Client sector insight: The water industry

Environment Analyst looks at where environmental consultants sit in a sector which is constantly under strain to deliver more for less. We examine how the water companies, regulators and supply chain are changing their approach to the management of environmental issues, what gains are being made, and the opportunities and challenges on the horizon

BY ROSS GRIFFITHS

With sincere thanks to our main contributors:

- **APEM:** Managing Director, Adrian Williams
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- **ESI:** Managing Director, Jon Cooke; Innovation Director, Mike Streetly; Water Group Director, Paul Daily
- **Stantec:** Technical Director, Evan Dollar

End of the pipe for grey infrastructure in the water industry?

Introduction

The UK's water infrastructure network is one of the most critical elements of the UK economy. Every day 32 privately-owned companies supply around 50m households with freshwater and remove and treat wastewater in England and Wales. In total the UK uses around 16bn litres of drinking water every day and the water industry supplies it through a network of 343,000km of pipes – equivalent to eight times the distance around the equator. Wastewater is then treated by around 1,130 treatment works across England and Wales.

The onerous requirements mean this sector is characterised by very high levels of capital investment as a proportion of turnover. Since 1989 around £140bn has been invested by Anglo-Welsh water companies, with £44bn spent between 2010-15 alone, equivalent to around £2,000 per property. But as with many former publicly-owned industries, it is constantly under pressure to demonstrate value for money.

Since the water industry was privatised in 1989 the sector has faced constant scrutiny in its balancing of social and economic requirements set by Ofwat and the utilities' shareholders – many of which are big private equity houses and international utility conglomerates – set against the environmental requirements set by the EU in Brussels and the Environment Agency.

Indeed, from a value perspective water companies may be one of the most underappreciated in the UK economy. The average price of a 2 litre bottle of branded water from supermarket is a 90p. But the average price of water from the tap in the UK is just one-third of a penny. And that must pay for water treatment, pipelines, energy, taxes, wages, equipment, new assets and of course environmental protection measures.

And now the industry is facing a new wave of scrutiny. UK environment secretary Michael Gove made headlines recently when he slammed water companies for having a licence to print money at the Water UK City Conference: "Since privatisation around £140bn has

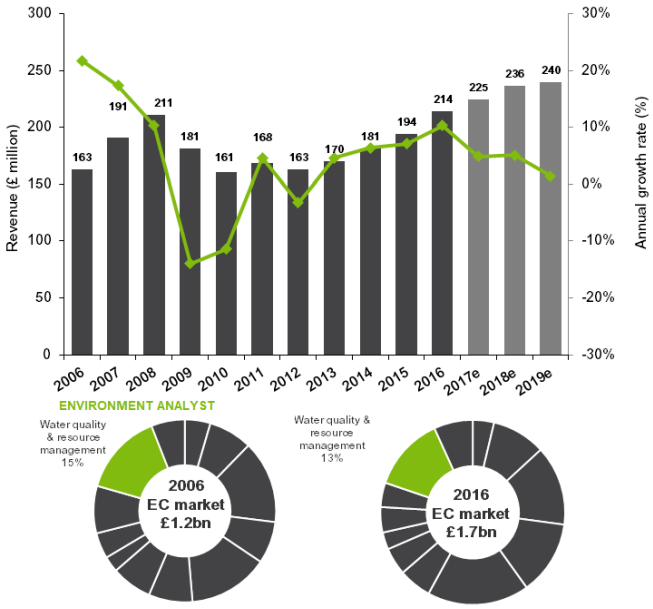
been spent in water infrastructure with levels of leakage down by a third and two-thirds of the UK's beaches now classed as excellent, up one third pre-privatisation," commented Gove. "While £140bn has been pumped into the network to repair existing assets, there has been no investment in new nationally significant supply infrastructure, such as major reservoirs, since privatisation."

> "There has been no investment in new nationally significant supply infrastructure, such as major reservoirs, since privatisation." (Gove)

At the same time, Gove pointed out customer bills have increased 40% between 1989 and 2015 with inflation factored in. While he acknowledged the recent price reductions in the latest price period, his observations perhaps downplayed the state of the sector when it was placed into private hands precisely to tackle the lack of capital investment.

