

The cover illustration is a circular diagram with a teal center. The center contains the title 'Climate Change Adaptation' in large white font, followed by 'External Accessible Report' and '2022' in smaller white font. Surrounding the center are various icons connected by dashed lines: a sun over cracked earth, a cracked building, a storm cloud with lightning, a leaking pipe, a tornado, a pipe discharging into a polluted pond with a fish and a green object, a forest fire, and two industrial buildings. Small blue circles and wavy lines are scattered around the diagram.

Climate Change Adaptation

External Accessible Report

2022

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Foreword from our CEO



Climate change is one of society’s greatest challenges. Average temperatures have already increased, rainfall patterns have been altered, and these trends are continuing. Our supply area is already classed as being in serious water stress, and climate change will increase current challenges, posing a risk to the services and supplies to our customers if we do not take action.

We are committed to achieving operational Net Zero Carbon by 2030, playing our part in helping the UK achieving its Net Zero goal. But despite this, some of the impacts of climate change will continue to threaten us, because of past and current global actions which are increasing greenhouse gas emissions and damaging land and aquatic ecosystems.

We need to continue to build resilience and adapt to climate change, so that we can continue to provide an essential service to our customers that is fit now and for the future. This is one of our 5 Pledges, and aligns with our company purpose: “Harness the potential of water to enhance nature and improve lives”.

This report describes how we have identified key climate change risks to our services, and the actions we are taking to manage these risks. These actions include existing controls we have in place, as well as investing in additional measures for the long term.

For example, as a member of Water Resources South East (WRSE), we are working with neighbouring water companies to develop a regional resilience plan for water resources in South East England, which will deliver the most benefit to people across the region, the environment, and sectors that rely on water.

In parallel with adapting to climate change we are also committed to protecting the natural environment. We remain the only water company to currently hold The Wildlife Trusts’ Biodiversity Benchmark certification, having achieved it for two of our sites, making us industry-leaders in our goal to enhance and protect biodiversity.

We are continuing to work with our partners to refine our adaptation plans, and to deliver a climate resilient service whilst maintaining affordable bills for our customers.

Our climate adaptation work will inform the development of our next business plan in 2024, and we are keen to hear your thoughts on this work and our priorities for the future.

Ian Cain
CEO – SES Water

Key Messages

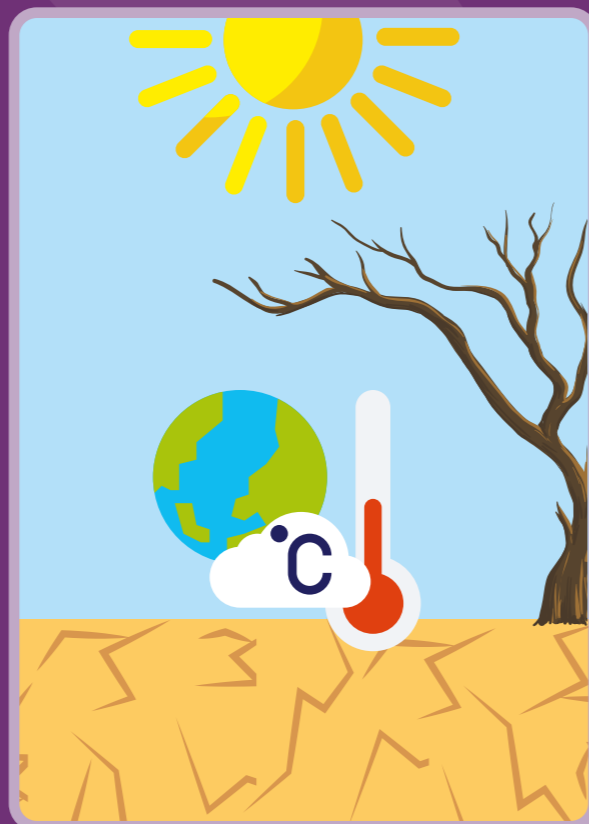
At SES Water, we recognise climate change poses a significant challenge in serving our customers and protecting the environment.

Our supply area has been classed an area of 'serious water stress' by the Environment Agency, and climate change will increase current challenges. It is important we understand the risks we face, put in place controls to manage these risks, and identify where additional investigation, action and investment are required to improve our ability to be resilient in the face of climate change.

Climate change has already increased average temperatures and changed rainfall patterns, and the evidence shows these trends will continue.

Climate projections indicate more droughts, increased storm intensity and flooding, subsidence, and an increased risk of a decline in biodiversity, which could pose a risk to our water resources, water quality, and water production and supply networks.

Adapting to climate change is an ongoing process. As part of this we have undertaken a climate change risk assessment and reviewed our plans for adapting to climate change and minimising our contribution to it. The outcomes from our assessment are summarised in the following pages.



