

February 2022

Ofwat's 3rd Climate Change Adaptation Report

Ofwat

Executive summary

Every five years, under the Climate Change Act 2008, we produce a report on the impacts of, and our proposals for adaptation to, climate change, along with an assessment of any progress made. In particular, and in relation to us as an organisation, we provide details of the current and future risks presented by climate change, and the measures we have adopted to manage these risks.

As a sector, we must take action together now to find solutions to meeting the long-term environmental challenges. We are evolving and changing how we work, so that water companies are in the best possible position to respond to the challenges. This means strengthening our environmental expertise and joining forces with regulators, governments, companies and civil society to deliver our ambition for the environment. As a regulator, we are also clear on the risks that stem from climate change as they affect the delivery of our statutory functions and duties.

This document builds on Ofwat's first and second adaptation reports published in 2011 and 2016 respectively. It sets out how our understanding has evolved, progress we have made in implementing actions previously committed to, and what we will be doing going forwards.

Both our 2011 and 2016 adaptation reports identified three broad categories of climate change risk that could adversely affect our ability to carry out our functions. We continue to view these as relevant, with climate change potentially affecting our ability to carry out our functions in three broad ways, with the latter risk category being of greatest significance.

- I. **By hampering our ability to carry out our day-to-day functions:** both our previous adaptation reports concluded that the direct risks arising from climate change in relation to it affecting our ability to carry out our functions were very low. We have a range of policies and procedures in place to mitigate the disruption caused by outside events.
- II. **By affecting the views and decisions of stakeholders in a way that influences our work:** our current strategy, '[Time to act, together](#)', published in 2019, emphasises the importance of collaboration with a range of stakeholders, and commits us to exploring and implementing new ways to ensure insights from this engagement influences and informs our work.
- III. **By affecting the ability of the sector we regulate to deliver sustainable and resilient water and sewerage services over the long-term:** it is the companies we regulate that are primarily responsible for undertaking the actions that respond to climate change. We view the risks facing the sector we regulate as being of most significance, as they fundamentally affect our ability to safeguard the services customers rely on. We can only fulfil our functions effectively if the companies we regulate take action to adapt to climate change.

We have an important role to play in supporting the water sector to respond to the risks and opportunities of climate change, and are committed to acting in the long-term interests of society and the environment, and supporting the government in its ambition of leaving the environment in a better condition for future generations, as highlighted in our strategy. This report makes clear what we view the risks from climate change to the water sector to be, and how our assessment aligns with the work of Climate Change Committee. This report also makes clear the commitments and actions we have taken, and are taking, to allow the water sector to deliver sustainable and resilient water and sewerage services over the long term.

Our review of past commitments demonstrates we have delivered on almost all of the commitments detailed in our 2016 adaptation report. Despite this, we consider that both we and the sector should make more progress in areas such as abstraction, leakage reduction, sewer flooding, consumer behaviour, and company environmental performance; with more stretching targets to ensure the sector is delivering the actions needed to respond to the impacts of climate change and support wider environmental improvements.

The current and future climate change adaptation commitments and actions set out in this report mark a further evolution in our regulatory approach for the period 2020–25, driven by the development and implementation of our strategy, and our 2019 price review (PR19). In our strategy we make clear our goal of meeting the long-term challenges of climate change, with an explicit focus on ensuring long-term planning in relation to water supplies, operational resilience, and the environment.

Box 1: Our 2019 price review (PR19)

At PR19, which covers the period 2020–25, we allowed more expenditure on resilience than ever before, with £13 billion allocated to companies in this area. This included more than £1 billion to reduce the impact of flooding on communities and £469 million to address long-term drought challenges. Other key elements of the PR19 determinations that help to improve the resilience of water supplies included funding to cut leakage by 16%, reduce mains bursts by 12%, and funding to help customers cut water use by up to 13%. £200 million of funding was also allocated to support innovation in the sector, with climate mitigation and adaptation projects being encouraged via the associated innovation competitions. We also allowed £4.8 billion of expenditure for the Water Industry National Environment Programme (WINEP) in England and National Environment Programme (NEP) in Wales for environmental investment, to ensure water companies meet their environmental obligations.

We intend to further progress action on climate change in our next price review, PR24, as set out in our [PR24 and beyond: Creating tomorrow, together](#) consultation. This proposes four key goals: increasing focus on the long term; delivering greater environmental and social value;

reflecting a clearer understanding of customers and communities; and driving improvements through efficiency and innovation.

Our current and future commitments to climate change adaptation will enable and build adaptation and resilience in the water sector. We are working in partnership across the sector to address issues of real concern for customers, from the restoration of chalk streams and chalk stream habitats, to eliminating the harm from storm overflow discharges into rivers and reducing leakage. We will also continue to hold companies to account by setting ambitious targets, reporting on progress, imposing incentives and, where necessary, by taking enforcement action.

This report additionally outlines a series of next steps we intend to take in the next two years to allow us to continue to be in the best position to support climate change adaptation.

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1. Introduction

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

This document has been produced in line with the third round of the adaptation reporting power under the Climate Change Act 2008, which invites organisations with functions of a public nature or statutory undertakers (which includes Ofwat, along with water and wastewater companies¹) to report against the current and future projected impacts of climate change, and their adaptation proposals. The government, in particular Defra, intends to use the information from organisational adaptation reports to feed into the UK's [2022 Climate Change Risk Assessment](#), which it is obliged to produce every five years.

This report builds on Ofwat's second climate adaptation report, which was published in [July 2016](#). It sets out how our understanding has evolved, progress we have made in implementing actions previously committed to, and what we will be doing going forwards.

As the companies we regulate are primarily responsible for responding to the risks of climate change, we view the risks facing the sector as being the most significant group of climate change risks facing us as an organisation (see Section 2). If realised, such risks would affect the ability of the sector we regulate to operate effectively in the interests of customers and would impact our ability to effectively carry out our statutory functions in the manner we consider is best calculated to meet our statutory duties², and in accordance with the strategic policy statements issues by the UK and Welsh Governments³.

Climate change and emerging threats and opportunities since our last report

Climate change threatens resilience, both of our networks and our water supply. Since the publication of our last adaptation report, the UK Meteorological Office has updated its climate

¹ Only those water companies serving over 50,000 billed premises have been invited to report. Water companies invited to report can be found [here](#). Water companies in Wales have not been directed to report. The direction to report is the responsibility of the Welsh Government, with the reporting taking place under the 'National Adaptation Programme' being primarily for England as well as covering UK reserved matters.

² The general statutory duties for most of our work as an economic regulator are set out in section 2 of the Water Industry Act 1991. These require us (in summary) to carry out our relevant functions in the manner we consider is best calculated to: further the consumer objective to protect the interests of consumers, wherever appropriate by promoting effective competition; secure that water companies properly carry out their functions; secure that the companies are able (in particular, by securing reasonable returns on their capital) to finance the proper carrying out of those functions; and further the resilience objective to secure the long-term resilience of companies' systems and to secure that they take steps to enable them, in the long term, to meet the need for water supplies and wastewater services. Subject to those duties, we also have duties to (among other things) contribute to the achievement of sustainable development.

³ Under sections 2A and 2B of the Water Industry Act 1991, we have duties to carry out our relevant functions in England and Wales in accordance with the statements of strategic priorities and objectives published by the Defra and the Welsh Government respectively. We expect the existing statements to be updated in 2022.

change projections (UKCP18)⁴. This sets out that the UK climate will continue to be characterised by warmer, wetter winters and hotter, drier summers⁵. UKCP18 makes clear that the need for changes to infrastructure is now more urgent than at any time in the past.

We are already seeing drier summers, more frequent and intense rainfall, more variable river flows and biological changes in water bodies. The sector has already experienced a number of extreme weather events; for example, the 'Beast from the East' in 2018, flooding from storms like Storm Ciara and Storm Christoph in 2020, and surface water flooding in London in July 2021. The heatwave of August 2020 increased pressure on water supplies particularly in the southeast, with prolonged increases in temperature having the potential to adversely impact unique water environments, such as chalk streams. It is further estimated that there is a 25% chance of the worst drought in recorded history within the next 30 years.

As the statutory regulator for the water industry in England and Wales it is vital we play our part in ensuring that current and future customers are protected from the impacts of extreme weather and other climate-related risks, and that water companies can continue to deliver their functions efficiently in the long-term, and finance them, in the face of the challenges presented by climate change.

As significant as the impacts of climate change are, we recognise that responding to climate change presents the water sector, including all relevant regulators, with significant opportunities for change in how it operates. At a high level, opportunities exist in relation to innovations in long-term adaptive planning, collaboration, partnerships, data management, and the restoration and increased protection of unique habitats, along with the adoption of lower carbon nature-based solutions. For example, in the context of long-term planning, and recognising the need for, and the benefits to flow from, enabling greater collaboration, we have worked with key stakeholders focused on facilitating improvements in water quality and resilience to drought (see Box 2). However, it is clear that there is more to be done, as evidenced by our [Asset Management Maturity Assessment](#).

It is against this background of challenges and opportunities that we play a key role in climate change adaptation, by ensuring that water companies are suitably incentivised, challenged, encouraged and capable of responding to the risks climate change poses to the services they deliver and customers are dependent on, and their environmental impact.

Box 2: Facilitating long-term planning

⁴ UKCP18 projections are statistically derived from the global model projections to produce data for alternative scenarios. The projections are based around scenarios for future greenhouse gases referred to as representative concentration pathways, with projections reflecting global warming scenarios of between 20C and 4 OC. These scenarios have been updated to reflect changing assumptions in relation to such issues as future population, economic development, and the mitigation of GHG missions (UKMO, 2019).

