

by Natalie Akroyd, Head of Water Strategy & Environment, South Staffs Water & Cambridge Water



# Water – why we all have a part to play in protecting this precious resource...

**People, agriculture and other businesses depend upon ready access to clean water. The water environment also provides many recreational, health and wellbeing benefits.**

In 2021, the Environment Agency reviewed water availability across the UK and designated a further seven areas as “seriously water stressed”, taking the total to 14. Whilst such challenges in the East and Southeast of England are well documented, some of the newly classified areas may come as a surprise – they include much of the Midlands area and stretch as far north at Staffordshire and as far west as parts of Somerset.

These areas can also face significant pressure from climate change, economic challenges, population density and housing development. Just to be clear, the remaining parts of the country that are not classified as seriously water stressed are also facing water resources challenges.

## So why is water becoming scarcer?

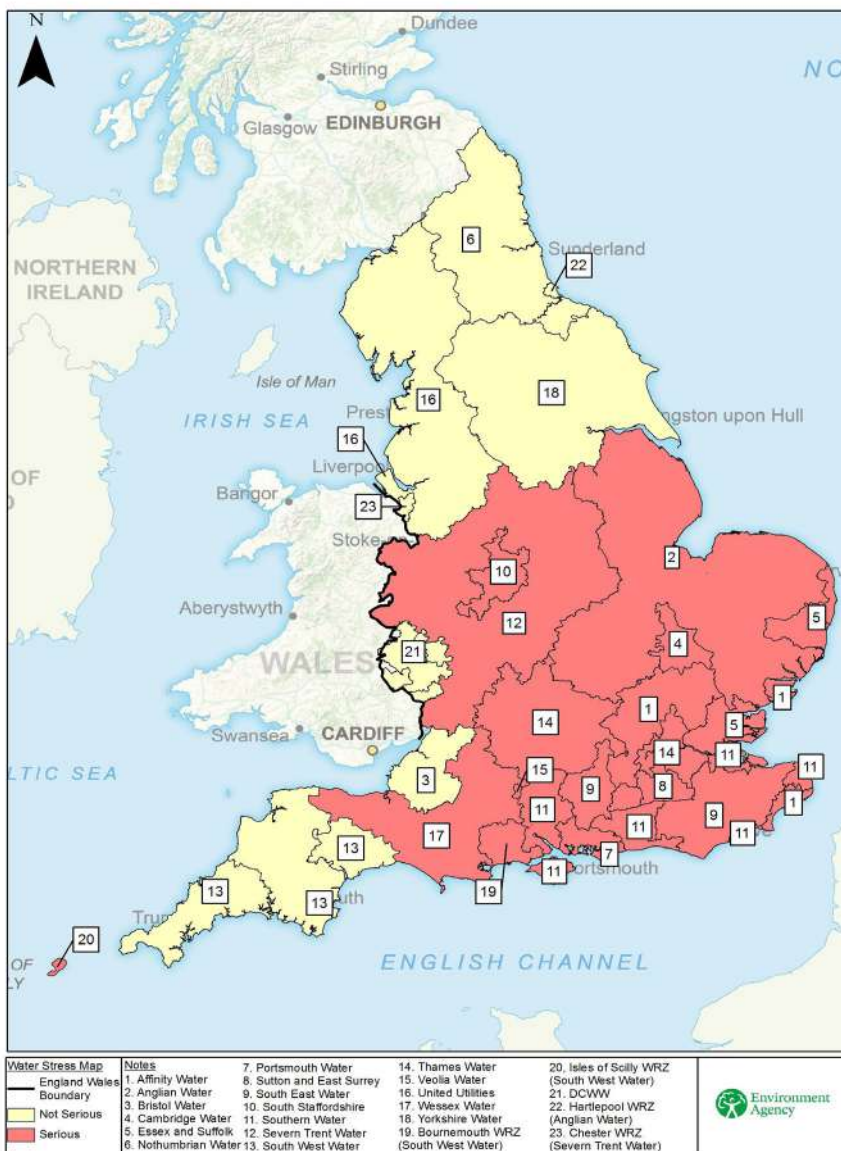
Our planet is covered in water, but less than 3% is freshwater and the remainder is saltwater. Two thirds of that water is locked up in ice caps, glaciers and permafrost. This means less than 1% of the planet’s water is available for drinking.