Our key actions for managing risks and adapting to climate change

We have controls in place to manage climate change impacts on our operations and the wider environment, and we are working to enhance these in the current and future investment periods. These include:

Sustainable management of our water resources

Enhancing resilience in our production and supply systems

Safeguarding our water quality

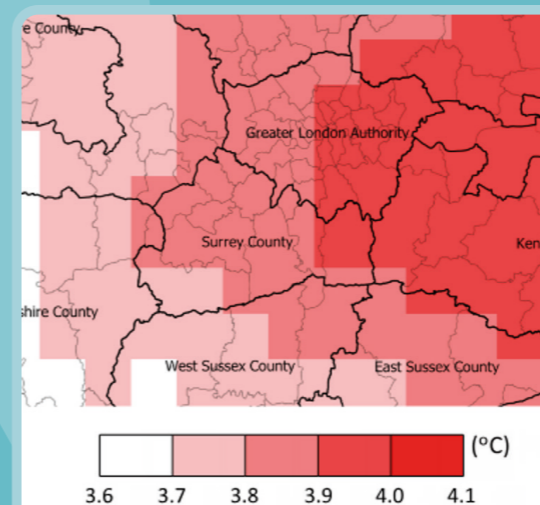
Enhancing the environment

This is part of our wider climate and environmental commitments, including our work towards achieving operational Net Zero Carbon emissions by 2030. As part of our Business Plan for 2020 to 2025 we are investing £39.8 million into improvements to

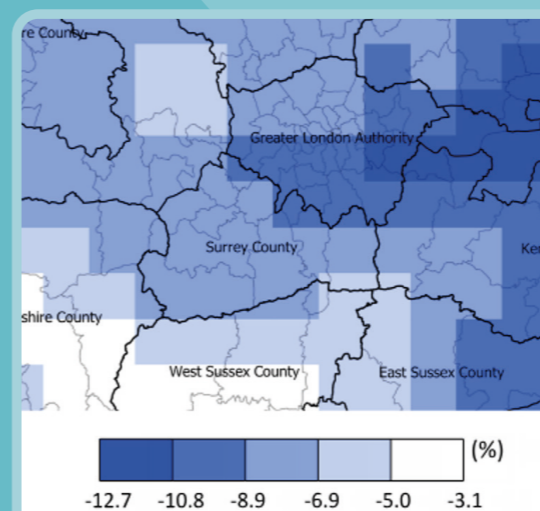
our service, resilience, and the environment. We will continue to engage with and listen to our customers and work closely with our partners and stakeholders to achieve the shared outcome of a climate resilient future for our region.

Climate Trends in South East England

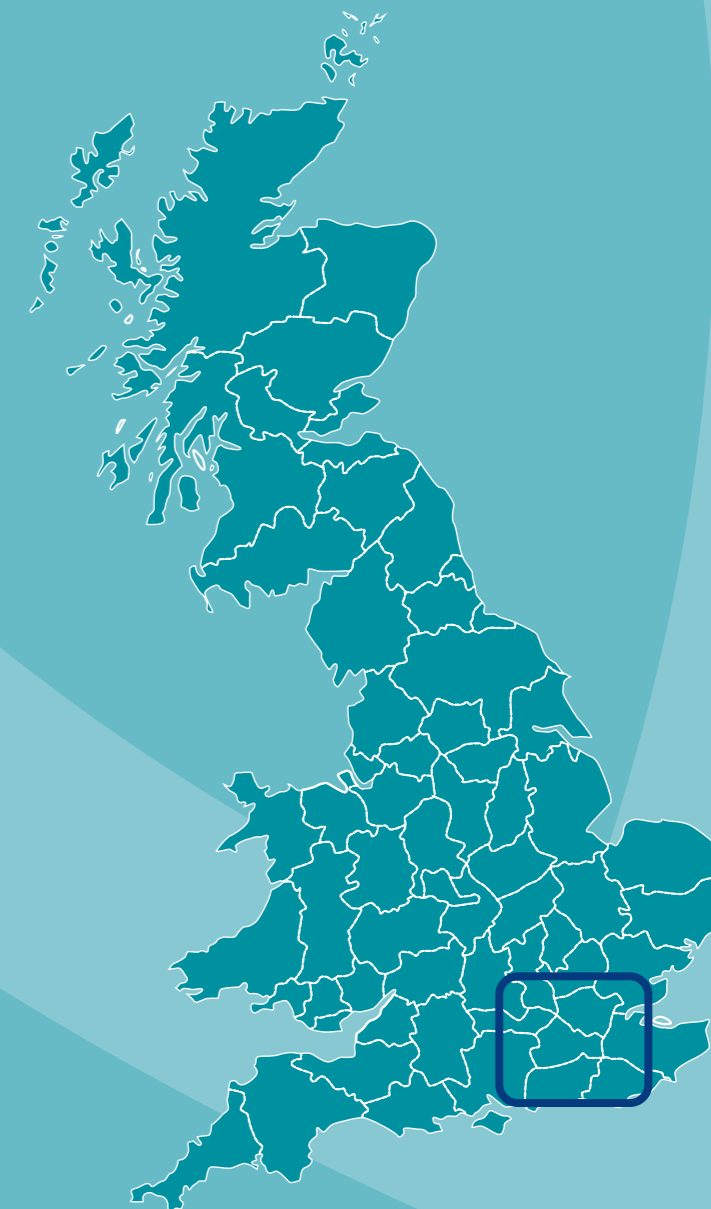
Climate models provide future climate projections which demonstrate the impacts of climate change in the South East. The latest UK climate projections from 2018² show increasing temperature and rainfall variability in 2080 under a high emissions scenario; a scenario where there has been limited global action to reduce climate change. Temperatures are projected to increase, and annual rainfall is projected to decrease.