⁵ Met Office, '[UKCP18 Factsheet: Derived Projections](#)', 2019.

Water Industry National Environment Programme (WINEP)

The WINEP is the most substantial programme of environmental investment in England, with its investment going to asset improvements, investigations, monitoring and catchment interventions. We are currently working with the Environment Agency, Defra and others through a taskforce to review the WINEP methodology. A revised WINEP methodology will enable greater drought resilience and the delivery of improved flood resilience in line with the Environment Agency's National Flood and Coastal Erosion Risk Management Strategy.

Long-term delivery strategies

For PR24 we are asking companies to submit long-term delivery strategies alongside their five-year business plans. These strategies will cover the company's planned activities over the next 25 years and how they expect to meet key long-term outcomes and government targets. This includes outcomes/targets related to climate change, such as meeting net zero, securing drought resilience, and reducing leakage. We have set out expectations that companies use scenario planning and other techniques to alleviate future uncertainty in their strategies. We also expect the strategies to use the adaptive pathways approach to show how the company plans to adapt its activities to plausible future changes in external factors, such as changes in the frequency and severity of weather events due to climate change⁶.

Regulators' Alliance for Progressing Infrastructure Development (RAPID)

Responding to the scale of the water supply challenge facing particular areas of England and Wales in the context of climate change, we set aside about £470m at PR19 to develop 17 large scale strategic supply options, establishing the 'Regulators' Alliance for Progressing Infrastructure Development' (RAPID) to oversee their development. RAPID brings together key stakeholders, notably the Environment Agency the Drinking Water Inspectorate (DWI), and Ofwat to ensure all our views are equally recognised in the delivery of new large-scale strategic supply options.

1.1 The legal basis for Ofwat's action on climate change adaptation

As a statutory body, Ofwat's role and the type of work we're able to carry out is primarily set out in the Water Industry Act 1991. We must carry out our relevant functions in the manner we consider is best calculated to meet our statutory duties. While we consider that all of our primary duties are relevant to this issue, three of our primary duties in particular provide

⁶ Ofwat, '[PR24 and beyond: Long-term delivery strategies and common reference scenarios](#)', November 2021

scope for us to take climate change considerations into account: our consumer duty, which takes account of the interests of both existing and future consumers, our duty to secure that companies' functions are properly carried out, and our resilience duty (see Box 3), which requires us to secure the long-term resilience of water supply and wastewater systems in the face of environmental pressures, population growth, and changing consumer behaviour, including by promoting the sustainable management of water resources. We also have a secondary duty to contribute to the achievement of sustainable development, which is fundamentally affected by how societies and organisations respond to the challenges of climate change.

Climate change plays a pivotal role in shaping our understanding of resilience and the types of pressures that will occur, how particular pressures or risks may be exacerbated, and ultimately what actions need to be taken to ensure the sector can adapt to the impacts of climate change and continue to deliver for customers and the environment. For example, water supplies will need to be capable of withstanding the pressure placed on them by a growing population, but they will also have to be capable of responding to the increased pressure placed on them by climate change, with climate change having the potential to increase water demand further due to increased temperatures increasing consumption which in turn can impact the ecosystem that provides raw water in the first place.

Box 3: Ofwat's resilience duty

- a) To secure the long-term resilience of water undertakers' supply systems and 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 to reduce pressure on water resources.

In addition to our duties, we must carry out our work in accordance with the UK and Welsh Governments' strategic policy statements (SPS), both of which provide scope for us to help tackle climate change by, for example, securing long-term resilience, challenging the sector to plan, invest and operate to meet the needs of current and future customers, incentivising companies to manage water and wastewater sustainably and ensuring companies have appropriate regard to the wider costs and benefits to the economy, society and the

environment. The UK government SPS also requires us to have regard to the 25 Year Environment Plan, which, among other things, sets out the government's goals around mitigating and adapting to climate change. The UK government issued a draft SPS for consultation in July 2021, which set out a number of key resilience priorities, and we expect each government's SPS to be updated in 2022.

1.2 Ofwat's regulatory approach and strategic commitment

Ofwat's regulatory approach places the emphasis on companies to understand how climate change impacts on the services they provide, as well as their wider obligations, in the following ways:

- by creating a framework that incentivises and encourages the sector to safeguard the services customers and society value by adapting to climate change in innovative, efficient and sustainable ways.
- by making sure that this framework sends the right signals for service providers to plan and invest for adaptation over the long-term.
- by targeting our intervention using the best information available, working with others to improve our own understanding about climate risks and opportunities.
- by monitoring and measuring outcomes in the sector to ensure companies deliver in line with the intentions of our regulatory action.
- by ensuring companies listen to, and are engaging with, customers.

Our commitment to climate change is made clear in our strategy, '[Time to act, together](#)', which highlights that we want to strengthen the sector's approach to climate change mitigation and adaptation. In particular, our strategy outlines our three key goals for the sector, which are:

- a) to transform water companies' performance;
- b) to drive water companies to meet long-term challenges through increased collaboration and partnerships; and
- c) for water companies to provide greater public value, delivering more for customers, society and the environment.

Alongside this, we make specific environmental and climate change commitments, notably to:

- make the environment integral to all that we do;
- strengthen the industry's approach to achieving long-term operational resilience in its assets; and
- strengthen the sector's approach to climate change adaptation and push them to do everything they can to be ready for the challenges climate change will bring.

Since our last adaptation report, and for the period 2015–20, the industry has continued to take action to increase resilience for customers and the environment and, as a result, can demonstrate increases in resilience for customers and the environment in specific areas. For example:

- leakage decreased by 6% on average across the sector, with five water companies reporting a greater than 10% leakage reduction;
- abstraction at low flows were reduced by around 15,000 Ml at 38 environmentally sensitive sites;
- supply interruptions fell by 27%; and
- mains bursts fell by 10%.

Our regulatory model has also continued to evolve, with the PR14 price review period drawing to a close in 2020 and the 2019 price review (PR19) final determinations being published in December 2019. PR19 set the price, service and incentive package for water companies for the period 2020–25. To do this, our PR19 final determinations:

- set stretching PCs on the outcomes that matter to customers and the environment;
- challenged companies to go further on cost efficiency;
- promoted the development of markets including direct procurement of customers (DPC) for large infrastructure projects and in bioresources, and a more strategic approach to water resources, and
- allowed more funding for new investment and innovation.

In line with our statutory duties set out above, resilience was also central to this price review. Companies have duties to develop and maintain systems for water supply and sewerage services, which need to be resilient in the long-term, recognising the challenges we mention above. At PR19 we required companies to demonstrate their approach to managing risks to resilience in their business plans. Much of the funding to provide resilient systems and services is included in normal business ('base') operating costs. We provided additional ('enhancement') funding where companies demonstrated that they could achieve real reductions in risk and improvements in resilience. We strengthened the incentives for companies to increase resilience through their commitments on asset health. We also set stretching commitments on key indicators of day-to-day resilience, such as leakage, supply interruptions and sewer flooding. All of these are relevant to the climate challenge and are key to enable companies to adapt.

Additionally, through PR19 we allowed funding for new water resources and promoted long-term planning and investment. Company business plans and draft water resource management plans failed to deliver appropriate new long-term water resource solutions, so we stepped in, for example, funding the development of strategic regional water resources solutions through RAPID to help support drought resilience challenges, and set expectations

with respect to company resilience action plans. Our PCs also encourage companies to reduce demand for water and pressure on water resources.

Uncertainties and challenges for the sector remain, not only in terms of climate change but also due to unforeseen events, which the coronavirus pandemic has and continues to demonstrate. In addition to impacts on affordability and vulnerability for customers, in particular the levels of debt and the number of customers on social tariffs has increased, the pandemic has also resulted in a shift in consumption patterns, with household water use increasing and non-household consumption decreasing⁷.

At PR24 we intend to build on the strong foundations we set at PR19, and to help the sector overcome the challenges presented by climate change and embrace opportunities we intend to increase our focus on the long-term. We are encouraging companies to focus on their long-term strategies, ensuring understanding of their long-term outcomes and how they fit in with the long-term ambitions of the UK and Welsh governments. We are proposing to strengthen our approach to resilience so that companies are more strongly incentivised to maintain their assets for the long-term. We are also considering whether to provide greater clarity on our approach to future price reviews. This includes both what we expect companies to deliver in future periods from their current allowances and as to what additional incentives we will provide.

A greater long-term focus that takes account of future challenges, uncertainty, and affordability constraints, can help to strengthen companies' approaches to resilience. Our ambition for the PR24 framework also includes delivering greater environmental and social value; reflecting a clearer understanding of customers and communities; and driving improvements through efficiency and innovation.

⁷ Ofwat, '[Economic Impact of Covid19 on the Water Sector. Final Report](#)', December 2020.

2. Climate change risks and Ofwat's functions

Both our 2011 and 2016 adaptation reports outlined three broad categories of climate change risk that could affect our ability to carry out our functions. We consider that these three broad risk categories remain relevant. In particular, we continue to view climate change as being able to affect our functions in three broad ways, as detailed in Table 1.

Table 1: Risks arising from climate change that could impact Ofwat's functioning

	Risk Category	Description
2.1	Hampering our own day-to-day functions	Disruption to office facilities, transport etc that could prevent systems or staff operating effectively; and the way we work.
2.2	Affecting the views and decisions of stakeholders in a way that influences our work	As a regulator, our activities are influenced by both our duties, and the views and actions of others that shape how we and water companies do our work
2.3	Affecting the ability of the sector we regulate to deliver sustainable and resilient 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

Whilst sections 2.1 and 2.2 discuss the key actions we have taken to ensure we effectively manage the risks from climate change to our day-to-day operations, and the actions of our stakeholders, the discussion in Section 2.3 is also focused on making clear our understanding of the risks facing the water sector.

