Dŵr Cymru
Welsh Water

Annual Report

Wt7 Water Catchments Improved (Safeguard Zones)
Table 3E.7, Line 17

AMP7 Measure of Success	Delivery Date
Reduce number of Safeguard Zones from 23 to 18	March 2025

	Year				
	2020/2021	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**
No. Safeguard Zones	23	23	23	23	LBE 18

Background

The drinking water Catchment Strategy is delivering our Welsh Water 2050 ambition *Strategic Response 1: Safeguarding Clean Drinking Water Through Catchment Management* and it is the starting point for our source to tap risk management process. Our work builds resilience into the front end of our water supply systems to provide consistent, manageable, and reliable supplies of raw water to our Water Treatment Works (WTW) to meet the demands of our customers, now and in the future.

As we own <5% of the land within our catchments it is essential that we collaborate with key stakeholders to deliver our programme of activities. We have built a robust network of stakeholders and partners who are key to the effective delivery of our programme.

We have established standard ways of working in AMP7, which can be applied across multiple AMPs to support the delivery of the long-term water environment protection strategies of both our business and our Regulators. Our AMP8 plan will continue to build on the lessons learnt and progress made in to date, and our business plan has been submitted. Both NRW and DWI have confirmed their support for the proposed AMP programme.

Safeguard Zones

In order to ensure the long-term resilience of our catchments, under the Water Framework Directive, there is provision to designate drinking water Safeguard Zones (SgZ) for areas where there is a current water quality deterioration from one or many pollutants *e.g. pesticides, nutrients, sediments, bacteria/cryptosporidium.* **The Environment Agency (EA) and Natural Resources Wales (NRW) are responsible for designating Safeguard Zones (SgZs) based on water company intelligence.**

SgZs are non-statutory designations, they identify areas where land use, management practices and other activities may affect the quality of the raw water. The Water Services Science Catchment Team are working in collaboration with a variety of stakeholders and partners to implement a significant programme of targeted measures, that will reduce the risk of pollutions and improve the quality of our raw water sources, so that the need for extra treatment of raw water is avoided.

23 of our Water Treatment Works (WTW) catchments were designated as SgZs by the EA (2017/18) and NRW (2020). They are listed in Table 1, on page 2, along with their progress status based on the associated Action Plans, ID numbers in brackets refer to locations on the map on page 3. SgZs marked * indicate those targeted to potentially meet our Measure of Success (MoS) (see table on page 15 for site specific details).

Our Performance Commitment *Wt7: Water Catchments Improved* will be confirmed by the removal of Safeguard Zone (SgZ) status from 5 water treatment works catchments, at AMP7 end. **This de-designation is verified by the environmental Regulators**; NRW have confirmed in principle that we are on track to provide suitable evidence to agree the removal of SgZ status from our 5 target catchments in Wales.

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Safeguard Zones List

Table 1. List of Safeguard Zones by region and progress towards achieving de-designation.

North	Status	South East	Status	South West	Status	England	Status
***Cwm Dulyn WTW (19)** *(Llyn Cwm Dulyn)*		***Cwmtillery WTW (13)** *(Cwmtillery reservoir)*		***Pendine WTW (1)** *(Morfa Bychan aquifer)*		**Whitbourne WTW (2)** *(River Teme)*	
***Cowlyd WTW (20)** *(Llyn Cowlyd)*		**Builth WTW (8)** *(River Wye)*		**Bolton Hill WTW (5)** *(Eastern & Western Cleddau rivers)*			
***Trecastell WTW (22)** *(Ffynnon Asaph aquifer)*		**Cantref WTW (15)** *(Beacons & Cantref reservoirs)*		**Capel Dewi WTW (6)** *(River Towy)*			
Alaw WTW (17) *(Llyn Alaw)*		**Court Farm WTW (11)** *(River Usk & Llandegfedd reservoir)*		**Felindre WTW (7)** *(River Towy & Lliw reservoirs)*			
Bretton WTW (23) *(River Dee)*		**Llwyn Onn WTW (16)** *(Llwyn Onn reservoir)*		**Llechryd WTW (3)** *(River Teifi)*			
Cefni WTW (18) *(Llyn Cefni)*		**Llyswen WTW (9)** *(River Wye)*		**Preseli WTW (4)** *(Rosebush reservoir)*			
		Mayhill WTW (10) *(River Wye)*					
		Pontsticill WTW (14) *(Pontsticill & Pentwyn reservoirs)*					
		Sluvad WTW (12) *(Llandegfedd reservoir)*					

KEY:
Late delivery likely
Delayed but recoverable
On track
***Targeted to meet AMP7 MoS**