Projected change in average temperature in 2080 under the high emissions scenario (compared to temperature between 1981-2010)



Projected change in average annual rainfall in 2080 under the high emissions scenario (compared to rainfall between 1981-2010)



² UK Climate Projections 2018: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp>

Our region

SES Water supplies water for over

745,000

customers across Surrey, West Sussex, Kent and south London.



85%

of our water comes from underground sources beneath the North Downs

15%

is abstracted from the River Eden and stored in Bough Beech reservoir near Edenbridge

We supply **160 million** litres of water each day which can rise to

225 million

litres during a hot summer

Recent trends

The most recent decade (2009-2018) **+1°C** - the average increase in temperature compared to the pre-industrial period

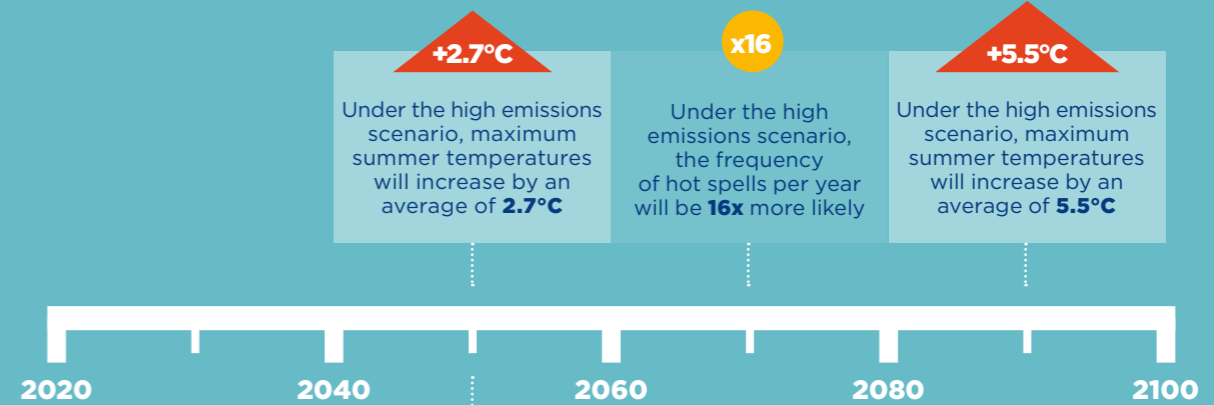


Future trends

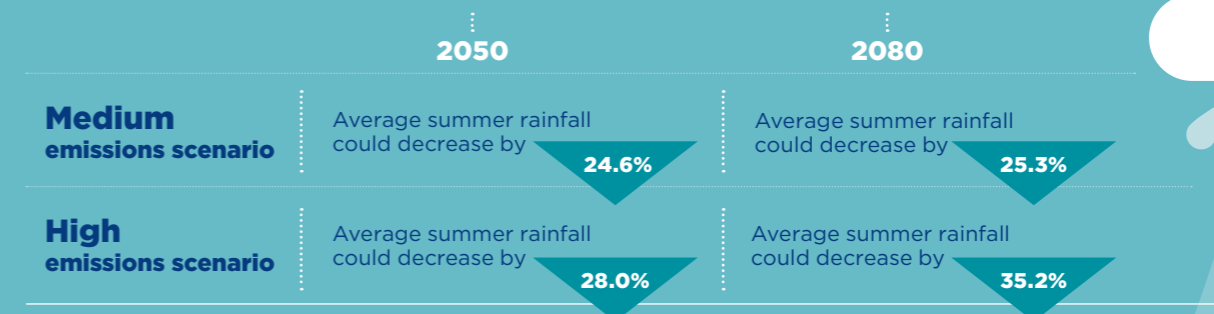
The latest UK climate projections (2018) provide an indication of how the climate might change under different greenhouse gas emissions scenarios. The high emissions scenario is commonly used for assessing climate change risks, because it provides an indication of some of the most severe impacts from climate change

Based on the current policy commitments around the world, the planet is on track for warming somewhere between a medium and a high emissions scenario². Therefore, far more action is needed to reduce greenhouse gas emissions, alongside actions to adapt to climate change and safeguard our communities and the environment.

