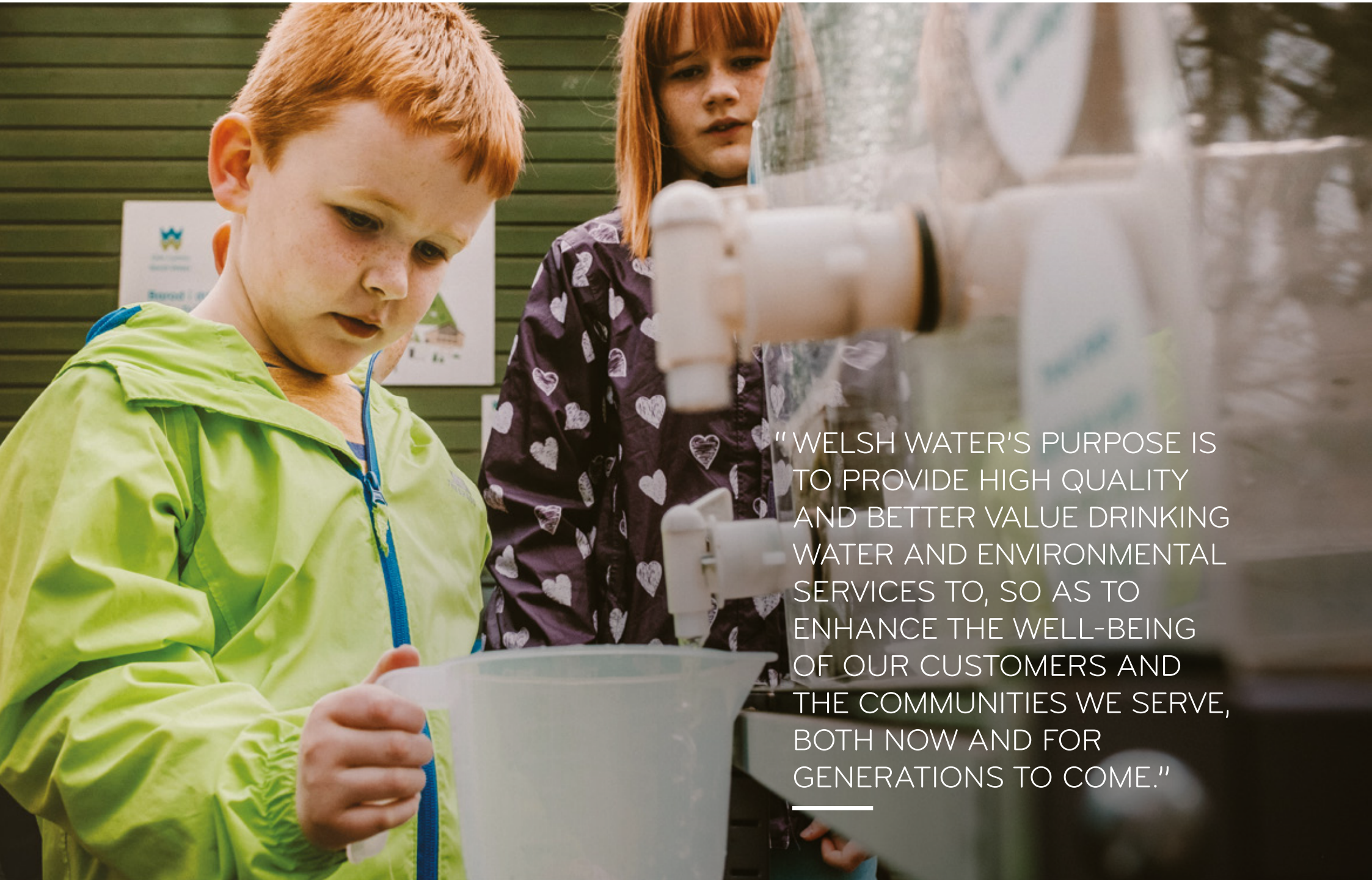

Dŵr Cymru
Welsh Water
IMPROVING OUR
RIVER WATER
QUALITY
2022



"WELSH WATER'S PURPOSE IS TO PROVIDE HIGH QUALITY AND BETTER VALUE DRINKING WATER AND ENVIRONMENTAL SERVICES TO, SO AS TO ENHANCE THE WELL-BEING OF OUR CUSTOMERS AND THE COMMUNITIES WE SERVE, BOTH NOW AND FOR GENERATIONS TO COME."

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INTRODUCTION

PETER PERRY
CHIEF EXECUTIVE, WELSH WATER

We fully understand the importance of river water quality to our customers in Wales. This is why we are committed to continuous improvement in this key area and the purpose of this booklet is to outline our current plans and the additional investment we will make between now and 2025 to play our part in achieving this objective.

