

## Appendices

### C Environmental Baseline Review

#### C.1 Biodiversity, Fauna and Flora

##### C.1.1 Baseline

Biodiversity comprises the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. The importance of preserving biodiversity is recognised from an international to a local level. Biodiversity has importance in its own right and has value in terms of quality of life and amenity.

The sensitivity of environmental features that can be affected by implementing drought management measures is site specific. A drought is transient, and the deployment of a drought management measures would only be for a limited period of time. Therefore, the duration of effects on sensitive features and the reversibility of the effects post drought are important considerations.

##### Designated Sites

The assessment area includes a variety of sites that are designated at an international, European, national or local level as important for biodiversity, flora and fauna, including:

- 9 Ramsar Sites
- 10 Special Protection Areas (SPA) <sup>1</sup>
- 26 Special Areas of Conservation (SAC) <sup>2</sup>
- 195 Sites of Special Scientific Interest (SSSI) <sup>3</sup>
- 24 National Nature Reserves (NNR) <sup>4</sup>
- 67 Local Nature Reserves (LNR) <sup>5</sup>
- Local Wildlife Sites (number not known)

**Figure C1 and C2** show the location of these designated sites.

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<sup>1</sup> Special Protection Areas (SPAs) are strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species. [www.jncc.org.uk](http://www.jncc.org.uk)

<sup>2</sup> Special Areas of Conservation (SACs) are protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites.

<sup>3</sup> Natural England now has responsibility for identifying and protecting the SSSIs in England under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000).

<sup>4</sup> NNRs are protected under Sections 16 to 29 of the National Parks and Access to the Countryside Act, 1949 and the Wildlife and Countryside Act, 1981.

<sup>5</sup> LNRs – places with wildlife or geological features that are of special interest locally.

Figure C1      Designated Sites

[INSERT FIGURE]

## Priority Habitats and Species

Species and habitats of principal importance for the conservation of biodiversity in England are identified in the Natural Environment and Rural Communities (NERC) Act 2006 Section 41. There are 18 habitats<sup>6</sup> designated within the Act that may be found within the assessment area. These include rivers and streams, reedbeds, fens and water meadows. Important water-related NERC species within the assessment area listed below:

- |                                |                          |
|--------------------------------|--------------------------|
| • Otter                        | • Fine-lined Pea Mussel  |
| • Water vole                   | • Freshwater Pea Mussel  |
| • Atlantic salmon              | • Depressed River Mussel |
| • European eel                 | • Greater Water Parsnip  |
| • Sea/Brown trout              | • Club-tailed Dragonfly  |
| • River lamprey                | • Tassel Stonewort       |
| • White clawed crayfish        | • Desmoulins Whorl Snail |
| • Snakeshead Fritillary        | • Snipe                  |
| • Loddon Lilly                 | • Lapwing                |
| • Creeping Marshwort           | • Natterer's Bat         |
| • Narrow-leaved water-dropwort | • Daubenton's Bat        |
| • River water-dropwort         | • Pipistrelle Bat        |

The focus for this Drought Plan period, in relation to NERC priority species and habitats, will be on achieving the conservation objectives set for each of the existing sites, and in a small number of cases in the area, the provision of compensatory habitat where development activities have led to an adverse effect on a priority habitat. A range of measures are included in the management plans for each site to contribute to these objectives and, assuming sufficient resources are in place, it is likely that the condition of these habitats and species populations will improve over the medium term to reach the objectives. These timescales recognise the time required for environmental changes to arise following positive interventions.

## Ancient Woodlands

Ancient woodlands in England are important habitats that should be protected. An ancient woodland is any wooded area that has contained woodland continuously since at least 1600 AD. They tend to be more ecologically diverse and of a higher nature conservation value than those developed recently, or where cover on the site has been intermittent. They often also have cultural importance. Areas of ancient woodland are shown on **Figure C1**.

## Water Framework Directive - ecological status

The WFD ecological status classification considers the condition of biological quality elements (e.g. aquatic invertebrates, plants and fish), the morphology of the habitat available in each water body (e.g. a defined stretch of river), and concentrations of supporting physico-chemical elements (e.g. oxygen or ammonia and concentrations of specific pollutants). See the 'Water' topic for details on water quality and ecological condition of water bodies.

Water abstraction and associated infrastructure can sometimes result in adverse effects on water-related sites. Impacts on biodiversity may be caused by the drying out of wetland habitats, lower water levels and slower flows in watercourse, deterioration in water quality, change in water temperature, or the transfer or proliferation of invasive species. The various WFD River Basin Management Plans

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<sup>6</sup> Species or habitats of principal importance for the conservation of biodiversity in England, identified in the Natural Environment and Rural Communities (NERC) Act 2006 Section 41.

(RBMPs) relevant to the study area identifies changes to the natural flow and level of water as one of the major issues affecting the ecology of rivers – these being related to abstraction and flow regulation measures.

The Severn River Basin District experiences a number of pressures. 27% of watercourses are subject to physical modification, 29% experience pollution from wastewater, 12% experience pollution from towns, cities and transport, 40% experience pollution from rural areas, 2% experience pollution from abandoned mines, 7% experience changes to the natural flow and level of water, and approximately 1% experience negative effects from invasive, non-native species (INNS).

#### C.1.1.1 Invasive Non-Native Species (INNS)

There has been a dramatic increase in the number of non-native species arriving into the UK over recent decades, as well as in the number of invasive species being established. There are approximately 2000 non-native species established in Britain, with the majority in the terrestrial environment and smaller numbers in marine and freshwater environments. Invasive species in the River Severn area, for example, include mink and Japanese knotweed, to those with currently less extensive distribution, such as the sunbleak fish in parts of Somerset and the highly invasive aquatic plant pennywort found at a number of coastal freshwater bodies<sup>7</sup>. Non-native species cause significant adverse impacts, including out-competing native species and spreading disease. The UK Government 2015 strategy on invasive non-native species<sup>8</sup> builds on previous strategies to provide a framework for coordinated action to prevent spread and work to eradicate species across the UK.

#### C.1.2 Future Baseline

It is not expected that many additional sites will be designated under international or national legislation over the life of the Drought Plan, with the focus therefore on achieving the conservation objectives set for each of the existing sites, and in a small number of cases in the area, the provision of compensatory habitat where development activities have led to an adverse effect on a European Site. A range of measures are included in the management plans for each site to contribute to these objectives and, assuming sufficient resources are in place, it is likely that the condition of these sites will improve over the next two or three decades to reach the objectives. These timescales recognise the time required for environmental changes to arise following positive interventions. A similar trend is likely for achievement of objectives associated with the NERC priority habitats.