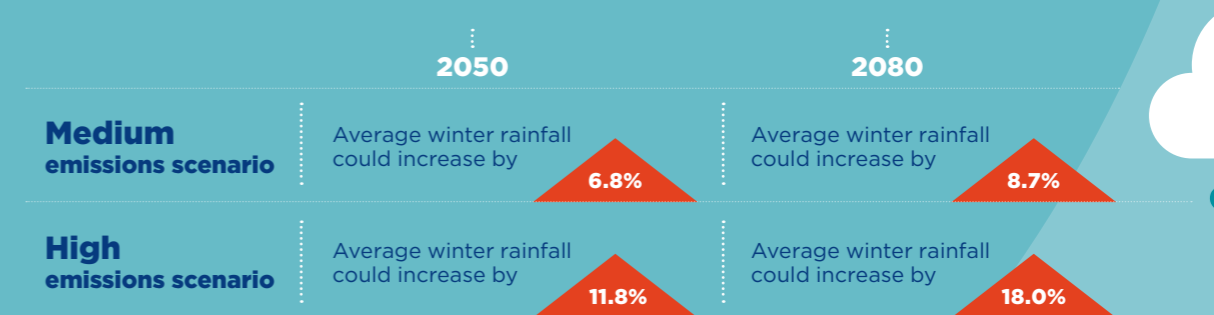
Hot summers will become more common



We can expect **drier summers** but with possible increases in the intensity of heavy summer rainfall events

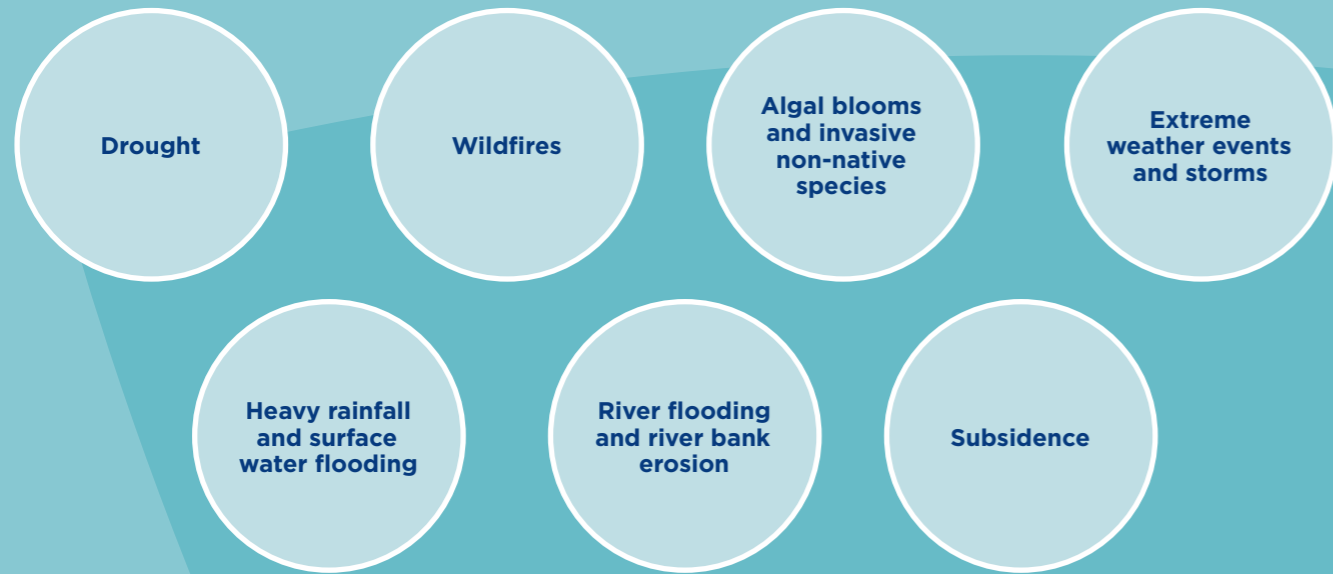


We can expect an **increase in winter rainfall** with a high level of variability



² Climate Action Tracker 2022: <https://climateactiontracker.org/publications/despite-glasgow-climate-pact-2030-climate-target-updates-have-stalled/>

Climate change projections and science indicate there will be an increased risk of:



Our Customer and Stakeholder Priorities

Our commitment to our customers centres around the issues that matter most to them. Our Pledges reflect the customer and stakeholder priorities we are delivering between 2020 and 2025. We established these priorities in 2019 through extensive engagement with our customers and stakeholders, and we will be updating these and continuing to engage with customers and stakeholders as we develop our next business plan.

We shared the outcomes from our climate change risk assessment with a customer focus group in August 2021, and we presented this work to our Environmental Scrutiny Panel in October 2021. We have since published the detailed assessment on our website, and submitted the report to the UK government as part of their climate adaptation programme.



Our Climate Change Risk Assessment

We are already experiencing the impacts of climate change, and we know the scale of the challenge ahead. We have taken a precautionary approach in our climate change risk assessment to avoid underplaying the significance of the challenges that we face, and the challenges faced by our suppliers and the infrastructure we rely on.

To assess our risks we considered the impacts of climate change across our area and business, and we screened for risks which are of most significance to us. We then assessed these risks up to 2080 if we did nothing to manage the risks, before assessing them again with consideration of our current and planned adaptation actions.