We take our environmental responsibilities very seriously. However, we sometimes unintentionally get things wrong. We are extremely sorry when this happens and we always try to learn any lessons that will help us avoid such incidents in the future wherever possible.

Our approach to investing is evidence-led so that we improve our assets in a prioritised way which focusses on tackling those which cause the most adverse impact on our environment. We have and will continue to work collaboratively with our environmental regulators on our plans.

However, we also recognise that our stakeholders and our customers want us to do as much as we can to accelerate these environmental improvements, and to work with others to help them achieve our common goals.

We are fully committed to working in partnership with others to maximise the opportunities to make river quality improvement. In our detailed action plan set out in the following summary, we highlight we where we are being proactive to achieve this and we are keen to keep developing this way of working.

In the decade to 2025, we will have invested approximately £1.5 billion in improving and maintaining our wastewater network and this has helped ensure that 44.5% of our rivers in Wales are in good ecological status compared to 14% in England.

But we know that we need to go further. This is why we are investing an additional £20 million in improving our Combined Storm Overflows (CSOs) (having already committed £83 million between 2020 and 2025) and an additional investment to tackle nutrient pollution. Having led the industry in installing telemetry on our assets and making that data openly available on our website, we want to build on this progress to make best use of the £836 million investment we are making in wastewater assets between 2020 and 2025, which we have increased from £783 million originally agreed with Ofwat at the last price review.

We are aware that our customers and society more broadly wants to see changes in the way our infrastructure operates with less impact in terms of overflows and reduced nutrients from our wastewater treatment processes. We really understand these concerns and are committed to making measurable progress to achieve this. It is a significant challenge and will take many years to complete but for the avoidance of doubt we will look to achieve continuous improvement year on year as we move from through our five year business plans in order to deliver better river quality for the communities we serve.

Despite the challenges we face, we are and always will be committed to doing the right thing. As a 'not-for-profit' without any shareholders, we are privileged as we can focus exclusively on what is in the best interest of our customers and the environment on which we depend – now and for the long term.

This is the only way we to ensure that we can continue to earn the trust of our customers.

SUMMARY – OUR PLANS

To help us improve river water quality in Wales, here's a summary of what we will do between now and 2025.

Protect and enhance river and coastal water quality

We will:

— Help ensure that at least 420km of rivers in Wales and Herefordshire are improved to help achieve 'good ecological' status by 2025.

— Increase our investment in our wastewater infrastructure by 2025 from £783 million to £836 million (including almost £100 million invested in improving CSOs, delivered as part of the Wales Storm Overflow Roadmap programme as well as additional investment to tackle nutrient pollution).

— Alongside NRW we will be seeking the views of key stakeholders across our operating area and our Independent Environment Advisory Panel on the development of the National Environment Programme (2020 to 2025).

— Provide £250,000 of funding and expertise to the Welsh Government 'Four Rivers for Life' programme, on the river's Cleddau, Teifi, Tywi and Usk.

Be open and transparent about our activities and our impact on rivers

We will:

— Ensure over 99% of our Combined Storm Overflows are monitored and openly reported on our website by April 2022 (the remaining 1% are currently inaccessible due to accessibility safety constraints but we are still targeting 100% and are currently working on solutions).

— Launch our interactive web-based overflow map covering our operating area in July 2022l; we will be able to report all CSO discharges within an hour of them operating by 2025.

— Build on and expand our bathing water CSO alert systems to community and representative groups.

Play our part in partnerships to jointly improve river quality

We will:

— Provide nutrient pollution source modelling free of charge to all sectors, on Special Area of Conservation Rivers in Wales and Herefordshire by July 2022.

— Support the establishment of Nutrient Management Boards across our operating area – e.g. building on our existing programme to work with others providing land where possible and expertise to develop wetlands to mitigate diffuse nutrient pollution – including 8 sites planned for development during 2022/23.

— Introduce a nutrient offsetting trading programme to work further collaboratively with the agricultural sector and developers by April 2023.

— Maintain our support for Welsh Government proposals to ban single use plastics – especially 'wet wipes'.

— Continue to utilise our Pollution Reduction Technicians to liaise with and support local river user groups and 'citizen scientists'.

— Work with our Independent Environmental Advisory Panel and Customer Challenge Group to listen to the views of key environmental interest NGOs and customers.

Encourage people and communities to enjoy our inland and coastal waters

We will:

— Support the development of inland bathing waters policy and criteria.

— Work to identify candidate sites for inland bathing waters and discuss options for future investment to develop locations with Welsh Government & Natural Resources Wales.

— Continue to encourage uptake of open water swimming at our designated visitor centre reservoir sites in conjunction with open water swimming associations.

— Build on the 800,000 people who have visited our Visitor Centres and enjoyed water-based activities and sports.

— Maintain our commitment to Wales having the highest percentage of Blue Flag Beaches in the UK – with 34% of the total awards achieved in Wales in 2021 despite having only 15% of the UK's coastline and 5% of the population.