Safeguard Zones Map

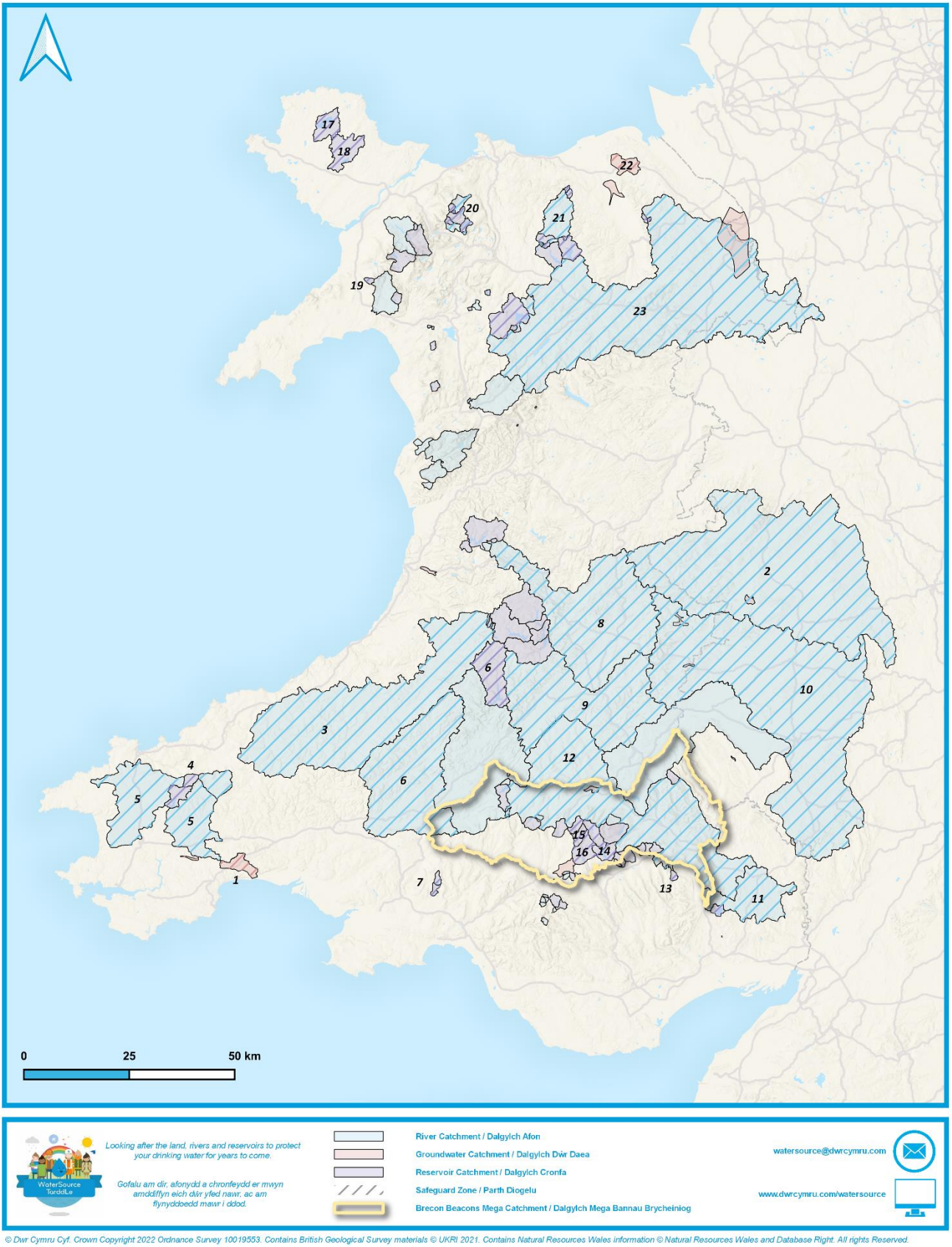

Figure 1. Location and extent of Safeguard Zones

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Year 4 Progress Summary

We previously reported that years 1 to 3 of our AMP7 catchment management programme had been delayed due to Covid-19 restrictions, we are pleased to report that the programme is now back on track and expected to fully deliver the measures which will achieve our Performance Commitment by the end of AMP7. The breadth of the catchment SgZ programme is extensive, this report highlights some of the progress and key successes since our last update.

To communicate progress to our key stakeholders we hosted our annual WaterSource conference on 4th October 2023. The event focused on '*Demonstrating Positive Progress*' - showcasing the diverse collaborations and initiatives that we are delivering to protect our drinking water sources and support multiple benefits to address the Nature and Climate Emergencies. There were over 60 attendees from Welsh Government, Regulators, NGOs, and other key organisations, who heard about the broad range of our projects we undertake. Link to WaterSource23 Conference.

Our routine Risk Evaluation work is providing continuous improvement to our understanding of the characteristics and behaviours of our drinking water catchments. Through raw water quality investigations, developing robust catchment characterisation methodologies and continuously improving our catchment DWSPs we are building a risk profile which is informing our current and future investment requirements.

Under our Smart catchments programme, we have installed 6 reservoir profilers and one upstream in-situ river monitoring system and we are currently designing further packages for our other large rivers. Having sight of near real-time raw water quality will provide more resilience to downstream WTW in the event of naturally occurring changes and / or pollution incidents. We are also progressing with the development of our catchment 'Digital Twin' by working with Aberystwyth University's Living Wales team. We will be using Earth Observation to monitor and model changes to raw water quality as a result of changes to land uses which will provide 'early warning' of deteriorations to enable optimisation of our WTWs. Link to Living Wales.

We continue to be collaborative partners on UKWIR Big Question and Ofwat Water Challenge funded research projects such as '*Update of Current Knowledge of Threats and Mitigation'*, **'***CaSTCo'* (Catchment Systems Thinking Cooperative) and '*Mainstreaming Nature-based Solution's*. Our Industry leading taste and odour (T&O) research is continuing, with the focus now moving to understanding environmental factors which influence T&O production, with the UK Centre for Ecology & Hydrology and '*When and How to Mix*' project with Cardiff University, looking at designing effective management strategies for in-reservoir technologies (i.e. ResMixers).

We have continued to seek opportunities to work collaboratively to promote our WaterSource approach with local partners and stakeholders. The team attended the regional shows, including RWAS Summer and Winter Fair, and continued our award-winning Be PestSmart campaign, promoting best pesticide best practice to householders and gardeners. DEFRA have also included Be PestSmart and our Disposal Scheme as best practice case studies in the updated Sustainable Use of Pesticides Directive National Action Plan (NAP). Additionally, the team continues to facilitate partnership groups to inform and trial ways of working to protect water quality, for example the Women's Institute, Central Beacons Partnership and Sheep Scab Eradication industry group.

Our Beacons Water Group (BWG) continues to pioneer our approaches for working with farming communities in our catchments. The group has undertaken opportunities to showcase our approach to policy makers, regulators and industry leaders by hosting Wales Land Management Forum Agri-Pollution sub-group and presenting at Welsh Government's River Pollution Summit, both in summer 2023. The BWG was also awarded the Committee Award at the 2023 Institute of Water Innovation Awards in recognition of its passionate and inspirational approach to building collaborations. This year we have expanded our network of Water Groups using BWG as our framework for engaging other farmer-led partnerships. These facilitated groups share our water quality challenges to prompt co-created catchment-based solutions and trial new mitigation approaches in the catchment. We have extended our network to work with existing groups and adapting our approach. This year we hosted the first networking day for the group facilitators to come together to share best practice and ideas.

We continue to work closely with our regulators. Alongside working in partnership with NRW on their Four Rivers For LIFE project we are also supporting the development of the Teifi Demonstrator Catchment project. In Autumn 2023 we hosted a further 3 regional Safeguard Zone workshops for colleagues in NRW and EA. The workshop was attended by over 50 colleagues from local and policy teams where there were opportunities to discuss further joint working projects and aligning policy objectives.

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Key activities delivered in 2023/24 under each workstream

Further details can be found in the case studies, starting on page 6.