The companies we regulate are primarily responsible for delivering action on the ground that responds to the risks attributable to climate change. As a result, we continue to view the risks facing the sector we regulate as being the most significant, as they fundamentally affect our ability to safeguard the services customers rely on. We can only fulfil our functions effectively if the companies we regulate can adapt to climate change.

2.1 Hampering our day-to-day functions

Our first and second adaptation reports considered the risks from climate change to our day-to-day work in the context of the 2009 United Kingdom Climate Change Projections (UKCP09). These projections have since been superseded by the 2018 UK Climate Projections (UKCP18). The aim of these projections is to enable organisations to better determine the risks they could be subjected to from a changing climate to inform their adaptation planning.

The latest UKCP's confirm that the UK will experience an overall shift toward warmer, wetter winters and hotter, drier summers, with this being accompanied by an increase in the frequency and magnitude of extreme weather events. The findings of UKCP18 do not alter our assessment of the risks climate change poses to us as an organisation. The updated UKCP18 projections are of greatest significance in aiding the sector we regulate to understand and appropriately adapt to climate change.

Operational resilience

Both our previous adaptation reports concluded that the direct risks arising from climate change in relation to it affecting our ability to function were very low. Our Birmingham office is at little risk of fluvial flooding, with the direct threat to our current London office also being low. Most of our work is desk or communication based. So, the main threats are to staff getting to the office and widespread communication system failures, which could be exacerbated by the sectors we are reliant on, such as the transport network.

If external events do occur that affect our ability to operate from our offices, we have an established business continuity plan. Our business continuity plan works by creating teams with specific responsibilities under the leadership of senior leaders at Ofwat. Each team brings together people with expertise in facilities, IT, finance, HR, communications, and portfolio management. This preparedness is designed to allow us to get our processes back up and running as soon as possible. We test this plan regularly to ensure it is up-to-date and able to respond to emerging risks.

As our response to the coronavirus pandemic has demonstrated, we can work remotely as an organisation and in doing so effectively discharge our regulatory functions and duties. As we, and the sector we regulate, emerge from the pandemic, we are reflecting on how we can shape our future ways of working to ensure we have in place an approach that not only allows us to respond well to the disruption caused by external events, but one that also allows us to maintain our resilience in response to the challenges of working remotely.

Ofwat's governance

The primary lens through which Ofwat's Board considers the impact of climate change on the sector we regulate is through the lens of our regulatory approach, and our strategy. Key highlights of, and the progress we are making under our approach are set out in sections three and four, below.

As a non-ministerial department Ofwat's Chief Executive is designated as the Accounting Officer (AO), who is accountable to Parliament for all aspects of Ofwat's work. Ofwat also has a Board that bears collective responsibility for a range of matters, including (for the purpose of this report):

- the discharge of Ofwat's duties under the Water Industry Act 1991 and any other relevant legislation;
- establishing Ofwat's overall strategic direction in the context of a robust policy and resourcing framework; and
- ensuring that effective arrangements are in place to provide assurance on risk management, governance and internal control.⁸

Ofwat's Board is comprised of four executive members drawn from our senior leadership team, six non-executives, and a non-executive Chair. Its non-executive members are drawn from a diverse range of backgrounds and bring a balance of skills and expertise.

The Board includes specific expertise on climate change related matters; whilst the nature of our organisation and that water is a natural resource means we have a wide range of staff with specific expertise in matters including wastewater systems and engineering, asset health, water resources planning, along with relevant expertise in legal, economic, and general public policy fields, all of which have the potential to support Ofwat's work relating to climate change adaptation. In addition, we have an Environment Team that includes specialist climate change adaptation and net zero expertise. Environmental issues and concerns, including with respect to climate change adaptation, are regularly discussed at Board level, whether in the context of specific policy areas or discussion of our strategic risks and opportunities (see further below).

Board Committees play an important role in assurance, challenge and scrutiny, including through providing advice and recommendations to the Board. Of the five Board committees, the Audit and Risk Assurance Committee (ARAC) is most relevant for these purposes.

The ARAC supports the Board and the AO in their responsibilities for managing issues of risk, control, governance and associated assurance by providing assurance as to the adequacy and effectiveness of Ofwat's systems and processes. It does this by reviewing the sources of assurance in place, considering whether they are sufficiently comprehensive and complete, and reviewing the reliability and integrity of those assurances. ARAC acts in an advisory capacity, including advising on how well the Board and the Accounting Officer are supported in decision making and discharging their accountability obligations.

Our risk management framework is based on HM Treasury standard guidance in the Orange Book. The Senior Leadership Team (SLT) oversee the response to the strategic challenges faced by Ofwat as a whole. A member of SLT acts as an owner for each risk, and the strategic risk register and associated mitigating actions are regularly reviewed by the SLT as well as ARAC and the Board. There is active management of risk registers in clusters and project

⁸ Ofwat, [Rules of Procedure for the Water Services Regulation Authority](#), 2021

teams, with action required taken accordingly. Individual risks within clusters and projects can be escalated from delivery directors to the SLT as appropriate. In addition to a regular review of the strategic risk register, the ARAC undertakes deep dive reviews at each meeting into key risks, whether by strategic risk area, or by cluster and/or project.

Our strategic risks are those that can obstruct our ability to achieve our strategic goals and ambitions to deliver great outcomes for present and future customers. The Board focuses on three broad risk areas, of which two are particularly relevant to this report:

1. **Our regulatory regime:** including specifically the risks that:
 - our regulatory approach, framework and tools may become ineffective, and we might fail to keep pace with what matters to consumers, society and the environment;
 - we may fail to enable and encourage the sector to address longer-term challenges, to motivate the right culture and behaviours within the sector and to provide the right environment for sustainable investment in the long-term interests of customers; and
 - we might have insufficient insights to understand sector performance, and to evaluate and evolve our regulatory methodology/interventions.
2. **External relationships and other factors:** this includes the ability to deal quickly with unexpected events eg, weather, or those outside of our direct control, which may have a significant impact on company performance and our ability to deliver.

Climate change adaptation is therefore considered across a range of our strategic risks, recognising the complexities and interdependencies across our functions and responsibilities. Beyond this, and given the nature of the sector we regulate, we consider all aspects of climate change throughout our policy development and other activities, including in particular through the development of our PR24 methodology and wider delivery against our strategy. We will continue to keep our approach to assessing the risks of climate change under review to ensure our governance framework remains appropriate, and in particular to ensure that we have appropriate oversight of the nature and scale of risks in this area and the actions we can take, or motivate others to take, to address them.

Monitoring and reporting:

Our annual Forward Programme outlines our strategic goals and we detail our progress in our Annual report and accounts⁹. Our organisational reporting in relation to climate change is focused on detailing our emissions of greenhouse gas (GHG) and how we plan to mitigate them. Detail on our scope 2 and 3 carbon emissions is set out in the Sustainability section of our Annual Report. Our carbon footprint is calculated using the relevant requirements of the [Greenhouse Gas Protocol Corporate standard](#). Ofwat does not currently report against any

⁹Ofwat, 'Annual report and accounts 2020-21', July 2021

other external climate change metrics such as the Taskforce on Climate-related Financial Disclosures (TCFD), although we continue to keep best practice in these areas under review.

2.2 Affecting the views and decisions of stakeholders in a way that influences our work

Our work has always involved collaborating and engaging with a broad range of stakeholders and climate change has been a consistent theme of this engagement for a number of years, reflecting the increasing focus of all of our stakeholders on this critical issue and its impact on customers, both in terms of the need for swift action and for a longer-term perspective on the challenges we face as a society. We look to experts for their knowledge and insight on climate change and recognise that expertise in this area comes from a range of sources. We listen to the concerns of pressure groups and customer groups, both of which influence our approach. We also fully recognise the ability of significant new data or extreme events to influence our work (as well as the successful operation of our functions in terms of resources and processes). One of the drivers for our work on open data is to drive much greater transparency of information and insight to augment both our and the sector's efforts and impact in tackling the challenges of climate change.

Box 4: Examples of stakeholders influencing our activity

In 2018, [The National Infrastructure Commission](#) estimated that new water supplies equivalent to the water consumed by over nine million people would be needed by the mid-2030s. At PR19, we were concerned that company water resource management plans were not sufficiently co-ordinated between companies and there was insufficient investment in developing strategic new water resources, particularly in the context of climate change. Responding to the scale of that challenge, and as highlighted in the introduction, we set aside about £470m to develop 17 large scale strategic supply options, establishing RAPID to oversee their development by bringing key regulatory stakeholders together to ensure their views were captured and subsequently fed into the planning process.

Our current strategy, '[Time to act, together](#)', released in 2019, emphasises the importance of collaboration with a range of stakeholders and listening to customers, and commits us to exploring and implementing new ways to ensure insights from this engagement influences and informs our work. We also placed a greater focus on customer engagement and listening and acting upon the views of customers and other stakeholders at PR19. As part of our final methodology for PR19, we specifically encouraged companies to engage with their customers on longer-term issues, including resilience. As a result, our Initial Assessment of Plans (IAP) at PR19 looked at this specifically.

With a view to ensuring we are fully engaged with and aware of customer views at PR24, we have recently published [a position paper](#) which sets out our intentions for how we are

going to conduct customer research collaboratively with the Consumer Council for Water (CCW) and the sector for PR24 to inform common performance commitments, outcome delivery incentive (ODI) rates and acceptability and affordability testing.