Risks from **drought and peaks in water demand**

Risks to our **water quality and natural capital** (including algal blooms, invasive non-native species, run-off, and pollution)

Risks to our assets from **subsidence**

Risks to our assets from **flooding, high river flows, and riverbank erosion**

Risks of household **water supply interruptions due to extreme weather and wildfires**

Risks from the **failure of infrastructure which we rely on**

For each risk we assessed the likelihood and the consequence of the impacts, and we multiplied these together to determine a risk score as shown in the table below. Risks are then classified as high (red), medium (yellow) and low (green).

Table -1 - Our risk scoring matrix

| | | | | | | |
|--------|-----------|-----------------|----------|----------|--------|---------------|
| Impact | Very high | 5 | 10 | 15 | 20 | 25 |
| | High | 4 | 8 | 12 | 16 | 20 |
| | Medium | 3 | 6 | 9 | 12 | 15 |
| | Low | 2 | 4 | 6 | 8 | 10 |
| | Very low | 1 | 2 | 3 | 4 | 5 |
| | | Highly unlikely | Unlikely | Possible | Likely | Highly likely |
| | | Likelihood | | | | |

In this report we have focused on six key risks across our operations in line with Government requirements. In the Appendix we provide further details of the risks.

Our Adaptation Plans

We have developed plans to manage our risks and adapt to climate change, and we are continuing to investigate areas where we need more information to decide how significant the risk is and how we can best respond. Climate change data and research constantly evolve, meaning the risks may be greater than we know at present. We recognise that our adaptation plans assume and require a joint effort between a range of organisations, including local authorities, environmental groups, and national government.

Risks to our assets from flooding, high river flows, and riverbank erosion

9 20

Climate driver
Storms, heavy rainfall

Adaptation actions

- Enhanced flood resilience at some key sites
- Flood risk assessments
- Incident management plan
- Improved supply network connectivity and dual supply for customers

Link to Our Customer Pledges: **3**

Risks to water quality and natural capital (including algal blooms, invasive non-native species, run-off and pollution)

12 25

Climate driver
High temperature, storms, heavy rainfall

Adaptation actions

- Catchment management strategy
- Water source monitoring and selectivity
- Biodiversity Action Plan
- Wildlife Trust's Biodiversity Benchmarking certifications
- Improved supply network connectivity
- Water treatment process solutions
- Water quality investigations
- Surveying for invasive non-native species

Link to Our Customer Pledges: **1, 3, 5**

Risks to our assets from subsidence

12 25

Climate driver
High temperature, low rainfall

Adaptation actions

- Enhanced monitoring and soil moisture modelling
- Targeted renewal of assets at risk

Link to Our Customer Pledges: **3**

Risks from droughts and peaks in water demand

9 20

Climate driver
High temperature, low rainfall, heatwaves, wildfires.

Adaptation actions

- Ensuring sufficient water storage
- Leakage reduction programme
- Customer engagement and metering
- Drought Plan
- Planning for 1 in 500 year drought resilience
- Future scenario testing
- Improved supply network connectivity

Link to Our Customer Pledges: **1, 3, 4**

Risks of household water supply interruptions

6 12

Climate driver
High temperature, heatwaves, storms, cold snaps, wildfires

Adaptation actions

- Improved supply network connectivity
- Strategic placement and protection for key assets
- Asset renewal

Link to Our Customer Pledges: **1, 3, 4**

Risks from the failure of infrastructure we rely on

8 16

Climate driver
High temperature, heatwaves, storms, cold snaps, wildfires

Adaptation actions

- Communications and power alternatives
- Surplus chemical storage
- Mutual aid schemes

Link to Our Customer Pledges: **3**

Our Priorities for Future Investment

Adapting to climate change is an ongoing process, and our Adaptation Report reflects where we are currently at with understanding the risks and taking the right actions, while recognising we have to do more in future investment periods. We recognise there are some areas where our understanding of our risks from climate change could benefit from more investigation and analysis, and we will be consulting with our customers and others to understand their priorities when we develop our future investment plans.

Looking ahead, our work as a company will be focusing on the following areas:

- Enhancing systems-based resilience across our company** – we will be progressing the work carried out in developing our climate change risk assessment and enhancing our adaptation actions across all of our systems.
- Embedding climate adaptation and resilience measures into all our investments** – our investments in infrastructure and across our business will consider climate change and include adaptation measures into the investment, to ensure we remain resilient and able to continue to provide wholesome water for our customers whilst protecting the environment. **Adapting to climate change while managing affordability** – we will continue to take action to adapt to climate change and enhance our environment, whilst keeping bills affordable for our customers. We will use findings from this Adaptation Report to inform our planning for future investment periods, while engaging with customers to understand their priorities for investment and supporting customers who are struggling to afford their bills.
- Achieving net zero carbon** – we are continuing work towards achieving operational net zero carbon emissions by 2030. We will continue to be mindful of the carbon footprint of any actions we take to adapt to climate change, ensuring that we are not hindering our efforts towards net zero carbon.
- Collaborating to enhance resilience** – we will continue to listen to and engage with our customers and work closely with our partners and others to achieve the shared outcome of a climate resilient future for our region.
- Learning from others** – we will continue to learn from others across the water sector and from other sectors and countries in adapting to climate change.



