BRISTOL AVON CATCHMENTS - THE FACTS

We operate in several catchments in the Bristol Avon region:

- The North Somerset Streams catchment (draining to the Severn Estuary)
- The South Gloucestershire catchment (draining to the Severn Estuary)
- The Bristol Avon (Rural and Urban) catchment

KEY ISSUES

Sewage treatment

Within the Bristol Avon Catchments, we operate 121 water recycling centres (WRC - formerly known as sewage treatment works), 714 sewage pumping stations (SPS) and more than 670 storm overflows (SO).

Nutrients

One of the main issues to affect the Bristol Avon catchment is the impact of nutrients on rivers and wetlands. This is primarily from phosphorus, although nitrogen can also have an effect particularly around our coasts and estuaries. Phosphorus causes eutrophication (where the nutrients cause excessive growth of plant life) in rivers and wetlands and is a particular problem for the streams and rivers in the catchment, as well as on the North Somerset Levels. Nutrients come from our own sewage assets but also from diffuse sources, such as agricultural and urban run-off.

Bathing waters

It is important to protect bathing water quality for recreational users of our seas and some inland waters. Water quality on the Severn Estuary coast is affected by many factors, including our own discharges from treatment works and storm overflows, but also by diffuse pollution in river catchments upstream of bathing waters. We support the ambition to reduce impacts from our storm overflows and improve water quality, both for amenity use and the environment. For inland waters this is a complex issue which will take many years to improve and requires changes in both legislation and regulatory approach.

We have invested in upgrading our sewerage and sewage treatment infrastructure at various locations to improve bathing waters by:

- increasing storage in our network (to reduce the number of discharges from storm overflows)
- installing Event Duration Monitoring equipment so that we understand when our storm overflows operate
- investigating whether Wick St Lawrence WRC affects the Sand Bay and Clevedon Bathing Waters. Our investigation concluded that the WRC is not significantly affecting bathing water quality at either beach and our passive ultraviolet (UV) light lagoons are as effective as standard UV disinfection technology at reducing bacteria levels in the discharge.

Water supply and resources

Within the catchment we operate 13 water treatment centres, 13 water sources, 10 stream supports (where we add water to rivers when flows are low) and more than 85 distribution sites (such as storage reservoirs or pumping stations).

The aquifers beneath the northern (Malmesbury) part of the Bristol Avon catchment have long been used for public water supply from the two limestone aquifers – an Upper and a Lower Oolite. Wessex Water uses the upper aquifer while Bristol Water abstracts from the lower. The volume abstracted has increased as the population has grown, and water is also exported from the catchment.

During the 1970s, trials showed that increasing abstraction was having an effect on river flow, due to this we now add groundwater to the Bristol Avon to maintain target flows through 10 stream support sites. Despite this, during drier summers since the 1990s some sections of the river have dried up. Working with the Environment Agency, Bristol Water and local people our abstractions and stream supports have been better balanced. To achieve a sustainable abstraction regime, Bristol Water will reduce abstractions from the lower aquifer during a long dry summer/autumn and Wessex Water will supply replacement water from the upper aquifer.

The UV lagoon at Wick St Lawrence

KEY INVESTMENTS COMPLETED UP TO 2020

Nutrients

By the end of AMP6 (2020) we had installed phosphorous removal at the following treatment works:

Site	Installation Year	Approximate Cost (£k)	Approximate Phosphorous removed (kg/yr)
Saltford	2004	1,250	51,700
	2009	650	
Bowerhill	2005	1,200	4,500
Bradford On Avon	2004	500	4,900
Calne	2002	500	9,600
	2018	2,000	
Chew Stoke	2005	1,250	5,800
Chilcompton	2018	700	800
Chippenham	2002	700	20,000
Devizes	2003	350	3,700
Erlestoke	2018	500	300
Frome	2005	1,750	13,900
Keynsham	2005	600	5,400
Lyneham	2018	850	2,200
Malmesbury	2005	2,500	5,800
Melksham	2003	750	8,600
Paulton	2015	900	4,100
Potterne	2005	350	5,300
Radstock	2005	350	11,000
Seend	2018	850	300
Sutton Benger	2018	600	2,700
Tetbury	2008	1,150	2,000
	2018	2,200	
Thingley	2005	450	6,500
Trowbridge	2005	500	26,800
	2019	500	
Westbury	2003	800	9,400
Wootton Bassett	2006	2,650	6,000
	2018	1,500	

