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# South West Water Bournemouth Water

*Drought Plan  
October 2018*



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## EXECUTIVE SUMMARY

The purpose of this Drought Plan is to explain our operational approach to how we will manage water resources during periods of drought. In doing so, this document covers:

- details on the South West Water (SWW) and Bournemouth Water (BW) systems including current Levels of Service
- details of the drought triggers that underpin our operational plans
- demand-side and supply-side actions we will take to manage in a drought
- environmental impact assessments during a drought
- the management and communication plan that we will follow during a drought

This Drought Plan builds on learning from previous droughts both within the company and from national studies.

The assumptions that have been made in producing our Plan are listed, together with a checklist for stakeholders, to refer to on the content of our Plan.

Following the merger of SWW and BW in 2016, the Drought Plan now incorporates the BW area within this document.

### About us – your water supply

SWW provides drinking water to a population of 1.7 million across Devon and Cornwall and parts of Dorset and Somerset. Our water resources in this area consist of three large reservoirs, a number of smaller reservoirs, river intakes and some groundwater sources which are predominantly in East Devon. To the east, SWW operates the BW area in Hampshire and Dorset. Water resources in this area are largely made up from river abstraction with some groundwater, and supply approximately 0.5 million customers.

In order to optimise the yield of all of our water resources, the sources are operated in conjunction with one another in the area to form four Water Resource Zones (WRZs).

All our Resource Zones are currently in a supply demand surplus and there have been no demand restrictions imposed across the area in the last 20 years. This Plan shows that our supplies are resilient to a repeat of any weather events observed in the last 50 years. Whilst a repeat of a drought similar to the most severe historical drought on record (1975/76) could cause a need for temporary-use demand restrictions, we would not need to invoke supply-side drought orders or demand side emergency drought orders<sup>1</sup> (such as bans on non-essential use or rota cuts). We estimate that these further drought measures would not have to be imposed unless the area experiences a drought more extreme than a drought which has a return period greater than once every 100 and 200 years respectively on average. These events are therefore unlikely during the lifetime of this Drought Plan. For completeness, this Plan shows the process of how a drought would be managed in the highly unlikely event that within the lifetime of this plan, we experience a drought more

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<sup>1</sup> Under demand levels likely to be experienced in the life time of this Plan, neither the reservoir drawdowns or demand levels enter the Zone D trigger area thereby negating the need for these measures.

extreme than that of the historical drought of 1975/76. However, we do not expect these measures to be needed.

Table 1 sets out these current levels of service and for comparison the Level of Service used within strategic water resources planning.

**Table 1: Levels of Service**

	Level of service used within strategic water resources planning	Current Levels of Service (those likely to be experienced during the life time of this Drought Plan)			
		Colliford WRZ	Roadford WRZ	Wimbleball WRZ	Bournemouth WRZ
Publicity, appeals for restraint and water conservation measures	1 in 10 years	> 1 in 10 years	> 1 in 10 years	> 1 in 10 years	> 1 in 10 years
Temporary Use Bans (TUBs) <sup>2</sup>	1 in 20 years	> 1 in 40 - 135 years*	>1 in 175 - 220 years	>1 in 110 – 125 years	> 1 in 130 -150 years
Supply-side Drought Orders or Drought Permits <sup>3</sup>	1 in 20 years	> 1 in 40 - 135 years* (a)	>1 in 175 - 220 years (a)	>1 in 110 – 125 years (a)	> 1 in 130 -150 years (a)
Demand-side Drought Orders <sup>4</sup>	1 in 40 years	> 1 in 40 - 135 years* (a)	> 1 in 175 - 220 years (a)	> 1 in 110 – 125 years (a)	> 1 in 130 -150 years (a)
Emergency Drought Orders – partial supply, rota cuts or standpipes <sup>5</sup>	>> 1 in 200 years (a)	>> 1 in 200 years (a)	>> 1 in 200 years (a)	>> 1 in 200 years (a)	>> 1 in 200 years (a)

*\*Analysis and modelling of our more severe plausible droughts has shown that this is likely to be in the region of 1 in 200 or more severe*

*(a) Should the area experience a drought requiring these actions, the drought would be more extreme than the most severe historical drought on record (1975/76)*

*NB Greyed drought measures would only be required in very extreme drought scenarios which are outside of normal drought planning criteria considered in this plan*

<sup>2</sup> Formerly termed hosepipe bans.

<sup>3</sup> The use of drought orders or permits of this nature are not envisaged in the lifetime of this plan as can be seen in our analysis of historic droughts.

<sup>4</sup> Formerly termed bans on non-essential use. All resource zones do not currently enter Zone D of our drought triggers based on our worst historical drought of 1975/76. This has a return period of at least 1 in 100 years across all zones.

<sup>5</sup> Previously service level listed as unacceptable. Following further guidelines from the Environment Agency we have included an estimated return period for this service level based on our drought analysis. Drought return periods of this magnitude are inherently uncertain, but the events that would cause these interventions are rare.

## How we will manage in a drought – drought triggers

This Drought Plan sets out the triggers that we will use to manage water resources in a drought. We term these drought management curves.

In the SWW supply area, the curves relate the storage in a reservoir to the time of year and the level of risk to water resource availability. For example, if a reservoir is only half full at the end of the summer there will be less risk to supplies than if it was half full at the beginning of the summer when high demands and low rainfall might be expected in the following months.

In the BW area the curves relate to the level of customer demand. For example, if demand is very high there is a higher risk to water resource availability than when demand is low.

This Drought Plan uses different curves for the SWW and BW areas to reflect the different water resources in each area. Details of each of the curves are included in this Plan.

## Drought management actions

This Drought Plan outlines a series of options that we could adopt as drought conditions in either the SWW or BW area deepen.

These options are divided into two categories: those which seek to reduce the demand for water and those which seek to increase the amount of water available for supply. This Drought Plan proposes a balanced approach to drought management using options from both categories. A full breakdown of the actions we could adopt is included in the Plan.

This Drought Plan does not include proposals for the use of environmental Drought Permits and/or Drought Orders to increase abstraction during a drought. This is because our work shows we have sufficient water resources to meet our Levels of Service when compared to historic droughts.

## Management structure and communication

This Drought Plan sets out the details of our internal management arrangements for how we would manage in a drought. This includes the meeting structures and roles required at each. The management structure is important to ensure that there is effective and efficient management of the water resources during a drought period when the supply system will be under, or is predicted to be under, stress.

This Drought Plan also includes details of our communications strategy in a drought, and the actions we could take. Keeping our customers and stakeholders informed of the situation, and the actions we are taking during a drought, is a vital part of the process. The Plan includes details on the type and content of communication we would take with each stakeholder (Appendix J). This includes details of communications with the new non-household retailers following the opening of the non-household retail market in April 2017, and also reflects recent changes in customer expectations with regard to digital media channels.

## Changes and improvements since the last Plan

This Drought Plan includes a number of changes and improvements since the previous Plans were published (BW in 2012, SWW in 2013). The principal changes and improvements are:

1. This Drought Plan includes new work examining the performance of our water supply system against droughts more severe than we have experienced in the past.
2. Inclusion of proposed Levels of Service for demand-side Drought Orders (formerly termed bans on non-essential use) and emergency Drought Orders for the BW area. Historically these have not been defined and this leaves a gap with regard to service levels customers can expect. In this Drought Plan we are aligning the Level of Service such that for demand side drought orders all our WRZs have a 1 in 40 years service level, whilst we propose that emergency drought orders will never be sought.
3. Updating the Plan for the new non-household retail market that opened in April 2017.
4. Inclusion of a checklist for activities that must or should be included in a Drought Plan developed from Defra and Environment Agency guidelines (Appendix M).

Droughts can vary enormously in nature, but we believe that the proposals described in this Plan provide a balanced and robust approach to maintaining essential supplies to customers, whilst minimising any potential adverse environmental effects.

## Commercial and security information

The published version of the Drought Plan is required to exclude any matters of commercial confidentiality and any material contrary to the interests of national security. There were no matters of commercial confidentiality. In the published version of the Plan we have excluded information relating to the location of key assets on the advice of our certifier for emergency planning and in the interests of national security.

# 1. Introduction

## 1.1 Overview of process

Water Undertakers in England and Wales are required to prepare and maintain Drought Plans.

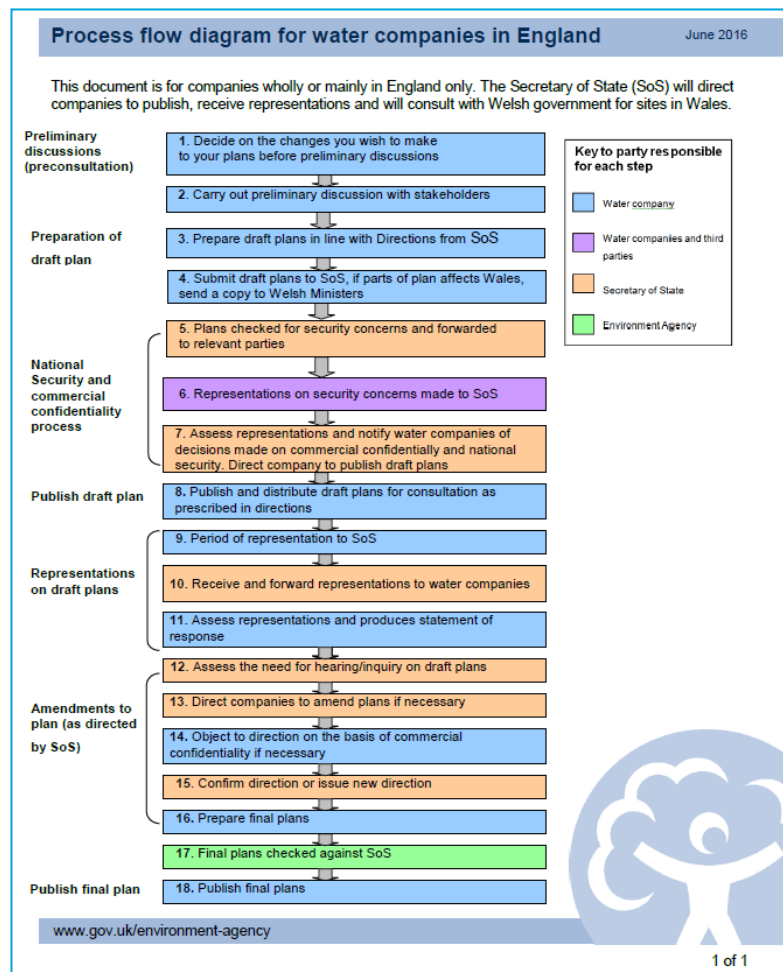
This Drought Plan is for SWW and includes BW, following the merger in 2016.

The purpose of the Drought Plan is to set out the short-term operational steps we may take before, during and after a drought.

A summary of the steps water companies are required to follow under the relevant legislation is shown in Figure 1. Further information is given in the Water Company Drought Plan Guideline (Defra and the Environment Agency, 2015).

**Figure 1: Water Company Drought Plan Statutory Process**

(Source: Environment Agency, 2016a)





## 1.2 Pre-draft and draft consultation details

Consultation is an important element in the process of our Drought Plan. As part of the preparation of this Plan we advised various organisations, which included Defra, Environment Agency, Natural England and Ofwat, that we were commencing a review of our Drought Plan and would appreciate any comments at this early stage of the process. A list of consultees is given in Appendix A.

We have also held technical meetings with the Environment Agency, which included a focus on historic droughts in our company record as well as drought events that could be of longer duration and lower rainfall than those in the historic record.

We have taken account of any responses we have received as shown in the relevant sections of our Plan.

## 1.3 Water company specific information

### 1.3.1 Supply Area

This Plan covers Cornwall, Devon, Bournemouth and parts of Hampshire, Dorset, Somerset and Wiltshire.

### 1.3.2 Water Resource Zone (WRZ)

Water resource planning is based on WRZs. A WRZ is defined as the largest possible zone in which all resources, including external transfers, can be shared. A WRZ is therefore a zone in which all customers experience the same risk of supply failure from a resource shortfall.

We have four WRZs - Colliford, Roadford, Wimbleball and Bournemouth - for planning and managing our water resources. The WRZs in our Drought Plan are consistent with the WRZs in our current Water Resource Management Plans (WRMPs).

For Devon and Cornwall, each WRZ is served primarily, but not exclusively, by one of the three strategic reservoirs: Colliford, Roadford and Wimbleball. For example, customers in the Roadford WRZ have a very high proportion of their water supplied by Roadford Reservoir and its associated sources, but a small proportion of their water is provided by transfers from the Wimbleball WRZ.

We operate a conjunctive use system with links between and within WRZs, which enables us to transfer water from less stressed to more stressed areas and to optimise use of existing resources before we would consider drought management actions.

In the SWW WRZs, due to prescribed flows being in place on abstraction licences for most of our river abstractions, as a drought progresses we would have to stop using

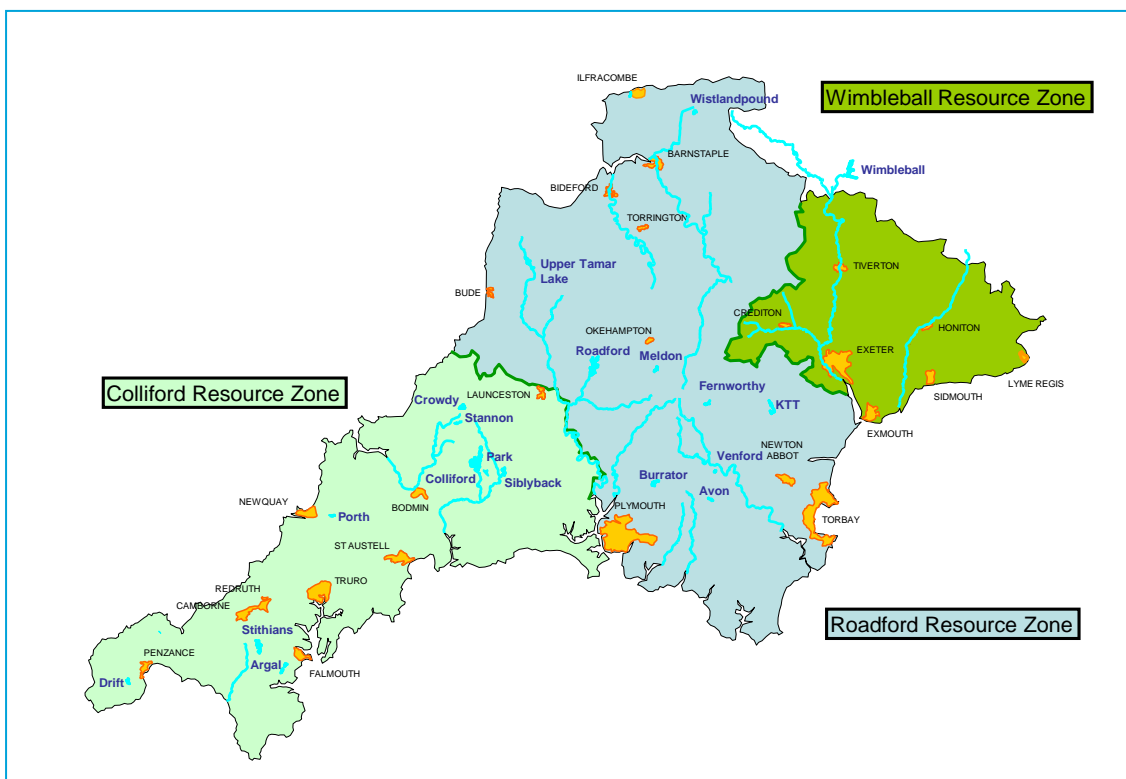
these sources first and switch to reservoir sources, hence protecting the environmental flows.

This helps to minimise the environmental impact of any actions before, during or after a drought.

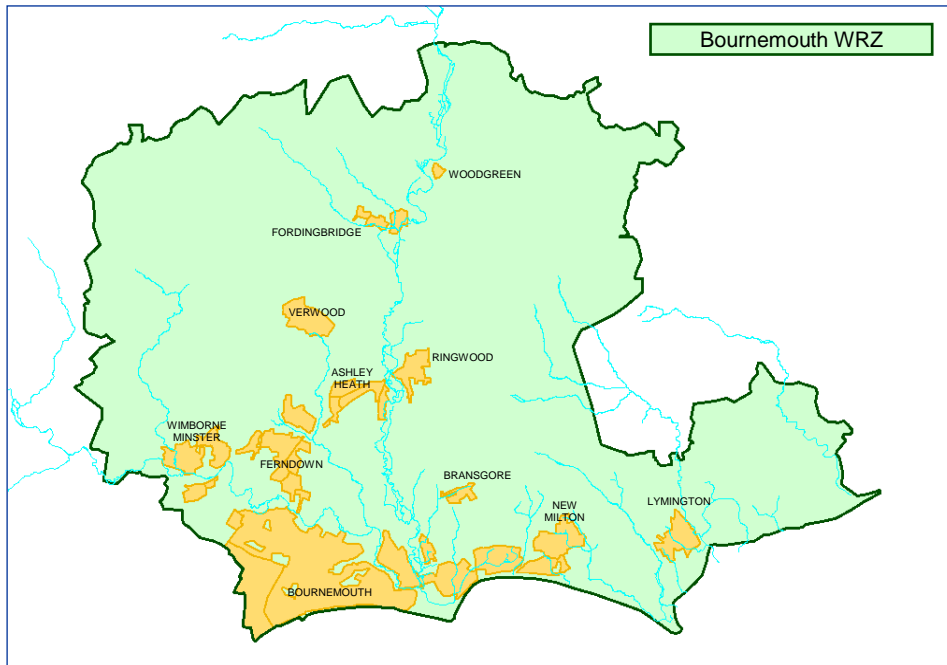
In the Bournemouth WRZ, sources of water are dominated by direct run-of-river abstractions from the River Stour in Dorset and the River Avon in Hampshire with interconnectivity across the zone. These abstractions are located fairly low in the catchment and demand has been reducing over time, which is enabling us to minimise the environmental impact of any actions before, during or after a drought.

The WRZs are shown in Figure 2 and Figure 3. WRZ schematics are shown in Appendix B.

**Figure 2: Colliford, Roadford and Wimbleball WRZs**



**Figure 3: Bournemouth WRZ**



Further information on our WRZs is also given in our WRMPs.

The SWW area is unusual in that it borders just one other water company, Wessex Water. Colliford WRZ and Roadford WRZ have no neighbouring water companies. Wimbleball WRZ neighbours Wessex Water and we share a major water resource on Exmoor, Wimbleball Reservoir. During our normal operations we are in regular discussions with Wessex Water on the operation of this source.

SWW has one small import (Smeatharpe) and two small exports (Charmouth and Wellington) of treated water with Wessex Water. Discussions with Wessex Water have confirmed that we would not expect these small transfers to be either increased or decreased during a drought.

Southern Water and Wessex Water neighbour our Bournemouth WRZ. Although we have no formal agreements on bulk transfers, due to our sources being robust in times of drought there is a possibility that we could supply neighbouring water companies.

We will ensure that we communicate with neighbouring companies early in the drought management process to ensure that we are in a position to offer or receive assistance when needed.

We have also recently helped initiate a new water resources group – the West Country Water Resources Group (WWG). The group has been set up to support a co-ordinated approach to water resources planning in the south west of England and neighbouring water company areas and understand opportunities for water trading.

However, the group will also present an opportunity to ensure joined-up working and consistent drought messaging to customers across the region in the event of drought.

### 1.3.3 Previous Drought Plans

This Plan is an update of our previous Drought Plans and is produced in accordance with the Defra and Environment Agency guidelines (Defra and the Environment Agency, 2015).

Previous plans were produced for BW (2012) and SWW (2013) separately. Following the merger in 2016, these have now been combined into one Plan and have been updated.

### 1.3.4 Water Resource Management Plans and Water Company Business Plans

Our Plan is consistent with our Water Resource Management Plans (WRMPs), for example the same Levels of Service, and same drought triggers. The WRMPs are available on the internet (SWW, 2014a and Sembcorp BW, 2014a).

Our Plan is in line with our Business Plans (SWW, 2014b and Sembcorp BW, 2014b) which set out our strategic objectives and proposed investments, for example Security of Supply Index. Ofwat uses this Business Plan to set our price limits for the next five years.

### 1.3.5 Emergency plans

Our Plan is not intended to cover details of arrangements for providing water supplies when there is a civil emergency, as advised by the guidelines (Defra and the Environment Agency, 2015).

Every production site has a contingency plan which is an International Organisation for Standardisation (ISO) document. This document sets out steps to undertake to maintain supplies in the event of significant interruptions. These plans include procedures to deploy alternative water supplies (e.g. standpipes, bowsers). SWW have contracts in place to facilitate this, such as tanker provision and distribution.

### 1.3.6 Environment Agency Drought Plans

The Environment Agency re-issued their Drought Plan in 2015 (Environment Agency, 2015). There are no specific additional drought management actions relating to SWW and BW which are applicable to our Drought Plan.

### 1.3.7 Water Framework Directive - River Basin Management Plans

We believe there are no actions identified within the River Basin Management Plan that would be affected by this Drought Plan.

### 1.3.8 Habitats Regulation Assessment

Current legislation requires us to ensure our Plan meets the requirement of the Conservation of Habitats and Species Regulations 2010, and therefore we must determine and undertake, if necessary, a Habitats Regulations Assessment (HRA) on the effects of the Drought Plan on European sites, whether within this Plan alone or in combination with other plans.

A HRA refers to the assessment of the likely or potential effects of any actions on European sites, including Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites (Defra and Environment Agency, 2015 and Environment Agency, 2016b). This requirement is only of relevance to any actions within this Drought Plan; abstractions that occur under our usual licensed abstractions are covered within the abstraction licensing system.

The need and applicability for an HRA as a result of our Drought Plan is covered in Section 4.

### 1.3.9 Strategic Environmental Assessment

The Strategic Environmental Assessment (SEA) Directive (2001/42/EC) requires a formal environmental assessment of certain categories of plans and programmes which are likely to have significant effects on the environment. The specific need is based on multiple factors and the applicability to Drought Plans is covered in the guidelines (Defra and the Environment Agency, 2015) and the UKWIR Report Strategic Environmental Assessment – Guidance for Water Resources Management Plans and Drought Plans (UK Water Industry Research, 2007). As a water company, we are a responsible authority and therefore must determine if our Drought Plan falls within the scope of the SEA Directive.

The need and applicability for an SEA as a result of our Drought Plan is covered in Section 4.

## 1.4 **Baseline water resources situation and Levels of Service**

### 1.4.1 Baseline water resources situation

Our WRMPs show the supply demand balance for each of our WRZs. In all four of our WRZs, supply is greater than demand for the period of this Drought Plan.

### 1.4.2 Levels of Service

The design standard against which a water company manages the water supply system is termed the Levels of Service. The Levels of Service detail the frequency with which a water company might need to impose drought management measures which may have an adverse effect either on customers or the environment. If supply is greater than demand i.e. a WRZ is in surplus, then the current Levels of Service

will be greater than the design standard used for longer term strategic water resources planning.

Our policy is to try to avoid imposing demand restrictions, such as temporary water use restrictions, or seeking Drought Orders and/or Drought Permits and in this we have been successful for the last 20 years in Devon and Cornwall. No demand restrictions have ever had to be imposed in the Bournemouth WRZ.

It is also our policy to balance the direct effect on customers with that on the environment.

Table 2 sets out the current Levels of Service. For comparison the Level of Service used in our longer term strategic planning within our Water Resources Management Plan and Business Plan is also shown. The drought triggers (for example, triggers relating to reservoir storage) show when we are likely to need to invoke drought management actions and Table 2 shows the expected frequency of occurrence in the lifetime of this plan. This gives transparency on how and when actions would be made.

However, all droughts are different and the form of any drought and how it evolves greatly influences the mitigation actions needed. We have therefore developed this plan to be flexible and adaptable to different outcomes.

Although we do not envisage the need for Drought Permits in the life of this plan, our analysis in this plan and the Water Resources Management Plan show situations which could give rise to particular stress. The types of drought we have considered include, but are not limited to:

- Long, multi-season droughts extending over the summer and spanning summer-winter-summer or winter-summer-winter
- Exceptionally high demand or population changes with prolonged dry weather periods
- Loss of significant resource availability due to licence reductions or land use changes during prolonged dry weather periods

These scenarios can occur singularly or in tandem. The potential interaction of these situations means it is not feasible or practical to assign risks a simple return period. Were these scenarios to arise, we would liaise with the Environment Agency on the specific issue to highlight the risk to public supply and the actions we would promote. Such discussions would include the role of Drought Permits or Drought Orders.

The response of our supply system means typically we would look to start that process the season before any issue might threaten public water supply.

We aim to have a six month maximum duration of a TUB. In the unlikely event that demand side Drought Orders would be sought, we assume a four month maximum duration of such restrictions.

The Levels of Service in Table 2 are used within our WRMPs and Business Plans.

Table 2: Levels of Service

	Levels of Service used within strategic water resources planning	Current Levels of Service (those likely to be experienced during the life time of this Drought Plan)			
		Colliford WRZ	Roadford WRZ	Wimbleball WRZ	Bournemouth WRZ
Publicity, appeals for restraint and water conservation measures	1 in 10 years	> 1 in 10 years	> 1 in 10 years	> 1 in 10 years	> 1 in 10 years
Temporary Use Bans (TUBs) <sup>6</sup>	1 in 20 years	> 1 in 40 - 135 years*	>1 in 175 - 220 years	>1 in 110 – 125 years	> 1 in 130 -150 years
Supply-side Drought Orders or Drought Permits <sup>7</sup>	1 in 20 years	> 1 in 40 - 135 years* (a)	>1 in 175 - 220 years (a)	>1 in 110 – 125 years (a)	> 1 in 130 -150 years (a)
Demand-side Drought Orders <sup>8</sup>	1 in 40 years	> 1 in 40 - 135 years* (a)	> 1 in 175 - 220 years (a)	> 1 in 110 – 125 years (a)	> 1 in 130 -150 years (a)
Emergency Drought Orders – partial supply, rota cuts or standpipes <sup>9</sup>	>> 1 in 200 years (a)	>> 1 in 200 years (a)	>> 1 in 200 years (a)	>> 1 in 200 years (a)	>> 1 in 200 years (a)
<p><i>*Analysis and modelling of our more severe plausible droughts has shown that this is likely to be in the region of 1 in 200 or more severe</i></p> <p><i>(a) Should the area experience a drought requiring these actions, the drought would be more extreme than the most severe historical drought on record (1975/76)</i></p> <p><i>NB Greyed drought measures would only be required in very extreme drought scenarios which are outside of the normal drought planning criteria considered in this plan</i></p>					

<sup>6</sup> Formerly termed hosepipe bans.

<sup>7</sup> The use of drought orders or permits of this nature are not envisaged in the lifetime of this plan as can be seen in our analysis of historic droughts.

<sup>8</sup> Formerly termed bans on non-essential use. All resource zones do not currently enter Zone D of our drought triggers based on our worst historical drought of 1975/76. This has a return period of at least 1 in 100 years across all zones.

<sup>9</sup> Previously service level listed as unacceptable. Following further guidelines from the Environment Agency we have included an estimated return period for this service level based on our drought analysis. Drought return periods of this magnitude are inherently uncertain, but the events that would cause these interventions are rare.

## 2. Drought triggers and scenarios

### 2.1 Triggers, data sources and arrangements

#### 2.1.1 Introduction

We use a series of drought triggers which encompass forecasting, monitoring and discussions with the Environment Agency as a drought develops.

It must be recognised that each drought is different in terms of severity, location, duration and impact, and therefore the Drought Plan must be flexible within an agreed consistent framework.

We use the drought triggers to identify when we should consider implementing specific drought actions to reduce demand and, if necessary, to obtain extra water resources. However, it should be noted that our triggers are used as part of a framework for drought management. Professional judgement, along with information such as river flow information, rainfall data and weather forecasts, are also used during each specific drought situation to assess what actions are appropriate.

The drought triggers can be divided up into three different types of triggers; groundwater triggers; surface water triggers and demand triggers. Different triggers are appropriate for different water resources systems. We describe how we use these different triggers in the sections below.

#### 2.1.2 Groundwater triggers

Our groundwater sources contribute approximately 10% of the water we put into distribution across the area covered by our Colliford, Roadford and Wimbleball WRZs, and 15% in our Bournemouth WRZ.

For the majority of groundwater abstraction sites in our area, the controlling constraint is either an abstraction licence limit or the abstraction capacity of the source. As a consequence, the impact on supply capability of a groundwater drought in our area is significantly less critical than that of a surface water drought.