The number of locally designated sites may increase slightly in response to growing community activities and the development of local environmental initiatives. An improving trend in condition of these sites is also anticipated with greater resources (particularly voluntary resources) devoted to their protection and enhancement. It is acknowledged that there is a need to allow wildlife to adapt to the impacts of climate change.

The Defra 25 Year Environment Plan<sup>9</sup> includes a commitment to restore restoring 75% terrestrial and freshwater protected sites to favourable condition and to create or restore 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits. The 25 Year Plan also proposed an adoption of 'Biodiversity Net Gain' approach to development, an approach introduced into national planning policy in 2019 and which will be mandated by the upcoming Environment Bill.

The 25 Year Plan also includes a commitment to support land management at landscape and catchment level and to support the adoption of long-term sustainable land management practices to significantly expand wildlife habitat and provide opportunities for species and ecosystem recovery.

Climate change is likely to have an impact on wildlife in the future by exacerbating existing pressures such as changes to the timing of seasonal activity, and water scarcity. It is acknowledged that there is

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<sup>7</sup> Severn Estuary Partnership (2014): Invasive Non-Native Species detected within the Severn Estuary Area: <https://severnestuariespartnership.org.uk/sep/estuary/physical-natural-environment/non-native-species/>

<sup>8</sup> Defra (2015) The Great Britain invasive non-native species strategy

<sup>9</sup> HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Accessed at <https://www.gov.uk/government/publications/25-year-environment-plan>. Accessed 09 June 2020.

a need to allow wildlife to adapt to the impacts of climate change. Climate may limit species' distributions indirectly through the impact of invasive species on native species along climatic gradients<sup>10</sup>. It will affect the abundance and diversity of natural enemies, competitors and species that constitute resources, as well as a species' ability to compete for resources or resist natural enemies.

The West of England Nature Partnership (WENP) is a cross-sector partnership working to restore the natural environment in the West of England through embedding the value of nature in decision making across spatial planning, public health and economic development. It is the designated Local Nature Partnership (LNP) for the West of England (Bristol City, South Gloucestershire, North Somerset and Bath & North East Somerset). LNP's are a key commitment from the 2011 Government White Paper, The Natural Choice: Securing the Value of Nature, which recognised the need for a more joined-up approach to reverse the loss of biodiversity and degradation of ecosystems. WENP is working to develop a regional Nature Recovery Network for the West of England, aligning with shared principles developed across the South West to ensure coherence and strengthened networks across the wider region.

Bristol Water established the Biodiversity Index approach (a ranked assessment of biodiversity gain opportunities) in 2015 with the aim of ensuring a positive impact on the natural environment following operational activity/construction works. The initiative was developed to quantify enhancement works to Natural England and to show that biodiversity improvements are being made across sites.

### C.1.3 Key Issues

The key sustainability issues arising from the baseline assessment for Biodiversity, Fauna and Flora are:

- The need to protect or enhance the region's biodiversity, particularly within designated sites, protected species and habitats of principal importance.
- The need to avoid activities likely to cause irreversible damage to natural heritage.
- The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors.
- The need to control the spread of Invasive Non-Native Species (INNS)
- The need to recognise the importance of allowing wildlife to adapt to climate change.
- The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.
- The need to deliver an increase in the Bristol Water biodiversity index.

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<sup>10</sup> Pateman & Hodgson (2015) Biodiversity Climate change impacts report card technical paper. Available from: <http://www.nerc.ac.uk/research/partnerships/lwec/products/report-cards/biodiversity/papers/source06/>

## C.2 Population and Human Health

### C.2.1 Baseline

#### Population

The greater South West region is mainly rural, with an estimated population of 5.69 million in 2020<sup>11</sup>. Between 2016 and 2026, the population of the south west region is expected to grow by 6.8%<sup>12</sup>. By 2030, the population is anticipated to grow to 6.05 million<sup>Error! Bookmark not defined.</sup>.

Considering the purpose of Drought Plans is for short-term management of drought risks over the next 5 years only, it is considered that the longer-term issues relating to population growth represent key issues for the strategic nature of the Water Resources Management Plan rather than the more tactical, shorter duration Drought Plan. The awareness of the population in the region to drought conditions and the avoidance of emergency drought measures are considered key issues with respect to the Drought Plan and needs of the current and near-future population of the area.

Water is supplied by Bristol Water to around 520,000 households. There is a resident population in the Bristol Water supply region of over 1.1 million<sup>13</sup>.

#### Human Health and Deprivation

The Drought Plan has the potential to influence quality of life, including human health, well-being, amenity and community, through alterations to the operation of existing infrastructure, the operation of temporary infrastructure (e.g. pumps) and potentially any construction requirements. The Drought Plan also sets out measures to ensure that essential water supplies can be maintained to all of Bristol Water's customers, thereby protecting public health during drought conditions.

The UK is committed to delivering against the 17 Sustainable Development Goals (SDGs) as part of the United Nations 2030 Agenda for Sustainable Development. These include sustainability indicators related to health and deprivation and the UK published a Voluntary National Review in 2019<sup>14</sup>, reporting on the UK's progress to date on delivering the SDGs. In general, the health of the population is good in the regions that the Bristol Water supply area covers.

The Office of National Statistics compiled the 'Indices of Multiple Deprivation' in 2019<sup>15</sup>, which score and rank local authorities and smaller 'Super Output Areas' according to their performance against seven distinct categories of deprivation. It highlights that deprivation levels within the Bristol Water supply areas vary heavily. Whilst North Somerset, west Bristol and north-east Bristol are relatively affluent, there are pockets of significant deprivation, including in Weston-Super-Mare, Avonmouth and south and central Bristol. The SEA will consider whether any of the Drought Plan measures will influence deprivation, either positively or negatively.

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<sup>11</sup> ONS (2020): Population Projections, Local Authorities: SNPP Z1. 24<sup>th</sup> March 2020: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/localauthoritiesinenglandz1>

<sup>12</sup> ONS (2020) Subnational population projections for England: 2018 Based, 24<sup>th</sup> March 2020: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2018based>

<sup>13</sup> ONS (2020): Middle Super Output Area Population Estimates. 9<sup>th</sup> September 2020: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/middlesuperoutputareamidyearpopulationestimates>

<sup>14</sup> HM Government (2019) Voluntary National Review of progress towards the Sustainable Development Goals. United Kingdom of Great Britain and Northern Ireland, June 2019 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/818212/UK\\_VNR-web-accessible1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/818212/UK_VNR-web-accessible1.pdf) (accessed 9 June 2020)

<sup>15</sup> MHCLG (2019) The English Indices of Deprivation 2019 (IoD2019) [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/835115/IoD2019\\_Statistical\\_Release.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835115/IoD2019_Statistical_Release.pdf) (Accessed 9 June 2020)

## Recreation and Tourism

Drought management measures have the potential to affect areas with recreation value. Impacts may arise from operational phases resulting in effects on water levels beyond those that may result from the 'natural' drought alone. Any potential construction requirements may include indirect reductions in amenity through reduced access or loss of areas of amenity value. Temporary water use restrictions (voluntary and statutory) may also adversely affect some recreational activities due to the suspension of external water uses such as watering of sports grounds.