Risk Evaluation

-DWSP annual reporting completed with 0 rejections from DWI

-Supported operational colleagues during incidents

-Supporting seasonal sampling for pesticides and T&O risks

-PFAS monitoring ongoing and supported DWI Liaison meetings, membership of industry working groups and best practice sharing

-Reg 26 best practice Catchment Characterisation methodology included in DWSP assessment framework

-Welsh Gov's Water Policy Team visit to WTW to understand DWSP process and treatment optimisation

-Supporting x2 schemes of national importance within DrWPA catchments to ensure no impact on raw water quality

Smart Catchments

- Development of near-real time smart monitoring network for raw water quality to inform deteriorations at abstraction points and inform WTW optimisation:
- **Reservoir** installations at: Alwen, Talybont, Llandegfedd, Llwyn Onn and Pentwyn & Pontsticill.
- **River** installation at Monmouth. In design for River Teifi, River Wye, River Usk, River Teme and River Towy

-Bi-monthly meetings with NRW to discuss joint monitoring opportunities for raw water

-Working with Aberystwyth Uni to enhance their Living Wales approach: exploring the link between land use and water quality change through Earth Observation

Research & Innovation

-Productive Buffers project with Aberystwyth Uni buffers areas sown Spring 2023 and trial launched at RWAS Summer Show

-Supported European Innovation Project Wales event to focus on crypto project outcomes

-Facilitated GW4 academic research group visit to Llandegfedd reservoir to discuss T&O challenges

-Attended meetings of the PFAS partnership, an industry wide group managed by Isle Utilities

-Ongoing research partnership with Cardiff University and Centre for Ecology & Hydrology to understand T&O challenges

Partnerships & Engagement

-Promotion of WaterSource at events including RWAS Winter Fair, Brecon and Anglesey shows

-WS23 conference ~60 attendees showcasing programme progress

-WaterSource messaging integrated into Educational Team activities for young people

-3 regional EA & NRW SgZ online workshops: ~50 attendees

-Weed wiper trial features in *New Scientist* magazine

-Engaged in NRW's Teifi Demonstrator Catchment Project

-Launched engagement campaign with WI groups in Teifi

-Contributed to response to Sustainable Farming Scheme consultation

-BBMC programme update to local MS James Evans

Mitigations & New Ways of Working

-BBMC: steering group; 160ha peatland restoration completed; 4 x Task & Finish groups;

- BWG hosted WLMF Agri Pollution Subgroup, presented to IEAP & Welsh Gov's Phosphate Summit

-Cwm Dulyn and Cowlyd crypto project continues – on farm faecal analysis & technical advice

-6 Water Groups supported & facilitator network day

-Supported NRW's 4Rivers for LIFE project –weather stations, site visits & attend shows

-*Be PestSmart* campaign continues to promote best practice

-Waste sheep dip gap analysis study to support industry group

-Supporting Estates Strategy develop exemplar land

Workstream 1 – Risk Evaluation	Status
Ongoing understanding of challenges and risks to raw water quality through regulatory monitoring, catchment knowledge and Drinking Water Safety Plans (DWSP).	

Comments 203-24

Annual DWSP reviews and raw water monitoring complete. Continue to respond to planning and consultations to highlight risks and mitigations to ensure activity avoids any impact on drinking water sources. Support operational needs during incidents e.g. pollution, dry weather to limit impact and ensure consistent water supply to customers.

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
Drinking Water Safety Plan continuous improvement Accreditation process completed in Summer 2023 for the Drinking Water Inspectorate Risk Management Approval Scheme. DWI no longer supporting Accreditation however quality and robustness of our source to tap Drinking Water Safety Plans (DWSPs) process and associated frameworks significantly improved. Annual review of DWSPs completed in July. Continue to review and manage DWSPs following approved process.	All	2	Ongoing
Responding to Consultations All planning applications in Drinking Water Protected Areas (DrWPAs) assessed for their potential impact on raw water quality. Comments are provided and adherence of developments to best practice guidelines is reiterated to ensure DrWPAs are safeguarded.	All	2	Ongoing
Source to Tap Risk Review Team members from across Water Services Science undertook joint visit to review DWSP risks from Source to Tap. Sites visited include Felindre and Bolton Hill WTW.	All	2	Ongoing
PFAS Ongoing sampling of raw and final waters. No above trigger detections on final water to date.	All	2	Ongoing
Operational support Support colleagues in water Process and Production during incidents that effect raw water quality. As and when pollution incidents are reported upstream of our drinking water abstractions, we work with operational colleagues understand and mitigate risks to WTWs, for example 2 fuel spills in June 2023 in the River Teme and catchment team supported the efforts to mitigate impact upon Whitbourne WTW downstream.	All	2, 5, 6	Ongoing
River Dee Catchment Protection Group Working with United Utilities, Severn Trent Water and Hafren Dyfrdwy to re-establish River Dee Catchment Protection Group to share raw water quality challenges and review pollutions impacting intakes with NRW & EA. Meeting held in January 2024.	**Recover (SgZ):** Bretton	2, 3, 5, 6	Ongoing
Dinas Mawddwy Forest Felling Working with NRW to understand felling and rhododendron clearance obligations and timeframes for activities. Concerns over protection of water source voiced. Monthly update calls arranged, and notes/actions being tracked.	**Adaptive**: Dinas Mawddwy	2,5,6,9	Ongoing
Llannerch Park new road bridge Working with NRW, Local Authority and internal teams to assess potential impacts to the aquifer from the building of a new road bridge approx. 100m upstream of the abstraction point (within SPZ1). Bridge design altered following DCWW assessments, and new designs under review.	**Adaptive:** Llannerch	2, 5, 6	Ongoing

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Workstream 2 – Smart Catchments	Status
Working towards a 'Digital Twin' that will allow us to better predict when raw water deteriorations may occur, so that we can actively manage our abstractions to avoid challenging our water treatment works processes.	

Comments 2023-24

WaterSource Portal, spatial data management system continues to be developed as part of our Digital Twin approach including working with Aberystwyth University's Living Wales programme. Ongoing programme of catchment monitoring (reservoirs profilers and river monitors) will inform operational decisions e.g. draw off management. Methodology for hydrological connectivity mapping has been devised and ground truth with Water Groups.

