

July 2016

Trust in water

# **Enabling, incentivising and encouraging climate adaptation in the water sector: Ofwat's updated climate adaptation report**

[www.ofwat.gov.uk](http://www.ofwat.gov.uk)

**O f w a t**

Submitted to Defra July 2016

## About this document

This document updates our first climate adaptation report submitted to Defra in 2011. It follows a request from Defra for voluntary updates and covers how our understanding has evolved, what progress we have made in implementing actions we committed to previously and what we will be doing in the future.

Adaptation means making changes that help us cope with the effects of climate change. It can be used to describe institutional as well as physical adjustments. It is different from mitigation, which means action to reduce greenhouse gas emissions.

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## 1. Introduction

We are the economic regulator of the water sector in England and Wales. Our duties are laid out in statute, primarily in the [Water Industry Act 1991](#) (as amended). The companies we regulate are responsible for delivering water and sewerage services to customers.

In 2011 our first adaptation [report](#) made the case that climate change presents serious challenges to those services. These include more frequent drought reducing water availability, higher temperatures driving up demand and increasingly violent storms that could overwhelm the capacity of drainage systems causing flooding and discharges of untreated sewage to the environment.

Since we published that report we have experienced the 2011-12 drought across the south east, an event that broke with extreme rainfall and widespread flooding of homes and infrastructure. While we should be cautious about attributing weather events to climate change this experience does illustrate the kind of challenges that climate science tells us will be increasingly commonplace in the future.

It is against that background that we see economic regulation as playing a vital role in ensuring that water companies understand the risks climate change poses to the services that customers and wider society value and in incentivising innovative, sustainable and flexible responses that build resilience over the long term.

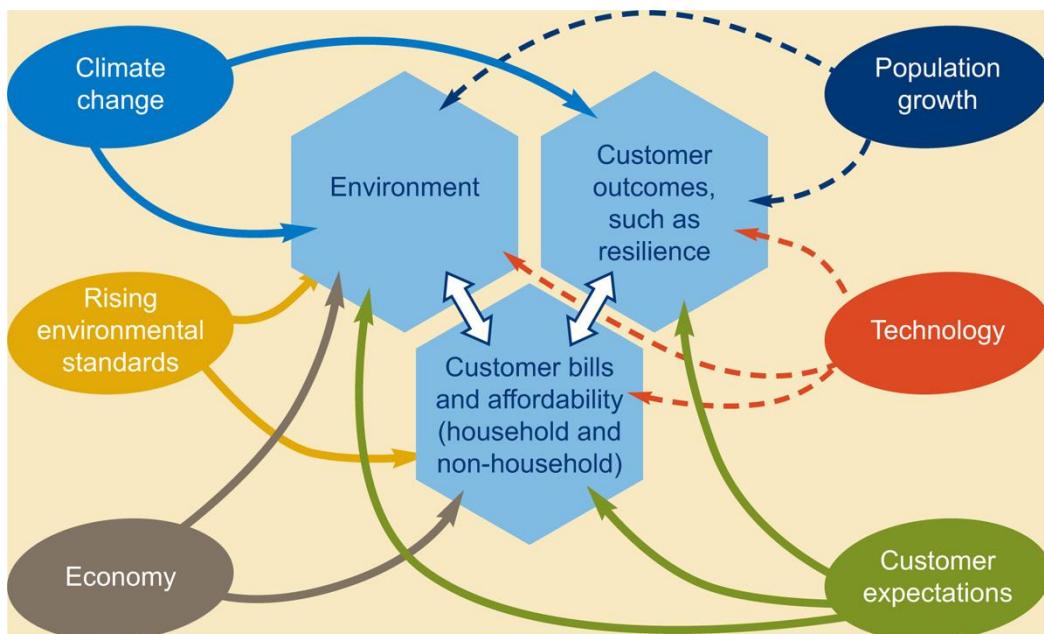
### 1.1 Our regulatory model

Our original model of regulation served customers well for more than 25 years. Since privatisation the industry has invested over £120 billion, dramatically improving the quality and resilience of services that customers, industry and the environment rely upon. These include:

- a 40% reduction in leakage since its peak in 1994-95,
- a 99% reduction in the number of customers experiencing low-pressure,
- a significant improvement in the quality of public supplies of drinking water with just 0.04% of samples failing numerical standards in both [England](#) and [Wales](#) in 2015,
- a more than 50% reduction in phosphate and ammonia emissions since 1995.

But we recognise climate change as one of a number of pressures that interact to increase uncertainty and challenge our ability to use past performance to predict the future (Figure 1).

**Figure 1 – Pressures on the water sector**



Our strategy, [Trust in water](#) is a direct response to those challenges, building on a shared [vision](#) for the sector of trust and confidence in the provision of water and wastewater services, now and in the long term. The strategy marks a shift in the regulatory model adopted by Ofwat which sees us moving away from prescriptive, ‘one-size-fits-all’ approaches which focused attention on obligations and outputs determined by regulators.

Instead, we will use approaches that are based on frameworks that align interests of companies and investors with customers ('pro-market') – with proportionate and targeted action by us, supported by robust intelligence and assurance and a greater focus by companies on their customers (Figure 2).

**Figure 2 – Ofwat’s regulatory model**

Prescriptive	→	Framework-based	Variable assurance
Interventionist	→	Targeted	A risk-based approach informed by market intelligence
One-size-fits-all	→	Proportionate	Two-way, proactive stakeholder engagement
Regulator-focused	→	Customer-focused	Strong working relationships with stakeholders
Administrative	→	Pro-market	Transparency

In essence this means results which will be driven by company engagement with customers but giving more freedom about how they are achieved. Where this happens, we can step back and allow the companies greater freedom to innovate and earn rewards where they deliver what customers want. Where the sector or others do not step up, we will step in to protect customers.

Our regulatory model places the emphasis on companies understanding how climate change might impact on the services customers and wider society value, as well as their wider obligations. And it places the emphasis on us:

- creating a framework that enables, incentivises and encourages the sector to safeguard the services customers and society value by adapting to climate change in innovative, efficient and sustainable ways;
- making sure that this framework sends the right signals for service providers to plan and invest for adaptation over the long term;
- targeting our intervention using the best information available and working with others to improve our own understanding about climate risks and opportunities; and
- acting as a safety net by measuring outcomes in the sector and the companies' performance to inform our regulatory action.

## 1.2 Our resilience duty

Our legal framework has also evolved since 2011 with the [Water Act 2014](#) introducing a resilience duty under [section 2 of the Water Industry Act 1991](#).

