

Water Resource Management Plan 2024

Appendix D – Environmental Destination

WONDERFUL ON TAP



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Appendix D – Environmental Destination

D1 Environmental Destination overview

In its 25 year Environment Plan the Government has set out ambitious long term goals to protect and enhance the water environment by improving at least three quarters of our waters to be close to their natural state as soon as is practicable. These long-term goals are reflected in the Environment Agency's latest River Basin Management Plans.

To achieve these goals, we will need to make large scale changes to the ways we abstract water from our sources of groundwater supply. During the 2030s the Environment Agency's abstraction licensing policy means that many of our existing groundwater abstraction licences will be capped and we can no longer assume that any spare licence capacity will be available to meet future needs. In the longer term, by 2050, the current guidance on WFD no deterioration licencing capping and environmental destination means we would need to reduce groundwater abstraction to help achieve the environmental destination goals described in the Environment Agency's National Framework.

The measures set out in our Water Resources Management Plan 24 (WRMP24) will protect and improve the water environment. The recommendations set out in this plan are a continuation of the proactive, long term environmental protection measures that were described in our WRMP19. The plan has been updated following consultation feedback on our draft plan and using updated data.

Overall, we estimate that the impacts of these changes will mean that the licence capping policy will reduce our current deployable output by 187MI/d by 2035 while the medium to longer term environmental destination impacts will reduce our deployable output by a further 231MI/d by 2050. For our preferred WRMP we have listened to the feedback from our stakeholders and we will accelerate the delivery of our long term environmental destination commitments. We have explored a range of potential environmental destination scenarios and the profile used in our plan reflects the affordability and deliverability of the AMP-by-AMP new water resource schemes that will be needed to accelerate the future abstraction reductions. We have also updated our Environmental Stretch alternative pathway to account for different delivery profiles. These are material changes to our supply capability and our WRMP24 includes the supply and demand investment that will be needed to accommodate these changes without destabilising public water supplies.

The potential impacts on our water supply-demand capacity are material, but the environmental destination scenarios are also highly uncertain due to the potential impacts of climate change and local hydroecology needs. Regardless of these uncertainties, we are committed to the environmental destination objectives and the long term investment plan needed to achieve them. However, the details of the exact investment solutions and the timing of implementation in future AMPs are still uncertain. In AMP8 our WINEP includes an extensive environmental destination investigation plan, the second largest in the sector, to quantify the exact catchment abstraction changes needed and to define the necessary investment solutions that will be included in WRMP29 / PR29. We are working with the EA to agree the scope of the required AMP8 WINEP investigation programme, and to align the approach across the Water Resources West (WRW) region.

The statutory PR24 WINEP deadlines are staggered between March 2027 and March 2030, but in practice we will make sure the environmental destination outputs are available to inform the draft PR29 Business Plan and WRMP29 as well as to better inform the scope of our AMP8 water networks investment schemes. The outcome of these studies will be a series of sustainable abstraction reduction scenarios and investment options for consideration in our for the catchments across our region.

Based on our current understanding of the need to cap abstraction licences in order to prevent WFD deterioration and the need to reduce future abstraction in order to achieve Environmental Destination goals, our WRMP24 includes the deployable output reductions summarised in Table D1.1.

Table D1.1: Summary of water resource zone deployable output reductions (MI/d) in WRMP24

Resource Zone	Early regulatory needs, 2030 to 2040			2050 BAU+
	2030/31 1:200 Drought LOS	2035/36 1:200 Drought LOS	2040/41 1:500 Drought LOS	2049/50 1:500 Drought LOS
Bishops Castle	0.00	-1.40	-1.40	-2.16
Chester	0.00	-0.08	-0.08	-0.08
Forest and Stroud	-0.16	-0.38	-0.06	-5.43
Kinsall	-0.21	-0.21	-0.49	-0.49
Mardy	-0.74	-0.74	-0.74	-3.31
North Staffordshire	-11.50	-18.73	-19.68	-95.57
Ruyton	0.00	-0.78	-0.78	-1.27
Shelton	-31.00	-35.00	-35.00	-78.49
Stafford	-0.30	-2.82	-2.82	-16.33
Strategic Grid	-41.45	-65.20	-43.79	-94.09
Whitchurch & Wem	-3.78	-3.78	-3.78	-3.96
Wolverhampton	-0.08	-3.24	-3.58	-19.33
Newark	0.00	0.00	0.00	-1.44
Nottinghamshire	-34.82	-54.76	-36.78	-96.36
Rutland	0.00	0.00	0.00	0.00
Total	-124.04	-187.39	-148.96	-418.29

Note: Table summaries of two levels of service (LOS) for drought resilience. A 1:200 LOS is assumed up until 2038/39 changing to a 1:500 LOS from 2039/40 onwards. Further information on this can be found in Appendix I.

In our WRMP19 we recognised what the WFD requirements could mean for our future abstractions, and we took proactive measures in that plan to prevent WFD status deterioration. For example, in our WRMP19 we committed to reducing our impacts from current groundwater abstractions under the Restoring Sustainable Abstraction Programme (RSA) by 23.5MI/d in the Nottinghamshire WRZ. We also committed under WFD No Deterioration, to not take up spare licence capacity by up to 88MI/d at our groundwater sources abstracting from the Sherwood sandstone aquifer. We also committed to ambitious demand management and leakage reductions. These measures alone will improve the long-term resilience of the aquifer

Through our WRMP19 commitments, we already have an ambitious set of environmental improvement actions in train that will deliver by 2030. Severn Trent's (STW) WRMP24 plan goes even further, and will deliver a deployable output (DO) reduction of c.124MI/d by 2030 and c.187MI/d by 2035, which will bring environmental improvement and will protect against environmental deterioration by preventing further abstraction growth from these water bodies. By 2050 the BAU+ deployable output reductions equate to a total of c.418MI/d.

To put this into a Water Resources West (WRW) regional context, for the BAU+ scenario STW is contributing 70% of the planned DO reductions across the whole of the WRW region to deliver environmental improvement

and prevent future deterioration by 2050. The remaining 30% is made up 22% United Utilities and 8% South Staffs Water

For our environmental stretch adaptive plan we have considered three scenarios; a lower impact scenario (Low), a middle scenario (BAU+) and a higher scenario (Enhanced). The total reduction in deployable output, by 2050, included for these sustainability reduction scenarios are shown in Table D1.2.

Table D1.2: Severn Trent company deployable output reduction scenarios evaluated in the final WRMP

Reduction scenario	Low 2050	BAU+ 2050	Enhanced 2050
Revised draft WRMP	-309.10	-418.29	-449.47

Note: This uses water resource Aquator model outputs for seven of the WRZs.

Our waste and water operation alongside broader catchment partnerships and collaboration activities provide us with much further reaching environmental improvement solutions beyond that of just abstraction control. In addition to the c.124Ml/d of DO reduction we are committed to in the short term, we have also identified two priority catchments in England where we will focus on delivering wider water quality and environmental improvements that are informed by local stakeholders’ priorities.

We have also committed to a continuation of our extensive abstraction monitoring and investigation programme in sensitive water bodies to gain a better understanding of challenges going forward and shape longer term solutions from a more informed basis and we have included an extensive investigation programme in the AMP8 WINEP to reduce the uncertainty in the assessment of future water needs for the environment and the range of solutions to achieve the outcomes required.

To summarise what features in the plan:

- We have an accelerated plan to deliver c.124Ml/d deployable output reduction by 2030;
- We have alternative proposals for two priority catchments where we will look at catchment measures to enhance resilience;
- To build confidence in sustainability of operation and holistic betterment of the environment we will continue to monitor and investigate the remaining areas over the course of planning cycle to inform thinking for activities beyond 2030.
- We have also considered accelerating sustainability reductions between 2040 and 2050 by testing our plan against alternative reduction profiles for the BAU+ scenario.
- Our preferred plan brings forward some of the sustainability reductions, required by 2050, earlier where feasible.

D1.1 Policy context

This section outlines some of the main English policies, pertinent to the Environmental Destination of our region. The main Welsh regulatory policies, regulations and legal instruments are outlined in Section D14.

The Government’s 25-year Environment Plan

The Government’s 25-year Environment Plan for England sets out an ambitious vision to secure a supply of clean and plentiful water by bringing at least three quarters of our waters close to their natural state as soon as practicable. This can be achieved by implementing the following objectives in England:

- Reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021, the proportion of water bodies with enough water to support environmental standards increases (from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies across England)

- Reaching or exceeding objectives for rivers, lakes, coastal and groundwaters that are specially protected, whether for biodiversity or drinking water as per the River Basin Management Plans
- Supporting Ofwat’s ambitions on leakage, minimising the amount of water lost through leakage year on year; each water company is expected to reduce leakage by at least 15% from 2020 to 2025.

Severn Trent, working with Water Resources West (WRW), will endeavour to propose a plan which promotes the Government’s long-term ambitions to protect the environment.

Local Nature Recovery Strategies

The Local Nature Recovery Strategies is an important new policy brought in through the Environment Act 2021. The UK Government’s overall ambition is that Local Nature Recovery Strategies will be a powerful new tool that will help the public, private and voluntary sectors work more effectively together for nature’s recovery, and enable collective effort to be focussed where it will have most benefit. Key to achieving this will be creating genuine local collaboration with a partnership of organisations and individuals working closely with each “responsible authority”. Local Nature Recovery Strategies are an important part of an ambitious package of measures introduced by the Environment Act 2021 to reverse nature’s decline. Environmental Improvement Plans and legally-binding targets, including the additional target for species abundance for 2030, will establish long-term policy direction and ambition. As a company, and through WRW, we will work with the responsible authority and wider group of stakeholders to ensure our proposed plan supports the aims of the Local Nature Recovery Strategies. The upcoming guidance in this regard will help us shape our future environmental destination to ensure we have a supportive role in restoring and protecting our natural environment.

National Framework for Water Resources

The National Framework sets out the principles, expectations and challenges for the five regional water resources groups (made up of the statutory water undertakers and other water users). The National Framework outlines the principles that must, should and could be incorporated into their plans. The Welsh Government and Natural Resources Wales have also given their support to this framework. The framework has strong links to the River Basin Management Plans. The following sections summarise how we are implementing the National Framework principles and expectations in the WRMP24.

Regional Water Resource Planning

On 16th March 2020 the Environment Agency (EA) published their National Framework (NF) for Water Resources. Appendix 4 of the National Framework presents the scenarios. The National Framework sets the strategic direction for long term regional water resources planning. It marks a step change in water resources planning and establishes five regional water resources groups who will produce a set of coordinated cross-sector plans. The plans will identify options needed in each region to manage demand and increase supply and realise opportunities from water resources planning by working collaboratively.

Severn Trent Water Limited (STW) is part of WRW along with Dwr Cymru/Welsh Water (DCWW), South Staffs Water (SSW), United Utilities (UU) and Hafren Dyfrdwy (HD) as well as representatives of other abstractor sectors. The EA’s National Framework report identified that WRW will require an additional 639Ml/d for public water supply between 2025 and 2050 (167Ml/d for drought resilience, 237Ml/d for population change, 167Ml/d for environmental improvement and 68Ml/d for climate change) with an additional 283Ml/d for other water users (industry, agriculture and power generation).

Regional groups and water companies need to understand environmental needs in the long term to inform water resources planning and deliver best value investment decisions. Up until now, we have focused on identifying sustainability changes for the upcoming AMP (Asset Management Plan), using the EA’s WINEP (Water Industry National Environment Programme). Now, for the first time, regional groups and water companies will work with regulators and other partners to develop a shared long-term destination on sustainable abstraction and a plan

to achieve it. This will include potential future licence changes, to be included in the longterm supply demand balance of our WRMPs.

Our plan and WRW's need to include scenarios for sustainability changes for environmental destination to use as planning assumptions. These will be used for inter-regional comparison and to support adaptive planning.

WRW has produced a methodology framework to enable a consistent development for the region's Environmental Destination and this, along with regular discussions with regulators and stakeholders, has been used in the development of our WRMP24.

English WRMP supplementary guidance

The EA published supplementary water resources planning guidance for Environmental Destination in England. For England, the Environmental Destination set out in this document relates to our public water supply abstractions and potential reductions in deployable output to protect and enhance the environment.

Environmental Destination should take a holistic approach to catchment management and be cross sector. However, we are in the early stages of the evaluation and strategy development and the focus from our English regulator, the EA, is on the identification of potential abstraction reductions and solutions development.

The Environmental Destination includes both the shorter to medium-term regulatory needs and the potential longer term direction to 2050 and beyond, taking account of a dry climate change scenario. We have included Water Framework Directive (WFD) improvement implementation measures, licence capping assumptions to prevent WFD status deterioration based on recent guidance (see Section D5) and scenarios relating to the longer-term environmental destination (see section D8).

Welsh WRMP supplementary guidance

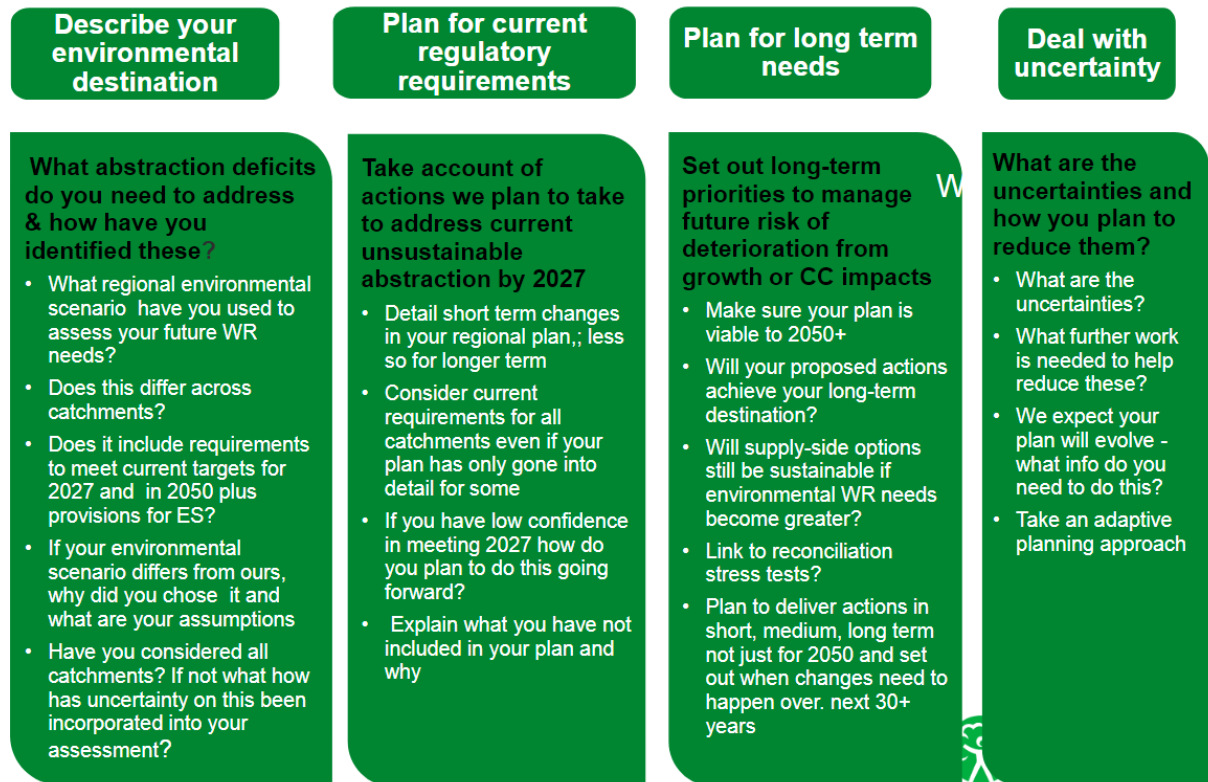
Natural Resources Wales has also published supplementary guidance for Environmental Destination. This takes a holistic approach and is aligned with Welsh legislation. Further information in Wales is in section D14.

Environment Agency Updates 2021/22

In early 2022 the EA produced a summary of what it wanted to see in regional plans (see figure 1.1). This is also a useful reference of what needs to be evaluated and reported in the Severn Trent WRMP24. The approach for columns 1, 2 and 4 are summarised in this section. Column 3 is outlined in Appendix G: Our Plan.

Figure D1.1: EA slide on what they expect to see in the plan

What we expect plans to include



The WRMP Planning Guideline sets out that the plan:

- “must deliver the regulatory actions required to avoid deterioration and meet targets for Protected Areas
- must deliver actions required to meet the abstraction plan for 2027 (where applicable) and those required to achieve WFD regulations objectives, as defined in River Basin Management Plans
- should take account of government and regulators’ objectives for the environment
- should include the measures in the Water Industry National Environment Programme (WINEP) and the National Environment Programme (NEP) (where applicable)
- should include your long term environmental destination, clearly setting out the actions you will take in the short, medium and long term to achieve it. You should distinguish between actions that are required to meet current regulatory requirements and those that form part of your longer term destination. If the actions to achieve the long term environmental destination are not known at this stage, you should identify what further work is needed to understand the actions that are required to deliver your environmental destination
- should fully reflect and support the achievement of the regional long term environmental destination (where one applies) and the achievement of your WRMP environmental destination”

The Water Resources Planning Guideline (WRPG) was updated in 2023 and further strengthens the need to deliver improvements for the environment, to meet current legislative needs, as soon as feasible.

In addition the EA and OFWAT have specified three scenarios to be evaluated in the WRMP and regional plans (the definitions of these are described in Section D6):

1. High Scenario – Enhanced
2. Core scenarios to be included in the WRMP plan baseline tables – Business as Usual (BAU) scenario plus needs of riverine European Designates sites (BAU+)
3. Low Scenario – a plausible low scenario required by OFWAT

D1.2 Draft plan consultation responses

We have reviewed consultation responses on our draft WRMP. These responses were from our regulators, the farming sector, NGOs and individual stakeholders. We published our Statement of Response in July 2023, which explains how we have taken the consultation comments into account in the development of our plan.

We understand and are committed to our obligations to prevent deterioration of Water Framework Directive (WFD) status and to achieve the objectives set out in the River Basin Management Plans. Our contribution to achieving these statutory obligations have been agreed with the Environment Agency (EA) through the Water Industry National Environment Programme (WINEP). The Environment Agency’s WINEP planning guidance has been updated since our draft WRMP24 was produced and our understanding of how to tackle this challenge has evolved accordingly.

Our WRMP sets out our plans to make abstraction licence reductions to enhance and protect the environment over the next 10 years along with longer term plans to improve the water environment by 2050. Our plans to cap abstraction licences between 2030-35 and provide alternative, sustainable sources of water supply form the first step in our commitments to helping water bodies along the pathway to WFD good status. In the longer term, our WRMP sets out options that would allow us to leave more water in the environment and help water bodies across our region to achieve good status and be more resilient to future climate change.

We received feedback from our regulators and wider stakeholders on the scale and pace of the long-term environmental improvements proposed in our dWRMP. Using that feedback, we have developed further ED scenarios for the final WRMP that explore opportunities to accelerate the timing of making licence reductions in priority areas to help achieve WFD improvements.

We recognise the need to bring forward improvement actions as soon as feasible and affordable and we are evaluating scenarios to explore what may be possible. Currently there is a lot of uncertainty in the assessment of future water environment needs and we have included a substantial investigation programme and option development in our next business plan. We are in fact going to be starting this early, so we have better information to inform our next plan. We will seek to understand the challenges better and to further develop a holistic range of options including nature-based solutions and multiple benefits.

Since we published our dWRMP we have agreed with the EA the extent of our AMP8 WINEP programme, which includes extensive technical investigations and options appraisal in the catchments where abstraction reductions will be required to achieve the ED objectives. Our AMP8 technical investigations will provide us with a more robust understanding of both the pressures and options to achieve WFD and nature recovery obligations.

While the WRMP considers the water abstraction impacts of achieving our WFD and nature recovery obligations, it is important to note that we are delivering a much broader range of environmental protection and improvement measures. For example, the WINEP includes our commitments to improve river water quality, protect and enhance water catchments, improve designated sites, and enhance biodiversity across our region.

Overall, we are already committed to delivering a broad package of investment in environmental enhancement in AMP8 that will contribute to improving catchments and ecological resilience. We have summarised this broad package of planned environmental interventions in the plan.

Key requirements from the EA included:

- The timing of the abstraction reductions to demonstrate the plan meets current regulatory requirements and justifications for timings.
- A summary of where sources have been screened out of reductions.
- Licence level reductions (in the WRMP guidance)

D1.3 Overview of Severn Trent Water’s approach to Environmental Destination

Our Environmental Destination

In England, by 2050 the BAU+ deployable output reductions increase to a total of c.418MI/d.

Measuring progress against the our BAU+ environmental scenario reductions our plan presents ~30% of the reductions delivered by 2030 rising to ~40% by 2040. The remaining ~60% of the reductions are planned between 2040 and 2050. To put this into context, we are contributing 70% of the planned DO reductions across the WRW region to deliver environmental improvement and prevent future deterioration.

For the WRMP24 we have used the BAU+ scenario in our baseline plan and are using the High (Enhanced) and low scenarios to develop an adaptive plan. We have not used the Enhanced scenario in our preferred plan as we consider the differentiation small (29MI/d ~6%) and outweighed by other uncertainties in the assessment at this time. The Idle catchment has the largest differentiation between the BAU and Enhanced reductions (~20MI/d). We consider the BAU+ scenario to represent a high ambition for the water resources in our region. More detailed investigations proposed for AMP8 will reduce the uncertainty and allow more detailed evaluation of the designated features for our region.

We have developed a low scenario where we have removed or reduced the reductions that are have higher uncertainty to test the plan against a lower scenario and build an adaptive plan.

We are seeking opportunities to explore further opportunities for catchment measures with stakeholders to bring catchment improvements and ecological resilience without destabilising public water supplies. We are initially undertaking this evaluation in two priority catchments, the Idle and the Worcestershire Middle Severn.

Plan for current regulatory commitments

The early abstraction licence reductions between 2030 and 2040 relate to our current estimate of what is needed to deliver our planned environmental improvements and an estimate of total licence capping to prevent environmental deterioration. Our ambitious commitments to protecting the future water environment result in a loss of c.124MI/d in public water supply deployable output by 2030 increasing to c.187MI/d by 2035.

For AMP7 we have included agreed licence reductions and flow compensation changes to achieve WFD improvements. This includes c.30MI/d reduction in abstraction from groundwater sources and changes to the operation or hands-off flow at four surface water abstractions. Licence changes will be implemented between 2025 and 2030.

For WFD no deterioration there are a number of groundwater sources in AMP7 WINEP where we have already committed to take the average deployable output down to the no deterioration baseline (NDB) by 2030.

The AMP7 WINEP includes both investigations and adaptive planning. High Priority regulatory outputs were delivered by September 2022 and remaining AMP7 WINEP outputs will be delivered in 2024 and 2025. Despite the uncertainty around these investigations, we have assumed licensed abstraction will be reduced in those water bodies most at risk of future deterioration.

In our draft WRMP24 for those sources that are at a lower risk of deterioration, we assumed a potential loss of 50% of the difference between our current average deployable output and No Deterioration Baseline (NDB – agreed average annual abstraction between 2001 and 2015) by 2030, in our central best estimate for all sources in this category. We also took a precautionary assumption of average licence reduction to the NDB by 2040.

For our final plan we have recognised that this approach was not consistent with the EA’s evolving guidance and so a different reduction scenario has been used in which all sources are reduced to NDB by 2030 or 2035 depending on their priority (defined by the 2018 No Deterioration Guidance) and the timing of predicted growth (if any) above the NDB.

These reductions are planning assumptions and subject to modification taking into account source specific evidence through the No Deterioration investigations being carried out in under the WINEP in AMP7 and AMP8.

It is possible, when we have undertaken updated WFD no deterioration risk assessments considering the risk of growth in abstraction from our sources, that the timing of the implementation of any sustainability reduction could change. To evaluate this risk, we are also running two additional scenarios where we are assuming reductions to NDB by 2030/2035 (depending on the AMP7 and AMP8 WINEP action and the priority assigned in the AMP7 and AMP8 WINEPs) and a scenario where all licences are reduced to NDB by 2030, this will inform our adaptive plan for this requirement.

River restoration measures are being implemented as well as licence changes in higher risk catchments. We anticipate that similar work will be required in the next plan, but details are not yet available.

Planning for long term needs

We have used licence change / average deployable output scenarios, based on the EA National Framework, to examine the full range of potential environmental protection scenarios for 2050. We are using these scenarios to inform our adaptive management plan for Environmental Destination and long-term water supply/demand investment needs.

We are taking a catchment approach. We are producing a prioritised investigation plan the AMP8 WINEP which will aim to reduce the uncertainty in the assessment of abstraction licence reductions and consider a range of holistic solutions to build catchment resilience. We will work with stakeholders to understand current and future pressures and seek collaborative solutions, building on the experience of the first 2 priority catchments that have had an initial evaluation.

For future plans the environmental destination will be refined based on bottom-up catchment scale analysis and latest available data and benefit assessment. Both public (PWS) and non-public (non-PWS) water supply needs will need be taken into account at a localised catchment scale.

For WFD no deterioration, we are taking steps between now and 2040 that will prevent long term growth in abstraction in those water bodies most vulnerable to the impacts of climate change. Our approach means that abstraction licences will be retained for longer, to allow time for solutions to be implemented, unless the risk of deterioration changes and requires alternative measures.

We will seek to align no-deterioration risk and environmental destination opportunities to bring catchment improvements to higher risk areas while extending the time frame for improvement in lower risk areas.

Uncertainty

The National Framework scenarios have high uncertainty including climate change and local hydro-ecology needs. We have therefore tested our plan using Enhanced, BAU+ and a low scenario. These scenarios will inform our adaptive planning approach to demand management and water resource scheme delivery.

The National Framework data does not consider all flow related issues e.g., the need for high spate flow release from reservoirs. We anticipate these to be identified through the WINEP & NEP and stakeholder engagement.

We are proposing an extensive investigation programme for PWS abstractions through the water company WINEP programme, between 2025 to 2030 (AMP8), to reduce the uncertainty on abstraction licence needs and to develop holistic catchment approaches. We have discussed this with the EA and agreed the required AMP8 WINEP investigation programme that will need to include further climate change evaluation for Environmental Destination. The water resources investigations are summarised in Section D13.1.

Other evaluation programmes are being undertaken e.g., River Severn Regulation review and the Shropshire Groundwater Scheme. We have a collaborative plan to understand when outputs may feed into the Environmental Destination evaluation process.

Collaboration at catchment scale and opportunities for joining with other sectors to achieve multiple benefits. We are prioritising catchment engagement with other sectors and seeking to join up water company plan drivers to maximise catchment benefits.

We will factor uncertainty and the ranges of pressures on catchments into our decision-making process.

Tools and data used in the evaluation will include groundwater models, hydro-ecological models, and UKCP18 climate data.

Insights into the evaluation and approach to date

While these environmental destination scenarios are helpful to inform our thinking about long term environmental goals, they go beyond the traditional WINEP approach, they do not consider a cost/benefit or cost/effectiveness test in the assumed reductions. They also go beyond the Government's 25-year Environment Plan which sets a target of getting "...75% of water bodies to near natural status as soon as is practically possible."

For us, the effect of these scenarios is felt largely on our groundwater sources. The scenarios seek to reduce abstraction from failing groundwater bodies and have the objective of returning groundwater to more natural levels in the primary aquifers from which we abstract. For our plan, the effect of adopting the BAU+ scenario would be a reduction of c.418MI/d deployable output from our sources including the loss of licensed abstraction headroom across many of our sites. On a system wide scale, the effects would be even greater, our reservoir and river abstraction sources are designed to operate conjunctively with our groundwater sources and so the overall effect on our integrated system would be a material loss of supply resilience.

The scale of abstraction reductions identified in these scenarios means that our water resource model outputs are not likely to be representative of a realistic scenario. Our water supply network and infrastructure are not designed to operate under such a scenario, and simply reporting the model outputs gives a false impression of the scale of impact on our supply/demand and resilience; the impact on modelled DO is much greater than the individual source reductions entered into the model. Therefore, we have used non modelled reductions in our analysis of the longer-term impacts (2040 - 2050).

While we have identified the water resource solutions needed to accommodate these abstraction changes, we need to better understand the scale of water distribution network and treatment works investment needed to accommodate these new licence constraints. These will be evaluated as part of our AMP8 WINEP investigation and options appraisal work.

We also need to take account of the environmental impacts of implementing abstraction reductions. While the scenario objective is to return groundwater levels to near natural levels, this could lead to increasing groundwater flooding across large parts of our urban and agricultural geography. Under the BAU+ scenario, the scale of new water supplies needed to replace the groundwater reductions mean that we would need to deploy alternative schemes that will have material environmental impacts of their own e.g., raising reservoirs, enhanced waste water treatment for reuse, pumping water over large distances etc. Therefore, the net environmental costs and benefits of the scenario need to be weighed up before making any further long-term commitments. To do this, our PR24 business plan has included significant expenditure on environmental investigation and appraisal to inform the evidence base for a PR29 investment plan.

The following sections describe the shorter term and longer-term actions that we have taken account of in the WRMP24 and regional plan. Sections D2 to D5 set out the shorter-term sustainability reductions for England. Section D6 to D8 outlines longer term scenarios. Sections D9 and D10 describes work in two catchments to consider a holistic approach for Environmental Destination. Sections D11 and D12 provide an overview of other shorter term WFD related actions. Section D14 describes our relationship to the upstream catchments in Wales.

D2 Restoring Sustainable Abstraction (RSA)

Some of our existing water abstractions may be having a detrimental effect on the environment, particularly during dry weather periods when river flows are low. The EA ran the RSA programme from AMP3 to AMP6 to investigate and implement solutions to address potentially environmentally damaging abstraction licences. We investigated the impacts of those abstractions identified by the Environment Agency as possibly causing harm to the environment. Through our investigation work we gathered site specific evidence of the extent of damage being caused, and whether our activities are the main cause, or just part of the problem.

Upon investigation, where our abstractions were identified to be the cause or part of the problem, we acknowledged that we needed to find and implement solutions. These solutions might include supporting stream flows through compensation discharges and environmental improvements. Where this has been evaluated alongside WRMP24 solutions, for some areas, we have reduced (or are planning to reduce) our abstraction licences at the affected sites, linked to developing alternative source of supply. Sustainability reductions to licences may have been required to protect international or national designated conservation sites (Habitats Directive, Sites of Special Scientific Interest or Biodiversity 2020 sites), to protect locally important sites or to deliver Water Framework Directive (WFD) objectives.

Our RSA investigations were all completed by 2020 and the EA have now closed the RSA programme. We are implementing solutions from the AMP6 investigations between 2020 and 2030.

D2.1 RSA Sustainability Changes

In the preparation of our previous plans, the Environment Agency's National Environment Programme (NEP) identified the waterbodies and protected sites where it was suspected that our abstractions were unsustainable and causing detrimental environmental impact. This has been the route whereby water companies have evaluated and included action to improve the WFD status relating to flow or water level pressures. Throughout AMP6 we worked with the Environment Agency to complete environmental investigations and solution appraisals at these sites. This options appraisal process was completed and the Environment Agency incorporated the results into the AMP7 WINEP3 that was released in April 2018 for implementation between 2020 and 2025. The outcomes of these appraisals informed the recommended solutions we described in WRMP19 and these ongoing activities have been reflected in our WRMP24.

Where the investigations concluded our activities were having a damaging impact, then our WRMP24 includes the solutions we have agreed with Environment Agency to remove or mitigate these effects. These solutions take the form of:

- 'Local' solutions, such as changes to our compensation flows at surface water sites or environmental improvement measures such as river habitat restoration which are being implemented in AMP7.
- 'Strategic' new supply-side solutions that will allow us to reduce abstraction from a number of our unsustainable groundwater sources.

Where we need to reduce unsustainable abstraction, we agreed with the Environment Agency that we will make changes to the associated abstraction licences by end of AMP7 (2025). However, we also agreed with the Environment Agency that in some cases we would take an 'upfront permitting' approach to these licence changes. This means that in some cases the changes will not take effect immediately, allowing us time to

complete the required engineering changes to our water supply network and protect our customer’s security of supply. In such cases, we are implementing local schemes in AMP7 to mitigate for the effects of ongoing abstraction by making improvements in stream habitat (see Environmental Measures below). All licence reductions and our required interventions will come into effect and be applied by 2030.

We have included the AMP7 WINEP implementation schemes in our plan. This includes the agreed sustainability changes for each individual site. Although there will be refinement of the distribution of reductions during AMP7 we have used these assumptions in our plan, ahead of further evaluations being completed. These site level changes have been modelled, where applicable, in aggregate using our Aquator water resources model to derive the deployable output impact on each water resource zone. The site-based reductions have been used to assess the combined impact of both RSA and WFD No Deterioration impacts on our deployable output (DO).

Table D2.1 to D2.6 below lists those sources where our AMP6 RSA investigations concluded that abstraction reductions or other environmental solutions may be required. The sites listed in these tables were included in the Environment Agency’s April 2018 WINEP3 and carried an ‘implementation’ driver. A short description of the nature of the solution has been added for clarity. These schemes were included in our WRMP19 and are now part of our AMP7 WINEP delivery programme or in some cases have already been incorporated into the related licence conditions. The schemes are all subject to further feasibility work in AMP7 and the final outcome may change but the assumptions in our WRMP are stated below.

