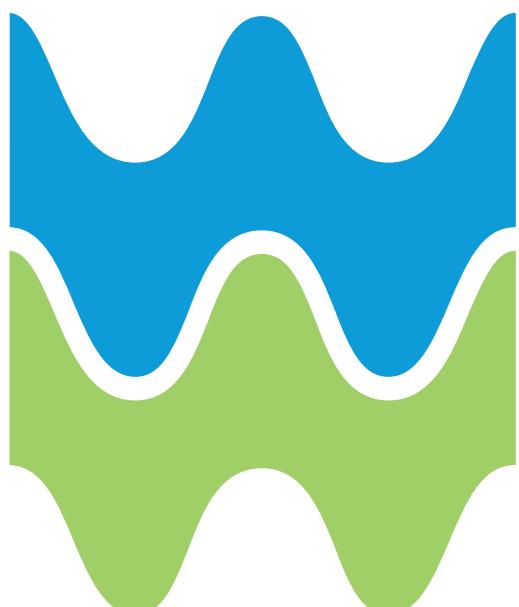


# Water Catchments Improved

Annual Report 2022/23



# Annual Report

## Wt7 Water catchments improved (Safeguard Zones)

### Table 3E, Line 17

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

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

#### Background

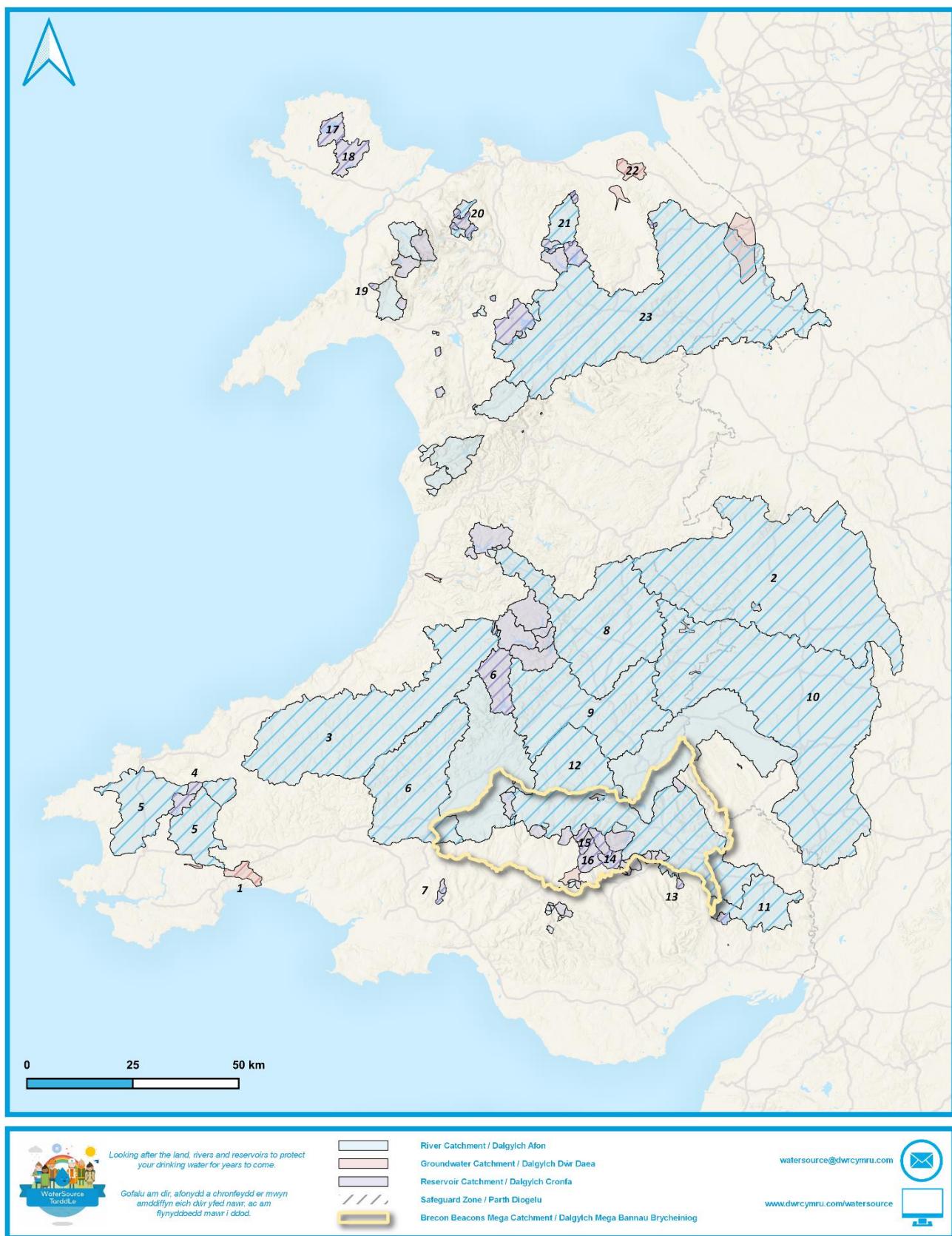
Under the Water Framework Directive, there is provision to designate drinking water Safeguard Zones (SgZ) for areas where there is a current water quality deterioration from one or many pollutants *eg. pesticides, nutrients, sediments, bacteria/cryptosporidium*. **The Environment Agency (EA) and Natural 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 Welsh Water's Water Treatment Works (WTW) catchments have been designated by the EA (2017/18) and NRW (2020), they are listed below along with their progress status based on the associated Action Plans. SgZs marked \* indicate targeted catchments to potentially meet our Measure of Success (MoS) (see table on [page 11](#) for site specific details). SgZ ID numbers in brackets referring to locations on the map [page 2](#).

