



Bristol Water Plc

Drought Contingency Plan

Draft Consultation December 2011

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Non-Technical Summary

Draft Drought Contingency Plans

Water companies in England and Wales are required by Statute to have contingency plans for coping with periods of drought. The Bristol Water Drought Contingency Plan (DCP) sets out the actions we will take to maintain a reliable mains delivered supply of water to customers during a period of drought.

We have a limited number of water sources and 85% of these are from river or reservoirs supplies. The water available from these sources may decline during an intense or long drought and our plan takes this into account. Drought can vary in length, intensity and impact so it is difficult to predict the exact character of a future event. To guarantee a secure supply whatever the circumstances would result either in greatly increased water bills, or be potentially damaging to the environment. As a consequence, circumstances can occur where we would ask, or require, customers to reduce their use of water. This action would be needed to ensure continuous supplies can be maintained during the worst types of drought that the region has experienced over the past 100 years. In our Water Resources Management Plan (WRMP) we set out in detail the frequency that customers may be required to reduce their demand in response to dry periods.

In our area, there is an historic frequency of five to seven dry periods per century severe enough to cause local water management issues. From this, we estimate that the statistical requirement for temporary restrictions on customer's water consumption will occur approximately once in fifteen years on average.

Our analysis of data since 1830 indicates the occurrence of two extreme droughts. If similar events occurred in the near future at the current unconstrained level of water demand, there is a possibility a water supply failure could occur. Such extreme droughts have occurred approximately once a century. Our plan is intended to mitigate the impact that such an extreme drought would have on water stored in our reservoirs and reduce the probability of a water supply failure to less than once in 100 years (avoiding the need for planned cuts to supply unless the drought was more severe than any ever experienced in the region).

We are not able to predict in advance how severe or prolonged the effects of any drought may be, or exactly what measures will be required. Our plan is intended to be flexible and provide a phased and proportionate response as the drought develops. The actions we propose for mitigating the effects of moderate to extreme droughts and maintaining a piped supply of water include:

- Publicity and appeals for customers to reduce their water consumption.
- Temporary bans on specified categories of domestic water use.
- Reduction of water demand by cutting system pressures and more leakage control
- Deployment of disused poor quality water sources (with temporary treatment)
- Using drought orders to for temporary bans on discretionary water use by businesses

We are all at risk from the impact of drought, so it is reasonable that actions to mitigate the effect of drought are shared amongst stakeholders. If both customers and the company respond by implementing the actions set out in our plan, we would expect to avoid the possibility of a wider failure of the water supply system. If the staged implementation of

measures listed above was not adequate to curtail demand, then we may need to use emergency drought orders to carry out a programme of rota cuts to supply in order to maintain water supplies to essential water users, large businesses and vulnerable customers.

At this stage, we are interested in your views on stakeholder risks and the proposals we have set out for the management of resources during severe droughts. If you wish your views to be considered as we develop our final plan, you should respond by 4th February 2012. Any representations you wish to make can be sent by e-mail to water.resources@defra.gsi.gov.uk, or by post to:

The Secretary of State for Environment Food and Rural Affairs
Drought Plan consultation
Water Availability and Quality Programme
DEFRA
Area 2C Ergon House
Horseferry Road
London SW1P 2AL

Water Supply in the Company Area

There are two major categories of water source in the Company's supply area, and these sources are utilised flexibly to obtain the maximum benefit to our customers. Water resources in the Company area alone are not sufficient to meet the normal demand so approximately 50% is imported from Welsh reservoirs via the River Severn.

To the north of the Company area, water from the River Severn is abstracted from the Gloucester-Sharpness canal.