Table D2.1: WINEP groundwater schemes (measure taken from AMP7 WINEP) – Forest & Stroud WRZ

WRZ	RSA Investigation Site	Measure	Description of scheme
Forest & Stroud	Cinderford Brook	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	Catchment/River Restoration Measures Sustainability change to prevent risk of future deterioration

Table D2.2: WINEP groundwater schemes (measure taken from AMP7 WINEP) – North Staffordshire WRZ

WRZ	RSA Investigation Site	Measure	Description of scheme
North Staffordshire	Aldford Brook	Sustainability Change	Catchment/River Restoration Measures Sustainability change to prevent risk of future deterioration

Table D2.3: WINEP groundwater schemes (measure taken from AMP7 WINEP) – Nottinghamshire WRZ

WRZ	RSA Investigation Site	Measure	Description of scheme
Nottinghamshire	Dover Beck and Oxtun Dumble	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	
Nottinghamshire	Rainworth Water	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	Catchment/River Restoration Measures in waterbodies
Nottinghamshire	Bevercotes Beck	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	Combined sustainability reduction of up to 23.5MI/d off 15-year NDB
Nottinghamshire	Vicar Water	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	

Table D2.4: WINEP groundwater schemes (measure taken from AMP7 WINEP) – Shelton WRZ

WRZ	RSA Investigation Site	Measure	Description of scheme
Shelton	Lower Worfe - Stratford Brook, Albrighton Brook & River Worfe	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	Catchment/River Restoration Measures Sustainability reduction of up to 3MI/d off 15-year NDB
Shelton	River Strine (multiple waterbodies)	Land Management/ Habitat Restoration/ Physical Improvement	Catchment/River Restoration and alternative local flow support measures
Shelton	Upper Worfe - Burlington Bk	Sustainability Change	Continuation of WRMP14 Scheme
Shelton	Upper Worfe- Neachley Bk	Sustainability Change	Continuation of WRMP14 Scheme

Table D2.5: WINEP groundwater schemes (measure taken from AMP7 WINEP) – Strategic Grid WRZ

WRZ	RSA Investigation Site	Measure	Description of scheme
Strategic Grid	Batchley Brook	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	Catchment/River Restoration Measures Sustainability reduction of up to 1.5MI/d off 15 year NDB
Strategic Grid	Confirmed Coventry Coal Measures (River Sowe and Sherbourne)	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	Catchment/River Restoration or local flow support measures. The scheme includes revoking a disused licence Sustainability reduction of up to 4.4MI/d off 6 year NDB
Strategic Grid	Hartlebury Common SSSI	Sustainability Change	Local flow support measure (small associated sustainability reduction of up to 0.5MI/d off 15-year NDB) – this is no longer anticipated to be required as water quality is not suitable.
Strategic Grid	Battlefield Brook	Sustainability Change	Completion of WRMP14 Scheme

Table D2.6: WINEP RSA surface water schemes (taken from WINEP3 - April 2018)

WRZ	RSA Investigation Site	Measure	Description of scheme
Strategic Grid	Carsington Reservoir (Henmore Brook) ¹	Sustainability Change & Land Management/ Habitat Restoration/ Physical Improvement	Catchment/River Restoration and small change to local flow support measures
Strategic Grid	River Dove at Egginton	Sustainability Change	Solution to be agreed with EA following further assessment. Agreed to remove 90 HOF
North Staffordshire	Tittesworth Res (R. Churnet)	Sustainability Change	Local flow support measures. Solution to be agreed with the Environment Agency following further assessment
Strategic Grid	Stanford Reservoir	Sustainability Change	Continue local flow support measures; change to control for compensation and reassessment of volumes required
Strategic Grid	Quorn Brook (Cropston and Swithland Resrs)	Sustainability Change & Adaptive Management	Local flow support measures by introduction of reservoir compensation volume of up to 4Ml/d
Strategic Grid	River Ashop ¹	Sustainability Change	Change to local flow support
Strategic Grid	River Noe ¹	Sustainability Change	Change to local flow support

Note 1: These sites are listed in WINEP3 with a no deterioration driver. They have been included in table A4.2 of our WRMP24 as they are AMP6 RSA investigation sites and scheme was agreed though RSA options appraisal.

We were required under the RSA programme to determine whether our existing abstractions were meeting RBMP sustainability objectives and in cases where there was risk of not meeting these, we determined the licence changes that were required to our abstractions to meet RBMP objectives. Where we have identified “sustainability change” in order to meet these requirements, we have assumed losses below the agreed No Deterioration Baseline rather than the current average abstraction licence quantity. The combined total for the RSA related sustainability changes for the groundwater sources, below NDB abstraction is ~30Ml/d.

D2.2 Environmental Measures

In AMP 7 we are delivering 11 environmental measures schemes which are included in tables D2.2 to D2.6 above. The driver for these projects is to improve ecological resilience to low flows. There are 11 catchments which include 17 waterbodies where we have an obligation to deliver environmental measures. Each of these catchments have been investigated for multiple AMPs (in terms of river flow, macroinvertebrates etc) to understand the impact of our groundwater abstraction on surface water flow. Where our groundwater abstraction is impacting surface water bodies we have included in WINEP for a solution to be implemented.

The sites which these schemes are being delivered at are as follows:

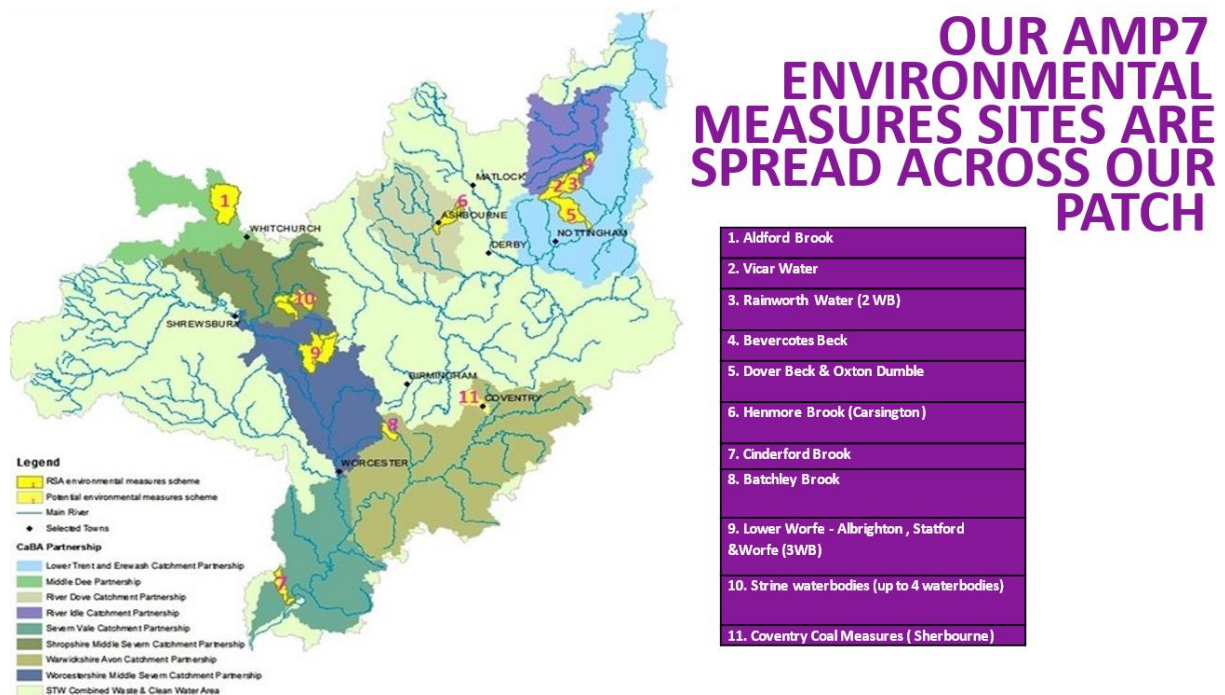
- Cinderford Brook
- River Sherbourne
- Aldford Brook
- Vicar Water
- Rainworth Water
- Bevercotes Beck
- Strine
- Lower Worfe
- Henmore Brook
- Doverbeck
- Batchley Brook

In year 2 of AMP7 we have already delivered a 6000m² wetland adjacent to Cinderford Brook as part of phase 1 of our restoration scheme for this site. This will provide habitat, biodiversity and natural capital benefits to the area and phase 2 for this site will follow for the remainder of this AMP and will focus on river restoration activities. We have also delivered feasibility and optioneering for all sites in year 2 of AMP7 and set up a new partnership working method for scheme delivery.

Our delivery method for this river restoration activity is partnership working with environment non-government organisations (eNGOs) such as Wildlife and River Trusts. We are formally in partnership agreement with Trusts to deliver this work. This partnership working with local Trusts and the EA will ensure successful delivery of these schemes by the end of AMP deadline and also provide many other benefits in terms of expert local knowledge, local stakeholder engagement benefits and so on.

Years 3 and 4 of AMP7 for these schemes have included and will continue to include consultation with the Rivers and Wildlife Trusts and EA to agree a proposed list of interventions and locations. Once Regulator approval of these proposals is received, the Rivers and Wildlife Trusts will move onto the next phase, working towards producing the detailed design for each proposed specific intervention. These detailed designs will also require ongoing consultation and approval from the Regulator. Following this stage and approvals are received, the Trusts will move onto the start of delivering activities in these catchments. The delivery of these activities is anticipated to start in Year 4 and progress into Year 5 of AMP7.

Figure D2.1: Distribution of Environmental measures schemes across the Severn Trent region



Protected area commitments

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

This piece of legislation combined the land and marine aspects of the European Union's Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (Directive 2009/147/EC) (known as the Nature Directives) to ensure the conservation of a wide range of rare, threatened, or endemic animal and plant species in the UK. Under this legislation, approximately 200 rare and characteristic habitat types are also targeted for conservation in their own right.

The Wildlife and Countryside Act 1981 (as amended) requires statutory undertakers (including water companies) to take reasonable steps, consistent with the proper exercise of their functions, to further conservation and enhancement of the features of sites designated as Sites of Special Scientific Interest (SSSIs).

Habitats Directive sites and SSSI could be sensitive to the impacts from abstraction if the features of interest are flow or water level dependent and abstraction sources do not necessarily need to be within the boundary of the site to have a potential for impact.

Historically we have investigated a number of protected areas under the RSA programme or under SSSI WINEP drivers in AMP7. Following investigation, where required, any licence changes have been made. One implementation scheme was included in the AMP7 WINEP for Hartlebury Common SSSI (see Table D2.5), however, following further feasibility and discussions with both the EA and NE, this solution is no longer going to be implemented and the commitment will be removed from WINEP.

D3 Water Framework Directive no deterioration

D3.1 Background to WFD No Deterioration

Under the Water Framework Directive (WFD) we have an obligation to prevent the deterioration of the quantitative and qualitative status of surface and groundwater WFD waterbodies. The EA defines deterioration as a change in the class of one of the elements used to determine the status of a waterbody from its existing class to the class below, or a deterioration within the lowest class.

Deterioration of the status of a waterbody could arise if our abstractions increase in the future due to growth. Growth may occur at a source due to increased demand, for example from new housing developments, to make up for a sustainability change elsewhere, or as a result of a planned operational change. If this occurred, we could be taking more water out of the environment. Taking action to prevent deterioration now will prevent us from having to repair damaged waterbodies in the future, which would be more expensive. Our abstractions need to be more sustainable, and we need to achieve this without compromising the supply of water to our customers.

The Environment Agency developed a methodology to advise water companies on a risk-based approach to managing the WFD risk at our sources relating to the timing of when the predicted risk of deterioration could occur 'Guidance on water resources investigations into the risk of WFD water body deterioration, Jan 18'. This facilitated the prioritisation of actions to be undertaken by water companies and these were included in our AMP7 WINEP programme.

In November 2021 and April 2022 the EA shared their evolving policy on licence capping to prevent deterioration of the water environment in the form of letters to water companies and supplementary guidance:

- 'Addressing deterioration risk from existing abstractions', letter to water companies in England, 15 November 2021
- Water resources planning guideline supplementary guidance – actions required to prevent deterioration (Draft), Published 15 November 2021
- 'Addressing deterioration risk from existing abstractions' letter to water companies in England, 4 April 2022
- Water resources planning guideline supplementary guidance – actions required to prevent deterioration v2.0, Published 4 April 2022

The latest Water Resources planning supplementary guidance indicates that there are likely to be different levels of reduction applied to licences depending on the risk of deterioration linked to the WFD status of associated

waterbodies. The EA will either cap licences at maximum peak abstraction or NDB average abstraction depending on the environmental risk. The April water resources planning supplementary guidance outlines that:

“Maximum peak abstraction is the maximum volume of water abstracted in any one year during the representative abstraction period. This means:

- *maximum peak abstraction is to allow flexibility to meet high demands, such as during droughts and for operational requirements, such as outage.*
 - *we expect water companies to control growth in overall abstraction above recent actual average volumes determined during the representative period at individual licensed sources.*
 - *previous caps at maximum peak potentially allow the quantities abstracted to increase year on year. This is no longer the case. We expect water companies’ average abstraction and deployable output (DO) to remain at recent actual average volumes unless the Environment Agency has confirmed that some growth is permitted.*
 - *the Environment Agency advises water companies not plan to use the additional DO provided by the maximum peak cap to enable housing growth unless the Environment Agency has confirmed that the associated increase in abstraction would be permissible.*
 - *where abstraction increases beyond permissible levels and causes deterioration, the Environment Agency may have to instigate changes to licences that have caused the deterioration to cap them at recent actual average abstraction.*
 - *maximum peak abstraction for operational reasons such as outage should not extend beyond 6 months.*
- *Recent actual average abstraction is the total volume of water abstracted during the representative recent actual period divided by the number of years in that period. No growth and very limited operational flexing are permitted in these circumstances.”*

A summary of the licence capping assumptions for the scenarios for which licence change should be considered are outlined in the 15 November 2021 letter accompanying the draft November guidance and is provided in Table D3.1.

Table D3.1: Licence capping summary table in EA 15 November 21 information letter reflecting the scenarios for a licence change detailed in Water Resources planning guidelines supplementary guidance - actions required to prevent deterioration (Draft), Published 15/11/2022.

Environmental scenario	Licence change
<ul style="list-style-type: none"> • flows in a water body do not support good ecological status (GWS); or • a groundwater body is at poor quantitative status; or • there is evidence that the ecology is damaged by abstraction; and • there is planned growth 	<ul style="list-style-type: none"> • cap licences at recent actual average abstraction rates
<ul style="list-style-type: none"> • flows in a water body do not support good ecological status; or • a groundwater body is at poor quantitative status; but • there is no planned growth 	<ul style="list-style-type: none"> • cap licences at maximum peak abstraction rates
<ul style="list-style-type: none"> • flows in a water body support good ecological status; or • a groundwater body is at good quantitative status; and • planned growth is likely to cause deterioration to poor status 	<ul style="list-style-type: none"> • cap licences at maximum peak abstraction rates

The WRMP supplementary guidance complements the risk-based approach used to prioritise the risk of deterioration based on forecast growth in abstraction, outlined in the section below, and therefore a profile of

potential average licence reductions, and hence deployable output reductions, has been generated to inform our planning assumptions for the WRMP24. We have also tested different licence capping profiles to inform our adaptive pathways planning.

The WRMP supplementary guidance for licence capping also includes a requirement not to assume we can take the maximum peak abstraction rates, they are for short term operational use to maintain security of supplies, not for sustained increase in abstraction. Therefore, under both licence reduction scenarios, the Environment Agency's expectation is that long term abstraction for sources would not exceed the NDB, either as an average over a period of a number of years or in some cases at all. As such for the plan we have had to make the precautionary assumption that our groundwater licences long term average deployable output is capped at NDB.

This latest EA supplementary guidance sits alongside the previous January 2018 guidance which advised water companies on a risk-based approach to managing WFD risk at our water sources. This previous guidance related to the timing of when the predicted deterioration risk could occur. The latest no deterioration guidance has led to a change in our understanding of the likelihood of abstraction licences being capped to NDB quantities.

D3.2 Development of the AMP7 WFD No Deterioration WINEP programme

We have a large AMP7 WINEP programme relating to WFD No Deterioration. In developing the programme in 2016-2018 we prioritised our groundwater sources for evaluation in AMP7 and categorised them as Adaptation, Prevent & Mitigate or Investigation sites.

- For the 42 Adaptation sources (known as Sustainability Change measures on the AMP7 WINEP) we assumed that we will make licence changes that will reflect the agreed NDB (or below, where RSA reductions are agreed). Licence changes are to be made by up front permit in 2024/25 and implementation of the new licence quantities by 2030. Catchment improvement measures linked to these sources are also being implemented in AMP7 in 11 catchments to improve the environment and mitigate any risk of deterioration (see Section D2; Environmental Measures).
- For the 24 Prevent & Mitigate sources (known as Adaptive Management measures on the AMP7 WINEP)) we undertook to carry out further evaluation and either make licence changes that will reflect the agreed NDB or identify and implement mitigation measures to prevent environmental deterioration; for WRMP19 purposes we assumed 50% of the deployable output loss between the current deployable output and the WFD NDB.
- For the 43 investigation sources we are carrying out investigations into the potential for deterioration; for WRMP19 purposes we assumed 50% of the deployable output loss between the current deployable output and the WFD NDB.

The latest EA WFD No Deterioration guidance supersedes the assumptions above made during the development of the AMP7 WINEP, the WRMP19 and the draft WRMP24. The scenario for the draft WRMP24 plan was developed between early 2021 and 2022 before the EA shared much of their guidance around expectations of licence reductions to prevent the risk of deterioration. Feedback from the EA in the consultation was that the scenario in the draft plan did not match guidance. Whilst we continue actioning the AMP7 WINEP programme (see D3.4 below), we have also altered our assumptions around the outcomes of that programme plus the proposed PR24 WINEP programme.

In this plan we have presented a conservative interpretation of the EA's no deterioration and licence capping guidance. It has been assumed that all groundwater sources in England will be reduced to the No Deterioration Baseline and the timing of that reduction is linked to the source's category, priority (A-D) and the potential whether there is growth predicted relative to 2030. The future growth estimates are based on the local authority household growth figures used in the plan and show how the increased demand anticipated from population growth and new homes could translate into local abstraction pressures. These growth projections are considered

very precautionary and are an assessment of what would happen to future abstraction if the household demand growth goes unchecked. However, at a water resource zone level it is expected the water saved through our AMP8 leakage and demand management plans will more than offset future demand growth. The consideration for growth was to inform a planning assumption for the profile of reductions in deployable output.

The investigations being completed throughout AMP7 and AMP8 may provide the evidence for an alternative outcome or redistribution of abstraction. Given the environmental setting of many of our groundwater sources, the scale of these opportunities is expected to be small and local compared to the overall reductions that may be required at zonal and company level. The final WRMP No Deterioration scenario is based on the best available data in December 2022. This is detailed further in D5.1.

For our surface water sources, the EA only classified a relatively small number as higher risk. Out of this modest number of sources there are Hands-off Flow (HoF) conditions in many of the licences. In most cases, the HoF provides appropriate protection for the environment. If the HoF is not considered an appropriate protection mechanism, then we will have already investigated the sources as part of previous Habitats Directive or Low Flows programmes. No further changes have been identified to be needed for WFD No Deterioration.

D3.3 Development of the hydro-ecology models

In AMP7 we continue to develop environmental evidence and the tools we can use to help improve our understanding of how we can achieve WFD objectives in our region. We continue to develop hydro-ecology models through collaborative projects with the Environment Agency. The models use historical and current ecology (invertebrate) data from a number of streams in part of the West Midlands originating from the Permo-Triassic sandstone. They have previously been used to assess abstraction pressure as part of the RSA investigations and have been updated during the course of our No Deterioration investigations in AMP7. Through using the models in conjunction with groundwater modelling, the hydro-ecological models now enable us to make predictions about future deterioration risk from our groundwater abstractions, where appropriate for use, and can provide an additional piece of supporting evidence to guide decision making around future abstraction.

Work is ongoing in AMP7 to extend the spatial scope coverage of the hydro-ecology model to other parts of our region influenced by the Permo-Triassic sandstone aquifers, to allow better understanding around the range of potential sustainability changes that could arise from WFD No Deterioration. A hydro-ecology model can help us optimise a solution to get the best environmental outcomes.

D3.4 Progress with AMP7 WINEP to July 2022

During the AMP7 investigation process we have further refined our approach and understanding of future predicted growth at our sources, aligning to the household growth numbers used for the WRMP24. We have also updated the allocations of waterbodies to our sources. Following the release of the new WFD No Deterioration guidance in April 2022 we are reviewing and updating our no deterioration investigation approach to bring it in line with expectations of the EA. Discussions are ongoing with the EA on the expectations and timings of the Adaptive Management (Prevent/Mitigate) and Sustainability Change (Adaptation) sources.

We completed a number of investigations in 2022. Table D3.2 summarises the final investigation outcomes.

Table D3.2: Assumptions used in the WRMP24 and the final investigation outcomes

Source	WRMP24 assumptions	Investigation outcome
Bigwell	No reduction.	Investigation agreed that no licence reduction is required for this source.
Kinsall	AMP8 deployable output at NDB for Kinsall, by 2030. AMP9 deployable output at NDB indicated for Rednal, by 2035.	Outcome of the surface water investigation is that annual limit for the Kinsall portion of the licence is to be reduced to 4.33MI/d, but with the understanding that we will operate to a 15-year average abstraction for the source at the NDB of 3.97MI/d, to come into effect by 2030. There is no licence change currently proposed for Rednal, the overall aggregate is unchanged and no change to max daily. This will be reviewed following completion of the groundwater body investigation.
Green Street	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that annual limit for the licence is to be reduced to 6.12MI/d (maximum peak abstraction), but with the understanding that we will operate to a 15-year average abstraction for the source at the NDB 5.3MI/d, the licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Lee Brockhurst	AMP8 deployable output at NDB by 2030	Revised baseline 6.25MI/d. Outcome of the surface water investigation is that annual limit is to be reduced to 7.1MI/d, but with the understanding that we will operate to a 15-year average abstraction for the source at the WFD baseline 6.25MI/d, the licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Overton Scar	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 1.8MI/d. The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Preston Brockhurst	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that annual limit is to be reduced to 1.34MI/d, but with the understanding that we will stick to a 15-year average abstraction for the source at the NDB 0.9MI/d, the licence will be varied in 2030, the licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Plemstall	Assume source deployable output reduced to NDB in AMP9, until groundwater investigation confirmed.	Surface water investigation agreed that no licence reduction required for this source due to the way the source operates and the current water body classifications. Any future planned increase in abstraction at this source would need discussion and agreement with the EA. This will be reviewed following completion of the groundwater body investigation.
Wellings	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 4.63MI/d (NDB). The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Shiffords Bridge	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 1.93MI/d (NDB). The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Stoke on Tern	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 1.2MI/d (NDB). The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.

Edgmond Bridge	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 6.81ML/d. The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Puleston Bridge	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 0.71ML/d (NDB). The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Lilleshall	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that annual abstraction for this source will be 3.6ML/d (max peak abstraction in qualifying period). Plus a condition requiring review of the abstraction against the NDB. The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Rodway	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 7.16ML/d. The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.
Woodfield	AMP8 deployable output at NDB by 2030.	Outcome of the surface water investigation is that a rolling aggregate is added for this source meaning 15 yr average will be 5.08ML/d. The licence will be varied in AMP8. This will be reviewed following completion of the groundwater body investigation.

D4 Managing the risks around WFD Deterioration

In July 2018, we shared with the Environment Agency our draft 'No Deterioration Technical Framework' that we proposed to follow in AMP7. In the document, we confirmed that our WFD No Deterioration investigations had been prioritised based on the abstraction risks.

A core aspect of our No Deterioration Framework is the annual abstraction review (AAR) process, this allows us to manage the risk of deterioration in a dynamic way. The AAR gives an update of abstraction rates across all of our sources each year. The AAR also includes a growth assessment to provide an updated forecast of growth across our supply area up to 2027 and up to 2040, this assessment will highlight the sources where abstraction is likely to increase to meet the demand and show the difference between NDB and forecast abstraction. We use this to identify any deterioration risks which aren't already being addressed.

For a number of our sources, we have also developed Source Action Plans (SAP). These SAPs provide an assessment of the WFD challenge for groups of sources, that form water supply operational control groups, and exploration of options that could be considered to solve that challenge.

Another important aspect that supports our No Deterioration Framework is environmental monitoring, which helps us measure and manage the risk of deterioration. We have developed a Monitoring Strategy; a process for prioritising environmental monitoring in accordance with the level of risk of WFD deterioration, which focuses on our Adaptation and Prevent/Mitigate sources. The monitoring strategy allows us to establish baseline conditions in relevant waterbodies; understand the sensitivity of receptors in those waterbodies to changes in groundwater abstraction; detect changes from baseline conditions; and understand the reasons for changes. It may also help understand the benefit or need for sustainability reductions and mitigation measures, as well as collect data to develop and refine our predictive tools, such as hydro-ecological models. Monitoring will help inform our Adaptive Management approach to ensuring activities are not risking WFD deterioration. Our investigation programme is supported by a bespoke monitoring programme, which is source and site specific,

aimed at filling in the data gaps to enable us to better understand the risk of deterioration. In addition, in AMP7 we are increasing the number of observation boreholes targeted at our sources, particularly those under investigation, to increase the number of sites we have for monitoring of groundwater levels across the region.

The information collated through the AAR, SAPs and monitoring work is being used in Operational Area Sustainable Abstraction Strategies (OASAS), these are being used to inform investment and operations based decision making to ensure that we are able to successfully implement our No Deterioration approach across the company. The OASAS look at our growth requirements and legislative requirements at a smaller scale than the WRMP24 and may also suggest smaller scale solutions such as those anticipated for the Prevent/Mitigate sources above (e.g. improved Instrumentation Control and Automation (ICA) and telemetry and new distribution links from sources which are more sustainable to control groups which need additional water). They will also identify the control groups within the Water Resource Zones where demand management and leakage reduction should be focussed.

D4.1 WFD No Deterioration and drought

This section summarises our review of sources of water we may call upon in drought conditions and our evaluation of the risk of no deterioration from the use of these sources.

We have followed industry best practice for drought planning purposes and our approach is summarised in our Drought Plan (DP). The programme for preparing DPs is slightly different to the WRMP process. Our current DP for period 2022-2027 is available on our website and has recently been published. Referring to our DP 2022-2027, we have measures in place to prevent or mitigate for the environmental impacts of drought actions. The raw water sources included in our DP, where we would apply for a drought permit or drought order, have an accompanying WFD assessment which appraises the risk of deterioration occurring from abstractions during drought conditions. For our groundwater sources, particularly those drawing from the Permo-Triassic aquifer, the inter-annual fluctuations arising from a drought is likely to be buffered by the storage of the aquifer.

We accept that if the emergency sources listed in our DP were to be used during a drought event, the effects of the abstraction would be compounded to those already in place under normal, average conditions within the waterbody. This may potentially lead to unsustainable abstractions in the interim within these waterbodies. We would mitigate for any long-term effects of any short-term abstraction changes using mitigation measures agreed with the Environment Agency.

While the emergency sources listed on our DP are not specifically listed on our WINEP programme, some groundwater sources are located on waterbodies that are listed on WINEP. Any compounding effects arising from the additional abstraction from the emergency sources would be considered through our WFD No Deterioration work and risk management. As an additional consideration, we have a responsibility to ensure that deterioration of waterbodies is prevented from abstraction at all our surface water and groundwater sites regardless of whether there is an entry listed in the WINEP programme.

Our DP states that for emergency sources, we will consider the need for assessments against waterbody deterioration if there was a likelihood that these sources would be required during a drought event. This is justified due to the long lead in time before we may need to use these sources. However, we will further consider within our technical WFD No Deterioration framework whether the sources most likely to be required during a drought should be investigated as part of our wider AMP8 WFD No Deterioration programme. We will continuously liaise with the Environment Agency regarding the need to undertake further work at our surface water and groundwater sources, regardless of whether they are listed in the WINEP programme.

D5 Short to medium term sustainability reduction assumptions

D5.1 Groundwater source deployable output scenarios

We have a large WINEP programme in AMP7 and AMP8 relating to RSA implementation actions and WFD No Deterioration risks which range from certain licence changes for the Adaptation sources (sustainability changes) to uncertain licence changes for the Investigation & Options Appraisal and Prevent & Mitigate sources.

For the draft plan three WINEP scenarios were developed:

- **Low DO impact (High DO):** The lowest impact scenario included RSA implementation and Adaptation WFD No Det sources being taken down to the WFD baseline volumes or below - certain for implementation by 2030.
- **Medium DO impact (Medium DO):** The medium scenario assumed an additional licence reduction at the investigation and prevent mitigate sources (50% of the gap between groundwater average deployable output (ADO) and NDB volumes) - assuming implementation by 2030. This was used as a planning assumption. The distribution of the impact and timing of any sustainability reduction will be modified once AMP7 WINEP evaluation has been undertaken for both the investigation & options appraisal and the prevent/mitigate at risk sources.
- **High DO impact (Low DO):** The highest impact would take all at risk sources down to the WFD baseline volume - assumes 2040 implementation. These were conservative assumptions based on the latest EA licence capping guidance. Unless we have confirmed licence changes/reductions with the EA via the WINEP, these are planning assumptions and subject to modification taking into account source specific evidence.
- **Groundwater sources that are not included in the current AMP7 WINEP:** For WRMP24 planning purposes, those sources that were at a lower risk of deterioration, we assumed a potential loss of 50% of the difference between our current DO and NDB volumes by 2030 for the central best estimate for all sources in this category. We assumed precautionary assumptions applying an average licence reduction to NDB by 2040.

Following the release of the licence capping guidance by the EA in November 21 and April 22, and feedback on the pre consultation of the regional plan in Jan 22, we assumed the High DO impact scenario in our draft plan as a precautionary approach at this time.

However we recognised that the approach taken in the draft plan was not cognisant with evolving guidance from the EA. Rather than running scenarios that had different approaches to the final DO it was agreed for the plan that the conservative assumption of all sources being reduced to NDB would be adopted.

The PR24 guidance indicated that the EA expected implementation before 2040. Three new scenarios were developed with different reduction profiles split between 2030 and 2035 linking the timing of reductions to the source's AMP7 WRMP category, prioritisation group and the timing of predicted growth above the NDB relative to 2030.

Adaptation sources: The approach taken for Adaptation sources was the same across all three scenarios. Sources included in the AMP6 RSA linked sustainability changes below the NDB, the volume of reductions for sources was based on the agreed Options Appraisal Notional Solutions. The distribution of these reductions had not been confirmed with the EA in AMP7 so the same assumptions were used as in PR19. Other Adaptation sources were taken down to the NDB volumes by 2030.

Other sources: For the remaining sources (Prevent Mitigate/Investigation), the three scenarios were:

- **Scenario 1: 2030/2035 split**
 - Prevent Mitigate sources and Investigation Priority A & B: NDB in 2030
 - Investigation Priority C & D: NDB in 2035.
- **Scenario 2:** All sources reduced to NDB in 2030.
- **Scenario 3: Alternative 2030/2035 split**
 - Prevent Mitigate: 2030 or 2035 depending on whether growth above NDB was predicted before 2030 (used the 2027 Annual Abstraction Review future predicted value as a proxy for 2030)
 - Investigation Priority A: 2030
 - Investigation Priority B: 2030 or 2035 depending on whether growth above NDB was predicted before 2030 (used the 2027 Annual Abstraction Review future predicted value as a proxy for 2030)
 - Investigation Priority C & D: 2035

Scenario 3 has been taken forwards as the No Deterioration scenario to be used in the plan. Unless we have confirmed licence changes/reductions with the EA via the WINEP, these are a planning assumption and subject to modification taking into account source specific evidence.

There are exceptions to these planning assumptions for a handful of specific sites, for example Plemstall and Big Well where the AMP7 investigation has been completed and agreement reached with the EA that capping to NDB is not necessary.

D5.2 Surface water licence changes

In addition, in all scenarios there are RSA implementation schemes on surface water sources included in the Aquator model outputs:

- The River Dove Egginton hands off flow (2030)
- Cropston and Swithland reservoir compensation changes (2024 – 2028)
- Ashop, Noe and Jagers Clough flow changes (2024-2028)
- Tittesworth Compensation / Deep Hayes

These surface water reductions have been included in the Aquator water resource modelling for 2030.

D5.3 Early WRZ source level deployable output reductions

For the shorter term regulatory requirements, we have included assumptions around our AMP7 WINEP programme and precautionary assumptions based on the latest EA WFD No deterioration guidance relating to licence capping. Unless we have confirmed licence changes/reductions with the EA via the WINEP, these are planning assumptions and subject to modification taking into account source specific evidence.

Table D5.1 summarises the sum of the groundwater source deployable output reductions by WRZ used as inputs to the Aquator water resource model or for smaller zones, directly into the data tables. Section D7 summaries the Aquator water resource model runs and what has been included in the baseline data tables.

Table 5.1: Summary of groundwater source DO reductions by WRZ for early regulatory needs (MI/d) (pre Aquator modelling)

Water Resource Zone	Total DO losses 2030	Total DO losses 2035	DO loss due to WFD improvement and licence Capping for No Det
Bishops Castle	0	-1.4	-1.4
Chester	0	-0.08	-0.08
Forest and Stroud	-1.54	-0.7	-2.24
Kinsall	-1.03	-0.28	-1.31
Mardy	-0.74	0	-0.74
Newark	-2.47	0	-2.47
Notts	-69.71	-1.8	-71.51
North Staffs	-20.57	-19.76	-40.33
Ruyton	0	-0.78	-0.78
Strategic Grid	-14.87	-11.23	-26.1
Shelton	-29.36	-7.74	-37.1
Staffs	-0.3	-2.52	-2.82
Wolves	-3.51	-2.33	-5.84
Whitchurch and Wem	-3.78	0	-3.78
Total	-147.88	-48.62	-196.5

D6 Longer term Environmental Destination methodology

As outlined in section D1 in 2020 the EA published their National Framework (NF) for Water Resources and Appendix 4 of the National Framework presents potential future abstraction licence reduction scenarios in the face of potential growth and dry climate change impacts.

This section describes the EA NF scenarios and the methodology used to translate the EA NF scenarios into source level Deployable Output numbers for scenarios to either input into Aquator water resource model or directly into the WRMP24 supply demand balance tables and adaptive planning scenario analysis. These scenarios support the development of our WRMP24 and the Water Resources West (WRW) regional plan.

