UK Water System Resilience: Looking for Solutions Across the Pond

Resilience in the water sector has been a point of attention for quite some time. Climate change, population growth, and ageing infrastructure place unprecedented pressures on water systems in both the US and the UK. These challenges highlight the shared need to ensure safe and reliable water services while also protecting environmental and social outcomes.

On their recently published interim report, the Independent Water Commission (IWC) noted concerns with the UK water systems, such as **supply chain capacity for necessary investments** and management arrangements that **do not fully address** the regional water systems demands.

We use the IWC report as a starting point to explore how solutions already tested in the US could help build a more resilient water sector in the UK, drawing parallels and highlighting opportunities for cross-Atlantic learning.

> A number of stakeholders, including the NIC, some water companies and supply chain firms have expressed serious doubts as to whether the supply chain has the capacity to undertake the huge increase in investment set out in Price Review 2024. This is in part due to the pressure on some parts of the chain from other sectors where major investment plans are in train. But they also point to the scale of the jump in the level of water industry investment. For example, the combined Water Industry National Environment Programme (WINEP) and National Environment Programme (NEP) averaged around £5.4 billion in the price reviews from 2004 to 2019 before jumping fourfold to almost £24 billion in Price Review 2024 (2022/23 prices).[237]

IWC interim report page 98, June 2025

> At present, there is a complex patchwork of system planning and management arrangements in England and Wales that does not effectively bring together all the demands on regional water systems, the challenges that need to be met and all the actors that have an impact on water. The Commission has heard that local voices are lost in the system.

IWC interim report page 28, June 2025

Water system resilience extends beyond ensuring pipes and treatment plants are in good condition. It's about the ability of water systems to absorb shocks – like droughts and floods – and adapt to long-term challenges. In the UK, the IWC frames resilience as a **"strategic imperative"**, highlighting that it must be addressed at the highest levels of planning and regulation, not just as a technical afterthought. In the US, resilience emerges through a complex interplay of federal environmental standards and state-level economic regulation, requiring an ongoing balancing of affordability, environmental protection, and infrastructure renewal.

Similar Challenges

While regulatory frameworks differ, some challenges are remarkably similar.

1. Ageing Infrastructure:

In the UK, the IWC exposes a clear recognition that asset health is not well understood and that renewal plans are often driven by past failures rather than proactive assessments. In the US, ageing infrastructure is a major concern, particularly for small systems that lack the resources for regular maintenance and renewal.

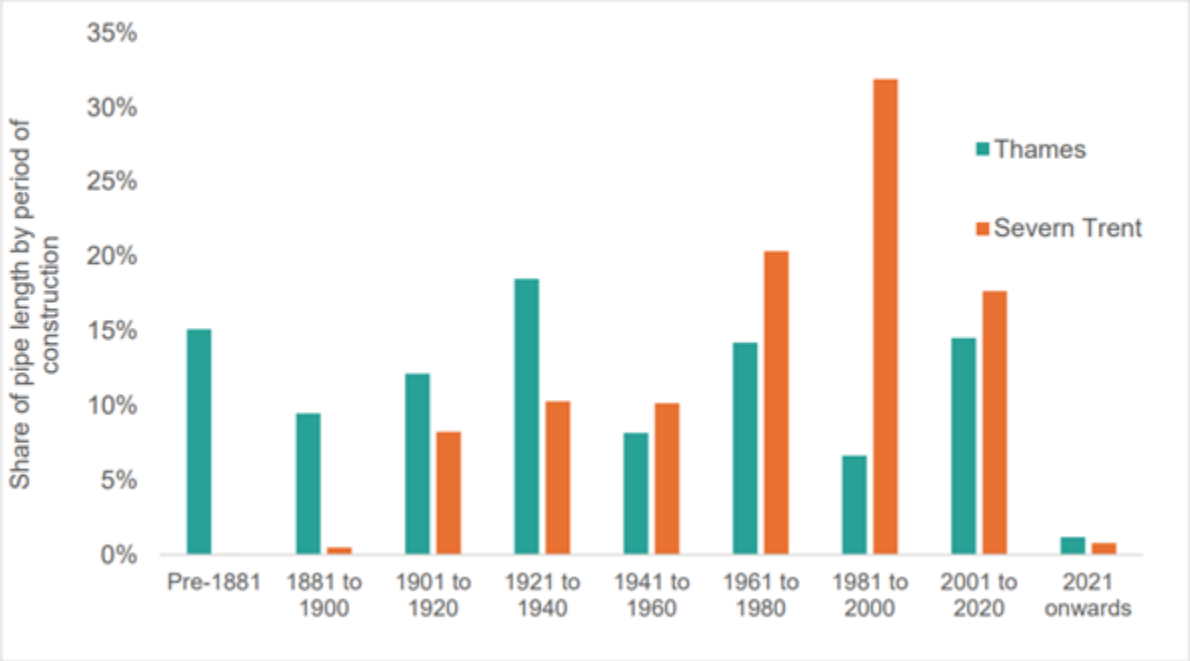
The Commission has heard that there is a lack of underlying condition data for water company assets in England and Wales. Given that the underlying legislation and regulatory framework is not fully prescriptive, English and Welsh companies have taken different approaches to managing their large and complex asset bases. To fill mapping gaps, for instance, the Commission has heard that one company follows a 'map as you go' principle to build up knowledge during routine maintenance, while another maps reactively only on failure of the asset.[225]