The introduction of specific groundwater triggers have been considered but are not appropriate to our water resources system as described below.

The groundwater sources are operated in conjunction with the surface water sources; therefore, in our Colliford, Roadford and Wimbleball WRZ, it is more appropriate to identify triggers within the remaining storage in the surface water reservoirs. In our Bournemouth WRZ, the groundwater abstractions are strongly licence constrained, rather than being constrained by groundwater levels. It is therefore more appropriate to use demand triggers, as explained below.

We still routinely monitor the groundwater levels to assist us with the operation of our sources, and examples are shown in Appendix E. At a few specific local groundwater sites, output could be affected by low flows; examples include Otterton



1A Borehole, Vennbridge and Duckaller Boreholes and Wilmington Springs. The lower projected output during periods of low flow from sources such as these is taken account of in the derivation of the drought triggers.

### 2.1.3 Surface water triggers and curves (Colliford, Roadford and Wimbleball WRZs)

#### (a) Description of triggers, reservoir control curves and link to Levels of Service

The essence of our Drought Plan for our reservoirs is a series of drought management triggers which relate drought management actions to the remaining reservoir storage through a series of control curves. We have developed these at WRZ level, as well as at a more local level. The curves are operated in conjunction with each other as appropriate. Local curves can also be used to give guidance should a very severe drought develop that is only localised in nature.

The curves divide the storage of the strategic reservoirs into Zones A, B, C and D and the storage of local reservoirs into Zones A, B and C. Example templates are given in Appendix C.

The zones relate to the Levels of Service described in Section 1.4.2 above and define drought management actions that could be taken. For example, if the reservoir storage is in Zone C, then the possible actions could include TUBs for certain activities (formally termed hosepipe bans), or supply-side actions such as the use of existing licensed sources not usually in supply. It should be noted that Zone D actions (demand-side Drought Orders, formerly termed bans on non-essential use) are only triggered by strategic reservoir storage.

As every drought is different in nature, we also use other data and information, such as local river or rainfall data, to help inform the most appropriate drought management action. Similarly, drought management actions may be implemented on either a whole WRZ or a local reservoir area depending on circumstances and the type of drought being experienced.

The sequence of actions defined by our zones is consistent with the Environment Agency's guidelines, and there is a balance between supply-side and demand-side actions. These actions are detailed further in Section 3.

#### (b) Derivation of triggers and reservoir curves

The derivation of our drought triggers and reservoir curves is consistent with our assessment of Deployable Output in the WRMP (SWW, 2014a). The triggers and curves were derived using historical rainfall records, reservoir levels, river flows and groundwater levels, as well as our computer models of the three WRZs.

The triggers and curves have been derived using historical flow records; post 1957 for the Wimbleball and Roadford WRZs, and post 1962 for the Colliford

WRZ. These flow records therefore include a variety of serious droughts. This is further covered in section 2.3 below.

The triggers and curves for our surface water reservoirs are shown in Appendix D, where they have been grouped by WRZ.

#### 2.1.4 Demand Triggers (Bournemouth WRZ)

##### (a) Description of triggers and link to Levels of Service

Even in very dry conditions, the water resources in the Bournemouth WRZ are robust, and therefore, in this area, drought triggers focus on the management of very high demands which could occur in drought periods. Potentially, very high, unusual demand as a result of dry weather could put excessive pressure on our available infrastructure. This is particularly relevant to the short-term peak summer demands that we experience, arising from the dual factors of household garden watering and the influx of tourists.

The drought triggers divide the demand into Zones A, B, C and D. Example templates are given in Appendix C.

The zones relate to the Levels of Service described in Section 1.4.2 above and define drought management actions that could be taken. For example, if the demand is in Zone B, then we would increase operational monitoring and request voluntary savings of water.

As every drought is different in nature, we also use other data and information such as local river, rainfall and demand data to help inform the most appropriate drought management action.

##### (b) Derivation of triggers

The triggers have been derived by an analysis of demand and infrastructure constraints and are consistent with the assessment of Deployable Output in the current WRMP.

Peak demands are related to weather and are, therefore, transient. We use a zone of demand as our trigger, which allows for a measure of flexibility when implementing drought management actions. We propose to implement a succession of escalating actions linked to rising demand levels, should there be areas of concern. Demand-side actions are further detailed in Appendix G.

## 2.2 Forecasting

When implementing drought measures, whether they are demand-side actions (e.g. TUBs) or supply-side actions (e.g. distribution zone management), it is very important to take into account the time taken to implement the measures. Therefore, resource monitoring and projections are regularly undertaken and updated in order to give as much warning as possible of the need for any drought measures. Further details of the monitoring and forecasting work we undertake is given below.

### 2.2.1 Rainfall and river flow monitoring and forecasting

As a dry spell develops, we monitor cumulative rainfall totals in the affected area for the relevant period (usually from when the reservoir was last full). We consider information from the Environment Agency in their reports available on the internet, reports from the Centre of Ecology and Hydrology and information from the Met Office. We also have information available from Tabony Tables (Tabony, 1977) which can be used to give an indication of the return period of the rainfall. An example is given in Appendix E3.

We also compare river flow data in the surrounding area to data available from historic droughts and river recession curves, which helps us project when river abstractions may be affected by licence conditions, as well as provide information on the projected reservoir inflow. An example is given in Appendix E4.

### 2.2.2 Reservoir monitoring and forecasting

In addition to the general monitoring and surveillance of the water situation using, for example, the Water Situation Report (see example extracts in Appendix E), we also produce projections of how the drought might develop. Such forecasts look at alternative scenarios up to 18 months ahead for the strategic reservoirs, and for shorter periods for our local reservoirs, as the majority of these are single season (i.e. they are highly likely to refill every year). This work is probabilistic in nature and based on the use of models driven by historic flow sequences. The storage projections are interpreted in conjunction with the analysis of rainfall and river flow data.

Examples of reservoir projections for our three strategic reservoirs are shown in Appendix E5.

### 2.2.3 Groundwater monitoring and forecasting

As detailed above, the impact on our supply capability of a groundwater drought in our area is significantly less critical than that of a surface water drought. However, we still undertake groundwater monitoring to assist us with the operation of our sources.

The best indication of the state of groundwater resources is obtained by comparing current groundwater levels across the South West Region with long term statistics.

Currently, three locations are monitored regularly and reported each week in the Water Situation Report, and these are shown in Table 3.

**Table 3: Groundwater locations reported weekly in the Water Situation Report**

Station Name	Location	Aquifer
Otterton S1	Otterton	Triassic Sandstone
Cofton Cross	Starcross	Permian Sandstone
Greatwell 9	Ottery St Mary	Triassic Sandstone

General projections of future groundwater levels can be made by assessing the recession of the groundwater level in comparison to historical trends. At times when declining water levels could potentially follow past drought patterns we both increase monitoring frequency and commence additional groundwater level monitoring at appropriate sites.

We keep our projections under review and develop groundwater monitoring plans relevant to the geographical area of impact and scale of any impending drought condition. Other early indications of a possible groundwater drought are: declining yields from both borehole and spring sources; deepening pumping water levels; an increase in pump power consumption or significant changes in groundwater quality. Greater monitoring of these parameters is a further element of our groundwater drought forecasting strategy.

#### 2.2.4 Demand monitoring and forecasting

Although we monitor demand for all our WRZs, this is particularly important in the Bournemouth WRZ, where we use a well-established correlation between summer water consumption, temperature and precipitation to anticipate likely demands. An example is given in Appendix E6 where a plot of monthly demand in Bournemouth WRZ against monthly average temperature and rainfall for the period April 1995 to March 2011 is given. The plot shows that demand is consistently lower in months where the average temperature is below 10 or 12 degrees, but increases steadily as the temperature rises above this threshold.

We can use this type of tool to forecast periods of likely increases in demand.

### 2.3 **Historic and plausible droughts**

#### 2.3.1 Historic droughts

As described above, the derivation of the triggers and curves, along with the scenario testing, is based on over 50 years of data and incorporates a variety of serious droughts like those of 1959, 1975/76, 1978, 1984, 1989 and 1995.

Nevertheless, in some areas of the country longer records are available, and DEFRA and the Environment Agency asked us to consider this further, both within our SWW

Drought Plan 2013 and following the publication of the Drought Plan 2013. For this purpose, analyses were carried out in 2011/2012 and in 2013 conjunctively by the Environment Agency and SWW (SWW, 2013a and SWW, 2013b), and further technical discussions between the Environment Agency and SWW were held in 2016. These resulted in recognition that given the difficulties with the availability of accurate historic data in Devon and Cornwall, there is currently no requirement to consider the use of data prior to 1957 for the Wimbleball and Roadford WRZs, and 1962 for the Colliford WRZ.

### 2.3.2 Plausible droughts

The Environment Agency guidelines advise that our Plan should consider not only historic droughts, but also droughts that are of longer duration and lower rainfall than those in the historic record.

We have therefore considered the characteristics of our water resources systems in periods of drier weather to derive a sequence of plausible droughts. These plausible droughts include the consideration of a drought continuing further into the autumn, drier winters, as well as the sequence of historical years in the mid 1970s being different.

These droughts are further explained in Appendix F4.

We have provided estimates of the severity of each plausible drought as required by the guidelines and these are also included in Appendix F4.

We have tested the behaviour of our water resources systems to these droughts, which is further explained in Section 2.4 and Appendix F4.

## 2.4 **Links to actions/measures with timing information**

### 2.4.1 Colliford, Roadford and Wimbleball (WRZs with conjunctive use of resources)

We have examined how effective our drought triggers are for the above WRZs by testing different drought scenarios. This approach can be used to demonstrate how drought management actions would be implemented as reservoir storage passes through the drought curves described in Section 2.1.3.

Whole WRZs have been considered in the computer simulations, but examples of reservoir drawdowns have concentrated on strategic reservoirs, given that Zone D actions are triggered only by strategic reservoir storage.

The drawdowns have been calculated by simulating both critical historic droughts and the plausible droughts described above. We have assumed the current infrastructure and operational practices. The demand level and demand patterns used in the simulations are those which might be anticipated during a drought. The simulations also include an allowance for the fisheries water bank releases.

The drought control triggers and curves are based on a combination of the most severe historic low flow sequences. Therefore, modelling specific drought years will not result in a drawdown that enters the lower storage zones for long periods of time.

Demand management savings and supply-side drought management actions assumed are as set out in Section 3.

(a) Historic droughts

The graphs in Appendix F1 are examples of the drawdowns that could occur in each of the three strategic reservoirs assuming the policies and measures set out in this document are followed. An example of a local reservoir (Wistlandpound) is also given in Appendix F2 to show how the strategic and local sources work in conjunction with each other.

For each strategic reservoir, we show the likely drawdown for:

- the whole period of record, which includes several serious droughts our area experienced, e.g. 1959, 1975/76, 1978, 1984, 1989 and 1995
- a long-term drought, typically lasting over 2 years (1975 to 1978)
- a shorter duration, multi seasonal drought (1 to 2 years, typically consisting of two dry summers and an intervening dry winter) (1975-1976).

The graphs also show the impact of the drought management actions.

Assigning return periods to historical droughts is complex, as it is related to severity, duration and area. For example, for the River Exe at Thorverton the drought of 1976 has been quoted as having a return period of greater than 50 or 100 years depending on the period being considered (Rodda & Marsh, 2011). To address this, we commissioned Met Office<sup>10</sup>, using rainfall data, to assign return periods to key droughts including 1975/76, 1984, 1989 and 1995. The Executive Summary is provided in our draft Water Resources Management Plan, which is due to be published in early 2018.

Estimates of the return periods for these droughts for Colliford, Roadford and Wimbleball WRZs are presented in Table 4 below.

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<sup>10</sup> Met Office (2017), *Severe Drought Analysis for Water Resources Management Plan and Drought Plan – v3.0.*

**Table 4: Estimates of return periods for historic droughts in SWW WRZs**

Historic drought	Return periods (years) Extreme Value Analysis (EVA)			For reference - Return periods (years)Tabony		
	Colliford WRZ	Roadford WRZ	Wimbleball WRZ	Colliford WRZ	Roadford WRZ	Wimbleball WRZ
1975/76	40 - 135	175 - 220	110 - 125	6-24	40 – 170	40 – 160
1984	25 – 50	30 – 35	15 – 20	20-80	20 – 80	13 – 50
1989	20 – 40	10 – 11	<10	15-60	7 – 26	5 – 18
1995	65 - 200	35 - 45	30 - 40	50-200	15 - 60	23 - 90

The graphs as shown in the appendices can be used to give an indication of the likely timing of implementation of the drought management actions. As referenced above, river recession curves and drawdown projections will be used to estimate when to start the preparation of drought measures which require a long lead-in time.

As can be seen in the graphs, strategic reservoir storages do not enter Zone C in the extreme drought of 1975/76. This is further explained below:

- Colliford Reservoir

Colliford Reservoir is a multi season reservoir and hence more susceptible to longer periods of drought. The drought of 1976, which follows the dry winter of 1975/76, shows how drought measures could be introduced as the storage in Colliford Reservoir falls. The projected drawdown for this period is shown in Appendix F1, Figure F1.3.

- Roadford Reservoir

Roadford Reservoir is a multi season reservoir and hence more susceptible to longer periods of drought. The drought of 1976, which follows the dry winter of 1975/76, shows how drought measures could be introduced as the storage in Roadford Reservoir falls. The projected drawdown for this period is shown in Appendix F1, Figure F1.6.

- Wimbleball Reservoir

Wimbleball Reservoir is a single season reservoir as it benefits from the pumped storage scheme to supplement natural winter inflows. The drought

of 1976 shows how drought measures could be introduced as the storage in Wimbleball Reservoir falls. The projected drawdown for this period is shown in Appendix F1, Figure F1.9.

- Local reservoirs

Our local reservoirs tend to be single season reservoirs, i.e. they are highly likely to refill even in multi season droughts. An example of a local reservoir drawdown for the period 1975 to 1978 is given in Appendix F2, Figures F2.1 and F2.2. If a local source enters Zone C, it is likely there is also concern about a strategic source and a series of drought management actions may be necessary, covering a range of scenarios within the affected WRZ.

It can be seen that none of the critical droughts trigger the need for the implementation of any further measures to those formally identified within the Appendices of this Plan.

It can also be seen that our scenario testing has considered not only the drought period of the mid 1970's but also the other serious droughts since the late 1950's.

(b) Plausible droughts

Analysing the impacts on water resources to droughts outside of the historic record is a requirement for the Water Resource Management Plan (WRMP) and Drought Plan (DP). These types of droughts are termed “plausible droughts”.

As described in section 2.3.2, we derived a series of plausible droughts and we have tested our systems against these in our scenario testing. Further information on how we have tested our systems is shown in Appendix F3.

We have commissioned the Met Office<sup>11</sup> to assign return periods to the plausible droughts for each WRZ. The results indicate some plausible droughts have return periods in excess of 1,000 years, depending on plausible drought and location. A summary of the return periods assigned to each plausible drought is presented in Appendix F4.

Our scenario testing concluded:

- Colliford WRZ

The plausible droughts considered in this analysis do not impact on Water Available for Use (WAFU) or the supply demand balance. The WRZ is therefore resilient to the types of plausible droughts considered.

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<sup>11</sup> Ibid. 11



- Roadford WRZ

Some of the plausible drought scenarios considered in this analysis impact on WAFU. However, because the WRZ is currently in a supply demand balance surplus, they are unlikely to impact on the supply demand balance within the planning horizon of this Drought Plan. The WRZ is therefore resilient to the types of plausible droughts tested within the planning horizon of this Drought Plan.

- Wimbleball WRZ

Some of the plausible drought scenarios considered in this analysis impact on WAFU. However, because the WRZ is currently in a supply demand balance surplus, they are unlikely to impact on the supply demand balance within the planning horizon of this Drought Plan. The WRZ is therefore resilient to the types of plausible droughts tested within the planning horizon of this Drought Plan.

As a result of this analysis SWW are not considering any resilience solutions specifically to address more challenging plausible droughts than those in the historic record within the planning horizon of this Drought Plan.

However, as part of our longer term planning in the WRMP we will explore how the resilience of the SWW WRZs may change over the next 25 years and beyond.

#### 2.4.2 Bournemouth WRZ

##### (a) Historic droughts

Comparison of demand in different historic flow years is shown in Appendix F3.

As can be seen, demand has been historically dropping and is currently significantly below the drought triggers.

We also commissioned the Met Office<sup>12</sup> to produce return periods for key historic droughts in the Bournemouth WRZ. The initial results are summarised in Table 5 below.

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<sup>12</sup> *Ibid.* 11

**Table 5: Initial estimates of return periods for historic droughts in Bournemouth WRZ (where available)**

<b>Historic drought</b>	<b>Return periods (years) Extreme Value Analysis (EVA)</b>	<i>For reference - Return periods (years) Tabony</i>
1975/76	130 – 150	60 – 240
1984	~10	8 – 32
1989	<10	5 – 18
1995	75 – 80	90 - 360

The graphs as shown in the appendices can be used to give an indication of the likely timing of implementation of the drought management actions.

(b) Plausible droughts

We have examined how effective our drought triggers are for Bournemouth WRZ by testing the same plausible drought scenarios as for the SWW WRZs (described in Appendix F4). The plausible droughts considered in this analysis do not impact on WAFU or the supply demand balance.

We have commissioned the Met Office<sup>13</sup> to assign return periods to the plausible droughts for each WRZ. The results indicate some plausible droughts have return periods in excess of 1,000 years, depending on plausible drought and location. A summary of the return periods assigned to each plausible drought is presented in Appendix F4.

The results show the Bournemouth WRZ is currently resilient to historic and more extreme droughts with higher return periods. This is consistent with the assessment of the supply demand balance which shows there is a surplus of supply over demand.

As a result of this analysis SWW are not considering any resilience solutions specifically to address more challenging plausible droughts than those in the historic record within the planning horizon of this Drought Plan.

However, as part of our longer term planning in the WRMP we will explore how the resilience of the Bournemouth WRZ may change over the next 25 years and beyond.

<sup>13</sup> Ibid. 11

### 3. Drought management action

#### 3.1 General

As a drought develops, we consider various drought management actions to maintain security of supplies, either by aiming to reduce demand (demand-side drought management actions) or to increase supplies (supply-side drought management actions).

Decisions concerning possible drought actions are made in conjunction with the drought triggers (see Appendix C) and the decision making framework, as described in Section 2 of this Plan.

Our priority is to assess demand-side and supply-side drought management actions in terms of ease of implementation, impacts on the environment and amount of additional water gained from each action.

Although we have included all reasonably foreseeable demand-side and supply-side options in our Drought Plan, given that every drought is different in nature and timing, other options may need to be considered.

#### 3.2 Demand-side actions (including TUBs and demand-side Drought Orders)

Our demand-side drought management actions are described below and are summarised in Appendix G on the required pro forma. This section describes demand-side actions potentially triggered by storage entering Zone B.

In coming to a decision on a demand-side actions, we would examine any potential adverse effects on customers and/or businesses in the areas affected to minimise the extent of any disruption wherever possible or reflect any site-specific needs e.g. hospitals, schools and critical national infrastructure.

##### 3.2.1 Publicity, appeals for restraint and water conservation measures

The initial aim of publicity is to inform customers of the water supply situation and to reinforce the message that water should be used wisely and not wasted.

If the supply situation continues to deteriorate, then radio, television and press publicity is increased in frequency, the message is 'hardened' and appeals are made to customers to use less water. These appeals are targeted both geographically and towards particular users of water. Direct mailing can also be used to send information to customers showing them how they can reduce their use of water.

The tourist industry is one of the most significant economic sectors in the South West and is a major user of water. Therefore, in a drought, a considerable amount of water conservation effort is directed at hotels and catering.

Further information on this action is detailed in Section 5.3.

It is extremely difficult to assess the effectiveness of demand-side drought management actions compared to the potential increase of supplies provided by supply-side drought management actions and this is recognised in the Environment Agency guidelines (Environment Agency, 2011).

For the purposes of drought planning, we estimate that actions such as those above could give a demand saving of around 2.5%.

### 3.2.2 Company use of water

It is incumbent upon us, at times when we are encouraging consumers to conserve water, to have regard to our own consumption. We use water for a variety of purposes at our offices and other premises and at the onset of drought conditions we will:

- post reminders at all toilets, washbasins and sinks for staff to reduce their use of water wherever possible;
- reduce, and suspend where appropriate, routine activities such as the washing of windows and buildings;
- review activities such as washing vehicles and filling fishponds, and cut back to levels commensurate with road safety and animal health respectively.

### 3.2.3 Leakage control and pressure management

Although leakage control is important in times of drought, the biggest impact on conserving water resources comes from ensuring low levels of leakage at all times. Our on-going leakage target is below the Sustainable Economic Level of Leakage (SELL) and therefore every year, even in non-drought years, we are doing significantly more to reduce network losses than could be expected to maintain water resources.

In order to manage our leakage, we use a monitoring system covering the entire distribution network of over 18,000 km of mains, which is divided into around 1000 District Metering Areas (DMAs). This system ensures that all parts of the distribution system are monitored on a continuous basis throughout the year. We continually review the operability and effectiveness of our DMA structure, which enables us to more effectively target leakage detection activity and fix leaks more quickly.

We are also increasing our investment in pressure management. This has the benefit of both managing leakage as well as extending the life of our assets. However, this is a long term programme and the implementation of new pressure management schemes takes many months – the work includes for example: scheme appraisal; site surveys of potential installation locations; detailed design; communication with customers and the Fire & Rescue Service; streetworks notification, as well as construction and commissioning. New schemes are generally

therefore not able to be developed and implemented quickly enough for assisting with a drought situation.

Our high customer meter penetration also assists in encouraging careful use of water and minimising customer supply pipe losses, as this water is measured and the customer may be charged if they are not diligent in the repair of their leaks. However, during a drought we will minimise our water use and increase our leakage effort where practical to do so. These activities include:

- suspending mains cleaning activity on the network that requires controlled releases of flushing water and would attract adverse comment from the public;
- bringing forward any pressure management schemes where practical;
- within existing pressure management installations, trimming settings to a lower level where it is possible to do so. (However opportunities are limited as we aim to set these to minimum acceptable levels to maintain suitable supply pressures for customers);
- categorising a larger proportion of customer supply pipe leaks as high priority to target a shorter repair time both to minimise losses and avoid visible leaks that may be running onto the public highway; and
- increasing our leakage detection resources and mobilising additional leak repair gangs.

We will also promote and prioritise leakage work to the most drought stressed areas.

In a severe drought, these further reductions related to leakage control, pressure management and metering could be in the order of up to 5 MI/d over a short term period, or potentially 10 MI/d but with less certainty.

#### 3.2.4 Temporary Use Bans (TUBs, formally termed hosepipe bans)

If there is no improvement in the situation, in order to save water, we may wish to temporarily restrict certain types of customer water use, such as the use of a hosepipe for watering the garden. These restrictions are likely to be triggered by reservoir storage entering Zone C.

This type of restriction is authorised under Section 36 of the Flood and Water Management Act 2010, which also specifies that the following uses of water may be prohibited:

- watering a garden using a hosepipe;
- cleaning a private motor-vehicle using a hosepipe;
- watering plants on domestic or other non-commercial premises using a hosepipe;
- cleaning a private leisure boat using a hosepipe;
- filling or maintaining a domestic swimming or paddling pool;

- drawing water, using a hosepipe, for domestic recreational use;
- filling or maintaining a domestic pond 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; and
- cleaning other artificial outdoor surfaces using a hosepipe.

We are unlikely to seek to implement demand-side management actions which would only have minimal anticipated savings, such as restricting the use of a hosepipe in winter.

Demand restrictions are likely to be implemented over a whole WRZ. However, depending on the type of drought being experienced across the area, there may be an occasion when it is appropriate to consider a more local area.

We would begin to signal that a TUB may be required typically four to six weeks before projections of reservoir storage show a risk of entering Zone C. Prior to this we will have also reviewed findings from our customer research as well as any research available from other water companies. We will also continue to ensure our customer research is appropriate to the prevailing circumstances.

When, on the balance of evidence, it becomes necessary to impose TUBs, any such restrictions will be advertised in at least two newspapers in the area affected as well as on our websites ([www.southwestwater.co.uk](http://www.southwestwater.co.uk) and [www.bournemouthwater.co.uk](http://www.bournemouthwater.co.uk)), along with details as to how to make representations about the proposed restriction. In some cases, there could be a justified reason for an exemption, such as on the grounds of health and safety. An example form of how representations could be made is given in Appendix G.

The time allowed for representations will be proportionate to the scale of the proposed implementation and the customer base likely to be affected by the restrictions, but will be a minimum of a week. The period of representation will also balance the urgency of demand reductions required with the anticipated public interest of the restriction.

We will implement any such restrictions using a transparent approach and will aim to be proportionate to the nature of the water supply situation and the water savings that could result in the prevailing circumstances. The way restrictions are implemented could therefore vary depending on the type of drought being experienced. We will also take into account the latest relevant customer research available regarding exemptions and concessions. We will liaise with our neighbouring companies to establish links between any planned TUBs as appropriate.

In order to prioritise the phasing of any restrictions, apart from the above information, we will take into consideration the report produced by UKWIR (UK Water Industry

Research, 2014) which provides a code of practice and guidance on the implementation of such restrictions. The code follows principles that restrictions are implemented in a consistent, proportionate and clearly communicated manner.

It is generally more difficult to assess the effectiveness of demand-side drought management actions compared to the potential increase of supplies provided by supply-side drought management actions and this is recognised in the Environment Agency guidelines (Environment Agency, 2011). However, for the purposes of drought planning we estimate that restrictions of this nature will give an estimated saving of potential demand of 5%; this figure is consistent with that assumed in our WRMP. This figure is also in line with the findings from other parts of the country where hosepipe bans have been more recently introduced.

At the end of the drought, we will give notice of any restrictions being revoked in at least two newspapers in the area affected as well as on our websites ([www.southwestwater.co.uk](http://www.southwestwater.co.uk) and [www.bournemouthwater.co.uk](http://www.bournemouthwater.co.uk)).

### 3.2.5 Demand-side Drought Orders (formally termed bans on non-essential use)

Continuing deterioration of the situation may lead us to consider applying for a Drought Order to restrict the non-essential use of water.

This type of restriction is authorised by the Secretary of State under Section 74 of the Water Resources Act 1991 and Drought Direction 2011. The purposes that water companies can prohibit or limit the use of water are:

- watering outdoor plants on commercial premises;
- filling or maintaining a non-domestic swimming or paddling pool;
- filling or maintaining a pond;
- operating a mechanical vehicle-washer;
- cleaning any vehicle, boat, aircraft or railway rolling stock;
- cleaning non-domestic premises;
- cleaning a window of a non-domestic building;
- cleaning industrial plant;
- suppressing dust; and
- operating cisterns.

We have assumed that a demand-side Drought Order (formerly termed a ban on non-essential use) will result in a reduction in demand of 5% over and above the reduction produced by the TUBs (formally termed hosepipe bans); this figure is consistent with that assumed in the our WRMP.

We would begin to signal that a demand-side Drought Order may be required typically four to six weeks before projections of reservoir storage show a risk of entering Zone D.

When, on the balance of evidence, it becomes necessary to impose demand-side Drought Orders, any such restrictions will be advertised in at least two newspapers in the area affected as well as on our websites ([www.southwestwater.co.uk](http://www.southwestwater.co.uk) and [www.bournemouthwater.co.uk](http://www.bournemouthwater.co.uk)), along with details as to how to make representations about the proposed restriction. In some cases, there could be a justified reason for an exemption, such as on the grounds of health and safety.

The time allowed for representations will be proportionate to the scale of the proposed implementation and the customer base likely to be affected by the restrictions, but will be a minimum of a week. The period of representation will also balance the urgency of demand reductions required with the anticipated public interest of the restriction.

It should be noted that companies are not required to include details of arrangements for providing water supplies to cope with situations when there is a civil emergency as a result of water shortage.