The managing director of aquatic ecology consulting specialist APEM Adrian Williams sums up the situation, stating: "The water industry is perennially caught in a delicate balance between two potentially conflicting demands: the need to supply cheap, clean water and the expectation of an improving environment."

Figure 1 EC revenue from water quality & resource management services 2006-2019e

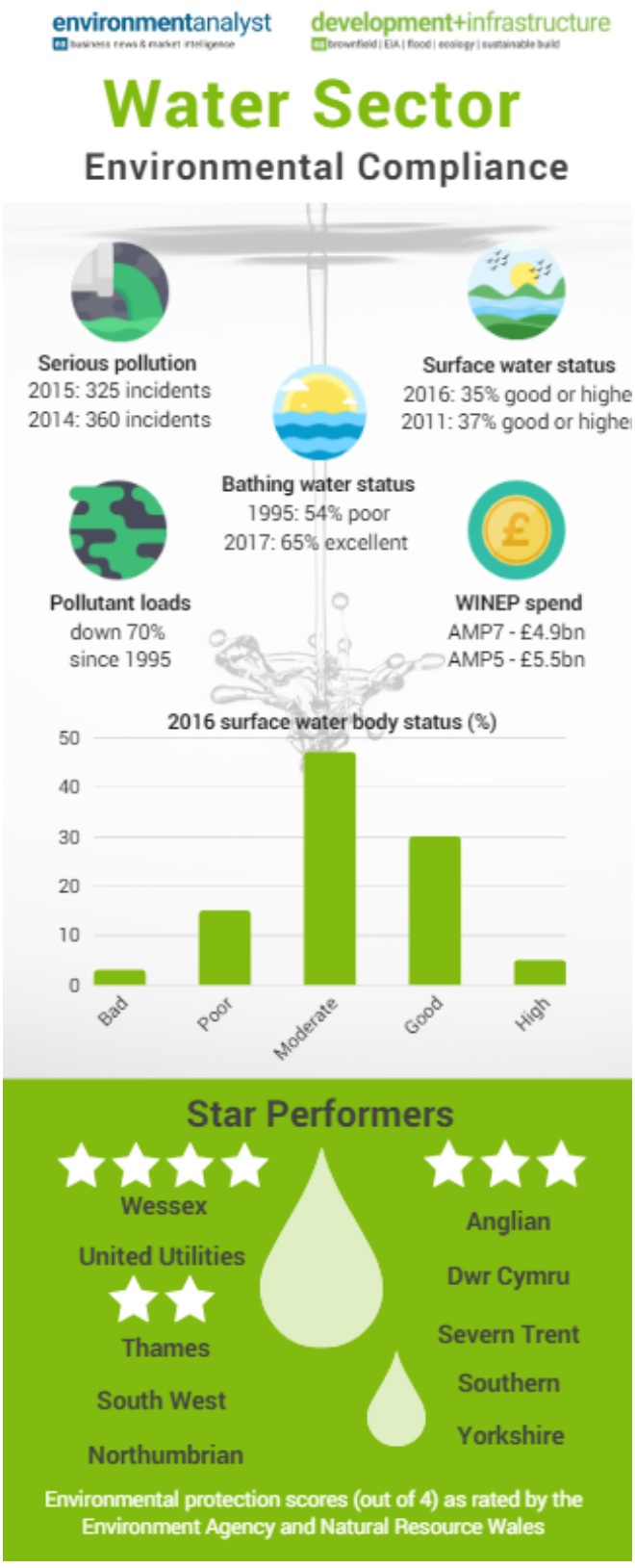


Water utility investment support forms a significant income stream for environmental consultancies operating in the UK. According to Environment Analyst's 2017 UK EC Market Assessment report, water quality and resource management services make up the third-largest work area, bringing in over £214m in 2016 and account for 13% of the total EC market (EA 18-Jan-18). Companies including **WSP, Mott MacDonald, Jacobs** and **Stantec (formerly MWH)** have carved out serious market share – indeed the top ten consultancies jointly hold a 64% stake in this segment. Growth of 10.3% in 2016 – as the water utilities' five year spending programme ramped up was right on cue, although is expected to come in at a slightly lower rate in 2017 (Figure 1).