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)		Llyn Onn WTW (16) (Llyn Onn reservoir)		Llechryd WTW (3) (River Teifi)			
Cefni WTW (18) (Llyn Cefni)		Llyswen WTW (9) (River Wye)		Preseli WTW (4) (Rosebush reservoir)			
Glascoed WTW (21) (Plas Uchaf & Dolwen reservoirs)		Mayhill WTW (10) (River Wye)					
KEY: <span style="background-color: red; color: white; padding: 2px;">Late delivery likely</span> <span style="background-color: yellow; color: black; padding: 2px;">Delayed but recoverable</span> <span style="background-color: green; color: white; padding: 2px;">On track</span> <span style="background-color: cyan; color: black; padding: 2px;">*Targeted to meet AMP7 MoS</span>		Pontsticill WTW (14) (Pontsticill & Pentwyn reservoirs)					
		Sluvad WTW (12) (Llandegfedd reservoir)					

## Safeguard Zones



## APM7 programme of work

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 (eg. PFOS, 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*
  - *Undertaking root cause analysis of risks to guide development of appropriate mitigations*
- **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. We are developing this by:
  - *Installing 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*
- **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:
  - *Develop predictive modelling of Taste and Odour events*
  - *Understand the links between livestock health and cryptosporidium in the water environment*
  - *Set up the Brecon Beacons Mega Catchment Research Hub (proposed 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 eg. ‘WaterSource’ and ‘PestSmart’*
  - *Setting up partnership collaborations such as 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 Welsh Water’s SMNR catchments and 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 (eg. Beacons Water Group)*
  - *Engaging with community groups to understand how they could act as ambassadors for protecting drinking water sources (eg. Cwm Taf Community Partnership)*
  - *Opportunity mapping to identify multiple benefits and deliver greatest value solutions*

## Progress Summary

Momentum is returning following the impact of the global pandemic in 2020 and 2021 which effected year 1 to 3 of the programme. This year the team continued to seek opportunities to work collaboratively promoting our WaterSource approach and progress mitigation actions to safeguard raw water quality. The team attended the RWAS Summer and Winter Fair and other regional shows, sponsored the annual UK Nuffield Farming Conference (held in Cardiff), plus facilitated a workshop with NRW and Local Authority to explore future management options around the Alaw reservoir, Anglesey. The team continues to facilitate partnership groups to inform and trial ways of working to protect water quality, for example our Glascoed Nutrient Project and Central Beacons Partnership.