D6.1 Environment Agency Scenarios 2020

The Environment Agency (EA) has undertaken a national catchment data exercise using their Water Resources Geographical Information System (WRGIS) water resource models to identify waterbodies that may not meet their environmental flow targets by 2050, taking into account the impacts of climate change on natural river flows.

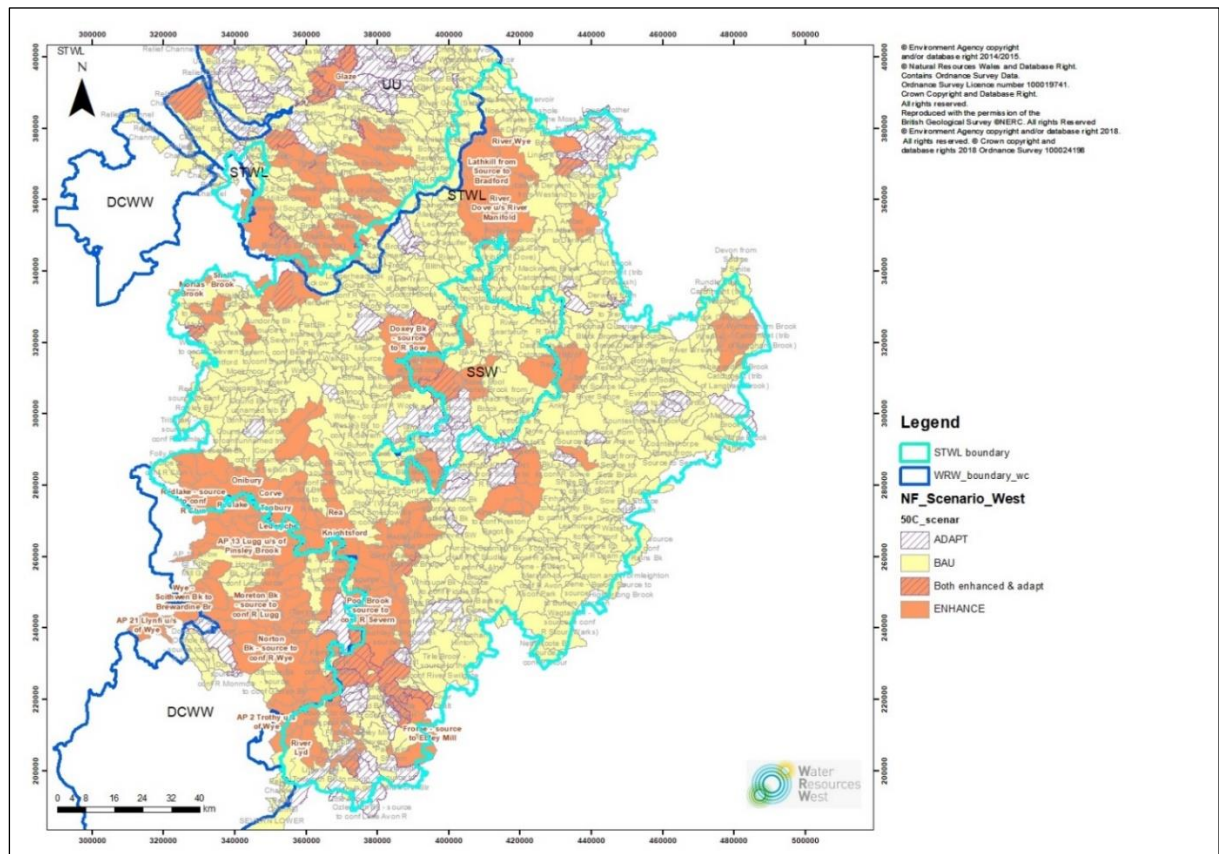
To help develop the long-term environmental destination, the EA developed scenarios exploring the impacts of the potential abstraction recovery required to achieve different levels of environmental protection. The figures quoted are based on the presentation output from the WebEx1 held on the 23 April which presents differing numbers from that included in the Appendix 4 of the National Framework document:

- 2050 BAU (business-as-usual) scenario (the minimum expected). This identifies 380MI/d of abstraction reduction for water companies in WRW in order to meet the Environmental Flow Indicator (EFI). This

volume excludes NRW. EFI is a high level, desk-based tool and should only be used as a screening tool rather than to set the flow target itself; better information (e.g. site specific) and understanding is needed on how to set appropriate flow targets. The EA have stated that we must use this scenario as a minimum in our WRMP24. This excludes WFD uneconomic waterbodies

- 2050 Enhance scenario. This identifies 423MI/d of abstraction reduction for water companies in WRW. This volume excludes NRW. The Enhance scenario gives greater protection for Special Areas of Conservation (SACs) by applying the CSMG (Common Standards Monitoring Guidance) targets which are tighter than EFI. The EA have stated that we should use this scenario to target action in protected areas and Principal Salmon Rivers.
- Adapt scenario. This scenario accepts that we may not be able to achieve the Enhance scenario with a shifting climate meaning a lower standard of compliance in non-WR HMWB (non-water resources heavily modified water bodies, HMWB, i.e. not reservoirs). As this relates to non-water resources HMWB it is not particularly relevant to STWL and we have not utilised it. We have not been provided with the abstraction impact numbers for this scenario.
- Combined scenario. This scenario combines BAU/Enhance/Adapt and specifies which scenario the EA have used for each waterbody. Where a waterbody is both Enhanced and Adapt the EA has taken the precautionary approach and used the Enhance scenario. We have not been provided with the abstraction impact numbers for this scenario.

Figure D6.1: Distribution of BAU, Adapt, Enhanced and Enhanced/Adapt waterbodies within WRW region, with specific focus on Severn Trent region.



For both the BAU and Enhance scenarios, the EA have assessed Future Potential (based on recent actual abstraction rates uplifted for growth) and Fully Licensed (assumes licences will be used to their full volumetric limits) abstraction rates.

The slides below (figures D6.2 & D6.3) are taken from the EA workshop on 23rd April 2020 (200423 Environment ambition WebEx Workshop 1.pdf) and give the total reductions by sector for each region. Note that these differ significantly from the equivalent figures in Appendix 4 of the National Framework (Appendix_4_Longer_term_environmental_water_needs.pdf). These slides are more recent than Appendix 4 which was published on 31st March 2020 and the slides are therefore assumed to be correct.

There is an expectation that water companies will plan for abstraction reductions above and beyond those required in the WINEP, with the aim of meeting environmental flow requirements in all waterbodies. Other types of measures to achieve the ambition and make catchments more resilient should also be considered.

Short (<5 years), medium (5-15 years) and long term (>15 years) priorities need to be identified to achieve the environmental destination and can include investigations, licence changes and other actions. This will then feed into the decision-making process to determine what is taken forward at this time taking into account the decision making criteria and affordability.

Figure D6.2: EA slides summarising the NF scenario data – Business as usual scenario

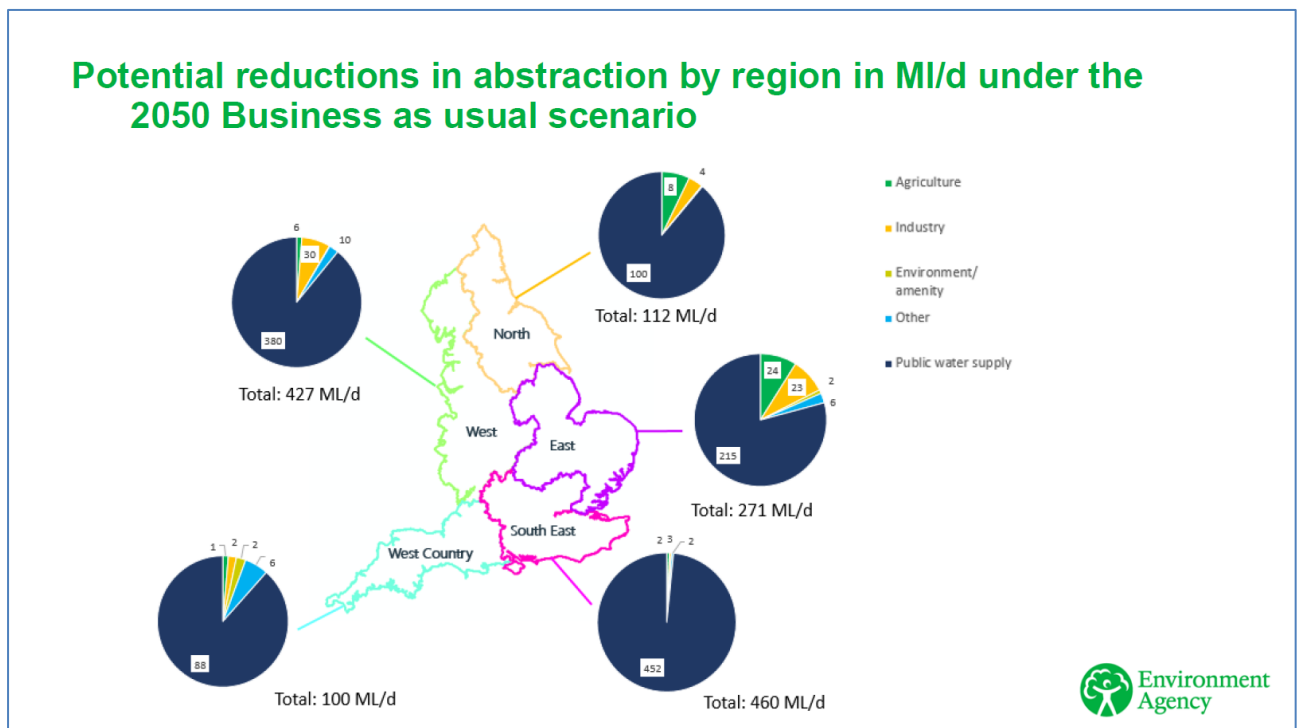
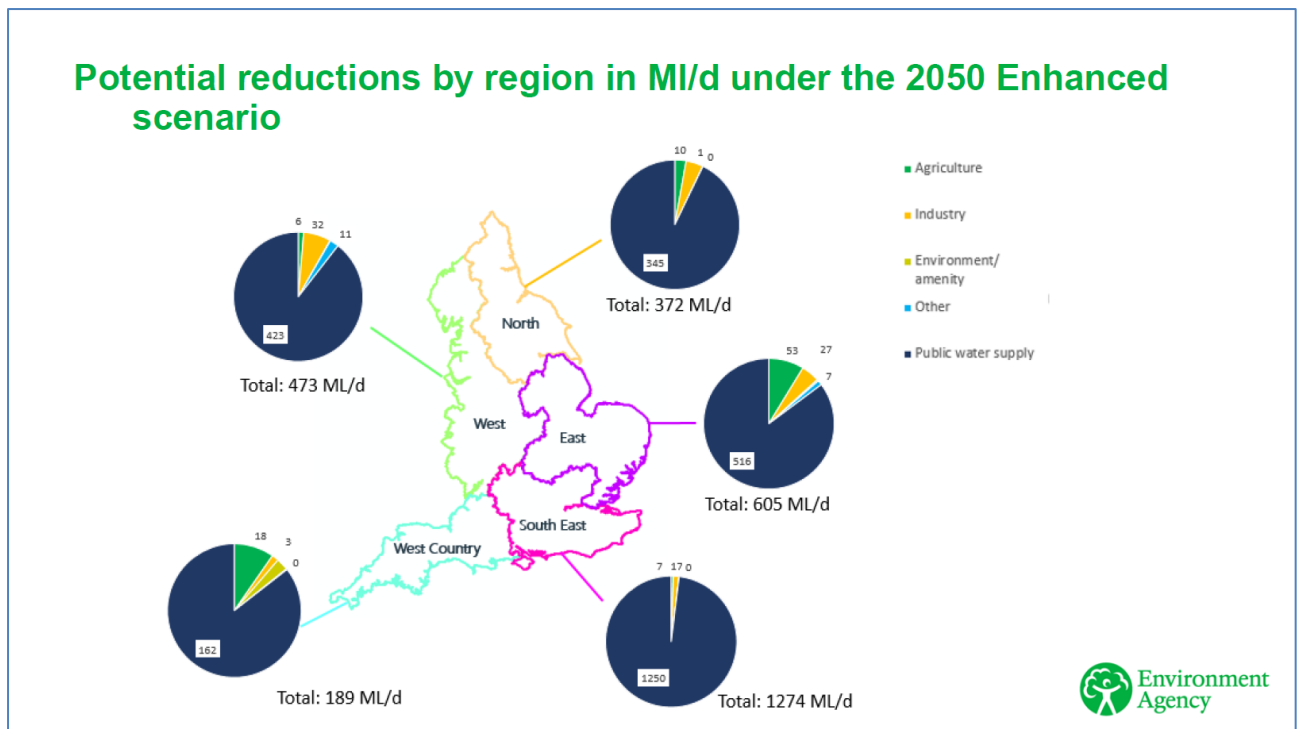


Figure D6.3: EA slides summarising the NF scenario data – Enhanced scenario



We consider that there are a range of uncertainties associated with the EA’s method including:

- It is based on achieving the EFI (Environmental Flow Indicator), which is a useful screening tool, and may not take into account local evidence of the flows required to support the ecology.
- The factors used in WRGIS for groundwater sources to surface water bodies are approximations and would require detailed evaluation to inform any abstraction licence change.
- It is based on achieving CSMG targets in Enhance catchments, but these targets may not yet have been formally agreed.
- It uses UKCP09 climate change scenario (not UKCP18) and only uses one ensemble member (AFIXK) which is one of two driest ensemble members.
- To determine the Future Predicted scenario the EA have used growth factors (based on difference in distribution input between 2020/21 and 2044/45) from our revised dWRMP19. The EA’s approach allows Future Predicted abstraction to exceed Fully Licensed due to growth, but this would not be allowed if there is any concern over the environmental impact. Future Predicted was based on recent actual abstraction rates (using the 2010-15 period which is now 5 years out of date) uplifted for growth.
- 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.
- The abstraction licence and recent actual data in the WRGIS is not up to date.
- It is unclear what has and has not been included in the EA’s 2025 baseline analysis.

Although there is considerable uncertainty, these scenarios are the best tool we have available to explore the potential future challenges for the environment and abstraction impacts at this time.

D6.2 Scenarios included in the WRMP24

In order to inform regional planning as part of WRW and WRMP24, we are required to assess and quantify impacts of potential abstraction licence changes on our sources. The Environment Agency’s Water Resource Planning supplementary note, 2020 (Environmental Destination guidance) outline how we should review the National Framework environmental scenarios data to explore how different levels of environmental protection affect potential abstraction changes; this should be used as a guide to inform decisions on the longer-term destination. Consideration is to be given to use of additional information or local evidence to interpret these. We should use the scenarios to consider catchments at risk of not meeting environmental objectives in the future due to abstraction pressures.

The National Framework scenario data has been used to inform a view of potential future abstraction licence changes in the longer term. This work will contribute to the development of an adaptive plan for Environmental Destination. It is noted that this is a very high-level assessment and that our view is that a 5 to 10 year investigation and options appraisal programme is needed to gather evidence, develop a full range of appropriate solutions and assess the cost and benefit of any potential changes.


We received feedback on the consultation that was held on the pre-draft WRW regional plan in January 2022. In addition, we have been receiving further guidance in the form of presentations and documents. The latest clarification, which we are using in our plan was shared on the 3 May 22 (20220503 Response to regional group paper_final.doc) and included clarification from both the EA and Ofwat. Key paragraphs are presented below.

“The BAU+ locally verified scenario uses existing policy and regulatory approaches now and in the future. It includes everything under which Environment Agency’s policy and regulatory commitments remains the same. It also includes applying Common Standards Monitoring Guidance (CSMG) flow targets at European designated riverine sites by 2050 at the latest. These targets were defined by Natural England in 2014 and therefore it is appropriate to account for these in long term planning. Locally verified refers to the analysis that regional groups have done to refine the scenario data developed at national scale by the Environment Agency for the National Framework. This incorporates the discussions held locally with stakeholders and regulators plus work that has already happened or is in progress to ensure the right level of protection and enhancement is being applied.”

Figure D6.4 shows the differences between the scenarios.

Figure D6.4 – EA table summarising the Environment destination scenarios, the arrow indicating which should be utilised as a minimum

Environment Agency Scenario	Supports Good Status (WFD) by 2027	Supports Good Status (WFD) by 2050	CSMG met for Protected Areas (European sites)	CSMG Met for SSSI's	Enhanced Abstraction Sensitivity Banding for Chalk	Enhanced Abstraction Sensitivity Band for Salmon
2025 Baseline (current planned action)	Yes	No	No	No	No	No
2050 Business as Usual (BAU)	Yes	Yes	No	No	No	No
2050 BAU+	Yes	Yes	Yes	No	No	No
2050 Enhanced	Yes	Yes	Yes	Yes	Yes	Yes
2050 Locally enhanced	Enhanced plus additional priorities					



“BAU+ locally verified is the minimum requirement, however, this does not limit regional groups and water companies from developing a higher level of protection and enhancement for the environment and seeking enhanced scenario.”

Further clarification has also been provided relating to the scenarios that OFWAT require to be considered in the WRMP24.

“2.2 Compatibility of the Environment Agency’s position on BAU+ with the Ofwat’s Common Reference Scenario

Ofwat, in its guidance for Long Term Delivery Strategies at PR24, complements the work and desire of the environment destination. While the Environment Agency has set out that the BAU+ locally verified scenario should be used in planning, the local verification element means that changes could be different, and potentially lower, than those included in the original BAU scenario. **Local verification, and therefore long-term clarity on the changes required to abstraction, will take time, require evidence and will not be fully understood until after the completion of investigations between 2025 and 2030.** For this reason, it is important that the Ofwat common reference scenarios both high and low set out an envelope and mark the boundaries of potential changes in each direction. Companies will then test the long-term delivery strategy against both high and low scenarios to demonstrate its robustness to each potential future.

The Ofwat common reference scenarios include a **high scenario (which is based on the Environment Agency’s enhanced) and a low scenario which is 'currently known legal requirements'**. The latter is being applied in the regional plan reconciliation process using the Environment Agency EA's national framework BAU+, then using local review to take out proposed licence changes with significant associated uncertainty. All these scenarios should include agreed WINEP changes and licence capping. BAU+ as the most likely scenario would fit between the high and the low. The approaches are therefore compatible, being based on common scenarios and representing a plausible range of changes. “

Abstraction changes in the medium term relate to the current AMP7 WINEP programme and the latest EA licence capping guidance.

A summary of the scenarios being generated that are explicitly reported in the plan are summarised in Table D6.1:

Table D6.1 Water Resources Plan 24 scenario summary

Enhanced	BAU+		Plausible Low
Min to be included in the WRMP24 baseline tables			
OFWAT high	+	BAU	OFWAT low
Used EA Waterbody Abstraction Tool (WAT) Outputs reviewed by water co’s, adjustments made	Review European sites and associated licences – identify if additional reductions needed	Used EA Waterbody Abstraction Tool (WAT) Outputs reviewed by water co’s, adjustments made	Start with baseline scenario (BAU+) and use local reviews to remove abstractions with significant uncertainty about whether the reduction is needed
Early reductions to include WINEP and licence capping guidance sustainability reductions (outlined in sections D2 to D5)			

The methodology we have used for the assessment of the longer-term potential abstraction impacts for the Plan is described in the sections below.

D6.3 Choice of scenario for our plan

In the WRW emerging plan WRW, incorporating our thinking, set out a journey for an Enhanced environmental destination for our region but highlighted the uncertainty in the evaluation and included both the medium and longer term potential abstraction reduction impacts in scenario analysis to inform an adaptive plan rather than include it in or base plan.

We have gathered information, via a number of forums, on views of our stakeholders and customers. While these do not represent a statistical survey for our supply area, they are important feedback for us along with the views of our regulators. Table D6.2 provides a high-level summary of the feedback from key forums where we specifically asked for views relating to Environmental Destination. Appendix I describes our stakeholder and customer engagement in more detail.

Stakeholders are for the most part supporting an Enhanced destination. Customers were supportive but saying we need to consider the cost to customers.

For us, as a whole the, BAU+ and the Enhanced scenarios are very similar. The volume of water being protected in the scenarios where there were designated sites or species are already high in the BAU+ scenarios so additional water for Enhanced protection is relatively small in the EA NF assessment. The areas where a potential need for Enhanced protection include Nottinghamshire (mostly the Idle catchment) in the east (~20Ml/d), Shropshire in the west (~6Ml/d) with small differentiations (~1Ml/d) in some other areas.

Table D6.2: High level summary view of stakeholder feedback on the level of ambition for WRW and STW.

Forum	View on level of Environmental Destination
WRW pre-consultation plan stakeholder workshop voting , Jan – Feb 2022	79% supported Enhanced, 15% BAU and 6% current regulations
Written consultation responses to WRW pre-consultation plan, Feb 2022	Stakeholders overall supporting an Enhanced destination
Written consultation responses	Stakeholders overall supporting an Enhanced destination
Deliberative research on strategic priorities, drought resilience and approach to the environmental destination (November 2021)	Views were initially mixed on which level of the ED they preferred, with the lowest level of ambition being least preferred. For those selecting level 1, cost is the main reason, as well as the balance with other challenges Severn Trent is facing. Level 2 was felt to be a middle ground, balanced and proportionate. Level 3 was felt to be required by some to address an urgent problem. When presenting more information on the trade offs involved including the wider environmental impact of new water sources around 1/3 of participants changes their view, with a mix of those selecting a lower level (influenced by the need to balance cost, the environment and carbon) and those choosing a higher level, reflecting the importance of the local environment.
Reconvened deliberative research on the environmental destination (May 2022)	We presented two possible approaches to tackling the environmental destination – an adaptive planning approach which included statutory investment in AMP8 as well as extensive investigations compared to more extensive investment in AMP8. With concern over the cost of living having risen since the initial research in November 22 we find a preference for the adaptive approach.
Quantitative research on the environmental destination and compulsory metering (May 2022)	Representative quantitative research with 1,000 customers including the bill impacts of the environmental destination. More customers (45%) support the adaptive approach compared to more extensive investment up front (42%) with 13% unsure. Reasons for supporting doing extensive investment now centre about doing the best for the future and the environment now and avoiding uncertainty, whilst those who support the adaptive approach focused on the benefit of doing investigations.
Meeting with NFU	Supportive of the need to manage abstraction but in a way that supports all abstractors. NFU and members would like to work more closely with us on alternative options / share water resources to mitigate any reductions.
dWRMP consultation feedback	Support for our plan but an increased pace of delivery required. The need for partnership working and holistic approaches.

For the WRMP24 we have used the BAU+ scenario in our baseline plan and are using the High (Enhanced) and low scenarios to develop an adaptive plan. We have not used the Enhanced scenario in our preferred plan as we consider the differentiation small (29MI/d ~6%) and outweighed by other uncertainties in the assessment at this time. The Idle catchment has the largest differentiation between the BAU and Enhanced reductions (~20MI/d) and this catchment has been prioritised for early investigation to understand the needs of this catchment. We consider the BAU+ scenario to represent a high ambition for the water resources in our region. More detailed investigations proposed for AMP8 will reduce the uncertainty and allow more detailed evaluation of the designated features for our region.

By 2050 the BAU+ deployable output reductions increase to a total of c.418MI/d. Measuring progress against the STW BAU+ environmental scenario deployable output reductions our plan presents ~40% of the reductions by 2040. The remaining ~60% of the reductions are planned between 2040 and 2050. We have tested multiple scenarios that would accommodate changes by 2050. Taking on board the stakeholder consultation on our dWRMP, we have proposed further reductions in our fWRMP prior to 2050 where feasible, however there is considerable uncertainty around this later programme and we are proposing to undertake a large AMP8 WINEP investigation and options appraisal programme to refine the plan.

We have developed a low scenario where we have removed or reduced the reductions that have higher uncertainty to test the plan against a lower scenario and build an adaptive plan.

D6.4 Methodology for development of the BAU and Enhanced scenarios

Waterbody Abstraction Tool analysis

The EA provided a copy of their Waterbody Abstraction Tool (WAT) to regional groups to aid analysis of the Environmental Destination scenarios and allow local review and refinement. This tool can be utilised to run the original NF scenarios outlined above. For the plan we commissioned Mott MacDonald to utilise an adapted version of the EA Waterbody Abstraction Tool (WAT) to generate source level licence reductions for the EA scenarios. These scenarios included Enhanced, (BAU+), BAU, Adapt and Combined. This is an automated process with set decision criteria and is useful to evaluate the potential scale of reductions, however, it is not suitable to make decision for individual sources. We have used data from the Enhanced and BAU scenario to develop the scenarios to include in our plan. We reviewed the data for its groundwater sources and provided some revised input data to:

- Ensure group licences were apportioned appropriately across sources in the group, taking into account any sources that were non-operational.
- Applied a few corrections to annual licences.
- Provided recent actual data that aligned with WRMP24 Medium WINEP scenarios for potential licence reductions.
- Set growth factors to 0 for our groundwater sources. There were a mixture of negative and positive growth factors in the WAT data. We will manage the groundwater sources to ensure no deterioration so no growth has been assumed.

D6.5 Our review of Waterbody Abstraction Tool outputs

We undertook a review of the PWS source reductions provided by Mott MacDonald. A high-level summary of the review has been shared with the Environment Agency.

Surface water abstractions

The surface licences in each ledger were reviewed separately from the groundwater sources to determine the likelihood that the National Framework reductions included changes to surface water licence. In most cases the working assumption is that they have not, based on the assumptions the EA have stated in the National Framework. The assumptions included screening out if they were a reservoir (RESRVRFLAG), level dependant (LDMU), a lake (LAK), or have a Q95 hands off flow (Q95HF); these reasons were explicitly flagged in the National Framework sheets. The methodology also indicated that they also screened our water bodies where upstream support was "COMPLEX support > SWABS impacts, these were not explicitly flagged in the data, but a view was taken that where support by regulation, such as the River Severn Abstractions, this applied to those abstraction points. The exception is made where 1) the scale of reductions appears to be significantly larger than can be accounted for by groundwater alone and 2) the surface water licences in the ledger have a Q95 WR impact that is non-negligible.

The Dove catchment was the only instance in which there is clear evidence that the original National Framework reduction has a large surface water component. This is due to the Egginton licence, the current HOF for which is set to protect Q98 rather than Q95, so a change in HOF is included in the EA scenarios. Due to the location near the bottom of the catchment and taking into account recent investigations which indicate that the ecology is not significantly impacted by the current hands-off flow, this has not been included in our assessment for our WRMP24. This assumption was shared with the EA in Aug 21 (email 10/8/21). The lower HoF (90MI/d), which can be used in certain reservoir conditions (but we have not used for many years) has not been investigated - however the abstraction licence was varied in 2020 to remove this lower HoF in 2030 (this will reduce environmental risk in future if flows drop below 159 HoF).

We also reviewed the conditions we have on our surface water licences and the planned licence changes we have agreed to implement with the EA. We concluded that the surface water abstractions already contained environmental protection and not further changes have been assumed.

A summary table of the PWS surface water abstractions has been prepared in response to a request from the EA in the dWRMP consultation response. This is summarised in Table D6.3.

Table D6.3: Summary of public water supply surface water abstraction licences where no licence reductions have been applied.

<u>Surface water abstraction</u>	<u>Licence number</u>	<u>Source type</u>	<u>Reason for exclusion from Environmental Destination licence reduction scenarios</u>
Ambergate	03/28/40/0121	River	HoF/ licence conditions providing environmental protection
Bamford / Derwent / Howden	03/28/38/0018	Reservoir	HoF/ licence conditions providing environmental protection
Church Wilne - Draycott	03/28/44/0006	River	HoF/ licence conditions providing environmental protection
Homesford	03/28/40/0059	River (sough)	HoF/ licence conditions providing environmental protection
Jaggers Clough	03/28/38/0018	River	HoF/ licence conditions providing environmental protection
Ladybower	03/28/38/0018	Reservoir	Excluded (Reservoir)
Little Eaton	03/28/46/0007	River	HoF/ licence conditions providing environmental protection
Ogston	03/28/41/0025	Reservoir	Excluded (Reservoir)
River Ashop / River Noe	03/28/38/0018	River	HoF/ licence conditions providing environmental protection
Spondon River /R Derwent (Alvaston)	03/28/48/0036	River	HoF/ licence conditions providing environmental protection
Carsington	03/28/29/0064	Reservoir	Excluded (Reservoir)
Egginton	03/28/35/0005	River	HoF/ licence conditions providing environmental protection. See main text for further information.
Tittesworth	03/28/30/0124	Reservoir	Excluded (Reservoir)
Foremark	03/28/36/0148	Reservoir	Excluded (Reservoir)
Shardlow	03/28/36/0173/1/R01	River Trent	HoF/ licence conditions providing environmental protection
Staunton Harold	03/28/36/0147	Reservoir	Excluded (Reservoir)
Chelmarsh	18/54/02/0164	Reservoir	Excluded (supported by River Severn regulation)
Hampton Loade	18/54/02/0163	River	Excluded (supported by River Severn regulation)

Mythe	18/54/08/0165	River	Excluded (supported by River Severn regulation)
New Barnes Farm /Lickhill	MD/054/0002/031	River	Excluded (Q95 HOF, Severn Regulation)
Ripple / Upton	18/54/08/0101	River	Excluded (supported by River Severn regulation)
Shelton Roughts	18/54/02/0020	River	Excluded (supported by River Severn regulation)
Trimpley	18/54/02/0110	Reservoir	Excluded (supported by River Severn regulation)
Witcombe Brook	18/54/20/0116	Reservoir	Not used for PWS (listed in Drought Plan as emergency drought source)
Anstey	03/28/56/0030	River	Excluded (Reservoir transfer)
Blackbrook	03/28/57/0062	Reservoir	Excluded (Reservoir)
Cropston & Swithland	03/28/57/0063	Reservoir	Excluded (Reservoir)
Whitacre-Blythe	03/28/11/0069	River	The gravity fed abstraction has a HoF/ licence conditions providing environmental protection. For the pumped intake, the introduction of a 5ml/d HoF was investigated in AMP6 - it was concluded that it was not required as flow backs up from Cole and allows fish passage.
Whitacre-Bourne	03/28/11/0069	River	HoF/ licence conditions providing environmental protection
Brownsover Mill	18/54/10/0072	River	HoF/ licence conditions providing environmental protection
Eathorpe	18/54/12/0094	River	HoF/ licence conditions providing environmental protection
Willes Meadow	18/54/12/0053	River	HoF/ prescribed flow condition providing environmental protection
Stanford	18/54/10/0071	Reservoir	Excluded (Reservoir)
River Wye at Mitcheldean	19/55/18/0375	River Wye	HoF/ licence conditions providing environmental protection

HOF = Hands off flow

Reductions taken forwards

For the most part the groundwater reductions have been taken forwards for the operational sources at this time. Some overrides have been applied in the BAU and Enhanced scenario as follows:

- Screened out surface water abstraction reductions for abstractions with HOF, complex river support or HMWB measures (assessment undertaken on original National Framework dataset and summarised above);
- Tame Anker and Mease / SG WRZ: No reduction on Edgbaston as it is in the wrong ledger area in the EA's WRGIS;
- Worcestershire Middle Severn / SG WRZ: A quarter of the licence reductions has been assumed for the Bromsgrove sources that were set to 0, to prevent urban flooding, assume would increase compensation support (Burcot, Wildmoor and Sugarbrook). Reductions reduced by 15.84MI/d.

European Protected sites review

As outlined above there is a requirement, from the EA for England, to include a + element to the BAU scenario.

“It also includes applying Common Standards Monitoring Guidance (CSMG) flow targets at European designated riverine sites by 2050 at the latest.”

We have undertaken a review comprising the following steps:

- Mapped up the location of our abstractions in relation to European designated riverine sites for our region. Identified sources that could potentially impact these sites
- Reviewed the NE CSMG guidance for rivers (<https://data.jncc.gov.uk/data/1b15dd18-48e3-4479-a168-79789216bc3d/CSM-Rivers-2016-r.pdf>)
- Reviewed the NE catchment specific documents “Moving towards common monitoring guidance targets”
- Expert view discussion in STW’s Hydrology team

For us most European designated riverine sites relate to regulated rivers and a range of abstractors benefit from these rivers. Abstraction and flow is very complex and requires modelling to get to a target and solution. We will need to discuss with regulators if the existing habitats directive reviews provide the required protection. Based on the review we are not including any additional reductions but we need to take the summary of the review to our English environmental regulators EA and NE. The review is summarised in Table D6.4.

Table D6.4: Summary of Riverine SAC review relating to STW abstractions

SAC/SPA	Abstractions	BAU+ scenario
Severn Estuary	River Severn surface water abstractions. Regulated river. Extensive modelling, multi abstractors (PWS and Non PWS) for review of consents	No additional reductions included
Humber Estuary	River Trent catchment abstractions STW abstractions covered already in downstream HoF	No additional reductions included
River Dee	Regulated river, multi abstractors (PWS and Non PWS)	No additional reductions included
River Wye	Looked at individual CMSG targets for this river – these were developed after review of consents and targets seem to align with RoC	No additional reductions included
Peak District Dales Rivers (Derwent R Wye and upper R Dove)	No STW abstraction in this area – a few long disused sources to be considered for revocation.	No additional reductions included
River Meace	No abstraction close to river – STW is undertaking a project to relocate STW discharges.	No additional reductions included
R Clun/ R. Teme	Riverine SAC where STW has limited information on flows. Severn Trent have 1 small groundwater source (Clungunford) located upstream of site, this does not have HoF or other conditions on the licence. However, CMSG targets doc for 2014 comment from EA states The Clun and Upper Teme are considered fairly natural, there are no known large abstractions or discharges in that catchment. No existing investigation for the Clungunford source to determine if the abstraction is impacting or CMSG targets are being met.	No additional reductions included DCWW have been investigating their Leintwardine source in the AMP7 WINEP for this catchment.