While Ofwat have published a roadmap for improving the understanding of asset health, it is not mandatory for companies, and it is not clear to what extent companies are engaging. Moreover, although Ofwat noted that they had collected asset condition data on 70% of assets in Price Review 2024, these are at least partially based on failure metrics alone (such as sewer collapses, mains repairs and unplanned outages) rather than providing a prognostic assessment of asset health.

IWC interim report page 96, June 2025

Pipe age comparison – Thames and Severn Trent

The below figure shows the difference in pipe age between Thames Water and Severn Trent Water assets, with Severn Trent having a younger average age of pipe, suggesting that companies will face different challenges on asset maintenance going forward due to their asset endowment.



IWC interim report page 54, June 2025

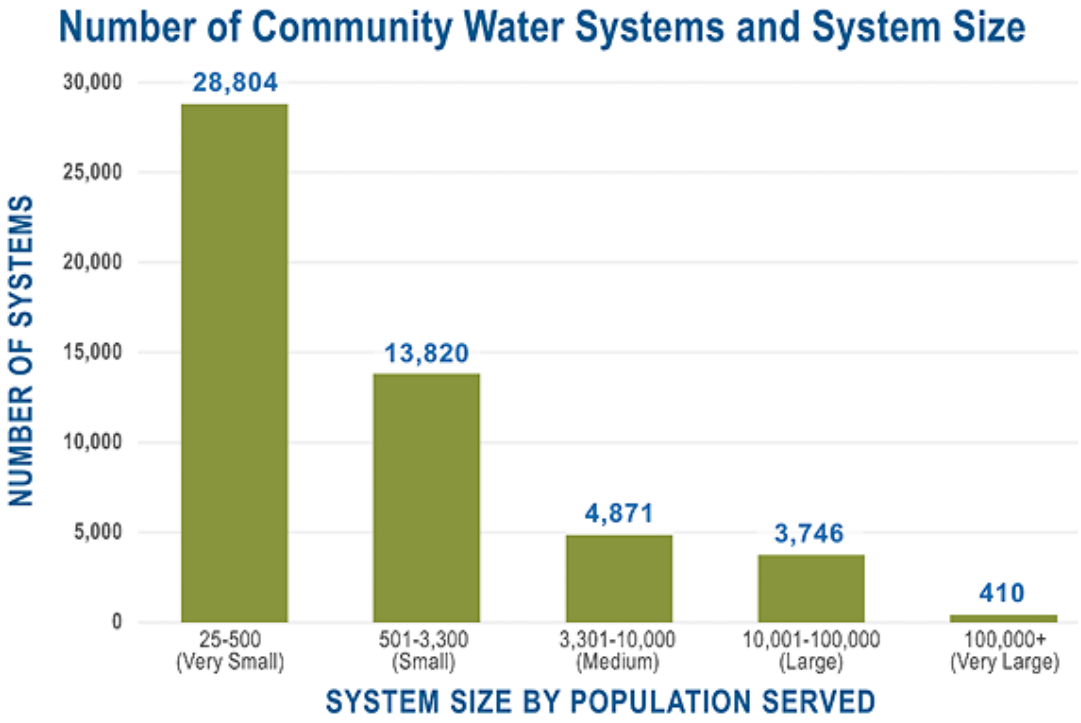
2. Fragmentation and Small Systems:

One of Ofwat's concerns brought up in the IWC report was that the UK water sector **experiences fragmented planning** and decision-making, complicating coherent responses to environmental and supply challenges. Similarly, in the US, many states like Georgia and North Carolina have thousands of small systems that struggle with staffing, investment, and ensuring affordability for customers.