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
Catchment Real-time Monitoring Installation of in-situ catchment monitors including reservoir profilers and upstream river monitoring. Systems will continuously monitor water quality to provide 'early warning' of raw water quality deteriorations and inform operational actions e.g. draw-off management, optimisation of treatment processes. Reservoir systems installed in; Alwen, Talybont, Llandegfedd, Llwyn Onn and Pentwyn & Pontsticill. Upstream river abstraction monitoring installed at Monmouth, other locations in design phase.	**Adaptive:** Alwen **Recover (SgZ):** Llandegfedd, Llwyn Onn, Pentwyn & Pontsticill, Mayhill, **Prevent (BBMC):** Talybont	2, 3, 5, 7	Ongoing
Joint monitoring opportunities Ongoing bi-monthly meetings with NRW to discuss joint raw water quality monitoring opportunities. Focus group led by NRW (including WUF and EA) for the Wye.	All	2, 3, 5, 7	Ongoing
Catchment Digital Twin Ongoing development of our 'Digital Twin' to support risk evaluation and risk forecasting. Working with Aberystwyth University's 'Living Wales' team to develop specific modules in the model that will measure the impact of land use change on raw water quality through Earth Observation techniques.	All	2, 3, 5, 7	Ongoing
Hydro-connectivity mapping Ongoing development of our approach to understanding land to water connections at a local scale. Using new 1m resolution Lidar coverage across Wales to refine our original methodology. Sharing the approach with local land managers (i.e. our farmer Water Groups) as well as stakeholder (i.e. Hereford CC) to verify the outputs with on the ground assessments. To date maps have proved very reliable and are supporting land management decision making.	All	2, 3, 5, 7	Ongoing
Intelligent tools for risk verification Working with Aberystwyth University the decline model for raw water pathogens has been completed and is in use for informing catchment DWSPs. This model is now being assessed for suitability of use for other raw water parameters. A data review is being undertaken to ensure there is enough robust data to build future models.	All	2, 3, 4	Ongoing
WaterSource Portal Ongoing improvements of WaterSource Portal and datasets. Working to make data stored on WaterSource portal more closely aligned with BAU (DWSPS etc.). Purpose is to improve visualisation of our working processes.	All	2, 3, 5, 7	Ongoing

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Workstream 3 – Research and Innovation	Status
Supporting cutting edge science to achieve a better understanding of the root causes of the raw water quality deteriorations that impact Customer Acceptability.	

Comments 2023-24

Taste & Odour and algae-derived organics research continues with the Centre for Ecology and Hydrology and Cardiff University to understand triggers and inform our prediction tool; this work was a particular focus during a visit by GW4 industry group. Ofwat Water Breakthrough Challenge: 'CastCo' continues in collaboration with United Utilities and Southwest Water, supporting understanding of Citizen Science for water quality monitoring. Research and Innovation continues to be embedded across all workstreams.

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
CaSTCo Ofwat Innovation Challenge winner. Project scope is to understand how citizen science can support monitoring and evidencing of decision making for the better management of the water environment. One of the eight demonstration catchments will be the River Usk for engagement with agriculture focus.	**Prevent (BBMC):** Court Farm; Sluvad;	2, 5, 6	Ongoing
Algae, Taste and Odour Prediction Scientific understanding of the conditions and triggers for T&O events is limited across the water industry, making it difficult to make operational decisions to manage risk, e.g. draw off management to avoid T&O in reservoir water column. Continued research into T&O triggers and potential land management for reduction or mitigation in risk with Cardiff University and Centre for Ecology & Hydrology (CEH).	**Recover (SgZ):** Alaw; Cefni; Cwmtillery; Glascoed; Preseli; **Prevent (BBMC):** Pontsticill; Llwyn Onn; Sluvad;	2, 3, 7, 8	Ongoing
DCWW/ Cardiff Uni Strategic partnership We have entered an agreement with the university to develop a programme of research across both waste and water priorities. Partnership is across the university disciplines so will have access to both environmental and social sciences.	All	2, 5, 6, 9	Ongoing
Farming Connect EIP Wales Event Supported an event to celebrate the role of on-farm research carried out across Wales through the European Innovation Project (EIP) Wales programme over the last three years. EIP Wales programme has funded 46 on farm projects, working with over 200 farmers across Wales investigating a variety of different topics including soil and grassland, animal health, biodiversity, air and water quality, carbon storage and genetics. We have been involved in the Crypto EIP. The day also featured interactive panel discussions on sustainable farming practices, agricultural technologies, animal health and welfare and horticultural production, led by scientists, vets, experts and farmers. BWG were also in attendance and presented.	All	2, 5, 6, 7	Complete
GW4 Research Visit Triggered from DCWW T&O Industry group, this is now led by Cardiff Uni and aims to bring together interested parties in T&O management. Last meeting (18th to 20th April) was hosted in Wales – Catchment Team facilitated a site visit to Llandegfedd reservoir to talk about our research (resmixer, WQ profiler, PhD into impact of climate change on WQ). Event was also supported by wider research presentations.	**Prevent (BBMC):** Sluvad	2, 3	Complete

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
Supporting Agricultural Research A member of our Beacons Water Group has recent become the first Agri-EpiCentre in Wales. Agri-Epicentre is a UK wide initiative aiming to bridge the gap between the people creating innovative new agricultural technologies, and those who benefit from them https://agri-epicentre.com/ The BBMC team are in discussions to understand the opportunities to align this with our WaterSource programme.	**Prevent (BBMC):** Court Farm; Sluvad;	2, 3	Ongoing
Developing Productive Buffers Working with Aberystwyth University (IBERS), this project monitors buffer strips established with different vegetation types to assess soil water infiltration and potential impact on soil and nutrient run off to water quality. Buffer strips have been established on 5 BWG farms and monitored throughout. Launched in RWAS, July 2023.	**Prevent (BBMC):** Court Farm; Pontsticill; Sluvad;	2, 5, 6, 9	Ongoing
Greenhouse Gas Emissions of Nature-based Solutions (UKWIR) Led by Atkins, research to understand GHG from NBS, focusing on systems design for wastewater treatment/polishing. Stage 1 literature review completed - to understand GHG fluxes from a variety of NBS designs (i.e. wetlands, settlement ponds, SuDS, etc) conclusions are that monitoring is inconsistent, very few papers looked at GHG in NBS monitoring, in most cases whole-life costs of NBS were not looked at (i.e. only operational stages were monitored).	All		

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Workstream 4 – Partnerships and Engagement	Status
Working in collaboration with partners and communities to raise awareness of the importance of safeguarding drinking water supplies both now and for years to come.	

Comments 2023-24

Various stakeholder engagement actions have been undertaken this year e.g. meetings, shows, forums, engaging a wide range of organisations, communities and individuals to promote our message and co-development of ideas. WaterSource '23 showcased our diversity of collaborations and positive progress of our catchment programme.