D6.5.1 Ofwat low scenario

On the 3 May the EA and OFWAT clarified their definition of the OFWAT low scenario.

“low scenario which is 'currently known legal requirements'. The latter is being applied in the regional plan reconciliation process using the Environment Agency EA's national framework BAU+, then using local review to take out proposed licence changes with significant associated uncertainty. All these scenarios should include agreed WINEP changes and licence capping.”

There is considerable uncertainty in the longer-term National Framework scenarios as outlined above. Other factors may limit the resilience of the water environment e.g. water quality related pressures, flood defence measures etc.

This aside this data is the best current information for regional groups to be using to develop scenarios relating to potential abstraction reductions in the longer term to protect the environment in a changing climate. To this end a range of scenarios are being considered in the company and regional WRMPs.

WRW has considered how to define and evaluate uncertainty to generate an OFWAT low scenario. The timing of the guidance on the OFWAT low has resulted in the development of a methodology that could be implemented to inform the interregional reconciliation underway in May 2022. In developing the low scenario, consideration was given to the 'Adapt' waterbodies in the water company review stage. For our area there is little difference between the BAU and Adapt licence reduction scenarios and further catchment/water body investigation is needed and proposed in our AMP8 WINEP.

It should be noted that we are seeking a plausible low scenario so we can test a range of scenarios in the regional plan. Some fairly conservative assumptions have therefore been made in order to achieve a differentiation between the low and the BAU+ scenario. We have applied the WRW methodology to the PWS abstractions.

Ofwat low methodology summary

A number of data sources and principals have been utilised to generate the OFWAT low scenario. This section describes the data sources and the methodology that was developed through WRW to ensure a consistent framework across all water companies in the WRW region.

The Waterbody Abstraction Tool

The EA Waterbody Abstraction Tool (WAT) has been used to generate 2050 scenario abstraction reductions, assuming abstraction is the sole action to deliver environmental destination. This tool uses Environmental Flow Indicator (EFI) flow targets to then calculate abstraction reductions needed to achieve the flow target. These reductions are calculated for both PWS and non-PWS abstractions.

The Environmental Flow Indicator

The Environmental Flow Indicator (EFI) has been developed by the EA as a national screening tool to determine the amount of flows required to support the environment (good WFD status) and is used as the initial step in the development of abstraction management policy for England. Within its evaluation methodology the EA acknowledge uncertainty in the assessment. A description of this uncertainty is summarised here (Source EA Environmental Flow Indicator paper Jan 2013):

“The EFI is used in the hydrological classification for WFD to identify the water bodies where reduced river flows may be causing or contributing to a failure of good ecological status. This is called the compliance assessment. Compliance has been assessed at low flows (Q95) using recent actual scenario.

The compliance assessment shows where specific scenario flows are below the EFI, and indicates by how much. This is used to identify areas where flows may not be supporting good ecological status and target further investigation of what measures are needed to achieve good ecological status.

The degree of non-compliance has been split into three compliance bands, each band indicating the certainty that flow conditions do not support good ecological status. The compliance bands help to prioritise action where the abstraction pressure, and therefore the risk of not supporting good ecological status are greatest. The percentage below natural flow for each compliance band is shown in Table 3.”

Figure D6.5: EA Table 3 in the EA Environmental Flow Indicator paper Jan 2013

	Flow adequate to support GES	Flow not adequate to support GES: Low to Moderate Confidence (uncertain)		Not adequate to support GES: High Confidence (quite certain)
Abstraction Sensitivity Band	<i>Compliant with EFI</i>	<i>Non-compliant Band 1</i> (up to 25% below the EFI at Q95)	<i>Non-compliant Band 2</i> (25-50% below the EFI at Q95)	<i>Non-compliant Band 3</i> (up to 50% below the EFI at Q95)
ASB3. high sensitivity	<10%	<35%	<60%	>60%
ASB2. moderate sensitivity	<15%	<40%	<65%	>65%
ASB1. low sensitivity	<20%	<45%	<70%	>70%

Table 3: The percentage difference from natural flows for each compliance band and how this relates to supporting good ecological status (GES). Percentages given are the range below natural flow for the relevant abstraction sensitivity band.

The EFI guidance also allows for the development of local flow requirements where there is sufficient evidence to do so. Tools such as hydro-ecology models or similar frameworks have and can be developed to improve the understanding of the needs of the catchment and flows required to support a healthy ecosystem.

We have utilised this uncertainty in the OFWAT low methodology we have adopted.

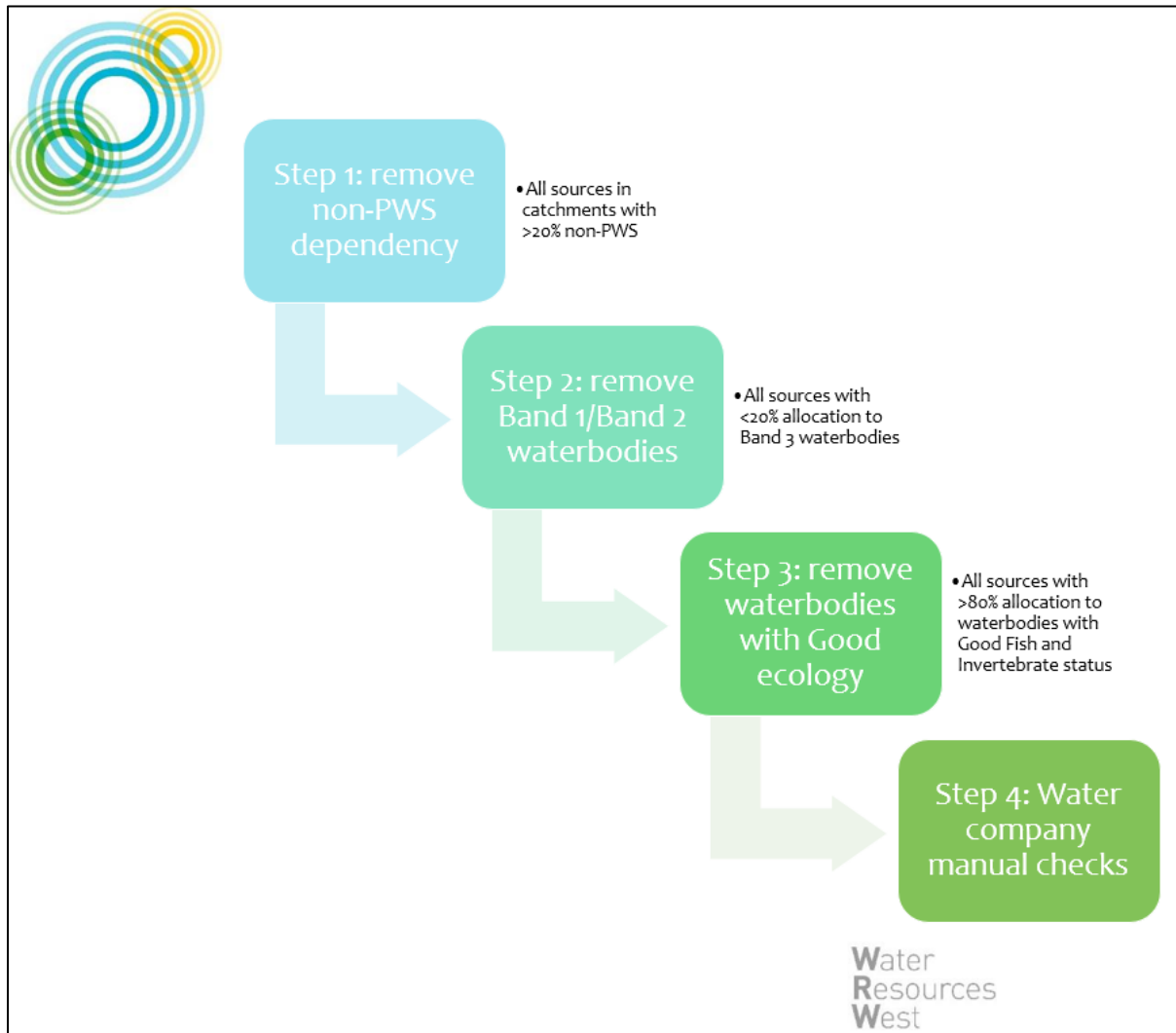
WFD RBMP Cycle 3 water body assessments

Each waterbody has a WFD classification (RBMP3) and we will use this data to aid the uncertainty assessment. Flows are a supporting element to WFD classification. The WFD ‘Supports good’ element may be Supports Good, Does not Support Good or Blank (usually for AP’s). A waterbody can be assessed as good status, even if the flow element does not support good, if other indicators are assessed as good or high. The latest WFD assessment has also been utilised in the OFWAT low methodology we have adopted.

Methodology summary

We used a four-step process for identifying reductions with ‘significant uncertainty’ that should be removed from the Ofwat Low scenario as summarised in Figure D6.6.

Figure D6.6: Methodology to develop the OFWAT low scenario for the long term Environmental Destination



Data sources utilised include:

- National Framework BAU PWS and Non-PWS reductions from the EA Waterbody Abstraction Tool (Mott MacDonald outputs for WRW)
- Flow compliance bands for 2050 BAU scenarios prior to any licence reductions (takes into account the climate change perturbed flows and proportionally adjusted ABS flow targets)
- Groundwater abstraction allocation to 5 surface waterbodies (from Waterbody Abstraction Tool)
- WFD classification assessment (Cycle 3) for WRW surface waterbodies
- WFD Groundwater body balance test (2019 assessments)

These have been collated to support the analysis.

Step 1: Remove lines with significant levels of non-PWS dependency

In catchments where a significant proportion of the reductions needed to meet the 2050 EFI are in non-PWS sectors there is considerable uncertainty as to the benefits of the allotted PWS reductions without a clear process for ensuring non-PWS reductions are also implemented.

Initial screening is undertaken at an EA CAMS ledger area scale to identify catchments with significant non-PWS abstraction. These reductions have been screened, removing any ledger areas that have >20% of the total reduction attributed to non-PWS.

For the ledgers that would fall out under this criterion a more detailed review is undertaken to determine the abstraction pressures in the surface water bodies that the PWS abstractions influence. If PWS abstraction dominates these waterbodies then the ledger area would not be screened out and be taken forward to step 2.

Step 2: Remove lines where reduction is driven by recovery from Band 1/Band 2 waterbodies

The flow compliance data set as our starting point is the Waterbody Abstraction Tool 2050 flow compliance bands pre any abstraction reductions. This 2050 EFI has been adjusted for the climate change scenario utilised for the National Framework assessment.

As noted in Section 3 above, the EFI methodology assigns a rating of “Quite Certain” that flows do not support Good Status to Band 3 non-compliant waterbodies, but a rating of “Uncertain” to waterbodies in Band 1 and Band 2. We have therefore screened out any reductions that are predominantly driven by recovery to the EFI in these waterbodies, as there is uncertainty about whether the flow regime does or does not support Good Status.

We have removed from the Ofwat Low scenario any source that has <20% allocation¹ to Band 3 non-compliant waterbodies.

Step 3: Remove lines where flow-sensitive ecological elements are currently at Good status or better

The Cycle 3 WFD assessment is based on monitoring data based on recent assessment. Some waterbodies have flows that are not compliant with the EFI but nevertheless are at Good status for flow-sensitive ecological elements (Fish and Invertebrates). This implies that the current hydrological regime does in fact support Good status, despite failing the EFI compliance test. There is therefore significant uncertainty that further flow reductions are required in such waterbodies, and we have accordingly screened them out of the Ofwat Low scenario.

All sources with >80% allocation to waterbodies with both Fish and Invertebrate status of Good or High are screened out.

Step 4: Water company review

The final step of the screening process for Ofwat Low is for water companies to review the screening steps and the list of sources that have been included and excluded and make any further manual changes based on local information. Sources may be screened out or back in at this stage.

In addition during this review the scale of reductions from individual sources can be adjusted and justification provided for any changes to the reductions included in the Waterbody Abstraction Tool outputs.

Calculation of groundwater source DO numbers post sustainability reductions

Alignment of WINEP/licence capping short to medium term reductions with the longer term Environmental Destination reductions has been undertaken. For this review we have used the potential new average licences from the Waterbody Abstraction Tool (BAU and Enhanced), the WINEP/licence capping scenarios (High, Medium and Low DO) and the OFWAT low scenario.

¹ Groundwater abstractions are given a percentage allocation to up to five waterbodies, whereas surface water abstractions are generally allocated to the single waterbody in which they are located

The WFD NDB numbers, that are in the process of being finalised with the Area EA, are used to develop the licence capping scenarios. Separately the EA Waterbody Abstraction Tool has been used to generate the longer term licence reduction numbers. The reductions from both data sets do not always align; we would expect the first reduction to be based on the WFD NDB and then a lower cap due to the Environmental Destination scenario. This is not always the case as they have been derived separately therefore the lowest value of the WINEP/ licence capping or ED is taken forward for the longer term deployable output number. The potential new annual licences are assumed to be the future ADO for the sources.

D6.5.2 Groundwater source deployable output reduction scenarios

The sum of the groundwater source BAU+ deployable output (DO) reductions, below the current PR24 average deployable output (ADO), for each WRZ is summarised in Table D6.5 below.

Note, these reductions are a sum of calculated groundwater source level reductions. For the larger water resources zones (WRZ) the zonal deployable output is modelled using the water resources Aquator model that gives an average deployable output for the source utilised in combination. These modelled results are reported in section D7 and D8.

Table D6.5: Summary of groundwater source DO reductions by WRZ for the BAU+ scenario (pre water resource modelling)

Water Resource Zone	DO loss due to licence Capping and No Det	Further DO reductions to achieve BAU+ ED by 2050	Total BAU+ DO losses 2050
Bishops Castle	- 1.40	- 0.76	- 2.16
Chester	- 0.08	- 0.00	- 0.08
Forest and Stroud	- 2.24	- 5.37	- 7.61
Kinsall	- 1.31	- 0.00	- 1.31
Mardy	- 0.74	- 2.57	- 3.31
North Staffordshire	- 40.33	- 75.89	- 116.22
Ruyton	- 0.78	- 0.49	- 1.27
Shelton	- 37.10	- 43.49	- 80.59
Stafford	- 2.82	- 13.51	- 16.33
Whitchurch and Wem	- 3.78	- 0.18	- 3.96
Wolverhampton	- 5.84	- 15.75	- 21.59
Notts	- 71.51	- 59.58	- 131.09
Newark	- 2.47	- 1.44	- 3.91
Strategic Grid	- 26.10	- 50.30	- 76.40
Total	- 196.50	- 269.33	- 465.83

The percentage licence reductions by EA Management Catchment, for the BAU+ scenario, is shown in figure D6.7.

Figure D6.7: 2050 BAU+ scenario average licence reductions in revised draft plans, by management catchment, for public water supply operational groundwater sources in the STW region.

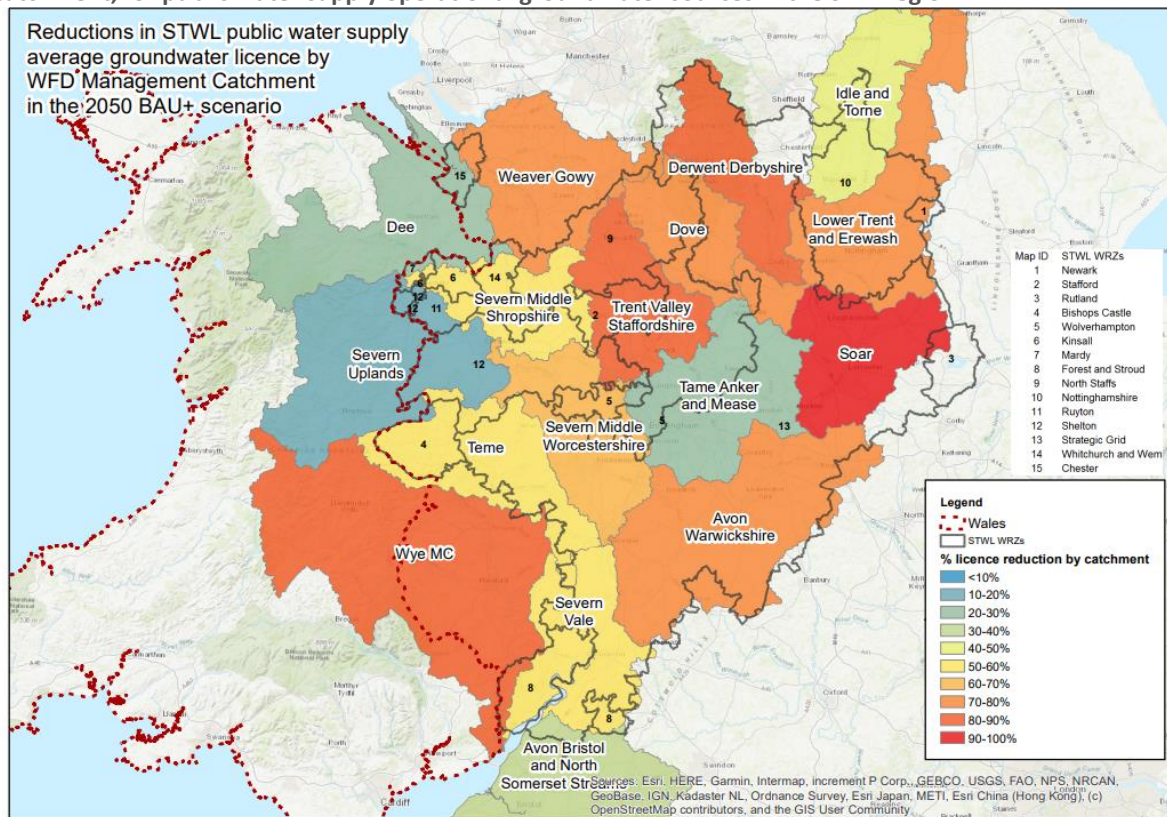


Table D6.6 summaries the 2050 deployable output reduction scenarios for each WRZ. This is based on the summation of all the individual sources, it does not take account of water resource modelling of conjunctive use zones and this described in Section D7.

Table D6.6: Summary of all scenario ADO source reductions including the earlier regulatory reductions for scenarios by WRZ (pre water resource modelling)

Water Resource Zone	Total ED reductions		
	Enhanced	BAU (+)	Ofwat Low
Bishops Castle	- 2.28	- 2.16	- 1.40
Chester	- 0.08	- 0.08	- 0.08
Forest and Stroud	- 10.72	- 7.61	- 2.24
Kinsall	- 5.60	- 1.31	- 1.31
Mardy	- 3.12	- 3.31	- 0.74
North Staffordshire	- 116.22	- 116.22	- 88.84
Ruyton	- 1.27	- 1.27	- 0.78
Shelton	- 82.47	- 80.59	- 72.83
Stafford	- 16.56	- 16.33	- 16.33
Whitechurch and Wem	- 5.24	- 3.96	- 3.96
Wolverhampton	- 21.59	- 21.59	- 21.46
Notts	- 150.96	- 131.09	- 99.97
Newark	- 3.91	- 3.91	- 3.41
Strategic Grid	- 76.99	- 76.40	- 43.29
Total	- 497.01	- 465.83	- 356.64

D6.6 Timing of Environmental Destination delivery

The dWRMP was published for consultation in spring 2023. We have reviewed all the feedback and developed a Statement of Response which was published in July 2023. The EA had a number of material responses in relation to the abstraction licence reductions. At a high level the expectation in this area is as follows:

- They welcomed the progress we made on our environmental destination since the emerging plan but said the pace of delivery for abstraction reductions is too slow.
- They encouraged us to plan the delivery of abstraction reductions in a way which ensures we maximise environmental benefits to comply with WFD obligations first, then start delivering extra reductions at a faster pace towards 2050.

In the Water Resources West (WRW) plan further pertinent response included:

- Delivery of options required to offset the loss to deployable output from abstraction reductions is also expected to be accelerated and reflected in the plan.
- They outlined concerns that environmental destination delivery for some water resource zones is reliant on the successful implementation of demand management measures; regulators are therefore expecting us to develop alternative pathways that would help us deliver the environmental destination even if our demand reductions cannot be delivered as planned.

We met with the local and national Environment Agency teams on the 16 March 2023 to seek clarification on the consultation feedback regarding timing of the delivery of potential future abstraction licence reductions in the medium to long term (2035 – 2050). Following this we have developed further licence reduction scenarios to bring forwards licence reductions in priority areas to further support the WFD pathway to good and priority sites. This has been considered in the context of what could be delivered sooner or what needs to be delayed due to deliverability or affordability.

The WRW water companies collaborated on the approach to prioritising sustainability reductions. The profiles have been developed for each WRZ taking the following into account:

- WRW regional catchment prioritisation which prioritised the highest abstraction pressures
- The remaining WFD abstraction pressures (considering the water industry level / flow and morphological reasons for not achieving good (RNAG))
- Designated water related sites
- Time needed to investigate to refine the reductions and expand the range of options
- Water resource options availability and timing
- Deliverability taking into account potential scale of work needed on our assets such as new pipes and modifications to pumps and water treatment works
- Affordability
- Risk around delivery of demand management.

We have taken on board stakeholders' feedback relating to delivering licence reductions sooner to enhance and protect the environment. To that end, in addition to the draft plan profile where the additional reductions identified are delivered by 2050, we have developed two additional scenario profiles: an "affordability profile" and an "affordability & deliverability profile".

These two alternative Environmental Destination scenario profiles have been further tested against two different demand reduction scenarios: one where the full benefits of the planned water efficiency activities are achieved and an alternative scenario where only half the demand reductions are achieved. This further test helps illustrate the sensitivity of delivering accelerated Environmental Destination choices to the impact of different demand profiles.

It should be noted, that the development of these scenarios does not consider other factors and uncertainties that are considered in the development of the fWRMP. These scenarios will form part of a larger range of scenarios that will inform our adaptive plan and identification of alternative pathways, including the Environmental Stretch alternative pathway.

The Affordability Profile

Licence reductions to protect the environment from deterioration are being implemented early in the planning period. The majority of changes are being implemented by 2035 along with significant investment into our assets to enable supply and resilience to our customers. The scale of change and investment during the first 10 years means that no additional licence changes to support licence improvement will be possible beyond those already committed to in AMP7. There will be a significant investigation and options appraisal programme for WFD and environmental destination drivers over the next 5 to 10 years which will also allow us to update our strategy to support the water environment. We have given further consideration of the need and timing of further licence reductions between 2040 and 2050 to bring environmental enhancement and protection taking into account affordability to our customers.

The affordability profile divides the BAU+ licence reductions over 15 years in each WRZ and assumes a third in each five-year planning period (2040, 2045 and 2050), this would allow earlier delivery of reductions and would spread the cost of the investment over three planning periods. Whilst this may be achievable for some WRZs it may not be in others.

The Affordability and Deliverability Profile

As with the Affordability profile, the first 10 years will be focused on licence reductions to protect the environment from deterioration due to sustained increases in abstraction. We have given further consideration of the need and timing of further licence reductions between 2040 and 2050 to bring environmental enhancement and protection, taking into account the current WFD water industry RNAGs related to abstraction, our previous investigations, the availability of demand and supply options, the deliverability of other supporting asset investment and affordability to our customers.

The affordability & deliverability profile has been developed using the BAU+ scenario for each WRZ, taking into account the variables listed for WRW above, in particular the remaining WFD pressures and availability of water resource schemes.

Strategic Grid, Nottinghamshire, Newark and Bishop's Castle WRZs

The Strategic Grid is the largest WRZ and has a number of supply options available. The options in this zone are also options that may be needed to support other zones namely, Nottinghamshire and Newark WRZs, North Staffordshire, Wolverhampton and the small zone of Bishop's Castle. It would also potentially be needed for Forest and Stroud WRZ in higher demand scenarios. From a water resources solution point of view, we have considered the Strategic Grid, Nottinghamshire and Newark WRZs together.

The Worcestershire Middle Severn (WMS) and the Idle are the two catchments we prioritised to start early stakeholder engagement for environmental destination, some sources in the former lie in the Strategic Grid, the latter in the Nottinghamshire WRZ. We have assumed that we would prioritise the WMS and the Nottinghamshire groundwater. There are a number of surface water bodies that currently have WFD water industry RNAGs associated with them, we are delivering some licence reductions to improve the environment by 2030, particularly in Nottinghamshire. We are also currently delivering environmental measures / river restoration in a number of catchments.

In principle, a phased delivery across AMP10 to AMP12, delivering reductions in 2040, 2045 and 2050 would allow costs to be phased for our customers. In addition to demand management, water resource schemes would be needed and would likely need to be delivered earlier than outlined in our draft plan.

Given the experience of the investment in the network and treatment for the earlier WFD no deterioration licence reductions, it may be that this scale is not achievable, however, we will test this as a scenario in the plan and refine as part of our planned AMP8 investigations and options appraisal. If it is found that only 50% of the demand reductions are delivered, then this would pose a significantly larger supply demand balance gap to fill in these WRZ. To retain this delivery profile significantly more water resource options would be needed. The options available would also be in demand from other water resource zones.

In the Bishop's Castle WRZ there are no current WFD abstraction pressures associated with these sources, and we have assumed we can delay any reductions to 2050. If environmental pressures are identified sooner, we could bring these reductions forwards. The current scheme is a long pipe transfer from the Shelton WRZ, which will be expensive and disruptive to the environment. Further investigations will seek to identify more local solutions if required.

North Staffordshire WRZ

North Staffordshire has significant licence reductions identified in the EA's 2050 National Framework analysis, is a high priority catchment in the WRW regional prioritisation exercise and is a priority for investigation. A number of SWBs have water industry RNAGs and we have undertaken investigations and implemented solutions including river flow support, licence changes and river restoration.

North Staffordshire's primary water resource option is a transfer from the Strategic Grid Carsington Reservoir to Tittesworth Reservoir. There are various size options, however, a 30MI/d option is most likely to be achievable in the shorter term. Large transfers make the option more complex and we could not commit to an increase in sizing before 2050 at this time. Even with leakage and demand interventions this WRZ falls into deficit post 2030 and therefore any further licence reductions will need to be addressed by new water resource schemes. All of these options will be utilised to deliver the licence reductions to protect the environment from deterioration, if there is some surplus this could then be utilised to make further reductions to bring improvements to the water environment. At this time other options are not available until 2050 so we could not consider earlier reductions until such time that we have undertaken further investigations and options development.

There is a newer option under development working with the Canals and Rivers Trust relating to the deployment of Rudyard Reservoir water to support North Staffordshire. This is in the early feasibility stages. It is anticipated to have a relatively small benefit but may enable some earlier delivery of licence reductions. This WRZ is less sensitive to only 50% of the demand reductions being delivered and is not a challenge in itself to the delivery profile.

Shelton, Mardy, Kinsall, Ruyton and Whitchurch and Wem WRZs

There are a number of WFD RNAG pressures in this WRZ, although we have made significant investment in the Worcestershire Middle Severn River Worfe catchment to reduce and move abstraction licences, put in compensation flow support and deliver environmental measures. We are also undertaking river restoration and adjusting river augmentation in the River Strine.

The Shelton zone has limited water resource options. The two options available early in the planning period, Shelton WTWs expansion and releases from Vyrnwy, are required to support licence reductions to protect the environment from deterioration. Further reductions will be dependent on the delivery of new resources associated with the restoration of an existing operational quarry. For our scenario we have taken the optimistic view that this could be delivered by 2045. This is currently sized at 32MI/d so we have assumed we could deliver this scale of licence reduction at this time, with the remainder by 2050. Given the experience of the investment in the network and treatment for the earlier WFD no deterioration licence reductions, it may be that this scale is not achievable, however, we will test this as a scenario in the plan and refine as part of our planned AMP8

investigations and options appraisal. This WRZ is less sensitive to only 50% of the demand reductions being delivered and is unlikely to significantly impact the profile.

Water resource zone options for the Shelton water resource zone may also be utilised by a number of the smaller water resource zones including Mardy, Kinsall, Ruyton and Whitchurch & Wem. The smaller water resource zones require reductions in the order of 3.3MI/d for the current BAU+ scenario. We are undertaking feasibility of the schemes to connect the smaller zones to the Shelton Zone. There is a WFD RNAG pressure in the Whitchurch and Wem WRZ and we have currently assumed this would be delivered by 2040 when a new resource scheme is assumed to be available in the Shelton WRZ. Due to the uncertainty of need and lack of WFD water industry RNAG pressures in the other zones, we have assumed they are delivered later by 2050. Kinsall has an enhanced licence reduction of 4.3MI/d, we will consider if this could be achieved by 2050. The current schemes are long pipe transfers from the Shelton WRZ which will be expensive and disruptive to the environment, further investigations will seek to identify more local solutions if required.

Wolverhampton WRZ

The three Wolverhampton groundwater sources lie in the upper Stour catchment in the Worcestershire Middle Severn management catchment which is a priority area and has WFD RNAGs for a number of the waterbodies. A compensation flow support scheme has been constructed to support low flows in the upper catchment. Licence reductions to prevent further sustained growth in abstraction will be delivered early in the planning period.

To support further licence reductions in the mid-term, there is one transfer scheme from the Strategic Grid that may be sized for 10 or 20MI/d. A compensation support is already in place which will bring resilience to the watercourse. Currently we will assume that this would be prioritised to be delivered by 2040, however this may have a knock-on impact on the delivery in the Strategic Grid. Depending on the amount of investment in the local network and treatment assets and affordability for customers this may need to be delayed.

This WRZ is less sensitive to only 50% of the demand reductions being, however, delivery is linked to the Strategic Grid which is sensitive to the demand reductions.

Forest and Stroud WRZ

The Forest and Stroud WRZ's groundwater sources include three springs and three boreholes. We have some actions in our current WINEP but these are then not a priority for further WFD improvements in the shorter term. A number of the groundwater sources are in limestone strata, which will be more sensitive to climate change. The limestone supported streams will have a fast response to changes in recharge and abstraction. The streams can be more sensitive to water availability and benefits could be seen sooner if licence reductions are implemented earlier. With the planned leakage and demand reductions this WRZ will have surplus water and we are therefore considering a scenario where we bring licence reductions forwards to 2040. There is also more opportunity to move to the enhanced scenario in this zone. This WRZ is less sensitive to only 50% of the demand reductions being delivered and would be unlikely to impact delivery timeframes.

Stafford WRZ

The Stafford WRZ is a groundwater only zone supported by transfers. Licence reductions to prevent further sustained growth in abstraction will be delivered early in the planning period, by 2035. The water bodies in this catchment are not a priority for further action to achieve WFD objectives. The Cannock Chase SAC lies in this area and impacts have been investigated and a licence changed. The impact of abstraction on Aqualate Mere SSSI has also been completed. To support further licence reductions in the mid-term, there is one scheme which would be a new water treatment works from the river near Stafford. If this WTWs scheme is found to be feasible it would need to be brought forwards from 2050 to 2045 to allow earlier delivery of reductions. Significant

infrastructure would also be required to reconfigure the assets for this new supply arrangement. This WRZ is less sensitive to only 50% of the demand reductions being delivered and would be unlikely to impact delivery timeframes.

D7 Sustainability Reductions included in the data tables

D7.1 Scenarios modelled in water company water resource models

The scenario source deployable output numbers, from reductions needed to support both the shorter-term regulatory needs (RSA and WFD no deterioration) and the longer term potential Environmental Destination reductions, have been used as model inputs to our water resource model, Aquator. This modelling has followed the methodology described in the Supply Forecast methodology outlined in Appendix A. Seven of our 15 water resource zones have a modelled deployable output using the Aquator water resources model. The remaining eight water resource zones are calculated in the tables by summing the individual source potential sustainability reductions.

For the fWRMP, two scenarios were run for the capping of licences to prevent WFD deterioration. These were run for both the 1:200 and the 1:500 drought resilience. Table D7.1 summarises the associated Aquator modelled deployable output numbers. In many WRZs the modelled reductions are larger than the draft plan, as the latest licence reductions assumed to protect from no deterioration, take all licences down to the baseline. In the draft plan it had been assumed that, for some of those sources, some licence was to be retained above the baseline and we would manage the risk.

Table D7.1: Aquator model WRZ deployable output reductions for WINEP and licence capping scenarios

WINEP/licence capping scenario	WRZ						
	Strategic Grid	Nottinghamshire	Newark	North Staff	Shelton	Wolverhampton	Forest & Stroud
All sources to NDB (Scenario 2) WINEP impact on 1 in 500 DO	-43.79	-36.78	0.00	-19.68	-35.00	-3.58	-0.06
All sources to NDB (Scenario 2) WINEP impact on 1 in 200 DO	-65.20	-54.76	0.00	-18.73	-35.00	-3.24	-0.38
Priority A and some of Priority B & Adaptive Man to NDB (Scenario 3) WINEP impact on 1 in 200 DO	-41.45	-34.82	0.00	-11.50	-31.00	-0.08	-0.16
Priority A and some of Priority B & Adaptive Man to NDB (Scenario 3) WINEP impact on 1 in 500 DO	-30.47	-25.59	0.00	-11.43	-31.00	-0.81	-0.04

**Modelled WINEP impacts are not used in WRMP24 table for North Staff*

For the draft WRMP longer term Environmental Destination, three scenarios were run in the Aquator model, (Enhanced, BAU and 50% Enhanced) to evaluate the range of modelled deployable output reductions. For these

Environmental Destination scenarios the modelled deployable output impacts were far higher than the sum of the individual source deployable output numbers. Upon review of where the Aquator model was failing, it was concluded that the Aquator model results were not representative of the water resource pressures, due to network connections leading to demand centre failures; essentially our system is not configured to be able to move water around when there are such large sustainability reductions included in the modelling (or on the ground) and this breaks the modelled definition of the water resource zone. It was therefore decided that the sum of the source deployable output numbers would be included in the SDB tables for the longer term as a representative way of representing the scale of impact and water resource solution investment required. Additional investment in the supply network / assesses has not yet been assessed or costed and will need to be evaluated for the WRMP29 plan following further investigations and options development. The model results are summarised in Table D7.2. For the fWRMP we have continued to use the sum of individual source deployable output reductions.