1 THE SERVICES WE PROVIDE

As the only not-for-profit water company in England and Wales, we provide an essential public service to 3.1 million people across most of Wales, and some neighbouring parts of England.

Our operating area includes:

HOW WE PLAN OUR WORK

We work in five-year investment cycles – informed by the Welsh Government's Strategic Priorities and Objectives Statement and underpinned by the Environment (Wales) Act 2016 – and our work involves operating and maintaining an enormous network of assets worth some £30 billion.

Our long-term planning approach is closely aligned with the Well-being of Future Generations (Wales) Act 2015 and is driven towards achieving our long-term mission "to become a truly world class, resilient and sustainable water service for the benefit of future generations" as outlined in Welsh Water 2050, published in March 2018 following extensive customer and stakeholder consultation.

Between 2020 and 2025, we are investing £1.8 billion in our services (after investing £1.5 billion between 2015 and 2020).

This means that we invest almost £1 million a day in our services which enables us to:

— Operate 63 water treatment works and treat and supply on average around 830 million litres of safe, clean drinking water through some 27,400 km of pipes to over three million people every day;

— Carry out some 275,000 water quality tests a year at our state-of-the art laboratories in Newport (South Wales) and Bretton (North Wales);

— Collect wastewater (including surface water) through a network consisting of some 30,000km of sewers before treating it at 828 wastewater treatment works; and

— Manage 40,000 hectares of land, directly employing some 3,500 staff across Wales, Hereford and Deeside that help to ensure that we provide a first-class essential service.

2 HOW WE DEPEND AND IMPACT ON THE ENVIRONMENT

There are very few sectors more dependent on the environment than the water sector. From abstracting water from rivers to provide drinking water and using some our reservoirs to produce electricity and provide recreational space for our customers, to managing our land for carbon and biodiversity purposes, these are just some of the ways we depend on the environment around us.

OVER £836 MILLION
ON IMPROVING OUR WASTEWATER ASSETS DURING OUR CURRENT INVESTMENT PLAN (2020–25)

The service we provide depends on a sustainable environment and our ability to protect public health is enabled by how we treat and release wastewater safely back into the environment. This part of our business is completely dependent on the environment and we have a duty of care to do everything we can to protect it – now and for future generations.

We take this responsibility very seriously and are investing £836 million (including an additional £39 million) on improving our wastewater assets during our current investment plan (2020–25).

This overarching investment plan is supported by a specific £250 million National Environment Programme, developed in conjunction with our environmental regulators (Natural Resources Wales and the Environment Agency) and based on the following principles:

— Sound evidence.

— Value for money (i.e. affordable).

— Innovative approaches to unlocking better outcomes for the environment, customers and society more generally.

— Customer support.

Our investment plans, performance targets and the amount of revenue we can raise from customers are regulated and approved by Ofwat.

MANAGING WASTEWATER

Urban wastewater, commonly referred to as sewage, is generally a mixture of domestic wastewater from baths, sinks, washing machines and toilets, wastewater from industry and rainwater run-off from roofs, roads and other surfaced areas.

Every day, all this goes into our sewer network. Most of our sewers are so-called 'combined sewers' which mean that they carry both wastewater and rainwater run-off which is then taken to be treated at our wastewater treatment works.

After treatment, the effluent is discharged to inland waters such as rivers as well as estuaries and the sea in accordance with permit conditions set by our Regulator.

Without suitable treatment, this wastewater would damage the water environment and increase public health risks particularly in areas like our designated bathing waters. Untreated sewage contains organic matter (carbohydrates, fats, proteins), bacteria and chemicals. Bacteria naturally present in environmental waters do break these substances down, but in doing so they use the oxygen dissolved in the water.

When there is a large or continuous untreated discharge of urban wastewater, this can result in too little oxygen for fish and other aquatic life to survive. The purpose of wastewater treatment is to remove organic substances to protect the environment, and other uses of that water.

OUR WASTEWATER NETWORK

Welsh Water's operating area is a largely rural area and we therefore have a disproportionate number of wastewater assets, many of which are remote.

Our current wastewater network includes:

— 36,000km of sewers (enough to stretch to Australia and back).

— 2,456 sewage pumping stations (SPSs) which help pump wastewater from one location to another, horizontally and/or uphill when gravity cannot be relied upon to do the job.

— 828 wastewater treatment works which enables us to treat wastewater before releasing it safely back into the environment.

— 2,336 Combined Storm Overflows (CSOs) which work as overflow valves to release wastewater to stop sewers and treatment works from becoming overwhelmed during periods of heavy rain.