The population on our planet is increasing rapidly; in 1975 there

were around 4 billion people – today, that number is over 7 billion, and is forecasted to be nearly 10 billion by 2050. Furthermore, we now use more water than ever before in our daily lives. In England, we use approximately twice as much water per person per day as we did in 1975. On average each person uses 1145 litres per day. This is the equivalent of each person having a bath (80 litres), doing one



Blithfield Reservoir | South Staffs Water ([south-staffs-water.co.uk](https://south-staffs-water.co.uk))



Source - Environment Agency (<https://www.gov.uk/government/publications/water-stressed-areas-2021-classification>)

load of washing (50 litres), using the dishwasher (10 litres) every day, and other uses / consumption (5 litres). In Germany, the average is 121 litres.

And this is only one factor leading to increased pressure on our precious water resources.

The other major factor in water availability is climate change. Obviously, the future impacts of this are uncertain, but water companies run various scenarios looking at a range of temperature increases. **All of these scenarios show that climate change will reduce the amount of water available.**

The risk of hotter, drier summers will increase likelihood of drought conditions. Wetter winters see an increased risk of flooding, and the challenge is how to capture these huge flows when they do fall without creating expensive, carbon intensive and infrequently used infrastructure.

Temperature increases can also lead to raw water quality issues, requiring further water treatment either by chemicals, energy intensive processes - or both!

Linked to this, we also need to factor in the needs of the environment. Abstraction has increased due to rising

populations and consumption, and this process removes water from the environment, sometimes with negative impacts on ecology and biodiversity.

We need to take steps now to protect the environment from further increases in abstraction and to mitigate the future impacts of climate change. In some areas, we need to reduce abstraction further to restore and enhance the local environment; chalk streams are a good example of this.






Chalk streams are rivers that rise from springs in landscapes with chalk bedrock. Since chalk is permeable, water percolates easily through the ground to the water table and chalk streams therefore receive little surface runoff. As a result, the water in the streams contains little organic matter and sediment and is generally clear.

In the UK, we have 85% of the world's chalk streams, and these beautiful rivers and streams are extremely sensitive to water quality and quantity. We need to protect and restore these precious areas.

### So what about energy and carbon?

For a water only company (WOC) such as South Staffs and Cambridge Water; delivering potable water to customers is an energy intensive process - extracting, storing, treating and pumping water to our business and domestic customers. Typically, across both regions our energy consumption is over 240 GWh per year. 100% of our grid supplied electricity is a Net Zero tariff and we also use <sup>2</sup>HVO fuel in our standby generators at the Hampton Loade water treatment works.

South Staffs Water and Cambridge Water continue to target further efficiencies and our Net Zero roadmap includes; more energy efficient assets e.g., pumps, 'Smart' controls and analytics e.g., using AI to identify early asset deterioration, accelerated leakage reduction beyond current

	South Staffs region	Cambridge region
 Area served (km <sup>2</sup> )	1,497	1,175
 Population served	1,366,845	347,243
 Water supplied each day on average (Million litres Ml)	323.11	83.32
 Residential connections	565,062	138,951
 Business connections	33,750	8,920

commitments, further reducing our use of fossil fuels – operations and vehicles, journey reduction by our employees (commuting and field operations), investing in renewable energy at our sites, reducing water consumption per connected property and In-setting / Off-setting.

