to flow required at this time	N/A
1. Eagley Brook GB11206906 4570	Belmont, Springs and Dingle reservoirs						No further action related to flow required at this time	N/A
2. Springs Reservoir GB31231312	Springs Reservoir						No further action related to flow required at this time	N/A
3. Dingle Reservoir GB31231314	Dingle reservoir						No further action related to flow required at this time	N/A
4. Delph Reservoir GB31231264	Delph reservoir						No further action related to flow required at this time	N/A
1. River Beal GB11206906 4690	Ogden (Milnrow), Kitcliffe, Piethorne, Hanging Lees and Norman Hill reservoirs						No further action related to flow required at this time	N/A
2. Rooden res GB31231435	Rooden reservoir						No further action related to flow required at this time	N/A
3. Hanging Lees Reservoir GB31231405	Hanging Lees reservoir						No further action related to flow required at this time	N/A
4. Norman Hill Reservoir GB31231367	Norman Hill reservoir						No further action related to flow required at this time	N/A
5. Piethorne Reservoir GB31231393	Piethorne Reservoir						No further action related to flow required at this time	N/A
6. Kitcliffe Reservoir GB31231399	Kitcliffe reservoir						No further action related to flow required at this time	N/A

7. Ogden reservoir GB31231398	Ogden (Milnrow) reservoir						No further action related to flow required at this time	N/A
1. Blackstone Edge GB312311168	Blackstone Edge reservoir						No further action related to flow required at this time	N/A
2. River Roch (source to Beal) GB112069064720	Watergrove and Blackstone Edge reservoirs						No further action related to flow required at this time	N/A
3. River Roch (Beal to Spodden) GB112069064700	Watergrove and Blackstone Edge reservoirs						No further action related to flow required at this time	N/A
1. Watergrove GB31231164	Watergrove reservoir						No further action related to flow required at this time	N/A
2. River Spodden GB112069064730	Cowm and Spring Mill reservoir						No further action related to flow required at this time	N/A
3. Cowm reservoir GB31231141	Cowm reservoir						No further action related to flow required at this time	N/A
4. Spring Mill reservoir GB31231212	Spring Mill reservoir						No further action related to flow required at this time	N/A
5. River Roch (Spodden to Irwell) GB112069064600	Rochdale reservoirs						No further action related to flow required at this time	N/A
1. Naden Brook GB112069064710	Ashworth Moor, Greenbooth, Naden Middle/Upper, Watergrove, Blackstone Edge, Ogden (Milnrow), Kitcliffe, Piethorne, Hanging Lees and Norman Hill reservoirs						No further action related to flow required at this time	N/A
2. Ashworth Moor Reservoir GB31231267	Ashworth Moor reservoir						No further action related to flow required at this time	N/A
3. Upper Naden Reservoir GB31231214	Upper Naden reservoir						No further action related to flow required at this time	N/A
4. Middle Naden Reservoir GB31231229	Middle Naden reservoir						No further action related to flow required at this time	N/A
5. Lower Naden Reservoir GB31231250	Lower Naden reservoir						No further action related to flow required at this time	N/A
6. Greenbooth reservoir GB31231260	Greenbooth reservoir						No further action related to flow required at this time	N/A

	1. Middle Brook GB11206906 4540	No UU sources in catchment						N/A	N/A
Todmorden (North East EA)	1. Ramsden Clough Reservoir GB30431071	Ramsden Clough reservoir						No further action related to flow required at this time	N/A
	2. Warland Reservoir GB30431070	Warland reservoir						No further action related to flow required at this time	N/A
	3. White Holme Reservoir GB30431104	Whiteholme reservoir						No further action related to flow required at this time	N/A
Vrynwy (EA Wales)	1. R Vrynwy - Lake Vrynwy to conf Afon Cownwy (i.e., Marchnant) GB10905404 9880	Vrynwy reservoir						Compensation flow issue related to Cownwy and Marchnant catchments	AMP6
	2. R Afon Cownwy - source to conf Afon Vrynwy GB10905404 9750	Vrynwy reservoir						New Hands off flows on Cownwy and Marchnant catchments	AMP6

United Utilities Water Limited
Haweswater House
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington
WA5 3LP
unitedutilities.com



Water for the North West