We follow guidance from Ofwat regarding compensation available to customers if there are demand restrictions. Their guidance<sup>14</sup> is as follows:

*“All companies are required under licence conditions to pay compensation to customers where essential household water supplies are interrupted as a result of restrictions authorised by emergency Drought Orders. This includes water supplies for purposes such as:*

- *cooking*
- *washing*
- *drinking*
- *flushing the toilet*

*It does not include uses such as watering the garden, car washing or filling a pool.*

*Although this measure is not part of the GSS, it does mean that customers have access to compensation if essential supplies are not maintained.*

*Companies must accept our decision in the event of any disputes about entitlement.*

*Companies should pay household customers £10 for each day (or part day) that the water supply is interrupted or cut off. The maximum compensation entitlement is equal to the company’s average household bill for the previous year.*

*Companies should pay business customers, in the same circumstances, £50 a day (or part day). The maximum amount payable is the water charge paid by the customer in the previous year. If, however, the customer has not paid a full year’s water charge, or a third party is responsible for the water charges, the maximum is set at £500.*

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<sup>14</sup> <http://www.ofwat.gov.uk/households/supply-and-standards/standards-of-service/>



*There is no entitlement to a payment under Condition Q if the circumstances are so exceptional that, in our view, it would be unreasonable to expect the company to avoid the interruption.”*

### 3.3 Supply-side actions (including Drought Orders and Permits)

If a dry spell develops and reservoir storage starts to fall from Zone A to Zone B, we will change our operational practice from cost minimisation to yield maximisation.

If reservoir storage is projected to continue to fall towards Zone C, we may need to implement further supply-side actions. Sections 3.3.1 to 3.3.3 below give an overview of potential supply side actions, further details on specific schemes are given in Appendix H. Appendix H also gives details of when each scheme could be implemented. None of the identified actions in Appendix H require authorisation through a Drought Permit or Drought Order.

To gain an understanding of the frequency of how often the supply-side actions are likely to be used within the lifetime of this Plan in the Colliford, Roadford and Wimbleball WRZs, strategic reservoir drawdowns have been simulated assuming there is a repeat of historical hydrological and hydrogeological conditions with current level of demand. Graphs for the three strategic reservoirs from these simulations are given in Appendix F (Graphs F.1.1, F.1.4, F.1.7). Underneath each graph is a table which details how often the reservoir storage drops from Zone A into Zone B; Zone C or Zone D. This information can be used to give an indication as to the frequency each specific supply-side action could be implemented.

To gain an understanding of the frequency of how often the supply-side actions are likely to be used within the lifetime of this Plan in Bournemouth WRZ, we have compared historical and forecast peak demand against the drought triggers as shown in Appendix F.3.2. As can be seen it is highly unlikely we will move significantly into Zone B in the lifetime of this plan, unless we experience a very dry year and high demands.

#### 3.3.1 Distribution zone management

Distribution zone management is a key aspect of drought planning and one which has been used extensively by SWW in the past. Distribution zone management is used to reduce the demand on sources under stress and transfer the demand to sources with relative abundance. However, changes of this sort have to be managed carefully in order to minimise adverse effects on customers e.g. ‘different taste’ complaints.

#### 3.3.2 Emergency capital works (e.g. emergency pumps and pipelines)

Few capital works are shown in Appendix H, as the necessity for particular works usually only becomes apparent during the drought (e.g. the installation of temporary boosters). Such works are frequently relatively minor and require only planning permission rather than drought authorisation.

It is possible that some of the sites where this would be required may be designated (such as Listed Buildings). We will therefore follow standard procedures for obtaining any necessary permissions and consents to ensure potential impacts on historic environment assets are taken into consideration.

### 3.3.3 Existing licensed sources usually not in supply

Abstractions may occur from sites with existing authorised licences that are not usually used when other sources are in surplus.

Our supply-side drought management actions are given in Appendix H, on the standard pro forma provided by the Environment Agency.

Choosing which supply-side drought management actions should be implemented will be made according to the circumstances prevailing in the WRZ at that time. For this reason actions have been grouped into WRZs rather than being allocated to specific zones for individual reservoirs.

### 3.3.4 Drought Orders and Permits

Drought Permits and Drought Orders are seen as being, in the national context, necessary mechanisms for the management of water supply in exceptional circumstances. They can be used where there is a serious deficiency of supplies of water in any area, and where the reason for the deficiency is an exceptional shortage of rain. Times of exceptional shortage of rainfall are also often characterised by extremely high demands, which is of particular interest in the Bournemouth WRZ.

Prior to the development of the three strategic reservoirs and further investment in the mid 1990s, various Drought Orders and Permits were granted in the Colliford, Roadford and Wimbleball WRZs. For completeness, these *historical* Drought Orders and Permits are listed in Appendix H5, along with reference to any details regarding environmental monitoring.

Going forward, as we have demonstrated in our Plan, supplies can be maintained without recourse to such measures during the most severe drought conditions on record, as well as droughts of a more severe return period.

We are therefore extremely unlikely to experience supply-side shortages and therefore do not include Drought Orders in our current Plan.

As part of the development of our WRMP we will examine whether there may be a need for such Drought Orders in the long-term and what additional studies may be needed to support any application.

## 4. Environmental impacts

This Drought Plan takes into account any potential environmental impacts of our Plan and any proposed supply-side drought management actions. It is not intended to address environmental effects of the natural aquatic drought itself.

Significant ecological sites are shown in Appendix I for information.

### 4.1 Environmental assessment

Within a Drought Plan, water companies must include an environmental assessment of the effects that planned actions will have on the environment. Companies must also consider whether individual drought actions, or groups of drought actions require a Habitats Regulations Assessment (HRA) or a Strategic Environmental Assessment (SEA).

Under non-drought conditions, the SWW and BW areas are operated with sufficient supply-side surplus that some licensed abstractions are required only infrequently or at a lower capacity than permitted. In the event of a drought, we will make fuller use of available, permitted resources but still remain within the acceptable environmental limits already prescribed under the permitting regime.

#### Habitats Directive and Water Framework Directive sites

Abstraction licences in Habitats Directive sites and/or Water Framework Directive (WFD) waterbodies have been or are being reviewed by the Environment Agency and several SWW licences have had their conditions revised. Hence the use of these licences in a drought is unlikely to result in any adverse impacts.

In the SWW WRZs, due to prescribed flows being in place on abstraction licences for most of our river abstractions, during a drought demand is largely met through increased use of strategic reservoir storage rather than from river abstractions. Therefore, abstractions from sites within significant ecological areas, such as the Dartmoor SAC, will not be significantly increased during a drought, compared to wetter flow years. As a result:

- it is unlikely that there would be any significant effect on a SAC, SPA or Ramsar site (known as Habitats Directive sites); and
- it is unlikely that there would be any adverse effect on the integrity of the Habitats Directive sites from the supply-side drought management actions in the Drought Plan.

As shown in Appendix H, all supply-side drought actions identified in this Plan are permitted under existing abstraction licences. These abstractions are constrained and prescribed by licences determining the volume and nature of abstractions allowed at a particular site, including maximum daily and annual abstraction limits, along with prescribed flows. Licences are set by the Environment Agency to ensure all abstractions fall within acceptable environmental limits.

Any potential environmental impacts resulting from the implementation of supply-side drought actions are therefore considered to be negligible and, for this reason, environmental assessment of individual drought actions has not been undertaken.

In the Bournemouth WRZ, abstractions take place from the River Avon at Knapp Mill. Although all abstractions during a drought would take place in accordance with the abstraction license conditions, concerns at this site have been raised. In the previous Drought Plan <sup>15</sup>, we reported “Concerns about possible impact on salmon migration and other species – extensive investigations have been completed and have resulted in no further concerns”. However, through the Water Industry Environment Programme (WINEP) we have recently been advised by the Environment Agency to include further investigations at this site in our Period Review Business Plan 2019 as a result of new evidence becoming available.

During 2020 - 2024, we will therefore carry out further investigations into fish passage at low flow and consider implementation of improvements to the structures if needed. However, should the area experience periods of exceptionally low flows before results of the above investigations are available, we will liaise with the Environment Agency as appropriate.

#### Environmental Legislation and Protected Areas

All the drought actions identified in this Plan are already permitted under existing abstraction licences and therefore no impacts on any statutory designated sites are anticipated.

This includes sites designated under the Habitats Regulations (i.e. SAC, SPA, Ramsar Sites) as well as domestic environmental protection (i.e. SSSI). There is therefore no requirement to undertake a Habitat Regulations Assessment (HRA) for this Plan.

Results of catchment wide investigations into eels and invasive species currently underway to ensure compliance with other legislation and regulatory requirements but not due to report until after publication of this Plan will also be considered in more detail.

#### Mitigation of environmental impacts

As all drought actions fall within the existing permitting regime it is not considered necessary to propose mitigation or compensatory measures for specific drought actions.

#### Strategic Environmental Assessment (SEA)

There is no requirement in this Plan to undertake an SEA.

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<sup>15</sup> Sembcorp Bournemouth Water (2012), *Drought Plan, March 2012*

### Future Environmental Assessment

All proposed drought actions within this Plan fall within the current abstraction regime and are therefore considered to be of negligible environmental impact.

In the longer term, it is likely that the supply demand surplus will reduce due to increasing projected demand towards the end of the WRMP period and the likely reduction in available supply from the existing licenses due to climate change. Hence under plausible droughts, supply-side Drought Permits and/or Orders might be required. We will explore this as part of our long term planning and use it to determine whether we need to undertake environmental studies in the 2020 - 2025 period.

#### **4.2 Environmental data provision and monitoring plan**

As shown in Appendix H there are no supply-side drought management actions that are outside the existing abstraction licence system.

There is therefore no further environmental data provision or monitoring plan work required within our Drought Plan.

#### **4.3 Mitigation measures, compensation requirements**

As shown in Appendix H there are no supply-side drought management actions that are outside the existing abstraction licence system.

There is therefore no further work required on environmental mitigation measures within our Drought Plan.

## **5. Management and communications strategy**

It is vital to ensure that all drought management actions we take, particularly where they are targeted at water use, are conveyed fully and effectively to as many water users as possible.

### **5.1 Management structure**

Our managerial responsibility for drought actions rests within two groups: the Water Supply Command Group (WSCG) and the Water Supply Review Group (WSRG).

The key functions of these groups and their current membership are set out below. Co-ordination between the two groups is managed through the Director of Operations – Water Resources and Production and the Head of Environment and

Upstream Markets, who are members of both groups. The minutes of the meetings of each group are circulated to the members of both groups.

The frequency of the group meetings will depend on the prevailing circumstances and the severity of the drought. Our past experience shows that this is likely to start monthly and as the drought develops this is likely to increase to weekly and possibly daily.

## 5.2 Roles and responsibilities

### 5.2.1 Water Supply Command Group (WSCG)

The key functions of the WSCG are to:

- provide strategic guidance on drought related issues;
- take an overview of our response to the drought;
- make decisions on drought related policy issues;
- ensure that drought schemes can be fast-tracked where appropriate;
- oversee communications with key external interests; and
- ensure interventions are cost efficient.

Membership and responsibilities of the WSCG are given in Table 6 below.

Representation of Legal and administration support as required.

**Table 6: Membership and responsibilities of the WSCG**

<b>Role</b>	<b>Responsibility</b>
Managing Director	Overall management
Customer Service Director	Customer liaison and communication
Regulatory Director	Regulatory liaison
Operations Director Drinking Water Services	Overall water production and network management
Engineering and Supply Chain Director	Engineering scheme delivery
Finance Director	Financial assurance
Director of Corporate Affairs and Investor Relations	Government and Investor relations
Director of Operations – water resources and production	Water production management
Director of Operations – network and customer services	Water network management
Head of Environment and Upstream Markets	Water resources and environmental management

### 5.2.2 Water Supply Review Group (WSRG)

The key functions of the WSRG are to:

- review strategy options;
- recommend actions to the WSCG;
- oversee the implementation of the drought strategy;
- co-ordinate operational and engineering activities; and
- liaise with the Environment Agency and other interested parties.

Membership and responsibilities of the WSRG are shown in Table 7.

Representation of Legal and administration support as required.

**Table 7: Membership and responsibilities of the WSRG**

<b>Role</b>	<b>Responsibility</b>
Operational Customer Services Manager	Customer Services
Director of Operations – water resources and production	Water production management
Director of Operations – network and customer services	Water network management
Head of Environment and Upstream Markets	Water resources and environmental management
Water Resources Strategists	Water resources modelling and forecasting
Demand Forecaster	Demand forecasting
Head of Water Quality	Water quality issues and management
Head of Communications	Communication and media
Drinking Water Asset Manager	Water asset management scheme identification
Head of Solution Development and Technical Performance	Systems operation
Security and Emergency Planning Manager	Emergency planning and security

### 5.3 Communications plan

#### 5.3.1 Introduction

Hydrological and water resources information is routinely passed to the Environment Agency and other key external stakeholders as part of the SWW Weekly Situation report. Examples of information routinely sent to external stakeholders, including the Environment Agency, is given in Appendix E.

The Drought Curves from this Plan, along with other key operational reservoir control curves are also shared with the Environment Agency. This, in conjunction with the data above, enables the Environment Agency to regularly monitor the water resources situation against the Drought Curves and triggers and keep abreast of the development of any potential drought.

Our communications plan is based on a phased approach appropriate to the prevailing circumstances. Should reservoir storages start to drop significantly, initially there is an early water supply campaign. If a drought develops, this is followed up appropriately.

Our communications plan remains flexible and will be reviewed and revised as a drought develops, given that droughts can vary enormously in nature.

The SWW area is unusual in that it borders just one other water company, Wessex Water. We have excellent joint working relationships and we share a major water



resource on Exmoor, Wimbleball Reservoir. We will work with Wessex Water on any communications it is deemed appropriate to do jointly.

Our Bournemouth WRZ is more typical of other companies and borders with Southern Water and Wessex Water. Although we have no formal agreements on bulk transfers, we would work with these water companies on joint communications plans.

This section sets out how we will:

- Increase customer awareness of the limited availability of water resources.
- Regularly inform customers, relevant organisations and regulators about the development of the drought and the implementation of drought management actions through all the communication channels at our dispersal.
- Communicate and work with wider interest groups and partners to help reduce demand in a drought.
- Promote and enhance water efficiency advice and information, including initiatives already in operation under normal circumstances and those used during a drought.
- Encourage household customers to use water wisely in the home and garden and explain what they can do to help in a drought.
- Work with new retailers and the customers themselves to help non-household customers to become more water efficient and explain what they can do to help in a drought.
- Announce and reinforce any water restrictions that may be introduced.
- Promote the positive work we are undertaking, individually and in combination with others, to manage the drought.

Throughout any period of potential drought and as any drought develops, we will also be liaising closely with the Environment Agency at both a technical and wider level. The liaisons and discussions will vary depending on both the severity of drought and other prevailing circumstances.

### 5.3.2 Link to Drought Triggers

Table 8 details the phased approach and shows the link between communication actions and drought triggers as a drought develops.

Whilst a repeat of a drought similar to the most severe historical drought on record (1975/76) could cause the need for temporary-use demand restrictions, we would not need to invoke further drought measures such as supply-side drought orders or

demand-side drought orders (or emergency drought orders<sup>16</sup> such as rota cuts). We estimate that these further drought measures would not have to be imposed, unless the area experiences a drought more extreme than an historic drought – this is assessed as a return period typically greater than once every 200 years on average (see Table 4 and 5). These events are therefore unlikely during the life time of this Drought Plan.

However, for completeness and transparency, we show below the process of how a drought would be managed in the highly unlikely event that, within the life time of this plan, we experience a drought more extreme than the historical drought of 1975/76.

The estimated return periods for the 1975/76 historical drought are given in section 2.4.1 and section 2.4.2.

**Table 8: Communication actions and triggers**

<b>Communication Action</b>	<b>Possible Drought Triggers</b>
Early water supply campaign (spring or early summer)	A prolonged period of dry weather; reservoir storage(s) approaching Zone B
Follow-up communications plan	Continuation of dry weather; Reservoir storage(s) approaching Zone C
Consider TUBs (formerly termed hosepipe bans)	Continuation of dry weather; Concerns over projected reservoir storage (Zone C)
Period for representations about TUBs to be made	The time allowed for representations will be proportionate to the scale of the proposed implementation and the customer base likely to be affected by the restrictions, but will be a minimum of one week. It will balance the urgency of demand reductions required with the anticipated public interest of the restriction
Consider supply-side Drought Orders and Drought Permits	Reservoir storage continues dropping (Zone C)
Advertise demand-side Drought Orders (formally termed bans on non-essential use)	Reservoir storage continues dropping (Zone D)

<sup>16</sup> Under demand levels likely to be experienced in the life time of this Plan, neither the reservoir drawdowns or demand levels, enter the Zone D trigger area thereby negating the need for these measures.

Communication Action	Possible Drought Triggers
Period for representations about demand-side Drought Orders to be made	The time allowed for representations will be proportionate to the scale of the proposed implementation and the customer base likely to be affected by the restrictions, but will be a minimum of one week. It will balance the urgency of demand reductions required with the anticipated public interest of the restriction
Emergency Drought Orders	We have indicated that emergency Drought Orders are unacceptable
Monitor and evaluate the effectiveness of drought communication activities	Includes consideration of feedback from representatives of customer groups and other institutional organisations, website hits, requests from customers for information on water efficiency or water saving devices and the change in demand for water

### 5.3.3 Early water supply campaign

Our early water supply campaign will usually take place in spring or early summer. Our campaign will include messages concerning water conservation and water efficiency.

These might include:

- Direct communications with customers via SWW Newspaper or letters.
- Water conservation messages in prominent position on website home page with links to other pages on the website which give water conservation advice and help.
- Informing employees through verbal briefing system ('News and Views'), e-mail and notice boards and individual briefings for key personnel.
- Advertising campaign to promote water wise messages, if appropriate.
- Using social media channels to encourage water saving measures.
- Briefing call centre staff so they can help customers who call us directly.
- Individual briefings with key editors, press conference, press release or media briefing note depending on the state of supplies.
- Regular liaison with the West Country Water Resources Group.

- Regular updates to Water UK and as required to provide information on the national picture.
- Letters to MPs, MEPs, local authorities and other key organisations explaining our position and forecast.
- Distributing the booklet 'SWW Top Tips for saving water in the garden' plus supporting poster and wider advertising campaign if appropriate.
- Review of schools information.

#### 5.3.4 Follow-up communications campaign

If the dry weather continues, our follow-up communications campaign will build on messages from our earlier water supply campaign and will continue to promote water conservation and water efficiency.

The follow-up communications campaign might include:

- Regular press releases or media briefing notes to keep journalists informed of the current water supply position and resource progress.
- High profile website and social media advertising and signposting to online water conservation material, help and advice.
- Production of monthly progress bulletins for local authorities.
- Newspaper, radio and television advertising campaigns to publicise conservation messages.
- Update of information to local MPs and key organisations e.g. the Consumer Council for Water and the Environment Agency.
- Mail-drops or outbound text messages to customers in areas with special difficulties, which could include water conservation top tips, how to get our free water-saving kit and promotion of discounted water butts.
- Use of our SWW community team to distribute information at locations selected for their high customer footfall.
- Advice to our own staff on water conservation, messages to customers and preparation for actions to be taken during a drought, if appropriate.
- Provision of staff with fliers and message cards to carry on vans and distribute to customers.

#### 5.3.5 Promotion of customer awareness of the limited availability of water resources

We always ask our customers to use water wisely, and messages promoting customer awareness of limited availability of water resources are also part of our early water supply campaign. An example of this is given in Appendix J. We will build on these messages should a more serious drought develop.

#### 5.3.6 Promotion and enhancement of water efficiency advice and information

We encourage customers to implement water efficiency measures as part of our normal practice.

During a drought, water efficiency messages are part of both our early water supply campaign and subsequent communications as a drought develops. Our communications to our customers will explain what they can do to help in a drought.

#### 5.3.7 Encouragement of non-household customers to become more water efficient

To date we have developed extensive and award-winning systems to help businesses be more water-efficient, including enabling them to better monitor usage through online accounts, a free water audit scheme and a certification process for water-wise businesses.

We will follow the protocols, as laid out in the non-household retail market codes, to work with retailers and non-household customers during a drought, to help them reduce water use and inform them of any demand restrictions that may be needed. We will use the data in the national operator and our system on sensitive customers and site specific arrangements to tailor any response needed to specific customers.

#### 5.3.8 Communication and work with wider interest groups and partners to help reduce demand in a drought

In addition to the processes outlined above for press conferences, media briefs, updating MPs and other authorities and key organisations, the following measures will ensure effective communication with customers, relevant organisations and regulators:

- We have relationships in place with key customer stakeholders which would be used to discuss and agree the best communications route for each customer group.
- We will visit individuals and local organisations to brief and assist as necessary.
- Individuals within our Company have responsibility for managing relationships with the different organisations such as the Consumer Council for Water and the Environment Agency. These contact points would be used for ongoing briefing and communication.

- The SWW Community Team, which can be based anywhere in the region, would be moved around the most severely affected areas to promote drought awareness.
- We have capacity to deliver tailored messages directly to customers on their bill and via our online accounts facilities. Further updates and reminders can be given via leaflets with bills during the rest of the year or by a further direct mail-out as we did for private sewers transfer.

#### 5.3.9 Informing special needs and vulnerable customers

The following measures would be used to support special needs and vulnerable customers:

- We have a register of Priority Services customers in our region which would be the first point of reference. Staff from the Customer Support Team would then visit these customers and manage their concerns on an ongoing basis.
- Customers with medical conditions requiring a constant supply of water would be prioritised.
- We are able to contact all the hospitals, nursing and care homes and special schools in the region to offer support for our most vulnerable customers.

#### 5.3.10 Information available for press and media

Activities to assist communications with our customers through the press and media include:

- Controlled access to reservoirs etc to obtain up-to-date film footage and photographs of the latest water supply situation; we would set clear parameters to promote balanced reporting and challenge any use of old images or footage.
- Information on our website about reservoir levels and access to up-to-date library images and footage.
- Access to works being undertaken by us to improve the situation.
- Clear, simple graphs and charts showing reservoir level trends.
- Availability of key personnel for interviews to fit in with tight news timescales.
- At appropriate times, very frequent, even daily, interviews and discussions.
- Regular briefings for environmental correspondents, news editors and journalists.

An example of a press release issued is attached in Appendix J.

5.3.11 Water situation monitoring - regular information to customers, relevant organisations and regulators

We have in place a respected and well-received mechanism for informing wider stakeholder groups about water resources. The Water Situation Report is produced weekly using both our own data and some provided by the Environment Agency. An example of the report is shown in Appendix E.

The purpose of the report is to give a comprehensive overview of the current state of the factors affecting the availability of public water supplies in our area. The Water Situation Report includes information on:

- demands
- rainfall
- river flows
- reservoir storage
- groundwater levels

The Water Situation Report is currently sent on a weekly basis to key stakeholders including:

- Environment Agency
- Consumer Council for Water
- Centre for Ecology & Hydrology
- Emergency planners
- Health protection agencies
- Devon Wildlife Trust

The Water Situation Report is also sent on a monthly basis to all local authorities and health authorities across the region and other interested parties who have requested it.

It should be noted that at times of drought the circulation list is further increased to include other interested organisations and individuals.

We believe that the widespread circulation of the Water Situation Report provides an appropriate vehicle through which local interests can obtain a comprehensive picture of a developing drought situation.

We provide on our website ([www.southwestwater.co.uk](http://www.southwestwater.co.uk)) weekly updates of storage in the five largest reservoirs (Roadford, Colliford, Wimbleball, Stithians and Burrator), as well as total reservoir storage, in both tabular and graphical form. Information is also provided on the equivalent storage recorded during the previous year and in a drought year for comparison.

#### 5.3.12 Announcement and reinforcement of any water restrictions that may be introduced

Should any temporary restrictions on water use be required, we would announce this through the media, on our website and in adverts in appropriate local newspapers in our region.

We would also consider advertising in any other media deemed appropriate, depending on the nature of the drought and any specific geographic issues.

We would anticipate intense media interest and scrutiny if any temporary restrictions on water use were to be announced. We would prepare for this with thorough questions and answers about the nature of the restrictions on our website and make these available to reporters.

To encourage accurate reporting of the restrictions, we might have individual briefings with editors, hold a press conference, put videos on our websites, and make available media-trained staff for interviews and in-depth reporting.

We would also make available and share via social media the frequently asked questions (FAQs) to our call centre and front-line staff to ensure customers receive consistent responses.

#### 5.3.13 Increased customer contacts in a drought

As a drought develops, this invariably leads to increased communication with our customers. The following measures demonstrate our capacity for dealing with the additional customer contacts:

- our Customer Contact Centre is required to be able to respond to increases in contacts due to issues such as operational emergencies.
- there is capacity within the Exeter site to handle increases in calls from customers.
- we have dedicated teams for both SWW and BW areas.
- any further demand can be managed through the Water Force industry arrangement which provides offsite overflow call handling capability.
- we have capacity to support an increase in written contacts as a result of any restrictions.



5.3.14 Promotion of the positive work we are undertaking, individually and in combination with others, to manage the drought

We have considered the UKWIR report 'Drought and demand: potential for improving the management of future drought' (UK Water Industry Research, 2007b) and would aim to emphasise the positive messages for customers outlined in it e.g. stressing what customers CAN do, such as use a watering can and a bucket for washing cars and windows.

We would anticipate ongoing intense media interest in the progress of a drought, and we will take steps to promote the positive work we are doing and positive relationships we have with partner organisations including the Environment Agency, health authorities, local authorities, South West Lakes Trust and other interest groups.

5.3.15 Audiences and key messages

A summary table listing our key messages to different audiences is given in Appendix J. The table sets out:

- the different audiences that specific actions apply to;
- the key messages for these audiences;
- when the communication actions will be taken in response to crossing drought triggers;
- any subsequent actions a company will take; and
- how the communication actions will be tailored and delivered to each group.

5.3.16 Data and information sharing with the Environment Agency

SWW has a good working relationship with relevant sections of the Environment Agency. We regularly share data on reservoir levels, reservoir releases, etc with the Environment Agency. The Environment Agency provides us with hydrological data.

SWW has a flexible approach to sharing data and information. We will work with the Environment Agency to ensure that the relevant data and information is passed between the organisations, as appropriate to the prevailing circumstances during a drought.

## 5.4 Lessons learned from previous droughts

Historical droughts have occurred in our area in 1975/6, 1984, 1989 and 1995. Prolonged dry periods were also experienced during the autumns of 1978 and, more recently, 2003. River flows were also exceptionally low in parts of our region during spring and early summer 2011 and spring 2012.

We have been successful in not implementing demand restrictions or applying for Drought Permits or Drought Orders since the mid 1990s in our Colliford, Roadford and Wimbleball WRZs. In our Bournemouth WRZ, demand restrictions have never had to be imposed.

Lessons learned from our experience are:

- **Importance of early forecasting of water resource position**  
Early forecasting of the supply demand position is vital. Examples of the types of plots we produce are given in Appendix E. For example, over the 2016/17 dry winter, this occurred early in the process to understand the future supply position going into the summer of 2017 and enabled the actions within the Drought Plan to be started as appropriate.
- **Importance of implementing the management structure and enhanced reporting**  
Implementation of the management structure ensures that we are pro-active in the preparations. This also allows interventions to be implemented on a source by source basis to ensure resources are maximised. This was successfully delivered in both spring 2012 and the dry winter of 2016/17.
- **Communication with other stakeholders**  
As a drought begins to develop, making early contact with stakeholders such as the Environment Agency or local media ensures that communication channels are opened for constructive dialogue.
- **Maintaining hydrological and demand experience of our region**  
Droughts by their very nature have been rare occurrences to date. A key lesson learned from past events is the importance of maintaining technical hydrological and demand experience within the Company to have confidence in the control curves and drought triggers within this Plan.
- **Learning from other companies**  
We also take into account information available in the UKWIR and Environment Agency reports and information relevant to drought management and understanding of historic droughts.
- **Post-drought review of system performance**  
During a drought and during normal operation, we examine the performance of assets as part of our water supply meetings with documented decisions on what maintenance should be undertaken on what assets.

As each drought is different, a key learning point is to understand any specific issues that may have arisen in system performance so they can be either rectified for future droughts or built into future forecasting.

## 6. Post-drought actions

### 6.1 Identifying the end of a drought

The end of a drought can be defined as '*when the risk of impacts from drought is no greater than during a normal year, and where normal conditions have continued for a period of time*' (Environment Agency, 2015).

We will make this decision taking into account the data and information prevailing at that time including: rainfall and river flow data, reservoir storage data, demand data and the drought management triggers and curves. It would not be appropriate to use one single drought trigger on its own in deciding when the drought has ended and management actions should be stood down.

We will confirm with the Environment Agency that the water resource situation has returned to normal before declaring the end of a drought. We will describe the timings for the removal of any drought management actions and share how we will communicate this to our customers. We will also review the need for any continued environmental monitoring and mitigation.