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
Stakeholder Liaison Groups Continuous involvement in key industry groups i.e. WLMF Agri Pollution Subgroup and Sheep Scab Eradication Group, Welsh Government (Water Branch and Land Reform teams), local NRW teams (Anglesey, NE Wales and SW Wales), and 4Rivers for LIFE as members of both the Project Board & Steering Group. Host and facilitate BBMC Steering Group. Attend and steering group member of both the Wye and Usk Catchment Partnerships.	All	2, 5, 6	Ongoing
Promoting WaterSource (Shows /Events) Continue to raise awareness of our WaterSource approach with various stakeholders and the public at numerous shows and events. In 2023/24 attended RWAS Summer and Winter show and local shows (Brecon and Anglesey), attended Sêr y Bannau event hosted by BBNPA to launch their management plan. Attend local shows jointly with 4Rivers LIFE team (Pembrokeshire and Cothi Bridge). Attended meeting with James Evans MS at Brecon WwTW to showcase BBMC programme.	All	5, 6, 9, 10	Ongoing
Be PestSmart Campaign Continue to raise awareness of our PestSmart approach through ongoing management of the annual campaign for gardeners and homeowners and maintain comms materials (www.pestsmart.wales). Launched in 2021, to date the campaign has generated 88 million digital impressions, reached 440,000 followers through influencer partnerships and features on primetime TV and Radio, resulting in over 280,000 website views.	All	5, 6, 9, 10	Ongoing
WaterSource Conference 2023 Our annual WaterSource conference was held on 4th October. The event focused on 'Demonstrating Positive Progress' - showcasing the diverse collaborations and initiatives that we are delivering to protect our drinking water sources and support multiple benefits to address the Nature and Climate Emergencies. There were over 60 attendees from Welsh Government, Regulators, NGOs, and other key organisations, who heard about a broad range of our projects from latest technologies for in-situ water quality monitoring, cutting-edge academic research into taste and odour, multi-media campaigns to drive behavioural change, and innovative ways of collaborating with farmers and land managers to establish best practice land management.	All	5, 6	Complete
Wales YFC Partnership In the year to date, completed a series of roadshows with the Wales YFC to engage with and develop our relationship with the members and to publicise our 'WaterSource Champions' programme and launched 2023 scheme at RWAS in July however limited applications for the programme. Reflecting and exploring options for programme in 2024; potentially focus engagement at a county/regional level.	All	2, 5, 6	Ongoing

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
Influencing Future National Policy Team attended industry events to keep up to speed on current activity and announcements for future agri-environment programmes for Wales (Sustainable Farming Scheme) and England (Sustainable Farm Incentive) and inputted into DCWW response to Welsh Gov's SFS consultation in March 2024. Supported Beacons Water Group host visit from WLMF Agri-Pollution Subgroup to showcase the collaborative working approach and new ways of working trialled on farm which benefit farm business and water quality e.g. weather stations, developing productive buffers research. Also, ongoing participation in Welsh Gov's Emerging Contaminants to water working group and hosted a visit to Strata Florida WTW by colleagues from Water Policy Team to understand DWSP process and treatment optimisation.	All	5, 6	Ongoing
Y Bannau Launch Attended the launch of Y Bannau in April, the Bannau Brycheiniog National Park Authority's new management plan at the Senedd. Through our BBMC programme we have been working with the NPA to input into the development of the plan and will continue to work with them to align approaches.	**Prevent (BBMC):** Cantref; Court Farm; Llwynon; Pontsticill; Sluvad;	5, 6	Complete
Engagement with our younger customers Worked with Education Team to integrate WaterSource messaging into materials delivered through their 'Source to Sea' workshops which in the last year have been delivered to 87,173 participants in Wales, plus have been available as online resources. Additionally, they have supported us to develop a WaterSource Activity Book to be shared with younger customers at shows/events in July and August with positive feedback was received. We have also hosted work experience visits for 2 students from University of South Wales to showcase catchment work, specifically in BBMC in Summer 2023.	All	5, 6	Ongoing
NRW & EA Regional SgZ workshops Delivered 3 regional workshops in September for NRW and EA colleagues to share our WaterSource approach, highlight regional Safeguard Zones and work delivered through our 5 workstreams. 50 colleagues attended in total including local operations, strategy, and policy teams.	All	2, 5, 6	Complete
Water & Waste Joint Working Established links between water and waste teams to ensure consistent approaches and messages about both operational functions when engaging stakeholders. Established regular catchments with River Quality Liaison Managers and jointly attend meetings as required. For example, Wye Catchment Partnership, Teifi Working Group and Usk Catchment Partnership.	All	2, 5, 6	Ongoing
Nature Friendly Farming Network Collaboration Supported 8 workshops facilitated by Nature Friendly Farming Network and other partners across Wales to share learnings on soil health, regenerative grazing and whole farm planning Spring/Summer. Workshop conducted by Regenerative Agricultural Consultant, Niels Corfield which informed farmers of management techniques used to "weatherproof" their farms by increasing resistance to both drought and flood conditions, improving soil health, water infiltration rates and grass productivity. Catchment Team colleagues attended each event presenting our WaterSource message. Over 150 adviser, farmers and land managers were engaged through these events with very positive feedback from attendees.	All	2, 5, 6	Complete
Women's Institute – Teifi & Me Developed programme of engagement with the 13 WI groups within the River Teifi catchment to promote WaterSource. Launched in February 2024, actions ongoing include group presentations, WTW visits, collaborative artwork and river walks.	**Recover (SgZ):** Llechryd	5, 6	Ongoing

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Workstream 5 – Mitigations	Status
Co-designing solutions with our key stakeholders which will deliver multiple benefits for water, the environment, and people.	

Comments 2023-24

Delivery of mitigation actions has built more momentum following delays from years 1 to 3 due to pandemic restrictions. Collaboration is central to our approach, and we are working with existing and new stakeholder groups to raise awareness of our risks and co-design approaches which safeguard raw water sources and deliver multiple benefits.

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
Beacons Water Group Our partnership with BWG and the sharing of experiences, embracing and trialling of new ways of working to develop win-win solutions to bring long term benefits to both our drinking water catchments and farming business. This year attended/hosted 11 events to showcase the work of BWG including a visit from WLMF Agri Pollution Subgroup and addressed members of Welsh Gov's Phosphate Summit. Working independently group members have promoted the BWG work to approx. 180 people across 8 events they have attended.	**Prevent (BBMC):** Court Farm; Pontsticill; Sluvad	2, 5, 6, 9	Ongoing
Water Group Network DCWW are leading the development of a number of farmer-led group within SgZ, sharing water quality challenges and working with the farmers to co-create catchment-based solutions. Following the example of the Beacons Water Group, we are looking to develop similar groups in all SgZ to act as steering groups to identify issues and trial new approaches in the catchment. Current groups in progress in Builth, Llyswen, Bolton Hill and Pendine with external facilitators appointed, and working with existing farmer group in Whitbourne SgZ.	**Recover (SgZ):** Bolton Hill; Builth; Llyswen; Pendine; Whitbourne	2, 5, 6, 9	Ongoing
Central Beacons Partnership Facilitating the development in the central Beacon Beacons area to deliver peatland restoration. The partnership aims to work with BBNPA, landowners and graziers in this central area to identify priority areas of peatland and DCWW to fund restoration. The partnership will look to build capacity locally for contractors to further benefit the local community.	**Prevent (BBMC):** Court Farm; Pontsticill; Sluvad	2, 5, 6, 9	Ongoing
BBMC – Task & Finish Groups From the BBMC Steering Group task & finish groups have been established with partners to develop collaborative approaches to common challenges. 1) Wildfire management – working with NRW, BBNPA, Fire & Rescue Service and National Trust the group aims to create long term approach to manage wildfire to benefit water quality, biodiversity and communities. 2) Natural Flood Risk Management – working with NRW and BBNPA to identify, trial and evidence the benefit of novel and low-cost mitigations for water management and flood retention. Supported 2 training sessions & installation on BWG farm. 3) Agriculture – working with farming unions on ways of integrating their interests into the BBMC programme, conducting a series of workshops with a view to producing an actionable report and improving joint understanding of challenges facing each organisation. 4) Tourism – working with BBNPA and local tourism operators to explore opportunities for BBMC to work with tourism sector to share WaterSource messages to operators and visitors.	**Prevent (BBMC):** Cantref; Llwynon; Pontsticill; Sluvad; Court Farm	2, 4, 5, 6	Ongoing