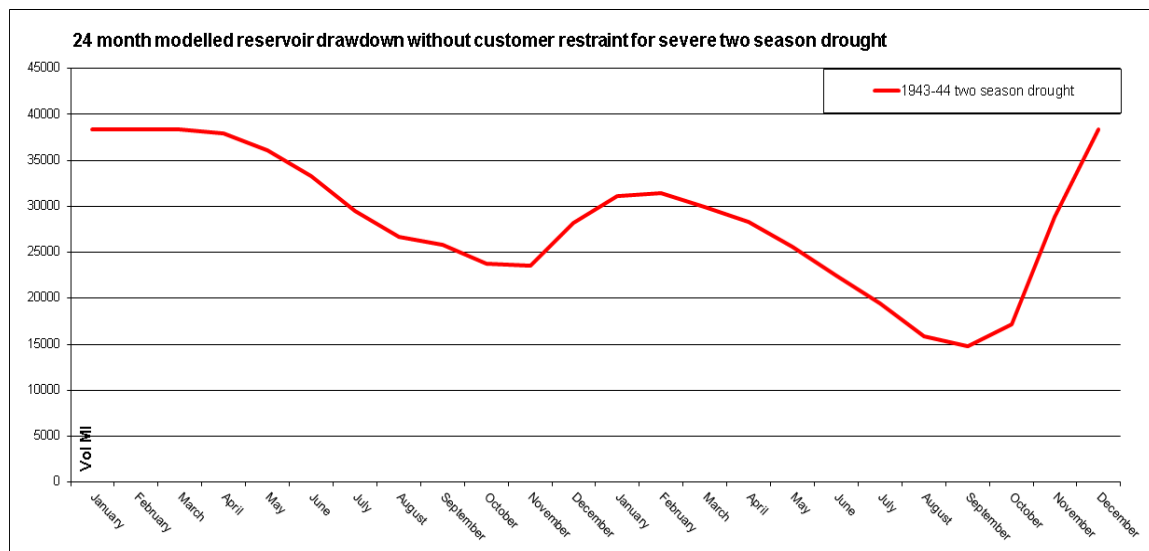
In the south of our area of supply, the Mendip reservoirs at Chew, Blagdon and Cheddar will provide on average 40% of the water required to meet demand. This water stored in reservoirs is critical in meeting the increased demand during seasonal peak consumption periods.

The remaining water supplied by the Company comes from a number of small groundwater sources, located across the area.

The water taken from the Severn can be transferred across the network to reduce water demand in the southern half of the Company area (that would normally be supplied by reservoirs). By operating in this way, we can manage the rate at which the levels of reservoirs fall during dry periods (thereby conserving and prolonging reservoir storage). However, if our reservoirs were to empty completely, we could not supply all of our customers using only water from the Severn. With empty reservoirs and typical dry weather unrestrained water demand, providing a continuously piped supply to all parts of our system would no longer be possible.

The volume that we are allowed to abstract from the Severn is controlled by the Environment Agency according to their River Severn regulation rules. However, there is usually a surplus of River Severn water available during the winter. This allows us to augment the natural recharge of the reservoirs and provides a measure of resilience to dry winters.

Analysis of past events indicates that the Company is vulnerable to droughts that last for more than a single year and include dry winter periods. This is illustrated in the modelled projection of how our total water in storage would reduce in response to the type of drought that could occur on average once every 50 years (assuming the short term forecast for water demand as set out in this report). The 1 in 50 year drought has been chosen as it forms the basis of our assessment of water available as set out in our Water Resources Management Plan (WRMP).



In this illustration, the transfer from the Severn of approximately 6000 Ml of water over the second year period maintains reservoir storage above the critical level of 10,000 Ml. Without this transfer, the reservoir volume would be below 9,000 Ml, supplies would be at risk and recovery from such a low storage position may be compromised.