In recent years, there has been a significant shift in attitudes towards the water environment. For example, communities are becoming increasingly concerned by companies' environmental performance. Increasingly aspects of our work are being driven by increased stakeholder concern about and engagement on such issues, which we have identified as being at high risk of being made worse by climate change (see section 2.3).

Water companies have a critical role in protecting and preserving the natural environment. As part of PR19, we required companies to reduce pollution incidents by 30% by 2025 and to improve 12,000km of rivers. Other key ways we are helping companies protect the natural environment include collaborating with the Environment Agency and others to develop a Chalk Stream Restoration Strategy¹⁰, encouraging adoption of nature-based solutions and allocating extra investment for environmental improvements.

We have backed investment of around £1 billion every year for water companies to improve the natural environment by increasing the capacity of the wastewater system to meet growing demand. In July 2021 we allowed almost £3 billion of extra funding for green recovery¹¹ plans to deliver lasting environmental improvements.

Companies are currently preparing their sixth round of water resources management plans (WRMPs)¹² and once again we are working closely with relevant stakeholders to ensure water companies are appropriately challenged with a view to ensuring companies are adequately prepared to respond to the climate change risks connected to the provision of water supplies. During the fifth round of WRMPs, as a statutory consultee we actively participated in the planning process, meeting all companies at least once to gain early insight into their plans and we intend to be similarly engaged at WRMP24.

¹⁰ CaBA CSRG, '[Chalk Stream Restoration Strategy 2021 Main Report](#)', 2021

¹¹ In July 2020, we – alongside Defra, the Environment Agency, the DWI and the CCW – invited English water companies to play their part in the green economic recovery from Covid-19. We set out our ambition to build back greener from the pandemic: delivering lasting environmental improvements for current and future generations, while meeting the economic and social challenges England faces. Overall, our final decisions allow five companies to invest an extra £793 million, on top of their existing five-year PR19 packages, to help the green economic recovery. The schemes will deliver a wide range of benefits, including action on the most significant environmental issues, such as improving river quality and reducing carbon emissions. Several projects will see companies embrace innovative approaches, including co-funding and partnership working, to deliver nature-based solutions and catchment management schemes.

¹² Long-term water supply resilience starts with an WRMP. WRMPs provide an overview of water companies' resilience to drought and the investment required to improve or maintain that resilience. They are produced every five years being kept under review annually. Companies follow the joint [water resources planning guidelines](#) by the Environment Agency, Natural Resources Wales and Ofwat when preparing their WRMPs.

WRMPs also involve us working closely with other regulators, notably the Environment Agency and Natural Resources Wales. During the fifth round of planning, we worked together to develop a risk-based approach that aimed to ensure we were proportionate, targeted, and consistent in our challenge of companies' plans. In particular, we provided challenge in the areas of: customer participation; resilience; leakage; water efficiency; water trading, regional solutions; and assurance. All these areas are strongly linked to ensuring the risks posed by climate change are mitigated effectively.

Currently, we are also working closely with a range of stakeholders to ensure the development of Drainage and Wastewater Management Plans (DWMPs) by water companies. In 2019, along with Defra, Welsh Government, Environment Agency, Natural Resources Wales, Consumer Council for Water, ADEPT and Blueprint for Water, we supported WaterUK's commissioning of a framework for DWMPs. DWMPs are focused on encouraging companies to work with stakeholders to better understand and target investment to improve the capacity and resilience of their drainage and sewerage systems over the long-term and thus in turn will play a key role in enabling companies to respond to the challenges and risks of climate change, particularly with respect to flooding. Measures in the Environment Act 2021 to put DWMPs on a statutory footing will also provide much needed impetus to longer-term planning with respect to drainage infrastructure, in the wider context of the system of flood and water resource management.

2.3 Affecting the ability of the sector we regulate to deliver sustainable water and sewerage services

As stated earlier, the companies we regulate are primarily responsible for responding to climate change. We continue to view the risks facing the sector as some of the most significant, as they fundamentally affect our ability to safeguard the services customers rely on. We can only fulfil our functions effectively if the companies we regulate are proactive themselves in addressing and adapting to the challenges of climate change. We have an important role to play in driving change: 1) through direct regulatory requirements, 2) through the incentives we generate, and 3) by using our position as a regulator to develop a clear shared understanding of the risks from climate change across the sector.

As part of the UK Water Industry Research (UKWIR) steering group on the development of a common climate adaptation framework, we are contributing to the development of a shared framework for climate change adaptation to support greater consistency in company climate change adaptation responses. We are also seeking to ensure greater consistency in company plans by being clear on the climate change scenarios we expect companies to use in their planning at PR24. In relation to PR24, we are currently consulting on asking companies to

adopt the Representative Concentration Pathways (RCPs), as adopted by the Intergovernmental Panel on Climate Change (IPCC) in its 5th assessment report¹³.

The RCPs are also used by the latest UK Climate Projections (UKCP18), which provide the most up-to-date assessment of how the climate in the UK may change in the future¹⁴. The RCPs specify different future concentrations of GHG emissions to create a wide range of plausible future emissions scenarios¹⁵. They range from RCP2.6 to RCP8.5, which represent low and high scenarios for the amount of 'radiative forcing' caused by GHG emissions, which in turn creates changes in factors such as temperature, rainfall, and sea levels. Since the publication of our second adaptation report, considerable progress has been made in how the climate change risks facing sectors of the UK economy are understood, in particular in the water sector. For instance, the CCRA3 report identifies seven broad risk areas in relation to the water sector, which either require more action or further investigation over the next five years (see Table A1 in the Appendix). These broad risk areas are:

- I. Risks to infrastructure networks from cascading failures
- II. Risks to infrastructure from river, surface water and groundwater flooding
- III. Risks to infrastructure from coastal flooding and erosion
- IV. Risks to subterranean and surface infrastructure from subsidence
- V. Risks to public water supplies from water availability
- VI. Risks to health from poor water quality and household supply interruptions
- VII. Risks to aquifers and agricultural land and saltwater intrusion

Further in relation to broad risk areas, it is notable that Defra has asked water companies to consider four key risk areas in their adaptation reports, principally:

- cascade failures due to interdependencies;
- risks from flooding;
- risks to public water supplies from drought and low river flows; and
- risks to productivity due to infrastructure disruption.

As the risks areas identified by Defra and CCRA3 are directly relevant to the companies we regulate, helping to focus company discussion, we have in Section Four of this report sought to reflect on our current and future actions against this backdrop. We view this approach as being useful in enabling us to inform stakeholders of how we are enabling the sector to become more resilient and adapt to climate change over the course of current and future price reviews, and which align with the five year 'actions' timeframe of the CCRA3 report.

As Table A1 demonstrates, our understanding of the risks facing the sector comprehensively align with the risk areas identified by CCRA3 and Defra. We have also identified three

¹³ IPCC, '[Climate Change 2014: Synthesis Report](#)', November 2014.

¹⁴ Met Office, '[UK Climate Projections: Headline Findings](#)', July 2021.

¹⁵ Met Office, '[UKCP18 Guidance: Representative Concentration Pathways](#)', November 2018

additional broad areas of risk that are not highlighted by CCRA3 and the Defra risk areas for the sector. These are: risks to the environment, risks to people, and risks to financial stability.

The next section of our report seeks to inform stakeholders of the progress we have made in enabling the sector to adapt to climate change against the commitments we made in our previous adaptation report, before discussing our current and future actions in the context of the Defra and CCRA3 risk areas.

3. Progress on past climate change commitments

Previous adaptation reports have sought to make clear the commitments and actions we have taken to allow the water sector to deliver sustainable and resilient water and sewerage services over the long-term. Our second adaptation report also reflected on the delivery of commitments we made in our 2011 report. This section of our current report continues that reflective approach by discussing the delivery of past commitments for the period 2015–20, detailing some of the key outcomes that flow as a result of those commitments. The next section of this report details our current and future commitments to climate change adaptation.

The period of time that has elapsed since our last adaptation report was principally shaped by the 2014 price review (PR14)¹⁶ covering the period 2015–20. PR14 marked a new regulatory approach for the water sector. We set out a framework for the 2015–2020 period that encouraged companies to engage more proactively with customers, and to focus on delivering the services that matter most to customers and the environment in the most cost-efficient way.

We set out in our ['Discussion paper on the PR14 Review'](#) on which we consulted in August 2021 that we considered over this period that prices and services generally improved for consumers and the environment. PR14 delivered change in five key areas, notably:

- the introduction of an outcomes-based framework focused on delivery for customers;
- securing value for money for customers;
- the balance between risk and return;
- the sustainable use of water resources; and
- the creation of separate targeted wholesale and retail controls.

From the perspective of ensuring the sustainable use of water in a changing climate, at PR14 we introduced targeted incentives to drive a change in company behaviour in three specific areas: water trading, abstraction from environmentally sensitive sites, and leakage reduction. Based on our assessment of the approach to encourage sustainable use of water resources during the 2015–2020 period, we found the following.

- The water trading incentive seems to have had limited impact during the 2015–20 period. Only two companies identified new water trades which qualified for incentive payments totalling £0.6 million. However, it can take many years to identify viable water trades, so the full impact of this incentive, which has been maintained in PR19, may not have been seen within the 2015–20 period. Moreover, while trading incentives increase individual

¹⁶ Every five years, water companies create plans setting out what they will deliver and the money they will need to collect from customers in return. Part of our role at Ofwat is to set the framework for companies' plans, scrutinise and challenge the plans, and set the service delivery packages and the revenues companies can collect from customers.

company motivation to trade, they do not solve co-ordination issues between companies or between regulators which can be significant.