Table D7.2: Aquator model deployable output reductions for 1:500 Environmental Destination (DO reductions in addition to the WINEP and licence capping scenarios in Table D7.1)

WINEP/ licence capping scenario	WRZ						
	Strategic Grid	Notting-hamshire	Newark	North Staff	Shelton	Wolver-hampton	Forest & Stroud
Enhanced ED	-222.88	-312.46	0.00	-116.27	-122.00	-17.42	-2.05
50% Enhanced ED	-93.14	-130.57	0.00	-57.90	-73.00	-9.84	-0.25
BAU ED	-215.52	-302.14	0.00	-116.27	-122.00	-17.42	-1.54

Note: None of these modelled ED impacts are used in WRMP24 table

For the shorter term regulatory requirements we have included assumption around our AMP7 WINEP programme and conservative assumptions based on the latest EA WFD No Deterioration guidance which outlines the licence capping approach. Unless we have confirmed licence changes/reductions with the EA via the WINEP, these are planning assumptions and subject to modification taking into account source specific evidence.

For our revised plan, we have not included 15 year rolling aggregate licences in our water resources model and we are still working with the Environment Agency to understand exactly how 15 year rolling average licence conditions will apply in practice. We shared our recommended approach with the Environment Agency in December 2023. Once the 15 year rolling average compliance approach has been agreed with the Environment Agency we can incorporate these new conditions into our water resources modelling.

We have modelled a proxy of how we think these reductions will affect deployable output using changes to our annual licences. We have done this by using the 15 year average as an annual value for sources effected by No Det for each year of our the model run when running No Det Scenarios. These are incorporated in to the Aquator model using a separate parameter scenario, and the changes to annual licences are made on the licence parameter for each abstraction or abstraction group as required.

In forming the longer term Environmental Destination scenarios for the plan we have accepted that the best available tool for developing scenarios at this time is the EA's Waterbody Abstraction Tools spreadsheet. The information has considerable uncertainty and is not sufficient to inform source level reductions but is useful to develop potential future scenarios to inform an adaptive plan in relation to potential environmental needs. It should not be interpreted that we are planning to implement or are signing up to any of the licence changes we have included in the scenarios to be modelled in our WRMP24. They are purely scenarios to show the possible

scale of impact. A comprehensive investigation plan should be included in the AMP8 WINEP to reduce the uncertainty in the assessments.

There are some earlier licence change commitments and where we have agreed and committed to these they are described specifically in section D3.4 above.

Environmental Destination sets out the plan for water resource deployable output reductions from 2025 through to a long-term plan for 2050 and beyond. Significant demand reductions and/or water source development as well as investment in the water resources assets and the supply network would be needed to enable the scale of licence changes we have modelled to be implemented. These elements, taking into account other water resource pressures for our plan, are described in Appendix G.

D7.2 WRMP data tables

The sustainability reductions are included in the WRMP data tables.

The earlier WFD reduction assumptions have been included in data Table 3a (Baseline), line BL7.2; Total confirmed DO reductions to restore sustainable abstraction. It should be noted, however, that these are planning assumptions, not source specific commitments. The timings of the reductions are distributed between 2030 and 2035.

The later Environmental Destination reductions are included in data Table 3a (Baseline), line BL7.3; Total additional DO reductions for Environmental Destination (excl. any confirmed reductions). These are included between 2040 and 2050 depending on the scenario under consideration.

For the water resource Aquator modelling, undertaken for the larger conjunctive use zones, consideration is given to the drought 1:200 and 1:500 level of service. For the 1:200 LOS is included up to 2038/39 and 1:500 from 2039/40. A step change is seen between these LOS DO reductions (see Table D7.1 and Figure D8.1).

For the final WRMP the EA requested that baseline lines, including BL7.2 and 7.3 are reported to 1:500 and the difference between 1:200 and 1:500 LOS is captured is included in Table 3b, line 6.3FP; summed with the difference in DO for DO modelling, climate change and demand savings. For the purposes of reporting on the sustainability reductions to protect and enhance the environment, the summary tables in this appendix include both the 1:200 and 1:500 reductions.

D8 Environmental Destination deployable output reductions evaluated in plan

This section summarises the sustainability reduction scenarios evaluated in the fWRMP. It uses the outputs summarised in Section D7; it includes the WRZ deployable output from the Aquator water resource model assessment.

D8.1 Shorter term sustainability reductions

The impacts of the earlier environmental improvements and no-deterioration licence capping for each water WRZ is summarised in Table D8.1 below.

In the catchment where there are proposed licence reductions there are also non-PWS abstractions. In most catchments action will be required by all sectors. We understand that the Environment Agency will bring forward proposals to address no-deterioration risk from non-PWS abstractions in due course. In many cases the removal of deterioration risk will be dependent upon PWS and non-PWS abstractions being assessed together.

Table D8.1: Sustainability reductions included in the WRMP data tables (1:200 drought LOS to 2038/39, 1:500 drought LOS from 2039/40)

Resource Zone	Early regulatory needs, 2030 to 2040			2050 BAU+
	2030/31	2035/36	2040/41	2049/50
	1:200 Drought LOS	1:200 Drought LOS	1:500 Drought LOS	1:500 Drought LOS
Bishops Castle	0.00	- 1.40	-1.40	-2.16
Chester	0.00	-0.08	-0.08	-0.08
Forest and Stroud	-0.16	-0.38	-0.06	-5.43
Kinsall	-0.21	-0.21	-0.49	-0.49
Mardy	-0.74	-0.74	-0.74	-3.31
North Staffordshire	-11.50	-18.73	-19.68	-95.57
Ruyton	0.00	-0.78	-0.78	-1.27
Shelton	-31.00	-35.00	-35.00	-78.49
Stafford	-0.30	-2.82	-2.82	-16.33
Strategic Grid	-41.45	-65.20	-43.79	-94.09
Whitchurch & Wem	-3.78	-3.78	-3.78	-3.96
Wolverhampton	-0.08	-3.24	-3.58	-19.33
Newark	0.00	0.00	0.00	-1.44
Nottinghamshire	-34.82	-54.76	-36.78	-96.36
Rutland	0.00	0.00	0.00	0.00
Total	-124.04	-187.39	-148.96	-418.29

D8.2 Medium to long term sustainability reductions

A number of environmental destination scenarios are being used to test the sensitivity of our water resources options to potential future sustainability reductions in the medium to long term.

Scenarios of abstraction reductions were provided by the Environment Agency, and we have assessed these. In addition, a low scenario has been generated by removing reductions with the greatest uncertainty.

In addition to PWS abstractions there are also licenced non-PWS. It is important to note that the EA Waterbody Abstraction Tool calculates licence reductions proportionately across a waterbody and as such, delivery of the environmental outcome, currently the achievement of the Environmental Flow Indicators (EFI's) in 2050, will be dependent upon complementary licence modifications to be undertaken by the Environment Agency from 2030 onwards.

Table D8.2 below shows the range of Environmental Destination scenarios WRZ deployable output reductions. A positive number shows a reduction in the deployable output relative to the WRZ deployable output. The BAU+ scenario has been included in the baseline tables.

Table D8.2: Environmental Destination scenarios reductions relative to WRZ deployable output

Resource Zone	Early regulatory needs		2050 BAU+		2050 OFWAT Low		2050 Enhanced	
	7.2BL (MI/d) (1:200 drought LOS)	7.2BL (MI/d) (1:500 drought LOS)	ED 7.3BL (MI/d)	Total (MI/d)	ED reduction in addition to earlier reg. needs	Total (MI/d)	ED reduction in addition to earlier reg. needs	Total (MI/d)
Bishops Castle	-1.40	-1.40	- 0.76	- 2.16	- 0.00	- 1.40	- 0.88	- 2.28
Chester	-0.08	-0.08	- 0.00	- 0.08	- 0.00	- 0.08	- 0.00	- 0.08
Forest and Stroud	-0.38	-0.06	- 5.37	- 5.43	- 0.00	- 0.06	- 8.48	- 8.54
Kinsall	-0.21	-0.49	- 0.00	- 0.49	- 0.00	- 0.49	- 4.29	- 4.78
Mardy	-0.74	-0.74	- 2.57	- 3.31	- 0.00	- 0.74	- 2.38	- 3.12
North Staffordshire	-18.73	-19.68	-75.89	-95.57	-48.51	-68.19	-75.89	-95.57
Ruyton	-0.78	-0.78	- 0.49	- 1.27	- 0.00	- 0.78	- 0.49	- 1.27
Shelton	-35.00	-35.00	-43.49	-78.49	-35.73	-70.73	-45.37	-80.37
Stafford	-2.82	-2.82	-13.51	-16.33	-13.51	-16.33	-13.74	-16.56
Strategic Grid	-65.20	-43.79	-50.30	-94.09	-17.19	-60.98	-50.89	-94.68
Whitchurch & Wem	-3.73	-3.73	-0.18	-3.96	-0.18	-3.96	-1.46	-5.24
Wolverhampton	-3.24	-3.58	-15.75	-19.33	-15.62	-19.20	-15.75	-19.33
Newark	0.00	0.00	- 1.44	- 1.44	- 0.94	- 0.94	- 1.44	- 1.44
Nottinghamshire	-54.76	-36.78	-59.58	-96.36	-28.46	-65.24	-79.45	-116.23
Rutland	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
Total	-187.39	-148.96	-269.33	-418.29	-160.14	-309.10	-300.51	-449.47

Table D8.3 compares the deployable output reductions for the dWRMP and fWRMP; it includes the earlier WFD driven reductions and the three longer term environmental destination scenarios. Overall there is a reduced impact in the order of 20MI/d to 30MI/d depending on the scenario. The main reasons for the changes are twofold. For the fWRMP we have used the North Staffordshire Aquator modelled DO reductions, rather than the sum of the individual groundwater source reductions. There have also been some changes to the no deterioration baseline numbers, agreed with the EA, particularly in the Shelton WRZ.

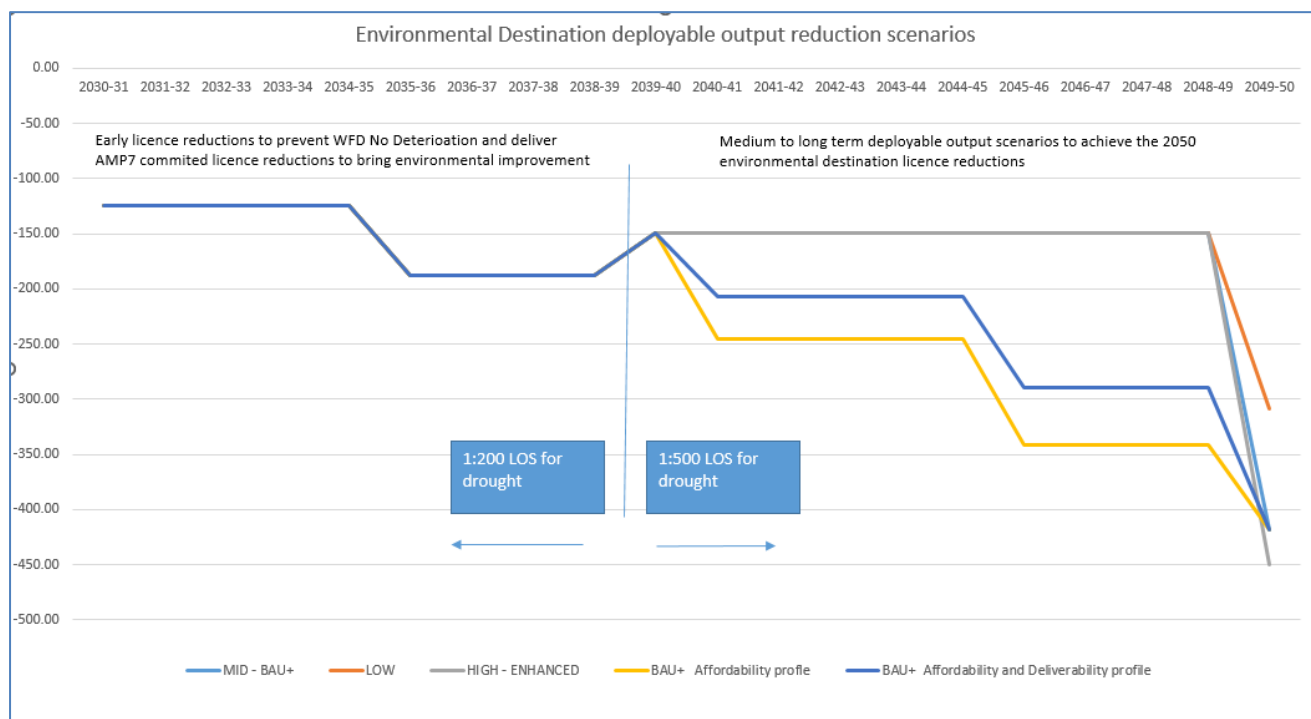
Table D8.3: Comparison of STW company deployable output reductions between first draft and revised draft plan (uses water resource Aquator model outputs for seven of the WRZs).

Reduction scenario	WFD reductions by 2040, 1 in 500 Drought LOS	BAU+ 2050	Low 2050	Enh 2050
First draft WRMP	-179.37	-442.02	-337.86	-471.26
Revised draft WRMP	-148.96	-418.29	-309.10	-449.47
Difference	-30.41	-23.73	-28.76	-21.79

D8.3 Scenarios evaluated in the WRMP

Five sustainability reduction scenarios have been evaluated as part of the fWRMP development. Figure D8.1 shows the deployable output reductions for these five scenarios. The earlier reductions to bring WFD improvements and to prevent deterioration of the water environment, from sustained increase in abstraction, are the same for the first 10 years. Following this there are the three potential end points by 2050, the BAU+, Enhanced and low scenarios. There are also two scenarios that explore earlier delivery of the BAU+ scenario. We retain the ability to adapt up to the Enhanced scenario later in the planning period if required.

Figure D8.1: Deployable output reductions for lines BL7.2 (WFD inc No Deterioration) and BL7.3 (medium to longer term Environmental Destination) under consideration in the STW plan development.



D8.4 The preferred WRMP plan

To develop the best value long-term plan, we must demonstrate that the investment is optimal given a wide range of plausible scenarios and their likely occurrence. We have considered a number of plausible futures, developed different scenarios and considered the best way of meeting its customers' future water supply needs in all of those possible futures. The alternative pathway planning approach provides a systematic way of establishing how robust the investment choices are to future uncertainties. We have tested our supply-demand requirements using 42 different plausible scenarios. Analysing these different scenarios and the investment choices that would be made forms part of the sensitivity on the size of the need.

Our additional scenarios reflect or Environmental Destination scenarios, plus different future assumptions about the following factors:

- Pace and success of national Strategic Resource Options (SROs).
- Effectiveness and pace of demand-side reductions (specifically whether distribution input reduces).
- Additional climate scenarios to reflect more extreme conditions, as recommended by the Met Office.
- Additional scenarios reflecting the pace at which the company works towards the drought resilience standard.

- It has taken care to ensure a balanced range of scenarios and ensure they are not overly biased towards a particular future.

BAU+ and alternative Environmental Destination scenarios have been used to test and improve or plan and have concluded the following:

- For our preferred WRMP we have listened to the feedback from our stakeholders and we will accelerate the delivery of our long term environmental destination commitments. We have explored a range of potential environmental destination scenarios and the profile used in our plan reflects the affordability and deliverability of the AMP-by-AMP new water resource schemes that will be needed to accelerate the future abstraction reductions.
- Optimising against all futures and making no/low regrets decisions based on a full range of benign to adverse plausible scenarios.
- The schemes selected in 2025-30 are no regrets in a range of future scenarios. In the first 10 years this includes for the licence reductions to ensure no future environmental deterioration due to sustained increased abstraction of our sources. It also facilitates the potential for earlier delivery of the medium to longer term Environmental Destination sustainability reductions.
- Include feasibility for the development of alternative water resource options taking account of future uncertainty.
- Updated the adaptive plan in relation to the longer term Environmental Destination to be able to deliver an earlier profile of reductions as well as being able to adapt upwards to the enhanced scenario. The 2025-30 investigations and options appraisal will inform our next regional plan and provide evidence for the decision trigger point for 2040.
- In some WRZs earlier delivery will be restricted by the availability and timing of water resource options.

The demand reductions assumed in our plan are uncertain and reliant on influences beyond the water companies. If these are not achieved this will impact on our ability to deliver environmental enhancements sooner.

D9 Catchment evaluation

D9.1 Introduction

The development of the Environmental Destination for us and WRW will be an iterative process and this methodology is focused on establishing the first version of Environmental Destination for the region.

For England, the EA National Framework (NF) high level assessment has been provided to aid understanding of the potential current regulatory pressures (baseline) and potential longer term pressures (2050 and beyond) on abstraction licences. The EA guidance highlights the need to consider abstraction pressures, however, a holistic range of measures is also encouraged.

For Wales, the NRW guidance is seeking a holistic approach and alignment with other Welsh priorities.

A WRW Environmental Destination methodology was agreed in 2020 to ensure consistency of approach between the different water companies within WRW. Following this WRW convened a Task and Finish Group for Environmental Destination which included representative from the water companies, EA, NRW and the EA to support the development of the WRW approach for Environmental Destination and allow review and discussion of analysis.

A supplementary methodology note, supporting the WRW environmental destination methodology, has been used to identify short to medium term no regret actions to improve the water environment where there is evidence of impact from an abstractor's water resource activities. The aim is to make the water environment more resilient to external pressures, such as drought and climate change, and/or improve water body status which will add short term value to our regional plan. Where possible we are seeking multisector catchment opportunities including water resource options for the short to long term. The main elements of the methodology supplementary note are outlined in this section and Section D14 for Wales.

The longer term risk and actions will require further evaluation, the scale of potential impacts from a dry climate change scenario is significant and so we need to ensure the most appropriate future river flow scenarios are utilised. Companies are likely to run a detailed investigation programme over the next 5 to 10 years to consider hydro-ecology and catchment resilience needs and how this can be balanced against the resilience of water supply across sectors and affordability. This investigation programme will form part of the short term measures needed to achieve the environmental destination.

The size of the WRW region means that it is not feasible to give the same level of assessment to all catchments at this time. To this end we have worked with WRW to review and prioritise at management catchment scale in England, to align EA ledger areas and with the Catchment Based Approach (CaBA) stakeholder groups. As similar prioritisation process was undertaken for Wales which is described in this section with the results summarised in Section D14; Environmental Destination for Wales.

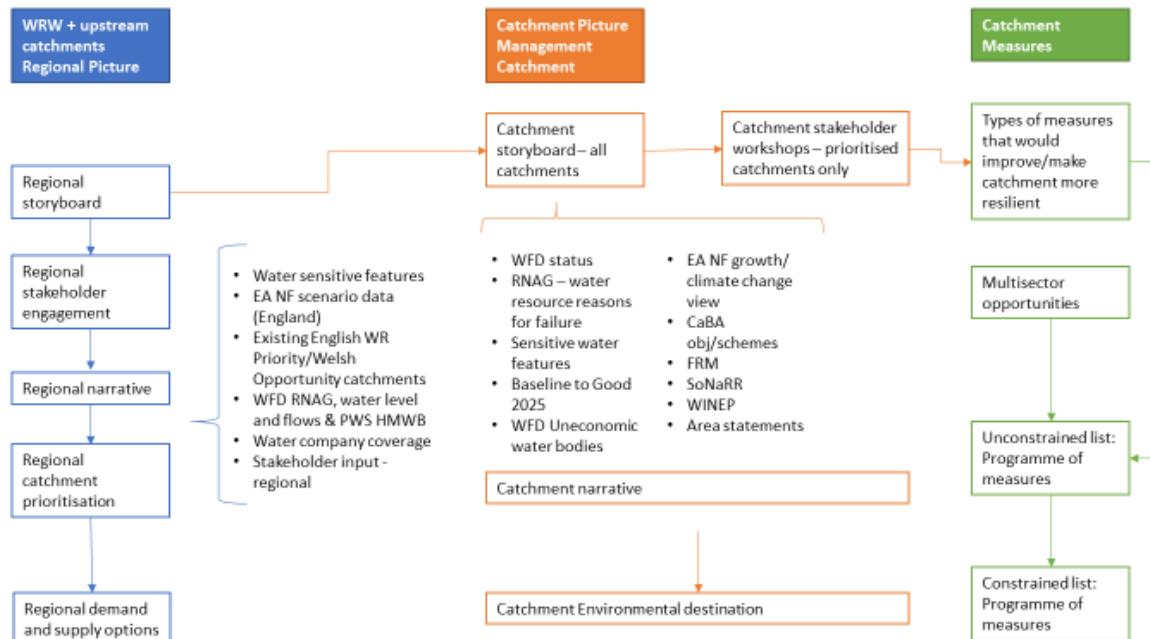
We have identified short to medium term no regret actions to benefit the water environment, with identifiably linked water resource benefit, in our region along with areas to focus further investigations.

This section outlines the methods used to:

1. Undertake regional catchment prioritisation in England, or areas of opportunity in Wales, across the region.
2. Undertake in-catchment characterisation and prioritisation. To generate an unconstrained list of potential options/measures (Tier 1 assessment).
3. To further develop an unconstrained list of options in some prioritised catchments to determine a constrained list of options and an investigation action plan (Tier 2 assessment).

An overview of the concept of points 1 to 3 is provided in Figure D9.1.

Figure D9.1: Overview of development of WRW Environmental Destination catchment characterisation and option development



For England, potential longer term water resource actions have been considered through scenario analysis where licence reduction assumptions are made using the EA National Framework data as a guide (see sections D2 to D8 above). Further investigations are likely to be identified to reduce the uncertainty in this assessment to inform the adaptive management plan for each catchment and the region.

The term “WRW catchments” includes the catchments in the WRW boundary and the upstream catchments in Wales. The Idle and Torne and Lower Trent and Erewash catchments originally lay in the Water Resources East (WRE) boundary but are part of our supply area, these catchments have now been moved into WRW.

Our process considered both (1) regional catchment prioritisation (England) and areas of opportunity (Wales) and (2) in catchment characterisation and prioritisation. These are defined as follows:

- **Regional catchment prioritisation:** To undertake a high-level characterisation and prioritisation of all WRW catchments, including associated upstream or supply area catchments, using readily available data sources. This was undertaken at a Water Framework Directive (WFD) management / Catchment Based Approach (CaBA) catchment scale. This identified the catchments to be prioritised for action in England for STW;
- **Areas of opportunity:** In Welsh catchments the NRW guidance indicated that we should identify opportunities to improve water resources management and seek to align with existing catchment projects and partnerships to maximise benefits. This identified the sub catchments/ areas that could be prioritised for action in Wales;
- **In-catchment characterisation and prioritisation:** To characterise and report on each catchment area and identify the ranges of measures that may be appropriate to protect and enhance water resources. This set out the water resources features, pressures and an unconstrained list of actions that could improve the catchment and make it more resilient to future changes.

D9.2 Regional Catchment Prioritisation

In 2021 we worked with WRW to look at our region and to consider how we can prioritise work in our supply area. A high-level characterisation and prioritisation of all WRW catchments was undertaken, including associated upstream or supply area catchments, using readily available data sources. The regional prioritisation was used to identify higher priority catchments for initial engagement and options appraisal. The approach was undertaken with WRW through a Task and Finish group which included representatives from the water companies, the EA and NRW as stakeholders in its development, alongside meetings with Natural England who could not regularly attend the group. Given the scale of the challenge we developed a methodology and delivered it with stakeholder buy in. We explored datasets that were available across our region. We screened SSSI for water related features. As data was not consistent across the region we instead turned to the EA's assessment of Enhanced water bodies that had been developed as part of the NF assessment.

The prioritisation is based on a numerical scoring assessment of datasets (see Table D9.1), weighted to give an overall ranking. A moderation stage then allowed stakeholder input that supported or overrode the numerical results. The reasons for any moderation were documented before being taken for approved by the multi-sector WRW senior management group. These elements of prioritisation are explained in turn below.

The steps followed were:

1. A numerical assessment per catchment

A numerical assessment has been undertaken using the datasets summarised in Table D9.1. Catchments have been scored against these criteria on a scale from 0 to 1.

2. A weighted overall prioritisation calculated

The weighting of these factors was reviewed in two separate England and Wales workshops in June 2021. These workshops included a range of external stakeholders. The organisations represented are summarised in Table D9.2 below.

Other comments were also captured in the workshop which were also considered in the regional Stakeholder engagement in step 3.

3. Stakeholder engagement evaluation

The main stakeholder forums that supported the assessment are show in Figure D9.2 below

Table D9.1: Summary of Regional prioritisation data sets and the indicator area

Data set	Indicator area
Water sensitive features (protected areas, SSSIs, GWDTE, Salmonid Rivers)	<p>These data sets give an indication of the relative water related environmental value in catchments at this time. Some initial screening has been undertaken to identify those which have water supported habitats that could therefore be potentially impacted by abstraction.</p> <p>At this time we do not hold a spatial data set to be able to include water related protected species, priority habitats or locally important features. This data will be collected for the prioritised catchments as evaluation progresses.</p> <p>Salmonid River: Represented by NF Enhanced waterbodies classification in England, Wales using the 2020/21 at risk status.</p> <p>SAC rivers were given additional weighting.</p>
EA National Framework (NF) scenario data with some initial	These data sets give a view of the potential sensitivity/scale of abstraction license reductions that may be required in the longer term to adapt to the

adjustments following review by water companies

pressures of climate change and growth. This included the water company reductions, with some adjustments, and the non-PWS abstraction reductions, no adjustments made.

It should be noted that all catchments are potentially significantly impacted by climate change in the longer term.

Climate Change Risk Assessment data for Welsh catchments

The National Framework assessment was only undertaken for English catchments. For Welsh catchments we have used the CCRA data to give an indication of future pressure on water resources in the longer term. Following stakeholder consultation it was determined not to use this in the scoring.

Existing Water Resource Priority/Opportunity catchments

The English Priority catchments are areas where the Defra and the EA have identified significant catchment pressures and have included them in their Abstraction Plan to take a catchment based approach to achieving sustainable abstraction.

The Welsh Opportunity catchments are areas that NRW has selected where the best suite of opportunities for addressing WFD objectives and wider SMNR and well-being outcomes have been identified. This has only been used where water resources has been identified as a driver.

WFD reasons for failure – RNAG 2015, PWS (Water levels/flows, Physical modifications)

This data is used to represent the flow pressure as determined in the WFD 2015 assessment. Similarly the assumption is that HMWB pressures will be picked up via RNAG e.g. RNAG Water Industry/Flow and Level pressure. The water companies will screen this data to determine if the pressure is likely to have been resolved through WINEP and may use this as a justification to deprioritise a catchment.

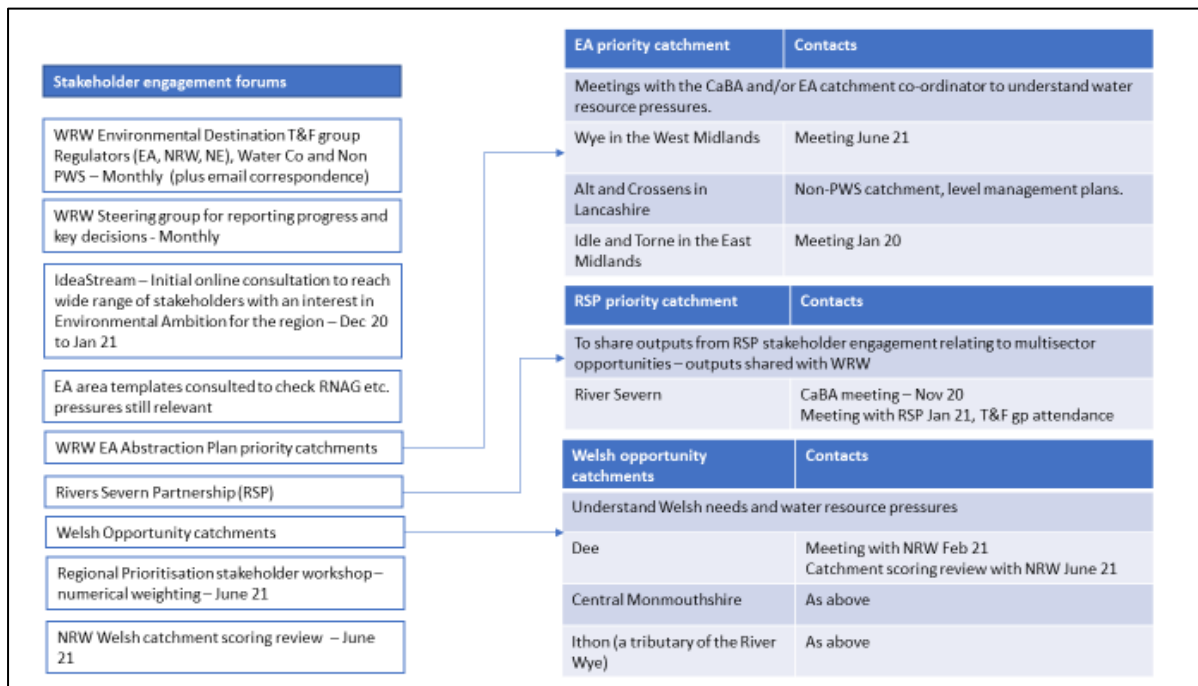
Heavily modified water bodies - HMWB (PWS)

Significant work has been undertaken to optimise the measures to support the environment from water company HMWBs as part of the WFD review. There may be further opportunities to support and enhance the environment while retaining the PWS purpose of these water bodies.

Table D9.2: Stakeholders supporting regional prioritisation workshops to finalise numerical weighting

Sectors	Organisations represented
Water companies and WRW	Welsh Water, Severn Trent Water, South Staffs Water and UU.
NGOs	Rivers Trust Wales, Welsh Dee Trust and the Wye and Usk Foundation
Non-PWS abstractors	Canal and Rivers Trust (CRT), Chemical Industries Association, Confederation of Paper Industries (CPI), Coal Authority, National Farmers Union (NFU) Wales, NFU West Midlands
Consultants	Stantec and APEM who are undertaking the evaluation with WRW

Figure D9.2: Stakeholder engagement forums to influence regional catchment prioritisation



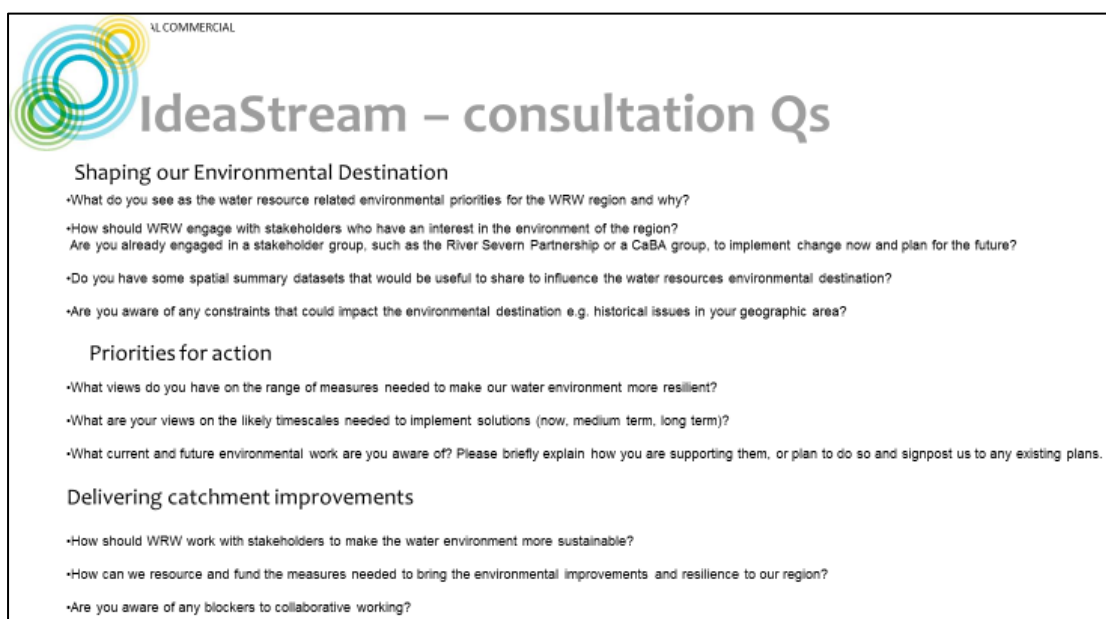
Water Resources West’s initial resource position set out the main strategic themes and influences on the WRW plan. The themes included Climate Change, Population Growth, Economic Growth, Environmental Considerations and Amenity and Recreation. Feedback from consultation included, alongside a general welcome for the approach, the highlighting of some themes:

- Environmental implications/ambition
- Integrated catchment management including multiple benefits
- Changes in farming- and how they are accounted for
- Reservoirs for flood- getting the balance right
- Cultural heritage
- Archaeological sensitivity- such as ancient woodlands/wetlands

These themes will need to be addressed in a number of places in the WRW and our WRMP plans, for example including catchment options in the environmental destination and water resource supply options workstreams.

WRW subsequently undertook an online consultation asking stakeholders a number of questions to help shape the environmental destination for the region. Figure D9.3 lists the questions asked in this consultation.

Figure D9.3: IdeaStream Environmental Destination consultation questions, Dec 20 – Jan 21



Responses were received from 33 organisations or individuals, summarised by sector in Table D9.3 as follows:

Table D9.3: Number of IdeaStream Environmental Destination consultation responses by sector

Sector	No. responses
Charities	2
Environmental	11
Farming	4
Internal Drainage Board (IDB)	1
Local Government	11
Non PWS	1
Other (individuals)	3
Grand Total	33

These responses include national-level organisations and area-specific responses. Table D9.4 show the number of responses grouped these by relevance to the different water companies in WRW.