We continue to work closely with our regulators, supporting the official launch of NRW's 4Rivers for LIFE project and hosting the first NRW and EA Safeguard Zone Workshop. The workshop was attended by colleagues from local and policy teams and provided an overview of the SgZs and examples of our catchment activities. We are also supporting the Ofwat funded research partnership project CaSTCo (Catchment Systems Thinking Cooperative) which aims to implement a UK national framework for a catchment monitoring cooperative, using citizen science and standardise approaches to data collection and management regarding water environment data in England and Wales. The River Usk catchment is one of the eight demonstrator catchments, and will focus on engaging farmers in participating in citizen science.

Our annual conference, WaterSource 2022 was held in November, after a 2-year break due to Covid. It was attended by around 60 delegates exploring how we can work in collaboration effectively to safeguard raw water quality and deliver wider benefits. The event was also an action of the recent Welsh Government Biodiversity Deep Dive and DCWW are keen to work with others to progress the recommended next steps.

We have supported BBNPA in their launch of their new management plan (Y Bannau) where we had an opportunity to showcase the work of Beacons Water Group (BWG) and PestSmart to partners including Julie James, Minister for Climate Change, and attended the official launch in May.

Under our Smart catchments programme we are continuing the install reservoir profiling systems and started a piece of work to better predict time of travel in our river systems which we hope will provide more resilience to downstream WTW in the event of pollution incidents. We are also progressing with the Living Wales project working with Aberystwyth University to use Earth Observation to predict and model changes to raw water quality in the event of changes to land uses.

Our routine Risk Evaluation work continues to deliver our Raw Water Monitoring Programme and Drinking Water Safety Plans; the latter of which is progressing to achieve accredited status. The team have been leading on our new PFAS sampling programme and supporting during seasonal and event monitoring of raw water quality e.g. dry/cold weather, pollution incidents.

**Key activities delivered in 2022/23 under each workstream**

Further details can be found in the case studies, starting on [page 12](#)



### Risk Evaluation

- DWSP annual reviews and accreditation on track
- DWI Audit**, positive feedback on catchment DWSP process and production
- Reg 26 & Catchment characterisation** Informs WTW disinfection risk and DWI recognise as Industry leading
- PFAS Risk Assessment** Identification of sources and raw & final water sampling
- Weather & Operations support** >60 sampling investigations and depth profiles, support during pollution incidents



### Smart Catchments

- **Bathymetric surveys** completed at 37 key reservoirs
- **Online monitoring** reservoirs – 5 installed, 3 in design, rivers in design, time of travel validation ongoing
- **Hydro-connectivity mapping** with x6 farmer groups
- Work with **Aberystwyth University** on Living Wales, Earth Observation project and MSc student placement



### Research & Innovation

- **T&O** drivers triggers for algae release of T&O understood and Predictive model developed for Glascoed
- **CastCo** Ofwat Innovation fund leveraged £7m funding for citizen science
- DCWW have established a strategic research partnership with **Cardiff University**
- **Animal Health** Breaking the link between livestock prevalence and raw water detections. Management of sheep scab and associated waste pesticides



### Partnerships & Engagement

- **SgZ workshop** with NRW and EA to explore joint working opportunities
- **Promotion and engagement** activities e.g. shows, events, forums
- Engagement with next generation farmers through **Wales YFC Sponsorship**
- x5 **Farmer led discussion groups** to co-design solutions
- Welsh Gov's **Biodiversity Deep Dive** supported by **WaterSource 2022**
- **PestSmart** best practice public awareness campaign, ~20M impressions on digital & social media
- Presentation to Julie James MS at BBNPA 'Sêr y Bannau' event highlighting our WaterSource approach and links to BBNPA to the new management plan



### Mitigations & New Ways of Working

- **Central Beacons Partnership** to undertake peatland restoration
- Supporting **SW 4Rivers LIFE NRW** project to safeguard water and environment (£9M total funding)
- **Glascoed Nutrient Project** working with NRW & local farmers
- **BWG** Nutrient Management Credit system trialled
- PestSmart **Pesticide Disposal Scheme** for farmers and land managers in Wales (29,500kgs collected)
- **Maize Undersowing** to provide soil protection in winter across 108 acres)
- **Central Beacons** peatland restoration (0.4 hectares)
- BWG Weather stations** for real-time decision making (4 installed)