Figure 2 Top 20 EC practices in the water quality & resource management service area (% market share)

Consultancy	2016 Market share
Arcadis	15.8
RPS Group	8.3
Jacobs	7.8
MWH (now part of Stantec)	7.0
WSP	6.3
ATKINS (SNC-Lavalin)	5.2
Mott MacDonald	3.9
Apem Ltd	3.4
Wood, E&IS	3.1
HR Wallingford	3.0
Arup	2.9
AECOM	2.8
CH2M (UK)	2.6
Black and Veatch	2.4
WRc	2.4
Royal HaskoningDHV	2.2
Ricardo Energy & Environment	1.9
Intertek Energy and Water (Metoc)	1.3
JBA Consulting	1.1
EMU Ltd (now part of Fugro)	1.0
Other consultancies	15.8

Jon Cooke, managing director at the 40-strong hydrogeological specialist **ESI**, which has recently been acquired by **Stantec** (EA 27-Mar-18), points out the willingness to pay is clearly there: "Water companies want to take a lead in environmental protection, but they are also wanting to protect their customers interests. There is an argument over who should pay for these improvements – but it will come back to the public one way or another. On the whole the public seem quite engaged and willing to pay so long as there are clear benefits."



How utilities have improved the environment

There have been noticeable improvements to the environmental status of UK water bodies – and much of this is down to water company actions and the oversight of the **Environment Agency**. Pollutant loads from the water industry have declined by up to 70% since 1995, while around 98% of bathing waters now pass minimum standards – with 65% at excellent status in 2017. This compares to the 54% of bathing waters classed as poor in 1995. Since 1990 the biological and chemical quality of rivers have also improved greatly from around 55%, to approximately 72% for biology and 79% for chemistry today.

But there are many areas the Agency is still not happy with. First and foremost is the amount of water bodies achieving 'good ecological status'. The proportion of rivers achieving GES is largely unchanged since 2009, according to the old method of assessment. But a more stringent method of measuring GES introduced in 2014 has documented a decline from 17% of rivers complying to just 14% in 2016. With the Agency targeting GES for rivers at 21% by 2021 the challenge and opportunity for water firms and their consultants is clear to see.

"When we see things not at good ecological status it's easy to blame the water industry," says Brian Cox, associate director within **Atkins**' 650-strong water industry team. "But it's important to remember the targets have changed. It's easy to think we are not making progress, and in some local areas that may be true, but overall we are seeing standards are constantly improving. We are just struggling to quite hit the mark on good ecological status."

While it is easy to be critical, these are tough targets which are constantly being revised for improvements. It's also worth noting that the water industry is responsible for 28% of rivers not reaching GES, compared to 31% from rural and agricultural land management. Tackling diffuse pollution from agricultural sources is arguably the next major challenge for UK water management. But the overall picture of change is generally positive and it's the tightening of expectations that has made the water industry a force for good, as well as a strong area for consultants over time.

"Over decades of investment we have gone from areas which were ecologically dead to areas where fish are migrating through on a regular basis, it's a fantastic thing to see," says Cox. "The challenge now is to make those improvements which are much more subtle, as we've got to a point where the progress is harder to achieve."

There are other parameters the **Environment Agency** is not happy with. Over the last ten years there has been no reduction in serious water pollution incidents, which average around 60 each year. Meanwhile, nearly half of

groundwater bodies will not reach good chemical status until 2021 – with nitrate levels a key concern. Water efficiency is also a growing concern with the Agency warning this month that overuse and wastage is placing an additional strain on the UK's water resources.

How did we get here?

Perhaps to really understand the progress made in protecting the water environment, it is worth reviewing how the standard management approaches have changed over time.

For Williams at **APEM**, the shifting focus and needs of Ofwat has determined the environmental priorities: "In the early days of privatisation the priority was to upgrade infrastructure after years of underinvestment. As a result there was a lot of practical engineering of pipes and treatment plants. More recently there has been a shift away from end-of-pipe solutions towards wider, more holistic solutions, including catchment management and associated disciplines."