### 6.2 The post-drought review

As soon as it is practical after the end of a drought, a senior manager will be appointed to supervise the compilation of a post-drought review in a timely manner. Our review will cover many aspects of the drought, including legal, communication and customer issues. We will invite relevant groups to contribute to this review where appropriate. It will have clear timescales for the implementation of any actions identified within the review.

Our review will also include:

- an assessment of the hydrological and water resources background to the drought;
- a strategic overview of our water resources strategy. If any strategic investments have been made as a result of the drought event, we will reconcile these with our WRMP or associated updates;
- any significant outcomes of the re-assessments of Deployable Output as a result of the drought. These will subsequently be reflected in our WRMP or associated updates;
- any significant outcomes of the re-assessment of our demand patterns and demand forecasts as a result of the drought. These will also subsequently be reflected in our WRMP or associated updates;

- determine whether the details of the drought management actions were sufficiently accurate, or whether the levels or sequence of trigger points should be changed;
- assess the effectiveness of communications through feedback from customer groups, individuals and other stakeholders and whether any changes are needed;
- review the environmental impact and any drought management activities; and
- review whether the Plan performed satisfactorily overall, or whether any amendments are required.

In the case of circumstances being identified that are sufficiently material to cause us to revise our Drought Plan, we will comply with the statutory timetable for such a revision.

## 7. Conclusions and summary of Plan

The purpose of this Drought Plan is to explain our operational approach to how we will manage water resources during periods of drought. In doing so, this document covers:

- details on the SWW and BW systems including current Levels of Service;
- details of the drought triggers that underpin our operational plans;
- demand-side and supply-side actions we will take to manage in a drought;
- environmental impact assessments during a drought; and
- the management and communication plan that we will follow during a drought.

This Drought Plan builds on learning from previous droughts both within the Company and from national studies. Following the merger of SWW and BW in 2016, the Drought Plan now incorporates the BW area within this document.

The assumptions that have been made in producing our Plan are listed, together with a checklist for stakeholders, to refer to on the content of our Plan.

Droughts can vary enormously in nature, but we believe that the proposals described in this Plan provide a balanced and robust approach to maintaining essential supplies to customers, whilst minimising any potential adverse environmental effects.

In building this Plan we have also considered what impacts any of the findings may have on our long term water resource planning and reference areas where we plan

to undertake further work in order to ensure a reliable and environmentally sustainable water supply for the future.

The published version of the Drought Plan is required to exclude any matters of commercial confidentiality and any material contrary to the interests of national security. There were no matters of commercial confidentiality. In the published version of the Plan we have excluded information relating to the location of key assets on the advice of our certifier for emergency planning and in the interests of national security.

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17. UK Water Industry Research (2014). *Managing through drought: code of practice and guidance for water companies on water use restrictions – 2013*, available from <http://www.water.org.uk/managing-through-drought-code-practice-and-guidance-water-companies-water-use-restrictions-%E2%80%93-2013>

## Appendix A - Pre-consultation consultees

N.B. There are no licensed water suppliers other than SWW and BW that supply water to premises in our area through our supply system.

A number of pre-consultation meetings were undertaken prior to the production of this Plan. Details of the meetings are given below in Table A1. The meetings included presentation of the key elements of our draft Drought Plan at the Customer Challenge Groups for both the SWW and BW areas. These are termed Water Future Panel and Customer View Group respectively.

**Table A1: A list of pre-consultation meetings**

Organisation	Date	Comment
Environment Agency (Local)	17 Feb 2016 to 25 May 2017	Range of topics covered including drought sequences and drought orders
Environment Agency (National)	13 June 2017	Update on progress given
Customer Challenge Group (Water Future Customer Panel - SWW)	20 April 2017	Discussion on BW Levels of Service and plausible droughts
Customer Challenge Group (Resilience and Environment Sub Group)	20 April 2017 20 June 2017	As Above
Customer Challenge Group (Customer View Group - BW)	19 April 2017	Discussion on BW Levels of Service
Consumer Council for Water	28 March 2017	Agenda item
Wessex Water	Various	Operation of Wimbleball

Pre-consultation letters were sent to the following consultees prior to the production of the draft Drought Plan. A list of the consultees is given in Table A2.

**Table A2: A list of recipients of pre-consultation letters**

Organisation	Pre-consultation letter sent
Defra	Yes
Devon County Council	Yes
Devon Wildlife Trust	Yes
Dorset County Council	Yes
Dorset Wildlife trust	Yes
Drinking Water Inspectorate	Yes
Environment Agency	Yes
Hampshire & Isle of Wight Wildlife Trust	Yes
Hampshire County Council	Yes



Organisation	Pre-consultation letter sent
Natural England	Yes
Ofwat	Yes
Southern Water	Yes
Wessex Water	Yes
Customer Challenge Groups (see above)	Yes

One pre-consultation letter response was received from the Environment Agency. This is included in Table A3 below for completeness.

**Table A3: Pre-consultation letter response from the Environment Agency<sup>17</sup>**

Letter	Response
<p><b>Response to drought plan pre-consultation for South West Water</b></p> <p>Thank you for consulting us for information and advice regarding the preparation of your draft drought plan. This letter provides our formal response to your pre-consultation request for information. We will be pleased to continue discussions on your draft drought plan as you develop it.</p> <p>In the sections below we set out the issues that you should address that are specific to South West Water, together with wider issues that we are asking all water companies to consider.</p> <p><b>1. Specific areas to address in your drought plan</b></p> <p>We welcome your ambition to test your drought plan against more extreme droughts, and would like to work with you to understand how these scenarios have been developed and the impacts that these have on the performance of your system. In particular, we would like to understand whether this work indicates the need for “resilience options” that would need to be included in your WRMP.</p>	<p>Details of our approach are given in Section 2.3 and Appendix F of our Drought Plan.</p> <p>The results show our water supply system is currently resilient to more extreme droughts. We are including tests in our WRMP modelling to assess the longer term position.</p> <p>We have identified a number of options that could be implemented to improve resilience in the longer term if needed and</p>

<sup>17</sup> Received by Email 24th May 2017

Letter	Response
	<p>we will use the scenario tests in the WRMP along with other drivers (such as interruptions to supply) to understand the case for investment.</p>
<p>We are pleased that you have worked with the Environment Agency to develop extended flow sequences and are using the findings from this work to test your drought plan. Your plan should be consistent throughout regarding your planned actions, and you should show the scenarios that trigger those actions, and that all of these actions are needed. You should also be clear on the sequence for implementing your planned actions, and the effect they have on your resources in a drought.</p>	<p>Sections 2 and 3 of our Drought Plan give details on our planned actions. The impact on resources can be seen in our modelling in Appendix F.</p>
<p>An assessment of the effect that your plan will have on Water Framework Directive status or potential. You should consider the effects your actions might have on environmental objectives and measures set out in river basin management plans. The extended flow sequences work should be used to review the need for actions you may use in an unprecedented drought. You should show that you can implement all your actions when needed and identify the information and work you need to do now, and provide a plan for future work to complete the necessary environmental assessments and any Habitats Regulation Assessments for these actions, or the overall plan. Supplementary guidance on environmental assessment and WFD has been published on the Defra Huddle. Our Area teams will be happy to discuss these requirements in more detail.</p>	<p>See Section 4</p>
<p>We would like you to routinely share with the Environment Agency your resource position against your drought control curves – particularly during periods of close monitoring due to below average rainfall and low flows. This would allow us to understand and appreciate your drought actions are being taken in accordance with your drought plan, and in an</p>	

Letter	Response
<p>appropriate and timely manner.</p> <p>You should provide estimates for savings for all your demand side actions. We would further like you to consider licences and Permits:</p> <p>As a result of the Sustainable catchment work (WINEP1), we have suggested that water companies voluntarily return all unutilised licensed capacity:</p> <ul style="list-style-type: none"> <li>• If not used for 10 years or more;</li> <li>• If the licence headroom exceeds quoted deployable output; and</li> <li>• If the company has no plans to use the licensed capacity as part of a WRMP solution.</li> </ul> <p>For unused licences needed as resilience for drought planning, you should set out under what circumstances the licences would be used. The following should be clarified:</p> <ul style="list-style-type: none"> <li>• Are the licences listed in the latest WRMP with a Deployable Output (DO) value?</li> <li>• Do you need the DO from these licences to meet your dry year demand at any point over the next 25 years?</li> </ul> <p>If yes to both questions, then we would consider the licences to be needed to meet the company's legitimate operational requirements.</p> <p>If not, then these licences would need to be listed in your drought plan, and you will need to</p>	<p>We have identified a number of unused licences that we will be returning. We have not included these in the Drought Plan but will write to you separately on those we are looking to return. Unused licences are listed in the "unused licence" section in the WRMP tables.</p> <p>Licences that are included as supply actions in the Drought Plan would be used when we enter drought zones B and/or C (as described in Appendix H). Unused licences are referred to separately in the WRMP tables and are not included as supply-side options.</p> <p>Yes. They are included in the group of licences for each WRZ. Because we operate conjunctive use systems, individual source DO values do not reflect the overall DO that can be achieved from the system as a whole.</p> <p>Yes. Our work on plausible droughts shows that whilst we are resilient to more extreme droughts than in the historic record, this would require the use of these licences.</p>

Letter	Response
<p>state under what circumstances you plan to use them.</p> <p>If they are not listed in your drought plan, you need to state under what resilience scenarios you will need the licences. In both cases, Drought Permits may be more appropriate.</p> <p>Your drought plan must include details of all the Drought Permits and orders you might apply for under the full range of droughts you've planned for. If a Drought Permit is required during a drought, and this Permit is not listed within your drought plan, it is highly likely the Permit will be refused. As such it is important that all Drought Permit options are detailed within water company drought plans, and that these Permits are 'Permit ready' to ensure swift determination.</p>	<p>We currently have a supply demand surplus and under our existing licences we can meet historical and the more extreme droughts we have considered.</p> <p>As such we do not plan for any Drought Permits or Drought Orders for increases in supply.</p> <p>However, as part of the long term planning in the WRMP we are looking at how the system will respond to future droughts. Although we have yet to complete the modelling, we consider that we should start a programme of targeted environmental monitoring in the next AMP period to prepare for the future on a 'no regrets' basis for any future needs.</p>
<p><b>2. Wider issues to consider</b></p> <p>Water companies should follow the water company drought plan guideline when preparing their draft drought plans, and consider all relevant statutory requirements including in the new Directions recently released. This is available from:  <a href="https://www.gov.uk/government/collections/how-to-write-and-publish-a-drought-plan">https://www.gov.uk/government/collections/how-to-write-and-publish-a-drought-plan</a>. Further information is available in supporting guidance documents hosted on the Defra Huddle:  <a href="https://www.huddle.com/">https://www.huddle.com/</a>. For login details or any problems with access, please contact Defra directly at <a href="mailto:water.resources@defra.gsi.gov.uk">water.resources@defra.gsi.gov.uk</a>.</p> <p>Please consider and detail the bulk supply arrangements you have with other water undertakers, and how these arrangements operate during a drought including if any changes to transfers will affect restrictions for</p>	<p>We have included a checklist in Appendix M of our Drought Plan. This helps point the reader to where the elements of the guidelines are covered in our draft Drought Plan.</p> <p>This is included in Section 1.3.2.</p>

Letter	Response
<p>your customers. You should ensure that there is a common understanding of their operation in both companies' drought plans.</p>	
<p>The Level of service (LoS) presented in the updated drought plan should be the same as the LoS in your Water Resources Management Plan.</p>	<p>Our Levels of Service are consistent with the WRMP. However, for the BW area there were no Levels of Service given for demand-side Drought Orders and emergency Drought Orders in WRMP14. This leaves ambiguity to customers. In the draft Drought Plan we have therefore included a section on BW Levels of Service and asked for comments on a proposal to set the Levels of Service to 1 in 40 and unacceptable respectively.</p>
<p>When updating the communication section of the plan you should also consider how you will engage in an effective way with your customers and stakeholders in a drought. You should consider how you will plan to avoid the risk of confusion for customers in neighbouring water operators' areas where drought actions may be different. It is important for you to liaise with neighbouring water companies during the pre-consultation period to ensure communications in a drought are as coordinated as possible, and you should include, and be clear on, the lead times for your communication actions.</p>	<p>We have a comprehensive communication plan (Section 5.3). This has been updated from the dry weather experience in 2017. It is also updated for the new non-household retail market.</p>
<p>Please consider any industry lessons learned from the 2011/12 and previous droughts. You should also consider any lessons learned from your own operational issues that have occurred since the publication of your last drought plan.</p>	<p>This is included together with learning from the 2017 dry weather period.</p>
<p>You should review and update as necessary the frequency and scheduling of your maintenance regime for key operational sources to ensure these can be used in a timely way during a drought.</p>	<p>We examine the performance of assets as part of our water supply meetings with documented decisions on what maintenance should be undertaken on what asset. This is also linked to the strategy for reservoir usage. Every dry weather situation is different so it may be useful for our teams to take you through our process on how we manage this day to day.</p>

Letter	Response
<p>Natural England (NE) must be consulted if any of your proposed drought actions may affect a designated site. A Habitats Regulations Assessment (HRA) must be undertaken if a drought action could affect a SAC, SPA or Ramsar, even if the drought action occurs in the winter months. Early liaison with NE and ourselves is important to agree the requirements for environmental assessments at these sites</p>	<p>See Section 4</p>

## Appendix B – Water Resource Zone schematics

This appendix presents the WRZ schematics for our operational area.

Figure B1: Colliford WRZ schematic

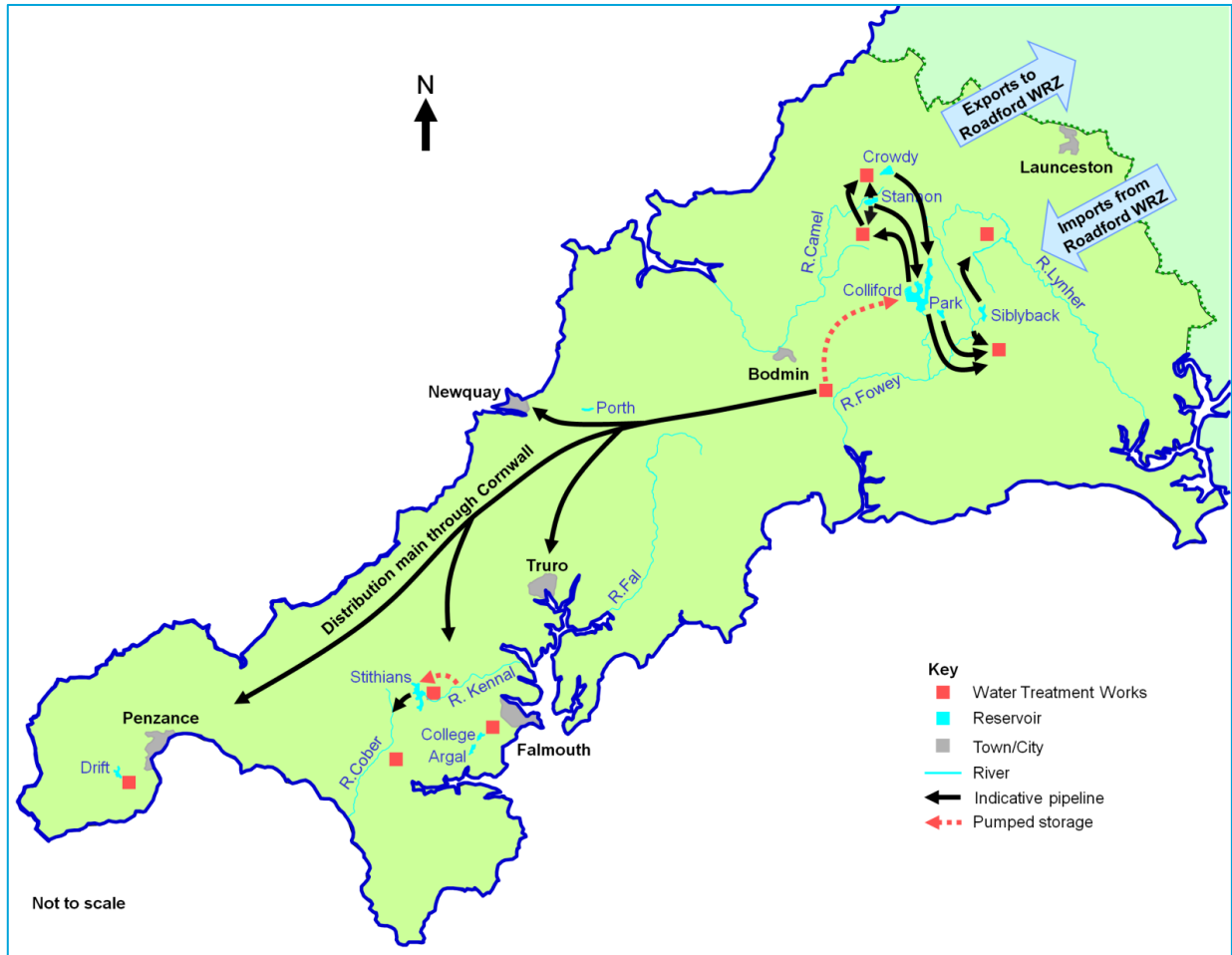


Figure B2: Roadford WRZ schematic

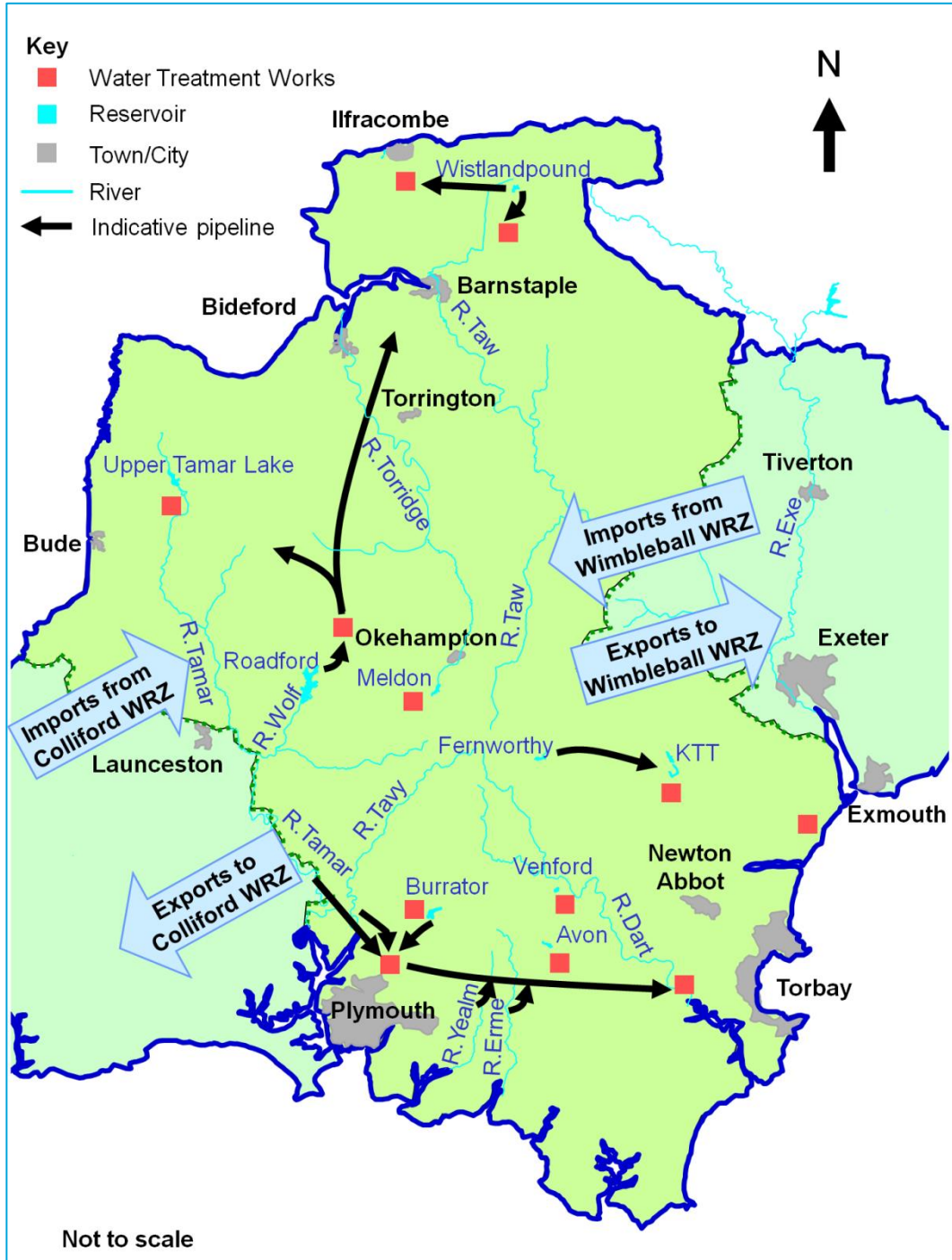




Figure B3: Wimbleball WRZ schematic

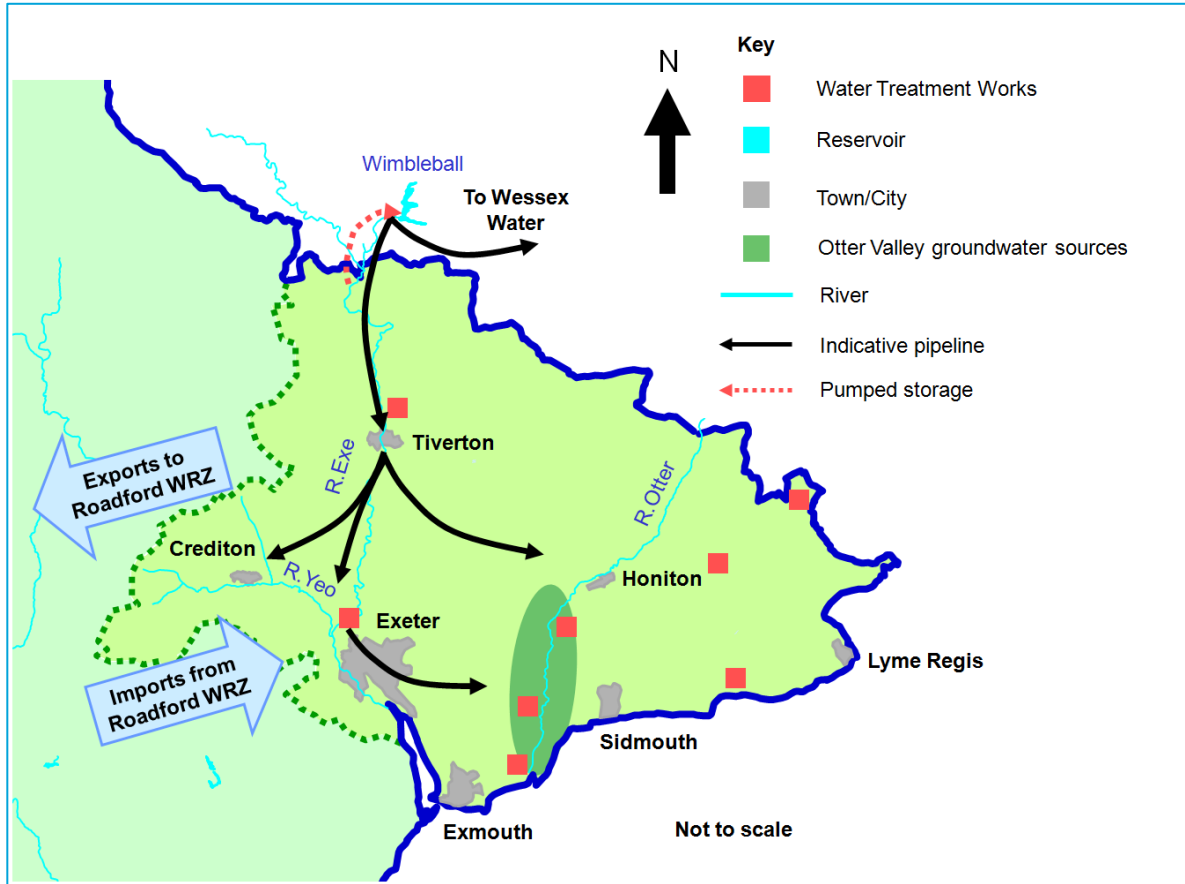
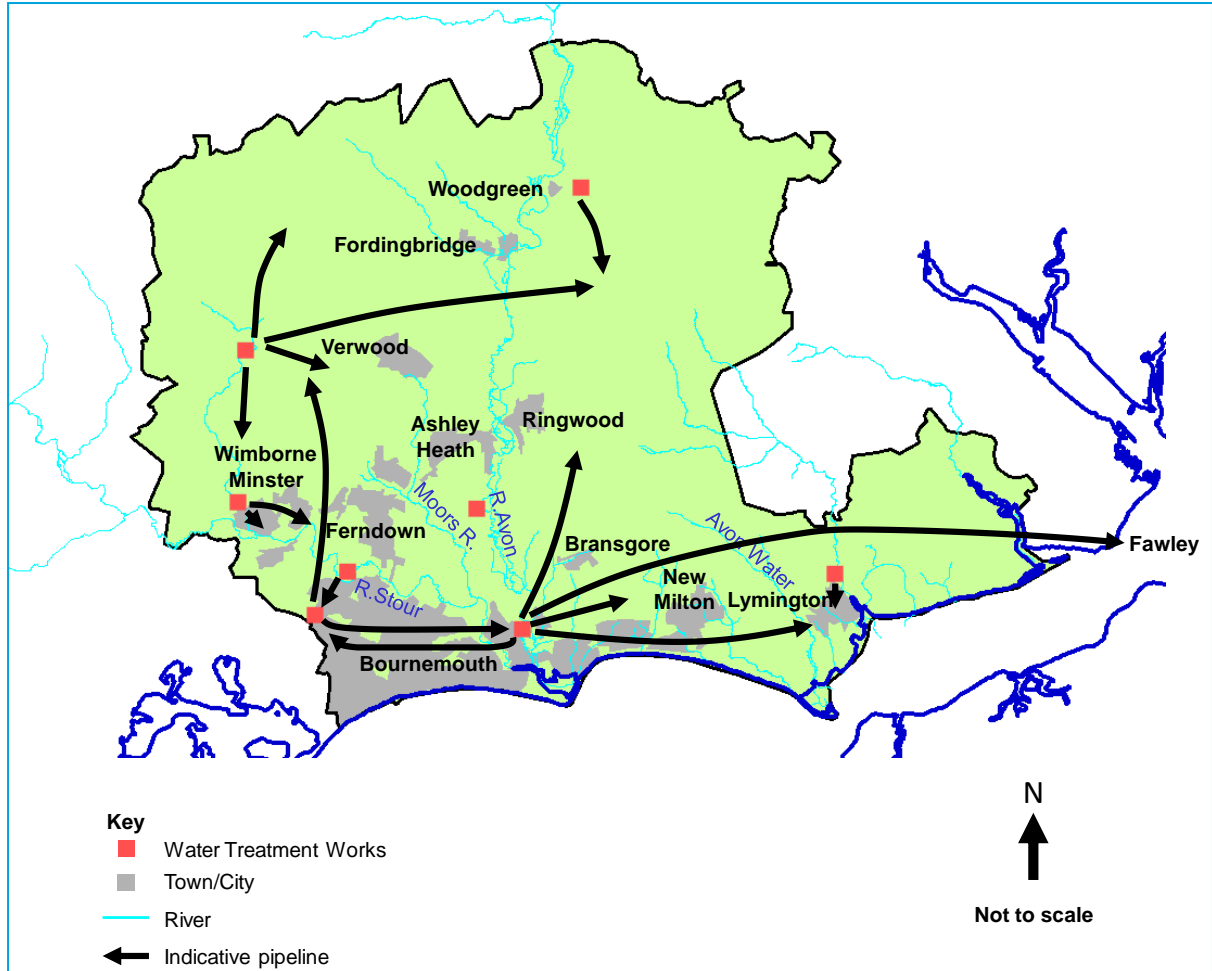


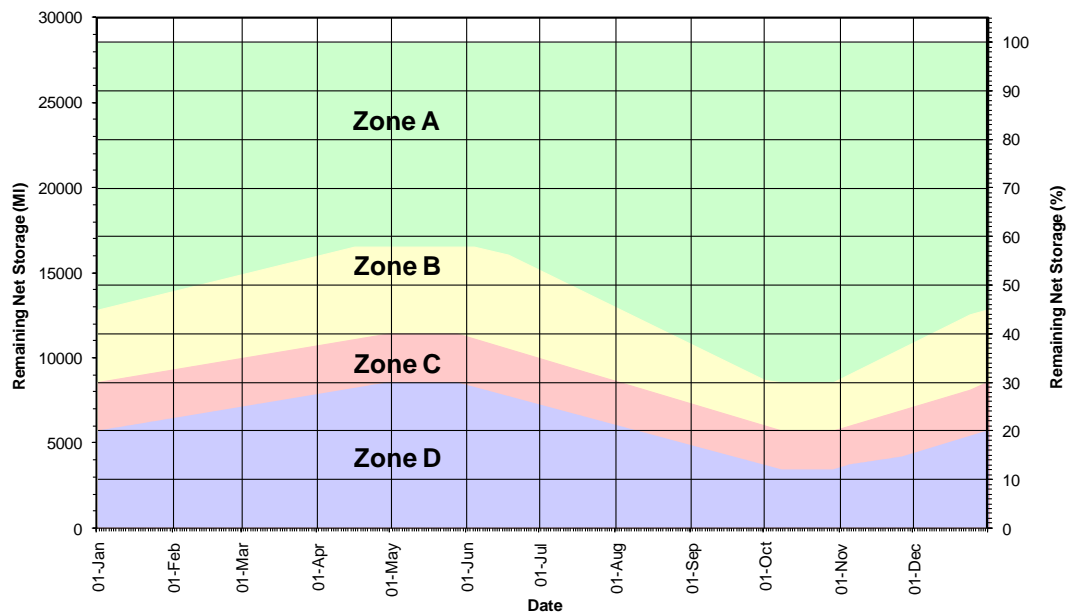
Figure B4: Bournemouth WRZ schematic



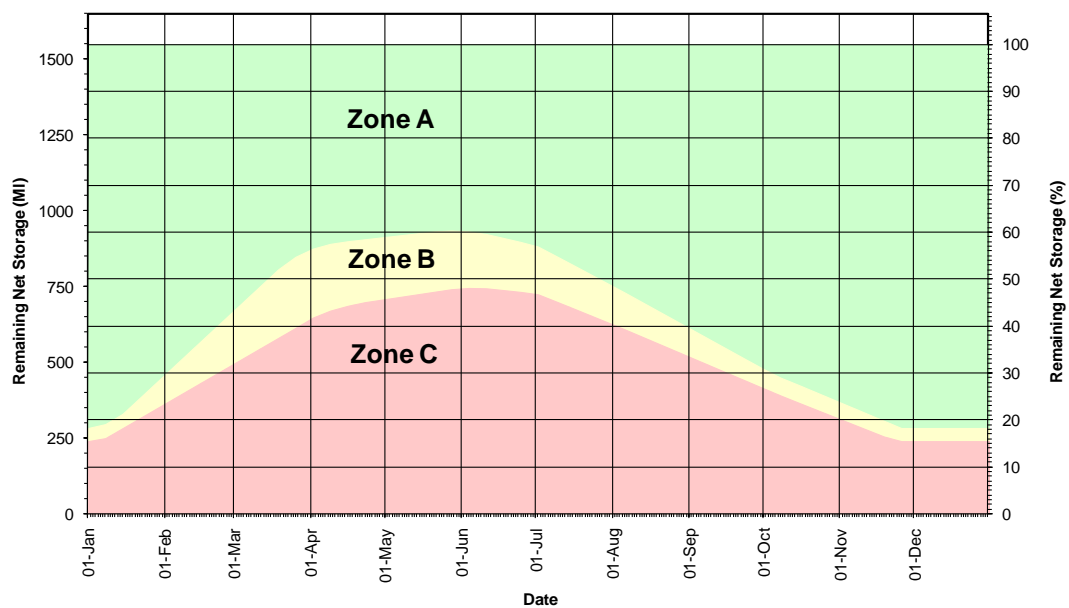
## Appendix C - Example drought management curves

This appendix sets out the format of the drought management curves for our WRZs and the associated actions in the trigger zones.