- The abstraction incentive mechanism (AIM) appeared more effective during the period than the water trading incentive. Although it only applied to a small number of very specific sites, it seemed to encourage the reduction of abstraction at low flows by 15,000 Ml at 38 environmentally sensitive sites. We recognise it is possible that companies might have reduced abstraction from these sites even without AIM. We also collected information that allowed us to make further use of the mechanism in PR19.
- The sector could have made more progress on leakage. It reduced by 6% on average across the sector, with five water companies reporting a greater than 10% leakage reduction. Progress seems to have mostly been spurred by the announcement of the more stretching PR19 leakage reduction challenge.
- More could be done to encourage customers to reduce demand for water. Per capita consumption increased by 2% from 139 litres per head per day in 2014–15 to 142 litres per head per day in 2019–20.

At PR14, companies committed to more than 70 performance commitments to maintain and improve the environment. Overall, where companies had environmental performance commitments, we saw a general improvement during the 2015–20 period. In particular, companies met 70% of their performance commitment levels (PCLs) with those commitments having clear links to the risks identified as stemming from climate change in section two of this report. For example, during the period 2015–20 PCs helped to drive a 36% reduction in category 3 wastewater pollution incidents. Improvements were also achieved in relation to the quality of rivers, bathing water, alongside a reduction in greenhouse gas emissions. Each of these improvements serves to demonstrate a water sector being incentivised to positively respond to the risks of climate change.

However, despite the above improvements, it is noted that the Environment Agency rated the environmental performance of four out of the nine water and wastewater companies in England as poor or requiring improvement in 2019. This compares to two out of the nine companies being rated as requiring improvement in 2014. While these PCs covered a range of activities which are not covered in the Environment Agency's Environmental Performance Assessment, this may suggest that PC levels could have been more stretching in some of these areas, or that out-performance incentives used for these PCs might have been stronger.

Delivery of past commitments

In our second adaptation report, we detailed a series of specific commitments that would allow the water sector to positively respond to the challenges of climate change (see Tables 2 and 3). For instance, for water services we committed to working with fellow regulators to facilitate better long-term planning in relation to the risks, pressures, options, and costs associated with climate change, as reflected by company WRMPs and future price review

submissions. We also committed to taking action to address supply-demand deficits by encouraging third party involvement and DPC as well as consulting of how to improve leakage and asset health outcomes, and requiring companies to engage with their customers on resilience issues.

For wastewater services we also committed to facilitating better long-term strategic approaches to wastewater and drainage planning, and DPC to facilitate large capital infrastructure projects required for adaptation. We also committed to facilitating better asset health outcomes, as well as requiring companies to engage with their customers on resilience issues connected with wastewater services. We also expected our market approach to bioresources to increase resilience to disruption through there being more service providers in the market.

Table 2: Water service commitments linked to climate change adaptation

In our 2016 report we said...	We have...
<p>We will work with Environment Agency and Natural Resources Wales (NRW) to ensure WRMPs submitted by companies take an appropriate long-term view of risks, pressures, options and costs.</p>	<p>We worked collaboratively with the Environment Agency and NRW to produce guidance for WRMP19 that required companies to take an appropriate long-term view of risks, pressures, options and costs. Understanding the potential range of impacts from climate change was a key part of this process.</p> <p>We reviewed company draft WRMP19 plans and provided formal feedback on areas for improvement in company specific letters. We additionally raised common areas of concern across the sector in an information note and in a joint letter issued with Defra, the Environment Agency and the DWI.</p> <p>At PR19 we made specific allowances for companies to take a twin-track approach of enhancing supply and reducing demand to ensure long-term resilience of supplies. This included allowances to develop long-term solutions in companies' own supply areas and strategic regional solutions alongside other companies.</p> <p>We formed the Regulators' Alliance for Progressing Infrastructure Development (RAPID) to help accelerate the development of new water infrastructure and future regulatory frameworks. This joint team is made up of the three water regulators: Ofwat, Environment Agency and the DWI.</p> <p>We have collaborated with the Environment Agency and the DWI on producing guidance for WRMP24. This has enhanced the focus on setting and delivering long-term environmental ambitions and ensuring the adaptability of plans.</p>
<p>We are currently consulting on companies making long-term commitments at future price reviews</p>	<p>As a result of our consultation on the outcomes framework for PR19, particularly in relation to long term issues, our decision document detailed our conclusion that companies' five-year performance commitments for 2020-25 should be supported by long-term projections for at least a further ten years.</p>

	<p>These projections were to help encourage companies to consider their long-term ambitions and to help customers and stakeholders engage on longer-term issues such as climate change.</p> <p>From PR24 onwards, we are asking companies to submit long-term delivery strategies alongside their five-year business plans. These strategies will cover the company's planned activities over the next 25 years and how they expect to meet key long-term outcomes and government targets. This includes outcomes/targets related to climate change, such as meeting net zero, securing drought resilience, and reducing leakage.</p>
<p>We will require companies to produce a Bid Assessment Framework to ensure third party proposals to close supply-demand deficits are appraised against existing legal obligations and policy objectives including the long-term WRMP framework.</p>	<p>Companies were required to produce draft Bid Assessment Frameworks alongside their PR19 business plans which we reviewed, with companies publishing final versions following PR19.</p>
<p>We will encourage Direct Procurement for Customers (DPC) – an approach that could allow large capital infrastructure projects to be subject to longer term price controls.</p>	<p>We developed DPC as a model for delivery of large projects, including those associated with climate adaptation, and included a requirement in our PR19 Final Methodology for companies to assess as part of their PR19 Business Plans whether any of their large infrastructure projects were suitable to be delivered by DPC.</p> <p>Under the model we developed, companies are required to put DPC projects out to competitive tender for a third party to design, build, finance, operate and maintain. DPC projects are funded outside of normal price controls and instead costs are recovered from customers by a separate Allowed Revenue Direction which provides certainty around long-term revenue streams (typically 25 years plus) to water and wastewater companies and third party competitive appointed providers (CAPs).</p> <p>At PR19 we identified five projects where DPC is likely to deliver better value for money for customers than in-house delivery. To give effect to the DPC delivery model, we have modified five companies' licences, establishing the framework for the regulation of DPC projects and allowing Ofwat, with the agreement of the water company, to designate a project as a DPC Delivered Project and require the company to deliver the project via DPC. Subsequently, we designated the first project (Anglian Water's Middlegate (formerly Elsham) DPC project) in June 2021.</p> <p>In addition to the projects identified at PR19, we have been working with RAPID to ensure that companies consider DPC when developing their strategic resource schemes and assess whether delivery via DPC may be suitable and whether it can offer better value for money for customers.</p>
<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>A separate price control for water resources was introduced at PR19.</p>
<p>We will evaluate WRMPs and exceptional expenditure included in business plans to check that</p>	<p>At PR19 we made a total allowance of up to £2.2 billion for companies to take a twin-track approach to delivering solutions to enhance supply and reduce demand to ensure long-term resilience of</p>

<p>the broadest range of possible solutions has been considered to balance supply and demand including leakage, water efficiency and third-party provision.</p>	<p>supplies. These solutions included new supply options, water efficiency programmes, smart meter installation, strategic regional option development (eg reservoirs) and leakage reduction. Our PR19 final determination included performance commitments requiring companies to deliver a 16% reduction in leakage over the 2020-25 period.</p> <p>We subsequently made additional allowances of up £793 million as part of a green economic recovery programme for companies to deliver further supply and demand solutions. These included further smart metering roll out and development of low-carbon water resource options.</p>
<p>We will consult on whether larger incentives should apply to outcome performance commitments to encourage greater service improvements.</p>	<p>We consulted on this issue and at PR19 set enhanced ODIs that aim to encourage companies to improve performance beyond the best level currently achieved by any company, to deliver benefits for all customers over the long term. This is likely to involve innovation and risk-taking by companies as they seek to significantly improve their performance. This approach should enable us to set new improved performance levels in future price controls to the further benefit of customers.</p> <p>In addition, we expect a company earning enhanced ODIs to share learning on what has worked and what has not, consistent with knowledge sharing plans set out in its business plan. We also expect companies to assess the success of their knowledge sharing and be able to provide evidence of this to Ofwat. We set out that we will take account of this when we determine ODI payments.</p> <p>Currently, it is too early to understand the impact of this development, but we will evaluate its effectiveness in considering our approach for future price reviews.</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>Having considered this further, we did not consider a dedicated information platform was necessary at this stage of the development of the market. However, we do require water companies to publish key information on their websites in a consistent format in order to support the bidding market for water resources, demand management and leakage services.</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>Commencement for the relevant legislation has not been implemented to date, therefore there has been no call for an access pricing framework. In our recent PR24 publication, 'Creating tomorrow, together', we noted that we propose to review the prospect for bilateral markets before PR29, but that we do not anticipate it will come into effect during the next price review period. Also, after consulting stakeholders, we have concluded that interest in bilateral markets is currently limited.</p>
<p>We will introduce a retail market for business customers in April 2017.</p>	<p>The business retail market was launched in April 2017, meaning 1.2 million businesses, charities and public sector organisations in England are no longer restricted to buying water services from their regional monopoly.</p>
<p>We will encourage direct procurement for customers (DPC) to ensure efficient delivery of large infrastructure projects – including those required for adaptation.</p>	<p>We have specified a DPC assessment framework for companies to assess large projects against and whether DPC can provide better value for money for customers, for example, through more efficient delivery. We have also provided companies with high-level principles for DPC procurement processes and contracts.</p>

