Appendix 12

Extreme drought management actions

Contents

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Our Drought Plan provides a framework for drought management against the worst historical droughts experienced in our region to date, as well as those of a 1 in 200 year drought severity (if not previously experienced). We have also assessed the vulnerability of sources to more extreme drought, such as a 1 in 500 year drought; where this would lead to a supply shortfall we would resort to an Emergency Drought Order.

As part of our continued long-term water resource and drought planning, we are also considering the feasibility of additional demand- and supply-side actions that we could employ to avoid the need for extreme restrictions (supply interruptions).

This extreme action section is a continuation of the previous Drought Plan and wider company work. We have generated a suite of possible extreme demand- and supply-side actions that could be implemented during an extreme drought scenario. Level 4 Emergency Drought Orders such as rota cuts are deemed unacceptable in our society. Therefore, extreme actions are to be used as "more before 4" measures which means that they will be applied after Level 3 (NEUBs), in an attempt to prevent Level 4 being reached.

For the identification of the actions, we have used the four key criteria given by the Environment Agency's Drought Plan guidelines:

- be practical to implement during an extreme drought.
- likely to be temporary.
- be technically feasible.
- generally not result in permanent increases to Deployable Output (DO) i.e. usually distinct from a WRMP option.

We undertook two drought scenario planning workshops to identify potential demand and supply options. These workshops simulated the progression from normal conditions towards a severe drought. The workshops were attended by a range of experts from various areas of the business. We also collated options previously considered or employed, for example in previous drought or dry weather events. From the identification of these actions a set of meetings was then held with individual business units to provide further detail on each action, including implementation timescales, and to evaluate the actions. The evaluation identified benefits of the options as well as barriers to successful implementation. A number of potential actions were screened out, mainly due to impracticality and technical infeasibility.

The actions summarised in the tables below are those which we will develop further, in consultation with the Environment Agency and other stakeholders where appropriate. Some actions within this list are a continuation of the standard actions set out in **Section 3.1 and Section 3.2 in the Main Plan**. However, they are instead applied to a more extreme extent and will be increasingly targeted on the possible areas at risk of Level 4 restrictions for a given scenario.

Extreme actions have been developed to include a wide range of both demand and supply type actions, from the lowering of borehole pumps and increased targeting of the Communication Plan, through to more innovative actions such as sea tankering and extreme pressure management. Road tankering has also been included as a possible extreme action but it is important to note that tankering is more likely to be a standard action in some WRZs (**Appendix 3**) and then an extreme action in other zones. Actions will be further assessed on criteria such as cost, carbon, operational constraints and environmental impacts amongst other factors.

In the tables, the overarching action is stated and then if required further defined into the different type of actions that might be available. The WRZ characterisation allows us to identify which areas are relevant for that type of action. These are split into four types:

- All
- Groundwater (GW)
- Surface water (SW)
- Coastal

We have also characterised the action benefit into three types. We have not used specific DO quantitative benefits as these will be highly dependent on the zone and given scenario, and they also do not appropriately reflect the benefit given by an action.

- Maintain Supply signifies that the action enables us to keep a consistent DO.
- New Source of Supply actions enable us to temporarily increase DO to support an area.
- Reduce Demand actions aim to influence behaviour and reduce the demand on our supply network.

The likely benefit and barriers columns then give qualitative opportunities and risks for each action, as described by the subject matter experts and stakeholders that the actions were developed with. Finally, the lead time provides the window required to make that action operational, providing a range as again this will be based on each scenario and location that it will be rolled out into. As mentioned in **Section 3.4, Main Plan**, we are able to identify potential droughts in our region at an early stage, allowing significant planning time before these actions are needed.

Table 1.1: Extreme drought management actions - demand-side

Type of action	Summary of action	WRZ characterisation	Likely benefit		Likely barriers	Approximate lead time
Metering (smart)	Increase active smart meter reading (e.g. hourly)	All	Reduce demand	Stronger campaigns around actions that make a difference (e.g. leaky loos) Increase the regularity of water balance updates Understand demand in more detail (by DMA, postcode, etc.) Able to store greater data for increased reporting / trend spotting Help create a real time model	GDPR issues - legitimate interest for non consent customers Only available to those areas that have smart meters installed Full roll out of smart meters will take a number of years How do we communicate it - customer journey	<1 month
	Set specific targets for customers	All	Reduce demand	Stronger campaigns around actions that make a difference (e.g. leaky loos) Increasing frequency of emails (monthly to weekly) explaining the community demand and the challenges / targets	GDPR issues - legitimate interest for non consent customers Only available to those areas that have smart meters installed Full roll out of smart meters will take a number of years Increasing frequency of emails requires cost and functionality	1 - 3 months
Metering (standard)	Ask customers to self-report how much water they are using	All	Reduce demand	Increasing customer social / environmental conscience Our my account webpage / app allows photos of meters to be uploaded Identification of leaks - spinning dials Greater understanding of demand - improved reporting	Changing behaviours Meters might be hard to access	1 - 3 months
	Ask our meter readers to increase data collection frequency	All	Reduce demand	Identification of leaks - spinning dials Greater understanding of demand - improved reporting	Changing behaviours Availability of meter readers	1 - 3 months
Household incentivisation	Provide financial reward or lower tariffs to customers who reduce their water usage	All	Reduce demand	Incentivise customers with lower tariffs if they reduce their water usage Incentivise customer to self-read more frequently (e.g. lower tariff if we get more reads) May change customer behaviours over the long term and even after the drought has ended Additional benefit from the power of word of mouth Previous incentivisation campaigns have provided reductions in demand	Too large an incentivisation (in the form of a prize) can have a negative uptake as it feels unachievable Metering - being able to keep track of customers savings	1 - 3 months