**Figure C1: Example strategic reservoir drought management curves for Colliford, Roadford and Wimbleball WRZs**



**Figure C2: Example local reservoir drought management curves for Colliford, Roadford and Wimbleball WRZs**



**Table C1: Actions taken when storage enters zones for Colliford, Roadford and Wimbleball WRZs**

Storage Zone	Demand-side actions	Supply-side actions	Operational and planning actions
<b>A</b>	None	None	Abstract as required: <ul style="list-style-type: none"> <li>• Within licence</li> <li>• Within quality constraints</li> <li>• Within operational rules</li> </ul> Support local reservoirs where necessary
<b>B</b>	Major publicity campaign requesting voluntary savings of water	Change operational practice from cost minimisation to yield maximisation	Increased operational monitoring Supplementary leakage checks Additional water conservation measures Regular contacts with Environment Agency Regular storage projections Increased drought monitoring Keep customers informed about the situation through regular bulletins and information on the Company website
<b>C</b>	Temporary Use Bans (TUBs, formerly termed hosepipe bans)  Six month maximum duration of TUBs	Use of Drought Orders or Drought Permits (e.g. reducing compensation or prescribed flows) not more than once every 20 years on average*  Use of Drought Orders or Drought Permits authorising use of emergency sources*	Reservoir water quality review  Consider further distribution zone management  Consider installation of temporary boosters  Keep customers informed about the situation through regular bulletins and information on the Company website
<b>D</b>	Demand-side Drought Orders (formerly termed bans on non-essential use)  Four month maximum duration of demand-side Drought Orders		

\* The use of Drought Orders or Permits of this nature is not currently envisaged to be required within the lifetime of this Plan. However, for completeness, and transparency, we show the process of how a drought would be managed in the highly unlikely event that, within the life time of this plan, we experience a drought more extreme than the historical

drought of 1975/76. Information on historical supply-side drought orders / permits is given in Appendix H6.

**Figure C3: Example demand based drought management zones in Bournemouth WRZ**

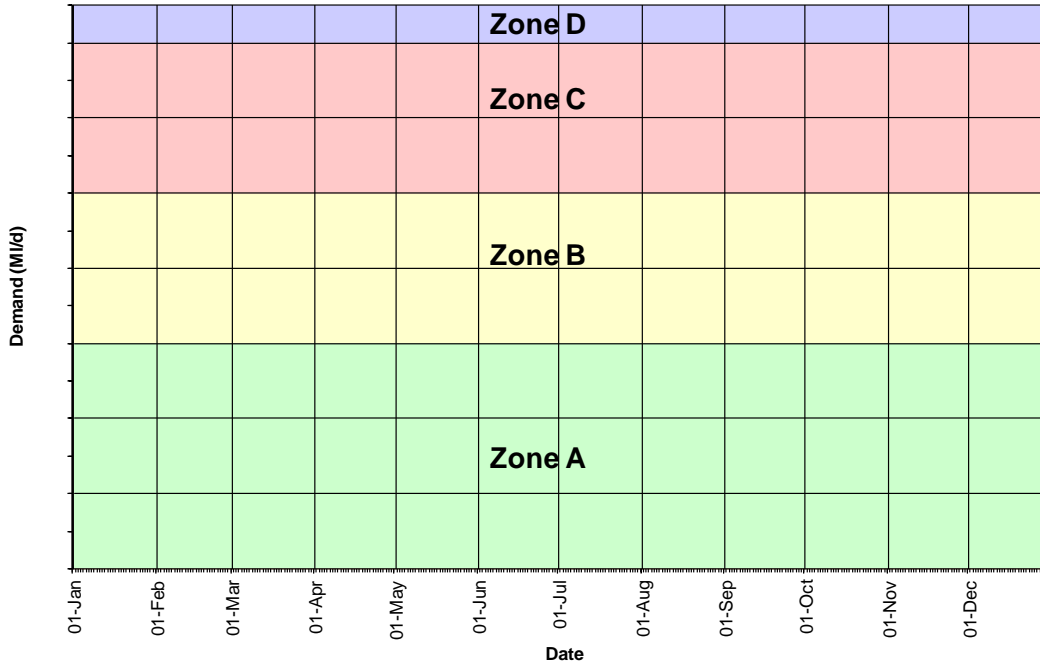


Table C2: Actions taken when demand enters zones in Bournemouth WRZ

Trigger Zone	Demand-side actions	Supply-side actions	Operational and planning actions
<b>A</b>	None	None	Abstract as required: <ul style="list-style-type: none"> <li>• Within licence</li> <li>• Within quality constraints</li> <li>• Within operational rules</li> </ul>
<b>B</b>	Major publicity campaign requesting voluntary savings of water	Change operational practice from cost minimisation to yield maximisation  Hold discussions with major industrial customers	Increased operational monitoring  Supplementary leakage checks  Additional water conservation measures  Regular contacts with Environment Agency  Regular water demand and supply projections  Increased drought monitoring  Keep customers informed about the situation through regular bulletins and information on the Company website
<b>C</b>	Temporary Use Bans (TUBs, formerly termed hosepipe bans)  Six month maximum duration of TUBs	Use of Drought Orders or Drought Permits (e.g. reducing compensation or prescribed flows) not more than once every 20 years on average*  Use of Drought Orders or Drought Permits authorising use of emergency sources*	Consider further distribution zone management  Consider installation of temporary boosters  Keep customers informed about the situation through regular bulletins and information on the Company website
<b>D</b>	Demand-side Drought Orders* (formerly termed bans on non-essential use)  Four month maximum duration of demand-side Drought Orders		

\* There is no requirement for ordinary Drought Orders or Drought Permits in our list of options for Bournemouth WRZ. However, for completeness and transparency, we show the process of how a drought would be managed in the highly unlikely event that, within the life time of this plan, we experience a drought more extreme than the historical drought of 1975/76.

## Appendix D - Drought management curves

This appendix sets out the actual drought management curves for our WRZs.

### D1 Colliford WRZ reservoir drought management curves

Figure D1.1: Argal and College Reservoirs drought management curves

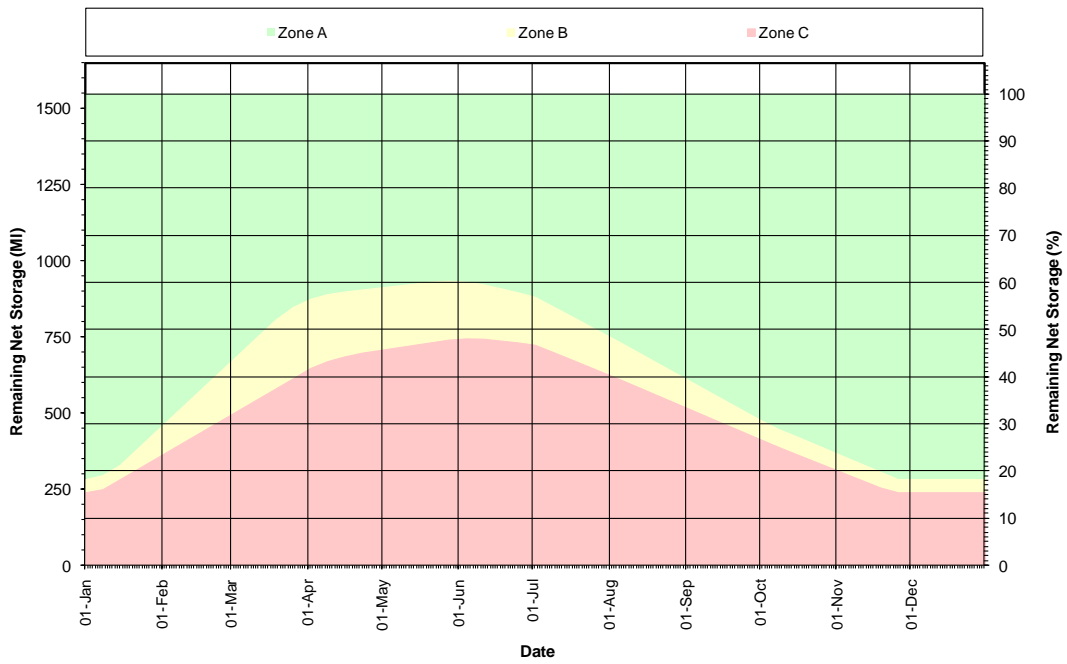


Figure D1.2: Colliford Reservoir drought management curves

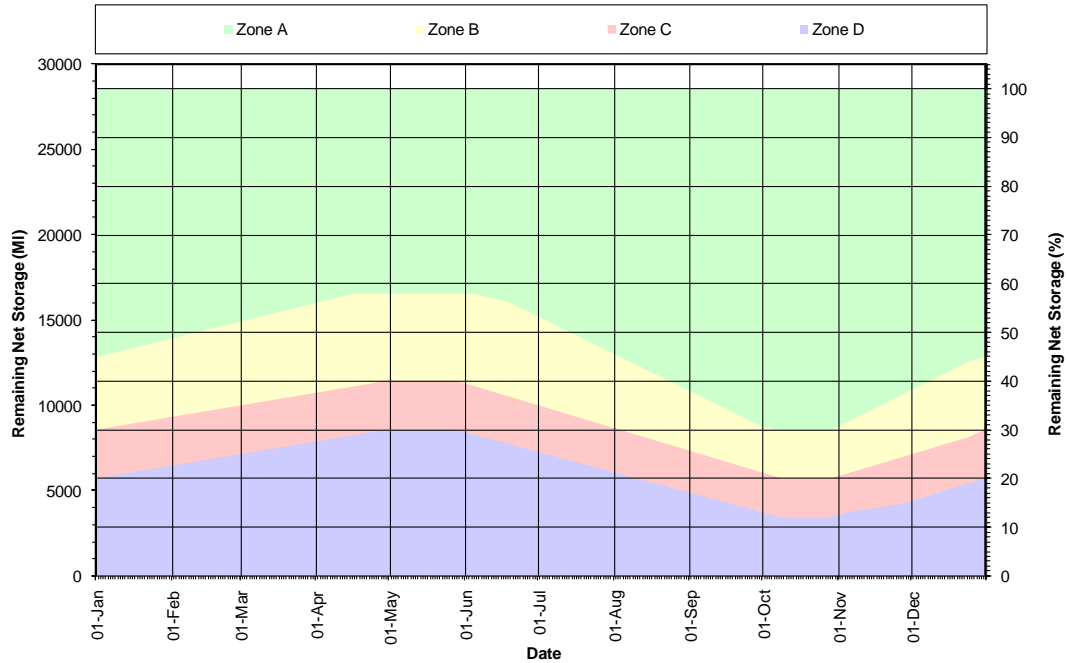


Figure D1.3: Crowdy Reservoir drought management curves

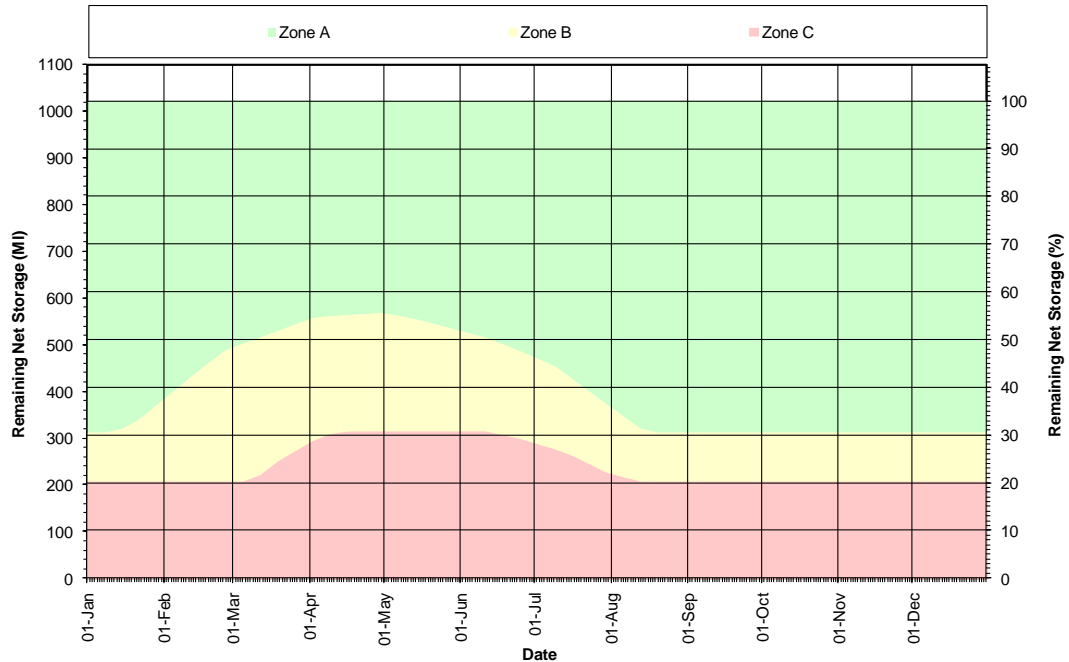




Figure D1.4: Drift Reservoir drought management curves

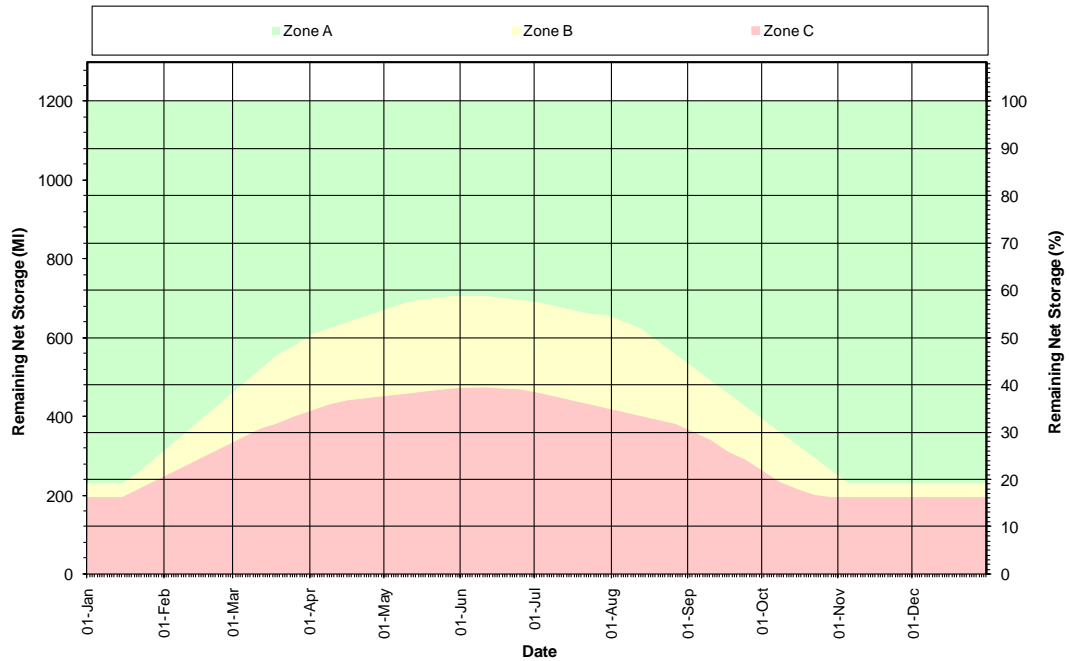


Figure D1.5: Park Lake drought management curves

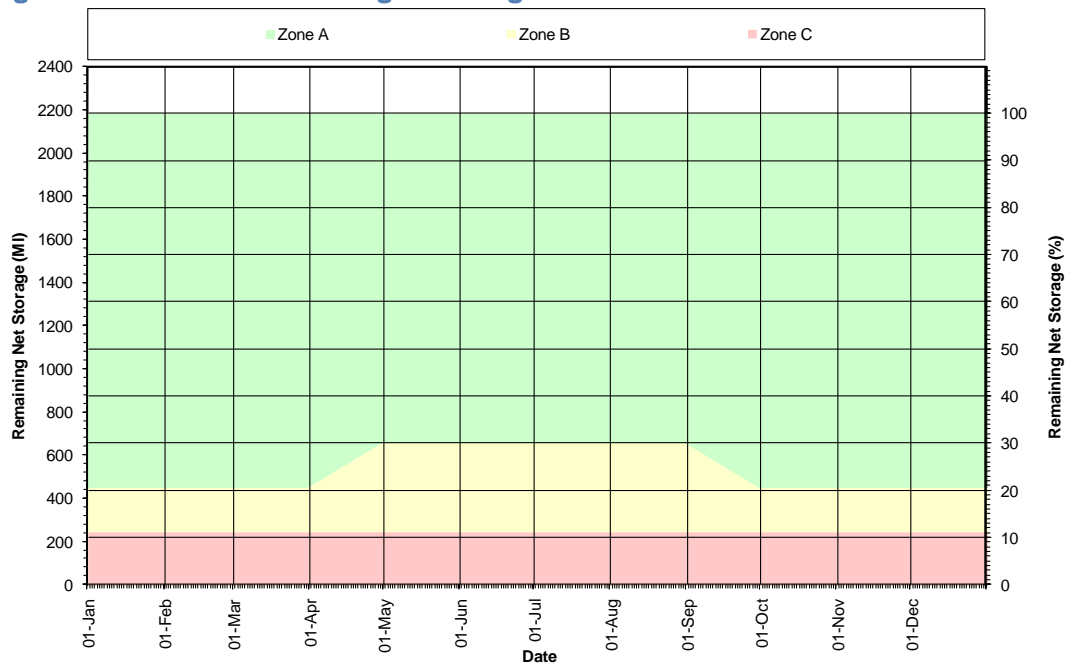


Figure D1.6: Siblyback Reservoir drought management curves

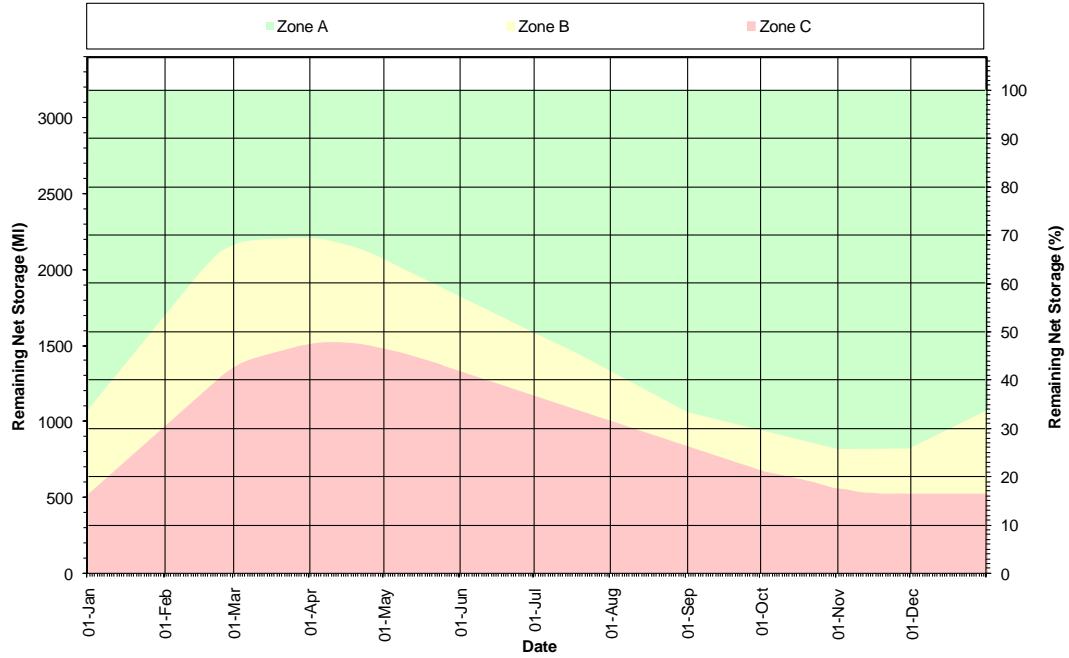


Figure D1.7: Stannon Lake drought management curves

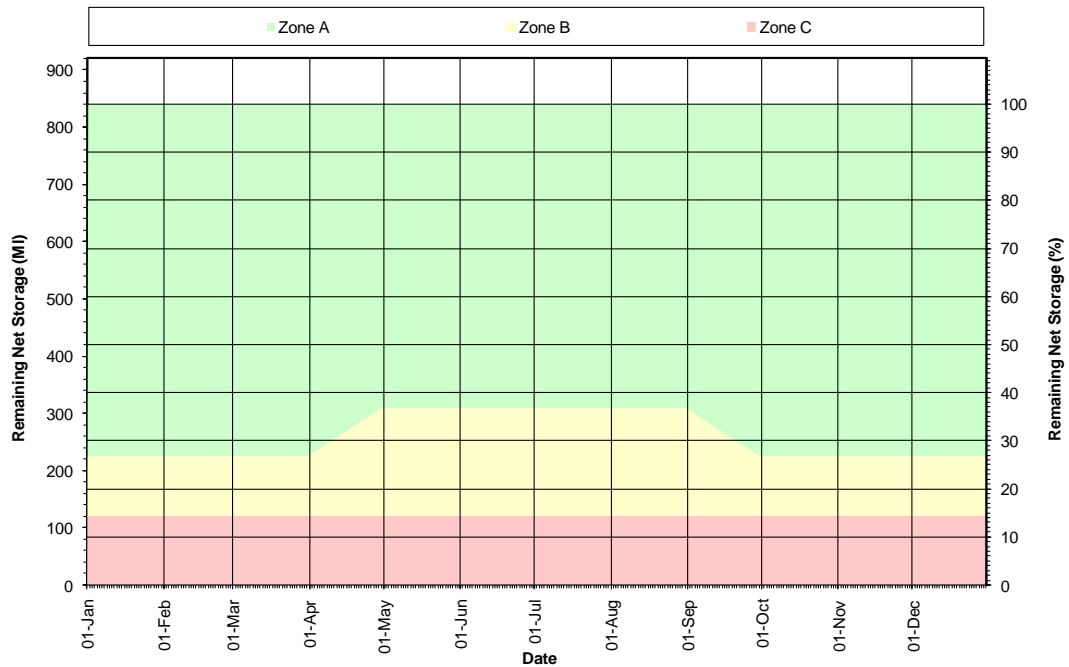
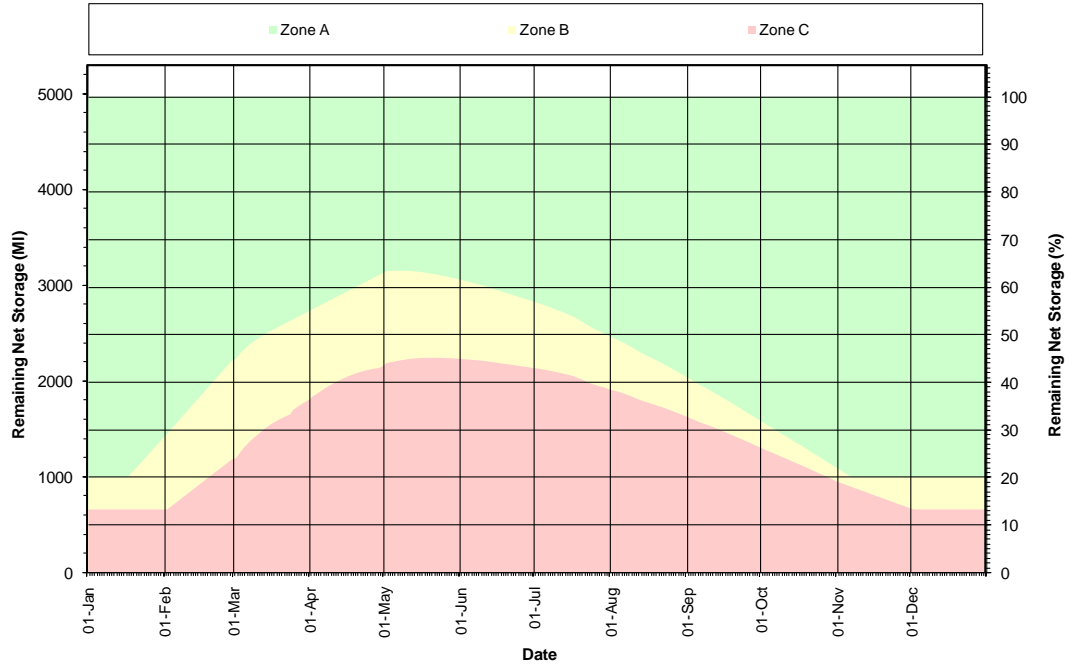


