

2021/22

APR

Annual Report

Annual Progress Report–July 2022

Wt7 - Water catchments improved (Safeguard Zones)

Table 3E, Line 17

AMP7 Performance Commitment	Delivery Date
Reduce number of Safeguard Zones from 23 to 18	March 2025

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

North	South East	South West	England
Alaw WTW (Llyn Alaw)	Builth WTW (River Wye)	Pendine WTW (Morfa Bychan aquifer)	Whitbourne WTW (River Teme)
Cefni WTW (Llyn Cefni)	Llyswen WTW (River Wye)	Llechryd WTW (River Teifi)	
Cwm Dulyn WTW (Llyn Cwm Dulyn)	Mayhill WTW (River Wye)	Preseli WTW (Rosebush reservoir)	
Cowlyd WTW (Llyn Cowlyd)	Court Farm WTW (River Usk & Llandegfedd reservoir)	Bolton Hill WTW (Eastern & Western Cleddau rivers)	
Glascoed WTW (Plas Uchaf & Dolwen reservoirs)	Sluvad WTW (Llandegfedd reservoir)	Capel Dewi WTW (River Towy)	
Trecastell WTW (Ffynnon Asaph aquifer)	Cwmtillery WTW (Cwmtillery reservoir)	Felindre WTW (River Towy & Lliw reservoirs)	
Bretton WTW (River Dee)	Pontsticill WTW (Pontsticill & Pentwyn reservoirs)		
	Cantref WTW (Beacons & Cantref reservoirs)		
	Llwyn Onn WTW (Llwyn Onn reservoir)		

APM7 programme of work

Measures to improve water quality are being delivered through 4 key workstreams:

- **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 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. 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** – 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.*

Progress Summary

The global pandemic has impacted on planned activities during the first and second year of the programme, particularly activities within our Partnerships and Engagement workstream. The restrictions of the pandemic have severely disrupted our work patterns; non-essential site visits were halted, and furlough affected a number of stakeholder organisations which we work with. This has hampered our ability to develop essential partnerships and co-create catchment-based initiatives. Stakeholder groups moved online in 2020 however we found online conversations to be much less effective than face to face meetings which has stifled collaboration. Shows and events we would normally attend did not take place limiting our opportunities to reach new stakeholders and partners.

During 2020 and 2021 we were able to continue delivering some activities, such as the Pesticide Disposal Scheme, however uptake was understandably lower than anticipated as options for promotion was limited. In 2021 we began to resume face-to-face meetings and attended the first pan-Wales agricultural event to be held since the start of the pandemic; the Royal Welsh Winter Fair in November 2021.

Momentum is returning, for example the stakeholder groups that we support including programme steering groups and farmer-led groups, began meeting again in person which will enable us to progress with our programme of activities.

Progress against Workstreams and Case Studies

Workstream 1 – Smart Catchments	
<p>Aims to achieve a better understand the potential sources water of contaminants and source to receptor pathways. This can be achieved through the development of early warning systems for abstraction management, mapping and modelling for the forecasting of current and emerging risks and evidencing success of catchment management measures. Completion of Drinking Water Safety Plans and raw water monitoring provides a baseline for identifying and tracking risks in Safeguard Zones.</p> <p>Potential projects include sub-catchment sampling, real-time inline monitoring of physio-chemical parameters (rivers intakes and in-reservoir), reservoir bathymetric surveys, LPIS data and risk mapping, integration of all data (including spatial and earth observation) for the creation of a ‘Digital Twin’ system that will provide near real-time information on land use and water quality changes.</p>	
Comments 2020 - 2022	RAG Status
<p>Annual DWSP reviews and raw water monitoring complete. Installations of inline equipment is in progress.</p> <p><i>WaterSource Portal</i>, spatial data management system continues to be developed as part of our Digital Twin approach.</p> <p>Methodology for hydrological pathway mapping has been devised and shared with farming practitioner groups, limited opportunities to ground truth until recently.</p>	