WE CANNOT SIMPLY REMOVE THESE CSOs FROM OUR NETWORK AS IT WOULD COST BETWEEN £9 BILLION AND £14 BILLION TO COVER THE COST OF ALTERNATIVE ACTION TO PREVENT ANY FLOODING. THIS WOULD CAUSE SIGNIFICANT FLOODING IN COMMUNITIES – AND ALSO A LOT OF DISRUPTION, TAKE DECADES TO ACHIEVE AND WOULD MAKE WATER AND SEWERAGE BILLS UNAFFORDABLE.

CASE STUDY

RAINSCAPE AND GREENER GRANGETOWN

To help reduce our reliance on CSOs, we have developed schemes to reduce the volume of surface water entering our sewers and where possible catch, redirect and slow down the water, using a range of green/sustainable techniques that we call 'RainScape'.

Our award-winning RainScape solutions, including using basins and planters, swales and porous paving, can also enhance biodiversity and avoids the financial, environmental and carbon cost of traditional solutions such as building storage facilities to store stormwater during heavy rain.

LLANELLI – to help reduce flooding and improve the water quality in the Loughor Estuary (whose Shellfish waters were thought to be impacted by CSOs , which in turn was driven by Llanelli seeing almost as much storm water in its network as Swansea, which serves three times the number of properties), we invested £115 million across Llanelli and Gowerton between 2012 and 2020, laying around 14 miles of new pipework and kerb drainage, building a new tunnel just under one mile long underground to create rainwater sewers and planting almost 10,000 plants and trees in swales, planters and basins. The project delivered a 95% reduction in the volume spilt from CSOs, reduced the risk of flooding and keeps another 1.5 million cubic metres surface water per year from entering the network.

CARDIFF – We have also worked in partnership with Cardiff Council and NRW on a similar scheme, Greener Grangetown, contributing £1 million to prevent more than 40,000m³ of rainwater each year from entering the combined sewer network as part of Cardiff's Grangetown urban regeneration project. These schemes demonstrate that there is neither a 'quick fix' nor 'easy fix' to reducing our reliance on CSOs in the short-term as it will take significant investment and collaboration. However, working in partnership with others particularly the Local Authorities, we can deliver greater benefits for the communities we serve than working in isolation.

3 OUR PERFORMANCE SO FAR

One of the most important things we do is protect public health by taking away wastewater to be treated and returned safely to the environment.

Over the past 20 years, we have invested £573 million in our wastewater network or £28.6 million a year which has helped improve our performance and protect the environment.

Wastewater treatment works (WwTW): the performance of our WwTW is critical to ensure that the wastewater we return to rivers, streams and sea is of the highest quality. Our environmental regulators (Natural Resources Wales and the Environment Agency) issue a 'discharge permit' for each site, which sets the standard for how the wastewater needs to be treated before it can be returned to the environment.

The table below indicates our compliance with wastewater quality standards in our permits:

2010	2011	2012	2013	2014	2015
97.1%	95.6%	98.6%	97.9%	99.1%	98.6%

2016	2017	2018	2019	2020
99.5%	98.2%	99.6%	98.9%	99.6%

One important element of this is reducing the levels of phosphorus in wastewater and we have invested £56 million between 2015 and 2020 to reduce the amount of phosphorus released from 14 wastewater treatment works and are investing £95 million at 21 sites which will achieve an improvement for over 263km of river.

Our Water Framework Directive improvements also extend to tightening some of the existing sanitary determinands from our wastewater treatment works; we are investing £19 million in 8 sites and this will help improve over 15km of river.

Pollution incidents: problems with sewers and pumping stations (such as blockages or collapsed sewers) can often cause pollution incidents which can harm the local environment including rivers. These incidents are categorised by our environmental regulators, with each incident identified as high or low impact. Having been one of the worst performing companies a decade ago, we are now one of the leading companies in terms of the number of pollution incidents.

The table below shows the total number of pollution incidents caused by wastewater:

2010	2011	2012	2013	2014	2015
250	239	199	122	108	109

2016	2017	2018	2019	2020
107	103	101	94	77

In 2020, blockages continued to be a key cause of incidents having caused 27 of the 77 Category 1–3 incidents (35%). This indicates the importance of tackling blockages in order to reduce wastewater pollution.

Combined Storm Overflows (CSOs): these CSOs are overflows built into the sewer or pumping station to release wastewater to stop sewers and treatment works from becoming overwhelmed during rainfall and flooding into customers' properties. Due to the fact that the majority of the sewer network in Wales was built before the 1970s, it is 'combined', taking rainwater as well as wastewater. The system in Wales has to operate in wetter than UK average climatic conditions, and we have some of the highest numbers of these CSOs per 1,000km of sewer in the industry.