Type of action	Summary of action	WRZ characterisation	Likely benefit		Likely barriers	Approximate lead time
Non-Household (NHH) incentivisation	Incentivise water efficiency schemes (e.g. additional storage creation and leak fixing) Introduce schemes such as night time tariffing	All	Reduce demand	More water used during off peak periods Extra storage and reduction in leakage reduces demand on our system Could mean industrial users temporarily utilise public water supply rather than their own, allowing more effective catchment operation	Enforcement - current powers not legally binding Ability to influence some users Disrupting the NHH user process Engaging with our NHH users early enough Providing enough incentivisation or making the action easy enough to implement	1 - 3 months
Extreme Communications Plan	Keep customers aware of current storage situation Focus on biggest potential areas for saving (e.g. toilets and showers) Excessive water use seen as unacceptable Involved in national campiagns to change culture Guides for customers to show how to restrict water use to 50 litres/person/day Hard hitting messages and images	All	Reduce demand	We will build on the campaigns, communications and customer trust that has been established before and during the drought	Difficulty in balancing need for severe restrictions with public engagement / involvement	1 - 3 months
Leakage	Focus resources on leakage prevention (e.g. invest in additional noise sensors to cover the impacted areas)	All	Reduce demand	Fix pipes and leaks for customers even when outside remit Free and fast supply pipe repairs for customers Noise loggers speed up the detection of leaks Help to divert leakage programmes to areas of need	Exposing the pipes to fix leaks can be an inconvenience to customers Still a limit to how much we can drop our leakage figure Adding time on to previous planned leakage programmes	3 - 6 months
	Further optimise activities that reduce raw water losses	All	Reduce demand	Build on the raw water loss activities already in place	WTW treatment constraints	1 - 3 months

Type of action	Summary of action	WRZ characterisation	Likely benefit		Likely barriers	Approximate lead time
Extreme pressure management		All	Reduce demand	Reduce background leakage Pipe burst performance would be better in the shorter term Can replace need for rota cuts - a better way to control demand and can be done remotely so less people needed on the ground Reduce discolouration risk due to lower pressures	Requires effective planning before being needed which may increase lead times May cause further bursts and other issues in the longer term Can affect water tracking data Availability of assets in the impacted areas Communicating the need of these measures and explaining how it works to customers Need to understand any water quality risks and how these could be managed Need to understand and plan how the system is returned to normal pressures to mitigate potential water quality risks e.g potential for discolouration Problems for larger and more vulnerable users e.g. industry and hospitals Consideration would need to be given to pressure at hydrants (for which we would liaise with local fire services as requested by Part 5 of the 2004 Fire and Rescue Services Act)	3 - 6 months
District metering		All	Reduce demand	Benefits in leakage and also network management Particularly beneficial in large DMAs as we can distribute demand across the area	Requires effective planning before being needed which may increase lead times Sacrifice granularity of leakage measurement Need to understand any water quality risks and how these could be managed Flushing programme is required before implementation Availability of assets in the impacted areas	3 - 6 months
Removal of exceptions	Consideration of removal of all exceptions under any Temporary Use Bans (TUBs) or Non-Essential Use Bans (NEUBs) that are implemented	All	Reduce demand	Further reduce demand on top of the impact that the TUBs and NEUBs restrictions have already had	Communicating these changes to customers and businesses Financial impacts for affected users	1 - 3 months