In relation to resilience, we must exercise and perform the specified powers and duties in a manner that we consider is best calculated to further the resilience objective (see Box 1). This means our resilience objective does not sit outside our other work but like all our statutory duties, it informs and directs the way we deliver our strategy.

Climate change is fundamental to our understanding of the resilience objective both as one of the key environmental pressures facing the sector and as a driver for change in consumer behaviour that could exacerbate its impact e.g. by driving up demand during heatwaves. Climate change will also impact other systems and services that the sector relies on including the ecosystems that provide raw water and assimilate effluent, energy supply and transport infrastructure as well as the financial sector.

### **Box 1 The resilience objective**

- a) to secure the long-term resilience of water undertakers' supply systems and sewerage undertakers' sewerage systems as regards environmental pressures, population growth and changes in consumer behaviour, and
- b) to secure that undertakers take steps for the purpose of enabling them to meet, in the long term, the need for the supply of water and the provision of sewerage services to consumers,

including by promoting—

- i). appropriate long-term planning and investment by relevant undertakers, and
- ii). the taking by them of a range of measures to manage water resources in sustainable ways, and to increase efficiency in the use of water and reduce demand for water so as to reduce pressure on water resources.

Resilience is not a new concept and we recognise the sector has made significant progress on resilience since privatisation. But this change to our general duties challenges us to look beyond the assets and infrastructure that have often been the focus of past investment and instead consider the resilience of systems and services that companies provide. So we consulted on our approach to resilience and established an independent resilience Task and Finish group to challenge both Ofwat and the wider sector on:

- what resilience means in relation to water and wastewater services,
- what water and wastewater service providers need to consider in deciding how best to provide resilient services and
- what this means for Ofwat's approach to regulation.

[Towards Resilience](#) sets out our response to the consultation and the [Task and Finish group's](#) recommendations (see Annex 1). It sets out how our duty will inform our work and highlights that resilience thinking – for example, in the Cabinet Office guidance, '[Keeping the country running](#)' – has a broad application in helping us understand risks to the systems and services that customers rely on and the appropriate responses. As such it is directly relevant to our work on adaptation.

## 2. Understanding climate risk and uncertainty

### 2.1 Our approach to dealing with climate risk

Our 2011 adaptation report identified three broad categories of climate change impact that could adversely impact our functioning. This analysis remains valid as does the observation that of those risks the indirect impact on the companies we regulate remains by far the most significant risk to our ability to safeguard the services customers rely on (see **Table 1**).

**Table 1 – Climate risks that could impact Ofwat functioning**

Impact	Description	Change since 2011
Directly by hampering our day-to-day functions	Disruption to office facilities, transport etc. that could prevent systems or staff operating effectively.	<p>Our original assessment concluded that the direct risks were very low and this remains the case.</p> <p>Since 2011 we have:</p> <ul style="list-style-type: none"> <li>• refreshed our business continuity plan;</li> <li>• tested our disaster recovery plan;</li> <li>• undertaken a business impact assessment to understand critical business needs for continuity; and</li> <li>• introduced an IT strategy to support delivery.</li> </ul>
Indirectly, by affecting the views and decisions of stakeholders in a way that influences our work	These pressures are real but largely intangible and can be driven by system shocks such as the drought and flood events or long-term trends e.g. land use change and strategic planning policy.	<p>Our strategy, 'Trust in water' places an emphasis on forging strong working relationships, with stakeholders. This should help us anticipate, inform, and respond positively to wider policy debates.</p> <p>See Section 4 on interdependencies for further information.</p>
Indirectly, by affecting the ability of the sector we regulate to deliver sustainable water and sewerage services over the long term.	We can only fulfil our functions and deliver our strategy if the companies we regulate adapt to climate change.	This remains the most significant risk to the ability of companies to maintain services that customers and wider society rely on. As such it is the main focus of our ongoing policy development.

The company-specific nature of risk is borne out by our comparative analysis of the companies' [updated adaptation reports](#). The results are indicative rather than quantitative because we have had to categorise outputs from companies which have adopted differing approaches to assessing and classifying climate risk.

With that caveat in mind, **Figure 3** shows that company risk assessments cluster around the high to medium risk Ofwat identified in 2011. But there is significant variability and outliers – not least the risk to raw water quality which Ofwat identified as a low risk in 2011.

**Figure 4** reinforces the value of a company-led approach – with 27 categories of risk that did not feature in Ofwat’s 2011 risk assessment.

## 2.2 Our approach to uncertainty

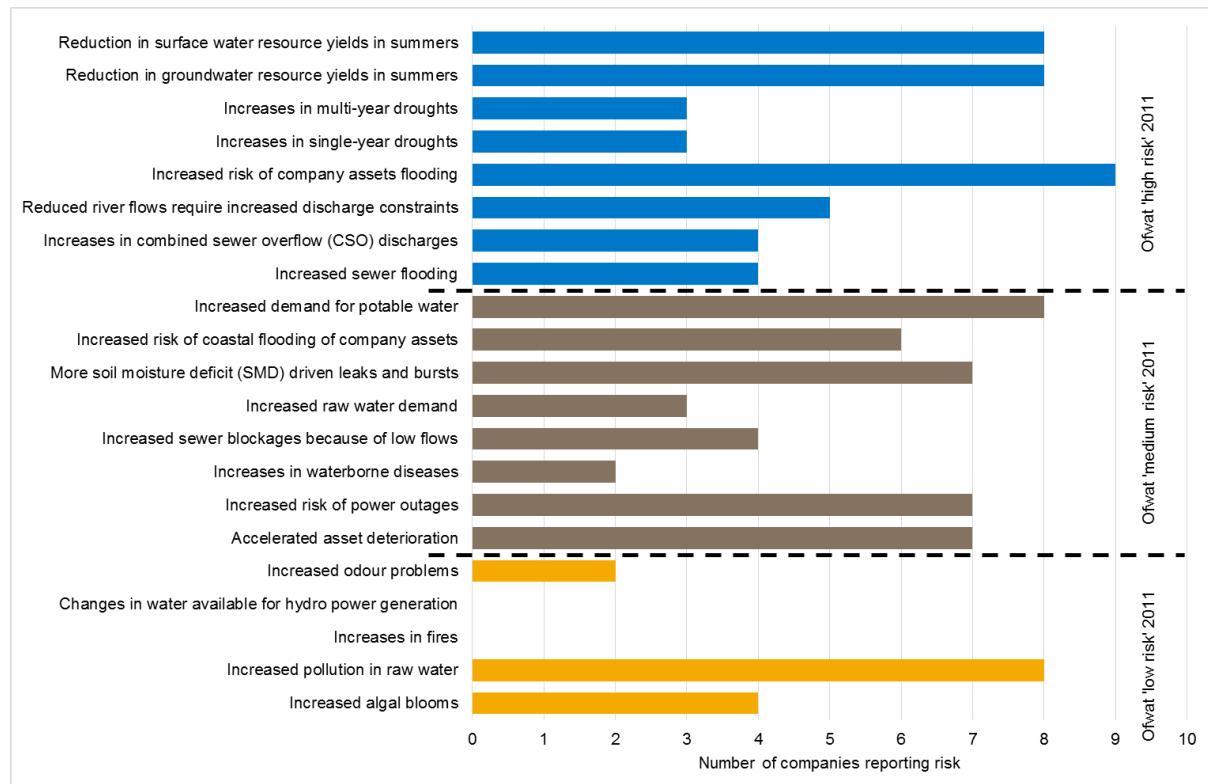
Our 2011 adaptation report identified uncertainty as a key barrier to progress. We highlighted that it could result in wasted resources, ineffective solutions or paralysis in decision-making. We also stated that uncertainty can make it difficult to produce robust, long-term business cases for adaptation. In that sense climate uncertainty is another aspect of risk that, on the one hand, could mean companies fail to deliver the services that customers and wider society rely on or, on the other, mean customers pay for infrastructure that is under-utilised, ineffective or environmentally damaging.