The discharges from these CSOs are regulated via permits issued by our environmental regulators. but we are conscious that we need to better understand how they perform. This is why we have led the industry in terms of investing over £10.5 million in installing Event Duration Monitoring (EDMs) monitors and were one of the first water companies to ensure over 99% of our CSOs were monitored by EDMs by April 2022. These EDMs tell us when a CSO has discharged and for how long and this is helping improve our understanding of how our assets perform and will inform our work and future investment. We publish all this data on our website and also provides a Real Time CSO Alert Service all year round at 30 bathing sites in Wales which provide 'real-time' information to registered users on when a CSO starts operating and when it stops. We provide this service voluntarily to beach managers, such as the Local Authority, and to Surfers Against Sewage for their Safer Seas Service website and app – and alerts are also sent to Natural Resources Wales.

In their latest data, Natural Resources Wales estimate that CSOs are a confirmed or probable reason for not achieving good status in [4.6]% of water bodies. However, while CSOs are mainly operating as designed and permitted, they can discharge more often due to:

- Hydraulic overloading (ie: when the capacity of a sewer is insufficient for the volume of waste water flowing through it) from increased flows since the sewer was originally designed. This can be caused: as a result of the connection of additional impermeable surfaces to the sewerage network (housing/business growth and when permeable areas are paved over); from increases in overall rainfall and rainfall intensity due to climate change; from increased population connected to the sewer network; from network issues (e.g. siltation and infiltration) – all this is made worse given the 'combined' nature of our sewers which usually need to carry surface water and wastewater;
- Misconnection of land drainage such as from farmland but also infiltration into the sewer network, whereby water finds its way into the sewer network through cracks or displaced joints in the pipework;
- Blockages (over 20,000) caused by 'unflushable' items that customers dispose to sewers (e.g. wet wipes or cooking oils). We run a behavioural change campaign ever year to educate customers to be careful what they flush or throw away in a bid to reduce the £7 million annual cost of clearing 2,000 blockages a month in our sewers;
- Sewer collapses and deterioration of the sewer system.

Removing all CSOs and eliminating spills could require duplication of nearly all our existing sewer network and have an estimated cost of between £9 and £14 billion (for comparison, our total investment for all our services is £1.8 billion between 2020 and 2025) and increase customer bills significantly – adding hundreds of pounds to every customer's bill. Trying to reduce CSO 'spills' by using traditional method such as building big concrete storage tanks to hold back the water is carbon intensive, can introduce more odour issues and is difficult to adapt to a changing climate. This is why we are adopting more innovative solutions such as RainScape and other nature-based solutions.

BLUE FLAGS

Although we are not solely responsible for the quality of bathing water, the improved performance at our wastewater treatment works and our environmental improvement programmes continue to benefit the water along our coastline. Despite only having a handful of Blue Flags in the 1990s, Wales now has some of the best bathing waters in the UK with latest results for 2021 showing that 85 of our bathing waters achieved the highest classification of 'excellent', 14 'good' and six 'sufficient'.

This ensured that Wales' coastline secured 100% compliance for the fourth consecutive year.

EVIDENCE AND RESEARCH

Over recent years, we have focused on working with regulators and stakeholders to gather evidence to inform future investment decisions. Our largest ever research programme has enabled us to develop new models to assess the impact of our operations on our coastal waters and river water quality, as well as the impact of other pollution sources. This is helping us drive our current investment programme and ensure our investment is targeted at the highest priority areas where we can bring the biggest benefit to the health of our rivers.

HOW OUR COMBINED SEWER OVERFLOWS OPERATE

Climate change is causing more extreme weather behaviour and over populations. Excess rain can cause sewers to back up, putting homes and communities at risk of being flooded with untreated sewage.

Increase in population puts added pressure on the old waste systems.

Flushing of wet wipes, cotton wool, and fat oil and grease causes blockages in the pipes.

Increased concrete for roads, housing and artificial grass leads to increased runoff.

At times of heavy rainfall the sewer system finds it difficult to cope with the amount of water and waste.

Combined Sewers have overflows which act as release valves to allow some of this diluted excess stormwater in to a nearby river, preventing local flooding.

Combined Sewers take the dirty water away from your home where it is joined by rain water from roads and roofs.

36,000 kilometres of sewers take waste away from homes and businesses. They were built over 100 years ago in a very different time.

Dirty water is then treated in one of our 800 waste treatment works before it's returned to the sea.

99% of these overflows are monitored so we know when and for how long they operate. We're able to report on these results, working closely with regulators and partners to find innovative solutions to minimise our reliance on them.

4 THE WIDER CHALLENGES WE FACE

Despite the record investment in our wastewater network, we still face many challenges that influence the way we work and ultimately our environmental performance.