Project Name & Key Activities	Management Approach & Catchment/s	Evidence	Status
NRW's 4 Rivers for LIFE Project Board and Steering Group meetings attended. Good progress being made towards activities on the ground. We have set up routine conversations between NRW/DWW to discuss activities taking place and are working together to ensure we capture joint messaging opportunities. Attend joint visits and local shows (Pembrokeshire and Cothi Bridge)	**Recover (SgZ):** Bolton Hill; Capel Dewi; Felindre; Llechryd **Prevent (BBMC):** Court Farm; Sluvad	2, 5, 6, 9	Ongoing
Beacons Water Group: Nutrient Credit System Data has been received from the group to evidence their nutrient management plans – they have been peering reviewed and payment approved for 2022. Nutrient Management Plans produced in 2023 and independently verified by consultant to independently verify BWG Nutrient credit system.	**Prevent (BBMC):** Court Farm; Pontsticill; Sluvad	5, 6	Complete
Glascoed Nutrient Project Engagement with local farmers to raise awareness of land management actions which can impact on water quality. Worked with farmers to gather baseline information about land activities (farm diary) and working with agronomists Huntchinsons to soil scan and interpret data to inform nutrient application on farm.	**Recover (SgZ):** Glascoed	5, 6	Ongoing
Cryptosporidium Project Following learnings from research undertaken through EIP, developed project to engage farmers in Cowlyd and Cwm Dulyn SgZ to better understand the presence of Cryptosporidium in sheep flocks and explore potential mitigations to reduced impact to water quality. Engaged local graziers in Summer 2022, and local veterinary practice delivered a sampling and analysis programme for sheep faecal matter in Spring/Summer 2023 to understand prevalence. Working with Moredun Research Institute who are undertaking analysis and participated in knowledge transfer event with farmers in January. ADAS engaged to deliver advisory visits and flock faecal sampling in Spring 2024.	**Recover (SgZ):** Cowlyd; Cwm Dulyn	5, 6	Ongoing
Sheep Scab Eradication Project DCWW with National Sheep Association Cymru (NSA) established industry working group in 2022 to raise awareness of water quality risks associated with dipping and disposal of waste dip (a by-product of sheep scab treatment). The group has identified a lack of alternate disposal options for waste dip. Subsequently DCWW has led on appointment Ricardo as framework contractor to conduct gap analysis research. In addition, DCWW invited as industry partner for the 'Gwaredu Scab' project, a 3-year industry led project run by Agricultural Research Centre (Coleg Sir Gar) funded by Welsh Gov.	All	2, 5, 6	Ongoing
Talybont Land Appraisal Appointed suppliers to undertake land appraisal on parcels of owned land around Talybont reservoir to understand risks and opportunities for managing land to safeguarding raw water quality. Assessment will include EIA, INNS mapping, historical aerials surveys to understand river corridor changes and riparian area and assess options for future land management.	All	5, 6	Ongoing
River Dee Joint Working UU/HD/STW Established joint working group of Water Companies operating on the River Dee – United Utilities, Severn Trent, Welsh Water and Hafren Dyfrdwy to explore a collaborative catchment management approach for the catchment in AMP8, in line with AMP8 NEP. Scope and scale of delivery will depend upon Ofwat's final determination of PR24 business plans expected in Dec 2024.	**Recover (SgZ):** Bretton	5,6	Ongoing
Supporting Estates Strategy Development Working with Estates team as they develop their future strategy for managing DCWW owned land to be in place for AMP8. Discussed the need to lead by example in our approach to land management and the opportunity in Talybont catchment, where we are the majority landowner, to develop exemplar land management practices.	All	2, 5, 6	Ongoing

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Targeted Activity to meet Wt7 Measure of Success

Table 1. Site specific details on activities undertaken to meet the MoS.

Safeguard Zone	Key Activities and Next Steps
19) Cwm Dulyn WTW *(Llyn Cwm Dulyn)* **20) Cowlyd WTW** *(Llyn Cowlyd)*	• Engaged with graziers end of summer 2022 and broad support for collaboration established. • DCWW industry partner in Moredun Institute's funding application for Diagnosis of Cryptosporidium and its Sources in Drinking Water Catchments to secure PhD support with analysis of samples • Internal project approval for work on this project. Local vets engaged to undertake sheep faecal sampling on 6 participating farms and samples with Moredun Institute for analysis. • Held dissemination event for farmers and partners to share sample results in January 2024. *Next Steps:* • Continue to gather baseline data for participating farmers so that sampling regime can be developed and repeated in 2024. • In progress - faecal and raw water sampling with on-farm audits / mitigation to limit impact during 2024 lambing and calving season
22) Trecastell WTW *(Ffynnon Asaph aquifer)*	• Joint NRW / DCWW engagement exercise with catchment farmers during July 2022 to offer support for mitigation schemes. If successful, hope to replicate approach in other catchments to be led via local NRW team. • 3 (with a 4th withdrawn) farms have expressed interest in fencing and alternate water supply work • Met with NRW teams to discuss potential joint working arrangements. Funding confirmed and agreement between NRW and DCWW finalised. *Next Steps:* • Ongoing discussions with Denbighshire AONB team and NRW on collaboration for landscape mitigations in 2024/5 • Discuss with farmers formalising into a Water Group which DCWW can facilitate. • Linking catchment engagement with Afon Bach catchment and wider work of NRW Clwyd Opportunity Catchment Group • Gather further understanding of the surface and groundwater connectivity using data layer from British Geological Survey
13) Cwmtillery WTW *(Cwmtillery reservoir)*	• Algal issues identified at reservoir summer 2022, resulting in WTW becoming offline due to filters being affected. • Catchment investigation undertaken to understand the root cause of this infrequent occurrence as it does not happen on a seasonal/annual basis. These issues are experienced in other catchments and industry leading research with Cardiff University and Centre of Hydrology and Ecology (CEH) is ongoing to better understand the factors that influence algae and T&O presence and inform predictive modelling. • Further investigation and discussion with Operational colleagues are that the fencing around the reservoir is in satisfactory condition. Land use in the catchment mainly agricultural – low input pasture and rough grazing. • Discussed with local teams' potential engagement with farmers around the catchment. Issues identified as farmers have been unapproachable in the past and disagreements by landowners about ownership/management control. We are unable to progress any engagement currently. • Review of tree planting opportunities undertaken to assess feasibility and potential impact. The area proposed and under DCWW management is currently listed as a priority habitat and is also accessed by a local fishing club. Due to this the area is currently unsuitable for tree planting. • Review of alternative mitigations and GIS spatial analysis of the catchment undertaken to better understand hydrological flow connectivity and land use changes over time. *Next Steps:* • Ongoing discussions with Estates Team on potential water quality improvement measures should landowner relations improve.
1) Pendine WTW *(Morfa Bychan aquifer)*	• Site has been performing well with no issues being detected during 2022 - improvement. • Identified facilitator to work with us to re-establish previous Agrisgôp with farmers and implement a programme of work to support actions that improve water quality. • Visual condition survey of DCWW diversion channel undertaken between Catchment and Production colleagues with no major issues identified. • Appointed facilitator and reconvened previous farmer group. *Next Steps:* • Support farmer group to deliver programme of activities