Case Study: Enhancing Network Resilience

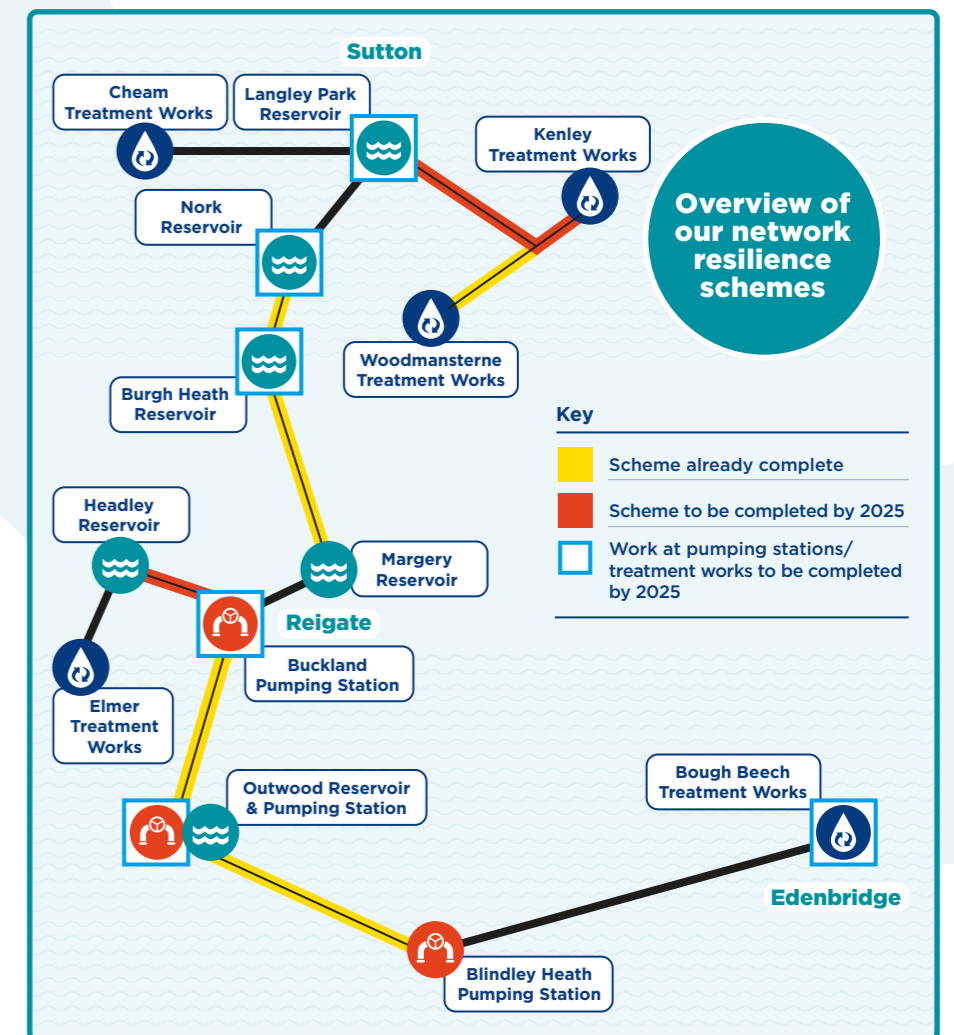
Climate change will affect how much water is available and its quality. Our supply area, which is already an area of serious water stress, will see changes to rainfall patterns and temperatures that will not only threaten water availability but will also impact on water quality with the increasing risk of algal blooms and invasive non-native species.

The challenge

When water quality issues arise, our ability to supply clean and safe water may be impacted. Therefore, to protect our supply and our customers we have to stop using that source and turn to alternative options. For example, during long hot spells we have experienced algal blooms at Bough Beech Reservoir which has reduced the amount of water available to us to abstract for several weeks, so that we rely on our other sources of water to supply our customers during that time.

Our climate change adaptation

When water quality issues have arisen in the past, we have been able to select alternative water sources and move water around due to the connectivity of our network. The ability to easily switch to alternative water sources reduces the need for temporary water supplies and ensures continuity in the supply of safe drinking water to our customers. Since 2010, we have been progressing with a resilience programme to increase the connectivity of our supply network with strategic new water mains between key locations as shown in the map below. When this work is completed in 2025 we will be able to supply every customer from more than one treatment works, increasing our resilience to water quality issues – such as due to algal blooms – in addition to any other supply interruptions.



Case Study: Our Commitment to Biodiversity

Healthy ecosystems can help to breakdown water pollutants and maintain natural balance in the water cycle, essential for our supply of safe and good quality water.

The challenge

The presence of invasive and non-native species (INNS) is an increasing threat to water companies, driven by changing climate conditions creating situations where some INNS grow or outcompete native species more rapidly. This reduces water quality and impacts the availability of drinking water. Actions to mitigate against the introduction and spread of INNS are likely to be expensive, so this is a risk that we are continuing to monitor.