These include:

Climate change: with more intense storms and rainfall events due to climate change (the UK had 5 named Met Office storms in 2021), this is increasing the amount of runoff from impermeable areas that drain to our network. This can often overwhelm many of our traditional assets which were not designed to cope with such extreme weather patterns;

Climate change – lower summer rainfall: this is reducing river flows in dry periods and their ability to absorb the treated effluent from our sewage treatment works and still meet their environmental quality objectives; drier summers will also stress our water resources and will drive investment to increase the resilience of these types of assets;

Population growth: the general population has grown significantly which means more wastewater entering our sewers now than ever before: many of our rural works in north and west Wales see very large population fluctuations with holiday makers and second homes;

Urban creep: as towns and cities have developed, there is now less green space to absorb surface water. This surface water is often directed into our sewers and runs rapidly off such hard surfaces during rainfall. This is often compounded by local authorities who often make changes to highway and street scene drainage without consulting the water company and this can also add to the level of flows in our sewer networks. And customers are increasing their impermeable areas, tarmac and concrete driveways to park more cars, patios and decks, and low maintenance artificial grass doesn't help to soak up the rainfall.

The way we provide our services is made more challenging in the communities we serve across most of Wales because:

— Our operating area is characterised by a relatively long coastline (approx. 15% of Great Britain's coastline), which has implications for our wastewater treatment costs.

— We operate across several distinct, rural, mountainous and sparsely populated areas, which means more assets (e.g. treatment works and lengths of pipe) per customer;

— There are a significant number of designated bathing beaches and shellfish waters along the long Welsh coastline, which means strict permit levels for wastewater treatment;

— With lots of smaller wastewater treatment works, programmes to deliver environmental upgrades, such as the capability to remove phosphorous, are more expensive and bring technical challenges to small rural works.

5 WHAT DOES THIS MEAN FOR OUR RIVER ENVIRONMENT

Our rivers are vitally important, from supplying drinking water and supporting fisheries to providing an essential resource for business, tourism and agriculture, transport routes and opportunities for leisure that promote wellbeing such as physical and mental health. Basically, a healthy water environment forms the basis of healthy and vibrant places in which we live and work.

There are 3 major river basins in Wales and the parts of England we serve.

There are nine river SACs (Special Areas of Conservation) in Wales – Cleddau, Eden, Gwyrfai, Teifi, Tywi, Glaslyn, Dee, Usk and Wye. These rivers support some of Wales' most special wildlife but five of these rivers are failing their phosphate targets. This is caused by a range of issues but means that each river and section of rivers will need different approaches and investment plans from various sectors.

Our operating area also breaks under the Water Framework Directive into 3 river basins planning districts. A river basin district includes the area of land and sea made up of one or more neighbouring river basins together with their associated groundwater and coastal waters.

River basin planning districts are broken down in turn to individual water bodies. A water body is defined as a 'discrete and significant element' of surface water such as a lake or reservoir or entire (or part) stream, river or canal, estuary or stretch of coastal water.

The status of each water body is assessed against over 30 different parameters within the Water Framework Directive (WFD) and grouped into:

— Ecological status (e.g. insect, plant and fish life) is a measure of a healthy and robust catchment ecosystem.

— Chemical status (covering priority substances such as mercury and benzene and other ubiquitous, persistent, toxic and bioaccumulative substances).

Ecological and chemical status are combined to provide the overall status of a waterbody. Ecological status is measured on the scale of *high*, *good*, *moderate*, *poor* and *bad*. Chemical status is measured as *good* or *fail*. The lowest scoring element determines a waterbody's overall status.

Waterbodies can be impacted by multiple activities including agriculture, urban run-off, wastewater discharges (continuous and intermittent), abstraction by water companies and other industries, physical modifications (dams, bridges, weirs) and industry (such as mines).

Increased winter rainfall, increased agricultural run-off and increased run-off due to urbanisation are likely to have a detrimental impact on the ecological status of waterbodies. Reduced summer rainfall will lead to more periods of low flows in rivers, exacerbating these impacts or potentially reducing the ability of water bodies to accept treated sewage discharges in future.

WHAT IS THE STATUS OF THE WATERBODIES IN WALES?

Our investment over the past 20 years and collaboration with stakeholders has played a key role in ensuring that 40% of Wales' waterbodies are deemed to be in 'Good or High Ecological Status' (compared to 16% in England) as assessed under the Water Framework Directive by Natural Resources Wales in 2021.

But this still means that 60% of waterbodies failed to achieve good or better overall status as defined by the Water Framework Directive.

WFD STATUS	Number of Waterbodies	% of Waterbodies	
High	2	0.2%	39.9%
Good	370	39.7%	
Moderate	454	48.7%	60.1%
Poor	96	10.3%	
Bad	11	1.2%	
Total	933		

NRW publication: WaterFrameworkDirective (WFD) Regulations Cycle 3 2021 Classification. Frequently Asked Questions.

The latest research by Natural Resources Wales suggests that the Reasons for not achieving "Good" status (produced in 2019) includes: mine waters, livestock management, land management, industrial estates, small sewage discharges (private), drainage misconnections, surface water drainage from developed area and storage – slurry, fuel, oils, chemicals.