Innovation director at **ESI**, Mike Streetly, points to how the science underpinning environmental assessments has evolved: "Looking back at AMP3 (2000-2005), the work was very hydrometric, very prescriptive and water companies didn't ask many questions. Now it is much more outcome focused and a much deeper understanding of the natural environment is needed."

Queen Elizabeth Olympic Park ©APEM

For **Atkins'** Cox it is public awareness of environmental issues that have led to important changes. "There is a will from the people to improve the environment; not just from conservationists, but from walkers, anglers, outdoor pursuit hobbyists," he says. "We are seeing the public more engaged in environmental issues than ever before. If people are uninterested in environmental improvements they will be uninterested in measures that may put water bills up."

For the **Environment Agency's** price review manager, Richard Thompson, the concept of identifying an issue and dealing with it has stayed fairly consistent, it's more that the issues themselves have moved on. "When I first started you had a lot of poorly treated wastewater and big issues with acute pollutants like ammonia and dissolved oxygen. Now we are dealing with antimicrobials and micro-plastics," he says.

> "More recently there has been a shift away from end-of-pipe solutions towards wider, more holistic solutions."
> (Williams, APEM)

Thompson also points out the technology available for assessing water companies' impacts has also evolved allowing much more rigorous environmental standards: "We were working towards a phosphate standard of 2mg/litre when treating wastewater. That is now down to what we think is a technically achievable limit of 0.25 mg per litre. What was achievable 10-15 years ago - you can do a lot more now and expectations evolve."

Catchment management

The other game-changer for water companies over the last fifteen years has been catchment management. It is a concept that used to be associated with land management and farmers but it has now evolved to incorporate the integrated management of business, water clients, agriculture, regulators and residents. Very simplistically it involves tackling pollution and resource issues at the source of the problem, rather than treating the issue at end of pipe.

Environmental consultants are finding steadily more opportunities through this line of work and with 8,000 water bodies in England and Wales in around 100 catchments, it's easy to see why. The success of schemes such as **United Utilities'** Sustainable Catchment Management Programme (SCaMP1) and the Catchment Based Approach Partnership for Action has meant more water companies are looking at catchment solutions as an alternative to capital solutions.

AMP6 is playing host to the largest programme of catchment management schemes ever seen with 180 projects being delivered by water companies across England and Wales. These schemes – aimed at reducing diffuse pollution to protect catchments used for drinking

water resources – will provide a real barometer of how effective catchment solutions are.

The **Environment Agency's** Thompson thinks he has seen enough proof to endorse the approach: "I have seen initial results from water companies that show we can improve the environment using these solutions. What we don't know is if this will deliver the full environmental outcome you want over the long term? Does it delay or remove the need for capital investment?"

Cox also thinks the enthusiasm for catchment management is as strong as ever: "One of the reasons the water industry likes the catchment-based approach is because it's actually a really good way for them to show customers what they have done. It's not just about reducing loads of chemicals in one location, it is transforming the way land is managed, returning it to low-intensity farming, and opening up land for people to enjoy."

Queen Elizabeth Olympic Park ©Atkins

The next wave of innovation for catchment management will see environmental economics and natural capital – something so staunchly backed in Michael Gove's 25-year environment plan – built into cost-benefit models. This requires broader ways of costing environmental improvements that make more sense to economists - a brave new world, but one which may help the value-for-money for argument.

"We see a number of water company clients rising to the challenge – they are trying to work in a much more holistic way," says technical director at **Stantec**, Evan Dollar. "**Southern Water** has the integrated water cycle management programme which has been going for two years to try and join up the thinking – looking at catchments and natural assets in a more holistic way and the impact of that on natural capital – putting customers at the centre of what they do."

PR19 and the future

The final price review agreed upon by all water utilities and published by Ofwat will be crucial for the water industry supply chain and will set out how much money will be spent between 2020-25. But we have to wait until March 2019 when the draft determinations are published before getting an idea of how much money will be spent in AMP7, and even then the final determinations won't be available until the following December. However, it is likely to be in the order of the £44bn water companies spent in AMP6 on their wastewater and water obligations.