Workstream 1 – Risk Evaluation		
Understanding of current and future challenges and risks to raw water quality		
Case Studies		
Name	Safeguard Zone	Key Actions
PFAS	All Safeguard	<p>New DWI Information letters (05/2021 and 03/2022), published in 2021 and 2022, require water companies to assess Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) risks through the water treatment chain to customers taps. Guidance requires in-depth understanding of potential risks in catchments. To date the team have completed a risk assessment and are undertaking baseline monitoring of all drinking water sources. No significantly elevated detections observed to date.</p> <p>Understanding impacts of PFAS, risk evaluation and adoption of further DWI guidance is ongoing.</p> <p><u>Next Steps:</u> Continue to monitor and comply with guidance from DWI</p>
DWSP Accreditation	All Safeguard Zones	<p>In recognition of the importance of DWSPs to drive future investment needs, Welsh Water will be accrediting our DWSP process. To achieve accredited status by spring 2023, team has been restructured and current processes and procedures are being reviewed and strengthened as required.</p> <p>Next Steps: Continue to adapt and improve the DWSP system. Ongoing catchment DWSP annual reviews</p>
Responding to Consultations	All Safeguard Zones	<p>As and when they are received, we review all planning applications for their potential impact on raw water quality. Comments are provided and adherence of developments to best practice guidelines is reiterated to ensure Drinking Water Protected Areas (DrWPAs) are safeguarded. Additionally we work with stakeholders when consulted on key activities, for example at Dinas Mawddwy we are working with NRW to understand felling and rhododendron clearance obligations and timeframes for activities to avoid unintended consequences on raw water quality.</p> <p>Next Steps: Continue to review applications and consultations as received</p>
Operational support	All Safeguard Zones	<p>Support colleagues in water Process and Production during incidents that effect raw water quality. During the period of dry weather in 2022 the team undertook raw water quality monitoring and depth profiling to support treatment optimisation at key WTWs, for taste and odour and manganese risks.</p> <p>As and when pollution incident are reported upstream of our drinking water abstractions we work with operational colleagues understand and mitigate risks to WTWs. Examples include period of elevated colour and sedimentation suspected to be forestry activities and 4x4 access; and significant fuel release in a river catchment which closed the abstraction for 36hours.</p>

<b>Workstream 2 – Smart Catchments</b>		
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.		
<b>Comments 2022-23</b>		<b>RAG Status</b>
<p><i>WaterSource Portal</i>, spatial data management system continues to be developed as part of our Digital Twin approach.</p> <p>Ongoing programme of catchment monitoring (reservoirs profilers and river monitors) will inform operational decisions e.g. draw off management</p> <p>Methodology for hydrological pathway mapping has been devised and shared with farming practitioner groups, limited opportunities to ground truth until recently.</p>		
<b>Case Studies</b>		
<b>Name</b>	<b>Safeguard Zone</b>	<b>Key Actions</b>
‘Early Warning’ systems	Talybont, Llandegfedd, Llwyn Onn & Pontsticill	<p>Completed feasibility study to explore options for calculating time of travel which can be used during pollution incidents.</p> <p>Ongoing programme to install catchment monitors including reservoir profilers and river monitoring upstream of abstractions will improve our understanding of waterbody dynamics that drive changes in raw water quality in near real time and allow abstractions to be managed accordingly. Reservoir profilers have been installed in x6 reservoirs. Additionally working with NRW monitoring teams to explore potential joint working opportunities e.g. LIDAR data gaps.</p>
Catchment Digital Twin	All Safeguard Zones	<p>Partnering on a project with Aberystwyth University to inform the potential impact of future land use, using Earth Observation and remote sensing, plus various datasets, and algorithms to analyse and monitor landscapes and landscape changes. The Living Wales platform can currently map and assess land covers (including crop types), habitats, and ecosystems pan-Wales, and indicate their extent and quality; this facilitates mapping connectivity as well. Future capacity will integrate socio-economic and ecosystem-service data, and predictive modelling.</p>
Hydrological Pathway Mapping	Court Farm; Sluvad; Builth;	<p>Following the success of developing this methodology with farmers within the Beacons Water Group, we have worked with our farmer groups in the Wye catchment to further validate this methodology for a wider range of land holdings. Positive feedback from the participants who have identified potential areas for land management improvements based on the results. This approach has been presented to EA and NRW and wider WLMF’s Agri Pollution Sub Group and will be exploring ways to upscale.</p>
Catchment Characterisation	All Safeguard Zones	<p>Following the AMP6 NEP catchment characterisation reports, we are further developing our catchment knowledge and building the baselines for our ‘digital twin’ by undertaking a review of information that is available spatially (ie. as GIS layers). This library is being managed via our Portal system, which is enabling us to quantify catchment risks based on location of risk, proximity to water source and likelihood of pollutant reaching an abstraction point.</p>