NRW PUBLISHED DATA NUMBERS OF WATER BODIES AND REASONS FOR NOT ACHIEVING 'GOOD' STATUS IN 2021

SECTOR	Confirmed	Probable	Suspected	Other	Total
Agriculture and rural land management	140	232	118	7	497
Water industry	85	141	136	3	365
Urban and transport	100	148	41		289
Mining and quarrying	105	164	14		283
Not applicable	44	8	6	114	172
Industry, manufacturing and business	17	28	14	1	60
Domestic/general public	2	14	43		59
Other (not in list)	6	19	6	6	37
Central Government		12	1		13
Navigation	8	2	1		11
Hydropower	9	1			10
Non-coal mining	3	2	3		8
NRW	2	3	2	1	8
Forestry	1	2	1		4
Local Government		1	3		4
Angling			1		1
Angling and conservation	1				1
Ngo	1				1
Unknown (pending investigation)	15	53	5	448	521

Table shows the level of certainty that the identified sector is contributing to a waterbody reason for not achieving good.

The data shows that 201 unique waterbodies – or 22.5% of all waterbodies in Wales – are not achieving 'good status' due the impact of our work in 2021.

We are only confirmed as the sole reason for 7 waterbodies not achieving 'good' status in Wales.

6 OUR PLANS

There are a number of reasons as to why our assets may be preventing water bodies from achieving 'Good' status under the Water Framework Directive.

We know the actions that we need to take to help reduce the impact of our assets on the environment and these are listed in the NEP:

Reducing nutrients – one of the main reasons preventing rivers from achieving WFD 'good status' is too much phosphorus. Phosphorus – a by-product of wastewater but also found in fertilisers and manure – is an essential element for plant life, but when there is too much of it in water, it can cause excessive growth of plants and algae leading to a lack of oxygen available for other organisms.

Preventing pollution – our CSOs can act as a conduit for pollutants [from sources such as roads, property etc that is washed into our sewers] being released into rivers and coastal waters.

Removing barriers to fish – some of our sewer pipes traverse rivers that may be causing a barrier, preventing fish from migrating further upstream.

Shellfish Water Protected Areas – these areas concern the quality of shellfish waters that need protection or improvement in order to support shellfish and contribute to the high quality of commercial shellfish products.

We are committed to playing a major role in helping Wales' rivers achieve Good Ecological Status (as set out in the Water Framework Directive) and this is a key driver in our current National Environment Programme with £250 million of investment to be made between 2020 and 2025.

REDUCING NUTRIENTS

To help reduce the amount of nutrients (such as phosphorous and nitrogen) that our assets release into the environment, we are:

— Targeting interventions: to reduce phosphate levels: where there is clear evidence that our assets impact on local rivers, we will drive investment to ensure that we play our part to address this issue. For example, we are investing £95 million over the next five years to increase phosphorus removal at wastewater treatment works across the area we serve.

This includes investing £70.47 million to reduce the amount of phosphorus we release from our wastewater treatment works into the River Wye in the five years to 2025.

Asset Name	Target delivery date	NEP delivery date	Cost £m	£ / total population equivalent
Rhayader WwTW	31st Sep 2024	31st March 2025	£5.1m	2423
Builth Wells WwTW	31st Dec 2022	31st Dec 2025	£0.23m	72
Llandrindod Wells WwTW	31st Sep 2024	31st March 2025	£1.3m	213
Norton WwTW	Completed Oct 2021	31st Dec 2021	£3.7m	9367
Presteigne WwTW	31st March 2023	31st March 2025	£3.6m	1952
Pontilas WwTW	31st Sep 2024	31st March 2025	£2.8m	1869
Weobley WwTW	31st March 2023	31st March 2025	£2.9m	2321
Kingstone & Madley WwTW	31st Sep 2024	31st March 2025	£3.3m	1188
Leominster WwTW	31st March 2024	31st March 2025	£11.2m	973
Eign WwTW	31st March 2024	31st March 2025	£20.7m	194
Rotherwas WwTW	31st March 2024	31st March 2025		
Total			£70.4m	20572

In addition, we're working with Natural Resources Wales (NRW) to confirm the investment schemes that can be accelerated on the River Usk. In addiition to the National Environment Programme, we are making further investment to our assets on the Usk at Llanfoist and Brecon to help remove phosphorous.