**Figure C2** shows some of the areas that may be used for recreation within the area. This includes National Trails, Areas of Outstanding Natural Beauty (AONB) (see Landscape and Visual Amenity topic), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs). Bristol Water's surface water reservoirs are accessible to the public and provide a range of recreation facilities, including birdwatching, walking, sailing or fishing. Some sections of rivers and canals in the area are of particular importance with respect to navigation (e.g. the Kennet and Avon Canal) and angling (e.g. Bristol Harbour).

Public areas of open space, country parks<sup>16</sup>, Public Rights of Way, walking routes and cycle routes are also important with respect to recreation and tourism. The National Planning Policy Framework (NPPF) states planning policies and decisions should protect and enhance public rights of way and access. All Local Authorities are required to prepare and publish Rights of Way Improvement Plans (ROWIPs). These plans explain how improvements made by local authorities to the public rights of way network will provide a better experience for a range of users, including pedestrians, cyclists, horse riders, horse and carriage drivers, people with mobility problems, and people using motorised vehicles (e.g. motorbikes).

The NPPF defines green infrastructure as 'a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities' (including rivers and ponds). Local planning authorities are required to plan positively for strategic networks of green infrastructure and take account of the benefits of green infrastructure in reducing the risks posed by climate change. The majority of Local Authorities have therefore developed Green Infrastructure Strategies or Studies addressing these issues. Green infrastructure will often play a large part in local recreational resources.

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<sup>16</sup> Area designated for people to visit and enjoy recreation in a countryside environment

Figure C2 Areas used for recreation

[INSERT FIGURE]



## Economy and Employment

The South West had a regional GDP of £152.3 billion in 2018 and was responsible for 7.1% of the UK's GDP in 2018. The regional GDP per capita in 2018 was £24,500, below the national average (£28,800). However, it varies significantly around the region, from well below average in Cornwall and the Isles of Scilly to significantly above average in Bristol, Gloucestershire and Wiltshire<sup>17</sup>. In Q3 of 2020, The unemployment rate in the South West was 4.1%. This was the lowest unemployment level in England (level with the South East) and the second lowest in the UK. The unemployment rate in the South West has increased during 2020, but at a much lower rate than the UK-wide figure<sup>18</sup>. Unemployment within the region varies within the region, being highest in Plymouth (4.7%) and lowest in Cotswold (2.1%)<sup>19</sup>.

At 23,829 square kilometres, the South West region covers nearly ten per cent of the UK's land mass with almost three quarters of its entire area (17,600km<sup>2</sup>) devoted to agriculture. There are almost 26,000 commercial 'agricultural holdings' of all shapes and sizes ranging from small family farms to highly sophisticated, multiple thousand-acre estates and agri-enterprises<sup>20</sup>. Some businesses that rely on water supply have the potential to be affected by the Drought Plan through a Temporary Use Ban or a Drought Order to ban prescribed non-essential water uses. However, the Drought Plan also sets out measures to maintain essential water supplies to all businesses during drought conditions to ensure most businesses can continue to operate without any disruption.

### C.2.2 Future Baseline

The west of England is a rapidly growing area and by 2045 the population Bristol Water supply is predicted to have risen from 1.21 million to approximately 1.48 million people. Nonetheless, the projected demand for water is not forecast to grow by the same extent, thanks to continuing action to reduce leakage, increasing rates of water metering (which helps reduce demand for water) and improvements in household water efficiency. Based on work undertaken for the WRMP19 it has been identified that total water demand will rise only gradually by 4.4 Ml/d across the 25 year planning period from 281.4 Ml/d at 2017/18 to 285.8 Ml/d at 2044/45.

Access to the recreational resources, green spaces and the historic environment will have greater importance in future planning<sup>21</sup>. For example, the National Ecosystem Assessment and the Marmot Review, *Fair Society, Healthy Lives*, demonstrate the positive impact that nature has on mental and physical health and as a result the Government intends to promote Green Infrastructure Partnerships<sup>22</sup>, with civil society to support the development of green infrastructure in England. Improvements to the quality of the water environment and certain potential climate change impacts will present opportunities for an expanding tourist industry in the region<sup>23</sup>.

### C.2.3 Key Issues

- The need to ensure water supplies remain affordable especially for deprived or vulnerable communities, reflecting the importance of water for health and wellbeing.
- The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas.

<sup>17</sup> European Commission (2018) Southwest of England, regional profile. <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/south-west-england>

<sup>18</sup> ONS (2020): )Labour market in the regions of the UK: November 2020. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/regionalalllabourmarket/november2020>

<sup>19</sup>

<sup>20</sup> Defra (2018) Agricultural facts – commercial holdings at June 2018 (unless stated): [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/866816/regionalstatistics\\_southwest\\_20feb20.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/866816/regionalstatistics_southwest_20feb20.pdf)

<sup>21</sup> Defra (2011) The Natural Choice: securing the value of nature, The Natural Environment White Paper

<sup>22</sup> Green infrastructure is a term used to refer to the living network of green spaces, water and other environmental features in both urban and rural areas.

<sup>23</sup> Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report.

- The need to ensure public awareness of drought conditions and importance of maintaining resilient, reliable public water supplies without the need for emergency drought measures.
- The need to ensure water quantity and quality is maintained for a range of uses including tourism, recreation, navigation and other uses such as agriculture.
- The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists for access to green infrastructure and the natural and historic environment, as well as protecting and enhancing recreational resources.
- The need to accommodate an increasing population and local housing growth through provision of essential services including water supply.
- Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and wellbeing and the economy.