Case Studies		
Name	Safeguard Zone	Key Actions
Bathymetric surveys	<i>Alaw; Cwm Dulyn; Glascoed; Sluvad; Cwmtillery; Preseli;</i>	<p>Hydrographic surveys undertaken to improve our understanding of reservoir dynamics and support future reservoir modelling and early warning of water quality changes.</p> <p><i>Next Steps: Integrate information into Digital Twin.</i></p>
Upstream Monitoring	<i>Court Farm; Sluvad; Builth; Llyswen; Mayhill; Capel Dewi; Felindre; Bolton Hill; Llechryd; Whitbourne</i>	<p>Online monitors upstream of our river abstractions will improve our understanding of poor raw water quality and potential pollutants coming downstream in real time so abstractions can be managed accordingly. Land ownership, availability of sites, security and power and comms connections are all key considerations in establishing a functional network. Ricardo have been appointed as suppliers to conduct a feasibility study to identify suitable sites and reliable monitoring equipment to be completed in 2022.</p> <p><i>Next Steps: Complete feasibility study and progress recommendations to install monitors.</i></p>
Hydrological Pathway Mapping	<i>Court Farm; Sluvad; Builth</i>	<p>Working with farmers within the Beacons Water Group developed and ground truthed a methodology for hydrological mapping of agricultural land. Using spatial datasets including LIDAR, soil type slope we have developed a methodology to identify land with higher connectivity to watercourses through leaching and overland flow. The information can be used by farmers to adapt land management activities to identify no-spread areas or more targeted application of nutrients.</p> <p><i>Next Steps: Continue to ground truth methodology and consider ways to offer to other farmer groups engaged in catchment.</i></p>

Workstream 2 – Research and Innovation	
<p>Aims to improve our understanding of the root causes and triggers of deterioration in numerous water quality parameters and the impact of climate change on our water sources. Working with academic institutions, we aim to further our understanding of raw water risks which will help inform mitigation measures and operational decisions e.g. draw off management, and further our understanding of how climatic changes may impact raw water. Research will also support our evaluation of the success of catchment-based solutions are essential for informing future investment and ways of working.</p>	
Comments 2020 - 2022	RAG Status
<p>Taste and Odour (T&O) 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.</p> <p>Ofwat Water Breakthrough Challenge: ‘CastCo’ bid progressed to Stage 2 (Citizen Science for water quality monitoring), in collaboration with United Utilities and Southwest Water.</p> <p>Collaboration with Welsh Government to further explore the opportunity for new Welsh land management policy to deliver for drinking water quality; Welsh Government’s Land Management Policy Manager from the Land Reform Branch joined Welsh Water in 2020 on secondment as the BBMC Programme Manager to further facilitate this.</p>	

Case Studies		
Name	Safeguard Zone	Key Actions
<p>Research Paper – Impacts of behavioural change campaigns on water quality</p>	<p><i>Llechryd; Capel Dewi; Felindre; Builth; Llyswen</i></p>	<p>In partnership with the University of Leeds, our innovative Weed Wiper Trial was used as a case study in their research into the impact of behavioural change campaigns with farmers and land managers on improving water quality. Water quality monitoring data from target catchments for the trial and compare to control catchments, and social science research undertaken with stakeholders and participants in the trial.</p> <p>The research concluded that our awareness raising and our promotion of the weed wiper method, played a role in reducing pesticide concentrations, particularly MCPA in drinking water sources. The paper was published in the <i>Journal of Environmental Management 287 (2021)</i> (Do awareness-focussed approaches to mitigating diffuse pollution work? A case study using behavioural and water quality evidence).</p> <p><u>Next Steps:</u> <i>Continue to assess where similar models of engagement can be applied.</i></p>
<p>Algae, Taste and Odour Prediction Research</p>	<p><i>Glascloed</i></p>	<p>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 Glascloed 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.</p> <p><u>Next Steps:</u> <i>Expand T&O research to improve understand environmental and chemical conditions which drive increase in reservoir e.g. nutrients. Continue to ground truth the model and consider how it could be rolled out.</i></p>

Workstream 3 – Partnerships and Engagement	
<p>Aims to work in partnership to raise awareness of and gain support for our Safeguard Zones programme. The successful delivery of catchment solutions relies heavily on participation of 3rd party land managers and stakeholders. Engagement opportunities include steering and discussion groups, sponsorship and production of material and messaging (leaflets, videos, digital campaigns, posters, microsite and information on our web pages) to raise awareness. Hosting our <i>WaterSource</i> conferences will help us to engage with key partners, explore joint working opportunities and disseminate lessons learnt.</p>	
Comments 2020 - 2022	RAG Status
<p>Progress impacted by Covid-19 pandemic. New ways of communicating tested (e.g. online meetings with farmers, podcasts, social and digital advertising); however largely not as effective as in-person engagement. Limited in-person engagement has now resumed, farmer-led groups set up in key Safeguard Zones to co-create programmes of work. The Taf Fechan Landscape and Community partnership has also provided us with a framework for how we can engage with community groups to encourage responsible activities in and around our water sources.</p>	