Figure D1.8: Stithians Reservoir drought management curves



D2 Roadford WRZ reservoir drought management curves

Figure D2.1: Avon Reservoir drought management curves

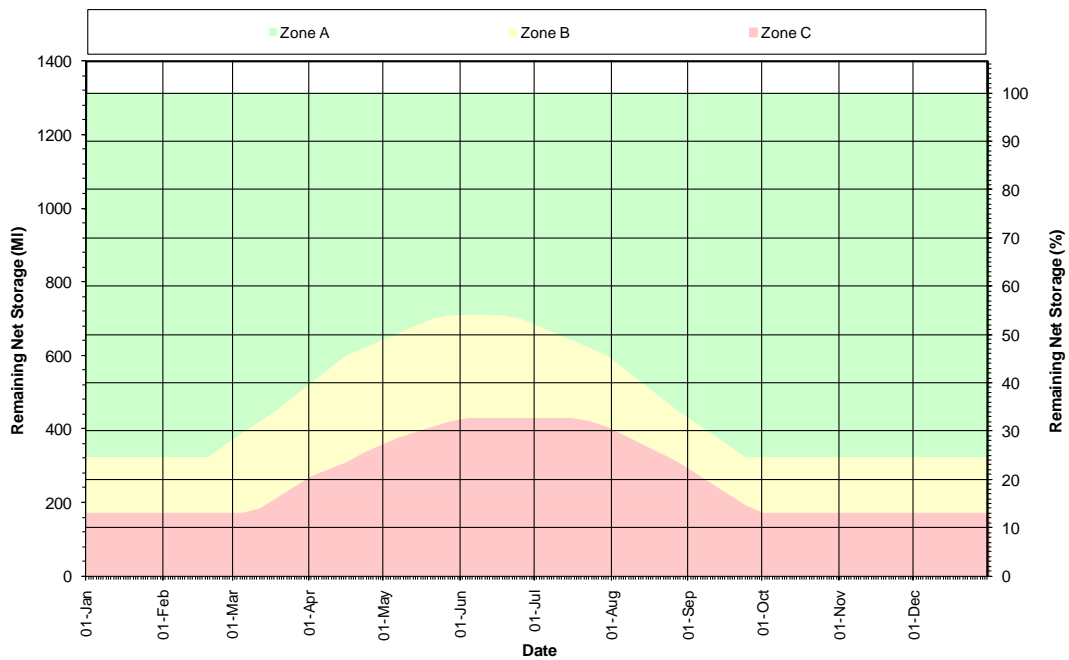


Figure D2.2: Burrator Reservoir drought management curves

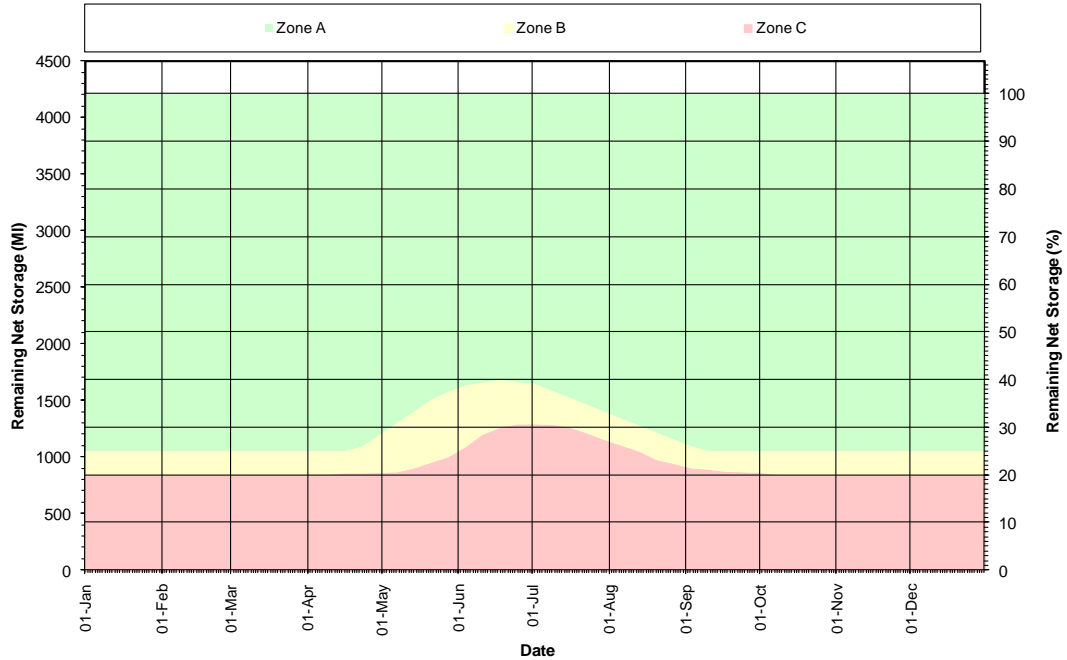


Figure D2.3: Fernworthy Reservoir drought management curves

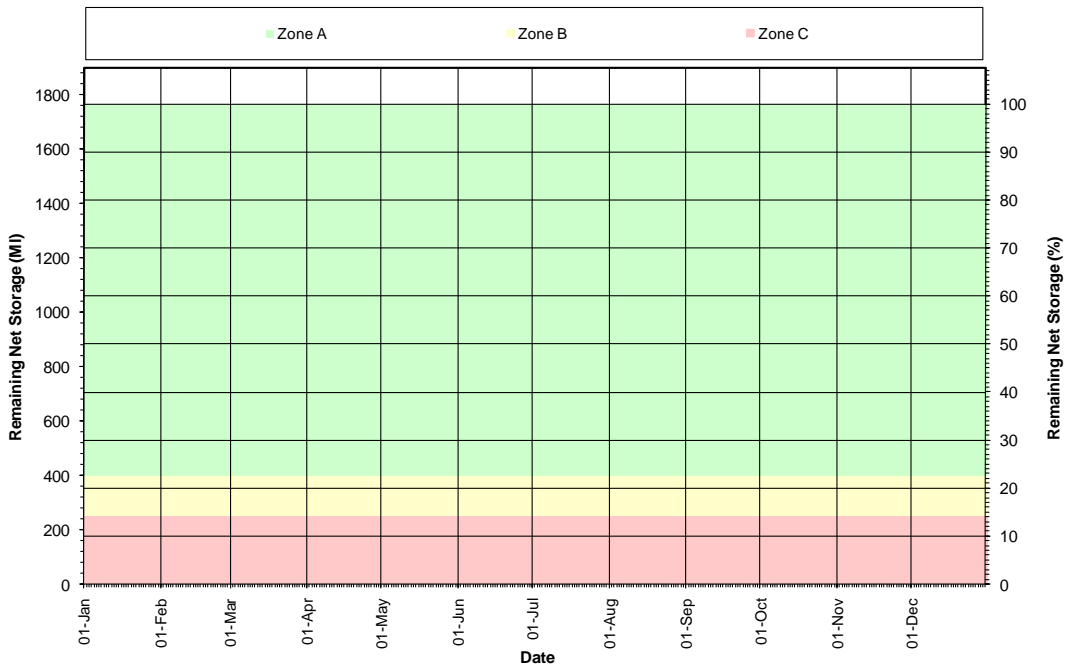


Figure D2.4: KTT Reservoirs drought management curves

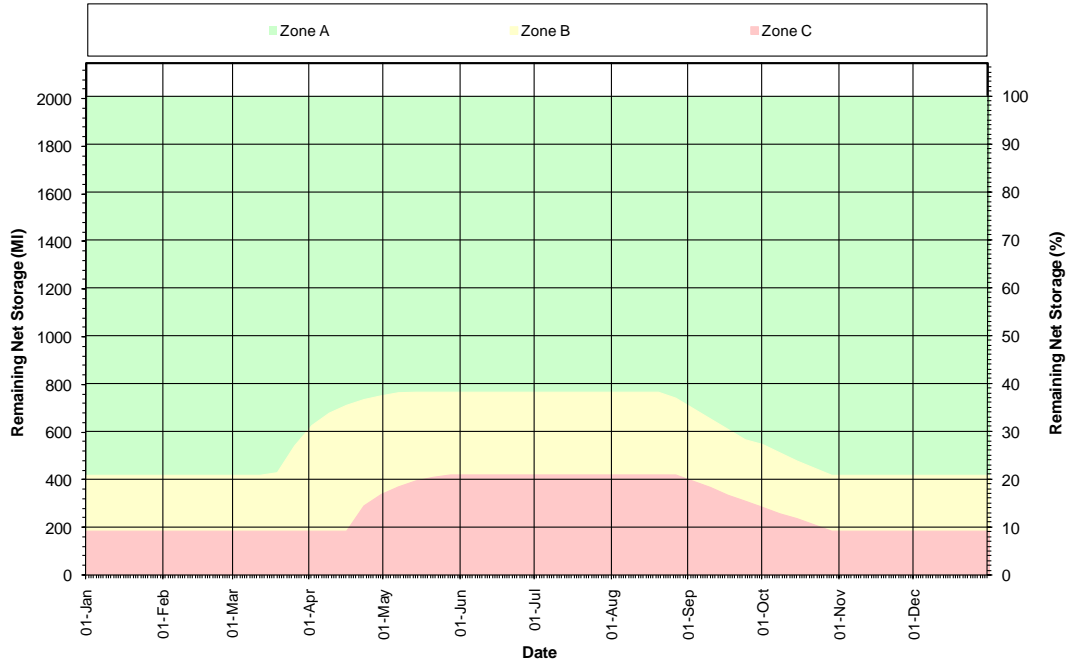


Figure D2.5: Meldon Reservoir drought management curves

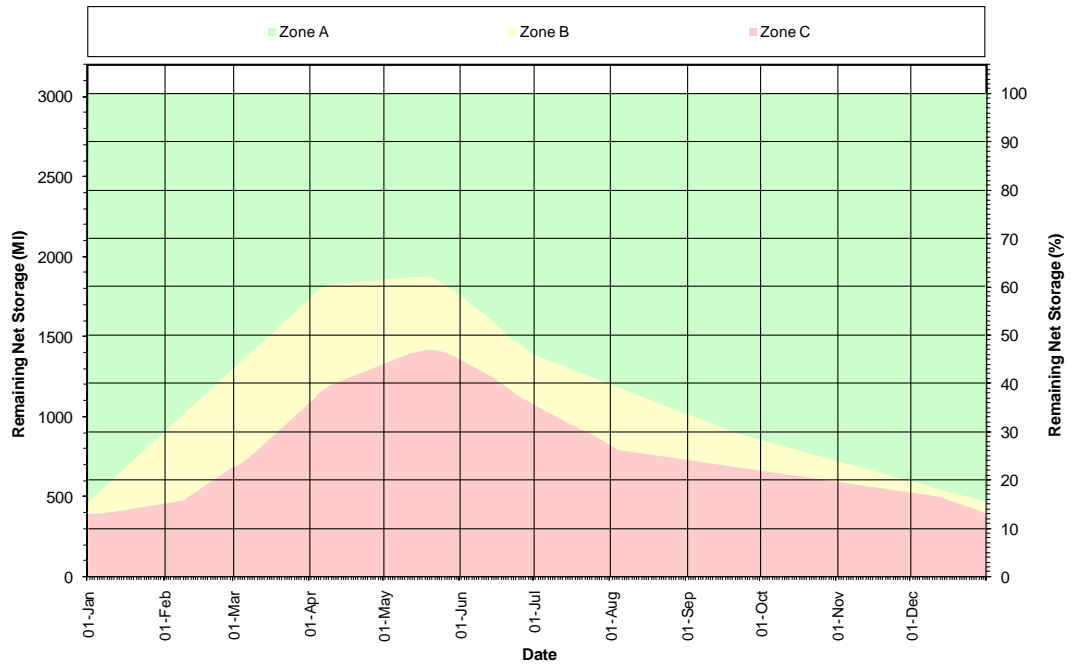


Figure D2.6: Roadford Reservoir drought management curves

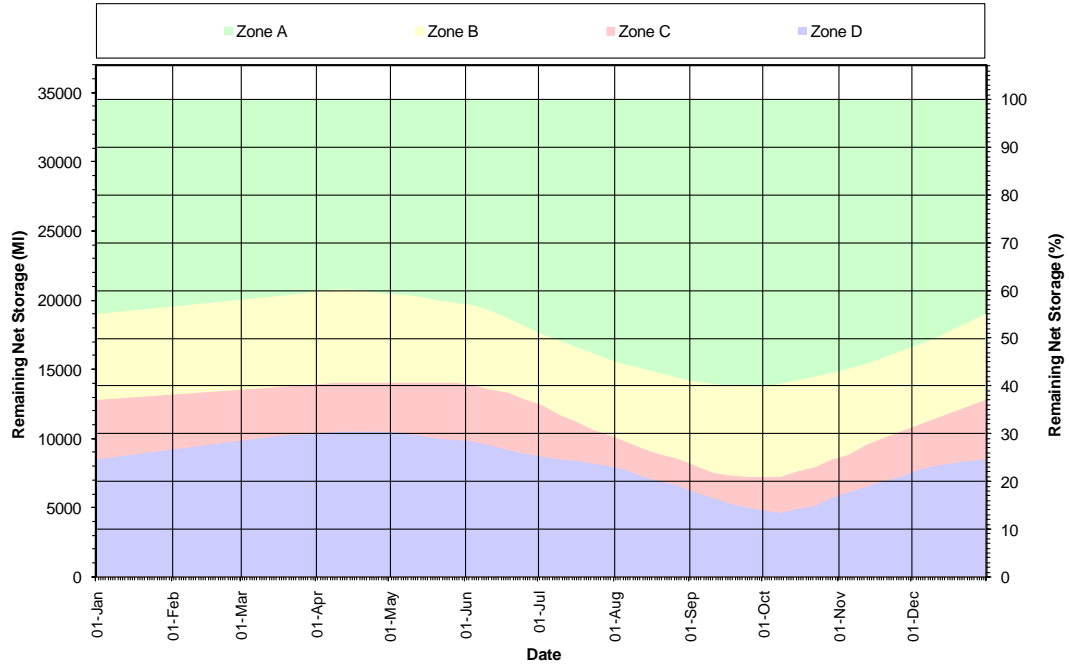


Figure D2.7: Upper Tamar Lake drought management curves

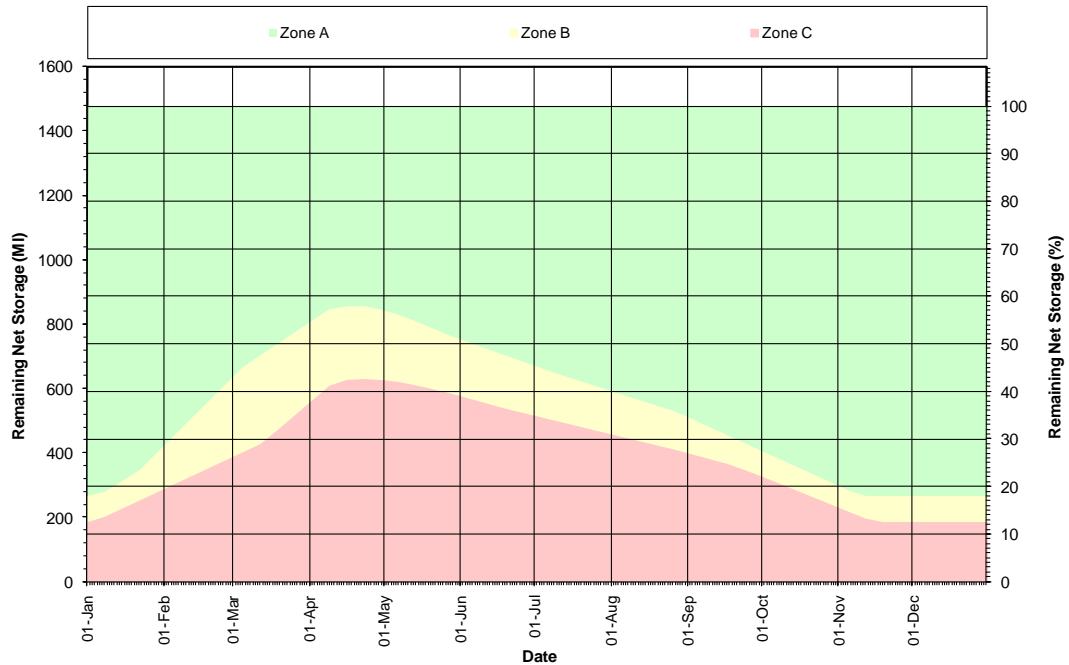


Figure D2.8: Venford Reservoir drought management curves

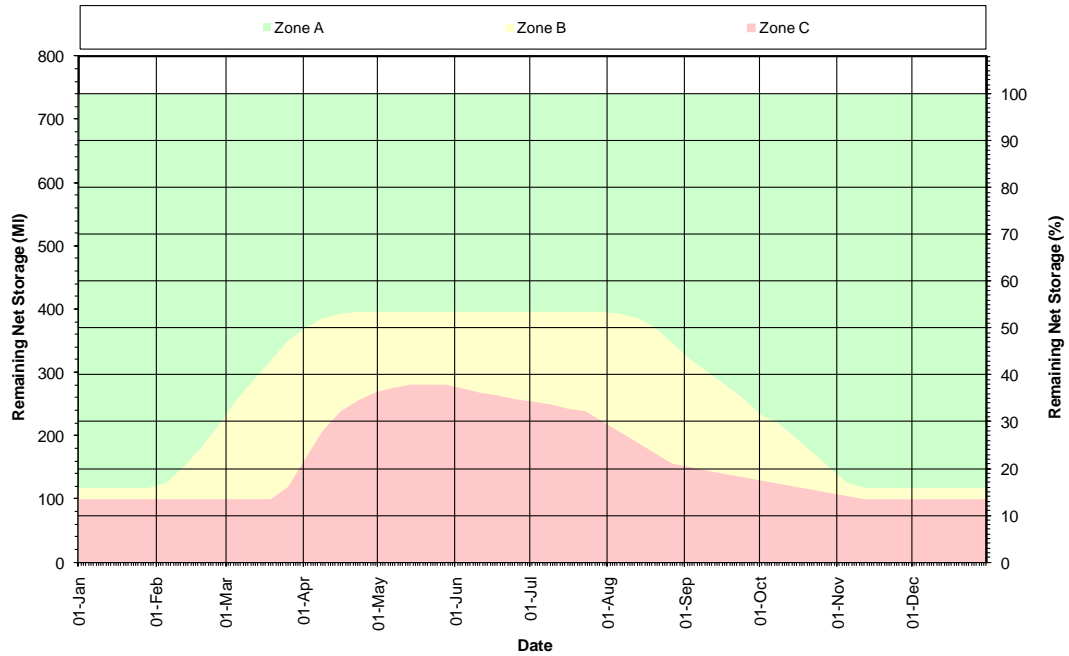
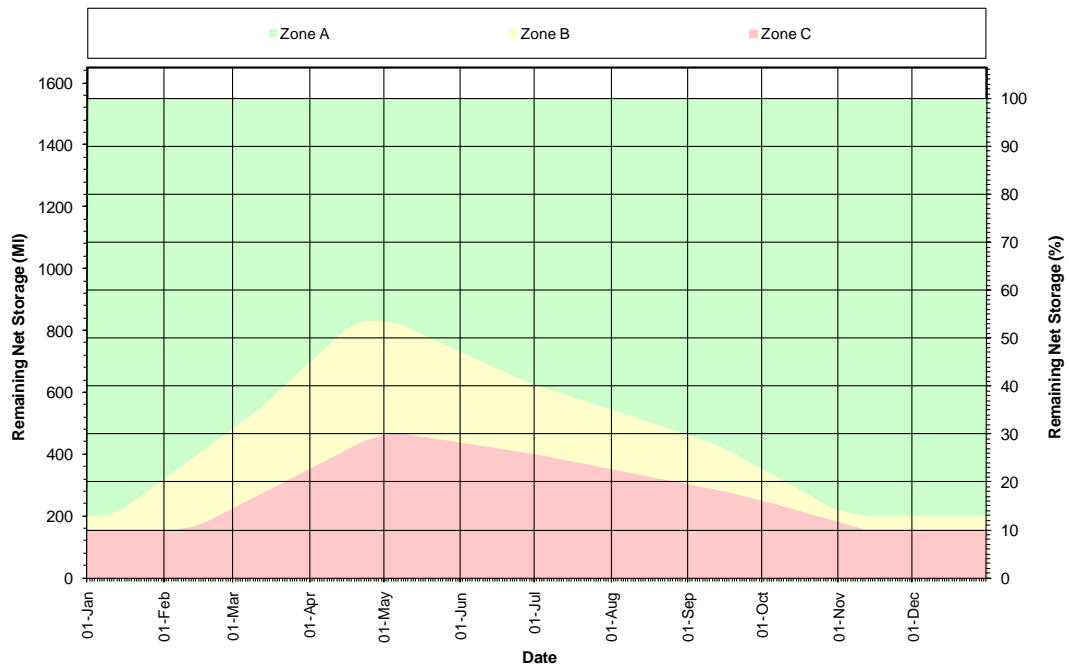
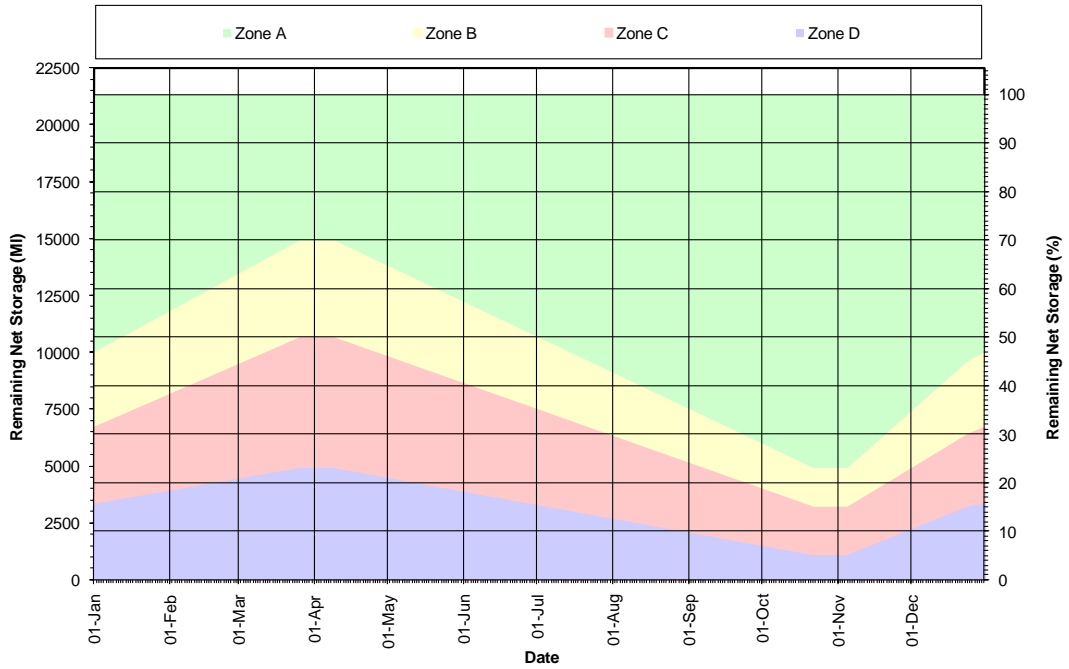


Figure D2.9: Wistlandpound Reservoir drought management curves



**D3 Wimbleball WRZ reservoir drought management curves**

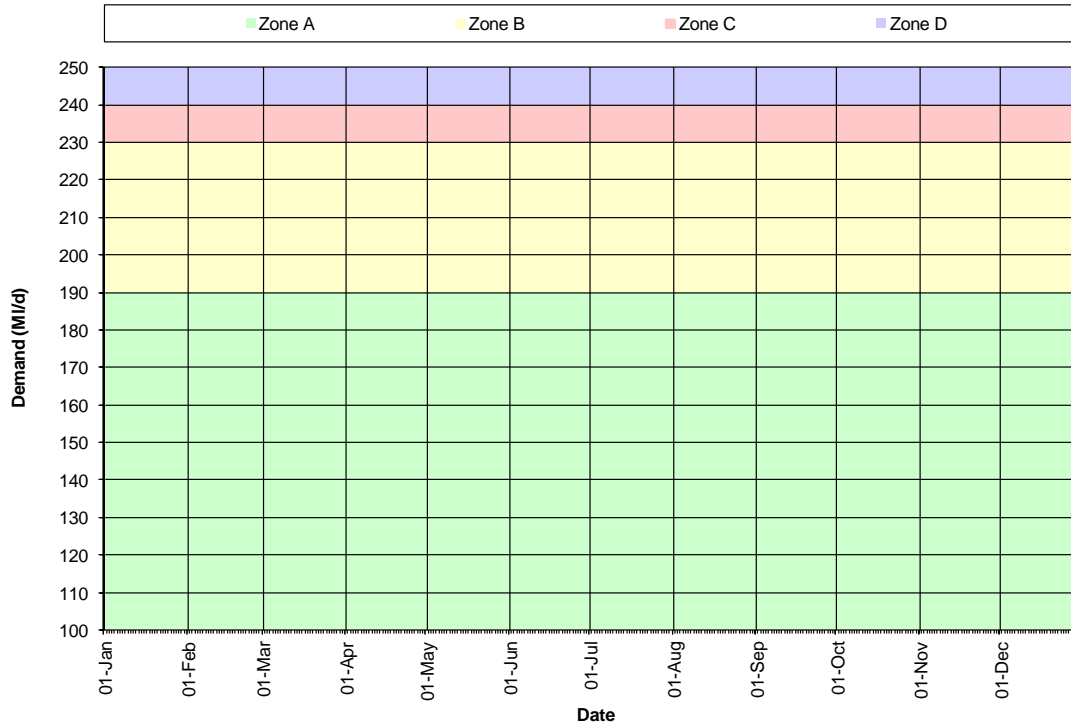
**Figure D3.1: Wimbleball Reservoir drought management curves**





**D4 Bournemouth WRZ demand based drought management zones**

**Figure D4.1: Bournemouth drought management zones**



## Appendix E - Routine monitoring and forecasting tools

This appendix sets out the routine monitoring tools used in our WRZs.