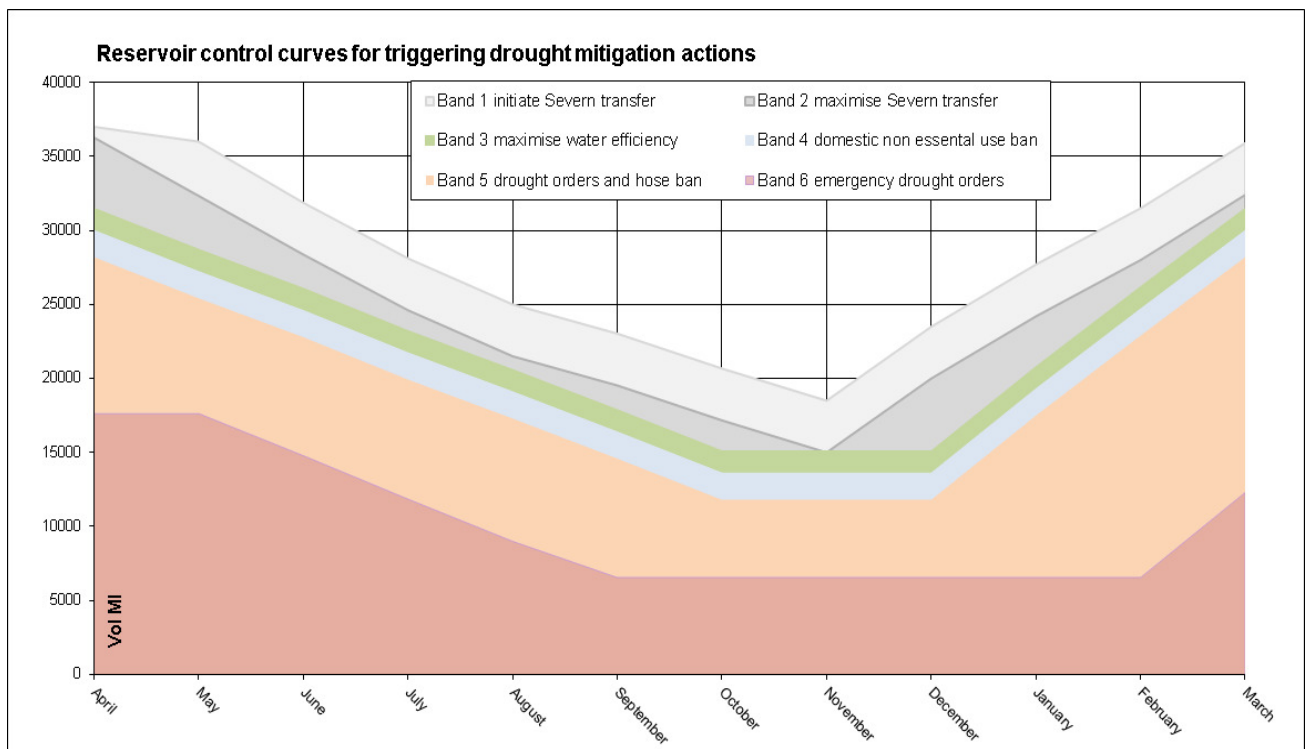
Drought Monitoring and Decisions

Droughts vary widely in their nature and the impact they cause on reservoir volume. Because of this, the volume of stored water at various points in the year is a good indicator of drought severity and future supply security.

We have modelled the effect of a wide range of historic droughts upon reservoir storage. This modelling has been used to inform us of reservoir volumes where we believe particular mitigating actions should be initiated in response to the increasing risks as water in storage reduces. The reservoir volumes associated with particular actions may vary according to the time of year and are usually referred to as control curves. Where stored water volume is above the Band 1 control curve representing normal operation, we would have operational flexibility to operate the network to reduce costs and maximise efficiency.

If reservoir volume fell below the lowest control curve, then the risk of supply failure would increase substantially, unless demand was substantially reduced or alternative sources of water became available. In between these extremes there is a range of phased actions that are intended to keep the stored water volume above the control position represented by Band 6. The actions we propose are summarised in tables 1 and 2 and can be related by colours to the plot of reservoir control bands below. A storage volume in the lowest band would only be anticipated in the most extreme type of drought that occur less than once a century (or due to some other emergency such as the operational loss of a major source).

Between these two extremes, additional control curves have been created, each representing an increasing level of risk to supply during the developing drought. The actual volume of water in storage is compared to these control zones throughout the year. If reservoir storage volume decreases to within any of the lower zones during the year, decisions will be made on the actions needed to conserve water and minimise the risk of water supply problems later in the year (on the assumption that dry conditions would continue).



Actions in Response to Drought

We expect to implement the drought management mitigations detailed in this report as the trigger levels shown in the plot above are crossed. However, there may be instances that would cause us to bring forward or delay certain actions, according to specific circumstances and perceptions of risk.

In responding to drought, we would play our part initially by transferring higher cost water from the River Severn, River Axe and increasing leakage reduction beyond the strict economic level stated in our WRMP. As the drought intensified we would begin engineering works to return to service some small uneconomical sources and reduce bulk supplies and non-potable supplies to customers if required.

We will ask domestic customers to reduce their demand for water, in particular discretionary water use such as car washing or garden watering. Initially we would use persuasion through a campaign of public information and awareness, or direct appeals for restraint. If this failed to deliver the required reduction in demand, we would use powers under the 2010 Floods and Water Act to require temporary water use bans on defined categories of domestic and commercial water consumption. We would implement these bans in a staged fashion as set out in the industry 'Code of Practice and Guidance on Water Use Restrictions 2011'. Before proscribing any categories of water use, we will consult with our customers and have regard to substantive representations.

In order to manage water demand of non-household customers, we will apply to DEFRA for drought orders at an early stage of the drought as a contingency. We would fully implement all actions only if the situation required. A summary of the legislation defining temporary water use bans and the principles we will follow in implementing the legislation is set out in the appendices to the report.

The temporary water use bans that we will implement to reduce demand for water at different stages of drought are summarised in the tables below. Table 1 highlights bans on specific categories of water use that will have a direct impact on customer amenity. These restrictions on customer water use will initially be modest and proportional, but are designed to increase in scope and become more effective as drought intensifies.