Workstream 3 – Research and Innovation		
Supporting cutting edge science to achieve a better understanding of the root causes of the raw water quality deteriorations that impact Customer Acceptability.		
Comments 2022-23		RAG Status
Taste & Odour and algae-derived organics research completed with the Centre for Ecology and Hydrology and Cardiff University. Proof of concept T&O in raw water predictor tool developed with Bristol University. Ofwat Water Breakthrough Challenge: 'CastCo' bid progressed to Stage 2 (Citizen Science for water quality monitoring), in collaboration with United Utilities and Southwest Water.		
Case Studies		
Name	Safeguard Zone	Key Actions
Catchment Systems Thinking Co-operative (CaSTCo)	Court Farm; Llandegfedd; (plus BBMC)	Ofwat Innovation Challenge winner - £7.1M project, led by United Utilities in partnership with The Rivers Trust, Water companies, academia and environmental NGOs. 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. Welsh Water, Wye & Usk Foundation and Cardiff Uni have had the initial kick-off meeting to plan out the blockers and challenges to partnership working and identify the activities that need to be undertaken to develop the framework, tools and training. <a href="https://waterinnovation.challenges.org/winners/castco/">https://waterinnovation.challenges.org/winners/castco/</a>
Algae, Taste and Odour Prediction Research	Glascoed	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. Working with the Centre for Ecology and Hydrology, Cardiff and Bristol Universities to better understand the root causes and triggers of algae growth and taste and odour production. A proof-of-concept model and dashboard has also been developed to try to accurately predict instances of T&O in reservoirs. The model uses meteorological, biochemical and volume datasets and centred around Plas Uchaf Reservoir in Glascoed SgZ as a test location. The dashboard was able to predict increases in T&O; delivering a 95% accuracy for concentration two weeks into the future.
Crypto EIP	Wye at Builth; Cowlyd; Cwm Dulyn	Partnered on a project funded by European Innovation Partnership (EIP) to help farmers better understand the impact of cryptosporidium infections in their flocks. The research helped identify the pathways for cryptosporidium movement across the farm and through the livestock. The learnings will help us identify how we can work in collaboration with farmers in priority catchments, and we will continue to work with industry experts at Moredun Research Institute.
DCWW/ Cardiff Uni Strategic partnership	All catchments	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.

Workstream 4 – 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.		
Comments 2022-23		RAG Status
Generally stakeholder engagement actions returned to in-person events e.g. meetings, shows, forums as Covid-19 restrictions are lifted, allowing more productive engagement and co-development of ideas with stakeholders.		
Case Studies		
Name	Safeguard Zone(s)	Key Actions
Liaison Groups	All Safeguard Zones	Continuous involvement in key industry groups including WLMF Agri Pollution Sub Group and Sheep Scab Eradication Group and set up regular conversations with Welsh Government (Water Branch and Land Reform teams). Also attend regular meetings with local NRW teams in Anglesey, NE Wales and SW Wales, and 4Rivers for LIFE as members of both the Project Board & Steering Group. Facilitate BBMC Steering Group. Facilitate quarterly reporting meetings to NRW and EA and hosted SgZ workshop for local and national colleagues in October 2023.
Promotional Activity	All Safeguard Zones	To raise awareness of our WaterSource approach and campaigns amongst stakeholders and public we have attended various shows and events as well as set up key sponsorships. National events attended include RWAS Smallholders Festival, Royal Welsh Show and Winter Fair, plus regional shows including Brecon, Tenbury Wells, Anglesey, Pembrokeshire and Usk. Sponsorship activities include EcoFutures Camp at Black Mountains College, Wales YFC and UK Nuffield Farming Conference. Additionally, supported BBNPA Ser Y Bannau Showcase events in early 2023 to outline the BBNPA Management Plan, this included sharing our WaterSource activities with Minister for Climate Change Julie James MS at the
WaterSource Conference	All Safeguard Zones	In November the team hosted our annual WaterSource Conference, for the first since 2019. The conference theme was Enabling Effective Collaboration and brought together key stakeholders to shape how we can work together to realise our 2050 ambition of safeguarding drinking water through catchment management. The event also provided an opportunity to act on recommendations laid down by Welsh Government's Biodiversity Deep Dive which calls on a 'Team Wales' approach to address the nature and climate emergencies. Around 60 people attended the event representing government, regulators, environmental NGOs and industry partners.
PestSmart campaign for gardeners and homeowners	All Safeguard Zones	Our PestSmart campaign encourages gardeners and homeowners to follow best practice when using pesticides and smarter approaches to reduce reliance on pesticides. Our 2021 campaign has won a silver award in the not-for-profit category, at the Chartered Institute of Public Relations (CIPR) Welsh Area Awards. The campaign continued into 2022 delivering various actions to share the message e.g. news articles in national and local publications, working with social media influencers, attending shows/events, digital and social media advertising all helped deliver over 20million digital impressions, this is a 42% increase from 2021. (Visit <a href="#">PestSmart.Wales</a> or <a href="#">PestSmart.Cymru</a> )