## C.3 Material Assets and Resource Use

### C.3.1 Baseline

#### Water Use

Bristol Water supplies nearly 264 million litres of drinking water each day from its 16 water treatment works through over 6,700 kilometres of water mains to customers' taps. Between 2015 and 2040, Bristol Water proposes to reduce water leakage from 18% of the total water supplied to the network to less than 10%. Bristol Water is actively pursuing measures to encourage its customers to reduce their water use and use water wisely, particularly in dry conditions. Currently, almost 60% of households are metered, and Bristol Water plans to reach a metered household rate of 75% by 2025. These measures are particularly relevant to the Drought Plan when water efficiency activities help to safeguard essential water supplies. Average daily water use per capita for Bristol Water customers was 144.6 litres/head/day (l/h/d) for the period 2019-20. It is expected that by 2040, average daily water use will decrease to 130 litres per person.

#### Resource use and waste

There is an ongoing need for society to reduce the amount of waste it generates by using materials more efficiently and improving the management of waste that is produced.

Waste going to landfill has more than halved over the period 2004/5 to 2014/15 (19,822 thousand tonnes to 6,361 thousand tonnes); household recycling rates in England are currently at 44.7% (2018/19), down from 45.2% in 2017<sup>24</sup>; waste generated by commerce and industry reached 37.2 million tonnes in 2018, a 3% increase on the year before and a 16% increase since 2010<sup>25</sup>. In line with the widely adopted 'waste hierarchy', best practice for waste management is to reduce, re-use, recycle and recover, and only then should disposal (or storage) in landfill be considered.

Data on waste arisings are collected in a range of categories. The activities of the water industry contribute to construction, demolition and excavation waste (CDEW), through construction of new infrastructure. The water industry also contributes to several waste streams through the operation of its treatment facilities. Waste streams include commercial and industrial waste (statistics include waste arisings from the power and utilities sector, which includes water supply and sewage removal), and also hazardous wastes.

Currently, 98% of the waste disposed by Bristol Water complies with Environmental Permitting Regulations; a 99% compliance rate is expected by 2040. Bristol Water is working towards a target of 100%.

Drought management measures which require infrastructure may result in the use of raw materials and the production of waste. The operation of Drought Plan measures may result in additional chemical use due to use of poorer quality raw water and the consequent production of waste through water treatment processes.

### C.3.2 Future Baseline

The Environment Agency recently published the national framework for water resources<sup>26</sup> which included ambitious targets to reduce average per capita consumption (PCC) to 110 litres per person per day (l/p/d) by 2050. In its 2019 WRMP, Bristol Water also aims to reduce per capita consumption to 110 litres per person per day, and it is anticipated that by 2045, average water usage will reduce from

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<sup>24</sup> Defra (2019) Statistics on waste managed by local authorities in England in 2018/19 (28<sup>th</sup> November 2019). [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/918853/201819\\_Stats\\_Notice\\_FINAL\\_accessible.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918853/201819_Stats_Notice_FINAL_accessible.pdf)

<sup>25</sup> Defra (2020) ENV23 – UK statistics on waste. 19 March 2020: <https://www.gov.uk/government/statistical-data-sets/env23-uk-waste-data-and-management>

<sup>26</sup> Environment Agency (2020) Meeting our future water needs: a national framework for water resources, March 2020.

141.6 litres per person per day to 129.4 litres per person per day. The Government's national aspiration is to reduce water usage to an average of 130l/h/day by 2030. Bristol Water aims to achieve such a reduction while increasing household metering to 87% by 2045. Bristol Water plan to reduce leakage by 15% by 2025 as detailed in the WRMP19. Bristol Water's aim is to manage water resources more efficiently in order to improve the reliability of water provision to its customers.

There is the potential for increase in operational waste from the water sector as regional population increases and standards of treatment are increased through regulatory requirements.

The Government's 25 Year Environment Plan includes goals for increasing resource efficiency and minimising waste, including working towards the elimination of all avoidable waste by 2050, and all avoidable plastic waste by the end of 2042. The government has also developed a new national Resources and Waste Strategy to look at the whole lifecycle of products in order to maximise the value of our resources during their lifetime. The Waste Strategy for England<sup>27</sup>, published in 2018, sets out measures to help society move away from a 'take, make, use and throw' approach to resources and materials and instead waste less and reuse, recycle and repair more. Targets for waste include; 50% recycling rate for household waste by 2020, 75% recycling rate for packaging by 2030, 65% recycling rate for municipal solid waste by 2035 and municipal waste to landfill at 10% or less by 2035.

### C.3.3 Key Issues

- The need to minimise the consumption of resources, including water and energy.
- The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill.
- The need to continue to reduce leakage from the water supply system to help reduce demand for water.
- The need to continue to encourage more efficient water use by consumers.

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<sup>27</sup> HM Government (2018) Our waste, our resources: a strategy for England

## C.4 Water

### C.4.1 Baseline

In the context of the WFD, the water environment includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile. The WFD brings together the planning processes of a range of other water-related European Directives. These Directives establish protected areas to manage water, nutrients, chemicals, economically significant species, and wildlife, and have been brought in line with the planning timescales of the WFD.

#### Surface Waters: Rivers and Canals

The area under consideration lies within the Severn River Basin District and the South West River Basin District.

Bristol Water is a water only company (WoC) that provides water supplies to 1.19 million people and all the associated businesses in an area of approximately 2,400 square kilometres centred on Bristol and the towns and villages within a 20-mile radius of the city. The water supply area stretches from Thornbury and Tetbury in the north, to Street and Glastonbury in the south, and from Weston-Super-Mare in the west to Frome in the east. Bristol Water relies on 68 water sources, including reservoirs, rivers, springs, wells and boreholes. Of the company's 14 raw water reservoirs, the largest is Chew Valley Reservoir, holding up to 20,460 million litres and providing around 40% of the water required to meet demand.

85% of the water supply managed by Bristol Water comprises surface waters while 15% comes from groundwater. A major abstraction is taken from the Gloucester and Sharpness Canal under agreement with the Canal & River Trust, which is supplied by the Rivers Severn, Cam and Frome. This single abstraction provides approximately 50% of the water available to Bristol Water. Abstraction from the River Severn is controlled by statutory and abstraction licence conditions. In dry periods, use of water supplies from the River Severn is increased by Bristol Water to conserve water stored in reservoirs.

Surface water features and the WFD ecological status of river catchments in the study area are shown in **Figure C3**.

#### Surface Waters: Lakes and Reservoirs

There are three surface water impounding reservoirs (Cheddar, Blagdon, Chew Valley) collecting water from the Mendip Hills. Chew Valley Reservoir is the largest and can store 20,460 million litres. There are also other smaller raw water reservoirs within the supply system.

#### Groundwater

Bristol Water operates 16 small groundwater sources such as springs, wells and boreholes which are used conjunctively and account for around 15% of the water available.