The uncertainty over future climate change means companies need to look beyond the structure and functioning of physical assets to consider innovative, adaptive approaches to maintaining the systems and services customers rely on. [Towards Resilience](#) highlights the opportunity this approach offers for innovation in:

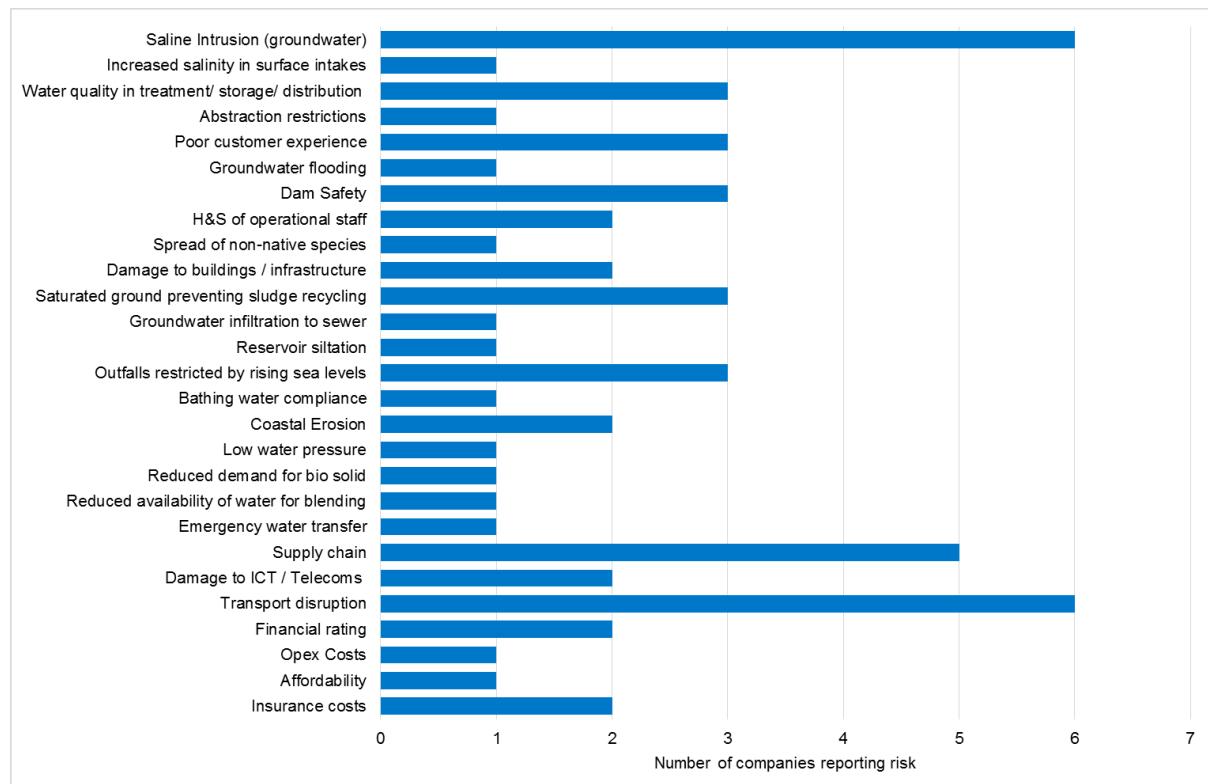
- engagement with customers;
- solutions to long-term challenges; and
- alternatives to traditional engineering solutions.

The challenge to us as the economic regulator, is to ensure the framework we create enables, encourages and incentivises companies to respond accordingly. Section 3 outlines the steps we have already taken and our ongoing policy development to encourage innovation and adaptation by companies and others.