Workstream 5 – 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.		
Comments 2022-23		RAG Status
Delivery of mitigation actions is building momentum following delays in previous years due to Covid-19 restrictions. Collaboration is central to our approach. 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.		
Case Studies		
Name	Safeguard Zone(s)	Key Actions
Facilitation Network	All Safeguard Zones	DCWW have led or supported through Agrisgôp 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. 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.
Beacons Water Group (BWG)	Court Farm (11); Sluvad (12)	BWG is a farmer led group in the Usk Catchment inspired by the Catskills Watershed Agricultural Council, recently registered as a Community Interest Company. Recently established formal contract with DCWW to develop and test new ways of working, which in the long term could be upscaled to other SGZ and influence future policy. Current activities include: <ul style="list-style-type: none"> <li>- utilising hydrological pathway mapping to identify 'no spread zones' to reduce nutrient or pesticide losses.</li> <li>- installation of on-farm weather stations (May 2022) to provide local data to aid decision making on inputs</li> <li>- developed and trialled nutrient credit system</li> </ul>
PestSmart Pesticide Disposal Scheme	All Safeguard Zones	Under our PestSmart initiative, we have delivered our annual pesticide disposal scheme for farmers, growers, foresters and land managers across Wales to safely dispose of up to 30litre/kg of unwanted or out of date pesticides for free. To date there has been over 900 participants in the scheme which has facilitated over 29,000 kg of pesticide to be safely collected and disposed. The scheme has improved awareness of the importance of safe disposal of pesticides to protect people, water and wildlife. This initiative is funded by the Welsh Government through the European Agricultural Fund for Rural Development (EAFRD).
4Rivers for LIFE	Llechryd; Capel Dewi; Felindre; Preseli; Bolton Hill; Court Farm; Sluvad	Catchment Team are partnering on the £9M project, led by NRW, with BBNPA, Coleg Sir Gar, Woodland Trust. Project scope to improve river habitats and work with agriculture to reduce sediment and nutrient run-off in the River Teifi, Eastern and Western Cleddau rivers, River Towy and River Usk. Attended the first project board meeting held to review scope of the work and initial conversations happening locally to discuss opportunities to align approaches. Practitioner working groups have also been attended to drive the direction of mitigations and engagement.
Central Beacons Partnership	Ponsticill; Court Farm; Sluvad	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.