Under the WFD, there are two separate classifications for groundwater bodies: chemical status and quantitative status. A groundwater body will be classified as having poor quantitative status in the following circumstances: where low groundwater levels are responsible for an adverse impact on rivers and wetlands normally reliant on groundwater; where abstraction of groundwater has led to saline intrusion; where it is possible that the amount of groundwater abstracted will not be replaced each year by rainfall. For a groundwater body to be at good status overall, both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution and which may lead to a future deterioration in status.

The groundwater quantitative status for the study area is shown in **Figure C4**.

Source Protection Zones (SPZ) provide additional protection to safeguard drinking water quality. This is achieved through constraining the proximity of an activity that may impact upon drinking water

abstraction. They are defined around large and public potable groundwater abstraction sites and take account of the groundwater travel time to an abstraction.

### Estuaries

There are four WFD estuarine waterbodies associated with the assessment area: Bristol Avon, Severn Upper, Severn Middle and Severn Upper, with a combined area of over 50,000ha. They are all considered to have an overall status of 'moderate' and an ecological status of 'moderate'. The Severn Middle also has a chemical status of Fail, whilst the other three have a chemical status of Good.

### Water dependent designated sites

There are a number of designated sites, designated both at a national and international level, within the Bristol Water Area, that are dependent on the fluvial environment to maintain the standard of their qualifying features. These include (but may not be limited to);

- The Severn Estuary Ramsar, SAC, SPA and SSSI;
- Bridgwater Bay SSSI
- Chew Valley Lake SPA and SSSI
- Avon Gorge Woodlands SAC
- Somerset Levels and Moors Ramsar and SPA

### Key pressures

The key pressures in the area, particularly affecting ecological and biological status are:

- Discharges from sewage treatment works releasing ammonia, phosphates, and other pollutants into the water environment. The major discharges in the catchment are from sewage treatment works and these can lead to signs of nutrient enrichment at times of low flows, for example in the River Axe and North Somerset Streams<sup>28</sup>;
- Intermittent urban discharges (pollution incidents);
- Diffuse runoff from agricultural land into water courses (increasing nitrates and to a lesser extent pesticides);
- Impact of historical release of nitrates into groundwater (nitrates continue to accumulate in water many years after the sources of nitrates are removed); and
- Surface water abstraction (public water supply and other abstractions impacting on low flows in the catchment).
- Pollution, from a range of sources (including diffuse runoff from agricultural land, pollution incidents, and diffuse pollution from urban areas), adversely impacting upon the qualifying features of nationally and internationally designated sites, which are designated for their riverine and/or coastal habitats and species.

### Water Framework Directive Classification

Since 2000, the health of water bodies has been classified using a status based approach according to quality elements defined within Annex V of the WFD.

Surface water status is awarded on a 5 point scale (High, Good, Moderate, Poor, Bad), as the lowest of the ecological status and chemical status of the waterbody (for a water body to be in overall 'good' status, both ecological and chemical status must be at least 'good'). Ecological status classification considers the condition of biological quality elements (e.g. aquatic invertebrates, plants and fish), hydromorphological quality elements, (the morphology of the habitat available), and general chemical and physiochemical quality elements (concentrations of supporting physio-chemical elements; and concentrations of specific pollutants).

Within the two management catchments within which the Bristol Water SEA area falls into (Avon Bristol Somerset North Streams and Somerset South and West), of a total of 13 (12%) and 11 (10%) are classified as achieving 'good' under 2015 (cycle 2) status respectively. No surface water waterbodies within the two operational catchments achieve a 'high' status.

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<sup>28</sup> Environment Agency (2015). River Basin Management Plan Severn River Basin District

However, by 2021 it is predicted that further waterbodies will achieve good status. The groundwater body status underlying the area of interest is generally good, except for the Bristol Triassic aquifer which is of poor chemical status despite having a good quantitative status. The WFD summary is presented in **Table C1**.

The WFD ecological classification for river catchments in the study area is shown in **Figure C3**.

Table C1 Key Status Statistics for Surface and Groundwater Bodies in the Bristol Avon and North Somerset Streams Management Catchment and South and West Somerset Management Catchment

	South and West Somerset Management Catchment		Avon Bristol and Somerset North Streams		
River and Lake Water Bodies	2015	2021 (Predicted)	2015	2021 (Predicted)	Improvement Measures
% at good ecological status or good potential	11%	27%	12%	41%	Nutrient treatment from phosphates from waste water treatment (Avon Bristol and Somerset North Streams only)
% at good or high biological status	32%	44%	23%	21%	
% at good chemical status	96%	98%	99%	96%	
% at good status overall	11%	27%	13%	19%	
Groundwater Bodies	2015		2021		Improvement Measures
Wells	good		good		N/A
Bristol Triassic	poor		poor		N/A
Mendips	good		good		N/A

## Flood Risk

Flooding can result from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources. The Environment Agency's Flood Risk Maps available on its website show what is at risk of flooding, including people, economic activity and natural and historic environment. There are two defined high flood risk areas – coastal areas along Bridgwater Bay (including areas near Cleveland) and the Mendip Hills area. These are areas where there is a significant risk of flooding from local sources, such as surface water, groundwater and ordinary watercourses, combined with a significant population at risk of the effects of flooding (Flood Zone 3). Approximately 156,000 people (14% of the study area's population) live along the coast<sup>29</sup>, and flood risk is mitigated by flood defences where urban areas are present (i.e. Burnham-on-Sea, Clevedon, Portishead and Weston-Super-Mare).

Flooding is not viewed as a key issue for the SEA water topic in relation to the Drought Plan because none of the drought management measures are likely to involve the construction of permanent physical infrastructure within areas at risk of flooding or contribute to an increase in flood risk.

## Drought

The Bristol Water Area has been subject to drought conditions in the past. Lack of rainfall is the first indicator of drought presence and severity. It directly affects other hydrological parameters, including river flows, groundwater recharge, soil moisture etc). When a drought becomes severe enough, Bristol Water may need to introduce restrictions in order to maintain supply. For example, a Temporary Use Ban (TUB) was brought in by Bristol Water during the 2011/12 drought. In this case, a period of heavy rainfall occurred a short time after the TUB was introduced, therefore it was difficult to determine the impact of the TUB on the continuation of services. However, using previous drought events as a baseline, Bristol Water estimate that a TUB would save approximately 9.5% of peak summer household demand<sup>30</sup>.