**Figure 3 – Risks reported by water companies against Ofwat 2011 categories**



**Figure 4 – Risks reported by water companies not included in Ofwat 2011 report**



### 3. Our commitments: Implemented and new

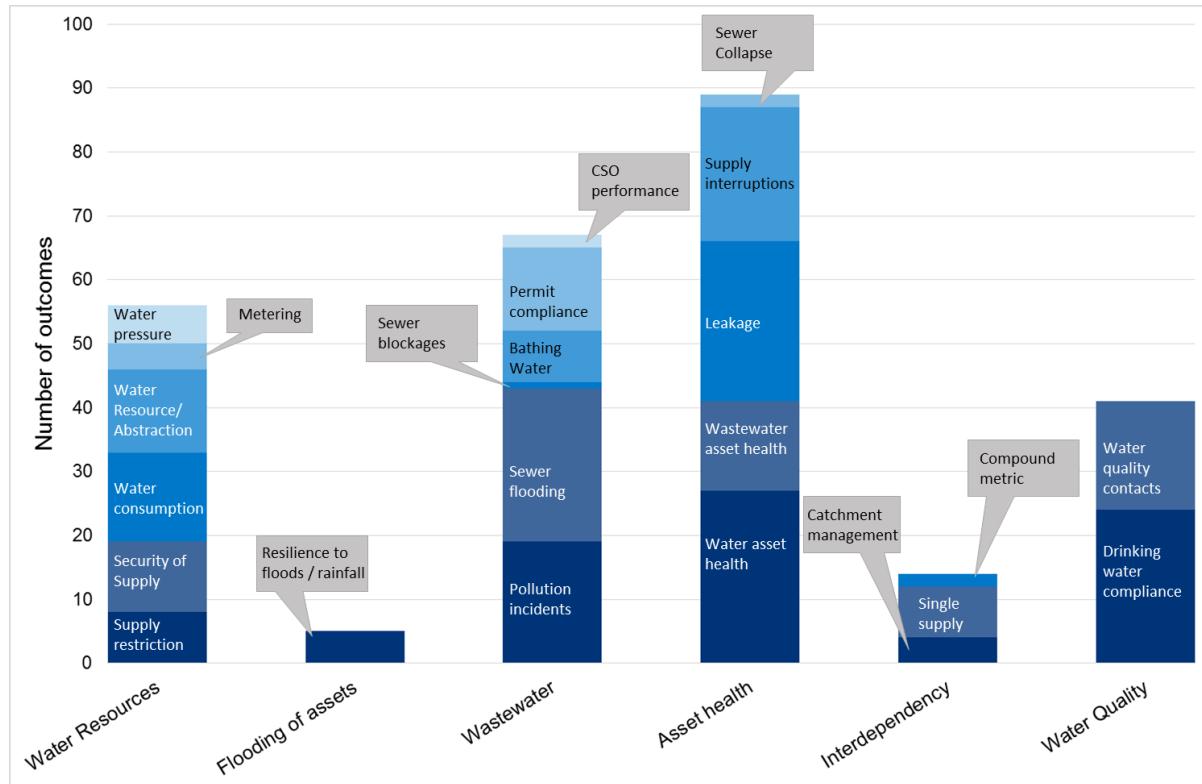
Our 2011 report set out a range of commitments to address the strategic climate risks we identified. **Table 2** and **Table 3** summarise the steps we have taken to fulfil those commitments and show a broad range of action across all fronts.

As outlined in Section 1.1, our strategy [Trust in water](#) marks a significant shift in our approach to regulation. The initiatives introduced in PR14 lay a solid foundation for that change. They include:

- focusing on companies undertaking meaningful customer engagement to understand their priorities with Customer Challenge Groups (normally individuals from a range of local interested parties) providing independent challenge to companies and assurance to us on the quality of a company's customer engagement and the degree to which this is reflected in its business plan.
- an outcomes framework that provides meaningful financial and reputational delivery incentives against performance commitments linked to customer priorities and their willingness to pay;
- introducing a total expenditure (totex) allowance rather than continuing to split costs into capital expenditure (long-term investment) and operational expenditure (day-to-day running costs);
- a Risk Based Review that scores business plans against key criteria and rewards those who submit high quality plans.
- a water trading incentive that encourages companies to look beyond their borders for cost-effective and resilient water supplies.

These reforms provide powerful incentives for companies to focus on customer priorities, including those relevant to climate risk (Figure 5). They are also flexible enough to capture the value customers place on less tangible outcomes such as protecting and enhancing environmental quality and allow companies to look across all options, beyond traditional capex solutions, to deliver against those priorities.

**Figure 5 - PR14 Outcomes categorised by climate risks identified in Ofwat's 2011 adaptation report**



The outcomes incentive framework and shift to totex also challenges companies to look for innovative ways of providing services that customers value. This could involve:

- buying services and resources from third party providers,
- looking for solutions outside the company's boundaries, and
- engaging customers and land managers to address risks through behaviour change rather than constructing new infrastructure.

This has resulted in companies engaging with customers and local interested parties on how long-term challenges are met, the wider benefits that can be delivered and a greater emphasis on partnership working.

These reforms have already paid real dividends in the level of ambition seen in PR14 business plans (**Figure 6**) and these features will endure in the next price review (PR19). But we recognise more could and should be done to encourage and incentivise innovation, efficiency, resilience, sustainability and long-term planning in the sector while retaining the focus on outcomes that customers and wider society value.

**Table 2 - Action against commitments made in Ofwat's 2011 climate adaptation report (1 of 2)**

Climate Risk	Commitments	Action taken
Water Resources	Establish our approach for the next price review	PR14 innovations: totex, outcomes, water trading incentive. Leakage outcome delivery incentive required for all companies in PR14. Abstraction Incentive Mechanism designed to encourage water companies to reduce the environmental impact of abstraction when water is scarce.
	Future water charging	Charging scheme rules - enable and encourage companies to promote efficient use of scarce water resources
	Valuing water	Valuing Water - a paper setting out how upstream markets could deliver for consumers and the environment. Policy development for Water Act 2014 implementation Retail market opening for business customers Bilateral markets
	Wholesale market development	The case for change: reforming water abstraction management in England – a joint publication with EA setting out pressures facing the water environment. WRMP joint letter setting out expectations including consideration of climate change and the need for innovation in supply and demand side options
Flooding of assets	Service resilience guidance	Resilience - outcomes focused regulation – setting out principles of resilience planning Independent resilience Task and Finish group - established to challenge the sector and inform our work. Towards Resilience - our response to the consultation 'Reliable services for customers' and the recommendations of the independent Task and Finish group on resilience

**Table 3 - Action against commitments made in Ofwat's 2011 climate adaptation report (2 of 2)**

	<b>Climate Risk</b>	<b>Commitments</b>	<b>Action taken</b>
<b>Wastewater</b>	Increased sewer flooding Increased sewer blockages because of low flows Increases in combined sewer overflows Reduced river flows require increased discharge constraints	Establish our approach to next price review	PR14 innovations: - totex and outcomes (all companies have adopted internal sewer flooding outcomes) Service Incentive Mechanism (SIM) required for all companies in PR14. Enhanced monitoring at 5000+ combined sewer overflows (CSOs) to inform future company action on intermittent discharges.
		Sustainable drainage project	Review of sewerage planning and drainage area plans Drainage strategy framework – commissioned by EA and Ofwat underlines the need to account for pressure and uncertainty of climate change.
<b>Asset health</b>	More soil moisture deficit (SMD) driven leaks and bursts Accelerated asset deterioration	Look at how the capital maintenance common framework operates with climate change risks	Superseeded by PR14 innovations: - Totex, outcomes, leakage ODI Capital maintenance framework maintained by UKWIR as industry planning tool
<b>Interdependency</b>	Increased risk of power outages	Service resilience guidance	Resilience - outcomes focused regulation – setting out principles of resilience planning including how to consider interdependency Independent resilience Task and Finish group - established to challenge the sector and inform our work. Towards Resilience - our response to the consultation 'Reliable services for customers' and the recommendations of the independent Task and Finish group on resilience PR14 resilience and service level outcomes
<b>Water Quality</b>	Increases in waterborne disease	none	Drinking water investment programme in PR14 WQ outcomes in PR14