**Targeted Activity to meet Wt7 MoS**

Safeguard Zone	Key Activities and Next Steps
<b>Cwm Dulyn WTW</b> <i>(Llyn Cwm Dulyn)</i>	<ul style="list-style-type: none"> <li>Met with graziers end of summer 2022 and broad support for collaboration established.</li> <li>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</li> <li>Internal project approval for work on this project.</li> <li>Identified local vets to support sampling collection and knowledge transfer.</li> </ul> <p><u>Next Steps:</u></p> <ul style="list-style-type: none"> <li>Gather baseline data for participating farmers so that sampling regime can be developed.</li> <li>Secure technical coordinator support (ideally from local veterinary practices) to deliver on farm sample collection to establish baseline Cryptosporidium prevalence from 2023 lambing and calving season.</li> <li>Research mitigation / management options for 2024 and 2025</li> </ul>
<b>Trecastell WTW</b> <i>(Ffynnon Asaph aquifer)</i>	<ul style="list-style-type: none"> <li>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.</li> <li>3 (with a 4th withdrawn) farms have expressed interest in fencing and alternate water supply work</li> <li>Schemes to be delivered via Rivers Trust in 2023</li> <li>Met with NRW teams to discuss potential joint working arrangements. Funding identified internally for DCWW contribution and NRW awaiting confirmation of their available funding.</li> </ul> <p><u>Next Steps:</u></p> <ul style="list-style-type: none"> <li>Work with procurement teams to finalise agreement to establish framework for the delivery of projects on the ground in 2023/24.</li> </ul>
<b>Cwmtillery WTW</b> <i>(Cwmtillery reservoir)</i>	<ul style="list-style-type: none"> <li>Algal issues identified at reservoir summer 2022, resulting in WTW becoming offline due to filters being affected.</li> <li>Catchment investigation undertaken to understand the root cause of this infrequent occurrence as it does not happen on a seasonal/annual basis.</li> <li>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.</li> </ul> <p>Discussed with Estates team engagement with farmers around the catchment. Issues identified as farmers unapproachable in the past and disagreements about land ownership/management, resulting in us being unable to progress any engagement.</p> <p><u>Next Steps:</u></p> <ul style="list-style-type: none"> <li>Land along the eastern edge of the reservoir is in DCWW ownership so aim to explore opportunities to develop tree planting project, potentially with the partner Stump Up for Trees to buffer the reservoir and improve biodiversity in the area.</li> </ul>
<b>Pendine WTW</b> <i>(Morfa Bychan aquifer)</i>	<ul style="list-style-type: none"> <li>Site has been performing well with no issues being detected during 2022 – improvement.</li> <li>Changes in staff has left us with limited resources to progress Action Plan in the last quarter.</li> </ul> <p><u>Next Steps:</u></p> <ul style="list-style-type: none"> <li>Appoint facilitator to re-establish previous Agrisgôp with farmers in this catchment and look to work with them to implement a programme of work to supporting actions that improve water quality.</li> </ul>

## Case Study (Risk Evaluation): DWSP Accreditation and Regulation 26 (Disinfection)

### Challenge:

- Quantifying catchment knowledge and using raw water analytics to inform risks to downstream treatment processes and distribution networks

### Outcomes:

- Developed a robust methodology of catchment characterisation (ecoli and sanitary survey) to quantify and validate:
  - Raw water quality risks in DWSPs
  - Disinfection risk to WTW
    - WTW need now based on the pathogen loading in the raw water – assign level of disinfection required in order to meet the WHO health-based tolerable level of disease burden ( $1 \times 10^{-6}$  DALY per person per year)
  - Reg 26 method recognised by the DWI as industry leading.

### Next steps:

- Achieve DWSP Accreditation
- Use outcomes to inform future investment plans from source to tap.



## Case Study (Smart Catchments): Hydrological Connectivity Mapping & Early Warning Systems (Rivers & Reservoirs)

### Challenge:

- Understand how and where water moves across land and identify connections to watercourses
- Early detection for water quality changes and deterioration to protect downstream water quality compliance

### Outcomes:

- Feasibility and installation of real-time monitoring in key catchments (Wye Transfer, Alwen, Talybont installed)
- Time of Travel validation (river systems)
- Maps used to make data-driven decisions on soil, nutrient and pesticide management

### Next steps:

- Programme of installations in reservoir and upstream on river systems 2021 to 2024
- Feed into Digital Twin for near real-time knowledge of risks
- Identify and trial simple solutions to manage surface water flows
- Take the maps further: build in rainfall scenarios to determine seasonal runoff patterns
- Use methodology as an engagement tool for other farmer groups



## Case Study (Research & Innovation): Geosmin & MIB

### Challenge:

- Understand the drivers of MIB and Geosmin production and identify solutions to reduce / mitigate the risks in catchments

### Outcomes:

- Worked with academia and environmental specialists to identify production drivers (research paper published) :
  - algae productivity, not biomass, generate compounds
  - nutrient ratios, not concentrations, drive production
- Predictive model developed (for Glascoed catchment)

### Next steps:

- Continue working with academia on research gaps ie. climatic triggers.
- Review effectiveness of predictive modelling
- Work with the rest of the water industry on innovation trials and technologies (GW4).