The UK and Welsh governments have sought to provide strategic direction on growing environmental, social, and financial pressures and demands on the overall water system – including in the Water Strategy for Wales (2015) and the UK Government's Plan for Water and its Environmental Improvement Plan, both published in 2023.[26] However, the Commission has heard that these plans have not effectively articulated prioritisation or provided accountability mechanisms to ensure they are delivered. [27] Ofwat has commented that, historically, "investment in the sector has been the result of fragmented water company planning and prescriptive environmental investment programmes with relatively little strategic direction from Government".[28]

In England, existing strategies have focused heavily on narrow targets, processes and policy decisions, and have not effectively considered costs, articulated priorities or set out system-wide outcomes.[29] Importantly, they contain little-to-no guidance on how regulators should strike a balance between potentially conflicting targets and outcomes, for example, how the regulatory system should balance affordable bills for customers with enabling water companies to deliver the investment needed to meet required environmental standards.

IWC interim report page 22, June 2025



Community Water System Distribution

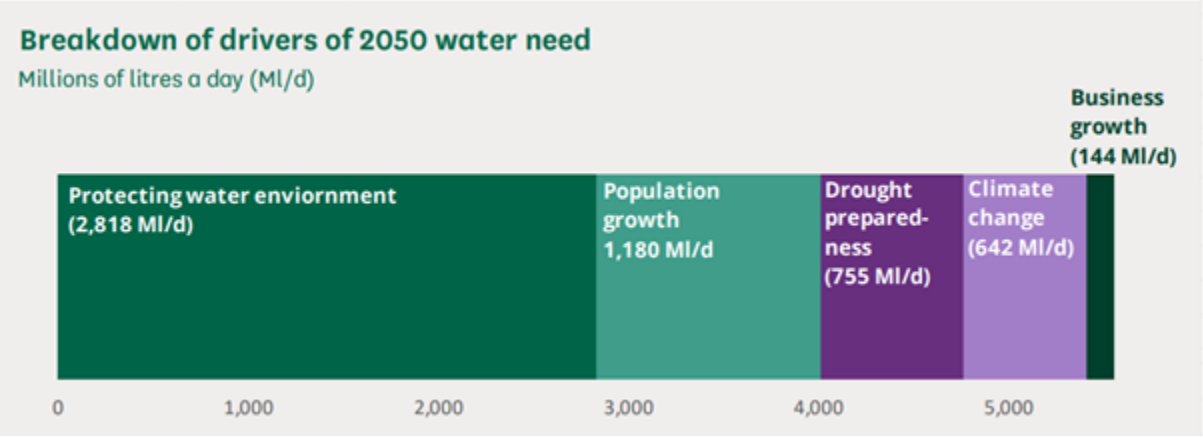
In the United States, 83% of community water systems serve fewer than 50,000 people. Despite this high percentage, these smaller sized systems serve only 8% of the population. In comparison, the remaining 17% of community water systems consists of larger water systems that serve over 250 million people. The majority of community water systems serving fewer than 10,000 people use ground water as their source. Most Americans are served by community water systems that serve greater than 100,000 people and use surface water as their source.

3. Climate Change and Extreme Weather:

The UK's National Infrastructure Commission (NIC) has warned that in the next 30 years, there is a **one-in-four chance of significant water supply disruptions** due to climate pressures. In the US, states such as North Carolina and Indiana are increasingly focused on drought resilience and future demand management to prepare for similar climate-driven challenges.

Equally, there are growing environmental, demographic and financial pressures on the water system. For example, the National Infrastructure Commission (NIC) estimates there is a 1 in 4 chance over the next 30 years that large numbers of households in parts of England will have water supplies cut off for an extended period due to severe drought.

IWC interim report page 19, June 2025



Case Studies

The US water sector offers several illustrative case studies and strategies for dealing with water system resilience:

Consolidation Efforts in California:

The California Public Utilities Commission (CPUC) has **worked to consolidate** small, under-resourced water systems unto larger companies, to improve resilience and equity, when these are in the best interests of customers.