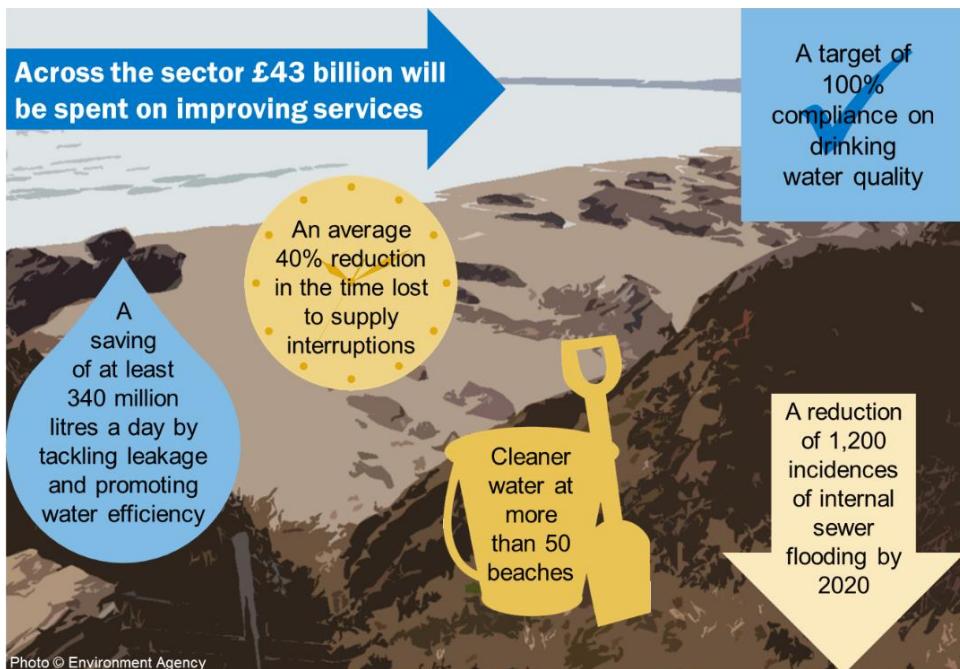
In particular we consider there are significant opportunities to drive these behaviours through the reform and expansion of markets. For example, markets can:

- be faster and more flexible than regulation in responding to changing demands and pressures;
- reveal information about system capacity and cost, allowing for better planning to meet long-term trends and short-term shocks;
- create diversity in the supply of services, reducing the risk of single points of failure and offering choice when shocks strike; and
- deliver outcomes efficiently, reducing costs to customers and/or freeing up resources for investment elsewhere in the system.

But markets can also bring risks. These may be specific to the service/market, or more general – for example, when competition strips out redundant capacity that could otherwise buffer shocks from extreme weather; or service providers fail in a competitive market, leaving water companies or customers without vital services. As a result, regulation will continue to play an important role in driving the right behaviours for climate adaptation, and ensuring that markets function effectively.

**Table 4** and **Table 5** summarise commitments to regulatory and market reforms we are pursuing that will play a positive role climate adaptation for water resource and wastewater services respectively. We are also continuing to refine our approach to the assessment of resilience. We will be engaging stakeholders on this question and the appropriate mix of common and bespoke outcomes (including asset health and leakage), the role of customer engagement and Customer Challenge Groups later this year.

**Figure 6 - PR14 Business plan commitments**



**Table 4 - Commitments that will enable adaptation in Water Resource service provision**

Long-term	Regulatory Approaches	Market Approaches
Innovative and Efficient	<p>We will introduce a separate price control for water resources to reveal better comparative information on company costs and allow a more targeted efficiency challenge.</p> <p>We will evaluate WRMPs and exceptional expenditure included in business plans to check that the broadest range of possible solutions have been considered to balance supply and demand including leakage, water efficiency and third party provision.</p> <p>We will consult on whether larger incentives should apply to outcome performance commitments to encourage greater service improvements.</p>	<p>We will introduce a water resource information platform to facilitate third parties bidding in water efficiency services and/or offering leakage control / water resources at lower cost than incumbents.</p> <p>We will develop a new access-pricing framework to facilitate a bilateral market in England (subject to commencement by SoS) - an approach that is expected to drive innovation in service provision.</p> <p>We will introduce a retail market for business customers in April 2017, an approach that has resulted in significant financial and efficiency savings for customers in Scotland.</p> <p>We will encourage direct procurement for customers to ensure efficient delivery of large infrastructure projects – including those required for adaptation.</p>
Resilient	<p>We will consult on proposals for</p> <ul style="list-style-type: none"> <li>• leakage and asset health outcomes</li> <li>• company resilience assessment and bespoke outcomes</li> </ul> <p>We will require companies to engage with their customers on resilience issues.</p>	<p>We will require companies to produce a Bid Assessment Framework to ensure</p> <ul style="list-style-type: none"> <li>• in-house solutions are not favoured at the expense of third party proposals that offer more efficient, resilient or sustainable services.</li> <li>• bids are assessed against existing legal obligations and policy objectives to maintain safeguards.</li> </ul> <p>We will maintain current environmental protection in the water trading incentive.</p>
Sustainable	<p>We will consider how best to accommodate the misalignment of business plan and River Basin Management Planning processes.</p>	