Case Studies		
Name	Safeguard Zone(s)	Description
PestSmart for gardeners and homeowners	<i>All Safeguard Zones</i>	<p>In Spring/Summer 2021, our <i>PestSmart</i> programme ran an awareness campaign encouraging gardeners and householders to use smarter ways to manage weeds, pests and plant diseases that help protect people, water and wildlife. A new bilingual website was created to host information (pestsmart.wales / pestsmart.cymru). Terry Walton (expert gardener and broadcaster) is a <i>PestSmart</i> ambassador to help promote the message. The campaign gained coverage in numerous news outlets and magazines, plus features on BBC Radio Wales, and ITV Wales all resulting in over 64,000 views to the website. This work was funded by the Welsh Government through the European Agricultural Fund for Rural Development (EAFRD).</p> <p><i>Next Steps: Continue to deliver campaign to end of AMP7.</i></p>
Agrigŵp Groups	<i>Preseli; Bolton Hill; Llyswen; Glascoed</i>	<p>Agrigŵp is an action-learning programme run by Farming Connect who are Welsh Governments farm advisory service. It funds and facilitates local farmer groups for 1 year to problem solve a particular issue. DCWW have supported the development of a number of farmer-led group with safeguard zones sharing water quality challenges and is working with the farmers in these groups to co-create catchment-based solutions. The groups moved online over Covid but suffered as these types of collaboration work best in a face-to-face setting. Recently they have been able to resume in person meetings, talks and visits sharing the latest industry best practice.</p> <p><i>Next Steps: use details to inform activities in SGZ Action Plans and consider succession for maintaining groups.</i></p>
Taf Fechan Landscape and Community partnership	<i>Pontsticill</i>	<p>Worked with its partners (NRW, Merthyr Tydfil CBC), Powys Council, Brecon Beacons National Park Authority, Keep Wales Tidy and Pontsticill Community Group) to improve the environment around the reservoir catchment, through volunteer days, promotion of responsible management of private waste systems and developing an anti-social behaviour action plan. This work was funded by Rural Action Cwm Taf, part of the Wales Rural Development Plan 2014 – 2020, which is funded by the European Agricultural Fund for Rural Development and the Welsh Government.</p> <p><i>Next Steps: use details to inform how we can engage with new community groups.</i></p>

Workstream 4 – Mitigations	
<p>Aims to work in partnership to co-create schemes that safeguard raw water quality as well as delivering multi-benefits, where appropriate. Welsh Water own less than 5% of land within our drinking water catchments, so the successful co-design and then delivery of catchment solutions relies entirely on participation of local land managers and partners.</p> <p>Campaigns such as <i>PestSmart</i>, <i>NutriSmart</i> and <i>Animal Health</i> will raise awareness of impact of parameters of concern on our water sources, so we can offer support for co-delivery of mitigations e.g. <i>best practice guidance for land and livestock management</i>, <i>pesticide disposal scheme</i>, <i>trials of new and novel technologies and hydrological pathway mapping</i>. Resolving water quality issues often has wider benefits than just safeguarding our drinking water sources so we aim to align our approaches and where relevant support partner projects (e.g. LIFE).</p>	
Comments 2020 - 2022	RAG Status
<p>Progress impacted by Covid-19 pandemic we have not been able to undertake site visits which has hampered our ability to in-person engagement has now resumed, farmer groups set up in key SGZ to co-create programmes of work. PestSmart initiative delivered Pesticide Disposal Scheme. Maize under-sowing trial delivered in SW, planned to extend and expand.</p>	

Case Studies		
Name	Safeguard Zone(s)	Description
Beacons Water Group (BWG)	Court Farm (11); Sluvad (12)	<p>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:</p> <ul style="list-style-type: none"> - utilising hydrological pathway mapping to identify ‘no spread zones’ to reduce nutrient or pesticide losses. - development of smarter nutrient application planning using advanced soil sampling and crop demand analysis to determine accurate balance of inputs needed to avoid excess applications - installation of on-farm weather stations to provide local data to aid decision making on inputs <p><i>Next Steps: Maintain links with group. Continue to explore support options including a Nutrient Credit Payments for Ecosystem Services (PES) model.</i></p>
PestSmart Pesticide Disposal Scheme	All Safeguard Zones	<p>In 2017, Dŵr Cymru Welsh Water and Natural Resources Wales ran a free pilot pesticide disposal scheme in six target catchments across Wales. The findings of the pilot were used to inform a Wales-wide pesticide disposal scheme and delivered as part of Dŵr Cymru Welsh Water’s PestSmart initiative funded by the Welsh Government through the European Agricultural Fund for Rural Development (EAFRD).</p> <p>Launched in 2019, PestSmart has delivered an 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 25,000 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.</p> <p><i>Next Steps: Underspend from grant carried over to run the scheme again in 2022 – likely the final time at this scale.</i></p>