The Wildlife Trust's biodiversity benchmarking certification

Healthy ecosystems with high biodiversity can help reduce INNS. At our Elmer Treatment Works site in Leatherhead, we enhanced biodiversity by undertaking habitat surveys; reduced lawn mowing to allow wildflowers to flourish; installed bird boxes and created bug hotels and deadwood piles to provide a food source and habitat for a range of species including beetles, bees, and birds.

Our work has led us to become the only water company to currently hold The Wildlife Trusts'

Biodiversity Benchmark certification, making us industry-leaders in our commitment to enhance and protect biodiversity. We have also been awarded this accreditation at both our Elmer Treatment Works and our 13 acre Fetcham Springs site in Surrey. We hope to gain the Benchmark certification at Bough Beech Reservoir in Kent by 2025.

We are continuing to enhance biodiversity across all our sites to protect our Natural Capital. For example, we've installed eel screens at our Goat Bridge site on the River Wandle near Hackbridge, and Barn Owl boxes on the land we lease to Kent Wildlife Trust near Bough Beech Reservoir.



Pardon the weeds we are feeding the bees!



Case Study: Our Collaborative Planning for Water Resources

We are a member of Water Resources South East (WRSE) which is an alliance of the six water companies in the South East of England, collaborating with advisory members from the Government, the Environment Agency, and Ofwat (our economic regulator). The key aim of WRSE is to consider the opportunities and options for sharing water resources and enhancing resilience on a regional basis.

The challenge

Climate change will put a strain on both our surface water and groundwater supplies, leading to drought conditions in our already seriously water stressed supply area.

Our climate change adaptation

With WRSE, we have modelled our water resources over the long term to understand how we may use our resources more sustainably.

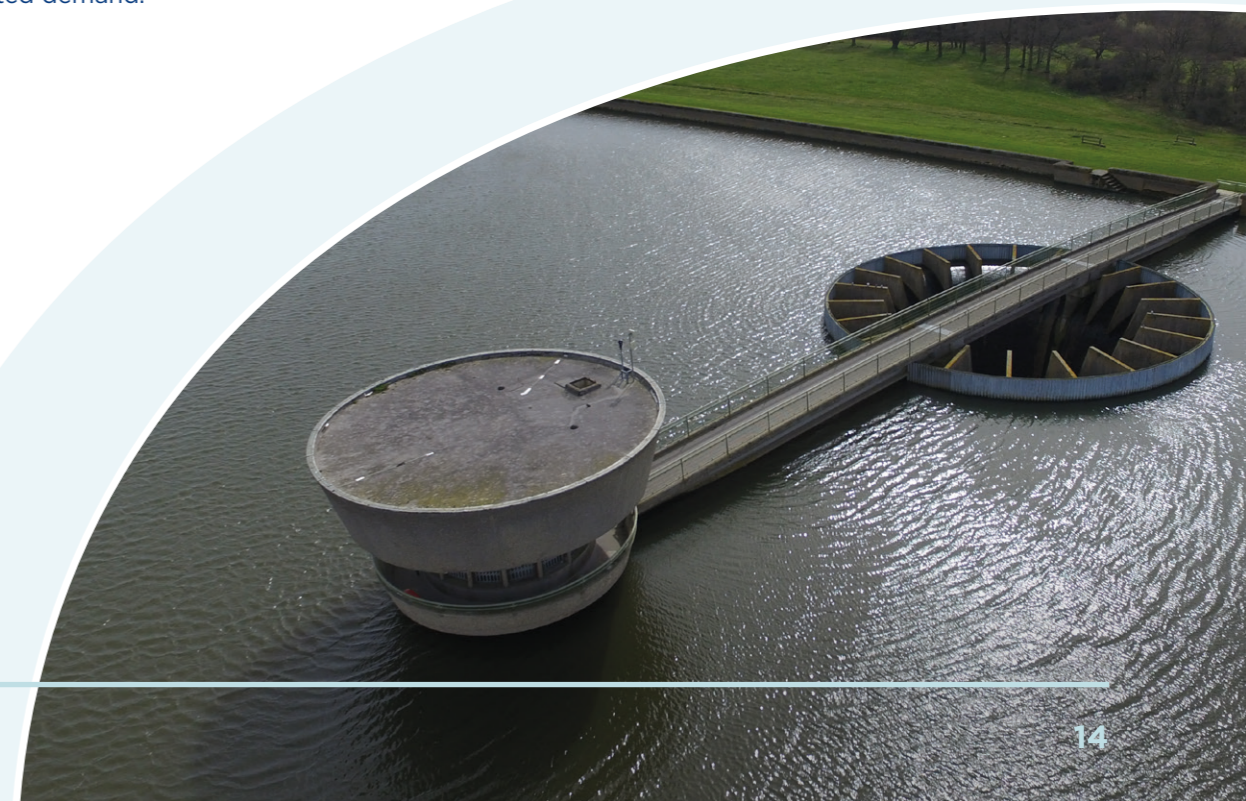
We tested the impacts of climate change on our surface water and groundwater sources for a 1 in 500-year drought event up to 2098.