For environmental consultancies, as well as engineers and contractors supporting the sector, this is a critical – and potentially nerve-wracking – time. Some AMP6 contracts were tendered with options to extend into AMP7 (EA 02-Jun-17), while others are being awarded now. At the start of the year **WSP** was appointed to **Anglian Water's** specialist consultancy framework tasked with providing hydrology, climate change and water quality services over the next six years. **Stantec** meanwhile was appointed by **Yorkshire Water** to act as its strategic planning partner in a £50m role (EA 31-Jan-18).

For environmental consultancies a key portion of the work they do for water companies relies on the water industry's National Environment Programme (WINEP). The WINEP sets out the initiatives the Environment Agency and Natural England want each water company to pursue in the AMP cycles, to move towards meeting the extended Water Framework Directive 2027 target of achieving good status of all water bodies.

> "You have to run to stand still to keep up with population growth, population movement and climate change" (Thompson, Env. Agency)

The Environment Agency has estimated the WINEP for AMP7 will be around £4.9bn, making it bigger than the AMP6 WINEP, but smaller than earlier cycles (AMP5: £5.5bn). While some stakeholders have had an early glimpse of how it will take shape – through the much broader Water Industry Strategic Environment Requirements sent to stakeholders recently – the WINEP won't officially be published until PR19 determinations are.

Around 40% of the AMP7 WINEP will be spent on meeting the requirements of the Water Framework

Directive, another 40% will be spent on meeting Urban Wastewater Treatment Directive and 10% will be spent on other drivers including initiatives to improve biodiversity. In total 6,000km of surface water bodies will be protected and improved with the potential for up to 9,000km.

Abberton Reservoir ©Stantec

Before we get to AMP7 though there is the end of AMP6 and the winding up of schemes in the current investment period to contend with. The water industry is known for its typical 'boom and bust' pattern of spending which Ofwat has doggedly tried to iron out with early involvement contracts. Fortunately for consultants and the supply chain the legislative drivers impacting their work are coming fairly early in this AMP7 round with options appraisals due in 2022. As such many water companies are looking to get the ball rolling early.

Priorities ahead

As far as environmental requirements are concerned the **Environment Agency's** Richard Thompson confirmed what his team is looking for from water companies for PR19.

First and foremost the Agency wants to see them to deliver excellent environmental performance. This means moving all water bodies towards the WFD 2027 goal of reaching good ecological status – which is quantified based on biological and physio-chemical testing and how much humans have modified the structure of a water body.

While this sounds simple enough, the number of rivers achieving GES declined by 1% in 2016. Indeed, ensuring there is no deterioration can be almost as difficult to achieve as further improvement. The primary culprit of a water body not achieving GES in 2016 was phosphorus – often originating from agricultural fertilisers.

"The no deterioration element is really important," says Thompson. "You have to run to stand still to keep up with population growth, population movement, climate change. If you are not investing in assets in a specific time then you can get deterioration and that would be the worst thing that can happen in terms of environmental management."

In February this year chair of the Environment Agency Emma Howard Boyd lamented the recent increase in "serious pollution incidents" flagged in the *State of the environment report* on water quality. As a result she called for an increasing emphasis on the management of chemicals and source pathways to minimise the need for end-of-pipe adaptations – a big green light for catchment management solutions.

Other priority areas for the EA will be the continued investment in improving bathing waters and other protected areas – where the Agency has invested heavily in the past as public buy-in remains strong. Stemming the spread of invasive non-native species, which impact the environment and operational capabilities of water clients, is also a key priority area.

How water companies respond and adapt to a changing climate and the extreme weather events that follow is also of critical importance. In 2012 the UK suffered its worst drought since 1976, then followed by the wettest winter on record in 2013/14. With Met Office forecasts suggesting these unpredictable weather patterns will become more frequent, utilities will be placed under further strain to manage water resources.