For the South Staffs region the water we supply is taken from Blithfield Reservoir, the River Severn and some 26 groundwater sites located across

our area of supply. For Cambridge, the drinking water predominantly comes from ground water held in the chalk aquifer. The aquifer can hold large quantities of water in a network of fractures and cracks in the rock and we are able to abstract it from 24 boreholes.

The whole water sector is committed to <sup>3</sup>Net Zero by 2030, and those plans are well underway in terms of deployment e.g. decarbonisation of energy, fleet

electrification, leakage reduction, investment in renewable energy generation, and process efficiency.

However, the need to conserve multiple precious resources including energy and water has never been more critical. Many energy managers will attest to the challenges of getting ‘water only’ savings projects over the line, and frequently ‘bundling’ them up into other projects to achieve investment return criteria.

We all need to challenge the norms and our expectation that there will always be water available for our needs e.g. how much ‘treated’ water is used in grounds maintenance; whether that be on our gardens at home, or our local cricket and football grounds? If we harvested rainwater we would not only reduce water extraction, but the energy used in water treatment and distribution.

It is a reality that the true cost of water (£, kWh, CO<sub>2</sub>e and wider



Hampton Loade – South Staff Water Treatment Works

environmental impact) is not always visible and transparent to the end customer (household or business). As a water sector we need to become far more effective in understanding and communicating the broader whole system costs, and interactions (including other utilities), in order to better target just and affordable solutions.

From a scope 3 perspective; the more we all understand our supply chain; challenges and opportunities, the sooner we will be able to tackle robustly and sustainably whole climate, carbon and environmental objectives. If every part of the supply chain is focused on their scope 1 and 2, the majority of scope 3 takes care of itself. We should not just be 'expecting' our suppliers to up their 'Net Zero Game,' but also asking them how we can collaborate and learn from each other.

Future energy system decarbonisation may also add additional pressures e.g. Hydrogen production. Additional water is required for both methane

reforming with Carbon Capture, Usage and Storage (CCUS) and for production by electrolysis. In both cases water purification is needed and for methane reforming it is also used for cooling. However, on balance and as all technologies evolve, there will be efficiency improvements, alternative solutions including sea water de-salination but ultimately all use water and energy.

For Hydrogen production by electrolysis reported water consumption varies between 254 and 509 litres / MWh, and of course purified / remineralised water is required – another 'process' in the mix. However, water consumption for electricity production from natural gas can be up to 2,500 litres per MWh, so there is actually potential for a decrease in water requirements globally.

There is still much debate as to the opportunities and challenges from expanding Hydrogen production, and the 'water sector is fully receptive to

all solutions which support and deliver our Net Zero ambitions. However, whole life and system impacts need to be considered as part of our water resource planning; particularly in the coastal areas where many of the Hydrogen projects are located.

New technologies will also play their role in production of water at domestic and industrial level. These include atmospheric water generation (UK has plenty of humidity to play with); Solar water generation (less effective in UK maybe but has potential); Solar desalination plant – becoming more efficient at smaller scale and could be used to supplement supplies

### **So what is the water industry doing to tackle these various challenges?**

A new approach has been adopted in order to ensure these issues are solved at a regional and national level, rather than just at a company



Photo used with kind permission of Staffordshire Birdseye View Photography

*Blithfield Reservoir Blythe Valley – providing up to 100 million litres of water each day to more than half a million houses and businesses in parts of the Black Country, East and South Staffordshire and South Derbyshire.*



*Source: New chalk stream assessment to take place (cambridge-water.co.uk)*

level. Five regional water resource groups have been created that are currently developing water resource management plans for their region for the next 25 years that look not only at public water supply needs, but all future water requirements in the region across all sectors e.g. agriculture, energy, navigation etc.

These regional plans are then overlaid to create a national plan that ensures the water needs are met across the country while representing best value to customers and the environment. These plans are intricately linked to water company individual water resource management plans (WRMP); all these draft plans will be published in autumn 2022.