We also forecasted future water demand for both a normal year and a dry year, considering the impacts of climate change on rainfall and temperature to inform our assessment.

We then tested the impact of a 1 in 500-year drought event on our forecasted availability of supply to meet the forecasted demand.

We were able to consider and test various supply-side and demand-side adaptation actions taking into account environmental considerations, costs, and inputs from stakeholders and customers to develop a preferred programme of demand and supply options.

We are continuing to work with our neighbouring water companies and other stakeholders in our region to maximise the sustainable use of water resources, including the option for us to transfer water to other companies in the future at times when they are in need.



Appendix A. Our Climate Change Risk Assessment

In this appendix we provide further detail of our climate change risk assessment.

Table 2 - A summary of our climate change risk assessment

| Key climate risk | Cause of climate risk | Our understanding of the risk (H/M/L) | Risk scoring before controls and adaptation | Risk scoring after controls and adaptation | Examples of our risk controls and adaptation actions |
|---|---|---------------------------------------|---|--|---|
| | | | Risk score (1-25) | Risk score (1-25) | |
| Risks from drought and high/peak water demand | High/peak demand due to heatwaves | M | 20 | 9 | <ul style="list-style-type: none"> • Ensure sufficient water storage • Leakage reduction programme • Customer engagement and metering • Drought Plan 2021 • Planning for 1 in 500 year drought resilience • Future scenario testing |
| | Drought impacting water supply | H | 20 | 8 | |
| | Climate induced land use change leading to high/peak demand | L/M | 12 | 6 | |
| | High temperature and low precipitation leading to reduced abstraction allowance | M | 12 | 6 | |
| | Wildfires and urban fires increasing water demand | L | 6 | 6 | |
| | | | | | |

| Key climate risk | Cause of climate risk | Our understanding of the risk (H/M/L) | Risk scoring before controls and adaptation | Risk scoring after controls and adaptation | Examples of our risk controls and adaptation actions |
|--|---|---------------------------------------|---|--|---|
| | | | Risk score (1-25) | Risk score (1-25) | |
| Risks to water quality and natural capital | High precipitation increasing run off and pollution | M | 25 | 12 | <ul style="list-style-type: none"> • Catchment management strategy • Water source monitoring and selectivity • Biodiversity Action Plan • Wildlife Trust's Biodiversity Benchmarking certifications • Improved supply network connectivity • Water treatment processes • WINEP water quality investigations • Surveying of INNS |
| | Declining natural capital due to high temperatures and low precipitation | L/M | 16 | 9 | |
| | Algal blooms due to high temperatures | L/M | 16 | 8 | |
| | Increased INNS driven by high temperatures | L/M | 15 | 6 | |
| | Changing climate driving land use change increasing pollution | L | 12 | 6 | |
| | Changing climate increasing wildfires driving increased diffuse pollution | L | 9 | 6 | |

| Key climate risk | Cause of climate risk | Our understanding of the risk (H/M/L) | Risk scoring before controls and adaptation | Risk scoring after controls and adaptation | Examples of our risk controls and adaptation actions |
|---------------------------------|---|---------------------------------------|---|--|---|
| | | | Risk score (1-25) | Risk score (1-25) | |
| Risks from flooding and erosion | High precipitation causing river, surface water and/or groundwater flooding of assets | L/M | 20 | 9 | <ul style="list-style-type: none"> Enhanced flood resilience at some key sites Flood risk assessments Incident management plan Improved supply network connectivity and dual supply for customers |
| | High precipitation causing river bank erosion impacting assets | L | 12 | 9 | |
| Risks from subsidence | Subsidence causing damage to assets | M | 25 | 12 | <ul style="list-style-type: none"> Enhanced monitoring and soil moisture modelling Targeted asset renewal |
| | High temperature and low precipitation leading to failure of earth impounding reservoir | L | 10 | 4 | |

| Key climate risk | Cause of climate risk | Our understanding of the risk (H/M/L) | Risk scoring before controls and adaptation | Risk scoring after controls and adaptation | Examples of our risk controls and adaptation actions |
|--|--|---------------------------------------|---|--|--|
| | | | Risk score (1-25) | Risk score (1-25) | |
| Risks from failure of interdependencies | Climate-induced disruptions to energy and telecoms | L | 16 | 8 | <ul style="list-style-type: none"> Communications and power alternatives Surplus chemical storage Mutual aid schemes |
| | Disruption to supply of critical materials and equipment | L | 16 | 9 | |
| Risk of household water supply interruptions | Extreme weather causing failures in production network | L | 12 | 6 | <ul style="list-style-type: none"> Improved supply network connectivity Strategic placement and protection for key assets Asset renewal |
| | Extreme weather causing failures in distribution network | M | 20 | 9 | |
| | High temperatures causing assets to fail in production and distribution networks | L | 12 | 6 | |
| | Wildfires causing damage to assets | L | 9 | 6 | |