Table 2 sets out wider actions, including those that we would take, beginning with normal operations under dry conditions and extending to the point at which we may have to implement intermittent cuts to mains supply for some parts of the system. These actions include establishing communications with stakeholders and regulators, enhanced network management and leakage control, together with the implementation of emergency engineering schemes. Further details are provided in the body of the report.

Table 1 Temporary water use ban categories directly affecting customer amenity

<p>BAND 3 Full briefing of EA Drought Coordinator begin</p> <p>Consultation for non essential water use bans</p>	<p>Start full scale publicity & media campaign to save water</p> <p>High profile appeals and advice for customer restraint</p> <p>Media campaign to encourage water efficiency</p> <p>Work with HTA to distribute information via garden centres</p>
<p>BAND 4 Briefing and working with Business groups</p> <p>Application for drought orders</p> <p>Further consultation on water use bans</p>	<p>Temporary ban on the following activities</p> <p>Cleaning a private leisure boat using a hosepipe Cleaning a private motor-vehicle using a hosepipe Filling or maintaining an ornamental fountain Cleaning walls, or windows, of domestic premises using a hosepipe Cleaning paths or patios using a hosepipe Cleaning other artificial outdoor surfaces using a hosepipe Drawing water, using a hosepipe, for domestic recreational use Filling or maintaining a domestic swimming or paddling pool</p> <p>Full media campaign with direct appeals for ban compliance</p>
<p>BAND 5 Application for additional drought orders + emergency drought orders</p>	<p>Additional bans on household water use</p> <p>Watering a garden using a hosepipe Watering plants on domestic premises using a hosepipe Filling or maintaining a domestic pond using a hosepipe</p> <p>Non Household water use bans</p> <p>Watering outdoor plants on commercial premises Filling or maintaining a non-domestic swimming or paddling pool Filling or maintaining a pond Operating cisterns (in unoccupied premises) Cleaning industrial plant (except for health and hygiene) Suppressing dust (except where controlled by HSE regulations)</p> <p>Further media campaign with direct appeals for ban compliance</p>
<p>BAND 6 Implementation of emergency drought orders</p>	<p>All actions outlined above plus non household bans on</p> <p>Operating a mechanical vehicle-washer Cleaning a window of a non-domestic building Cleaning any vehicle, boat, aircraft or railway rolling stock Cleaning non-domestic premises</p> <p>Setting out plans for area supply cuts</p> <p>Implementing rota cuts on least vulnerable parts of network</p>

Table 2 Summary of wider mitigating actions from normal operation to severe droughts

DROUGHT CONTROL BAND	DEMAND RESTRAINT ACTIVITY	OPERATIONAL AND PLANNING ACTIVITY	DEPLOYMENT OF ADDITIONAL RESOURCES
BAND 1	Normal background level Summer advertorial activity	System operation based on minimising costs but balanced against need to avoid reservoir volume falling to Band 2	All minor sources brought into service High cost sources brought on line
BAND 2 Advise key stake-holders of situation (EA BWB HTA CCW)	Enhanced publicity and awareness Water efficiency promotions	Increased monitoring and management Minimise use of reservoir water Ensure balancing of reservoir drawdown	Maximise River Severn and River Axe transfers to pumped storage Ensure current groundwater and River water abstractions are maximised
BAND 3 Full briefing of EA Drought Coordinator Consultation for non essential water use bans	Start full scale publicity & media campaign to save water High profile appeals and advice for customer restraint	Increased monitoring Intensify leakage reduction & pressure reduction Maximise Leakstop publicity and encourage reporting of leaks	Plan engineering for use of mothballed sources Minimise all compensation releases Reduce bulk supply to third parties
BAND 4 Briefing and working with Stakeholder groups	Full media campaign with direct appeals for ban compliance Ban on use of hose for cleaning and maintenance	Unauthorised usage monitoring and prosecution Apply for drought orders for non household water use ban	Begin implementation of schemes for mothballed sources Manage TW to cope with reduced water quality Postpone maintenance
BAND 5 Briefing of EA, CCW, DEFRA +Stakeholder groups	Intense media campaign Full ban on household hosepipe use and specified non household use	Enforcement activity for temporary use bans Application for emergency drought orders Plan for rota cuts	Construct schemes to reinstate mothballed sources Manage TW to cope with reduced water quality
BAND 6 Briefing of EA, CCW, DEFRA +Stakeholder groups	Hosepipe and non essential use ban for all customers Intense media campaign for restraint	Planning supply security for vulnerable customers Implementation of emergency drought orders	Managing draw off from reservoirs at low volume Manage TW to cope with reduced water quality Implement schemes to reinstate sources