The first and most important approach is to reduce the demand for water. The Government recognises the importance of this and so the new Environment Act is looking to create targets for demand reduction across households and non-households e.g. industry and commercial properties. Water companies have worked consistently over the last 30 years since privatisation to reduce leakage levels and educate

customers around their water usage to help reduce consumption. However, there is more to do and there are some ambitious targets across the sector which look to reduce leakage by 50% and reduce household consumption to 110 litres per person per day, both by 2050. If customers in the South Staffs Water region reduce their daily consumption by 30 litres each, it would save 40 million litres of water – equivalent of 16 Olympic sized swimming pools every day!

Since the market opened in 2017 for non-household supplies, retailers have owned the relationship with this sector. Water companies are working with retailers to identify how they can jointly help the non-household market reduce their demand - consumption and leakage. It is critical that we raise awareness across every single water customer to share the water resource challenges and to help provide the information customers need to make informed choices about their water usage.

The best way of doing this is through use of a water meter, although the sophisticated smart meters routinely seen in the electricity sector are

not available for water yet. Data from <sup>5</sup>Water UK suggests that there is significant difference in water consumption between metered and unmetered households i.e. 139 versus 183 litres per person per day.

Currently, all non-household properties should have meters, but there is no legal requirement for domestic properties to have a meter. The classification of an area as seriously water stressed enables the water company in that region to explore compulsory metering – this must be supported by customers to be progressed, and water companies are undertaking extensive customer engagement to explore how this might work.

Understandably, as we find ourselves in a cost-of-living crisis, there are significant concerns around affordability, particularly for larger households which tend to find bills increase when on a meter, and solutions to support this need to be found.

However, in some areas, demand management alone cannot solve the potential future predicted deficits in supply that will occur due to all of the pressures outlined above. In these



*SSW education programme; delivering exciting and engaging water-efficiency and water-cycle workshops and assemblies to Early Years Foundation Stage (EYFS), Key Stage 1 and Key Stage 2 pupils*

areas, options are being explored to create additional supply, whilst ensuring that these future options do not cause additional stress on the water environment or cause any environmental harm.

For Cambridge Water, all the water currently supplied to customers comes from chalk stream aquifers, and there is significant growth forecast for the area. In order to protect and enhance the chalk streams and meet the needs of the future; Cambridge Water are exploring the potential for a new reservoir that could supply both Anglian Water and Cambridge Water customers, and could be in supply in the mid 2030's.

This is not the only new reservoir currently being proposed across the country, and other options being explored include transfers of water from areas of surplus to those of deficit, and the potential need for desalination.

In short, water scarcity is an issue of increasing significance in the UK. There are some ambitious plans in place to reduce the overall water demand and ensure we have enough supply for future predictions, but it is important that everyone understands

the role they play in these plans if we are to be sure they will succeed.

Education is the first step along that path, ensuring that we engage with our future customers and consumers, while providing a fun learning experience.

It is also important that lessons are being learned from countries such as South Africa as we work to ensure we do not see the same scale of challenge in the UK in the future. The plans currently under development will show clearly how these challenges can be overcome, but it is critical that all water users work together to input and deliver these if we are to ensure success.

Water is a precious resource we cannot take for granted - it is part of a wider diverse system and cannot be considered in isolation. Effective, robust, resilient and sustainable solutions require collaboration, joined up thinking and innovation – not just in technology but also in process application and our interaction with communities and the environment.

The message to all stakeholders including customers must be - it is a partnership; we invest in the technologies and leak elimination; we need you to reduce consumption, and

together we will reduce water stress in the UK...

#### **Author's Profile:**

Natalie has been working in the water industry for nearly 20 years, and currently leads water resources and environmental planning teams for South Staffs and Cambridge Water. Natalie is a Chartered Environmentalist, a Technical Director for Water Resources East, and a Board member for the Society for the Environment.

#### **Sources:**

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6. [Education services | South Staffs Water \(south-staffs-water.co.uk\)](#)