Table D9.4: Number of IdeaStream responses grouped by water company area

Area	Water company	No. responses
Midlands	STWL/SSW	11
North West	UU	11
Wales	STWL/DCWW	6
National	all	5

The main themes from the responses were:

- Flooding was raised as an environmental priority across stakeholder groups along with reducing demand and increasing water efficiency.

- Early stakeholder engagement and effective communication are important across stakeholder groups.
- There are many opportunities for collaborative working with existing stakeholder groups. There are a number of ongoing projects/funding streams with similar ambitions. Waterwise and local government are particularly keen to work with WRW and this was mentioned in several of their responses.
- A lack of available funding and resources has been highlighted by a number of stakeholders as limitations to collaborative working. This will need to be considered when preparing surveys and organising engagement activities to get the most from stakeholders.
- A range of measures were suggested to make the water environment more resilient. Again, flooding and water storage were mentioned across stakeholder groups.
- The NFU responses were almost identical and consistently reinforced their desire to see flexible licencing, increased on-farm water resilience measures and grant schemes.

The EA and NRW guidance and the Environmental Destination Task and Finish Group feedback was also considered. This information has been used to inform the regional prioritisation relating to current catchment pressures and opportunities. The stakeholder feedback was also considered for in catchment prioritisation (see Tier 1 assessments below).

The final weightings for England prioritisation scoring was 3 for National Framework, environmental features, RNAG and 1 for the priority catchments, the latter being lower to ensure that this did not dominate the prioritisation results.

See section D14 for the weightings used for Wales.

4. Catchments evaluated by water company area and catchments prioritised as such.

The results of the numerical and graphical evaluation were evaluated for our sub region and any adjustments to the prioritisation amended and justified e.g. information based on previous water resource WINEP evaluations or similar schemes, that would give a more up to date view of the water resource pressures by 20252.

5. Final review and sign off

The final prioritisation was agreed by the WRW Environmental Destination Task and Finish Group and then taken to the WRW Senior Group for sign off.

The results of the prioritisation for the English catchments in our region are summarised in Table D9.5. The Welsh prioritisation process is summarised in section D14.

All catchments have had an initial characterisation assessment (Tier 1 assessment) undertaken to characterise them by the features listed in Table D9.1 above. A generic set of actions has also been generated as a starting point of an action plan and will be used to support AMP8 WINEP investigation proposals.

WRW took two catchments, in our supply area, forward for a more detailed assessment. This is termed a Tier 2 assessment and included stakeholder engagement in the catchments and a review of local evidence.

- The River Idle catchment in the River Trent catchment in the East Midlands. Anglian Water also has abstractions in this catchment and has engaged in this process.
- The Worcestershire Middle Severn catchment which includes the River Worfe and River Stour that form a sub catchment of the River Severn. South Staffs Water also has abstractions in this catchment and funded and engaged in this process.

² i.e. the end of this AMP period and the baseline starting point for the current WRW regional plan and WRMPs.

Table D9.5: Priority order of catchments

STWL ledger area regional prioritisation	
1. Idle & Torne	8. Warwickshire Avon
2. Worcestershire Middle Severn	9. Lower Wye
3. Staffordshire Trent Valley	10. Teme
4. Dove	11. Severn Corridor
5. Shropshire Middle Severn	12. Derbyshire Derwent
6. Lower Trent & Erewash	13. Soar
7. Severn Vale	

It is anticipated that further investigation of the higher priority catchments with water company abstraction will be undertaken for the next regional plan and some of these catchments may be taken forward for further evaluation at that time. We are currently proposing a large catchment investigation programme for WINEP AMP8 and will be working with the EA on the scope and extent of this work.

D9.3 Catchment stakeholder plans

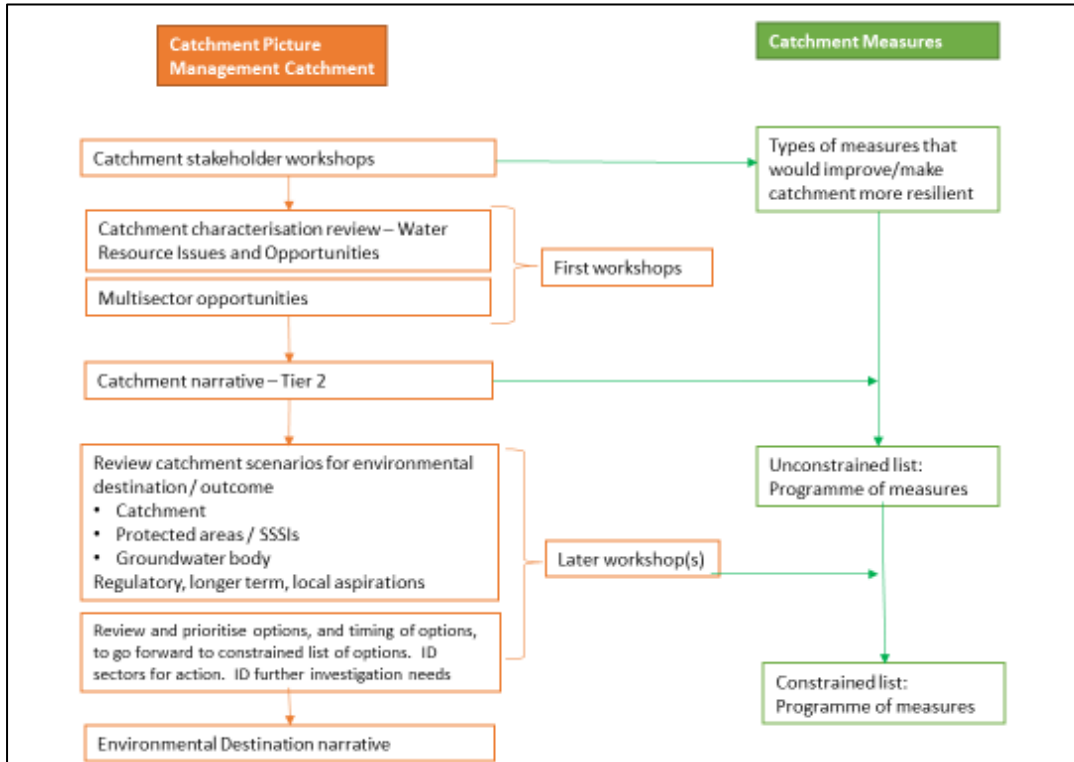
The Idle and the Worcestershire Middle Severn were taken forward for more detailed assessment including stakeholder engagement in the catchments (our Tier 2 assessments).

This assessment had a number of objectives:

- To trial an approach to working with stakeholders to develop a first version of a catchment specific action plan to support Environmental Destination objectives;
- to potentially include some no regrets early catchment resilience type options in our next business plan/AMP8 WINEP;
- To have a water resources focused catchment action plan for all stakeholders to consider in their development and implementation of catchment improvements in the future.

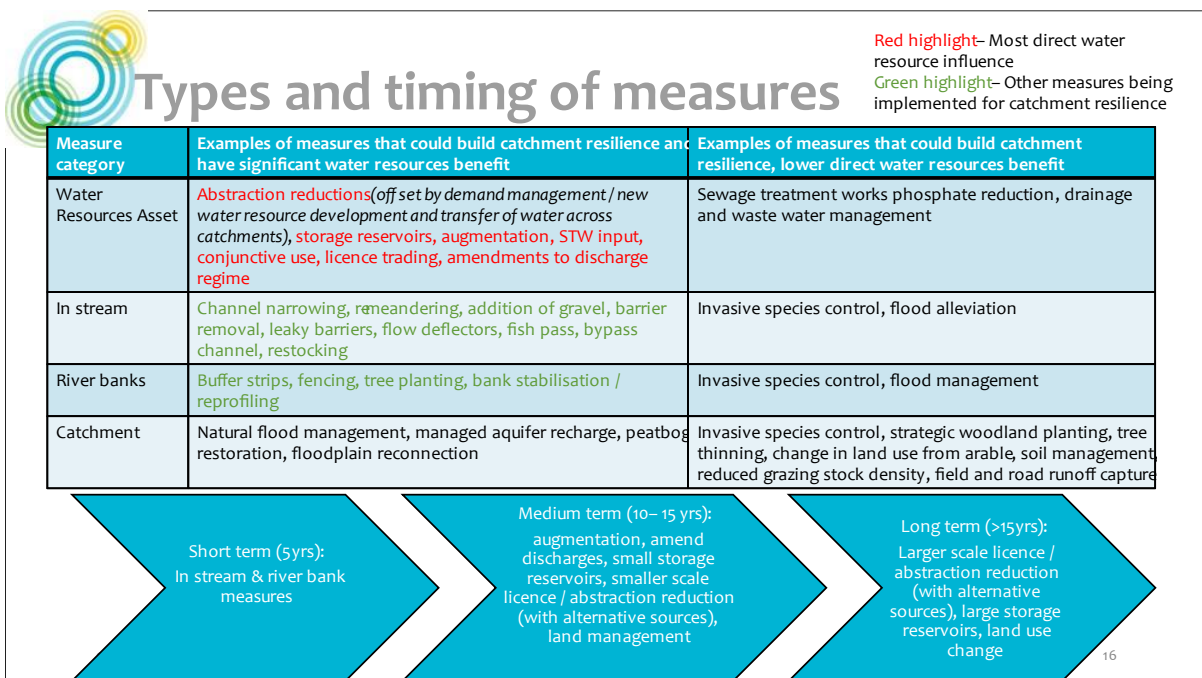
Figure D9.4 outlines the process that has been followed for these two catchments.

Figure D9.4: Tier 2 refined assessment for prioritised catchments only, working with stakeholders



A summary of the types and timing of catchment interventions with significant and lower water resources benefits is provided in Figure D9.5.

Figure D9.5: Types and timing of catchment interventions with significant and lower water resources benefits



We held initial meetings with the CaBA hosts and EA to discuss how best to approach the stakeholder engagement in their areas. For the Idle it was agreed to hold two workshops, one with members of the CaBA and one with EA staff. For the WMS CaBA catchment the stakeholder groups for the two main rivers, the River Worfe in the north and the River Stour in the south were for the most part different, so two workshops were held with these two sub catchments.

We then conducted the initial workshops with the stakeholders taking them through story boards of pressures and options and augmenting our understanding using their feedback. We engaged small groups of stakeholders through online forums (this was undertaken during COVID restrictions). Some written input was also received via a template supplied for feedback from those attending the workshop and from some stakeholders who could not attend. The range of stakeholders organisations involved is summarised in Table D9.6.

Table D9.6: Stakeholders who helped identify catchment pressures and options

Idle catchment	Worcestershire Middle Severn Stakeholders – River Stour
Environment Agency	Environment Agency
Nottinghamshire Wildlife Trust	Worcestershire Wildlife Trust
National Farmers Union	Severn Rivers Trust
Internal Drainage Board / Water management consortium	North Worcestershire Water Management
Severn Trent Water	Shropshire Wildlife Trust
Anglian Water	Severn Trent Water
	South Staffs Water

Once we had a revised list of options for habitat improvement/physical restoration type measures, an options screening process was developed for WRW that complemented the WRW water resource/demand management options screening process.

Further collection of local information on protected species and habitats was undertaken as more detailed investigations catchment / water body level environmental destination investigations progressed.

For all catchments we produced factual ('Tier 1') reports summarising available data on environmental features, including SAC, SPA, SSSI and GWDTE designations. We undertook a screening of these sites for water-related features using the designation information available online from Natural England. We also reviewed area templates provided by local EA teams.

For the two catchments selected for further early work, through the Regional Prioritisation, we gathered more data through workshops with local stakeholders. This included locations of National and Local Nature Reserves, lists of current and planned catchment partnership projects and Water Level Management Plans. This information was used to develop an unconstrained list of catchment measures which were taken forward to screening and options development.

Several documents were referenced as guidance to designing the screening criteria, these being:

- Water Resource Planning Guideline (WRPG) Supplementary Guidance – Environment and Society in Decision-making
- Water Resources Planning Guideline 2024 Supplementary Guidance: Environment and Society in decision-making (Wales)
- Water Industry National Environment Programme (WINEP) Options Development Guidance
- Water Resources West Options Development Methodology

The methodology overview is shown in Figure D9.6 and involves a high-level screening stage and a detailed screening phase.

The high-level screening questions are shown in Table D9.7. Scorings and rankings were developed and commentary informing decisions captured. In the high-level screening, no options were identified as unfeasible. Instead ~25% were categorised as low priority so they will still be available for further consideration, but won't be taken forward in the short term. The remaining options were taken forward to the detailed screening phase.

Figure D9.6: Methodology overview

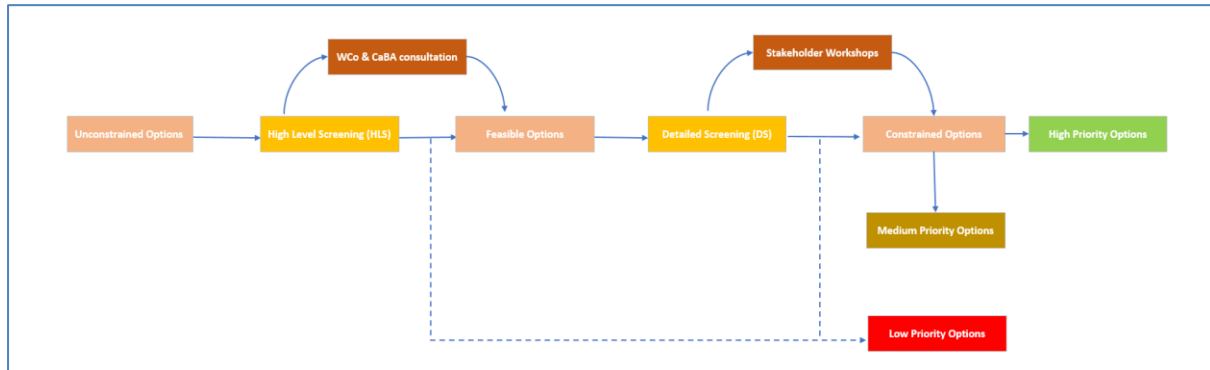


Table D9.7: High level screening questions

	Option benefit	Engineering Risk & Delivery Feasibility	Environmental Planning & Other Regulatory Constraints	Political & Customer Acceptability
Unconstrained List	Is there a Water Resource Benefit?	Is the option technically feasible?	Does the option cause unmitigable damage to a designated site?	Is the option politically unacceptable such that it is unlikely to gain planning approval?
	Will it improve catchment resilience?	Is the technology established with more than one example in the real world?	Does the option cause unmitigable damage to a national site?	Is the measure likely to be acceptable to landowners?
	Is the location feasible/ Flexible?		Does the option cause unmitigable damage to a heritage site/recreation use?	Is the measure likely to be acceptable to EA and Natural England?
	Is the option likely to be granted any necessary consent?			Does the option cause significant negative socio-economic impact that cannot be mitigated?


The detailed screening questions are summarised in Table D9.8. Guidance for each question has been developed along with scorings and weightings. Again, assumptions are captured and any overrides justified where better information was available.

During the options screening process we consulted external stakeholders through the WRW pre consultation stakeholder events in Jan and February 2022. Figure D9.7 shows the three questions put to the stakeholders and Figure D9.8 shows the response gathered via online voting. The response to question 2, on how we approach our environmental destination was used, following approval via the WRW Senior Group meeting, as the basis of the screening scoring prioritisation. From the feedback from these forums a multi benefit approach was taken to the numeric prioritisation process.

Table D9.8: Detailed screening questions

Option benefit	Engineering Risk & Delivery Feasibility	Environmental Planning & Other Regulatory Constraints	Political & Customer Acceptability	Natural Capital – Provisioning Services	Natural Capital – Regulating Services	Natural Capital – Cultural Services	Carbon	Cost
What timeframe will this be delivered in?	How developed is the scheme?	Does the option require any consents? (EA, NE, Planning, etc.)	Is the option likely to be completely unacceptable to local residents?	Is there surface water benefit?	Is there flood management benefit?	Are there social benefits?	Does it increase carbon sequestration?	Is the capital expenditure high, medium or low?
		Is there a Water Framework Directive (WFD) benefit?	Have landowners expressed interest?	Is there groundwater resource benefit?	Is there habitat creation?	Are there negative impacts on recreation?	What is the carbon footprint of implementation ?	Is the operational expenditure high, medium or low?
				Is there water quality benefit?	Are there improvements to fish passage?	Is there any benefit to other sectors?		
				Are there air quality benefits?	Are there improvements to fish passage?	Are there opportunities for volunteering?		
				Are there benefits to managing the water resource regime?	Is there improved habitat for species of interest?	Are there opportunities for education?		
				Are there negative impacts on agriculture/forestry /fishing?	Are there habitat connectivity benefits?			
				Will there be provisioning service enhancements?	Are there soil health benefits?			
					Can the measure be used for other scheme BNG requirements?			

Figure D9.7: Questions asked of stakeholders in pre-consultation WRW workshops Jan / Feb 22



ELECTRONIC VOTING

1. Which level of Environmental Ambition would you support?
 1 = Level 1 2 = Level 2 3 = Level 3 4 = Don't know / can't say

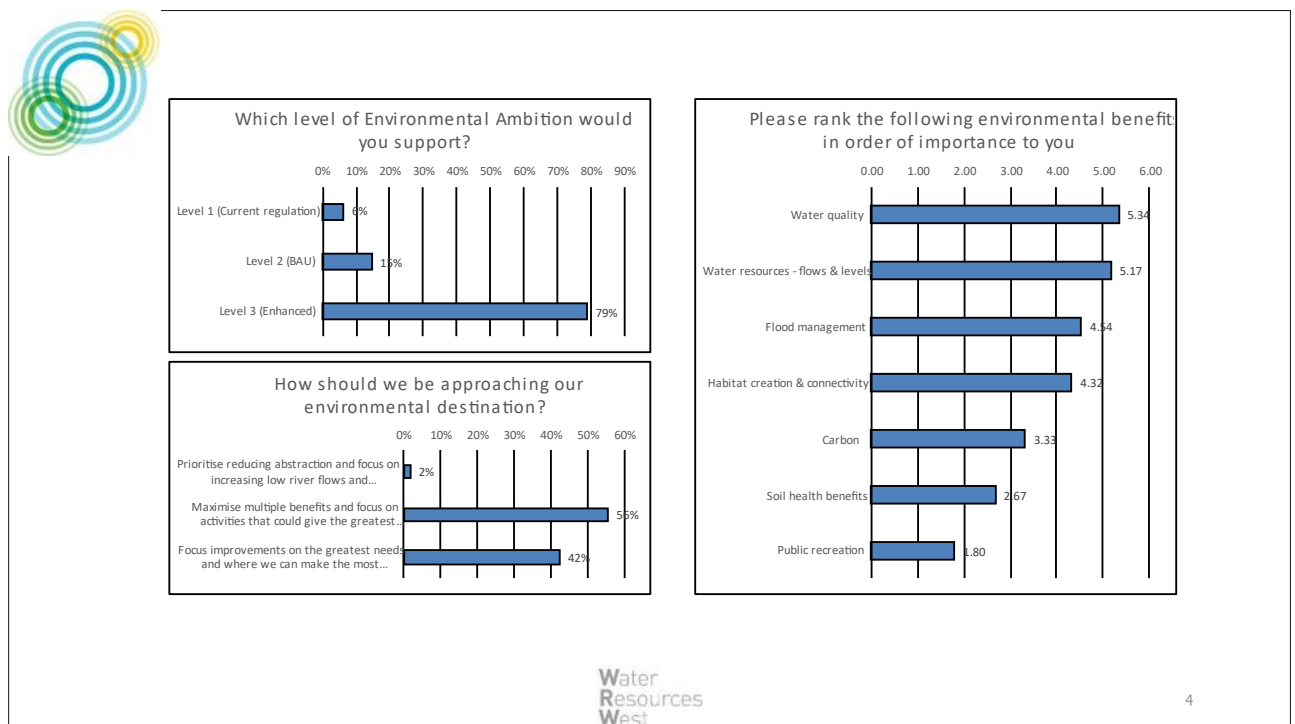
2. How should we be approaching our environmental destination?
 1 = Prioritise reducing abstraction and focus on increasing low river flows and groundwater levels
 2 = Maximise multiple benefits and focus on activities that could give the greatest overall improvement to rivers and water bodies
 3 = Focus improvements on the greatest needs and where we can make the most difference, recognising that each catchment will have different needs
 4 = don't know / can't say

3. Please rank the following environmental benefits in order of importance to you [drag and drop]

- Water resources- flows & levels
- Water quality
- Flood management
- Habitat creation & connectivity
- Soil health benefits
- Carbon
- Public recreation

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Figure D9.8: Voting results from pre-consultation WRW stakeholder workshops Jan / Feb 22



One of the objectives of the prioritisation was to identify some early options to take forwards to consider for implementation in water company AMP8 WINEP or other route. Therefore 4 options in this catchment were taken forwards to the high priority list category, and the remaining as medium priority.

During the stakeholder engagement phase, we also fill information gaps including water resource related National Nature Reserves or Local Nature Reserves Local (including Wildlife Sites, Wildlife Trust Nature Reserves, RSPB Reserves) and priority species and supporting habitats.

An evidence report has also been collated for each higher risk waterbody based on available data and existing reports provided by water companies and stakeholders. These evidence reports will be used as a starting point for refining environmental destination needs and AMP8 investigations.

Following high level screening and detailed screening we met again with the stakeholders to review the findings and gather feedback, which was used to make adjustments to the options priorities, and final prioritised constrained lists of options have been produced. These options lists are shown in Section D10. Following the section workshop in the River Idle catchment a meeting and visit with a farming abstractor group has also been undertaken to gain a better understanding of how they use and manage water and their future abstraction needs.

We are currently taking four options forward for further assessment and cost benefit assessment. These are listed in Table D9.9. We will consider taking two or more of these options for early Environmental Destination implementation options in the AMP8 Water company WINEP which improve catchment resilience, building on the AMP7 environmental measures that we are implementing in our current plan. The other water companies in these catchments will also be considering shorter term actions. These actions would run in parallel to further investigations that we propose to include in the AMP8 Water company WINEP.

Other parties and funding routes can also be explored by other regulators and stakeholders. These initial catchment plans provide a list of options in the catchments that would contribute to the water resources improvements and future resilience of the catchments. By publishing these plans and continuing to engage with the core stakeholder group and Severn Trent and WRW strategic stakeholders we will be promoting further action by others.

Figure D9.9 outlines a concept of how funding from us, and other water companies, via the WINEP Environmental Destination implementation driver in AMP8, could potentially be used to attract further funding and working with stakeholders in the catchment to bring catchment improvements.

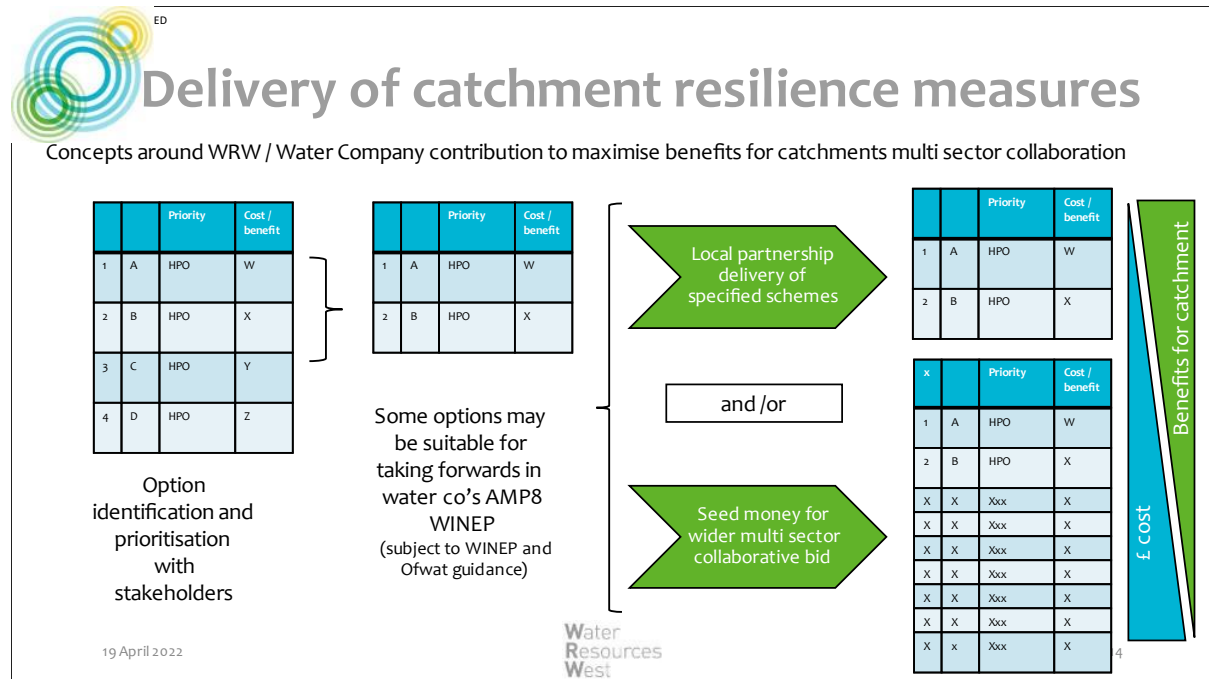
Table D9.9: Catchment resilience options being taken forwards for further evaluation

ID	Option Description	Benefits	Risks
Idle_43 (SVT)	Poulter & Clumber wetland and flood meadow restoration with natural flood risk management and aquifer recharge	Improves water quality, flood management, biodiversity. Enhanced recharge - trade off against future reductions.	Water resources benefit uncertain: how much could recharge be enhanced? GW body will remain poor.
Idle_41 (SVT)	Rainworth Water wetland creation as part of local CaBA masterplan	Improved water quality, habitat, hydromorphology. Enhanced recharge - trade off against future reductions. Improved flow regime in Rainworth Water.	Landowner permission required. May require protected species and archaeological surveys
WMS_02 (SVT)	Worfe on the Wildside extension and Worfe Water Environmental Improvement Fund for sedimentation control, fish barrier removal and , tree planting	Improve ecological resilience, Reduced sedimentation, Improved access for fish, Improved water quality.	None known
WMS_39 (SVT)	Bromsgrove Brooks building on the Love Your River work, STWs Sanders	Improved hydromorphology,	None known

Park restoration and the work of NWWM. Bromsgrove is important as one of the last breeding locations of water voles, it also suffers flooding and low flow issues.

Improved ecological resilience, Flood alleviation, Wetland creation – biodiversity, water vole habitat. Flow enhancement, groundwater recharge

Figure D9.9: Concepts around maximising benefits and funding in catchments to bring multi benefits for the environment



D10 Catchment options

This section includes tables of the options identified through the stakeholder engagement process in the two priority catchments:

- the River Idle in the Trent River Basin District and
- the Worcestershire Middle Severn (the rivers Worfe and Stour) in the Severn River Basin District.

The process of options identification and prioritisation is described in Section D9 above.

These options are included for information. Currently we are taking four options forwards for further assessment (see Table D9.9) to consider for inclusion in the AMP8 WINEP for implementation to build catchment resilience in the short term, in parallel to undertaking an extensive investigation programme and options appraisal for the longer term Environmental Destination for our region.

Table D10.1: Idle Prioritised Options Table

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
Idle_43	Poulter/ Clumber flood meadow restoration/N FM	Wetland/flood meadow restoration and NFM/MAR/WWNP in Poulter catchment. This may include 1) flood meadow restoration at Carburton upstream of Clumber Park, 2) flood meadow restoration at Cuckney/Norton, 3) slow the flow type measures to enhance recharge and manage flooding, 4) 2019 project dropped due to lack of funding/interest post-COVID.	HPO	Improves water quality, Flood management, Wetland creation - biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
Idle_19	Retford flood risk	Work with existing flood management programme (currently scoping/optioneering) to encourage NFM measures that will enhance recharge.	HPO	Improves water quality, Flood management, Wetland creation - biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
Idle_07	Wetland creation Bawtry/Idle Washlands SSSI restoration	Create biodiversity-rich flooded wetland u/s of Misson/Bawtry near confluence with Ryton. Store winter flows, restore floodplain habitats/Idle Washlands. Existing proposal was very developed as Silver Grasslands project, good partner/landowner buy-in but failed lottery funding. This option intends to build upon existing work already undergoing in this area.	HPO	Improves water quality. Flood management. Benefits for conveyancing/drainage issues? Wetland creation - biodiversity. Benefits for Misson Line Bank (SSSI) and Misson Training Area (SSSI)? Enhanced recharge - trade off against future reductions.	This area may be too far distant from STWL sources to have an appreciable benefit for STWL.
Idle_48	New Sources – Nottinghamshire Confined Aquifer	Intention to adjust abstracting groundwater further away from the outcrop areas and move East with boreholes.	HPO	Improved water quality for PWS (lower Nitrate). Abstraction impact on waterbodies potentially lower as more spread out and buffered by storage of aquifer; may help with conjunctive use.	Other water quality issues arising from older, deeper water?

Idle_01	Mansfield flood meadow	Flood meadow restoration near Mansfield STW (Maun catchment). Use existing flood ditch (historical flood meadow) to balance seasonal flow.	MPO	Improves water quality, Flood management, Wetland creation - biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
Idle_04	New WTW from River Idle	(WRMP09 Option 12-31) New intake on the River Idle between Bawtry and West Stockwith, pumping into a new raw water storage reservoir. A new WTW would also be required.	MPO	Could help resolve conveyancing/drainage management issues. Benefits for Idle Washlands SSSI (water level management)? Additional source of water that could replace future reductions in groundwater abstraction.	Idle currently closed to abstraction even at Q30. Will EA open at high flows? Can a PWS source be operated in such a way that drainage problems are resolved? Would there be buy-in without this? Intermittent (and unpredictable) supply - during high flows only. EA study on impact of abstraction at high flows 'inconclusive'.
Idle_18	Worksop flood risk	Work with existing flood management programme (currently scoping/optioneering) to encourage NFM measures that will enhance recharge.	HPO	Improves water quality, Flood management, Wetland creation - biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
Idle_20	Farm storage in lower Idle	Priority catchment work in April 2021 piloted farm storage of peak flows. Could this be scaled up? The Idle is currently closed to abstraction even at Q30. Possibly water resource benefit. Likely flood management benefits.	MPO	Flood management. Source of water to farms - encourage to trade/reduce groundwater licences?	Idle currently closed to abstraction even at Q30. Will EA open at high flows? WR benefit uncertain.

Idle_22	Calverton to ASR in Idle and Torne	WRMP24 option 202. Collaboration with the Coal Authority to transfer 10-30MI/d that they need to abstract due to rising mine water to ASR in the currently over abstracted Idle and Torn groundwater unit. Water would need significant treatment which cost would be split between STW and Coal Authority.	MPO	Wetland creation (one option to clean the mine water). 10-30MI/d that could replace future reductions in groundwater abstraction.	Cost of treatment Risk of contamination of aquifer
Idle_23	Calverton to River Trent and later abstract	WRMP24 option 203. Collaboration with the Coal Authority to transfer 10-30MI/d that they need to abstract due to rising mine water to the River Trent. STW could then abstract water that has been diluted further downstream.	MPO	10-30MI/d that could replace future reductions in groundwater abstraction.	Water quality impact on Trent
Idle_24	Enhanced demand management beyond WRMP19	Further steps to reduce leakage, reduce demand and improve water efficiency in Notts beyond targets already in WRMP19	MPO	Reduces demand.	What is already going into WRMP24?
Idle_41	Rainworth Water wetland creation	CaBa Rainworth Water Masterplan - the creation/improvement of wetlands in Rainworth Water to enhance biodiversity and recharge. It includes: 1) creating multiple managed wetlands that will collect runoff from the A60, 2) re-naturalise the riverbank at Joseph Whitaker school, 3) feasibility study to assess the creation of a wetland area in school grounds, 4) allow the river to break its banks and re-naturalise within the bounds of the local nature reserve, 5) extend existing small ponds into a series of wetlands, 6) Forestry Commission/NWT project Sherwood Pines, 7) feasibility study for urban runoff, 8) a new complex water quality project linked to other Rainworth projects. This option will follow on from the current delivery project,	MPO	Wide range of benefits for catchment depending on measures selected. Improved water quality, habitat, hydromorphology. Enhanced recharge - trade off against future reductions. Improved flow regime in Rainworth Water.	Landowner permission required Archaeological interest - may require investigation. Wildlife interest - may require protected species survey

incorporating further environmental measures building upon previous work.

Idle_42a	Flexible abstraction reform pilot	Pick one or more case study from to deliver in AMP8 under time-limited licence	MPO	Opportunity to make best use of available groundwater and surface water resource across multiple sectors.	Need to get approval from EA for any short-term licence changes Willingness of non-PWS abstractors to engage will be crucial
Idle_42b	Catchment-wide flexible abstraction reform	Case studies and collaborative working to promote flexible abstraction trading.	MPO	Opportunity to make best use of available groundwater and surface water resource across multiple sectors.	EA licensing approach may limit some opportunities (e.g., peak flow storage)
Idle_44	Revisit Vicar Water augmentation	Revisit rejected augmentation options from AMP6 RSA Options Appraisal: AMP6 constrained list VW02: New augmentation or supply to source ponds VW07: Augment from Clipstone PS or new borehole	MPO	Potentially a more effective way to restore flow to Vicar Water than GW abstraction reductions, with less risk of groundwater flooding.	If from new source, would need to take off existing abstraction. Cost to run for long period? Uncertain water quality, especially near source ponds.
Idle_45	Revisit Bevercotes Beck augmentation	Revisit rejected augmentation options from AMP6 RSA Options Appraisal: AMP6 constrained list BB06: New augmentation source	MPO	Potentially a more effective way to restore flow to Bevercotes Beck than GW abstraction reductions, with less risk of groundwater flooding.	If from new source, would need to take off existing abstraction. Cost to run for long period?
Idle_46	Revisit Rainworth Water augmentation	Revisit rejected augmentation options from AMP6 RSA Options Appraisal: AMP6 constrained list RW02,05,07: Augmentation from new source	MPO	Potentially a more effective way to restore flow to Rainworth Water than GW abstraction reductions, with less risk of groundwater flooding.	If from new source, would need to take off existing abstraction. Cost to run for long period? Depending on location of borehole, may lose much of the augmentation water to leakage through base of stream (fissured). Potential WQ disbenefits with STW augmentation option.