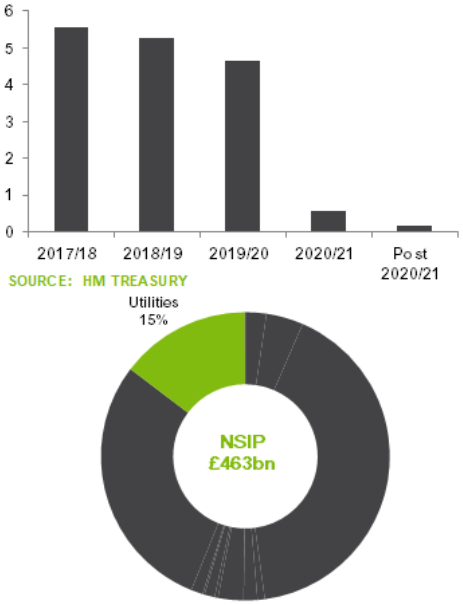
Water quality monitoring ©Environment Agency

"As water companies increase their resilience to drought, it is important that this is not to the detriment of the environment," says Thompson. "Abstraction that is unsustainable can have an adverse impact on the health of our rivers and the EA will work with water

companies to ensure that abstraction is sustainable for the long term."

The EA's perspectives will feed into PR19 priorities as well as calculations of where investment is needed in national infrastructure projects. Currently the water infrastructure pipeline component of the Treasury's total pipeline of infrastructure and construction projects is looking a little thin (Figure 3). But as soon as PR19 is published these figures will shoot up for the next five years.

Figure 3 (top) UK water national infrastructure pipeline (£bns); (bottom) Utility spend as a proportion of the national infrastructure pipeline



In a recent presentation given during a Westminster Energy, Environment and Transport Forum the **National Infrastructure Commission's** policy and engagement director Adam Cooper gave a little glimpse into the content of the upcoming National Infrastructure Assessment due for publication in July this year. He singled out water supply as a serious issue for the future with the Agency forecasting an extra 10m people living in the UK by 2050. As such he believes the UK needs an additional 4,000m litres per day alongside increased methods of transporting water, as well as a focus on demand efficiency.

For **ESI's** water group director Paul Daily the resilience of future resources and 'no deterioration' requirements are highly interrelated. "Water companies are having to contend with the inclusion of the no deterioration element of the Water Framework Directive in their WINEPs, and the associated implications for the resilience of water resource supply zones during extreme events or unplanned outages. As a consequence they have to think of more innovative means of bridging supply-demand gaps and approaching resilience," he suggests.

Brexit

With key regulations governing environmental protection in the water industry (the BWD, UWWTD, WFD) all stemming from Brussels, Brexit has the potential to be very disruptive to the sector. And this is just one of many reasons Defra was forced to recruit over 1,100 additional staff over three months last winter (EA 26-Apr-18). To assess the impact of the Brexit on the water industry the **Environment Agency** has established a programme to identify and assess the threats and opportunities.

With many of the water regulations embedded in UK law there is some level of certainty up till 2024, and after that it is PR24 and AMP8 which could provide the real opportunity to diverge from Brussels. The EA's Brexit team is looking into if it has a sound framework to set those objectives while a consultation is currently underway into the creation of an environmental watchdog - which would be able to hold the government to account for any infractions (EA 17-May-18). But it is also looking for ways to remove barriers to innovation and promote flexibility – by the next review of the RBMP.

One water industry player is leading the way in exporting its water consulting skills abroad in the midst of Brexit. At the end of last year **HR Wallingford** reported its first year of revenue growth in four years thanks to the strong performance of its international busines, while Brexit it said had created uncertainty in the markets it operates in the UK (EA 23-Nov-17).

Environment Analys's forecast model projects the water quality and resource management EC service area to grow by 15.6% between 2017-2021, giving it a five-year compound annual growth rate of a stable if unexciting 3% (Figure 1). With the regulatory drivers fairly secure up until at least 2024, any Brexit induced market fluctuations around 2019-21 may be felt more acutely in other EC service/industry sectors and as such water is forecast to be one of the stronger areas for next year. When considering the £4.9bn to be spent in the WINEP for AMP7, and how the industry is moving gradually away from end of pipe solutions towards consultancy-heavy catchment management programmes, growth could certainly be higher than the cautious 3% estimate in reality.