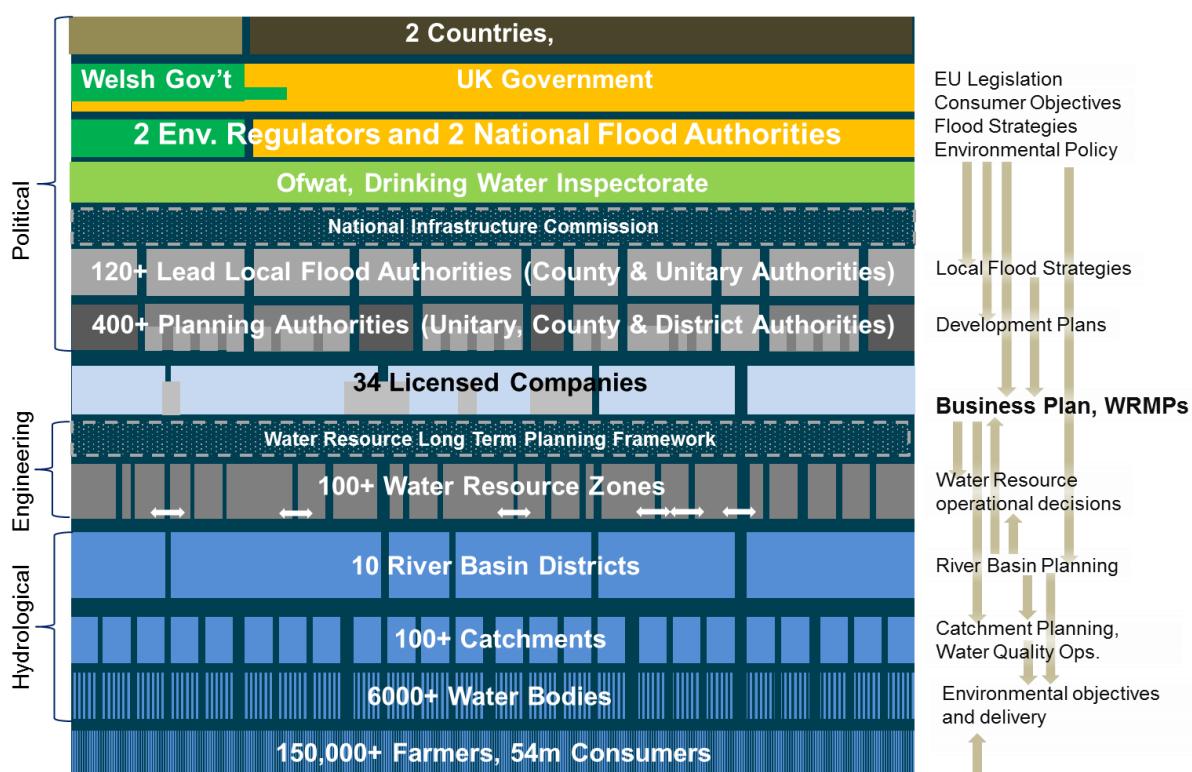
**Table 5 - Commitments that will enable adaptation in Wastewater service provision**

Long-term	Regulatory Approaches	Market Approaches
Innovative and Efficient	<p>We will introduce a separate price control for wastewater to reveal better comparative information on company costs and allow a more targeted efficiency challenge.</p> <p>We will consult on whether larger incentives should apply to outcome performance commitments to encourage greater service improvements.</p>	<p>We will introduce a bioresources (sludge) information platform to facilitate third parties bidding to provide processing, recycling and disposal services.</p> <p>We will encourage direct procurement for customers to ensure efficient delivery of large infrastructure projects – including those required for adaptation.</p>
Resilient	<p>We will consult on proposals for</p> <ul style="list-style-type: none"> <li>• asset health outcomes</li> <li>• company resilience assessment and bespoke outcomes</li> </ul> <p>We will require companies to engage with their customers on resilience issues.</p>	<p>Our market approach for bioresources services will introduce increasing resilience to disruption through there being more service providers in the market.</p>
Sustainable	<p>We will consider how best to accommodate the misalignment of business plan and River Basin Management Planning processes.</p>	<p>We expect our market approach to bioresources to increase renewable energy generation, decrease the carbon footprint of bioresources services and increase the use of biosolids displacing fertilisers in agriculture.</p>

## 4. Interdependencies and barriers

The water sector is vital to our quality of life, our economy and the natural environment. By its nature, it is an interconnected system whose operations depend on services that have their own climate vulnerabilities. The demands placed upon the sector, and the options available for adaptation, are also shaped by policy decisions that sit outside the control of Ofwat or the companies (**Figure 7**).

**Figure 7 - Illustration of water sector planning and regulatory processes and interactions**



### 4.1 Operational interdependencies

The day-to-day operations of water companies depend on a range of services including electricity networks that provide power to pumps and treatment works, a supply chain that provides chemicals required for treatment, and transport infrastructure that moves staff, supplies and waste where they are needed.

As outlined in Sections 1 and 3, our approach to PR14 and the evolution of our regulatory model place the responsibility on companies to take the lead on understanding risk and, where they have support from customers, adopt outcomes that incentivise efficient action. Figure 3 and Figure 4 demonstrate that companies have identified a range of interdependency risks in their updated climate adaptation

reports. The outcomes adopted in PR14 (Figure 5) include performance commitments that will incentivise companies to address risks from interdependencies. They also include commitments to more direct mitigation of interdependency risk, namely reducing the number of customers reliant on a single supply and catchment management.

As outlined in Section 3, we are continuing to refine our approach to the assessment of resilience and the outcomes that could underpin our understanding of the sector's progress. While the detail is not settled, the focus on assessing the resilience of systems and services that customers and wider society value will bring a greater understanding of climate related interdependencies including transport, electricity and supply chain disruption as well as external risks such as flooding.

#### **Box 2 - Accommodating River Basin Management Planning in PR14**

River Basin Management plans establish statutory objectives for water bodies and sources of raw drinking water and set out the measures required to meet them. The protection and enhancements they offer play an important role in building the resilience of ecosystems and water supplies. River Basin Management Plans transpose the requirements of the Water Framework Directive and as such are a significant driver for company investment.

We recognised the timing of the publication of River Basin Management Plans did not align with water company business planning early in the development of PR14. So we encouraged companies to engage with the Environment Agency to make sure that investment proposals were based on the best available information. We also worked closely with the companies and the Environment Agency when considering claims for expenditure that went beyond the modelled totex allowance.

This relationship-based approach was successful at PR14 helping ensure that the scale of Water Framework Directive-driven investment set out in company business plans matched the ambition confirmed by the second cycle River Basin Management Plans.

## **4.2 Policy interdependencies**

Our [consultation](#) on future regulation and markets examined the complexity of the current policy framework that impacts on the demands placed on companies. We

concluded that coordinating the broad range of plans and strategies falls outside of Ofwat's remit and, ultimately, may not be feasible or desirable. Instead our preferred approach is to encourage companies to improve coordination through engagement, partnerships, collaboration and markets. This relationship-based approach builds on experience from PR14 (see Box 2) and offers opportunities to further the sector's adaptation and resilience needs by:

- developing a coherent conversation with customers, the wider public and other stakeholders about the provision of water and wastewater services across the suite of water and environmental planning processes such as water resource management plans (WRMPs), river basin management plans (RBMPs), drainage strategies and flood strategies;
- revealing information that signposts opportunities for market entrants or helps Ofwat shape incentives and penalties for persistent monopolies;
- protecting consumer interests by ensuring decisions made outside of Ofwat / company ownership do not undermine deliverability or affordability of water and wastewater services;
- identifying opportunities for cost-sharing and optimisation across a range of services provided for in a catchment; and
- improving the water sector's resilience by enabling water companies and others to take better-informed long-term decisions.