<sup>29</sup> The Centre for Towns Data Tool: <https://www.centrefortowns.org/datatool>

<sup>30</sup> Bristol Water Drought Plan, June 2018



Figure C3 WFD Surface Waters

[INSERT FIGURE]

Figure C4 WFD Groundwater

[INSERT FIGURE]

### C.4.3 Future Baseline

The recently published national framework for water resources<sup>31</sup> highlights that if no action is taken between 2025 and 2050, around 3,435 million extra litres of water per day will be needed to address future pressures in England. Five regional groups have been set up each tasked with pulling together a regional plan to build resilience to a range of uncertainties and future scenarios. These include water companies and other water users. The south west region (termed in the west country in the national framework) increased consumption, driven by population growth, is the largest driver of future water need by 2050. Increasing public water supply resilience to extreme droughts also drives a significant component of additional water needed, with increased protection for the environment also driving a notable component of the future water need. The West Country Water Resources Group (comprising Bristol Water, South West Water and Wessex Water) has a priority to make the region more efficient by achieving the ambitious reductions in water use and leakage; and to explore the potential to transfer water to other regions – particularly the neighbouring south east.

Originally, the WFD set a target of aiming to achieve at least ‘good status’ in all water bodies by 2015. However, provided that certain conditions are satisfied, it was acknowledged that in some cases the achievement of good status may be delayed until 2021 or 2027. The primary objective in the short-term is to ensure no deterioration in status between status classes: the 2015 water body classification is the baseline from which deterioration between classes is assessed; no deterioration between status classes is permitted unless certain and specific conditions apply.

The UK Climate Change Risk Assessment (CCRA) 2017 Evidence Report<sup>32</sup> draws together and interprets the evidence gathered by CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. Findings of the assessment include:

- Increasing pressure on the UK’s water resources due to changes in hydrological conditions and regulatory requirements to maintain good ecological status.
- Increases in water demand for irrigation of crops.
- Lower summer rivers flows across the UK due to warming and drying conditions.
- An increase in precipitation in winter months due to a combination of greater depths and more frequent heavy rainfall events - suggesting larger volumes of runoff with potential negative impacts on flood risk and sewer overflows in urban environments.
- Flash-flooding associated releases from combined sewer overflows (CSO) could in turn increase associated illnesses at the coast due to the varying occurrence of microbial pathogens in the marine environment.

### C.4.4 Key Issues

- The need to further improve the quality of the region’s river, estuarine and coastal waters taking into account WFD objectives and designated sites objectives (i.e. assessment against Common Standards Monitoring Guidance, where relevant).
- The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives.
- The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters.
- The need to ensure sustainable abstraction to protect the water environment and meet society’s needs for a resilient water supply.
- The need to ensure that people understand the value of water.

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<sup>31</sup> Environment Agency (2020) Meeting our future water needs: a national framework for water resources. March 2020.

<sup>32</sup> Defra (2016) The UK Climate Change Risk Assessment 2017 Evidence Report

## C.5 Soil, Geology and Land Use

### C.5.1 Baseline

#### Geology

Geological sites may be sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land use practices. The study area is geologically diverse and includes a number of major aquifers including major chalk aquifers and interbedded sandstones and siltstones.

Geological Conservation Review (GCR) sites have been highlighted, which relate to geological important sites, related to their scientific elements and understanding of earth sciences, which are important on a national and international level<sup>33</sup>. GCRs are also designated as SSSIs. Several geological SSSIs are found within the area, however some are not directly designated because of geology, although the geological variation does impact on the flora present. The main reason for a geological citation for an SSSI is related to disused quarries and geological important sites such as gravels and cliffs. There are 88 GCRs within the study area (**Figure C4**).

#### Soils

The Soil Map of England and Wales<sup>34</sup> identifies dominant soil subgroups. In terms of agricultural land quality, planning policy seeks to protect best and most versatile agricultural land (defined as land in Grades 1, 2 and 3a of the Agricultural Land Classification). The majority of rural land in the study area is farmed, and it is noted that agricultural practices have a major influence on soil quality. Good soil structure is beneficial to water retention and crop yield. It can be seen from **Figure C5** that the majority of agricultural land is classified as Grade 3. Soil quality and structure is affected by changes in land use, groundwater levels and farming practices. Soil quality can influence run-off rates and therefore flooding and water quality.

#### Land Use

It is not anticipated that land uses within the Bristol Water area will be affected by implementation of any of the drought plan options. This is because no significant additional infrastructure will be required for any of the options to become operational. Additionally, these options would only be implemented in times of drought, when the baseline conditions would be that of significant water stress anyway. Implementation of the drought plan options would result in additional stress to an extent that is thought to be insignificant.

### C.5.2 Future Baseline

The Government's 25-year Environment Plan states that England's soils must be managed sustainably, and degradation threats tackled successfully by 2030<sup>35</sup>. This will improve the quality of England's soils and safeguard their ability to provide essential services for future generations.

The Water White Paper described the Government's intentions to take forward a catchment-based approach to water quality and diffuse pollution and work towards Common Agricultural Policy reforms that will promote the farming industry's role as custodian of the natural environment<sup>36</sup>. The Water White Paper also identified that the strategic policy statement for Ofwat and revised social and environmental guidance would give a strong steer on Government support for approaches that offer good value for customers and the potential to prevent and manage future risks to drinking water quality. These policy objectives were reflected in development of catchment partnerships across England (including in the SEA assessment area) to implement the catchment-based approach.

<sup>33</sup> <http://jncc.defra.gov.uk/page-2947>

<sup>34</sup> Produced by the Soil Survey of England and Wales for MAFF

<sup>35</sup> HM Government (2019): A Green Future: Our 25 Year Plan to Improve the Environment. 16 May 2019: <https://www.gov.uk/government/publications/25-year-environment-plan>

<sup>36</sup> Defra (2011) Water for Life - Water White Paper

One of the core planning principles of the National Policy Planning Framework (NPPF) is to encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value. The NPPF also places great importance with respect to Green Belt policy, the aim of which is to prevent urban sprawl by keeping land permanently open. Green Belt serves five purposes: to check the unrestricted sprawl of large built-up areas; to prevent neighbouring towns merging into one another; to assist in safeguarding the countryside from encroachment; to preserve the setting and special character of historic towns; and to assist in urban regeneration, by encouraging the recycling of derelict and other urban land. Although the NPPF promotes a presumption in favour of sustainable development, this does not apply where proposed developments may affect European or other designated sites covered by specific policies. The NPPF also states that planning policies and decisions should recognise the economic value of best and most versatile agricultural land, the viability of which may be impacted by the implementation of a drought plan.

### C.5.3 Key Issues

- The need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health.
- The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources). The Drought Plan is unlikely to affect land-use as no permanent development will be required to meet the objectives of the plan.