<p>We will consult on proposals for leakage and asset health outcomes, company resilience assessment and bespoke outcomes</p>	<p>We consulted on our approach and at PR19 set common PCs for leakage, asset health and resilience as well as expecting companies to propose further bespoke PCs. We set a targeted challenge for companies to deliver a reduction in leakage, including considering whether they could deliver a 16% reduction over the 2020-25 period. Overall, the industry considered it could meet or exceed this challenge.</p> <p>We also asked companies to demonstrate a systematic and integrated assessment to understand the risks to resilience across their entire business, and mitigate these risks in a way that provides long-term value for money for customers. We worked with companies as part of PR19 to better understand this area but consider that there is more work to be done by companies to understand a best practice approach to resilience in the round and the practical implementation of this approach.</p>
<p>We will require companies to engage with their customers on resilience issues.</p>	<p>As part of our final methodology for PR19, we encouraged companies to “engage with their customers on longer-term issues, including resilience”.</p> <p>As part of our Initial Assessment of Plans (IAP) at PR19, we looked at this specifically in our assessments, and a summary of our findings can be viewed in the ‘Summary of test area assessment’ document.</p>
<p>We will require companies to produce a Bid Assessment Framework to ensure in-house solutions are not favoured at the expense of third-party proposals that offer more efficient, resilient or sustainable services.</p>	<p>Our PR19 final methodology set out our expectations and the principles that water companies must comply with in their bid assessment frameworks.</p> <p>As stated above companies published final versions of their Bid Assessment Frameworks following our review at PR19.</p>
<p>We will maintain current environmental protection in the water trading incentive.</p>	<p>We maintained the environmental protection principle in the trading and procurement codes which we required companies to produce and comply with in order to receive an incentive payment.</p>
<p>We will consider how best to accommodate the misalignment of business plan and River Basin Management Planning processes.</p>	<p>We are working with the Environment Agency, Defra and others through the WINEP taskforce to develop a WINEP methodology and longer-term WINEP roadmap. The taskforce proposes we collectively:</p> <ul style="list-style-type: none"> • set the WINEP in the context of long-term plans; • extend the WINEP programme horizon to 10 years plus; and • investigate the impact of making legislative changes beyond PR24 to align the 5-year WINEP and the planning cycles (RBMPs, FRMPs) with each other. <p>We have identified the need to accommodate the interaction between the River Basin Management Planning process and the 2024 price review in ‘Creating tomorrow, together’, which presents our initial views on the framework for PR24 and future price reviews.</p> <p>At PR19, we adapted our approach to funding unconfirmed environmental requirements to better protect customers against the uncertainty associated with such requirements. This was because requirements were still uncertain when companies submitted their business plans to us in September 2018, and when we made our final determinations in December 2019. Our approach was to fund anticipated programmes, as long as companies propose an appropriate cost adjustment mechanism to account for a potential</p>

	discrepancy between the scale of the assumed and confirmed programmes.
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Table 3: Wastewater service commitments linked to climate change adaptation

In the 2016 report we said...	We have...
We will require proposals for exceptional investment to be supported by a long-term strategic approach to wastewater / drainage planning and service provision.	We have been working with Defra, the industry and others since 2018 to develop and implement the new drainage and wastewater management plans (DWMPs). These provide the basis for collaborative and integrated long-term planning by water companies, working with other organisations, on drainage, flooding and environmental protection issues. We will be taking account of DWMPs, in conjunction with other strategic planning frameworks, in PR24 and future price reviews, as explained in our document ' Creating tomorrow, together '.
We will introduce a separate price control for wastewater to reveal better comparative information on company costs and allow a more targeted efficiency challenge.	We introduced a separate price control for bioresources at PR19 to reveal better comparative information on company costs and allow a more targeted efficiency challenge.
We will consult on whether larger incentives should apply to outcome performance commitments to encourage greater service improvements.	As set out in the equivalent row of table 2, PR19 set enhanced ODIs that aim to encourage companies to improve performance beyond the best level currently achieved by any company, to deliver benefits for all customers over the long term
We will introduce a bioresources (sludge) information platform to facilitate third parties bidding to provide processing, recycling and disposal services.	Companies are required to publish market information which is aimed at facilitating third parties entering the market where efficient to do so.
We will encourage direct procurement for customers (DPC) to ensure efficient delivery of large infrastructure projects – including those required for adaptation.	As set out in the equivalent row of table 2, we developed DPC as a model for delivery of large projects, including those associated with climate adaptation, and included a requirement in our PR19 Final Methodology for companies to assess as part of their PR19 Business Plans whether any of their large infrastructure projects were suitable to be delivered by DPC.
We will consult on proposals for: asset health outcomes; and, company resilience assessment and bespoke outcomes	We consulted on our approach and at PR19 set common PCs for asset health and resilience as well as expecting companies would propose further bespoke PCs. We asked companies to demonstrate a systematic and integrated assessment to understand the risks to resilience across their entire business, and mitigate these risks in a way that provides long-term value for money for customers. We worked with companies as part of PR19 to better understand this area but considered that there is more work to be done by companies to understand a best practice approach to resilience in the round and the practical implementation of this approach. Since PR19 we have worked with water companies to undertake an asset management maturity assessment and will take account of the findings of this as we consider our approach for future price reviews.

<p>We will require companies to engage with their customers on resilience issues.</p>	<p>As set out in the equivalent row of table 2, as part of our final methodology for PR19, we specifically encouraged companies to “engage with their customers on longer-term issues, including resilience”.</p>
<p>Our market approach for bioresources services will introduce increasing resilience to disruption through there being more service providers in the market.</p>	<p>Our work since 2016 has included introducing a separate price control for bioresources at PR19 and establishing requirements for companies to make market information publicly available. Our work to develop the bioresources market makes it easier to identify and make use of a greater range of market options and enable companies to make best use of their capacity. This, is expected to increase resilience to disruption.</p>
<p>We will consider how best to accommodate the misalignment of business plan and River Basin Management Planning processes.</p>	<p>As set out in the equivalent row of table 2, through the WINEP taskforce we have identified the need to accommodate the interaction between River Basin Management Planning process and the 2024 price review in ‘Creating tomorrow, together’, which presents our initial views on the framework for PR24 and future price reviews</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>	<p>Water companies have in recent years increased the renewable energy generated by from bioresources activities. From 2020–21 we began collecting data on this in the context of our wider efforts to improve the reporting of GHG emissions by water companies. We expect the growing use of biosolids in agriculture to further displace petrochemical based fertiliser usage in the agricultural sector. These developments are decreasing the carbon footprint of companies bioresources activities.</p>

As Tables 2 and 3 demonstrate, we consider that we have delivered on each of the commitments detailed in our 2016 adaptation report, except for our proposal to review access pricing for bilateral markets with a view to enhancing the resilience of water supplies, particularly through driving innovation and service provision. That has not taken place as the relevant legislation has not been enacted¹⁷.

¹⁷ We propose to review the prospect for bilateral markets before PR29, but we do not anticipate it will come into effect during the next price review period. After consulting stakeholders, we have concluded that interest in bilateral markets is currently limited.

4. Current and future commitments and actions

This section covers the period 2020–2025, outlining key actions we are taking to facilitate a more resilient and responsive water sector to climate change risks. In particular, attention is focused on the commitments and actions taken in the current price review period (PR19; 2020–2025), with us highlighting, where appropriate, future actions we plan to take during the course of our next price review period (PR24; 2025–2030).

Since our previous adaptation report, our regulatory approach has evolved, driven by the development and implementation of our current strategy, '[Time to act, together](#)', released in 2019. In our strategy we make clear our goal of meeting the long-term challenges of climate change, with an explicit focus on ensuring long-term planning in relation to water supplies, operational resilience, and the environment. We have also been working to the SPSs set by the UK government and Welsh Government, with each SPS shaping our approach to addressing climate change adaptation in England and Wales, respectively.

At PR19 we approved more expenditure on resilience than ever before, with £13 billion allocated to companies in this area, including:

- more than £1 billion to reduce the impact of flooding on communities and £2.2 billion to address short- and long-term drought challenges¹⁸;
- funding to cut leakage by 16%, reduce mains bursts by 12%, and help customers cut water use by up to 13%;
- £200 million of funding to support innovation in the sector, with climate mitigation and adaptation projects being encouraged via the associated innovation competitions; and
- £4.8 billion of expenditure for the WINEP in England and NEP in Wales for environmental investment, to ensure water companies meet their obligations under environmental legislation and UK government policy.

As Table 4 makes clear, we are continuing to actively support the sector in responding to the key risks associated with climate change. Table 4 also serves to highlight that we have taken a series of actions, to enable the sector to respond to the challenges of climate change by addressing issues of uncertainty, resilience, stakeholder engagement, open data, and technological innovation.

Table 4 – Ofwat current and future actions on climate change

Commitments and actions	Link to climate change adaptation
At PR19 we allowed £13 billion of expenditure on resilience. We also set	Extremes in weather, triggered by climate change, threaten to undermine stability of water supply and the performance of

¹⁸ This includes £469 million for strategic water resource solutions, £1022 million for general supply-demand balance, and £653 million for metering at PR19. Additional £60 million was allowed in CMA redeterminations.