## Case Study (Mitigation & Partnership Working): 4 Rivers for LIFE

### Challenge:

- Deteriorating water quality in SAC rivers (Teifi, Towy, East and West Cleddau and Usk) that impacts drinking water source water quality and biodiversity

### Outcome

- DCWW co-financing (€200k contribution) NRW LIFE project with Biodiversity team (€9M leveraged)
- River restoration, priority habitats & species improvements, best practice land management for water quality protection

### Next Steps

- DCWW representation on Project Board, Steering Group and Working groups
- Integration of catchment management work across NRW and DCWW



## Case Study (Partnership Working): WaterSource22



- Annual WaterSource conference held with c. 100 stakeholders, policy makers, land owners
- Conference theme *Enabling Collaboration*
- Keynote from Minister for Climate Change, Julie James MS
- Event supported Ministers recent Biodiversity Deep Dive exercise and statement with recommendations
- The outputs of the event will feed back into the Deep Dive process and next steps

[Full statement and recommendations link](#)

## Case Study (Mitigation): PestSmart

### Challenge:

- Elevated detections of pesticides in raw water monitoring

### Outcome:

- £1m of funding awarded by Welsh Government to expand approach
- Pesticide Disposal Scheme: 27,000kg of unwanted pesticides collected
- Weed Wiper Trial facilitated 292 hires of this low risk method
- Public Awareness campaign created multi media content & promotion actions resulting in 14 million impressions
- Visit [www.pestsmart.wales](http://www.pestsmart.wales) / [www.pestsmart.cymru](http://www.pestsmart.cymru)
- Published Research on behavioural change & water quality
- Influence Policy and Schemes e.g. NAP for Pesticides, weed wipers added to Farm Business Grant

### Next Steps:

- Grant to conclude in March 2023
- Continue public awareness campaign to end of AMP7 and will be key tool for AMP8 programme



## Case Study (Partnerships & Engagement): Brecon Beacons Mega Catchment Welsh Government Secondment

### Challenge:

- How to align ways of working with future support and funding mechanisms and inform land management policy in favour of water management

### Outcome:

- Strategic partnership between Welsh Water and Welsh Government set up
- David Ashford appointed as Brecon Beacons Mega Catchment (BBMC) programme manager on 24 month secondment
- BBMC Vision and goals established, programme developed and implementation started

### Next steps:

- Continued liaison with Welsh Gov Water Branch and Land Management Reform Team
- Utilising our established farmer-led groups to support development of the new Sustainable Farming Scheme (SFS)
- SFS/WG Grants to recognise Drinking Water Protected Areas for investment



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## Case Study (Partnerships & Engagement): Brecon Beacons Mega Catchment - Beacons Water Group

### Challenge:

- How to engage farmers to take proactive steps to protect water quality using their knowledge and experience.
- Identifying simple, replicable interventions for win-win scenarios.

### Outcomes:

- First Community Interest Group as part of BBMC
- Committed partnership between DCWW and BWG
- Whole Farm Plan management to improve business efficiency e.g. hydrological flow mapping, weather stations & sensors
- Recognised as best practice in Welsh Government Sustainable Farming Scheme (SFS) and could help influence future models
- Knowledge sharing visits by Wye Agrisgôp group & Regen farming group

### Next steps:

- Pilot new innovative practices and evidence impact
- Use experience to develop other cluster groups in our water catchments with BWG members acting as mentors
- Develop a facilitator network



## Case Study (Research & Innovation): Catchment Systems Thinking Co-Operative (CaSTCo) – Ofwat Innovation Fund

### Challenge:

- Understand how citizen science can support monitoring and evidencing of decision making for the better management of the water environment.

### Outcomes:

- Leveraged £7M from Ofwat Innovation Fund
- River Usk is one of the eight demonstration catchments for engagement - with focus on agriculture sector

### Next steps:

- Identify existing sustainable management research that has not been translated into practical application, understand what blocks adoption
- 'Translate' research into usable, unbiased land management tools.
- Identify a cohort of farmers and land managers to co-produce solutions

