Appendix 13

Lessons identified from previous droughts and dry weather

Contents

1. 2011-12

This event is our most recent drought. The details of the drought event and our response are summarised below.

What happened in the 2011-12 drought

2011

- On the 10 July 2011 the Secretary of State announced that the Environment Agency's Anglian region had moved to drought status, as a result of nearly 6 months of exceptionally low rainfall and the soil moisture deficit being at its highest recorded level.
- This exceptionally low rainfall in 2010 and 2011 had a significant impact on flows in the River Nene, and affected our ability to refill Pitsford Water and Rutland Water.
- As a precautionary measure, we applied successfully for two drought permits on the River Nene to maximise the water available for abstraction. Both drought permits were issued in December 2011 and expired in April 2012.

2012

- By March 2012 it was being reported as the driest 18 months ever recorded.
- The low reservoir storage situation in March 2012 was compounded by low river flows across the Anglian region impeding refill opportunities. In addition, the drought area was starting to extend into our groundwater system.
- On 5 April 2012 we imposed Temporary Use Bans on our customers for the first time in 20 years, alongside six other water companies in the south and east of England.
- At that time, we were growing increasingly concerned about the potential impact of a third-dry winter, and that we would not be able to maintain supplies to customers in our Ruthamford WRZs without imposing severe restrictions.
- We responded to this risk by:
  - Reducing our leakage to record low levels (189Ml/d, 10% below our target of 211Ml/d).
  - Launching Drop 20, our biggest ever water-saving campaign, where we asked every customer to reduce their daily use by 20 litres.
  - Identifying and delivering a £47 million programme of capital investment to increase our resilience and protect customers' supplies, and
  - Leading the industry-wide response through the National Drought Management Team.
- Thankfully, the drought was brought to a rapid conclusion by six months of record-high rainfall between April and September 2012.
- We lifted the restrictions on 14 June 2012, just 10 weeks after they had started.

In response to drought conditions, we carried out extensive communications campaigns before implementing Temporary Use Bans for the first time in 20 years, alongside six other water companies in the south and east of England.

We invested significant capital expenditure to increase our resilience and protect customers' supplies. The capital programme to 2015 considered investment opportunities to commission a number of our licensed abstraction sources, although the requirement to conform with the Water Framework Directive impacted the viability of some schemes.

Key investments during this drought included new groundwater sources, a river augmentation main, booster pumps, Rutland Water refill schemes, leakage enhancement and pressure management. Capital investment was prioritised at three vulnerable groundwater sources in Lincolnshire and Norfolk, and to enhance interconnection in the Ruthamford region through the Hannington to Pitsford link.

2. Lessons identified from previous droughts

Our experiences of previous droughts show that our water resources respond differently to different types of drought, and therefore successful management actions need to reflect this.

A short intense summer drought will require a different approach to a sequence of winters with below-average recharge to water resources in aquifers and pumped storage reservoirs. The 1988-92 drought was characterised by the impact on groundwater resources and base flows to rivers during the summer of 1991, whereas the 1995-97 drought placed greater stress on surface water storage. The 2011-12 drought primarily impacted the rivers in the west of our region.

Our region often experiences periods of low rainfall, which will initially affect our surface water sources over a single season. In general our supply system is relatively insensitive to short-duration droughts, like 1976, except in a few locations where river abstractions go directly into treatment. Where possible in this scenario we would actively seek to maximise conjunctive use of our groundwater sources to reduce demand on surface water sources.

Assessment of our groundwater sources and their behaviour in drought scenarios has enabled us to identify and classify boreholes which are inherently more vulnerable to drought. This has allowed us to invest to secure these sources for future droughts. These boreholes and mitigation actions are described further in **Part 3, Main Plan** and **Appendix 6**.

Experience of previous drought sequences in our region has underpinned the importance of effective and timely customer and stakeholder communication at the onset of prevailing drought conditions - an example is presented in the case study below.

The requirement for effective engagement with customers via communications campaigns has been highlighted and we have experience of developing successful campaigns to promote our water efficiency messages (**Appendix 10**). The importance of an effective campaign to manage demand cannot be under-estimated.

We have a good baseline to launch our campaigns from due to the ongoing programme of other demand management measures, such as our enhanced and smart metering programmes and water efficiency programmes described further in **Part 3, Main Plan**.

Historically, droughts have all ended sharply in response to a period of above-average rainfall, for example the heavy rainfall in the winters of 1976-77, 1992-93 and 1997-98. This pattern was repeated with the heavy rain of 2012 following the 2011-12 drought. Demand restrictions and Drought Order applications have been withdrawn as soon as the prevailing conditions allowed.

The 2011-12 drought highlighted how the severity of a drought can change over a small distance, such that even within the Ruthamford WRZs the River Great Ouse and the River Nene responded very differently to the low rainfall. This is why our Grafham Water reservoir, which relies on refill from the River Great Ouse, remained in a healthy state whilst storage levels in both Rutland Water and Pitsford Water declined as a result of the low flows in the River Nene.