Catchment permitting

During AMP6 (2015-2020) we trialled a new approach to reducing nutrients in the catchment which has proven successful and continues to operate today.

Traditionally, we would install new treatment processes at each WRC to remove phosphorus. This is not sustainable as they are expensive to construct and consume large amounts of energy and chemicals to operate. Instead, we manage nutrients at a catchment scale with a single permit covering all WRCs across the catchment which spreads the required phosphorus reduction across a number of sites.

Individual WRCs are optimised with tighter permits at sites that either contribute the most phosphorus or are best able to reduce existing contributions. This reduces the overall phosphorus entering the catchment without having to build additional treatment processes at a larger number of WRCs and delivers the greatest length of river improved by phosphorus reductions at sites throughout the catchment.

Brinkworth Brook phosphorus offsetting project

The Brinkworth Brook phosphorus offsetting project runs from 2018 to 2023 and aims to reduce phosphorus entering the Brook from agricultural sources by 300kg phosphorus/year by 2022/23. Halfway through the project, Wessex Water funding has resulted in approximately 150 kg/year less phosphorus entering the brook. More than 70 farmers from across the 5,800ha catchment have engaged in the project to date, typically by attending events or receiving one-to-one advice visits from our nutrient and soil management specialists.

Types of measure promoted to farmers for reducing soil and nutrient loss include growing overwinter cover crops, subsoiling to improve water infiltration, exclusion of livestock from watercourses (with over 6km of fencing grants approved to date), farm track upgrades to reduce soil and manure run-off and farmyard infrastructure improvements to reduce dirty water runoff. A major focus has also been given to funding nature-based solutions such as creation of buffer strips, wetlands and woodlands and reversion of arable fields to low input pasture. Improved manure management on cattle farms is actively encouraged and a slurry transport scheme is due to be piloted in early 2021 to facilitate export of slurry from dairy farms with a surplus of soil phosphorus to nearby arable farms which have a deficit.

Sewage treatment and sewerage networks

48 major schemes were completed during AMP6 (2015-20), including:

- Flood alleviation schemes in Trowbridge, Bristol, Westerleigh, Bowerleaze, Melksham, Berkeley, Midsomer Norton and Lower Stanton St Quintin.
- Increased capacity in sewer networks to accommodate development, notably the Trym and Frome Valley Relief Sewers.
- Phosphorus removal installed at 10 WRCs.
- Expansion or improvements at five further WRCs (Saltford, Blagdon, Grittleton, Kilmersdon and Wanstrow).

Water supply

We have a rolling programme of business-as-usual maintenance at a number of our water treatment centres and distribution sites in the area as well as ongoing improvements to service new development, improve the resilience and reduce leakage.

Environmental investment

At Cromhall WRC we have invested £2 million to construct the first wetland in England to provide permitted tertiary treatment for phosphorus removal from a rural WRC. Completed in early 2020, this is a demonstration of our approach to deliver nature-based solutions. Working with three PhD studentships (Universities of Bath and Bristol) the wetland will be monitored over AMP7 (2020-2025) to assess how effectively it removes nutrients and its wider benefits, for example to wildlife.