Idle_16	Sutton-in-Ashfield river restoration	"Daylighting the Maun" - EA project (in the pipeline) with Local Authority. Maun currently culverted through park.	LPO	Improved ecological resilience.	Is this already happening? What is the benefit for WRW getting involved?
Idle_25a	Projects from Bevercotes desk study (riparian)	Range of riparian and WQ measures in Bevercotes Beck. Some will be picked up by STWL AMP7 Environmental Measures, but others could be delivered through ED. Measures include: -Protection of areas vulnerable to erosion -Leaky willow dams in agricultural drainage ditches -Diversification of channel morphology and flow conditions by: a. creation of vegetated in-channel pool-riffle sequences, b. installation of woody debris, meanders and berms in a widened riparian corridor along the length of the watercourse	LPO	Improved ecological resilience, Habitat improvements, Improved water quality.	Uncertain what will already be covered by AMP7 EM.
Idle_25b	Projects from Bevercotes desk study (sewage treatment)	Phosphate stripping of sewage effluent.	LPO	Improved water quality/ecological resilience.	None known
Idle_47	River support and downstream re-abstraction	Seasonal operation of PWS sources into river for downstream re-abstraction	LPO	None known	None known

Table D10.2: WMS Prioritised Options Table

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
WMS_02	Worfe on the Wildside extension and Worfe Water Environmental Improvement Fund	Previous river/catchment restoration project building on AMP7 STW environmental measures, CaBA partners and large landowners keen to keep working. Collaborate with existing project in Worfe. Holistic catchment approach. Possibly tackle sedimentation, fish barriers, tree planting, sedimentation. R7P project ENV068: The River Worfe catchment has ongoing land management issues resulting in ongoing WFD waterbody failures of all waterbodies within the catchment	HPO	Improve ecological resilience, Reduced sedimentation, Improved access for fish, Improved water quality.	None known
WMS_39	Bromsgrove Brooks	Working alongside partners at North Worcester Water Management, Worcestershire Wildlife Trust and the local community to continue to improve the towns brooks for people and Wildlife and deliver Bromsgrove further environmental measures. This would build on the Love your river Bromsgrove work, STWs Sanders Park restoration and the work of NWWM. Bromsgrove is important as one of the last breeding locations of water voles, it also suffers flooding and low flow issues. (R7P project ENV058)	HPO	Improved hydromorphology, Improved ecological resilience, Flood alleviation, Wetland creation - biodiversity Water vole habitat. May include alternative approaches to improving flow regime or enhanced recharge that may be traded off against future abstraction reductions.	None known
WMS_09	Salmon in the Stour/Smestow Fish access	Collaborate with/expand on existing Salmon in the Stour project (Severn Rivers Trust/EA). Remove barriers or create fish passes in Smestow and/or Stour catchment. Opportunities to improve WFD failings including habitat, water quality and fish passage.	HPO	Improved habitat for salmonids and access to tributaries at lower flows. Improving fish access could reduce requirement for future abstraction reductions	WR benefit uncertain: are fish the main driver for needing to improve flows in these waterbodies or would abstraction reductions still be needed in waterbodies with flow failures.

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
WMS_25	Upton Warren Hen Brook Enhancements	Hen Bk pollution from STW, opportunity to work together to enhance channel (reprofile) create additional ponds (offline)	MPO	Water quality improvement, Improved hydromorphology, Improved ecological resilience.	None known
WMS_04	Flow attenuation on Wesley Brook u/s Shifnal	Work with Shropshire Council and EA to develop NFM opportunities in Wesley Brook. This option will build upon a project that is currently being undertaken in the area.	MPO	Flood management, Wetland creation - biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
WMS_10	NFM/flow attenuation in Worfe u/s of Hilton a.k.a Hilton Flood Alleviation Scheme (R7P)	Work with Shropshire Council and EA to develop NFM opportunities upstream of Hilton R7P project ENV052: Shropshire Council are currently investigating the possibility of a flood alleviation project in Hilton to protect 14 properties at risk of flooding from the Hilton Brook. The exact format of this project is not yet known and options for upstream storage and/or NFM are being considered. An assessment of the recent flooding is currently being undertaken as part of a Section19 report. This option will build upon a project that is currently being undertaken in the area.	MPO	Flood management. Wetland creation - biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
WMS_19	Woodland Grange Flood Alleviation and Water Vole Habitat	Improve quantity and quality of wetland habitat and improve water environment; clear Himalayan Balsam, de-silt balancing ponds, tree-work and channel feature enhancement. This will increase flood storage and biodiversity and create water vole habitat.	MPO	Flood alleviation, Wetland creation – biodiversity, Water vole habitat. Enhanced recharge - trade off against future reductions.	Exact location unclear WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
WMS_01	Bridgnorth - rewilding & rewetting	Rewilding, flood plain reconnection/rewetting in Worfe catchment near Bridgnorth. EA has been approached by interested landowner. At least 1 farm cluster identified, opportunity for multi-benefit collaboration.	MPO	Flood management, Wetland creation - biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
WMS_08	NFM or similar in Salwarpe catchment	Fund NFM measures or other peak flow storage to resolve flooding issues and improve flow regime in Spadesbourne and Battlefield Brooks. Expand on existing flood storage work in Salwarpe and STWL RSA environmental measures.	MPO	Flood management, Wetland creation - biodiversity. Could enhance recharge to Bromsgrove sandstone aquifer, offset against reductions to groundwater abstraction.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
WMS_20	Land Management: Bromsgrove Brooks	EA have identified that headwaters are suffering from agricultural diffuse pollution. Initially, 4 farms will be targeted in this area for improvements; farm scale reports on soil and water management in the Salwarpe catchment.	MPO	Water quality improvement, Improved ecological resilience.	None known
WMS_13	Soil management	Soil management (reduce compaction, reduce intensity of farming). Possibly through ELMS scheme or existing STWL programmes (e.g. STEPS, B4B etc.)	MPO	Reduces flooding, Improved soil, health/sustainability of farming, Reduce soil erosion, WQ benefits, Climate change/carbon. May improve recharge/reduce runoff; trade off against future abstraction reductions.	WR benefit uncertain Yield implications for farmers.
WMS_27	River Severn Naturalisation	The project would aim to implement measures to increase marginal and bankside habitat features to increase ecological diversity and where feasible aim to restore the historic connectivity to the floodplain	MPO	Improved habitat and biodiversity Floodplain reconnection, flood alleviation?	None known
WMS_30	Battlefield Brook Water vole Habitat Creation	Creating backwash pools and water vole refuges along with providing FRM benefits	MPO	Water vole habitat.	None known
WMS_24	Catshill Marsh Development	With NWWM and WWT look at improving the development to improve the remaining marsh e.g., throttle brook to create a better marsh area	MPO	Flood alleviation, Wetland improvement – biodiversity.	None known

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
WMS_12	Riparian tree planting, buffer strips	Riparian tree planting, buffer strips. Possibly through ELMS scheme or existing STWL programmes (e.g. STEPS, B4B etc.)	MPO	Improved resilience of fish, Improved WQ (temp, nutrients, sediment runoff), Tackles rural pollution, Climate change, Biodiversity/habitat benefits. Could reduce flow requirements in some waterbodies; trade off against future abstraction reductions.	WR benefit uncertain.
WMS_31	Hoo Brook Water level management	The installation of a series of ramps or similar to hold water up in the Hoo Brook just above the confluence with the River Stour. This work is required to stop the northern end of Wilden Marsh SSSI from drying out. Recent developments nearby the proposed site has been noted and will be taken into consideration to ensure that there are not any adverse effects upon this development.	MPO	Habitat restoration – biodiversity. Improved flow regime in Hoo Bk and water level management in SSSI - trade off against future abstraction reductions?	None known
WMS_16	Lickey End Flood Alleviation Scheme	Purchase of a field to create biodiversity benefits and a flood storage area via a throttle weir. This will protect Bromsgrove. The area will be designed to include access for maintenance and habitat for water voles as well as biodiversity enhancement.	MPO	Flood alleviation, Wetland creation – biodiversity. Enhanced recharge - trade off against future reductions.	WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
WMS_36	Battlefield Brook Channel Restoration	Re naturalisation of channel of Battlefield brook parallel to M5 motorway. Creation of meanders, backwaters, installation of large woody debris. Tree planting.	MPO	Improved hydromorphology, Improved ecological resilience.	None known
WMS_37	Battlefield Rural Diffuse Pollution Project	Fence farmland between Sander Park and the M5 to restrict livestock access to the brook.	MPO	Water quality improvement, Improved ecological resilience.	None known

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
WMS_11	Fund farm storage infrastructure/rain water harvesting	Fund farm storage infrastructure in exchange for reduced GW abs?	MPO	Reduce flooding downstream Improved resilience for farms. Reduced non-PWS GW abs by making more use of peak flow storage; trade off against future PWS reductions.	Small volumes involved unlikely to be cost-beneficial; significant deficits will remain.
WMS_09	Salmon in the Stour/Smestow Fish access	Remove barriers or create fish passes in Smestow and/or Stour catchment. Collaborate with/expand on existing Salmon in the Stour project (Severn Rivers Trust/EA).	MPO	Improved habitat for salmonids and access to tributaries at lower flows. Improving fish access could reduce requirement for future abstraction reductions	WR benefit uncertain: are fish the main driver for needing to improve flows in these waterbodies or would abstraction reductions still be needed in waterbodies with flow failures.
WMS_28	Stour Weirs	There are a number of weirs on the River Stour that form a complete barrier to the movement of fish. The quality River Stour has improved significantly in recent years and many fish species are now present, including salmon and trout.	MPO	Improved access for salmonids to upper reaches of Stour.	None known
WMS_05	New source on River Severn	Make use of large surplus on Severn to replace groundwater abstractions with increased surface water abstraction (new source)	LPO	Opportunity to manage Severn flow regime better through Severn Reg Review. River Severn has WRGIS Q95 surplus of >100 MI/d throughout WMS catchment.	Lots of EA sensitivity around Severn (supporting habitat for SAC estuary, principal salmon river). Surplus is created by Severn Regulation which causes issues further upstream. Will need to review holistically and consider outcomes of Severn Reg Review. Also resilience concerns for water supply if balance shifts too much towards surface water - groundwater sources are an important asset.

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
WMS_06	Increase abstraction from existing sources on River Severn	Make use of large surplus on Severn to replace groundwater abstractions with increased surface water abstraction (existing sources)	LPO	Opportunity to manage Severn flow regime better through Severn Reg Review. River Severn has WRGIS Q95 surplus of >100Ml/d throughout WMS catchment.	Lots of EA sensitivity around Severn (supporting habitat for SAC estuary, principal salmon river). Surplus is created by Severn Regulation which causes issues further upstream. Will need to review holistically and consider outcomes of Severn Reg Review. Also resilience concerns for water supply if balance shifts too much towards surface water - groundwater sources are an important asset.
WMS_07	New source on Borle Brook	Make use of c. 6Ml/d surplus on this waterbody (new surface water source) to replace groundwater abstractions in Worfe catchment	LPO	Borfe Bk has WRGIS Q95 surplus of 6.8Ml/d. Could utilise this to replace groundwater abstraction in Worfe.	Potential for impact on Borfe Bk. Distance from relevant control groups possibly prohibitive - where would it be treated, how far would water need to move? Infrastructure requirements likely disproportionate to available resource.
WMS_14	Blakedown Brook augmentation	Revisit augmentation options rejected in AMP6 OA. Either: [2] New borehole adjacent to Ganlow or Clent Brook in upper catchment [3] New borehole at Roundhill or adjacent to pipeline [10] Pipeline from Broome Lodge (existing augmentation borehole)	LPO	More effective way of improving flow regime than large scale abstraction reductions.	Uncertainty whether flow regime requires augmenting. Uncertainty around GW quality and impact on SSSIs. Would need to reduce some GW abstraction anyway to provide licence for augmentation.
WMS_15	Spittle Brook (Checkhill Bogs) augmentation	Revisit augmentation options rejected in AMP6 OA to rewet Spittle Bk to confluence with Smestow	LPO	More effective way of improving flow regime than large scale abstraction reductions.	AMP6 flow trial showed that much augmentation water would be lost by the end of the SSSI due to leakage through the stream bed. Would need to reduce some

Option ID	Option Name	Option Description	Priority	Benefits	Disbenefits
WMS_32	River Stour Water Quality including Pollutants on the Stour (including tributaries Hoo Brook and Blakedown Brook).	A model for collaborative working to improve water quality, including Hoo Brook and Blakedown Brook. It will aim to tackle sources of urban pollution in Kidderminster and Stourport-on-Severn.	LPO	Water quality improvement Improved ecological resilience	GW abstraction anyway to provide licence for augmentation. None known
WMS_38	River Stour Ecological Enhancement and Stourport floodplain meadows	Historically the area has been canalised. It is owned by the council and an otter holt was installed, since then it has not received much attention and could be enhanced for ecology and improved from its current canalised state. Also opportunity to restore and recreate flood plain meadows and fen on the River Severn corridor in Stourport . (R7P project ENV001)	LPO	Habitat restoration – biodiversity. Improved hydromorphology. Improved ecological resilience. Enhanced recharge - trade off against future reductions.	Low priority waterbody for WRW WR benefit uncertain: how much could recharge be enhanced? GW body will remain Poor.
WMS_40	Catchment monitoring cooperative	More rigorous monitoring of catchment using citizen science (based on similar 3-yr project in Teme catchment).	Monitoring	Community engagement Improved conceptual understanding/data	None known

D11 Defra Abstraction Plan

Defra first published its Water Abstraction Plan in May 2018 which sets out its approach in some detail up to December 2022 and ultimately to 2027. The measures described in our WRMP24 will support the achievement of the Water Abstraction Plan goals. The approach has three main elements:

- making full use of existing regulatory powers and approaches to address unsustainable abstraction and move around 90% of surface water bodies and 77% of groundwater bodies to the required standards by 2021;
- developing a stronger catchment focus – bringing together the EA, abstractors and catchment groups to develop local solutions to existing pressures and to prepare for the future. These local solutions will:
 - protect the environment by changing licences to better reflect water availability in catchments and reduce the impact of abstraction;
 - improve access to water by introducing more flexible conditions that support water storage, water trading and efficient use;
- supporting these reforms by modernising the abstraction service, making sure all significant abstraction is regulated and bringing regulations in line with other environmental permitting regimes.

The two most relevant aspects of the Water Abstraction Plan are moving the water resources regulatory regime into the Environmental Permitting Regulations (EPR) and the continuing need to take action on unsustainable abstraction.

A further government consultation on moving water resources regulation into EPR closed on 22 December 2021. In that consultation, there were no proposals to reduce licence quantities as abstraction licences transition to being EPR permits. The Water Abstraction Plan goes on to state that: ‘The Environment Agency will make full use of its existing powers over the coming years to amend abstraction licences to protect the environment and will prioritise changes to licences having the greatest impact’.

Water Resources Planning Guidance for England and Wales states that:

“You should not retain unused water on your licences that poses a risk of deterioration and is not justified by your water resources management plan. If you have any licences that fall in this category, you should plan to give them up. For companies in England or affecting England, see the supplementary guidance ‘actions required to prevent deterioration- England’ for further information. Where companies have any licences within Wales, you should consult Natural Resources Wales.”

For the water industry a number of mechanisms exist whereby abstraction licences can be changed:

- Through the Water Industry National Environment Programme (WINEP) mechanism we agree voluntary changes, to permanent or time limited licences, following investigation and options appraisal.
- Through time limited licence renewal process which includes a sustainability assessment;
- Through the application of variations to licences, for example when we undertake borehole capital maintenance on sites and need to vary aspect of the licences to reflect changes to the site infrastructure, when a sustainability test will also be applied;
- Voluntary revocation of disused licences;
- EA can use its powers under Section 52 of the Water Resources Act to revoke disused licences;
- If it is likely that deterioration will occur before an alternative solution can be implemented, the EA uses its powers under Section 52 of the Water Resources Act 1991

Time limited licences

For previous WRMP there has been a presumption for renewal for time limited licences (TLLs). There have been a number of policy changes since this time and the latest guidance on licence capping gives clear indication that the EA will use the renewal mechanism to make changes to abstraction licences to make them more sustainable. The January 2018, EA guidance 'Guidance on water resources investigations into the risk of WFD water body deterioration' does allow a risk based approach relating to the timing of the risk of no deterioration. This should impact when a licence change is made or when any new conditions come into force.

We have 51 TLLs, covering nine surface water abstractions and 42 groundwater abstractions. The renewal dates for these range between 2022 and 2034.

On renewal as with all abstractors we have to produce a justification of need and sustainability assessment. As part of our strategy to manage abstraction, to ensure that we do not cause environmental deterioration, we will provide a risk assessment relating to recent actual abstraction and growth predictions in line with our monitoring and risk assessment as outlined in section D4.

We have undertaken a risk assessment on the TLLs and for the most part anticipate being able to retain our current licences up to 2030 in line with our planning assumptions.

Borehole capital maintenance

Our groundwater sources for the most part are from borehole structures. These boreholes, like other structures, deteriorate over time and periodically we need to maintain or construct new boreholes to ensure the water quantity and quality from these sources of water. Where we substantially modify the structure or drill replacement boreholes we also need to make variations to our abstraction licences and in some circumstances undertake testing to evaluate any resulting environmental impact. Variations to licences provide the opportunity to review licence quantiles and no deterioration risk. We will work with the EA to ensure that we can continue to maintain our assets and the security of our public water supplies while we evaluate the risk and timing of any required licence changes to prevent deterioration of the water environment. A list of the sources under consideration in AMP7 and AMP8 are shown in Table D7.1.

Disused licences

We will assess our unused licences, a number of them have been added to the PR24 WINEP for No Deterioration investigations. Where we can see no future use for the sources we will look to surrender these licences as soon as is feasible.

For the fWRMP tables we have cross checked Table 1C and our PR24 WINEP and updated table 1c where required.

As per the EA's accompanying instructions for PR24, an investigation line has been included in WINEP for AMP8, the completions date for these investigations is March 2030. We will be undertaking internal consultation prior to the beginning of AMP8 to review these licences and the possibility of revocation. Once the approach is confirmed, we will either apply for revocation and seek to remove this line from WINEP or undertake an investigation into the deterioration risk of using this licence.

Table D11.1: sources with planned borehole capital maintenance in AMP7 and sources under consideration for maintenance in AMP8

AMP7	AMP8
Audley	Bratch
Bratch	Brockhill
Dimmingsdale	Budby
Ketford	Burcot
Lambley	Caunton
Lilleshall	Chaddesley Corbett
Milford	Clungunford
Neachley	Cresswell
Norton Racecourse Lane	Dimmingsdale
Rufford	Lilleshall
Sugarbrook	Milford
Washingstocks	Ompton
Westwood	Peckforton
Wildmoor	Tattenhall
Woodfield	The Hollies
	Webheath

D12 Invasive Non-Native Species (INNS)

Invasive non-native species (INNS) are animals or plants that have the ability to spread outside their native range, which are having a detrimental impact on the economy, wildlife or habitats. Of particular concern are species that are:

- New to the country;
- On the list of European Union concern;
- Listed on schedule 9 to the Wildlife and Countryside Act (1981), or;
- Not ordinarily resident in the wild.

Some of the activities that we undertake have the potential to create pathways to spread INNS. These activities include recreational activity at our sites and some of the activities we undertake when we treat water and waste water. As part of our supply network we transfer raw water between waterbodies and this can be a potential pathway for spreading INNS.

In AMP7, we have reviewed our current abstraction operations and future solutions to determine the risk spreading INNS or create pathways which increase the risk of spreading INNS.

For our existing operations we have completed a risk assessment across all of our assets and business activities in AMP7. A Business Wide Biosecurity Plan has been developed that covers all our activities, as well as plans for our visitor sites. Our biosecurity plans identify realistic, pragmatic and cost-effective procedures and behaviours that reduce the risk of INNS introduction and establishment.

We have undertaken individual risk assessments on most of our existing raw water transfers using the INNS risk assessment tool developed by the EA. The licences reviewed are listed in Table D12.1 Transfer biosecurity plans have been developed, which include actions such as biosecurity measures and longer term plans to continue to test and develop feasible mitigations measures.

Table D12.1: List of major raw water transfers in our region where a AMP7 risk assessment has been completed

Licence	Description of transfers
3/28/38/18	River Ashop and River Noe into Derwent reservoirs (Derwent and Ladybower)
18/54/10/0717, 18/54/10/07 & 18/54/12/053	River Avon to Draycote Reservoir and Leam catchment
03/28/40/121	River Derwent to Ogston and Carsington Reservoirs
03/28/36/147 & 03/28/36/148	River Dove to Staunton Harold & Foremark reservoirs in Trent catchment
03/28/56/030	Rothley Brook and Swithland Reservoir to Cropston Reservoir
n/a	Elan Valley Aqueduct from Elan Valley Reservoirs to Frankley

D13 AMP8 Water Industry Environment Programme and other planned catchment activities

D13.1 Water Resource Investigations planned for AMP8

Ofwat provided consultation feedback to WRW about the investigations that are needed to better understand the links between abstraction and the environment locally and the type of option that may be most beneficial in that context. The proposed investigations are important because solutions could include reductions in overall abstraction, changes in how abstractions operate (such as changing river flow related conditions or seasonal variations) or a range of other measures. Local water management solutions have the potential to be lower cost and to bring greater benefits than simply replacing the water lost with another supply option that is likely to bring its own environmental impacts.

We have several investigations in England, that have been identified within the AMP8 WINEP to help us better understand the environmental impacts of any activity. The investigations are summarised below. A significant component of the investigations is options development and we agree local options would be more sustainable and affordable.

The achievement of the environmental objectives has a co-dependency between public water supply and non-public water supply abstractions. The Environment Agency is leading on working with the non-PWS sector and WRW will assume that the Agency is working to the same guidance as provided to the water industry via the Water Resources Planning Guideline and the WINEP methodology. Water resource investigations we have included in the AMP8 WINEP:

- Preventing deterioration investigations (unused licences) – 19 sites within the following catchments: Derbyshire Derwent, Lower Trent & Erewash, Lower Wye, Severn Corridor, Shropshire Middle Seven, Staffordshire Trent Vale, Tame Anker & Mease, Teme, Warwickshire Avon: Investigate implication of using licences that have not been used for at least 4 years to prevent deterioration from current status within the catchments, by March 2030
- Preventing deterioration investigations (priority C) – 25 sites within the following catchments: Bristol Avon & Little Avon, Dee, Lower Wye, Severn Corridor, Severn Vale, Staffordshire Trent Vale, Tame Anker & Mease, Teme, Warwickshire Avon: Investigate the risk of WFD deterioration to water bodies associated with each Priority C source, by March 2027
- Preventing deterioration investigations (priority D) – 26 sites within the following catchments; Bristol Avon & Little Avon, Dee, Derbyshire Derwent, Idle & Torne, Lower Wye, Severn Corridor, Shropshire Middle

Severn, Soar, Staffordshire Trent Vale, Tame Anker & Mease, Warwickshire Avon, Weaver & Dane, Dove: Investigate the risk of WFD deterioration to water bodies associated with each Priority D source, by March 2030

- River Teme SSSI investigation:—Investigation into public water supply abstractions in the catchment upstream of the River Teme SSSI and contribution to meeting the favourable condition targets for flow attributes, by April 2027
- River Clun SAC investigation – Investigation into public water supply abstractions in the catchment upstream of the River Clun SAC and contribution to meeting the favourable condition targets for flow attributes, by April 2027
- HMWB Mitigation measure investigation – Investigate missing mitigation measures in 2 WR Heavily Modified Water Bodies Stanford Reservoir and Draycote Water, by December 2026
- Environmental Destination early investigations and options appraisals– taking place throughout the region at Audley Groundwater Source, Dee Alford Brook, Dee Mardy, Diddlebury Source & Oakley Farm Source, Dove, Idle, Lower Trent and Erewash, Middle Severn, Severn Uplands, Shropshire Severn Vale, Staffordshire Trent Valley, Tame Anker and Mease, Teme Catchment, Warwickshire Avon, Worcestershire Middle Severn River Worfe & River Stour, Wye Catchment Lydbrook Source: Early investigations to inform WRMP and PR29 to enhance the water environment to meet the outcomes of the regional plan, by December 2028
- Environmental Destination later investigations and options appraisals – taking place throughout the region at; Idle, Lower Trent and Erewash, Staffordshire Trent Valley, Dove, Tame Anker and Mease, Worcestershire Middle Severn River Worfe & River Stour, Shropshire Middle Severn, Severn Uplands, Severn Vale, Warwickshire Avon, Dee Alford Brook: Later investigations to build on WRMP and PR29 and prepare for PR34, by March 2030

In line with regulatory expectations, the investigation programme also includes a WINEP regional options appraisal. We will work with the regional group, Water Resources West, and other stakeholders to deliver this work. It broadly has the following scope, which we will refine with the EA:

- Focus on supporting consistency of approach across the catchment investigation - scenarios, environmental assessment of options (e.g. SEA) etc.
- Dovetail with national work, e.g. UKWIR project
- Consider how climate change is included in the assessments
- Benefits assessment (quantification) for licence changes/reductions
- Review whether changes to abstraction will bring benefits elsewhere (e.g. potential to increase abstraction/new water resources options)
- Consistency of scenarios, environmental assessment of options (e.g. SEA), etc.

We continue to discuss future abstraction licensing strategy and WFD deterioration risk management with the Environment Agency and we expect decisions on licence changes to be communicated through the ongoing WINEP engagement. We expect these investigations will lead to finalising what licence changes need to be implemented and will be tracked via the WINEP process.

D13.2 Principles and requirements from the Environment Agency

The Environment Agency noted that WRW should ensure it takes account of the principles and requirements in the ‘Draft Environmental Destination options appraisal principles’. We are part of WRW and the principles that are set out in the appraisal have been included in our plan, as shown in Table D13.1 below.

The Environment Agency also noted that WRW should ensure it takes account of the principles and requirements in its ‘Environmental Destination narrative’. The principles set out in the narrative have been included in our plan as explained after the table.

Table D13.1. How we have taken into account the Environment Agency ‘Draft Environmental Destination options appraisal principles’

Principle	How it has been reflected in the WRW plan
Providing a range of scenarios / minimum requirement for the plans is the 2050 BAU+ locally verified scenario	We have included a range of scenarios in the plan including the Enhanced, BAU+ and a plausible low scenario. In developing the low scenario consideration was given to the adaptive waterbodies in the water company review stage. For our area there is little difference between the BAU+ and adapt licence reduction scenarios and further catchment/waterbody investigations are needed and proposed in our 2025-30 WINEP.
Take into account Enhanced scenario when developing plans	Our regional plan sets out the BAU+ as our preferred pathway with the option to adapt up to the Enhanced scenario. In relation to groundwater licence reductions in England, to enhance and protect the environment, the plan uses the BAU+ scenario in our baseline plan and uses the Enhanced and low scenarios to develop an adaptive plan (Section 5 below). We have not used the Enhanced scenario in our preferred plan as the differentiation between BAU+ and Enhanced was small (29MI/d ~6%) and outweighed by other uncertainties in the assessment at this time.
Use locally available evidence such as catchment specific groundwater modelling to inform and revise scenarios to identify best estimates of required abstraction changes	We are committed to licence caps to protect the environment and water companies have investigations in both the 2020-25 and 2025-30 WINEP too. Since the draft plan was published, we have continued to work with the Environment Agency to agree the timing and prioritisation of abstraction licence capping that will be required to avoid causing WFD status deterioration, which is supported through catchment specific modelling results. An initial review of the 2050 reductions has also been undertaken and further investigations are planned in 2025-30 to reduce the uncertainty.
Pace and extent to which actions are planned and that delaying action is a high-risk strategy	We recognise the need to bring forward actions as soon as feasible and affordable and we have evaluated scenarios to explore what may be possible. This is being considered in the context of what could be delivered sooner or what needs to be delayed due to the deliverability or affordability.
No deterioration	Since the draft plan was published we have continued to work with the Environment Agency to agree the timing and prioritisation of abstraction licence capping that will be required to avoid causing WFD status deterioration. We have updated the WRMP and regional plan assumptions to reflect our latest understanding of demand growth, risk and Environment Agency licence capping priorities. These are also reflected in our 2025-30 WINEP. An overview of the work undertaken can be found in Section 1.3 of this appendix.

We recognise the need to bring forward actions as soon as feasible and are affordable and have evaluated scenarios to explore what may be possible. This is being considered in the context of what could be delivered sooner or what needs to be delayed due to deliverability or affordability.

Schemes to improve the resilience of catchments (including nature-based solutions and habitat restoration) have been considered. Currently there is a lot of uncertainty in the assessment of future water environment needs and we are including substantial investigation programmes and option development in our next business plans. These will seek to understand the challenges better and to further develop a holistic range of options including natural solutions. We have been working with catchment partnership groups to see how we can integrate their nature-based solutions work into our regional plans and our work with Catchment Based Approach (CaBA) stakeholder groups focuses on both water quality and water resource related issues. The options for our supply will be assessed for the best value package of options for environmental

resilience. Through WRW, we are also having further discussions with CaBA nationally to see how we can better integrate their work into regional water resource planning.

Solutions are being delivered as quickly as feasibly possible. Beyond 2027, we have developed further scenarios to bring forwards licence reduction in priority areas to further support the WFD pathway to good status and priority sites. This will be considered in the context of what could be delivered sooner or what needs to be delayed due to deliverability or affordability issues.

Our WRMP24 sets out the BAU+ as our preferred pathway with the option to adapt up to the Enhanced scenario. In relation to groundwater licence reductions in England, to enhance and protect the environment, the plan uses the BAU+ scenario in our baseline and the Enhanced and low scenarios to develop an adaptive plan. We have not used the Enhanced scenario in our preferred plan as the differentiation between BAU+ and Enhanced was small and outweighed by other uncertainties in the assessment at this time. Our preferred WRMP accelerates sustainability reductions, prior to 2050 where feasible.

We have noted and understand the importance and requirement for investigations. Currently there is a lot of uncertainty in the assessment of future water environmental needs and we have included a substantial investigation programme and option development in our next business plan. In fact, we are going to be starting this early so we have better information to inform our next plan. These will seek to understand the challenges better and to further develop a holistic range of options including natural solutions.

D13.3 Meeting the requirements for failing sites under the Habitats Regulations

The EA has advised that the Conservation of Habitats and Species Regulation 2017 (Habitats Regulations) states that wherever abstraction reductions are planned to meet the requirements of failing sites under the Habitats Directive these changes must be made as soon as practicable. The EA in its consultation feedback interpreted this to mean that WRMP options to provide replacement water should be progressed for the earliest feasibility delivery date.

These Habitats Directive requirements are reflected in the WINEP requirements in England. The WINEP is developed in collaboration with the water companies, Natural England and the Environment Agency. There is a process for identifying risks and issues associated with water companies' current activities including licenced abstractions. Other company initiatives may also bring benefits.

The River Wye

The Wye Valley is an iconic landscape, hugely important for biodiversity due to the wide range of rare river wildlife, loved by people and important for farming. It has been designated as a site of special scientific interest (SSSI). In addition, together, the English part of the River Wye and part of the River Lugg form the 'River Wye Special Area of Conservation' (SAC), providing the rivers with the highest level of protection in the UK and of international importance. The SSSI condition status for the Wye and Lugg was largely previously classed as 'unfavourable - recovering'. Natural England's recent assessment identified that the River Lugg is showing declines in salmon, water quality and white-clawed crayfish. The River Wye is showing declines in macrophytes, salmon and white-clawed crayfish. Natural England regularly reviews the water quality targets and the data tells them that the River Wye is not showing a decline in water quality. Natural England indicates that further investigation is required to pinpoint specific causes of the declines, some of which may be beyond the catchment. As at least one interest feature in both the Wye and the Lugg are showing declines, and Natural England cannot be assured that all necessary management is currently in place, despite the significant efforts of many stakeholders, it has updated the SSSI condition status for the Wye and Lugg to 'unfavourable – declining'.

We have been working in partnership with the Wye and Usk Foundation in the Wye catchment since 2015. The partnership offers our Farming for Water programme to farmers within the River Wye Safeguard Zone. Farming for Water, works directly with farmers to deliver a suite of integrated environmental solutions, all with the aim of protecting water at source, impacting river health and drinking water quality. The main issue from a drinking water perspective in the catchment is from pesticides. Over the period 2020-2025 we aim to reduce the pesticide load across the safeguard zone by 115 kg. To date 227 farmers have delivered farm improvements that protect the environment through the Farming for Water programme. These activities have resulted in a pesticide load reduction of 87 kg so far, or 76% of the end of 2025 target. We have also created or enhanced 74.94 ha of on farm biodiversity through its Spring STEPs grants which are designed to improve on farm biodiversity. We will continue to work in partnership with farmers across the catchment in 2025-30.

We launched the Great Big Nature Boost in 2020 to help deliver 5,000 ha of enhanced biodiversity across the our operating area by 2027. The programme has been so successful that we are now on track to deliver 10,000 ha by 2025. Within the Wye catchment we have delivered 225 ha of biodiversity improvements. Projects in the catchment include:

- INNS removal with the Wye Valley AONB
- Wye Valley Farmer Group seeding herbal leys on agricultural land
- Conservation grazing to improve grassland using highland cows and fenceless collars.

Going forward over the next two years we are looking to expand on existing agreements and extend the projects above to deliver more hectares.

Other designated sites

The link between our groundwater abstraction and the condition of Doley Common SSSI was investigated during 2020-25. The agreed outcome of this investigation was that there was no further action required from us in relation to the water resources activities, although a commitment was made for 2025-30 to look at options of how improvements to the site's conditions could be supported.