This is not entirely new. Water companies are already playing a role in coordinating action at a range of spatial scales including the 300+ existing catchment schemes; regional water resource planning (Water Resources South East, Water Resources East Anglia) and the national Long-Term Planning Framework for water resources.

Companies are also helping shape policy development, for example through the Water UK 'Marketplace for ideas' and the industry-led 21<sup>st</sup> Century Drainage project.

We welcome the leadership the sector has shown and anticipate the evolution of our regulatory approach and expansion of markets will challenge companies to innovate further. But we also recognise we can play a role in creating a more coordinated policy landscape through the decisions we make and the way we work with others (see **Table 6**).

**Table 6 - Ofwat's approach to coordinating actions relevant to climate change adaptation**

<b>We have</b>
<ul style="list-style-type: none"> <li>• taken steps to better align the PR19 process with the next round of Water Resource Management Plans in England and Wales.</li> <li>• worked closely with Defra, the Environment Agency, Natural Resources Wales and the Welsh Government to establish common expectations and technical guidance for their production.</li> </ul>
<b>We are</b>
<ul style="list-style-type: none"> <li>• working with the UK Regulators Network climate adaptation sub-group to share knowledge and best practice.</li> <li>• engaging in key industry-led initiatives that involve climate adaptation including the national Long-Term Planning Framework, Water Resources South East, Water Resources East Anglia and the 21st Century Drainage project.</li> <li>• working with stakeholders on Ofwat's approach to future regulation and opening of markets through a series of workshops and consultations.</li> <li>• engaging with the UKCIP18 User Group to develop our understanding of emerging climate science.</li> <li>• working with stakeholders to ensure our regulatory framework supports the Wellbeing goals and natural resource management framework in Wales, and Defra's resilience roadmap and environmental ambition in England.</li> </ul>
<b>We will</b>
<ul style="list-style-type: none"> <li>• work with the National Infrastructure Commission to ensure the evidence base for future water and wastewater need is robust.</li> <li>• work with the Environment Agency and Natural Resources Wales to mitigate the risk of uncertainty and delay that could arise from the misalignment of the PR19 timetable with the next round of River Basin Management Plans.</li> </ul>

## 5. Monitoring and evaluation

### 5.1 Embedding climate adaptation in our thinking

In Section 1 we explained how climate change is central to our understanding about the pressures facing the water sector. This has helped shape our strategy [Trust in water](#) and the way our resilience duty informs our work. Section 0 set out the risk climate change poses to our functioning and how we are driving water companies to plan to deliver the systems and services customers rely on over the long term.

### 5.2 Monitoring delivery

The outcomes approach introduced in PR14 plays a key role in this company-led approach and marks a significant departure from previous price reviews. Although we can see companies have identified a wide range of outcomes that are relevant to mitigating climate risk (Figure 5) it is too early in the period to report what progress has been made against them. We are, however keen to learn from the PR14 process.

As flagged in Section 3, we will be engaging stakeholders to inform our policies on customer engagement, Customer Challenge Groups, long-term performance commitments and common outcomes (including leakage and asset condition) in preparation for the next price review (PR19). But our understanding of the resilience of the sector to climate change is not restricted to data gathered by Ofwat. Other sources of information include:

- the Long-Term Planning Framework which provides a national assessment of water resource vulnerability to a range of pressures, including climate change.
- Water Resources South East and Water Resources East Anglia which consider water resource planning at a regional scale.
- Statutory Water Resource Management Plans which require companies to consider climate change projections in assessing supply-demand deficits over a period of at least 25 years.
- the Environment Agency's annual reports on coastal and flood risk management which include a high level assessment of water company action to address flooding and
- the Environment Agency's environment performance assessment which reports on consent compliance and pollution incidents which, over the long term, provides an indication of how well company assets are coping with changing climate.

## 5.3 Financial benefits

We have not evaluated the financial benefit of climate adaptation but the regulatory approach in PR14 posed a significant efficiency challenge to the sector while delivering wide-ranging commitments to improve standards of service and resilience. More specifically, companies were required to engage customers in developing the outcomes adopted in PR14 with incentives adopted supported by evidence of willingness to pay. The process was assured by independent Customer Challenge Groups and ensures that the incentives deliver what customers want while offering value for money and a reasonable return for investors.

Our proposals for further regulatory reform and the expansion of markets in water resources and bioresources will drive innovation and investment in the resilience of the water sector. It is impossible to allocate projected economic benefits to climate adaptation given that investment is driven by a range of interdependent pressures which play out differently across each company. But our package of proposals will improve efficiency of delivery while continuing to focus the companies' attention on customer priorities and willingness to pay for action – including climate change adaptation.

## 6. Opportunities and benefits

Climate change offers some potential benefits to the sector which some companies have reported in their climate adaptation reports. These include a reduction in freeze-thaw related pipe bursts and increased sewage treatment efficiency. In theory these benefits could reduce costs of maintaining services.

In reality it is impractical to estimate what, if any benefits have accrued to date given the relatively modest savings in relation to potential costs, the long timescale over which benefits might be felt and the difficulty in disentangling weather variability from the long-term climate signal.

However, any systematic reduction in operating costs due to climate change would be captured in the data we use to model the totex allowance we give companies. Any positive impact on services will also shift the baseline for setting financial or reputational outcome incentives for subsequent price reviews. As a result the cyclical nature of the price review should ensure that savings are passed on to customers and the efficiency challenge to companies is maintained.

## A1 Annex 1: Independent Task and Finish Group recommendations on resilience and our commitments to delivery

Reproduced from [Towards Resilience](#)

Recommendation	Our response
<b>Agree a shared definition for the sector</b>  <b>When:</b> During 2016 <b>Lead:</b> Water and Wastewater Resilience Action Group (see Recommendation 10) <b>Involved:</b> All bodies involved in planning and delivering water resilience	We think that a commonly-agreed definition will help us in furthering the resilience objective. To that end we think the one adopted by the Task and Finish Group - now slightly amended - is a helpful starting point, although the wording of the resilience our duty remains paramount for our work.
<b>Increase public engagement and education</b>  <b>When:</b> 2015 - 2020 <b>Lead:</b> Water companies and governments <b>Involved:</b> All sector and non sector partners, including stakeholders and third parties	Our strategy places customers at the heart of the sector. Meeting our resilience duty cannot be achieved without incentivising service providers to ensure customers take a central role in their decision making.  We see Customer Challenge Groups playing a key role in challenging companies to use approaches to customer engagement that allow them to engage effectively on resilience and take the results into account in their plans. We also expect the Customer Challenge Groups to provide assurance to us as to the quality of that engagement, in particular taking account of engagement with customers on the long term and on the resilience of its systems and processes, as well as its services.  Ultimately, we propose to link the quality of a service provider's customer engagement – including the degree to which companies have effectively engaged with their customers on longer-term issues – directly to our assessment of business plan quality in the Risk Based Review.
<b>Ensure clear routes for funding legitimate resilience investment</b>	The Task and Finish Group report recognises the positive impact our approach to PR14 has had on