Environmental investigations

We completed 11 investigations between 2010 and 2020, including:

- **Sand Bay and Clevedon Bathing Waters** – bathing water investigations to understand the influence of our discharges on bathing water quality.
- **Water quality in the Tickenham, Nailsea and Kenn Moors SSSI** – understanding the causes of water quality problems in the SSSI.
- **Water quality in Blagdon Lake** – assessed the impact of our WRCs upstream of the lake and the Congresbury Yeo immediately downstream.
- **Hydrology of the Maiden Bradley Brook** – understanding the effects of our abstraction on the river ecology of the brook.
- **Biss Brook abstraction impact** – understanding the impacts of groundwater abstraction to determine whether this contributes to Water Framework Directive (WFD) failures
- **Chemical and phosphorus removals trial Bowerhill and Devizes WRC** – trialling new treatment processes to remove phosphorus and chemicals from sewage effluent.
- **Hydrology of the Malmesbury Avon** – river flow and groundwater monitoring in the Malmesbury Avon and By Brook to assess the effects of water abstraction
- **Collaborative public health project** – we led a project in Bath and North East Somerset Council to investigate sustainable options for reducing the amount of pharmaceuticals in the environment.
- **Water quality in the Bristol Avon catchment** – understanding the effects of our WRCs and other assets on water quality (phosphorus and nitrogen).

Streamclean team

Tackling sewerage misconnections across the catchment.

Biodiversity Partners Programme

Provided more than £185,000 funding to projects in the region since 1998, including:

- Water Voles & Crayfish project (1998-2006 with Avon Wildlife Trust).
- St Catherine's Valley project (2006-2010 with Avon Wildlife Trust).
- Avon Pond Project (2006-2010 with Avon Wildlife Trust).
- North Somerset Levels and Moors Restoration Project (2015-2020 led by Avon Wildlife Trust).
- Sherston River Improvement and Marvellous Marden Projects (both 2015 with Bristol Avon Rivers Trust).
- Bring back the Buttercup (2015 with South Gloucestershire Biodiversity Action Group).
- Riparian Habitat Enhancement Project (2015 with Bristol Zoological Society).

Conservation Access and Recreation

Fifteen projects delivering improvements for biodiversity and access on our sites, including: tree and bat roost assessments; management of woodland, improvements to Public Rights of Way and visitor interpretation.

Bristol Avon Catchment Partnership

We co-host the Bristol Avon Catchment Partnership (with West of England Rural Network from 2020, and prior to that Bristol Avon Rivers Trust) and provide £80k annual funding, including hosting the roles of the catchment co-ordinator, support officer and independent Chair.

PLANNED INVESTMENT 2020-2025

In addition to ongoing expenditure on our waste and water supply treatment and network assets, our business plan sets out the following key expenditure:

Phosphorus removal

New or additional phosphorus removal at the following WRCs:

Site	Installation Year	Approximate Cost (£)	Approximate Phosphorous removed (kg/yr)
Blagdon	2024	4,000	900
Charfield	2024	1,100	3,100
Leyhill	2024	850	500
North Nibley	2024	850	700
Radstock	2021	2,000	11,700 (additional 800)
Rode	2021	1,800	300
Rowde	2021	3,500	2,500
Trowbridge	2021	3,650	28,700 (additional 2,000)
Ubley	2024	4,000	1,000
Wickwar	2024	1,500	700
Wotton under Edge	2024	1,000	2,200
Wrington	2024	2,250	2,100

Under normal flow conditions, Ubley WRC currently discharges via a pipeline to downstream of Blagdon Lake. Under storm conditions, the site has a permitted discharge of dilute storm spills into the lake. This AMP, we will be laying a new pipeline sized to take the vast majority of flows, effectively removing Ubley's discharge into Blagdon Lake (except for extreme storm events).

Sewage treatment and sewerage networks

Expansion or improvements at a further 13 WRCs, including:

- Flow capacity improvements at Avonmouth, Lacock, Saltford (Bath) and Compton Bassett WRCs.
- Additional stormwater storage at Doynton, Leigh on Mendip, Shoscombe, and Wellow WRCs.