<p>performance commitments (PCs) related to improving resilience in the sector, which included a focus on supply interruptions, sewer flooding and asset health.</p>	<p>drainage systems. Improving operational resilience is key to addressing such risks from climate change. At PR19 funding to improve resilience included more than £1 billion to reduce the impact of flooding on communities and £2.2 billion to address short- and long-term drought challenges.</p>
<p>At PR19 we allowed £4.8 billion of funding to deliver the NEP for Wales and the WINEP for England to ensure water companies could meet their environmental obligations.</p>	<p>Climate change will lead to increased variability in rainfall leading to both flooding and drought. The WINEP is the most substantial programme of environmental investment in England, with its investment going to asset improvements, investigations, monitoring and catchment interventions. As well as contributing to greater drought resilience, WINEP determinations play a key role in delivering improved flood resilience in line with the Environment Agency's National Flood and Coastal Erosion Risk Management Strategy.</p>
<p>At PR19 we allowed companies funding to cut leakage by 16%, as part of a goal for water companies to cut leakage by 50% by 2050. We also set performance commitment levels requiring companies to deliver a 16% reduction in leakage by 2025.</p>	<p>Climate change will impact future water supplies so reducing the amount of water lost to leakage will help to minimise this risk. Reducing leakage can play a critical role in increasing the resilience of water supplies by extending the longevity of supplies in times of increased demand.</p>
<p>At PR19 we allowed companies funding to reduce main bursts by 12% by 2025.</p>	<p>Climate change, through increased temperatures, will lead to increased demand for water, which can be partially mitigated through less wastage. Reducing mains bursts will reduce risks from infrastructure disruption and, in turn, cascading failures due to interdependencies.</p>
<p>At PR19 we allowed companies funding to work with their customers to cut customer water usage by up to 13%.</p>	<p>Climate change risks household supply interruptions and future water availability. Reducing per capita consumption will play a key role in managing the increased water demand triggered by increased temperatures. Reducing water demand is a key part of the solution to ensure long-term resilience of supplies.</p>
<p>At PR19 we allowed £200 million to support innovation in the sector, with climate mitigation and adaptation projects being encouraged via the associated innovation competitions.</p>	<p>Playing a key role in limiting the levels of climate change adaptation we need to achieve is effort to reduce and remove GHGs. To assist the sector to improve productivity, accelerate the pace of innovation, and prepare itself for the challenges ahead, we established a £200m Innovation Fund (launched in 2021) to grow the water sector's capacity to innovate, enabling it to better meet the evolving needs of customers, society and the environment.</p> <p>We have concluded two competitions to date, awarding over £38m in funding across 20 projects. Examples include:</p> <ul style="list-style-type: none"> • Transforming the energy balance of wastewater treatments • Triple Carbon Reduction • Catchment Systems Thinking Cooperative • The Seagrass Seeds of Recovery project.
<p>In 2019, we established RAPID to help facilitate and accelerate the development and funding of new large-scale strategic water supply solutions by the water companies, as well as the design of future related regulatory frameworks. At PR19 we also allowed additional funding for the investigation and development of strategic regional water resource solutions.</p>	<p>Effective response to climate change will necessitate and be dependent on effective cross regulator collaboration. This is important to ensure infrastructure and water resources are prepared for changes and challenges that come as a result of climate change. RAPID is made up of the three water regulators: Ofwat, the Environment Agency and the Drinking Water Inspectorate. The innovative nature of RAPID has allowed three regulators to come together to ensure that we drive forward the water resilient solutions that will positively</p>

	impact the environment and water customers in the long term.
We have facilitated investment in specialist infrastructure designed to deal with effects of climate and population change. For instance, we have allowed £4.6 billion of investment for a new sewer to improve the water quality of the River Thames.	Climate change poses threats to the existing sewer and drainage network due to in part increased rainfall intensity. The Thames Tideway project will see the upgrade of London's sewer system to cope with its growing population and climate change.
We remain committed to ensuring improved financial resilience. At PR19 we took steps to encourage a number of highly geared water companies to improve their financial resilience, by reducing debt levels or by reducing dividends.	Financial resilience is necessary for companies to be able to deal with the uncertainties of climate change linked to emergency responses associated with issues of supply and flooding. Companies need to ensure financial stability and resilience to cope with future unexpected changes in costs as a result of climate change.
We have worked to ensure protection for vulnerable customers. This includes outlining guidelines for water companies in supporting residential customers to pay their bills, access the help they need, and repay debts.	Climate change could impact the future affordability of water services, so ensuring vulnerable customers are protected is essential. In our work on charging, we have worked to ensure protection for vulnerable customers.
We have collaborated with the Environment Agency and the DWI on producing guidance for WRMP24.	Climate change will necessitate that companies increasingly plan for the growing risks to water resources, such as how to respond to the impacts of drought. This has enhanced the focus on setting and delivering long-term environmental ambitions and ensuring the adaptability of plans.
We have developed Direct Procurement for Customers (DPC) as a model for delivery of large projects, including those associated with climate adaptation, and included a requirement in our PR19 Final Methodology for companies to assess as part of their PR19 Business Plans whether any of their large infrastructure projects were suitable to be delivered by DPC. We are continuing to develop new methods of accessing finance and promoting innovation.	Whilst climate change will necessitate that companies improve their infrastructure to be able to deal with resultant system shocks, it is imperative that companies seek to do this in the most cost-effective manner possible to ensure the costs of responding to climate change are minimised. Procurement of major new infrastructure projects opens up competition to provide finance and innovation for new infrastructure. This may assist companies in meeting their resilience targets while providing better value for customers: <ul style="list-style-type: none"> • The first schemes, with investment exceeding £1 billion, seek to reinforce asset resilience in northwest England and south Wales and improve water stressed areas of eastern England. • We have a gated approval process to facilitate investment of up to £180 million on improving resilience within London and have passed the first two of five gates. • The Havant Thicket project which is funded as part of PR19 to improve resilience for Southern Water has now reached planning approval stage and construction is to begin in 2022.
As part of our Green Recovery initiative, set up in July 2020, we have allowed extra funding for green investment projects that are enabling climate change adaptation.	Our Green Recovery decisions (2021) allowed an additional £2.7 billion of funding for environmental investment. This provided extra funding for innovative schemes that contribute toward meeting net zero, such as low-carbon water treatment solutions, nature-based and catchment management solutions and 'blue-green' flood protection infrastructure. We also approved £157 million of funding to help eliminate the

	<p>harm caused by storm overflows and the trialling of the creation of two new bathing rivers.</p> <p>We also provided additional allowances for schemes to mitigate climate change by improving resilience to drought, such as supporting water transfers and installing smart metering to encourage the necessary change in consumer behaviour.</p>
<p>We launched the 'Future Ideas Lab' for PR24 (as a successor to the 'Marketplace for ideas' for PR19).</p> <p>We aim to enable stakeholders to share and collaborate on ideas to further the development of the framework for PR24 and beyond.</p>	<p>Effective responses to climate change, particularly in relation to managing issues of uncertainty, are significantly dependent on collaboration and sharing of information. We want to actively work with companies to reach the best outcomes to ensure we are doing all we can to help the sector prepare for future challenges.</p>
<p>We are a key member of the storm overflows taskforce. The long-term ambition of the taskforce is to eliminate harm from storm overflow discharges.</p>	<p>Reducing instances of, and impacts from, storm overflow discharges is crucial as climate change presents challenges including more frequent extreme weather occurrences and risks to infrastructure. We intend to continue our work alongside Defra and others on the taskforce, including to support the implementation of new storm overflow duties on Defra and water companies in the Environment Act 2021.</p>
<p>We are part of the National Drought Group.</p>	<p>Climate change threatens to increase and exacerbate the frequency and intensity of droughts thus impacting security of supply. The work of this group is focused on collaboration to increase the resilience of England and Wales to the impact of drought on the public water supply, food production and the environment</p>
<p>We are part of the Senior Water Demand Reduction Group, set up in 2021.</p>	<p>More effective management of consumer demand for water will play a key role in helping companies respond to and manage the impacts on climate change on the availability of freshwater resources both for consumers and the environment. This group works to ensure water supply in England is resilient to climate change and population growth. Actions to date include monitoring progress against the water reduction targets at a national and regional level, and making recommendations to fellow regulators, Defra and industry on actions needed to correct risks, barriers, under-delivery or accelerate change.</p>
<p>In partnership with the UK government, the water industry, and environmental organisations, we have developed a Chalk Stream Restoration Strategy. As part of the strategy, Ofwat has committed to a review of the abstraction incentive mechanism (AIM).</p>	<p>Climate change will result in less water not only being available in the environment for consumers to use but also for the habitats it sustains. The review of AIM seeks to ensure that it is fit for purpose and to identify how it can be adapted to increase its effectiveness to ensure these unique habitats are appropriately utilised, particularly in the context of changing climate.</p>
<p>We carried out, and are now considering how we can take forward the findings of, our asset management maturity assessment (AMMA).</p>	<p>Climate change threatens to accelerate the deterioration, and thus ability of assets to deliver water and protect against flooding. Asset management is a key part of long-term resilience and is essential to ensure the environment is properly protected and that customers get an excellent and reliable service from their water company.</p> <p>Our AMMA has given us valuable insights and provided cross-sector visibility of key asset management issues, challenges and good practice. It has created opportunities for companies to identify areas to improve and share knowledge to improve</p>