The River Clun SAC and River Teme SSSI have been included for investigation in 2025-30, focusing on the public water supply abstractions in the upstream catchment and their contribution to meeting the favourable condition targets for flow attributes. These are also implementation activities included in the 2025-30 WINEP in relation to water quality targets and catchment nutrient balancing in this catchment.

Aqualate Mere SAC was investigated in 2000-10 through the RSA programme. It was agreed that the investigation would be signed off as complete with no further action from us, but ongoing monitoring would be undertaken by the Environment Agency and Natural England to collect baseline data. In 2020-25, we undertook a phosphate investigation under a water quality function and activities have been included for 2025-30 to address nutrient loading into the mere. This is a nitrate investigation planned for 2025-30.

In addition, our 2020-25 and 2025-30 WFD No Deterioration investigations consider the risk of deterioration to SSSI or SAC groundwater dependent terrestrial ecosystems (and functionally linked on-line SACs/SSIs) from any potential future groundwater abstraction growth compared to a historic baseline. Work undertaken in the River Wye is summarised in the section above.

D13.4 Catchment and other environmental Improvements in England

Our PR24 business plan will set out a variety of nature-based solutions (NBS) and natural flood management (NFM) solutions alongside their potential environmental benefits, which we see value in undertaking. More

details and updates on these interventions in England are provided in this section. We have also provided more detail on the Welsh catchments in Section D14 below.

We are currently undertaking nature-based solutions in catchments across our region. To inform our latest plan we undertook stakeholder engagement and identification of nature-based solutions in two high priority catchments, the Idle and the Worcestershire Middle Severn, as described in Section D9. We engaged with stakeholders and identified options, including catchment-based options, with these stakeholders. Based on this work we have selected and promoted four nature-based solutions which we have including in the scope of work we have committed to with the Environment Agency (the AMP8 WINEP which spans 2025-2030) and will be included in our PR24 business plan. For these catchment investigations the scope would include the implementation of some catchment measures to investigate the approach and benefits from such approaches to water resources and Environmental Destination. Although we have listed options, if better opportunities are developed these may be taken forward instead. Much of the water resources pressures identified in our plan relates to groundwater and we wish to consider natural flood-risk management and groundwater recharge opportunities.

Water companies are always looking for new partners or new ways of working with partners and many of our catchment interventions will be delivered through partnerships. For more information about partnership working please see Section [D13.5](#) below.

The 2025-30 WINEP has been developed since the publication of the draft plans. The WINEP is developed in collaboration with the water companies, Natural England and the Environment Agency. These will also make a significant contribution to improving the catchments and bring resilience for the future. There is a process for identifying risks and issues associated with our current activities including licenced abstractions. Our 2025-30 WINEP investment programme includes actions to meet our statutory obligations to protect and enhance the water environment along with investigation activities needed to inform future WINEP investment at PR29. Our business case covers a number of WINEP drivers, each of which have statutory requirements defined by the Environment Agency and Natural England:

- Water Environment (Water Framework Directive) Regulations
- Water Supply (Water Quality) Regulations
- Salmon and Freshwater Fisheries Act
- Environment Act
- Conservation of Habitats and Species Regulations
- Countryside and Rights of Way Act
- The Eels (England and Wales) Regulations
- Natural Environment and Rural Communities Act
- Wildlife and Countryside Act

The WINEP includes water resource commitments and investment in wastewater treatment, catchment-based solutions and further investigations under a range of statutory and non-statutory drivers to meet environmental obligations. These will also make a significant contribution to improving the catchment, from installing more wastewater treatment, preventing CSO overflow, reducing abstraction and working in catchments to improve water quality and biodiversity which will be resilience for the future. We recognise how important biodiversity is and we have committed to a 15% net gain in our next business plan (2025-2030), above the minimum 10%. We have also made a number of river pledges to enhance our rivers and create new habitats so wildlife can thrive.

Not all of the environmental activities delivered by us and our partners are captured in the WINEP. Specific initiatives planned relating to the WINEP and other initiatives are summarised below.

Water Resources WINEP

For the 2025-30 WINEP, we have developed a ‘no-regrets’ programme to meet its expanded statutory obligations through the WINEP.

Focusing on the provision of clean water for WINEP includes:

- Protecting the water environment and preventing deterioration of WFD status.
- Enhancing the UK’s natural environment by improving water quality, improving biodiversity and supporting aquatic ecosystems. Headline outputs:
 - Improved drinking water catchment protection in place at nine new sites
 - Further river restoration activities
 - Up to 739 biodiversity units created across 625Ha of land
 - 100% of SSSIs owned by us improved to recovering or favourable status
 - New INNS biosecurity plans in place at 10 visitor sites
 - Investigations across 70 abstraction sites to determine how to prevent WFD status deterioration and achieve the EA’s abstraction licence capping objectives
 - investigate the scale of investment needed across 130 of our abstraction sites and 12 catchments to achieve the National Framework’s long term environmental destination abstraction scenarios.

Biodiversity

Our biodiversity strategy has three pillars of action:

1. Managing and reducing the impact of its operations on biodiversity
2. Protecting and enhancing biodiversity on its own land
3. Investing in conservation partnerships and nature-based solutions

Investing in protecting and improving the natural environment is more than just the right thing to do, it is also a practical business imperative. The environment is the vital partner to our reservoirs, treatment works and pipelines, capturing, holding, cleaning, and carrying water. Therefore a flourishing environment plays an important role in helping us deliver our core activities more effectively and efficiently. More broadly, the habitats and ecosystems in the region have the potential to help businesses and communities moderate and adapt to the effects of climate change. We expect that in the next decades, the health of the environment will be reflected in the health of the wider Midlands economy. When nature and economy thrive together, they will set our region apart. Our Environment Plan is available online³.

Biodiversity enhancements will come through the implementation of the biodiversity plans developed in AMP7 across the 262 sites. We estimate that it will improve 267 hectares of grassland, 15 km of hedgerow, 226 hectares of woodland, 21 hectares of Invasive Non-Native Species (INNS), 7km of improved watercourses, 90 hectares of wetlands. Overall, while there is uncertainty around the specific sites it will be working on, it anticipates that its WINEP biodiversity commitments will deliver up to 739 biodiversity units across our region by the 2030.

In addition to our own sites, we will continue to support biodiversity on third party land that we interact with. During 2020-2025 we expect to deliver approximately 10,000 ha of biodiversity improvement, but these improvements largely fall under five-year agreements in line with funding and budgeting exercises. Upon cessation of these agreements, there is a likelihood that the biodiversity improvements implemented will revert back or no longer be maintained and looked after. We need to ensure there are mechanisms in place to support these projects beyond 2025 so that we can continue to provide biodiversity benefits, and consequently the wider environmental benefits that come from them such as water quality. The aim of our WINEP investment is to

³<https://www.severntrent.com/content/dam/stw-plc/sustainability-2023/caring-for-our-environment.pdf>

sustain the interventions that have been previously deployed with third party landowners and protect them from being removed.

We will also be removing barriers to fish passage at Peakshole Water to improve 5.5 km of river length and investigating barriers across the Derwent catchment.

We recognise how important biodiversity is and have committed to a 15% net gain in our business plan (2025-30), above the minimum 10%.

Waste Water WINEP

Focusing on the provision of wastewater our WINEP includes:

- Supporting healthy and thriving UK rivers by tackling nutrients, ammonia and chemicals in wastewater and reducing harm and discharges from storm overflows. Headline outputs:
 - 1375 km of river and 6 Km² of lakes benefiting from phosphate removal
 - 1868 Km of river benefiting from 362 storm overflow improvements
 - 346 km of river benefiting from enhanced ammonia removal and our other improvements
 - 164 Tonnes per annum of phosphate removed from our rivers and lakesWhole life (30 year) monetised river quality improvement benefit of £2,304 bn
 - 7957 hectares of farmland benefitting from Catchment Nutrient Balancing interventions
 - 13 environmentally sensitive areas improved

Land management

We have several other initiatives which are not captured in the WINEP activities. We will continue working closely with the Catchment Based Solution (CaBA) stakeholder groups on both water quality and water resource related issues. We have significant engagement with the farming sector. Our Environment Team also work in many catchments primarily through our “Farming 4 Water” catchment management programme which reduces pollution at source by working with the agricultural sector, landowners, NGOs and other stakeholders. We are scaling this work up in 2025-30, when we will be encouraging and incentivising farmers to take up regenerative farming measures and systems which will help to keep water within the landscape, encourage biodiversity, reduce unnecessary inputs, increase soil carbon sequestration, and maintain food production.

Trees

In line with our Biodiversity Strategy and Action Plan, we are committed to managing and reducing the impact of our operations on trees. Delivering clean water affordably and safely is our statutory duty and our top priority. In some circumstances this unfortunately means that we do have to remove or cause potential harm to trees in order to carry out our work - both on and beyond our own land. We use a mitigation hierarchy when managing woods and trees. This means that where possible, we will avoid damage to woods and trees from our operations. If we do need to take action, we aim to minimise the damage caused as much as possible. For example, there may be alternatives to felling, such as pollarding or pruning, which can effectively mitigate tree safety risks.

We are also committed to protecting and enhancing woods and trees on our own land. 1,600 ha of our land might be considered to be woodland or woody (such as scrubland) - that’s around 20% of our total land area. The majority of this is conifer plantation around reservoir sites, with broadleaved, mixed woodland and scrub making up the rest, typically in smaller patches. Amongst our broadleaf woods are at least 310 ha of ancient woodland, with the greatest coverage at Ladybower and Linacre Reservoirs. Around 103 ha of the approximately 500 ha of SSSI land owned or managed by us is classed as broadleaved, mixed or yew woodland. As part of our Biodiversity Action Plan we are conducting a phased process of ecological assessments across many of our sites that will assess the condition of these woods and trees and facilitate management decisions.

We are also creating new woodlands, including 818 ha of native trees being planted through our partnership with the Commonwealth Games. Much of this new planting will be across our own estate, as well as on land in the wider catchment.

We are committed to expanding and enhancing woods and trees across the wider catchment area. We are a major landholder but are also part of a wider landscape that holds and filters the water that we delivers to customers - and trees play a big part in that. The cover and condition of trees and woods in our catchments has a direct impact on our business operations, as well as our aspirations for biodiversity in the Midlands. Therefore, we are working in places including Mansfield, where urban trees are helping to reduce flood risk for 90,000 people; and working with farmers to plant trees and hedgerows on farms, sequestering carbon, improving biodiversity and reducing runoff.

Invasive Non Native Species (INNS)

Preventing the spread of invasive non-native species (INNS) is an important goal both in short and longer term and working in partnership a key component of controlling INNS. To that end we control invasive species on our own land wherever possible and have developed risk assessments and biosecurity management plans to help us better understand and reduce/remove mitigate the risk of invasive species spread at our assets and associated with our activities. We work in a number of partnerships to help control and prevent the spread of INNS. For example, we are working in partnership with the Canal & River Trust on a four-year project to help eradicate invasive plant species along 180 miles of canals across the Midlands.

We are also a partner in the Aquatic Biosecurity Partnership⁴, which focuses on improving aquatic biosecurity. This partnership is led by The GB Non-native Species Secretariat (NNSS) and includes Affinity Water, Anglian Water, Angling Trust, British Canoeing, Defra, Environment Agency, NNSS, Northumbrian Water, RYA, South East Water, South West Water, Southern Water, Wessex Water and Yorkshire Water.

Drainage and Wastewater Management Plans

Management of surface water is a key element of our Drainage and Wastewater Management Plan⁵, as sustainable drainage measures to collect rainfall run-off from supermarket roofs, car parks and other hardstanding areas can provide flood risk benefits. However, we recognise that better management of rainfall run-off can provide water resource benefits, such as groundwater recharge, supporting low flow rivers and water efficiency through rainwater harvesting/grey water re-use. As part of our ongoing Mansfield Green Recovery initiative, we will be working with businesses across the catchment to identify opportunities to work with them to manage run-off through surface water disconnection. This will provide incentives to businesses to reduce surface water disposal charges and promote rainwater harvesting opportunities and so the learning from the Mansfield pilot will be used across our region.

River Pledges

Licence reductions from our groundwater sources are a significant driver for the need for new water resource options, alongside demand management solutions. In 2022 we launched our Get River Positive plan⁶ which set out specific commitments to restore rivers for present and future generations; pledge four is to enhance rivers and create new habitats so wildlife can thrive. Overall, we are aiming to improve the quality of over 2,100 km of river.

⁴ <https://www.nonnativespecies.org/resources-and-projects/aquatic-biosecurity-partnership/>

⁵ <https://www.severntrent.com/about-us/our-plans/drainage-wastewater-management-plan/>

⁶ <https://www.stwater.co.uk/get-river-positive/>

Green Recovery investment

We secured investment through the government's Green Recovery initiative and we are investing in sustainable urban drainage around Mansfield, we are making voluntary improvements to 25 storm overflows to contribute to the improvement in water quality, to bathing water standards, in the Rivers Avon, Leam and Teme catchments. We are seeking to incorporate nature-based solutions in these areas where possible. We will apply the learning from these projects to deliver the AMP8 environmental outcomes.

D13.5 Partnership working

In consultation feedback some stakeholders highlighted that there is significant scope for more intensive, targeted partnership work under the umbrella of nature-based solutions. They also said we need to play a greater role in researching key challenges facing the water industry by working with collectives like the National Leak Research Centre, the Water Research Institute at the University of Cardiff, and the Environmental Change Institute at Oxford University.

We are working, through WRW, with partners to shape the regional plan and have input to the national forums for water resources planning. The WRW group includes water companies, regulators, and non-public water supply industry representatives. This also facilitates improved integration with other regional initiatives such as the River Severn Partnership and the River Trent Working group which links to a number of stakeholders including the River Trent Partnership. Through these forums we can share innovation and leverage investment in the region.

We are always in search for innovation. We have a broader reach through our WRW partners. In relation to the specific examples noted above:

- Severn Trent, United Utilities and Welsh Water are partners in the National Leak Research Centre
- Welsh Water has an extensive partnership with the Water Research Institute at the University of Cardiff
- WRW and the other regional groups have been working with RAPID and the Environmental Change Institute on National Systems Simulation Modelling for water resources

In addition, working with United Utilities and Welsh Water we are partners in the WIRE doctoral training centre with Newcastle University, University of Sheffield and Cranfield University. As an example, through this WRW is sponsoring PhD research into multiscale water resources planning. As another example, South Staffs is sponsoring PhD research at the University of Sheffield.

We have bid to the Ofwat innovation fund (e.g. relating to water efficiency, low carbon and environmental matters). We engage in projects by UKWIR, WRC, WaterUK and Waterwise and other club project working with other water companies (e.g. a club project with retailers to identify the best mechanisms to deliver non-household savings). We will continue to explore additional opportunities for collective projects such as this.

We have been working in partnership and are always looking for new partners or new ways of working with partners. We have been active supporters of Defra's catchment-based approach over the last 10 years and have used these groups to deliver catchment improvements that have enhanced a range of ecosystem services. River ranger teams have been established, who engage directly with local community groups to secure environmental improvements in our rivers. We have a long-standing history of involvement with partners such as Moors for the Future, Rivers Trust, Wildlife Trust. Over the last 10 years initiatives to work with the farming community and landowners have been delivered to protect water resources by improving water quality and biodiversity. These experiences have shaped our plans for securing more catchment focussed collaborations for 2025-30. Along with WRW, we will aim to work in catchments where flood risk and water resource challenges are best solved through the use of nature-based solutions in partnership with third parties. We prioritise partnerships

based on areas we operate and our activities. We will continue to engage with external stakeholder to understand and align our objectives.

We have two projects under the Green Recovery initiative. We are working alongside Mansfield District Council and Nottinghamshire County councils to protect communities from flooding. We will also be working with businesses across the catchment to identify opportunities to work with them to manage run-off through surface water disconnection. This provides incentives to businesses to reduce surface water disposal charges and promote rainwater harvesting opportunities, so the learning from our Mansfield pilot will be used across our region. The rural nature of the Teme catchment presents extensive opportunities for partnership working with the agricultural community to deliver some of our nutrient removal through catchment nutrient balancing (CNB). This will build upon relationships that we already have with farmers through our drinking water protection activities and Green Recovery bathing rivers project. We already know that farmers in this catchment would be interested in working with us on phosphate removal.

A good example specifically relating to nature-based solutions is a recent successful bid into the Ofwat innovation fund. Titled “mainstreaming nature-based solutions to deliver greater value”, this £8m project led by United Utilities includes a range of different partners including Severn Trent, Welsh Water, other water companies, the Rivers Trust, the Wildfowl and Wetland Trust and others. It recognises that nature-based solutions have the potential to provide multiple socio-economic and environmental benefits by tackling flooding, drought and water quality issues at landscape scale. Water companies want to use lower carbon and more environmentally-friendly solutions to serve its customers; the know-how is limited and solutions can be expensive for scale. The transformational programme of work brings together multi-sectorial expertise and leadership to collaboratively create and test new solutions to remove these barriers through real-life case studies and facilitate and enable transition of nature-based solutions into business-as-usual to deliver greater value for customers, society, and the environment.

D14 Wales

D14.1 Policy context

This section outlines some of the main Welsh policies, regulation and guidance, pertinent to the Environmental Destination for Wales.

The Environment (Wales) and Wellbeing of Future Generations Acts

The Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015 work together to create modern legislation for managing Wales’ natural resources and improve its social, economic, environmental and cultural well-being. Together with the Planning (Wales) Act 2015, they form part of a wider initiative to create a legislative framework for sustainable development to secure the long-term well-being of Wales. The Environment (Wales) Act establishes the principles of Sustainable Management of Natural Resources (SMNR). SMNR principles are defined in the Act as: “using natural resources in a way and at a rate that maintains and enhances the resilience of ecosystems and the benefits they provide ... and contributing to the achievement of the well-being goals in the Well-being of Future Generations Act.” Linked to these principles, SMNR has four main aims:

1. Stocks of natural resources are safeguarded and enhanced
2. Resilient ecosystems
3. Healthy places for people
4. A regenerative economy

Figure D14.1: The wellbeing of future generation act goals



The Wellbeing of Future Generations Act pursues several goals (see Figure D14.1) link closely to the SMNR aims (i.e. 'a resilient Wales'). At a national level, the priorities for applying SMNR are established through the National Natural Resources Policy. Natural Resources Wales investigate and publish reports on the State of Natural Resource Report (SoNaRR) to provide an evidence base for the National Natural Resources Policy. Natural Resources Wales have developed Area Statements as a response to the National Natural Resources Policy. These statements were shaped by stakeholders and reflect the key challenges facing each area of Wales, set out what the wider public can do to meet those challenges and how everyone can better manage natural resources for the benefit of future Welsh generations. We will reflect the findings of the recent SoNaRR report, the National Natural Resources Policy and Area Statements relevant to our regional plan and consider the contribution in our WRMP24. Further details of how the SMNR principles are reflected in our plan are given in Appendix A.

Welsh Government's Water Strategy for Wales

The Water Strategy for Wales sets out a long-term policy direction in relation to water; it aims to ensure a more integrated and sustainable approach to managing water and associated services in Wales. This strategy contributes to the implementation of the wider natural resource management policy in Wales. It also complements a range of policies and programmes across Welsh Government, such as the Well-being of Future Generations (Wales) Act 2015. Further details of how the provisions of the Water Strategy for Wales are reflected in our plan are given in Appendix A.

Nature Recovery Action Plan

The Nature Recovery Action Plan (NRAP) identifies the biodiversity issues that need to be addressed, the objectives for action and the set of actions which, through the Well-being of Future Generations (Wales) Act 2015 and the Sustainable Management of Natural Resources, will contribute to reversing the loss of biodiversity in Wales. The plan links to and complements The Well-being of Future Generations (Wales) Act 2015 and the Environment Act (Wales) 2016 by:

- providing the best available evidence to prepare area statements, reflecting local pressures on biodiversity and priorities for species and habitat recovery
- providing evidence and information to prioritise biodiversity action within the National Natural Resources Policy
- identifying and reporting on biodiversity status and trends and indicators, to inform the SoNaRR.

The aims of the Nature Recovery Action Plan are closely linked to other legislation and guidance around biodiversity, preserving and enhancing habitats and protecting wildlife. We are working to produce a regional plan which supports the achievement of the Nature Recovery Action Plan's objectives.

D14.2 State of the environment

According to the latest SoNARR, the key issues affecting freshwaters in Wales are:

- climate change
- physical modification
- pollution
- decline in freshwater biodiversity
- lack of connectivity between rivers and floodplains
- invasive non-native species.

Although over-abstraction is not a concern on its own merit in Wales, abstraction for public water supplies can add stress to freshwater ecosystems during periods of low flows. Low flows during dry weather periods can lead to:

- increased water temperatures which in turn can stress fish populations
- siltation which can damage habitats and prompt changes in the composition and diversity of macroinvertebrate and fish communities
- less dilution capacity for pollutants, which in turn can prompt a decline in water quality, with adverse effects on aquatic flora and fauna.

D14.3 Environmental Destination for Wales

The Water Resources Planning Guidance covers both England and Wales. There are specific elements for consideration in Wales that are pertinent to Environmental Destination. This include the supplementary guidance for Environmental Destination in Wales "*Setting an environmental destination for water resources: Enhancing ecosystems in Wales*".

Welsh Government has evidence of biodiversity decline in Wales. It is looking for an ambitious strategy for ecosystem resilience and wants water companies to work with regulators to help enhance biodiversity through their water resources activities whilst ensuring a plentiful supply to customers – this strategy is also known as your environmental destination. The flexible framework allows a long-term environmental destination that reflects local, regional and national priorities and can be reflected in a number of plans and processes.

Given the interconnected nature of water resources and ecosystems the environmental destination can be included as part of another plan or process, as long as the elements within the guidance have been included and are discernible.

D14.4 Welsh Regional prioritisation

Working as part of the regional group, WRW, we undertook an evaluation of Welsh catchments to understand the water resources pressures in the catchments upstream of of our region. The WRW boundary (based on the combined outlines of the water company WRZs) wholly encapsulates 26 WFD Management Catchments in England and Wales. For the purposes of Environmental Destination, we have also included three Welsh upstream catchments that are partly within the WRW boundary (Severn Uplands, Wye, Dee).

We have developed a separate prioritisation for catchments in England and for catchments in Wales. This is primarily to account for differences in legislation and regulatory approach between the two countries, as well as subtle differences in data availability and format.

- The environmental legislation in Wales (and guidance from Natural Resources Wales (NRW)) encourages a more holistic approach that provides wider environmental and social benefits to local stakeholders.
- We have considered the Climate Change Risk Assessment (CCRA) in Wales, however it was agreed with NRW that this should be excluded from our prioritisation scoring;
- NRW Opportunity Catchments have a range of drivers, not all related to water resources.

When considering ‘catchments’ we are primarily referring to WFD Management Catchments, as this is the largest scale unit that is defined in both England and Wales. However, we also make reference to other ‘catchment’ definitions for different purposes. WFD Operational Catchments, which are a sub-division of Management Catchments, have been used as the building block for the Wales regional prioritisation. This is because some of the datasets used for Wales (Opportunity Catchments, Climate Change Risk Assessment (CCRA)) are defined at an Operational Catchment scale.

Stakeholder engagement was undertaken to inform the prioritisation process. This is described Section D9. The main forums included:

- WRW Environmental Destination Task and Finish group monthly meetings which included the water companies and regulators;
- Welsh regional prioritisation workshop with NRW on 29th June 2021;
- Area statements were reviewed.

The Regional prioritisation datasets and assessment process is summarised in section D9. The weighting for Wales prioritisation scoring was even between environmental features, RNAG and the Welsh priority catchments.

Table D14.1 summaries the prioritisation of the Welsh catchments. For us the Severn Uplands is the highest priority upstream Welsh catchment. There are two significant reservoirs in catchment that are utilised directly for public water supply or support abstraction through river regulation. These are owned by water companies and present areas of opportunity. Some of the Strategic Resource Options under consideration in regional planning also utilise this catchment and as such will be an area of opportunity should these be taken forwards.

Table D14.1: Priority order of catchments in the Severn Trent region

NRW ledger area catchments	
* Indicates catchments relevant to STW	
1. Severn Uplands*	6. Clwyd
2. Dee*	7. Severn England TraC*
3. Usk	8. Tawe to Cadoxton
4. South East Valleys	9. Lower Wye*
5. Wye*	

For the Severn Uplands the numerical scoring of this catchment is low as there are a small number of designated environmental features. There are water resources related RNAG issues related to water industry identified in the WFD datasets. There are two significant reservoirs in catchment that are utilised directly for public water

supply or support abstraction through river regulation. These are owned by other water companies and present areas of opportunity:

- Clywedog reservoir main source of regulation water for River Severn regulation which support both PWS (STWL, SSW) and non PWS abstractions. Opportunity for further environmental enhancements.
- Vyrnwy also used for PWS and opportunities for further environmental enhancements. Well established work with stakeholders in catchment. Proposed water resource options and strategic resource options (SRO) in the catchment.

The Dee catchment is an Opportunity Catchment (NRW) and includes a water resources driver. It has high environmental features. WFD RNAG does not identify water industry water resources pressures. STW has one abstraction in this catchment, other water companies have a significant interest in this catchment (HD, DCWW and UU). This catchment is linked to the potential water resource and SRO at Vyrnwy (UU). The multi partner Dee Life project is active in catchment. There are also other well established catchment forums which include water companies.

The River Wye has high environmental value catchment, SAC river. The abstractions have undergone a review of consents and licence changes made to support environmental objectives.

D14. 5 Wales and Severn Trent Water

We do not own or operate any abstractions in Wales. The Welsh catchments do however support abstractions for our customers from the Elan Valley Reservoirs in Wales, which are owned and operated by Welsh Water and operated by Hafren Dyfrdwy, the River Dee at Chester and the River Wye in England. We, along with other PWS and non-PWS abstractions also abstract water from the River Severn; the River Severn is a regulated river operated by the EA in consultation with Natural Resources Wales (NRW) which releases water from upstream reservoirs in Wales (Clywedog and Vyrnwy) and the Shropshire Groundwater Scheme in England. Many of the assets and catchments in these reservoirs are owned by Hafren Dyfrdwy and United Utilities (UU). Flows are also naturally supported by the wider River Severn catchment in both the headwaters in Wales and downstream in England.

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. The potential future development of the Vyrnwy SRO brings future opportunities for the associated Welsh catchments. We will work with stakeholders, including the River Severn Partnership to promote catchment resilience solutions in this area.

We recognise the importance and value of the upstream catchments and we are working with the other water companies through WRW to understand opportunities for enhancing the upstream catchments.

D14.6 Updates for fWRMP

Natural Resources Wales provided consultation feedback on our WRMP. Natural Resources Wales expect the plan to recognise the importance of the Upper River Severn has to people and the environment along the whole of the Severn catchment.

Since the dWRMP we have worked with NRW on the development of the 2025-30 National Environment Programme (NEP) relating to Environmental Destination in Wales. We have committed to investigations and schemes in our NEP. There are also opportunities from the development of new water resource options. A summary of the proposed work is listed below.

Joint Schemes

Two joint schemes have been identified:

- **Dee catchment.** Severn Trent, United Utilities, Hafren Dyfrdwy and Welsh Water are implementing actions through a catchment enhancement scheme to prevent the deterioration in water quality (turbidity) in drinking water protected areas to avoid an increase in the level of water purification treatment on the River Dee. The scheme is looking to support farmers and landowners in the Dee catchment to reduce runoff etc.
- **Upper Severn.** Clywedog reservoir is a heavily modified water body which support flows on the River Severn; we abstract water further downstream in England. We have a scheme, along with Hafren Dyfrdwy and South Staffs, to investigate the impact of the impoundment on downstream fish spawning grounds and an associated improvement scheme to restore gravels.

Natural Resources Wales has not identified the need for licence changes. The guidance for the Environmental Destination in Wales differs and reflects the Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015, which works together to create modern legislation for managing Wales's natural resources and improving its social, economic, environment and cultural well-being. Together with the Planning (Wales) Act 2015, they form part of a wider initiative to create a legislative framework for sustainable development to secure the long-term well-being of Wales. The Environment (Wales) Act establishes the principles of Sustainable Management of Natural Resources (SMNR). SMNR is defined as: "using natural resources in a way and at a rate that maintains and enhances the resilience of ecosystems and the benefits they provide...and contributing to the achievement of the well-being goals in the Well-being of Future Generation Act". Water companies are included in the list of over 200 public authorities defined in Section 6 of the Environment (Wales) Act 2016 as having a duty to seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in doing so promotes the resilience of ecosystems, so far as consistent with the proper exercise of those functions. For the draft plan action in catchments was still in development.

Benefits arising from changing the use of Vyrnwy (water transfers)

The main opportunity for us to contribute to environmental improvements in Wales is through the development of new water resources options as identified in this WRMP. This involves joint working with United Utilities as the abstraction licence holder for Vyrnwy and Hafren Dyfrdwy as the owner of the reservoir.

A preferred option for us is associated with water from Vyrnwy, in the River Severn catchment, to make better use of water from Wales, within existing abstraction licence constraints. There will be no increase in the quantity of water that will be transferred from Wales for England, however, there is a proposal to potentially use water that goes from Lake Vyrnwy in a different way, with no increase to the Vyrnwy or River Dee abstraction as a result. Instead of water going to the North West, it could sometimes go into the River Severn for use in the Midlands (from the 2030s). In the preferred plans it involves 25Ml/d from Vyrnwy, out of the yield of 180Ml/d. This change is represented in both the our and United Utilities plans. The cost of the work, including wider benefits, will be paid by the recipients of the water. This would protect the resilience of water supplies and the environment in Wales. Benefits for Wales could arise through additional investment in catchments linked to change of use of existing transfers.

This change of use of Vyrnwy is part of the scope of the Severn Thames Transfer (STT) strategic resource option. Further volumes, within the 180Ml/d yield currently used, could be re-deployed from the North West to the South East under adaptive plan scenarios, which would increase the opportunity. Since these options result in less water going to the North West from Vyrnwy, there would also be development of options in the North West to offset the impact of this loss and maintain resilience within the North West (the North West Transfer (NWT) strategic resource option).

Investigations have facilitated research on the Vyrnwy catchment and this data has been shared with both the regulators and water companies and is publicly available on our website. This considers how operations may impact the SSSI and the river downstream of Lake Vyrnwy and can be used to inform how water company and regulator releases could be optimised for the environment. No specific net gain measures have been identified to date.

A wider benefits study has been published as part of the STT Gate 2 reports. Opportunities for environmental enhancement associated with the STT solution have been identified and evaluated using an SMNR approach. Examples include peatland restoration, improving accessibility of green space and planting, which could contribute to a number of wellbeing goals. The transfer proposal is at an early stage, United Utilities and Severn Trent will work with regulators to develop the strategy.

Stakeholder engagement

Progressing our Environmental Destination in Wales will require partnership working and stakeholder engagement.

We have worked along with WRW, other water companies and the STT and NWT project teams, to review and fully update our stakeholder engagement plan for Welsh stakeholders. We now have a joined-up engagement plan across the WRW core member companies and the STT and NWT projects for these aspects. We accept the need to do more engagement with Welsh stakeholders at this stage in the process, linking both to the transfer schemes and other opportunities, e.g. through Environmental Destination and partnership working. We have started to implement this plan, with a WRW presentation to the broadly attended NIC Wales/Consumer Council for Water conference in Cardiff on 31 March, a Hafren Dyfrdwy and STT meeting with Plaid Cymru on 19 April and WRW/STT meeting with the Wildlife Trusts along the Severn on 24 April. This also included the Dee Rivers Trust and the Severn Rivers Trust. Further coordinated engagement is planned, and we also welcome further input from regulators into our stakeholder engagement plan as we keep it live.

Impacts of existing abstractions on European sites

Since the publication of the dWRMP24 Natural England has raised concerns relating to our WRMP HRA in relation to impacts of existing abstractions on European Sites where a material change (to the site) has occurred. Natural England has highlighted four European sites where the condition status has changed since WRMP19. These are as follows:

- The River Wye SAC
- The River Clun SAC
- Aqualate Mere SSSI and Ramsar Site
- Cop Mere SSSI and Ramsar Site

We subsequently met with Natural England to discuss their feedback in more detail and to understand what actions are needed to address their concerns.

For the River Wye SAC, Natural England will be carrying out a new, full condition assessment, including a flow assessment, which will provide additional information on the pressures impacting the River Wye SAC. Natural England have agreed that they will continue to engage with Severn Trent and Welsh Water and once the full condition assessment has been completed, to add the River Wye SAC to the PR29 WINEP if appropriate. Therefore, no additional work is needed as part of the 2024 WRMP HRA.

For the Clun SAC, Aqualate Mere SSSI and Cop Mere SSSI, we agreed that we will be investigating the flow related issues as part of the AMP8 WINEP programme. We will continue to work with Natural England as a key stakeholder in those WINEP activities.

Because of our commitment to ongoing investigation at these sites in AMP8, Natural England has confirmed that no further work is required at this stage and that it supports our HRA.

The table below outlines our commitments to continue investigating these site as agreed with Natural England:

Table D14.2: Agreed actions for existing abstractions near or on listed European Sites

Site	Agreed action
The River Wye SAC	NE acknowledge the abstraction review undertaken in 2018 and changes made to abstraction. It is understood that there are multiple pressures in catchment (ST + Dwr Cymru abstractors). Awaiting output full condition survey from NE. If appropriate, will include in future WINEP for AMP9 if changes have occurred.
The River Clun SAC	This is a new site named site in the Defra Letter dated 24 Jan 2025. We are investigating as part of AMP8 WINEP.
Aqualate Mere SSSI and Ramsar Site	We are investigating as part of the AMP8 Environmental Destination driver.
Cop Mere SSSI and Ramsar Site	We are investigating as part of the AMP8 Environmental Destination driver

We look forward to continued discussion with Natural England regarding these sites.