— **Collaborate and share learnings with other key stakeholders:** with so many sectors often influencing river water quality, it can sometimes be difficult to have a clear, single, plan to drive improvements. Not every sector has an incentive to collaborate or improve and actions can sometimes prioritise short-term convenience over long-term impact. A case-study in how to overcome this can be seen in the development of the Wye Nutrient Management Plan which was first produced in 2014 by the Environment Agency and Natural England recognising the required phosphorus targets to be met through the activities of a number of different organisations and sectors working together (environmental regulators, council bodies, third sector organisations and Welsh Water) as no single organisation or sector can solve the phosphate issue in isolation. Such an approach has been fundamental in allowing us to identify and prioritise our investment in this area supported by our membership of Herefordshire Council's River Wye Nutrient Management Board – one of the only bodies currently with cross border responsibilities. A similar collaborative approach is being developed for other Welsh SAC rivers and we will support this work.

— **Undertaking detailed research:** we are using Source Apportionment Graphical Information System (SAGIS) water quality modelling to understand the impacts of all polluting sectors on the river Wye and other Welsh freshwater Special Areas of Conservation (SAC).

This system, developed and used by regulators and the wider industry, has allowed us to build a virtual representation of the river Wye. It takes data inputs from different sources and sectors and identifies the proportion of phosphorus from each. The model allows us to test proposed improvements in our sewage treatment works discharges to establish their impact on water quality in the river. SAGIS modelling on the Wye has shown that our assets account for around one third of phosphates in the river, with agriculture and land management being the primary source. The Wye model highlights that the around 60-65% of phosphorus in the river is coming from the agriculture sector. This finding was supported by Lancaster University's research that estimates 71% of the phosphorus is coming for agriculture.

We are voluntarily working on completing similar modelling work during 2022 for the other 8 SAC rivers in Wales whether they are failing their standard or not and will share this research with other sectors and regulators.

— **Innovating to deliver low carbon nature-based solutions to improve river water quality and offset the impact of development:** we are working with the Wye & Usk Foundation and Hereford Council amongst others to support measures to remove additional phosphorus from our treated effluent above that required by their permits by establishing low carbon wetland treatment sites that will offset the impact of development. These will take the form of a series of interconnected ponds that provide a natural filtering process to further improve the quality of water being returned to the river by removing unwanted pollutants and nutrients (e.g. ammonia, nitrogen and phosphorus) naturally whilst also enhancing local biodiversity. The construction of the first of these sites will start during Spring 2022 and is designed to offset both the impact of development and deliver a net improvement in water quality. In addition, we plan to pursue similar nature-based solutions in dealing with high spilling CSOs, and we recently received approval from NRW to start constructing such a facility in Pont Y Felin, near Pontypool.

PREVENTING POLLUTION

To help reduce the amount of pollution, we are:

— **Targeting evidence-led investment:** to reduce the reliance on CSOs: we have developed a new CSO Strategy which sets out our ambition for further reducing the reliance on overflows from the sewer network. The first part of this strategy involves investing over £100 million between now and 2025 to secure a progressive reduction in any adverse impact caused by CSOs on our rivers and seas.

We will prioritise those which are having the most significant impact on water quality. For the longer-term, we are working in partnership to produce a CSO Roadmap for Wales (co-designed by Welsh Government, Natural Resources Wales, Ofwat, Hafren Dyfrdwy and Welsh Water) and it is aimed at ensuring that the role of CSOs in Wales is understood, improved, and fit for the 21st century and the challenges we face.

— **Developing our first ever comprehensive Drainage and Wastewater Management Plan** (DWMP) that looks at how we can work in partnership with stakeholders to reduce the risk of flooding and our impact on the environment between now and 2050.

Our DWMP will be published for consultation in June 2022. It will set out strategically how the pressures of climate change, growth and water quality improvements will impact on our drainage systems. The drainage and environmental modelling completed to date shows that we must develop and implement new ways of approaching urban drainage, as traditional approaches to improve CSOs will be unaffordable and also may not be climate change proofed in their own right. Specifically, we need to move to more integrated working with the Local Authorities and many other parties who discharge surface (rainwater) water into the combined system and in so doing are the primary cause of storm overflow operation. Their assets as well as ours will need to be uprated and separated from the foul system if we are to cost effectively reduce the operation of combined storm overflows. Such new infrastructure will be both costly and disruptive to install.

Similarly, to reduce the polluting effects of our storm overflows, it is very clear that further controls at source on the entry of such pollutants as single use plastics, and wet wipes which contain plastics, need to be implemented through new legislative controls.

Both the above changes will require the attention of Government and or changes to the regulatory framework in which we work. We very much look forward to continuing to work with Local Authorities, Regulators and Government on outlining and then implementing the regulatory changes needed to cost effectively deliver improvements to our storm overflows.

REMOVING BARRIERS TO FISH

As well as dealing with our responsibilities with respect to both treated effluents from sewage works and Combined Storm Overflows, we are also working directly in the environment to make improvements to the ecological resilience of our rivers.

This takes the form of supporting partner organisations such as Natural Resources Wales with more than £10 million of improvements to riverine habitats co-financed by Welsh Water and our own programme of work to remove barriers for which we are responsible to the free passage of migratory species up and down our rivers.

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