Table 1.2: Extreme drought management actions - supply-side

Type of action	Summary of action	WRZ characterisation	Likely benefit		Likely barriers	Approximate lead time
Groundwater support	Lower borehole pumps or increase borehole depth	GW	Maintain supply	Aim to maintain existing yield / minimise impact on water levels through period of stress	Impact on local environment from increased draw down Need to risk assess and ensure CRAGS is up to date Water quality, turbidity and potential increase in chemical parameters Adequacy of treatment	3 - 6 months
	Satellite boreholes	GW	New source of supply	New source aiming to support existing yield / minimise impact on water levels through period of stress Spread draw down impact on aquifer - decrease horizon flow impact	Land access and agreement Impact on local environment from increased draw down Need to risk assess and ensure CRAGS is up to date Water quality, turbidity and potential increase in chemical parameters Adequacy of treatment	> 12 months
	Recommissioning of out-of-service boreholes	GW	New source of supply	Piping unused sources elsewhere for treatment River augmentation	Impact on local environment from increased draw down Need to risk assess and ensure CRAGS is up to date Water quality, turbidity and potential increase in chemical parameters Adequacy of treatment	3 - 6 months
	Recommissioning of boreholes that have recently or are likely to be abandoned due to sustainability reductions or licence removals	GW	New source of supply	Proven yields and historical operational	Impact on local environment from increased draw down Environment Agency consents e.g. abstraction licences and discharge Need to risk assess and ensure CRAGS is up to date	3 - 6 months
	Use of 3rd party boreholes	GW	New source of supply	Innovate East has led to the development of a licence trading database Retail customers may have their own dedicated boreholes Irrigation or agricultural boreholes Recommission of old private / industrial boreholes	Need to risk assess and ensure CRAGS is up to date Water quality, turbidity and potential increase in chemical parameters Adequacy of treatment Infrastructure links to network	3 - 6 months

Type of action	Summary of action	WRZ characterisation	Likely benefit		Likely barriers	Approximate lead time
River support	Emergency augmentation	GW and SW	Maintain supply	Boreholes on Water Recycling Centre land or any available boreholes close to rivers	Need to risk assess (SWRAs) and ensure CRAGS is up to date Water quality, turbidity and potential increase in chemical parameters Adequacy of treatment Actual yield gained	3 - 6 months
Temporary treatment	UV disinfection	All	Maintain supply	Ability to utilise for other extreme actions where adequacy of treatment is a barrier More effective at the end of the treatment works process Wastewater return to head of works	WTW constraints e.g. footprint of site	3 - 6 months
	Nitrate removal and / or blending	All	Maintain supply	Greater utilise sources used for blending Develop additional blending options	WTW constraints e.g. footprint of site	6 - 12 months
	Iron removal	All	Maintain supply	Utilise existing assets Accelerate lead time	WTW constraints e.g. footprint of site	6 - 12 months
Desalination	Mobile plants	Coastal	New source of supply	New source aiming to support existing yield / minimise impact on water levels through period of stress Information and help provided by work on larger scale options as part of the WRMP	Insufficient power supplies at location Connectivity to network Need to carry out full water quality risk assessment (DWSP) Availability of Reg 31 approved products Waste effluent discharge treatment	> 12 months
Effluent re-use	Diverting treated effluent so that it can be partially re-abstracted or compensate a continued or enhanced abstraction	All	Maintain supply	Adds resilience to river systems to allow abstraction to continue Reduces environmental impact	Environment Agency consents e.g. abstraction licences and discharge Need to carry out full water quality risk assessment (DWSP)	6 - 12 months

Type of action	Summary of action	WRZ characterisation	Likely benefit		Likely barriers	Approximate lead time
Overland pipes		All	Maintain supply	Flexibility of network (across DZ, DMA or WRZ level) Could be used to transfer potable or non-potable water	Requires nearby areas to not already be under water stress Length of pipe needed Above ground constraints (e.g. road and rail) Pumping constraints Ensure any acceptability impacts to customers are understood and managed Risk of non-native invasive species	1 - 3 months
Tankering	Movement of water via road tankers	All	Maintain supply	Flexibility of network (across DZ, DMA or WRZ level) Could be used to transfer potable or non-potable water	Requires nearby areas to not already be under water stress Distance travelled Ensure any acceptability impacts to customers are understood and managed	<1 month
Sea tankering	Movement of potable water via food-grade sea tankers	Coastal	Maintain supply	Aim to maintain existing yield / minimise impact on water levels through period of stress Could be used for aquifer recovery, to meet bowser demands or as an alternative supply for large users Approached by a potential supplier from Norway	Transportation time Storage Need to carry out full water quality risk assessment (DWSP)	6 - 12 months
Utilising other significant water bodies	Potential to use 3rd party bodies of water	All	New source of supply	New source aiming to support existing yield / minimise impact on water levels through period of stress Utilitisation for river augmentation and to mitigate any environmental impact	Connectivity to network Adequacy of nearby treatment Need to carry out full water quality risk assessment (DWSP) Environmental impact Non-native invasive species	6 - 12 months
Supply schemes	Acceleration of the strategic grid scheme	All	New source of supply	Different phasing options - Alton, Ardleigh, Peterborough Speed efficiency of partially / fully completed planning	Only available to areas that are planned to be supported by the strategic grid Timeframe for implementation Above ground constraints (e.g. road and rail) Need to carry out full water quality risk assessment (DWSP)	6 - 12 months
Resource trading and transfers	Short term trades between companies / sectors. Plans to increase / decrease bulk supplies.	All	New source of supply	Could be potable water for use in supply or non-potable water for aquifer or river recharge Could utilise effluent re-use schemes from other suppliers Water Recycling tool for modelling the mixing of water could be used to screen potential sources	Network connectivity Would require a control regime Water availability from other suppliers Environmental impact Need to carry out full water quality risk assessment (DWSP) Risk of non-native invasive species	3 - 6 months

Cover photo - Cracked ground during drought conditions.