	<p>asset management across the sector. Good asset management practice is crucial to understanding risks to assets, and, in turn, preparing for these risks.</p> <p>Ofwat now expects companies to work together to reflect on the AMMA findings and recommendations and share good practice to improve asset management maturity across the sector.</p>
<p>We will be taking account of DWMPs, in conjunction with other strategic planning frameworks, in PR24 and future price reviews, as explained in our document 'Creating tomorrow, together'.</p>	<p>This will inform how we can help companies plan adequately for future risks from climate change.</p>
<p>We are actively encouraging and facilitating the use of nature-based solutions to help companies better manage the risks from climate change.</p>	<p>We view the increased uptake of nature-based solutions as being key to enabling the sector to effectively respond to the challenges of climate change in a lower carbon way and one that maximises wider environmental value¹⁹.</p>
<p>At PR24 we will encourage companies to increase their focus on the long term.</p> <p>We are setting out expectations that companies use scenario planning and other techniques to alleviate future uncertainty in their strategies.²⁰</p>	<p>To help companies address challenges and uncertainties of climate change, the resultant expenditure, and the need to be adaptive in light of uncertainties around impact and costs, from PR24 onwards, we are asking companies to submit long-term delivery strategies alongside their 5-year business plans. Companies should use these strategies to set the context of their five-year plan, including the long-term outcomes they are aiming to deliver, how they expect to meet government targets, and the key investments and interventions likely needed to achieve them, taking into account future uncertainties such as from climate change.</p>
<p>We are committed to ensuring greater customer engagement will continue to be a key focus area for PR24.</p>	<p>Understanding customers and their needs is essential for understanding future challenges that may be faced. Also, customers will be part of the solutions to future challenges, such as reducing per capita consumption, so good customer engagement is crucial for companies' adaptation to climate change.</p>
<p>At PR24, we are proposing to consider a wider set of common performance commitments related to environmental outcomes including carbon emissions and biodiversity²¹.</p>	<p>Increasing focus on environmental outcomes is key for mitigating climate change and reducing the impact of climate change on companies.</p>
<p>We are encouraging the sector to use open data more.</p>	<p>Open data could aid in the development of long-term projects and solutions that protect the environment, providing a cross-sectoral data set to draw upon to deliver predictive forecasting and better understand the state of the environment allowing companies to respond to and manage the consequences of climate change.</p> <p>We recently published a document outlining our views on how open data can enable water companies to create value for water customers, communities, and the environment. We have stated in 'Creating tomorrow, together' that we expect companies to be making better use of data, including by embracing open data.</p>

¹⁹ Ofwat, '[PR24 and Beyond: Creating tomorrow, together](#)', May 2021, p. 4

²⁰ Ofwat, '[Long-term delivery strategies and common reference scenarios](#)', November 2021

²¹ Ofwat, '[PR24 and beyond: Performance commitments for future price reviews](#)', November 2021

<p>We are committed to sound internal governance procedures to ensure our effectiveness in fulfilling our role and supporting companies in the challenges they face, to ultimately ensure value for customers.</p>	<p>Through our Board, Leadership, Transparency and Governance principles (which we updated in 2019), we also expect companies to think about the long-term and principal risks. We also assessed to what extent companies were meeting these principles in Feb 2021. This is important to ensure companies have the correct frameworks in place to prepare for climate risks.</p>
<p>We are actively encouraging technological innovation and increased ground and weather monitoring.</p>	<p>Technological innovation will help the sector to be more responsive and prepared for the impacts of climate change. For example, improved ground and weather monitoring will help companies predict changes to subsurface soil composition, predict impacts of weather events on infrastructure etc. We are doing this via our work on the WINEP, the Green Recovery initiative, and our Innovation funding competition.</p>

We recognise that we need to accelerate action from companies further to ensure they can respond to risks and issues as they arise. Recognising risks as they change and develop is crucial, so companies need to continuously reflect on their preparedness for climate change and their flexibility in adapting to future challenges. Our increased focus on the long term at PR24 and encouraging the use of long-term adaptive planning approaches pushes companies to have greater consideration of the future and hopes to facilitate greater flexibility and preparedness for the future. As we look to the future, we will continue to evolve our approach to climate change adaptation, particularly as result of the new SPSs for Ofwat due to be published by Defra and the Welsh Government in 2022.

5. Next steps and opportunities

Climate change is very much a present and worsening issue that poses significant challenges to the delivery of safe and effective water and sewerage services. As section one highlights, our statutory duties, particularly in the areas of resilience and sustainable development, mean we can and do play a critical role in ensuring the water sector effectively responds to climate change for current and future customers.

Our commitment to enabling the water industry to respond to the risks and subsequent challenges of climate change is made clear in our current strategy, 'Time to act, together', with our commitment to delivery made clear in this report and through our funding decisions at price reviews, in particular PR14 and PR19 (see sections three and four). At PR24 we will further enable the sector to respond to and plan for climate change through adaptive planning and the adoption of common reference scenarios to help companies effectively respond to the challenges and uncertainties of climate change.

Despite the risks and challenges climate change poses for the water sector (see section 2), climate change also presents significant opportunities in relation to environmental restoration and quality enhancements, for example through the increased use of nature-based solutions such as sustainable drainage solutions. Such activities can also play a critical role in helping to create landscapes that are more resilient to the effects of extreme weather, such as flooding by increasing the ability to deal with increased surface water flows. Through our green recovery determinations, we have enabled companies to build on these opportunities by allowing them to take forward several nature-based solutions and catchment management schemes.

Opportunities also exist in relation to the utilisation of national and international voluntary standards to encourage greater accountability and continual improvement on climate change. For example, our approach to the reporting of GHG emissions encourages water companies to utilise voluntary standards to ensure that they not only make progress in reducing in their emissions but that they can robustly demonstrate the outcomes of action to a variety of stakeholders. Efforts to reducing GHG emissions will play a key role in shaping and limiting the types and extent of adaptation required by water companies.

With a view to ensuring we are fully engaged with and aware of customer views at the next price review (PR24), we have recently published [a position paper](#) which sets out our intentions for how we are going to conduct collaborative customer research, with CCW and the water sector to inform common PCs, ODI rates and acceptability and affordability testing. Such collaboration will afford us significant opportunities in relation to ensuring our actions are aligned with customers' concerns, notably climate change.

Our current and developing future commitments to climate change adaptation (see section 4) will allow the water sector to adapt to climate change, in doing so enabling it to become more resilient to the effects of climate change and the changing needs of society. Increasing focus on the long term at PR24 and requiring companies to implement long-term adaptive planning, for instance, will help the sector to consider future impacts climate change will bring and, in turn, will help companies prepare for such challenges.

To ensure our understanding of climate change adaptation is fully reflective of company planning and cross-sectoral best practice, such as the recommendations of the TCFD, we will continue to keep our own arrangements under review, and work with water companies to ensure our understanding and responses are what is needed to enable them to be able to effectively plan for and respond to the impact of climate change.

To ensure we make clear to our stakeholders our expectations for climate change adaptation (and mitigation) in the water industry, we will also update our climate change statement (last updated 2008). This will let us build on our work centred on company responses to net zero and the reporting on GHG emissions, with a view to enabling companies to respond climate change more effectively.

Appendix

Table A1 – Ofwat's understanding of climate change risks to the water sector

CCRA3 categories (7 water sector specific categories)	Defra (4 categories)	Risks identified by companies (2015) and Ofwat (2011) *risks not identified by companies	Risks solely identified by companies (2015)
Risks to infrastructure networks from cascading failures	Cascade failures due to interdependencies	Increased sewer blockages because of low flows	Reservoir siltation
		Increased risk of power outages	
		Increased fires *	
Risks to infrastructure from river, surface water and groundwater flooding	Risks from flooding	Increased risk of company assets flooding	Groundwater flooding
		Increased sewer flooding	Dam Safety
		Increases in combined sewer overflow (CSO) discharges	Damage to buildings / infrastructure Groundwater infiltration to sewer
Risks to infrastructure from coastal flooding and erosion	Risks from flooding	Increased risk of company assets flooding	Outfalls restricted by rising sea levels
		Increased risk of coastal flooding of company assets	Coastal erosion
Risks to public water supplies from water availability (England)	Risks to public water supplies from drought and low river flows	Reduction in surface water and groundwater resource yields in summers	Abstraction restrictions
Risks to public water supplies from water availability (Wales)		Increases in multi and single year droughts	Emergency water transfer
		Increased demand for potable water	
		Increased raw water demand	
Risks to health from poor water quality and household supply interruptions		Increased pollution of raw water	Water quality in treatment / storage / distribution
			Bathing water compliance
			Low water pressure
			Reduced availability of water for blending

Risks to aquifers and agricultural land and saltwater intrusion			Saline intrusion (groundwater)
			Increased salinity in surface intakes
	Risks to productivity due to infrastructure disruption.	Changes in water available for hydro power generation *	Supply chain
			Damage to ICT / Telecoms
			Transport disruption
Risks to subterranean and surface infrastructure from subsidence		More soil moisture deficit (SMD) driven leaks and bursts	
		Accelerated asset deterioration	
Additional risk areas identified by Ofwat and water companies			
Risks to Environment		Reduced river flows require increased discharge constraints	Spread of non-native species
		Increased algal blooms	
Risk to People		Increased odour problems	Poor customer experience
			H&S of operational staff
		Increases in waterborne diseases	Affordability
			Bathing water compliance
Risk to financial stability			Financial rating
			Opex costs
			Insurance costs
'Other'			
			Saturated ground preventing sludge recycling
			Reduced demand for bio solid

Key

CCRA3 – Action levels for England and Wales

More action	Further investigation	Sustain current action	Maintain a watching brief
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Ofwat risk colours -

High	Medium	Low
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**Ofwat (The Water Services Regulation Authority)
is a non-ministerial government department.
We regulate the water sector in England and Wales.**

Ofwat
Centre City Tower
7 Hill Street
Birmingham B5 4UA
Phone: 0121 644 7500

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Any enquiries regarding this publication should be sent to mailbox@ofwat.gov.uk.

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