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<p><b>When:</b> By 2017, in time to inform PR19</p> <p><b>Lead:</b> Ofwat and water companies</p> <p><b>Involved:</b> Water companies, investor community, customer bodies, wider water sector stakeholders</p>	<p>longer-term planning (and funding) for resilience, including through the introduction of a total expenditure ('totex') approach and a focus on outcomes. It also recognises the key role companies and customer groups have played in developing methods to test real customer acceptability of risks and costs, and to develop more partnership approaches.</p> <p>We will want to build on the PR14 approach at PR19 and make allowance for appropriate levels of resilience spending, including schemes that are clearly justified by cost benefit analysis (which should include the benefits of resilience). Resilience schemes and programmes will need to be linked to outcomes that deliver real benefits to customers. As with all other spending we will be seeking to make allowances for efficient costs – so that customers get the maximum level of resilience and other benefits for the level of allowed costs.</p> <p>The Task and Finish Group says we should provide companies with a clear framework and that it is important that companies retain ownership of their plans within this framework. It states a need for:</p> <ul style="list-style-type: none"><li>• clear guidance from us on our treatment of resilience when we consider business plans;</li><li>• flexibility to fund innovation against a wide assessment of costs and benefits, with future generational aspects factored into the assessment of business plans; and</li><li>• a clearer framework for developing, regulating, funding and evaluating soft infrastructure (such as community-led projects or sustainable urban drainage systems) and community-based resilience.</li></ul> <p>It also says we should specifically look at how and whether our framework could enable water companies or others to fund distributed assets and/or to manage assets at a community level.</p> <p>We commit to do this through the evaluation of our policy proposals as we outlined above, as well as through the frameworks we set for Customer Challenge Groups. This builds on the firm foundations of PR14, which gave more space for companies to develop sustainable, innovative approaches in discussion with their customers. As our approach evolves we commit to making sure our regulatory framework can take account of (and incentivise) further innovation, including greater use of partnership approaches that bring benefits to customers, the environment and wider society. We will make sure, to the extent we are able to within our</p>

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	<p>statutory framework, that our approach enables service providers to share costs as well as benefits with partners; try out new approaches that allow them to tailor their services against a spectrum of customer preferences; and provide a platform for other sectors such as farming and energy to play their part in solutions. We want to be clear that we see service providers' work to deliver resilience extending beyond what would traditionally have been considered 'investment', ie capital expenditure, and into all areas of their activity.</p> <p>As our approach evolves we commit to making sure our regulatory framework can take account of (and incentivise) further innovation, including greater use of partnership approaches that bring benefits to customers, the environment and wider society. We will make sure, to the extent we are able to within our statutory framework, that our approach enables service providers to share costs as well as benefits with partners; try out new approaches that allow them to tailor their services against a spectrum of customer preferences; and provide a platform for other sectors such as farming and energy to play their part in solutions.</p> <p>Our Water2020 consultation sets out proposals for encouraging service providers to focus on their customers over the longer term – see section 3.1.</p>
<p><b>Ensure coherent planning for resilience at both a regional and national level</b></p> <p><b>When:</b> By 2020</p> <p><b>Who:</b> Water companies, Environment Agency, Natural Resources Wales</p> <p><b>Involved:</b> Water sector bodies and NGOs</p>	<p>We have been working with Defra, the Welsh Government, the Environment Agency and Natural Resources Wales to develop a draft WRMP guideline, which is currently out for consultation. The published draft guidance was accompanied by a joint letter setting our expectation that companies should integrate the development of their WRMPs into their mainstream business planning. To support this, government and regulators have committed to working together to improve these planning processes and to streamline their alignment.</p> <p>We are involved with and supportive of the work led by Water UK on the long-term resource planning needs for England and Wales, for up to 50 years, and the practical steps required to meet them.</p>
<p><b>Establish wastewater, sewerage and drainage plans</b></p> <p><b>When:</b> 2020 - 2025, with a Drainage Road Map produced during 2015 - 2020</p> <p><b>When:</b> Governments, water companies, local authorities</p>	<p>Wastewater services are not subject to a statutory planning framework, but we support the recommendation that service providers should have long-term wastewater, sewerage and drainage strategies in place for PR19. We will consider how we should take these into account</p>

Recommendation	Our response
<b>Involved:</b> Regulators	alongside WRMPs in our Risk Based Review of company business plans.
<b>Improving the understanding of risk and failure</b> <b>When:</b> 2015 - 2020 <b>Lead:</b> Environment Agency, Natural Resources Wales, water companies	We agree that managing risk is at the heart of delivering resilience of systems and services. Understanding and management of risks will be something we look for in PR19 business plans and will form part of the Risk Based Review.
<b>Ensure services are resilient under different water sector structures</b> <b>When:</b> By 2017 <b>Lead:</b> Governments and Ofwat	This recommendation raises questions about our capacity to regulate a fragmented and evolving sector where not all the stakeholders are within the regulatory, licensed, framework. We recognise these are important questions and commit to building this into our thinking.
<b>Develop benchmarking, standards and metrics</b> <b>When:</b> By 2017 <b>Lead:</b> Ofwat, water companies and governments <b>Involved:</b> Water companies and wider water sector stakeholders	We agree that water companies should develop better measures of resilience as we look to PR19 and beyond and that we need to consider how we take these into account in our assessment of business plans, building on current approaches. We will consider the use of measures as part of our work on outcomes and customer engagement. Further details of our approach in this area can be found in sections 4.1 and 4.2.
<b>Ensure existing plans are stress tested</b> <b>When:</b> 2015 - 2020 <b>Lead:</b> Governments to set framework for work <b>Involved:</b> Water companies, regulators, governments, civil society	It is for companies to consider such a framework and build this into their approach to meeting their resilience obligations. But if we do not have confidence that companies are meeting these obligations, we will consider reflecting this in our requirements for annual performance reports and/or in the Risk Based Review process for PR19.
<b>Establish a water and wastewater resilience action group</b> <b>When:</b> During 2016 <b>Lead:</b> Water UK to initiate <b>Involved:</b> All water stakeholders	We look forward to working with all water stakeholders in this area.