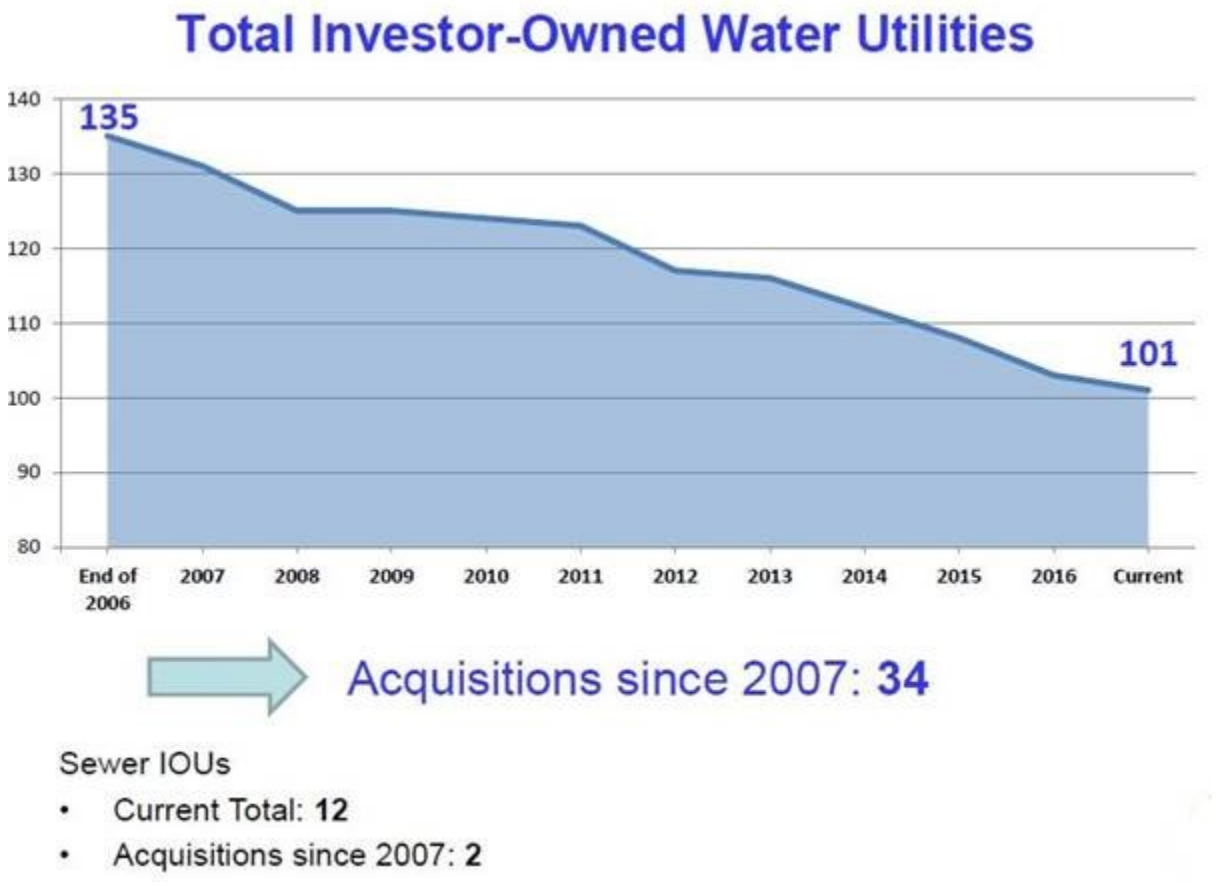
> Many communities throughout California are served by very small privately-owned or public water utilities. Some of these small providers have aging, inadequate infrastructure and are either failing, or are at risk of failing to meet the state's standards for clean and safe drinking water. In many cases, the customers of at-risk small water utilities are themselves more vulnerable, making addressing their needs an environmental and social justice priority.
>
> One of the potential solutions to this widespread challenge is for a larger, financially healthy water utility to purchase the smaller, at-risk utility and to continue serving its customers. The CPUC works closely with the State Water Resources Control Board to facilitate such acquisitions when they are in the best interests of customers.

The California Public Utilities Commission 2024 Annual report, page 25

The California Water Association summarised **water acquisitions and consolidations** in 2017, suggesting that the **total number of investor-owned water utilities had decreased**.

Rami Kahlon, CPUC Water Division Director, noted that there have been 34 acquisitions/consolidations by regulated water utilities since 2007. Of this total, 17 were acquired by other regulated water utilities, 10 by municipal or public agencies and seven by (or were incorporated into) mutual water companies. He explained that acquisitions by regulated water utilities were governed by the Public Water System Investment and Consolidation Act of 1997 (Public Utilities Code Sections 2718-2720), which among other things, uses "fair market value" as the starting point for determining the rate base value of an acquisition. The CPUC followed up the 1997 law with a 1999 decision on "Guidelines for the Acquisition and Mergers of Water Companies."