### E1 Examples of routine water resources and demand monitoring – SSW weekly Water Situation Report

Figure E1.1: Distribution Input (DI)

Colliford Resource Zone: West Cornwall

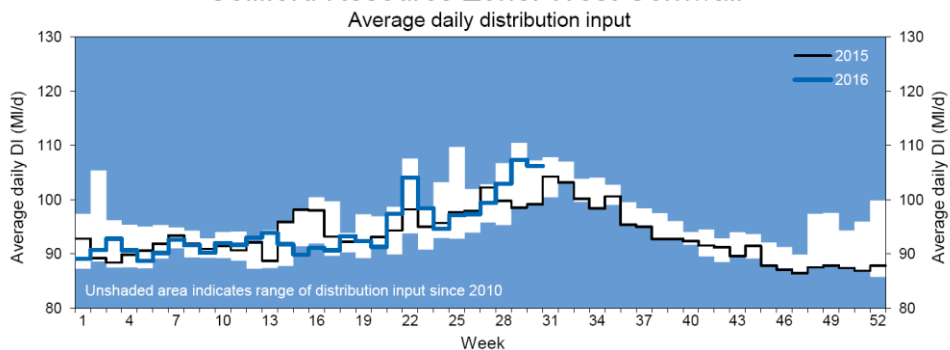


Figure E1.2: Rainfall

Rainfall Situation on 31 July 2016

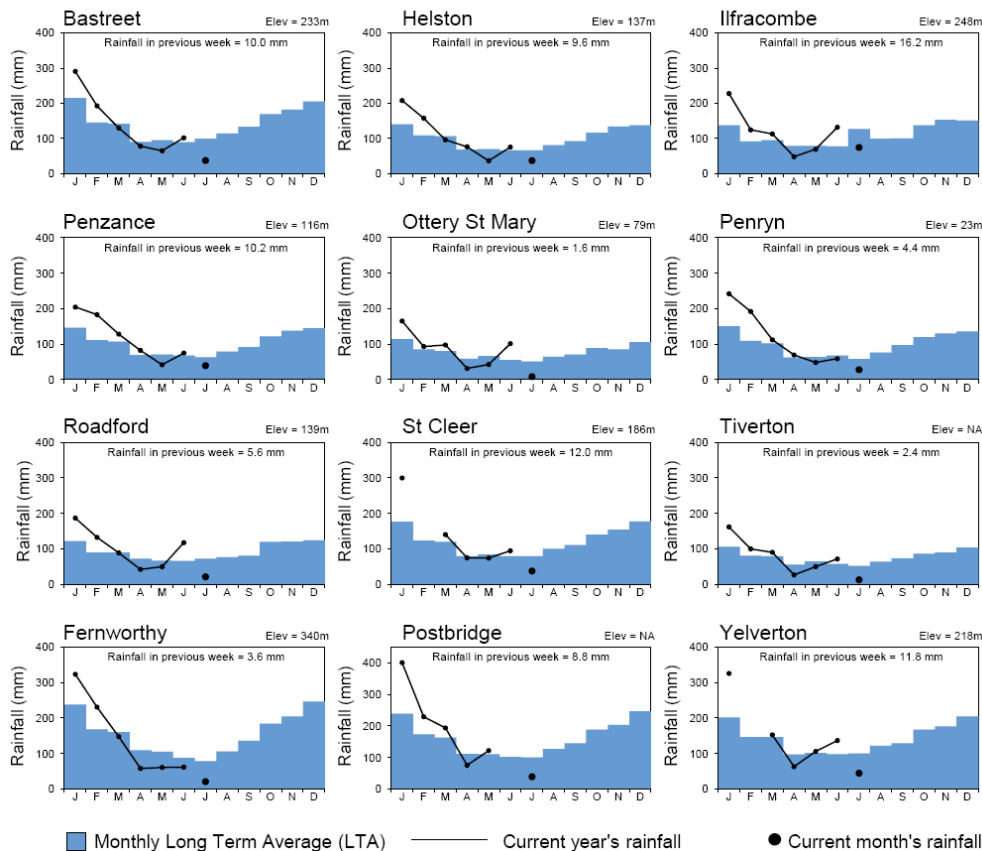


Figure E1.3: River flow

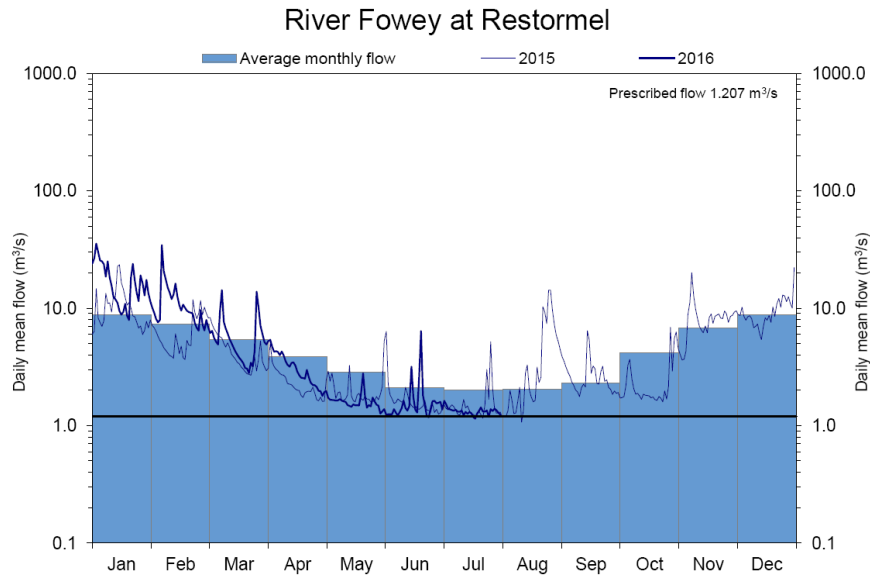


Figure E1.4: Reservoirs

West Cornwall Reservoir Storage on 31 July 2016

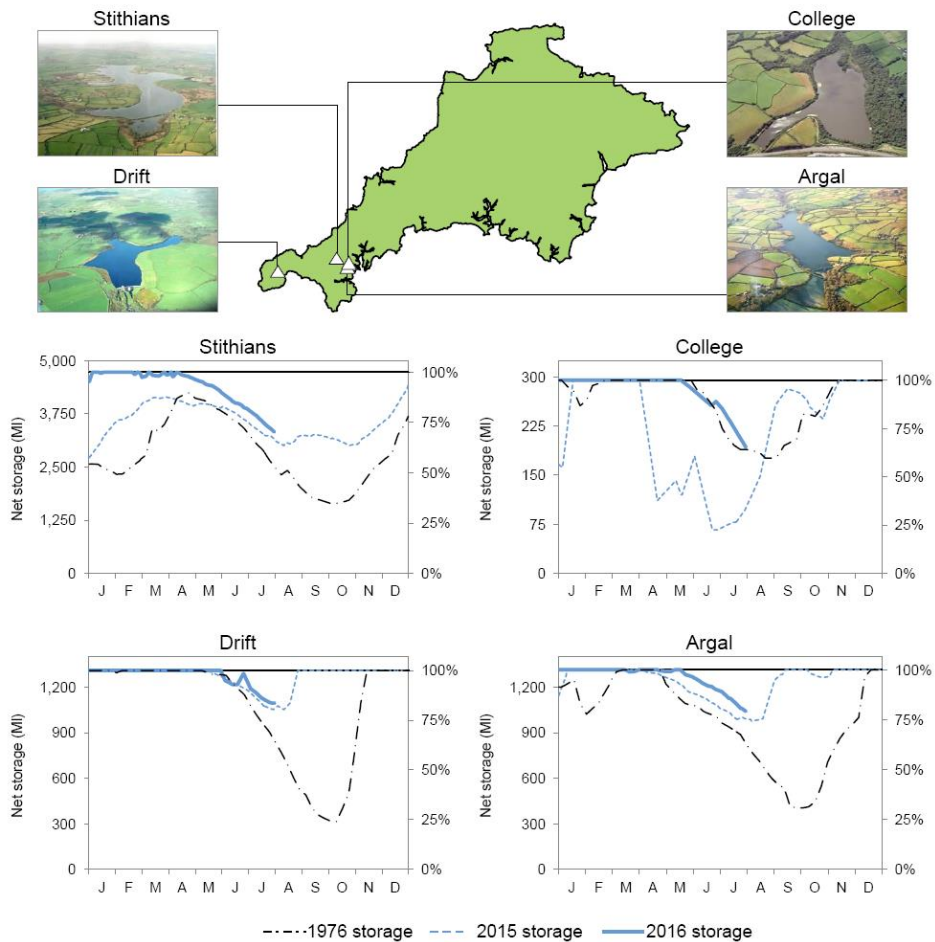
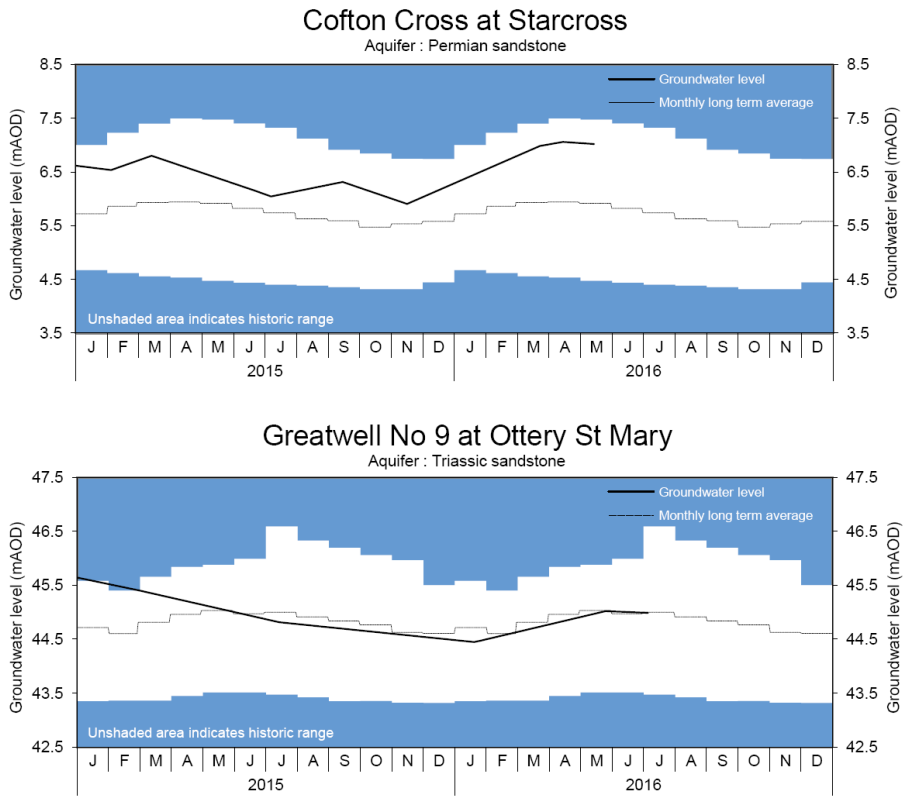
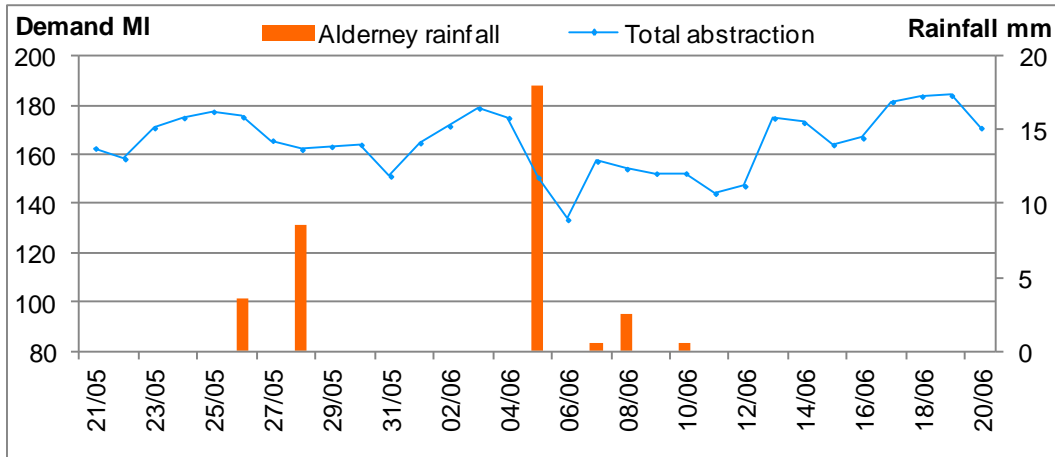


Figure E1.5: Groundwater



**E2 Examples of routine water resources and demand monitoring – BW report**

**Figure E2.1: Daily demand and rainfall for previous 30 days**



**Figure E2.2: Daily demand for previous 30 days**

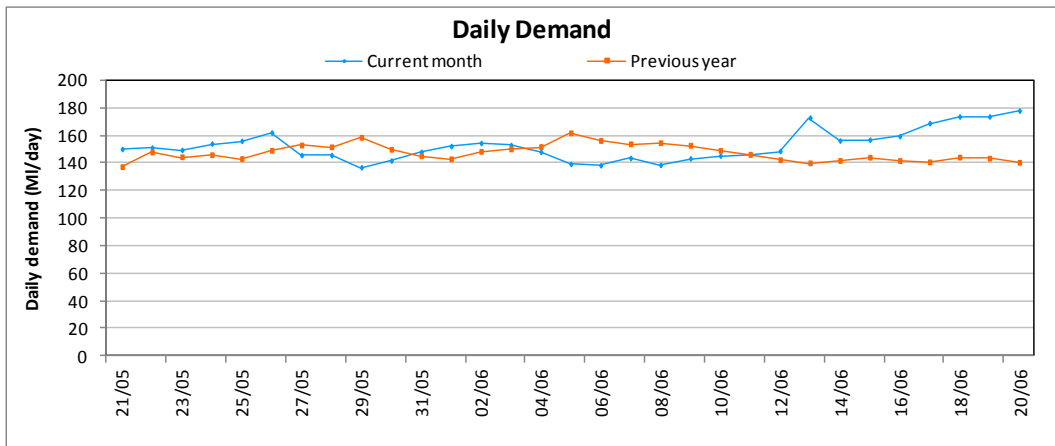
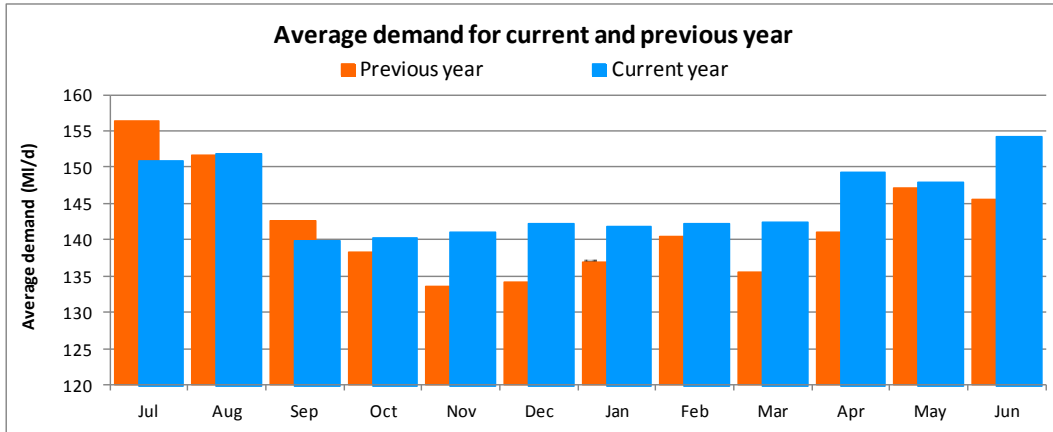


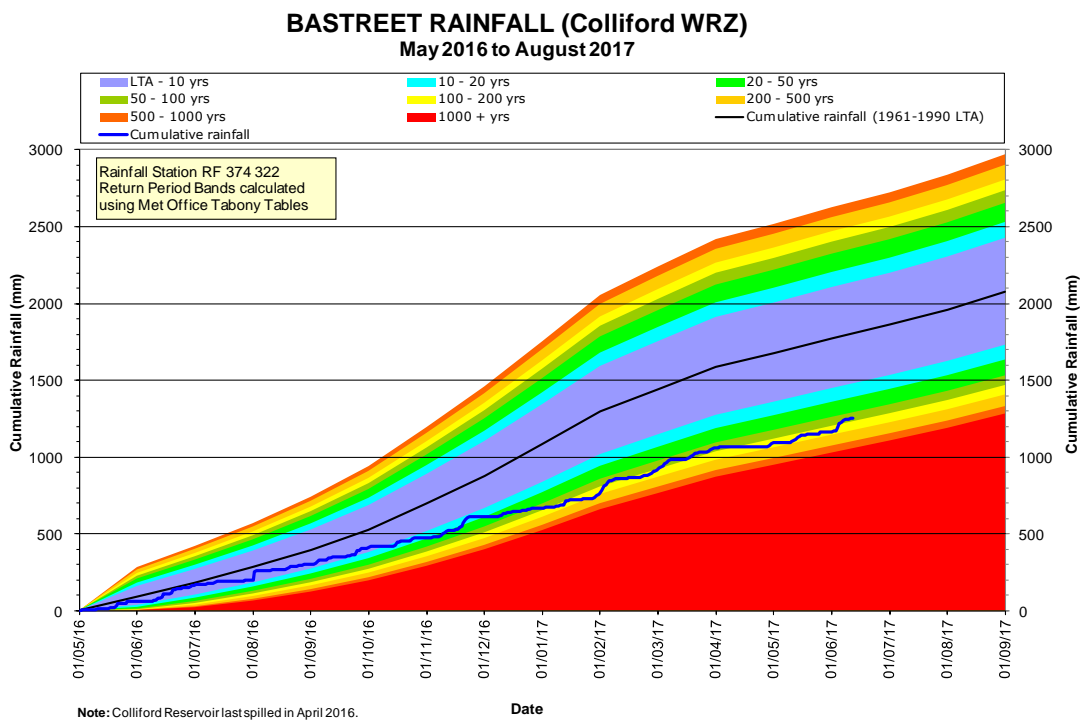
Figure E2.3: Monthly demand for previous 12 months



**E3 Example assessment of rainfall return period**

Figure E3.1 sets out an example of the assessment we undertake on rainfall return period in routine monitoring. This helps us understand the severity of any dry period.

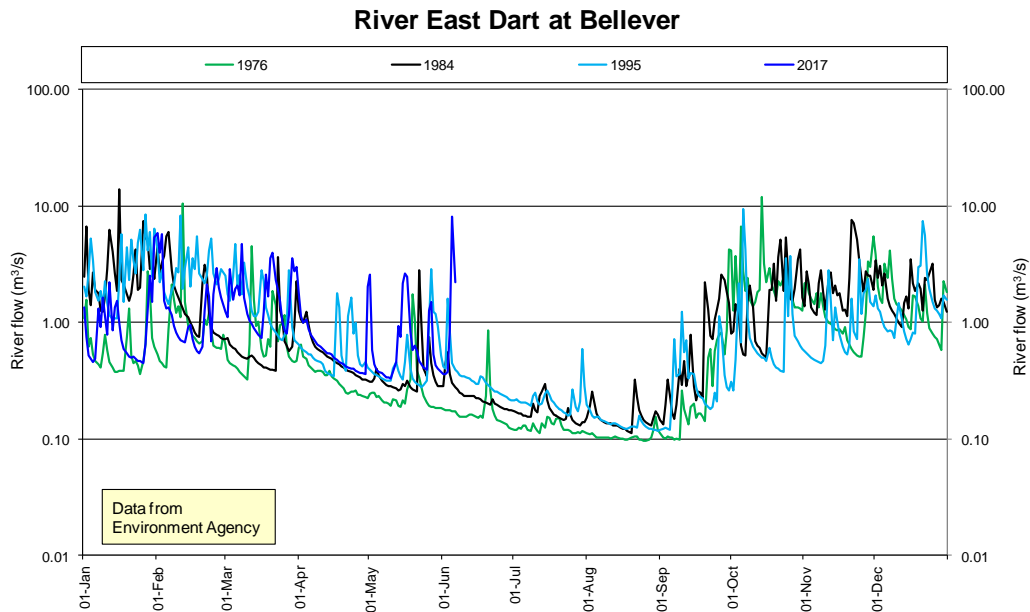
Figure E3.1: Example assessment of rainfall return period – Bastreet



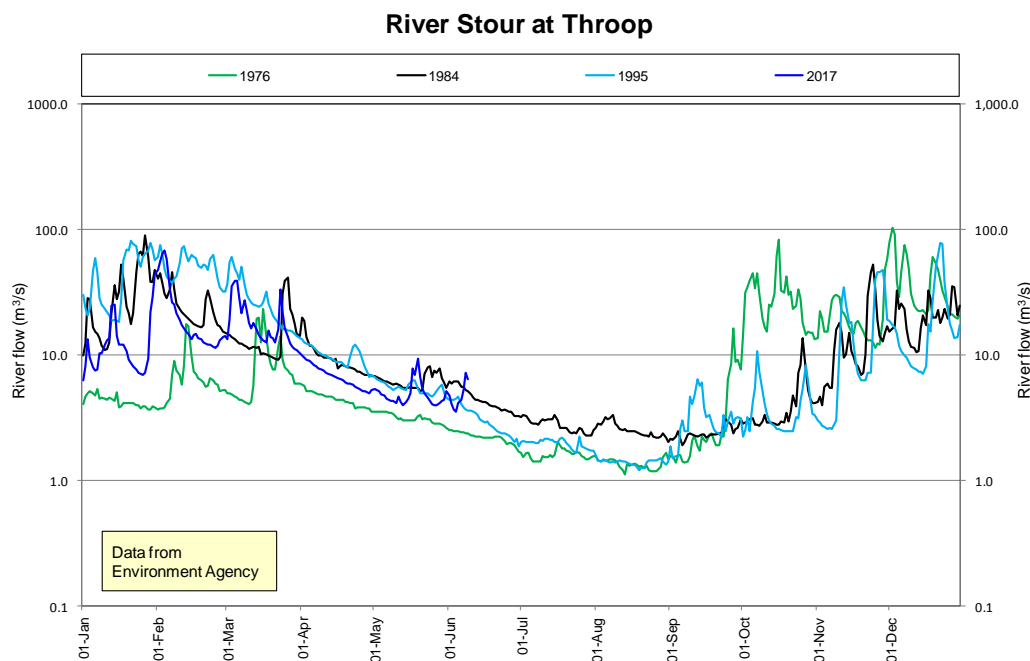
## E4 Example assessment of river flow

Figures E4.1 and E4.2 present examples of the routine monitoring of river flows compared to historic droughts. This helps us understand the relative severity of any dry period.

**Figure E4.1: Example assessment of river flow – River East Dart at Bellever**



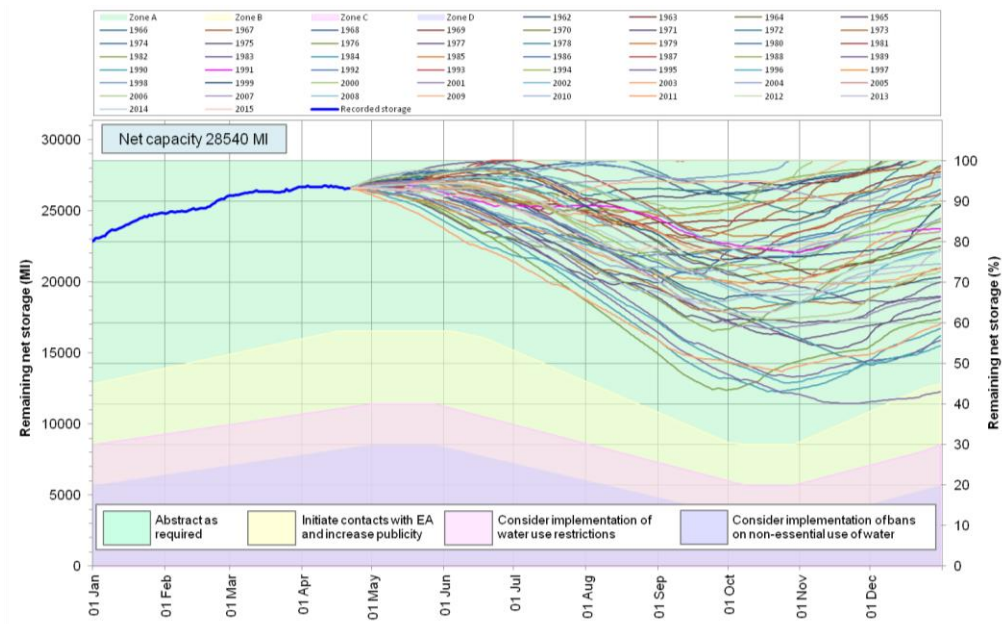
**Figure E4.2: Example assessment of river flow – River Stour at Throop**



**E5 Example strategic reservoir projections**

We routinely monitor reservoir levels and forecast future levels using historic data. This helps us understand the relative severity of current storage levels but also forecasts as to whether any drought actions may be needed<sup>18</sup>.

**Figure E5.1: Example Colliford Reservoir projection using a range of flow years**



<sup>18</sup> The primary purpose of Figures E.5.1 to E 5.6 are to give examples of how the Company undertake reservoir projections as part of our water resources monitoring work. These types of graphs are not used to assess the “design drought” of a water resources system. For the selection of the “design drought”, it is important to also consider multi season events, as shown in the reservoir drawdowns presented in Appendix F



Figure E5.2: Example Colliford Reservoir projection showing a dry, a wet and a typical year

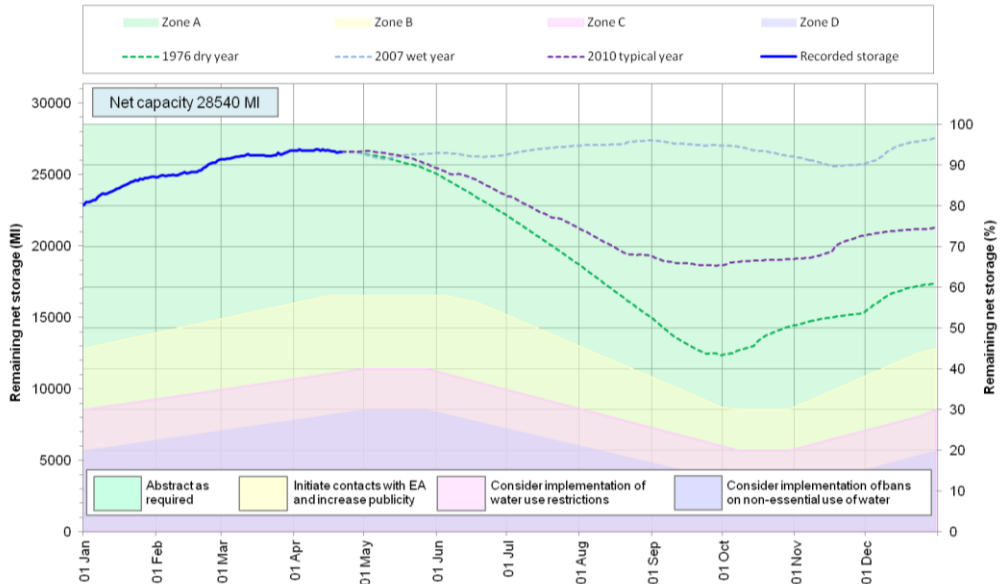


Figure E5.3: Example Roadford Reservoir projection using a range of flow years

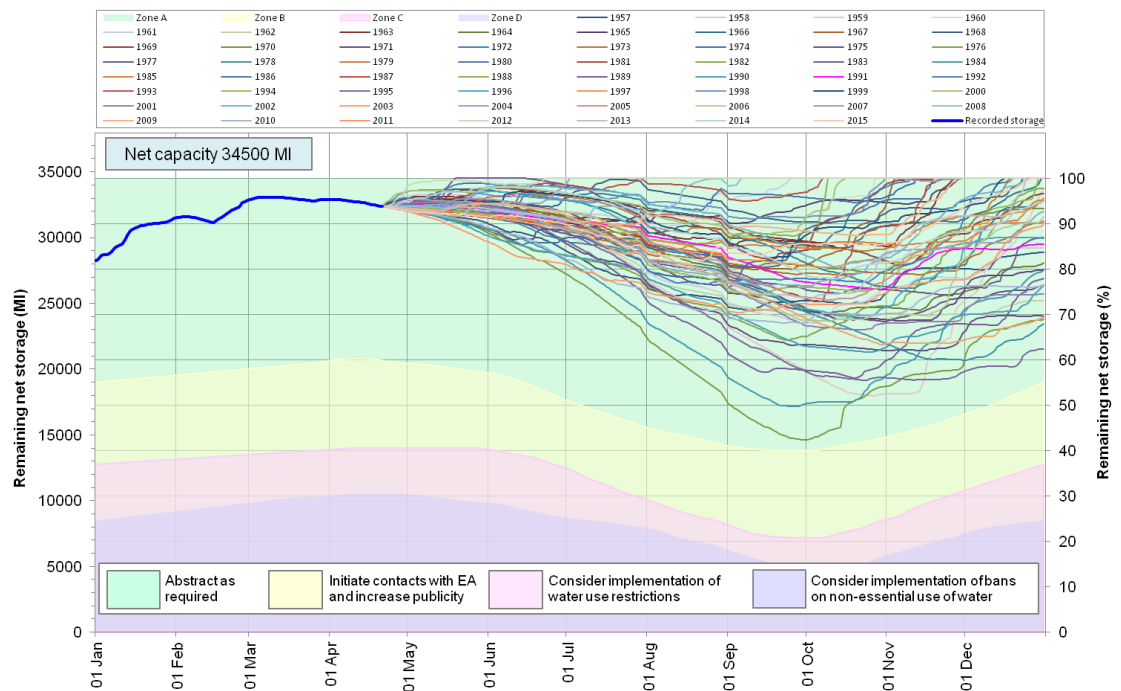


Figure E5.4: Example Roadford Reservoir projection showing a dry, a wet and a typical year