Figure C5 Agricultural Land Classification

[INSERT FIGURE]

## C.7 Air and Climate

### C.7.1 Baseline

#### Local Air Quality

Drought management measures may involve the operation of abstraction and treatment facilities at a greater level of intensity and/or in locations where such operations do not normally take place, with the potential for negative effects, although generally only in the short term.

The local air quality baseline situation can be best described through reference to the local authorities that have declared Air Quality Management Areas (AQMA). A local authority declares an AQMA when UK National air quality objectives are unlikely to be met. The local authorities in the area which have declared an AQMA within their boundaries are illustrated in **Figure C6**. There are 5 AQMAs in total within the study area. The majority of the AQMAs have been declared because of emissions from road transport.

The most recent Clean Air Strategy contains a set of objectives focused on the reduction of traffic emission impacts<sup>37</sup>.

The Air Pollution Information System ([www.apis.ac.uk](http://www.apis.ac.uk)) will be consulted during the assessment process to help understand the baseline risks of air pollution on habitats/sensitive and or designated sites.

In April 2015, the Supreme Court ruled that the UK Government must redraft the national nitrogen dioxide (NO<sub>2</sub>) air quality action plan, as well as 16 regional action plans, including Greater London, with the aim of ensuring that these areas reach compliance with legal NO<sub>2</sub> limits as soon as possible. In response, the Government published an updated plan in 2017 along with individual zone plans for the 37 zones identified as having air quality issues with NO<sub>2</sub>, including the South West<sup>38</sup>. It is expected that the South West region will be compliant by 2022.

#### Greenhouse Gases and Climate Change

The predominant greenhouse gas of interest is carbon dioxide (CO<sub>2</sub>). Bristol Water is a large user of energy due to the energy needed to treat and pump water. In 2019/20, 19kgCO<sub>2</sub>e per customer were produced by Bristol Water. This represents a 19% year on year reduction, and a fall since 2015 of 46%<sup>39</sup>. Bristol Water's emissions figure per megalitre of water supplied was 375kgCO<sub>2</sub>e/MI in 2016 and had fallen to 275kgCO<sub>2</sub>e/MI by 2020. In the last 5 years, carbon emissions from Bristol Water have fallen 51%.

Forecast future climate change is likely to influence processes within the hydrological cycle such as runoff and evapotranspiration. The impact of climate change on the water environment and water-related infrastructure is summarised in **Table C2**.

**Table C2 Potential impact of climate change on the water environment and water-related infrastructure**

Sector	Impact
Water Resources (i). water supply (ii). water demand	<i>Reduction in yields, either in total or at certain times of the year.</i> <i>Increased evaporation losses from surface water stores</i> <i>Increased sediment and pollution runoff into watercourses.</i> <i>Increased risk of algal blooms and pollution in reservoirs.</i> <i>Increase in demands in summer months leading to increase in average and peak requirements.</i> <i>Increased pressure on treatment and distribution system.</i> <i>Increased requirements for agriculture.</i>

<sup>37</sup> Defra (2019) Clean Air Strategy 2019.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/770715/clean-air-strategy-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf)

<sup>38</sup> [https://uk-air.defra.gov.uk/assets/documents/no2ten/2017-zone-plans/AQplans\\_UK0030.pdf](https://uk-air.defra.gov.uk/assets/documents/no2ten/2017-zone-plans/AQplans_UK0030.pdf) (Accessed 9 June 2020)

<sup>39</sup> Bristol Water Annual Performance Report 2020: [https://www.bristolwater.co.uk/wp-content/uploads/2020/07/BW\\_APR-2020\\_ART.pdf](https://www.bristolwater.co.uk/wp-content/uploads/2020/07/BW_APR-2020_ART.pdf)

Sector	Impact
Flood management	<i>Increased riverine storm occurrence and flood risk. Improvements and higher specifications required for flood defences, urban drainage and rainwater disposal.</i>
Water quality management	<i>Lowered water quality in lowland rivers, with implications for instream ecosystems and water abstractions. Altered potential for polluting incidents. Increased potential for combined sewer overflows due to an increase in extreme storm occurrences.</i>
Navigation	<i>Lower summer flows leading to reduced navigation opportunities in rivers and canals.</i>
Aquatic ecosystems	<i>Altered habitat potential, with species at their environmental margins most affected.</i>
Water-based recreation	<i>Impacts through changes in river flows and water quality.</i>

Drought measures could influence CO<sub>2</sub> emissions through additional pumping and treatment requirements. The Drought Plan is a tactical response plan that sets out to ensure the maintenance of essential water supplies during times of drought, which may become more prevalent and intense due to the effects of climate change. The Drought Plan itself functions as a form of adaptation to some of the effects of climate change.

### Adaptation to Climate Change

The UK Climate Change Risk Assessment (CCRA) 2017 Evidence Report<sup>40</sup> draws together and interprets the evidence gathered by CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. The assessment identified six key areas of inter-related climate change risks for the UK, including:

- Flooding and coastal change risks to communities, businesses and infrastructure.
- Risks to health, well-being and productivity from high temperatures.
- Risks of shortages to the public water supply, and for agriculture, energy generation and industry.
- Risks to natural capital, including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity.
- Risks to domestic and international food production and trade.
- New and emerging pests and diseases, and invasive non-native species, affecting people, plants and animals.

<sup>40</sup> Defra (2016) The UK Climate Change Risk Assessment 2017 Evidence Report



Figure C6 Air Quality Management Areas

[INSERT FIGURE]

## C.7.2 Future Baseline

Government and international targets (including the 2016 Paris Agreement) indicate significant cuts in greenhouse gas emissions will take place by certain years (2017, 2022, 2027 and 2032). The UK met its carbon budget targets to 2017 and is currently projected to meet its first three legislated carbon budget targets (until 2022), but not to meet the targets for 2027<sup>41</sup>.

The 2018 UK Climate Projections (UKCP18) estimate that summers in central England are likely, to be 0°C to 5.8°C warmer and 57% drier to 9% wetter<sup>42</sup>. These changes could affect the frequency and severity of drought events.

## C.7.3 Key Issues

- The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards.
- The need to reduce greenhouse gas emissions (industrial processes and transport).
- The need to adapt to the impacts of climate change, for example through sustainable water resource management, water use efficiencies, specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities afforded by climate change.