Source: California Water Association



Source: California Water Association

North Carolina's Supervisory Regulation:

North Carolina's Utilities Commission stands out for its more hands-on approach, engaging directly with smaller utilities to understand and address local challenges.

Challenges in Georgia and North Carolina Small Systems:

Many of these small systems face the dual burden of limited customer bases and inherited infrastructure, echoing the UK's own concerns about fragmented small system planning, mentioned in the IWC report.

Pennsylvania American Water:

This large utility provides comprehensive water and wastewater services, showing how scale can help secure long-term investment and operational stability.

Proposed Regional Water System Planning:

The UK is moving towards **catchment-based regional water system planning**. This aims to overcome fragmentation by involving local authorities and stakeholders in decisions about investment and environmental protection.

> In the Commission's view, there is, for England, a strong case that the current system planning functions should in future be carried out by better and stronger regional water system planning arrangements that involve all the sectors that have an impact on quality and quantity of water in a regional water system, including local authorities. This will enable a more comprehensive approach to addressing the various sources of pollution that are damaging the water environment. The Commission is exploring a range of options for how such arrangements might best be organised. They could, for example, involve committees within an existing regulatory body or more freestanding bodies. They should be clearly connected to local voice and draw on local catchment-based partnerships. It is crucial that such regional water system arrangements have real authority in relation to water industry investment and to water related resources directed at other sectors.

Source: IWC interim report page 8, June 2025

A map of the five regional water resources groups (from Environment Agency 2020)

Source: Environment Agency 2020

Under the National Framework for Water Resources, set out by the Environment Agency, each of these regional groups will produce a Regional Water Resources Plan. The purpose of these plans is to better understand and address the environmental and water resource needs of a region. This is important because it means strategic solutions can be developed across the country, with collaboration and management at regional scale, rather than being restricted to the boundaries of individual water companies.

The Environment Agency intends that the plans will:

- Reduce water demand, per person and across sectors.
- Halve leakage rates by 2050.
- Develop new water supplies, such as reservoirs and reuse schemes.
- Move water to where it's needed.
- Reduce the use of drought measures that impact the environment.

Source: Environment Agency 2020

Focus on Asset Health:

The IWC calls for a shift from reactive maintenance to proactive, long-term assessments of asset health, ensuring that future challenges like climate change are integrated into planning.

Regulatory Reform and Supervisory Function:

Instead of solely relying on industry-wide benchmarks. The IWC proposes integrating a "supervisory function" into regulation, which mirrors how US state commissions, like in North Carolina, combine oversight with local knowledge.

Nature-Based Solutions:

Wales' RainScape initiative in Llanelli and Gowerton shows how green infrastructure can deliver multiple benefits: reducing stormwater flows, improving biodiversity, and creating more resilient communities. This parallels emerging nature-based solutions in the US, like the **Staten Island Bluebelt initiative**

Source: West Wales Chronicle 2021

The US examples, while not mentioned in the IWC report, provide several interesting references for fragmented water systems and planning functions. Active regulatory supervision in the US, particularly in states like North Carolina, provides a reference point for going beyond benchmarking to understand local challenges and ensure early intervention. It also provides an opportunity to look for the new problems that would be encountered.

Nature-based solutions stand out as another area of shared learning. While Wales' RainScape project has demonstrated the benefits of green infrastructure in the UK, similar US initiatives show that these approaches can provide cost-effective and environmentally beneficial ways to address both flooding and drought risks. Finally, the US examples highlight the importance of regulatory clarity and clear long-term planning to attract investment and build trust with customers and communities – something the UK must continue to strengthen in order to support the ambitious changes outlined in the IWC report.

Conclusion

Building resilience in water systems is a challenge that transcends national boundaries. The experiences of the US and the UK demonstrate that there is no single path to follow. However, by drawing on each other's lessons – especially around consolidation, proactive regulation, and nature-based solutions – we will all be better informed.

About the Authors

PJ McCloskey

Director

pj@mcceconomics.co.uk

+(971) 58 588 7584

Rodrigo Remor

Consultant

rodrigo@mcceconomics.co.uk

+(39) 342 832 3977

Offices & Locations	Kemp House, 160 City Road London, EC1V 2NX, United Kingdom Al Sarab Tower, Abu Dhabi Global Market, UAE Office 901-2, Apricot Tower, Silicon Oasis, Dubai
Incorporation	UAE & UK
Registration details	UAE licence number 47005411
Web address	**www.mcceconomics.co.uk**
General email	**tenders@mcceconomics.co.uk**