Case study: River Nene drought permits 2011

The importance of collaborative working with key stakeholders was highlighted during the later stages of the summer of 2011. Regular drought liaison meetings between the Environment Agency and Anglian Water were instigated shortly after the region was announced as being in drought in July 2011. Concerns expressed by the Environment Agency regarding rainfall and river flows in the Nene catchment prompted detailed reservoir storage projections to be undertaken for a range of flow scenarios, which led us to take the precautionary step of applying for two winter drought permits.

We continued to work closely with regional contacts in the Environment Agency to ensure that we addressed all of their concerns in a timely manner. We engaged in early discussions with Natural England and reached agreement on appropriate mitigation measures to ensure that we fulfilled Habitats Directive requirements. We consulted widely and further discussions were also necessary with a number of key stakeholders including angling clubs, district councils and internal drainage boards.

The successful and timely outcome of the drought permit application to enable us to secure public water supplies, whilst minimising any environmental impacts and effects on other water users, was helped significantly by the good working relationships between all of our key stakeholders.

3. 2018-19

This dry period was classed as an environmental drought rather than a water resources drought. This means that although we had spells of prolonged dry weather and higher demand it did not have a significant impact on our resources. The details of this period and the lessons we identified are summarised below.

What happened during 2018-19

- The Anglian Water region received variable rainfall across the 2018-19 period with rainfall accumulations at 12 and 36 months showing exceptionally low values by the spring of 2019.
- Regionally we had 12 months of above average Soil Moisture Deficit (SMD) between June 2018 and May 2019.
- During the 2018/19 winter, rivers across the region saw little to no recharge in base flows and all rivers were classified as below normal or lower in January 2019, with 6 out of 13 showing exceptionally low flows for the time of year.
- Our supply network experienced long periods of high demand throughout the summers of 2018 and 2019 as well as significant demand peaks (above 1400 Ml/d).
- Consequently, levels in some of our reservoirs dropped. Alton Water experienced the largest impact and by the end of the 2019 summer the levels had dropped to the drought permit trigger.
- Groundwater levels dropped below normal at many locations in 2018 and due to the lack of winter recharge some aquifers dropped below the old Drought Alert Curve (DAC) triggers.
- By 2019 there was a notable regional split between the north and east of our region. The east had continued dry weather but the north received a considerable amount of rain.
- The recovery started in October 2019 with a number of storms crossing over the region. The winter 2019/20 total rainfall was 140% of the Long Term Average with all areas of the region receiving exceptionally high rainfall.

In response to the prolonged dry weather our Drought Management Team (DMT) was convened in February 2019 and subgroups were created to manage specific areas or problems. The Water Resources team increased the monitoring, forecasting and reporting of the sources affected as per Drought Plan 2019, to ensure actions could be taken and any solutions could be implemented. Operational activities such as eel screen implementation were rescheduled to maximise abstraction to replenish the reservoirs. Several targeted social media communications were run in areas such as Colchester over the 2019 summer including water saving tips, explanations of where the region's water comes from and online giveaways for water saving devices.

Lessons identified from 2018-19

Following on from our experiences during the 2018-19 dry weather period we compiled and reviewed all of the data and actions as part of the DMT so that we could pull out the key lessons that we could learn from as well as the successes of our actions.

Some of the lessons that we identified are summarised below:

- The need to improve dry weather indicators to better distinguish different types of drought; we have also worked with the Environment Agency to align our respective drought management levels and actions.
- To improve on our old groundwater drought management curves e.g. the Drought Alert Curve. These improvements have already been incorporated in this Drought Plan.

- We gained useful knowledge about how changes in weather can affect the scheduling of planned operational work.
- Some water quality issues need to be better reflected within our water resource modelling systems.
- Balancing our communications approach between proactive and reactive messaging.

We also captured the successes that we had during this period and some of these are listed below:

- Improved collaboration with key stakeholders such as the National Farmers Union, Internal Drainage Boards, RSPB and Natural England. One example of this is the Lower Nene working group where we were able to reduce abstraction at Wansford to allow more water to head downstream to support agriculture and the environment.
- As part of our borehole rehabilitations, water is normally discharged to a local river (as per Environment Agency guidelines) or tankered to a local treatment works. However, during periods of prolonged dry weather we worked with the Environment Agency and local agriculture users to identify if the discharged water could be used for irrigation purposes. This is now standard procedure for all rehabilitation work planned.
- Improved collaboration with Affinity Water on demand forecasting scenarios and weekly operational calls (with respect to Grafham Water export and Ardleigh Reservoir).
- Improved external communications on the dry weather, including an updated website, social media rainfall charts and videos of our groundwater sources to educate our household and non-household customers.
- Creation of the retail situation report for non-household customers, so they have a better understanding of the water resources situation.

Cover photo - Anglian Water's Pitsford Water reservoir, a 413-hectare biological Site of Special Scientific Interest (SSSI), north of Northampton in Northamptonshire seen during the 2011/12 drought. It was designated a SSSI in 1984.