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<sup>41</sup> DECC (2019) Updated energy and emissions projections 2018  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/501292/eepReport2015\\_160205.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/501292/eepReport2015_160205.pdf)

<sup>42</sup> Defra, BEIS, the Met Office and the Environment Agency (2018) – UKCP18 Climate Change Over Land: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-infographic-headline-findings-land.pdf>

## C.9 Archaeology and Cultural Heritage

### C.9.1 Baseline

Implementation of drought management measures could affect historic landscape character and historic structures associated with the water environment and the historical context of their setting. Archaeological remains are sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land-use practices.

Heritage designations for the assessment area are shown in **Figure C7**.

Nationally important archaeological sites are statutorily protected as Scheduled Monuments (SMs)<sup>43</sup>. There are currently around 20,000 entries in the Schedule for the UK<sup>44</sup>. As of 2018, within the southwest of England, there were 4 World Heritage Sites, 6,981 SMs, about 90,000 listed buildings and over 300 Registered Parks and Gardens. There are approximately 470 SMs located within the assessment area.

Historic England collects data on buildings at risk. There were 5,097 designated assets on the Heritage at Risk (HAR) register in 2020. 181 have been removed from the Register since 2014, and 216 added<sup>45</sup>. Heritage assets such as Scheduled Monuments can be at risk from water abstraction or dewatering (previously 1.71% nationally). However, other assets, such as those composed of organic material and preserved in waterlogged or anaerobic conditions, are proportionately more at risk (e.g. palaeoenvironmental deposits).

Conservation Areas are usually designated by the local planning authority. They are designated for their special architectural and historic interest. Conservation Areas can include historic town and city centres, fishing and mining villages, 18<sup>th</sup> and 19<sup>th</sup> century suburbs, model housing estates, country houses set in historic parks and/or historic transport links and their environment. There are over 8,000 conservation areas in England. Individual local authorities provide details on specific conservation areas.

In relation to unknown assets, waterlogged conditions preserve waterlogged archaeology, such as wooden artefacts and structures such as trackways. Remains may be rain-fed or groundwater fed. If the latter, then clearly abstraction levels can be a critical factor in maintaining conditions in which preservation of the remains is viable. In addition, there are waterlogged deposits that are specifically associated with chalk, such as springs and their intimately associated wetlands which again can contain important archaeological information, especially palaeo-environmental evidence. Such water-dependent heritage assets will be considered when assessing potential Drought Plan measures.

### C.9.2 Future Baseline

The NPPF was introduced in 2012 and aimed to make the planning system less complex and more accessible and changed the emphasis on planning to have a presumption in favour of development. However, core planning principles include those aiming to protect heritage assets, including “*conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations*”<sup>46</sup>.

Recent and ongoing national economic difficulties may have a negative effect on removing heritage assets from the heritage at risk register. Climate change could have variable impacts on heritage assets in the future. Some types of assets and landscapes have already experienced and survived significant climatic changes in the past and may demonstrate considerable resilience in the face of future climate change. However, many more historic assets are potentially at risk from the direct impacts of future climate change<sup>47</sup>.

<sup>43</sup> Nationally important archaeological sites designated under the Ancient Monuments and Archaeological Areas Act, 1979, [www.culture.gov.uk/historic\\_environment/scheduled\\_ancient\\_monuments/](http://www.culture.gov.uk/historic_environment/scheduled_ancient_monuments/)

<sup>44</sup> English Heritage (2015) Heritage counts 2015

<sup>45</sup> Historic England (2020) Heritage at Risk: Latest Findings: <https://historicengland.org.uk/advice/heritage-at-risk/findings/>

<sup>46</sup> CLG (2012) National Planning Policy Framework, Communities and Local Government. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf)

<sup>47</sup> English Heritage (2010) Climate Change and the Historic Environment

### C.9.3 Key Issues

- The need to conserve or enhance sites of archaeological importance and cultural heritage interest, and their setting, particularly those which are sensitive to the water environment.
- The need to protect water-dependent heritage sites during drought conditions.

Figure C7 Cultural Heritage Designations

[INSERT FIGURE]

## C.10 Landscape and Visual Amenity

### C.10.1 Baseline

The landscape character network<sup>48</sup> defines landscape character as 'a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse'. Some landscapes are special because they have a particular amenity value, such as those designated as Areas of Outstanding Natural Beauty (AONB). Others may have an intrinsic value as good examples or be the only remaining examples of a particular landscape type. Some landscapes are more sensitive to development whereas others have a greater capacity to accommodate development. Assessments of landscape character and landscape sensitivity enable decisions to be made about the most suitable location of development to minimise impacts on landscapes.

Implementation of drought plan measures has the potential to influence landscape and visual amenity, for example, effects on water levels in rivers beyond those occurring naturally as a result of the drought alone. AONBs and Natural England National Character Areas (NCAs) are shown on **Figure C8** for the study area.

#### Nationally Designated Sites

AONBs are defined as 'precious landscapes whose distinctive character and natural beauty are so outstanding that it is in the nation's interest to safeguard them'<sup>49</sup>. They are designated under the National Parks and Access to the Countryside Act, 1949, strengthened by the Countryside and Rights of Way Act, 2000. The primary purpose of the AONB is 'to conserve and enhance the natural beauty of the landscape.' There are 3 AONBs wholly or partially within the study area (Cotswolds AONB; Mendip Hills AONB; and Cranborne Chase and West Wiltshire Downs AONB). It is only the Mendip Hills AONB where measures in the Drought Plan have the potential for effects

The main characteristics of Green Belt is their openness and their permanence. The main aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The Green Belt therefore aims to check the unrestricted sprawl of large built-up areas; prevent neighbouring towns merging into one another; assist in safeguarding the countryside from encroachment; preserve the setting and special character of historic towns; and assist in urban regeneration by encouraging the recycling of derelict and other urban land.

#### Natural England National Character Areas and Heritage Coasts

Natural England National Character Areas also take account of landscape (also referred to in the Biodiversity, Flora and Fauna topic). These are shown geographically in **Figure C8**. There are no Heritage Coast areas in the Bristol Water's SEA assessment area.

### C.10.2 Future Baseline

With the pressures for housing in parts of the assessment area, there are likely to be some threats to visual amenity more broadly beyond designated landscape areas (including within Green Belt). Climate change and land use change (e.g. due to agricultural reform associated with the UK's exit from the EU and Common Agricultural Policy) may also, in the longer term, lead to changes to landscape character.

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<sup>48</sup> [www.landscapecharacter.org.uk](http://www.landscapecharacter.org.uk), accessed 14<sup>th</sup> July 2006

Figure C8 Landscape designations

[INSERT FIGURE]

## C.10.4 Key Issues

- The need to protect and improve the natural beauty of the area's AONBs and other areas of natural beauty.
- The need to protect and improve the character of landscapes and townscapes.