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Appendix 1

AMP7 programme: examples of activities

Measures to improve water quality across all SgZ catchments are being delivered through 5 key workstreams. These are listed below with examples of activities:

- **Risk Evaluation** - understanding of current and future challenges and risks to raw water quality. We are doing this by:
    - *Maintaining Drinking Water Safety Plans (DWSPs) for each catchment to identify current and emerging risks*
    - *Monitoring and evaluation of new and emerging parameters of concern (e.g. PFAS, new Drinking Water Directive standards)*
    - *Monitoring of regulatory raw water quality results, analysing trends and undertaking sub-catchment sampling to inform risks to WTW abstractions*

- **Smart Catchments** – working towards a 'Digital Twin' that will allow us to better predict when raw water deteriorations may occur, so that we can actively manage our abstractions to avoid challenging our water treatment works processes and also support long-term investment planning. We are developing this by:
    - *Installing near real-time raw water quality monitoring at strategic sites*
    - *Improving our spatial risk mapping, at field and catchment scale, through new earth observation, remote sensing and digital mapping systems*
    - *Mapping land to water connections (hydro-connectivity) at field and landscape scales*

- **Research & Innovation** – supporting cutting edge science to achieve a better understanding of the root causes of the raw water quality deteriorations that impact Customer Acceptability. We are accomplishing this by working with leading research institutes to:
    - *Undertaking root cause analysis of risks to guide development of appropriate mitigations*
    - *Develop predictive modelling of Taste and Odour events*
    - *Understand the links between livestock health and cryptosporidium in the water environment*
    - *Supporting the CaSTCo Citizen Science multi-agency project (funding via Ofwat Innovation Fund)*

- **Partnerships and Engagement** - working in collaboration with partners and communities to raise awareness of the importance of safeguarding drinking water supplies both now and for years to come. We are achieving this by:
    - *Developing materials and communications tools to raise awareness of the need for drinking water protection e.g. 'WaterSource' and 'PestSmart'*
    - *Setting up partnership collaborations such the; Pesticide Steering Group, Beacons Water Group and local Safeguard Zone working groups, to assist with promotion of our catchment activities*
    - *Supporting the business with the development of the new Cwm Taf Water Supply Strategy*

- **Mitigations & New Ways of Working** – developing best practice methodologies and co-designing solutions with our key stakeholders which will deliver multiple benefits for water, the environment and people. We are delivering this through:
    - *Land restoration and management improvements in peatland, forest and farm environments*
    - *Risk removal for example via our pesticide disposal and, award winning, Weedwiper schemes*
    - *Collaborations on multi-partner projects such as NRW's South West 4 Rivers LIFE.*
    - *Exploring ways to support and influence Government future strategic policies for water and environmental protection*
    - *Supporting farmer led groups to trial new technologies for more informed decision-making (e.g. Beacons Water Group)*
    - *Engaging with community groups to understand how they could act as ambassadors for protecting drinking water sources (e.g. Cwm Taf Community Partnership)*
    - *Opportunity mapping to identify multiple benefits and deliver greatest value solutions*

Risk Evaluation

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

Challenge:

- New DWI guidance on identifying and quantifying PFAS hazards in individual raw water sources

Outcomes & Impacts:

- Risk assess the potential PFAS Hazard in individual catchments
- Create a raw water sampling regime to establish a baseline assessment
- Establish an action plan in the event of elevated levels recorded

Next steps:

- Ongoing review of potential sources
- Continue raw water sampling to validate risks
- Through process sampling to understand impacts to GAC
- Continually review research and review learnings

Risk Evaluation

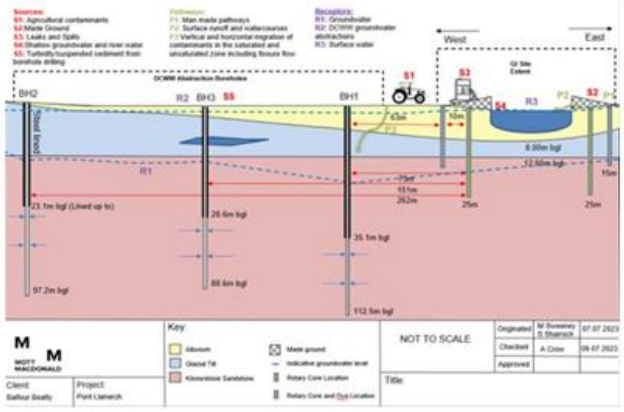
Llannerch Park Road Bridge

Strategic Response/s:
Continuous identification and effect mitigation of emerging pollutants, We have complete understanding of how our catchments behave

Challenge:
- New road bridge (nationally important infrastructure) within SPZ1 – impact of water quality within the aquifer

Outcomes & Impacts:
- Supported Production to quantify potential risk to water treatment
- Worked with developers to design more low-impact testing/drilling methods
- New road bridge design

Next steps:
- Ongoing monitoring during feasibility and construction phases
- Lessons learnt for managing developments in other SPZs



Risk Evaluation

Fuel Spills River Teme (Whitbourne WTW)

Strategic Response/s:

Continuous identification and effect mitigation of emerging pollutants, We have complete understanding of how our catchments behave

Challenge:

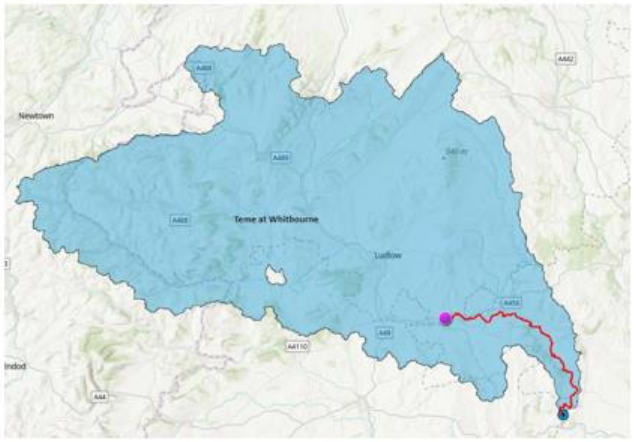
- Protect the downstream WTW – hydrocarbons cannot be treated
- Ensure appropriate clean up (short and long-term)

Outcomes & Impacts:

- No impact on WTW
- Intensive Catchment sampling programme & tankering to distribution
- Specialist contractor services for clean-up (limited support from Environmental Regulators)

Next steps:

- Response supported further spill in same catchment



Smart Catchments

Real Time Monitoring

Strategic Response/s:

We have complete understanding of how our catchments behave, Early Warning systems are in place

Challenge:

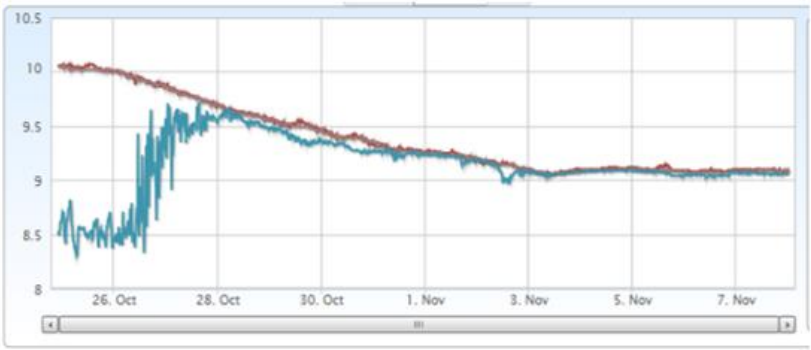
- Early detection for water quality changes and deterioration to protect downstream water quality compliance.

Outcomes & Impacts:

- Feasibility and installation of real-time monitoring. Programme of installations in reservoir and river systems - 2021 to 2024 at Alwen, Talybont, Llandegfedd, Llwynon, Pontsticill & Pentwyn
- Time of Travel validation (river systems)

Next steps:

- Programme of installations in reservoir and river systems - 2021 to 2024
- Aligning monitoring with other stakeholders
- Feed into Digital Twin for near real-time knowledge of risks



Smart Catchments

Catchment Digital Twin

Strategic Response/s:

We have complete understanding of how our catchments behave, Early Warning systems are in place

Challenge:

- Understanding live changes in land use and the impact on water quality that may affect downstream WTW

Outcomes & Impacts:

- Living Wales is a unique and novel world-first concept that aims to capture the state and dynamics of Wales's landscape, in near real time, historically and into the future (over the long term) through integration of earth observation data, supportive ground measurements and process models. Working with the team to expand their Earth Observation and Remote Sensing approach to:
  - Baseline water quality and land use monitoring
  - Link land use change with impacts on raw water quality – Algorithm development
  - Develop a Catchment 'Digital Twin' for near real-time understanding of impacts to raw water quality

Next steps:

- Ongoing project development

https://wales.livingearth.online/

LIVING WALES

Research & Innovation

Developing Productive Buffers

Challenge:

- Develop a readily adopted approach to reducing surface water flows from agricultural land, reducing risks to water quality from soil and nutrient runoff.

Outcomes & Impacts:

- Aberystwyth University research project Feb 2023 – March 2025
- Trial plots established on five farms
- Water infiltration monitoring commenced November 2023
- If adopted widely across our catchments buffer strips have the potential to significantly reduce runoff from agricultural land and the associated contaminant risks entering our raw water supplies.

Next steps:

- Monitoring water infiltration rates and changes in soil biology.
- Develop a methodology for replication in our catchments.

Partnerships & Engagement

WaterSource23

Challenge:

- Disseminate positive progress undertaken by the team across all five workstreams and encourage partners to continue working together towards common goals and solutions

Outcomes & Impact:

- More than 60 attendees at the event
- Positive feedback from key stakeholders
- Continuation of story of WaterSource journey through AMP 7
- Improved visibility of Catchment Team across the business

Next steps:

- Conclusion of Conference series at end of AMP
- Mini conferences for colleagues across Wales

Partnerships & Engagement

Promoting WaterSource at Shows & Events

Challenge:
Introduce the WaterSource message to the agricultural community and wider stakeholders and promote the team's achievements

Outcomes & Impact:
- More than 25 shows, events, walks, talks, awards and visits undertaken over the year
- More than 500 individuals engaged
- Training for the team in engaging with the public
- Improved perception of Welsh Water as a company that cares and will listen to and work with others

Next steps:
- Continue to attend events for remainder of the AMP and beyond
- Consider attending smaller agricultural shows with more of a grass roots attendance






Mitigations & New Ways of Working

Water Groups Network

Challenge:

- Engaging agricultural and community groups in actions to protect water quality

Outcomes & Impact:

- Based upon our Beacons Water Group approach, Water Groups have been developed in Builth (x2); Bolton Hill/Preseli; Pendine, and Whitbourne catchments (working with existing group)
- Providing independent facilitator and support for activities to raise awareness of water quality risk and explore actions to co-design catchment-based solutions
- Groups have created good working relationship with key stakeholder groups and improving the perception Welsh Water with communities

Next steps:

- Expanding network into other SgZs and trial approach with commons Grazing Association in BBMC area
- Convene a network of facilitators to share ideas

Mitigations & New Ways of Working

Central Beacons Peatland Restoration

Challenge:
Water quality deteriorations due to degraded peatland and landslips

Outcomes & Impact:

- Joint funding of peatland restoration, with Brecon Beacons National Park and the National Trust
- 250ha of restoration over 3 years. 160ha restored to date
- Improved water quality and retention in upland reducing erosion

Next Steps

- Further engagement with Grazing Associations to include livestock and fire management plans
- Integration of catchment management work across NRW and WW
- Opportunity for joint engagement messages on environmental protection across the park