Improvements to sewerage assets, including:

- Major maintenance at five sewage pumping stations - Twerton, Bristol (Ashton Avenue and Dalby Avenue), Bishop Sutton and Kingston.
- Major maintenance at five storm overflows – Watleys End, Monkton Combe, Bath, Willsbridge and Bradford on Avon.
- As of November 2020, nine storm overflows will be investigated as they are categorised as frequently operating overflows, and cost benefit assessments and/or improvements will be undertaken at these sites
- Enhancement of the sewer network to accommodate growth in North Bristol, Corsham, Harry Stoke (Bristol) and Trowbridge.

Environmental investigations

- Invasive non-native species (biosecurity improvements) at Backwell Lake and Monkswood Reservoir and at our largest WRCs including Avonmouth and Saltford.
- Invasive non-native species (raw water transfer risk assessment) at Limpley Stoke.
- Working with landowners and farmers to reduce nitrate losses and identify opportunities for biodiversity improvements in the Drinking Water Protection Areas at our Cherhill, Goodshill and Divers Bridge sources.
- Somer Valley Rediscovered, the umbrella partnership project which is delivering our Innovative Pathway Control investigation to assess options for social prescribing to reduce concentrations of pharmaceuticals in sewage, working with B&NES, Natural England and the University of Bath.
- Middle Bristol Avon investigation, understanding the effect of our groundwater abstractions between Chippenham and Trowbridge on the WFD status of the Avon and tributaries in the area.
- Cotswold Scarp Slope investigation, to determine the effect of groundwater abstraction for stream support on the WFD status of watercourses flowing into the Severn Vale.
- Nailsea partnership project, contributing to a partnership project addressing pollution from urban surface water drainage to the Tickenham, Nailsea and Kenn Moor SSSI.
- Cromhall WRC wetland monitoring, to determine the water quality and biodiversity benefits of the wetland. This includes investigating emerging contaminants and pathogen reduction, as well as nutrients.
- Chemical Investigations Phase 3, working with other water companies to improve understanding of WRCs discharging to coastal and transitional water bodies, reduce uncertainties with regards to specific substances and the effectiveness of removal processes and emerging issues such as microplastics and antimicrobial resistance.
- Clevedon Beach bathing water ambition investigation, identifying the improvements required to our assets to achieve Excellent status at Clevedon Beach bathing water.
- Assessing the environmental benefits delivered through the Catchment Permitting approach
- Inland bathing water investigation, working with stakeholders around a proposed inland bathing water near Bath to assess the current status of the river against public health criteria and understand the potential impact of our assets on the area

Catchment market

We are working with Avon Wildlife Trust and Wiltshire Wildlife Trust to develop a catchment market within the Bristol Avon catchment. This will look at developing and stimulating investment into a trading system for carbon, biodiversity, nutrient and flood risk credits. It is likely to centre on woodland planting within the catchment.

Biodiversity and partnership funding

Wessex Water Foundation's Partners Programme is supporting two projects in the catchment:

- A Better Biss Approach, with Wiltshire Wildlife Trust (£20,000 per year).
- Wilder Waterways, with Avon Wildlife Trust and Bristol Avon Rivers Trust (£15,000 per year).

In addition, Wessex Water is also supporting the West of England Nature Partnership (£10,000 per year), Bath and North East Somerset Council Waterspace study (£3,750 per year) and Wiltshire Wildlife Trust Nature Recovery Network (£10,000 per year).

The following projects will be undertaken across the Wessex Water region but are likely to include sites within the Bristol Avon:

- Maximising opportunities for birds at our water recycling centres.
- Priority habitat restoration and recreation.

Cromhall WRC wetland

FIND OUT MORE

You can access more information about our work in the Bristol Avon catchments on our website – wessexwater.co.uk/environment

- Use our interactive investigations map to download more information on each investigation.
- Read more about our catchment management work.
- Find out about our Drainage and Wastewater Management Plans including the location and frequency of operation of our storm overflows.
- View sample results and flow data from our water recycling centres on our Marketplace website.
- Read our business plan for details of our investments over AMP7 (2020-2025).