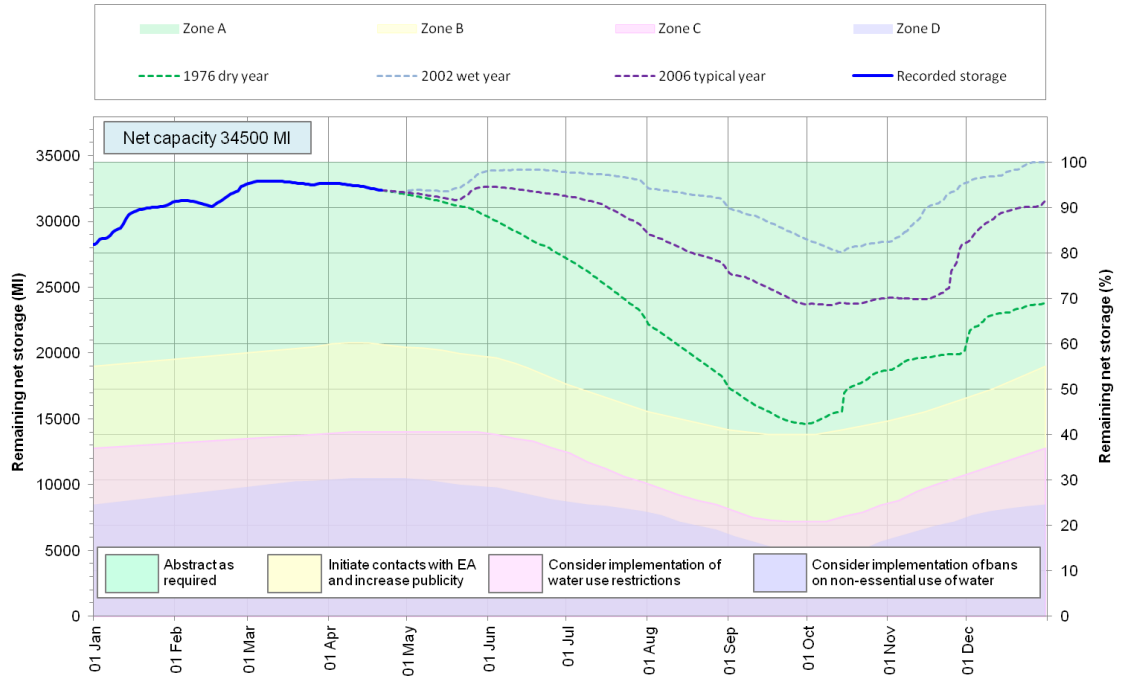


Figure E5.5: Example Wimbleball Reservoir projection using a range of flow years

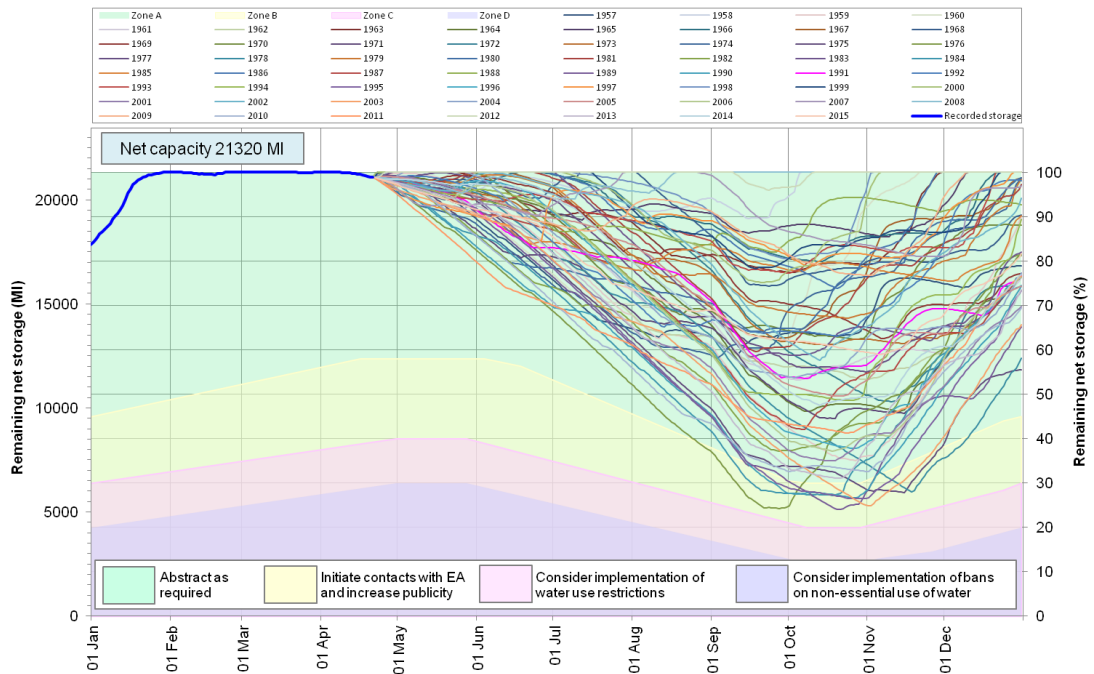
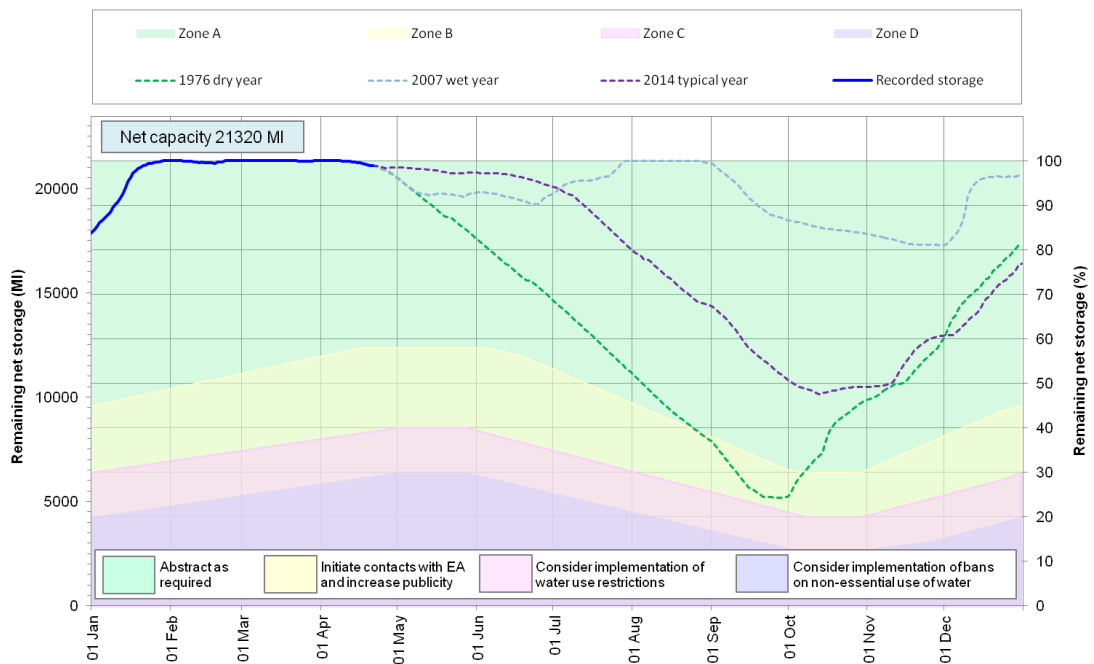


Figure E5.6: Example Wimbleball Reservoir projection showing a dry, a wet and a typical year



Note: There are no reservoirs in our Bournemouth WRZ

E6 Example demand-temperature-rainfall charts

Figure E6.1: A long term profile of monthly total demand, monthly rainfall totals and average monthly temperature in Bournemouth WRZ (1995 – 2011)

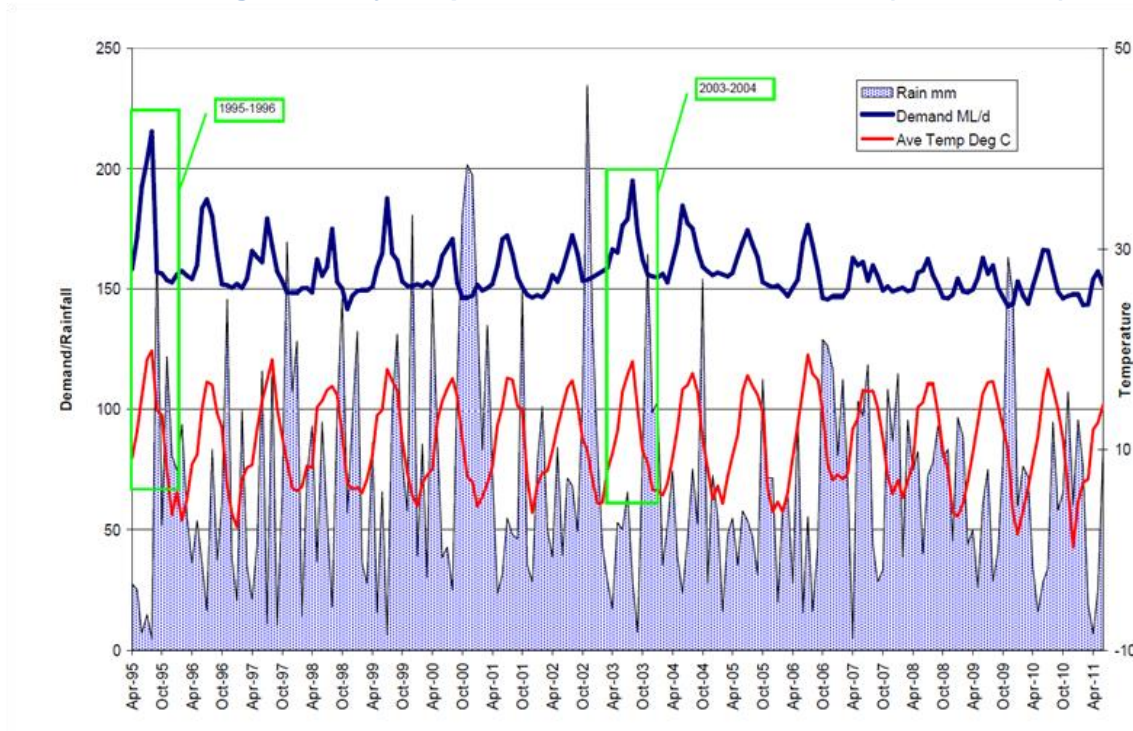
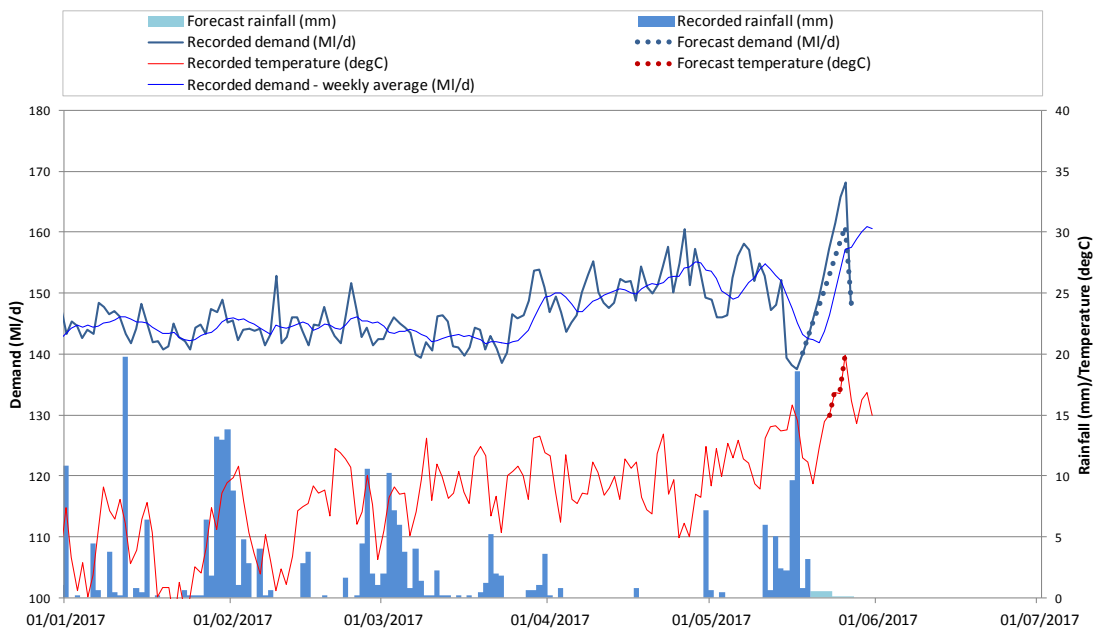


Figure E6.2: A recent demand-temperature-rainfall profile in Bournemouth WRZ



## Appendix F - Historic and plausible droughts

In this appendix we include the technical evidence on our work on droughts more extreme than we have seen historically. We term these plausible droughts.

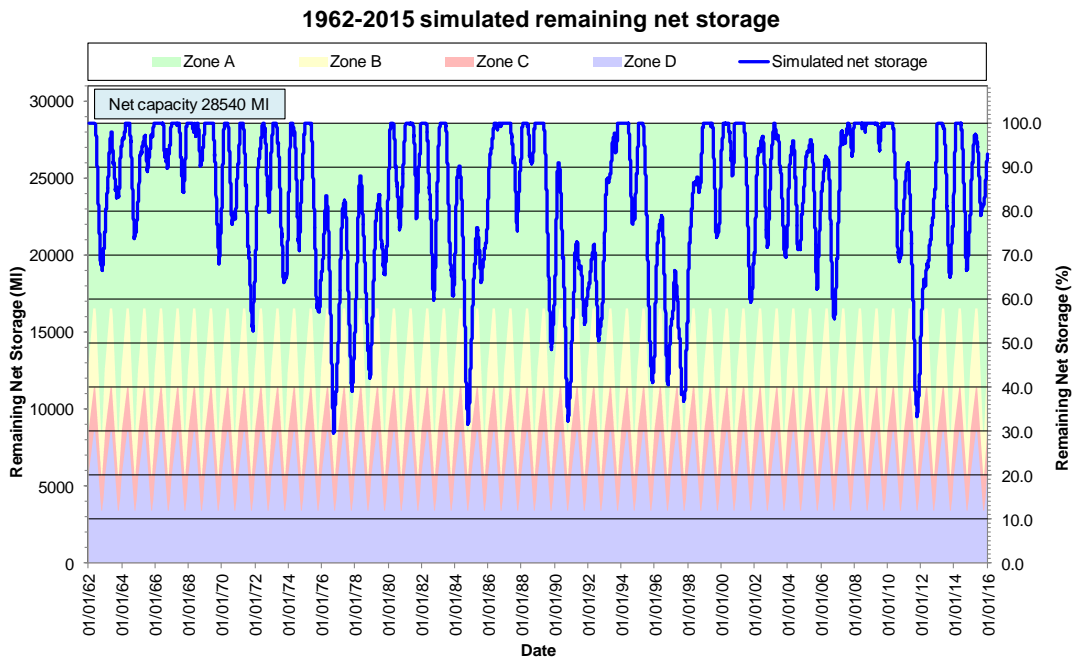
### F1 Historic droughts - Examples of strategic reservoir drought drawdowns for Colliford, Roadford and Wimbleball WRZ<sup>19</sup>

Figures F1.1 to F1.9 show examples of the drawdown response of the strategic reservoirs to historic droughts.

The 1975-76 drought is the design drought and the reservoir drawdowns shown include this time period. It can be seen that under current demand the reservoir drawdowns do not enter the Zone C area in either the Colliford, Wimbleball or Bournemouth Water Resources Zones, thereby negating the need for Drought Orders or Permits. In the Roadford Water Resources Zone, although storage does just cross into Zone C, this is very marginal and at the end of the summer period - reservoir storage recovers shortly afterwards. In such circumstances, as discussed with the Environment Agency, it would probably not be appropriate to implement Zone C actions, thereby also negating the need for Drought Orders or Permits in Roadford WRZ within this Plan.

(Note the forecast dry year demand is the level of demand that could be experienced during the lifetime of this Plan)

**Figure F1.1: Example Colliford Reservoir multi-season drought drawdown**



<sup>19</sup> Note there are no reservoirs in our Bournemouth WRZ.

Zone	Number of times reservoir drops into Zone	Notes
B	3 in 54 years*	Equivalent to 1 in 18 years on average:- <ul style="list-style-type: none"> <li>• Sep – Oct 1976</li> <li>• Nov 1990 – Jan 1991</li> <li>• Jun 1997 – Aug 1997</li> </ul>
C	0 in 54 years*	
D	0 in 54 years*	

\* 1962-2015 inclusive

Figure F1.2: Example Colliford Reservoir multi-season drought drawdown, showing 1975-1978 inclusive

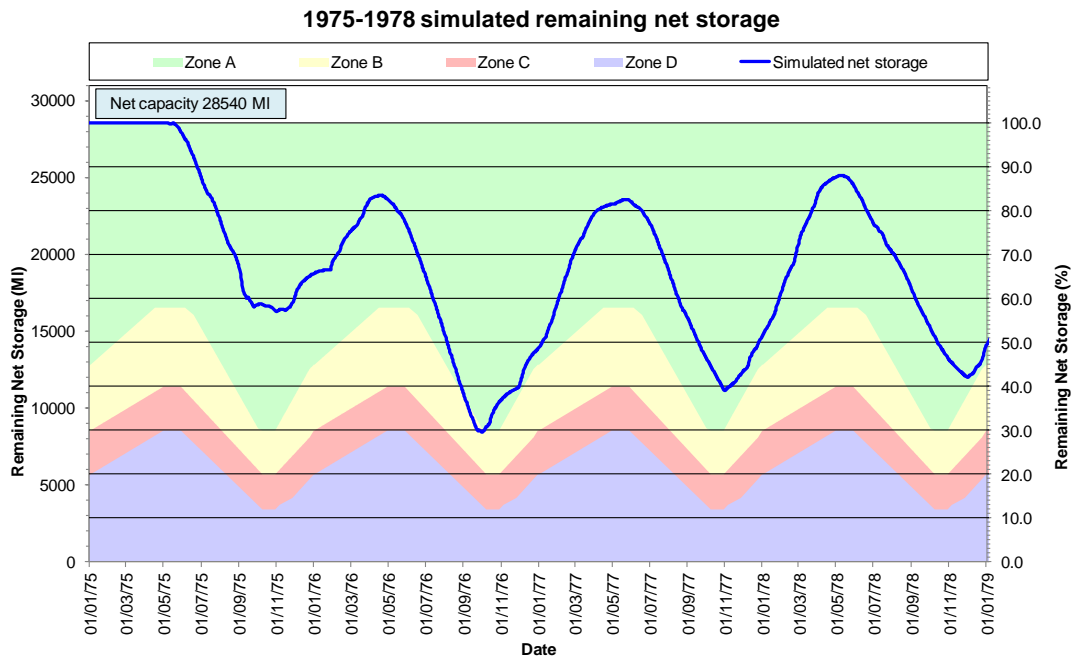
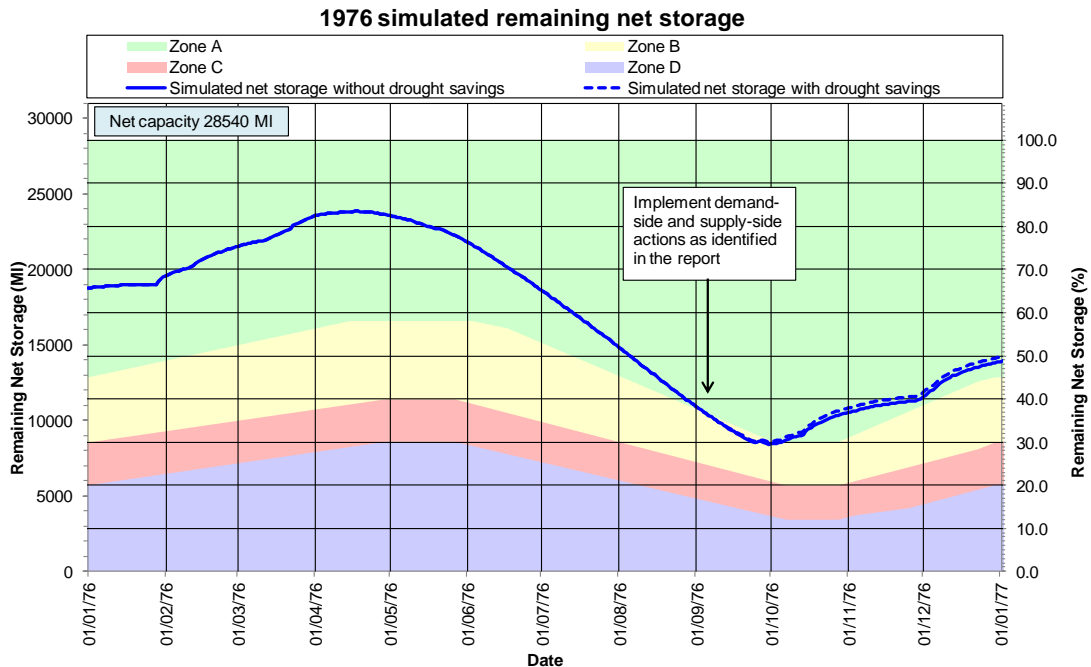
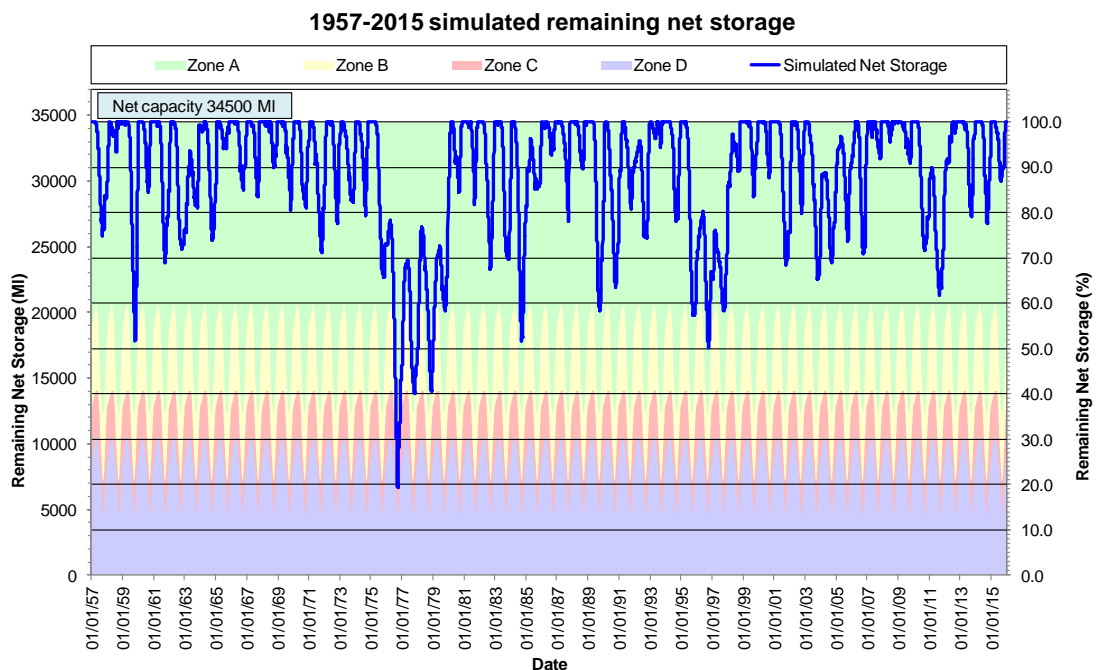


Figure F1.3 Example Colliford Reservoir single-season drought drawdown, with and without drought management actions



NB The use of Drought Orders or Drought Permits is not currently envisaged to be required within the lifetime of this Plan

Figure F1.4: Example Roadford Reservoir multi-season drought drawdown



Zone	Number of times reservoir drops into Zone	Notes
B	3 in 59 years*	Equivalent to 1 in 19.7 years on average:- <ul style="list-style-type: none"> <li>• Aug 1976 - Feb 1977</li> <li>• Nov 1977 - Jan 1978</li> <li>• Nov 1978 - Feb 1979</li> </ul>
C	1 in 59 years*	Storage only just dips into Zone C for 10 days at the end of the drought (Sep 1976), so it is highly unlikely that any Zone C actions would be implemented
D	0 in 59 years*	

\* 1957-2015 inclusive

Figure F1.5: Example Roadford Reservoir multi-season drought drawdown, showing 1975-1978 inclusive

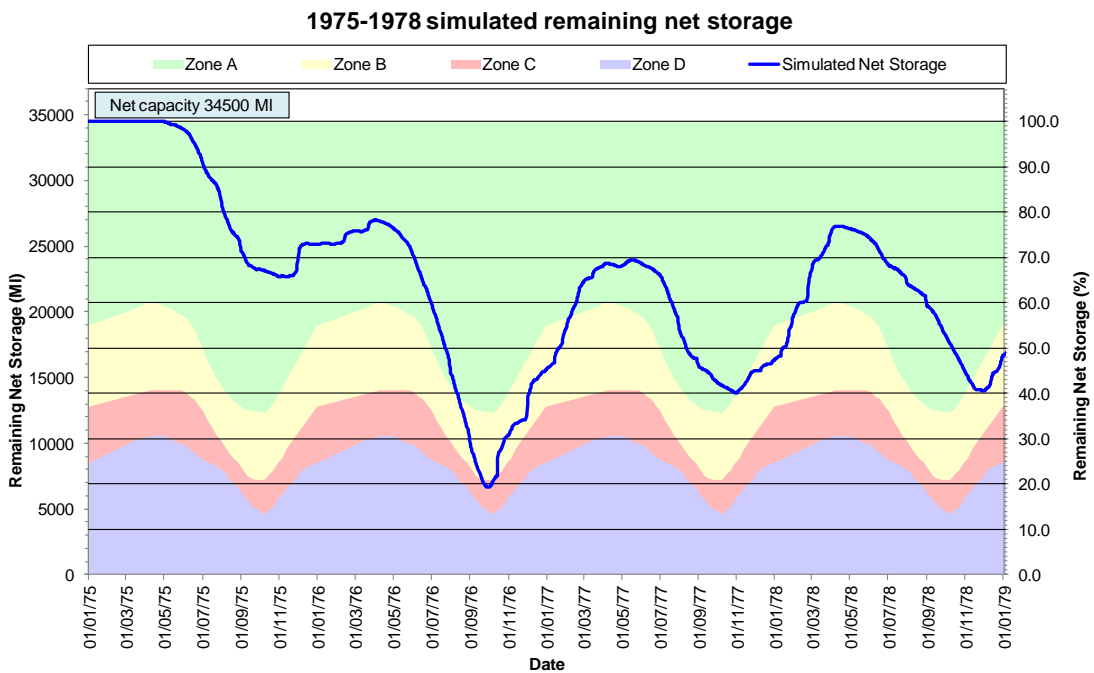
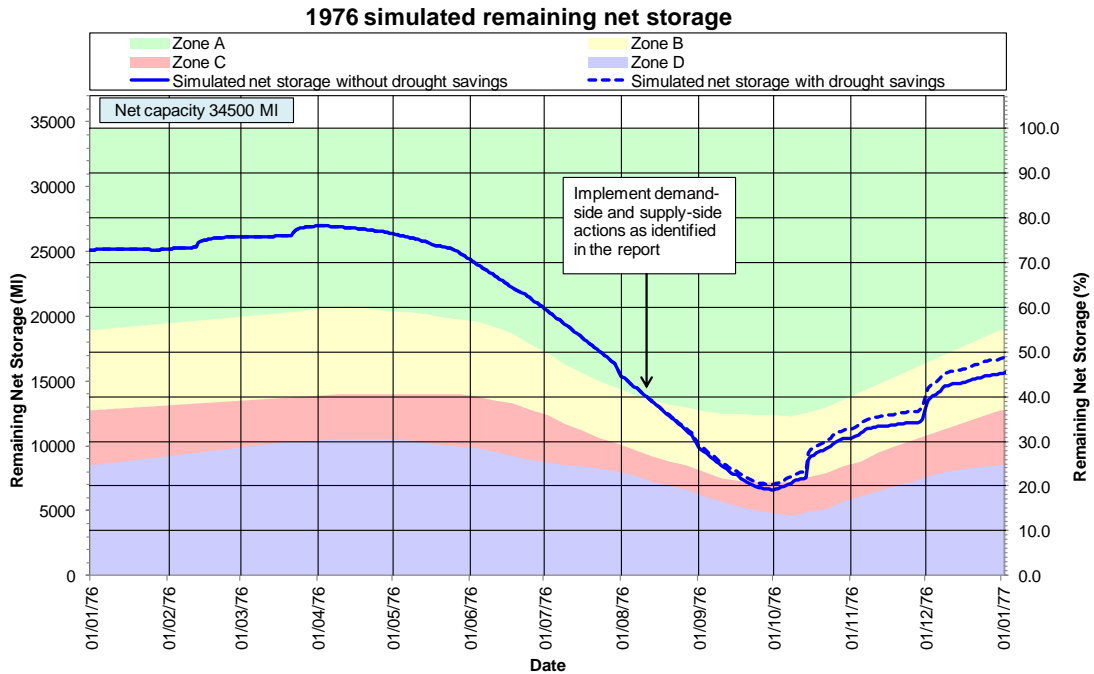


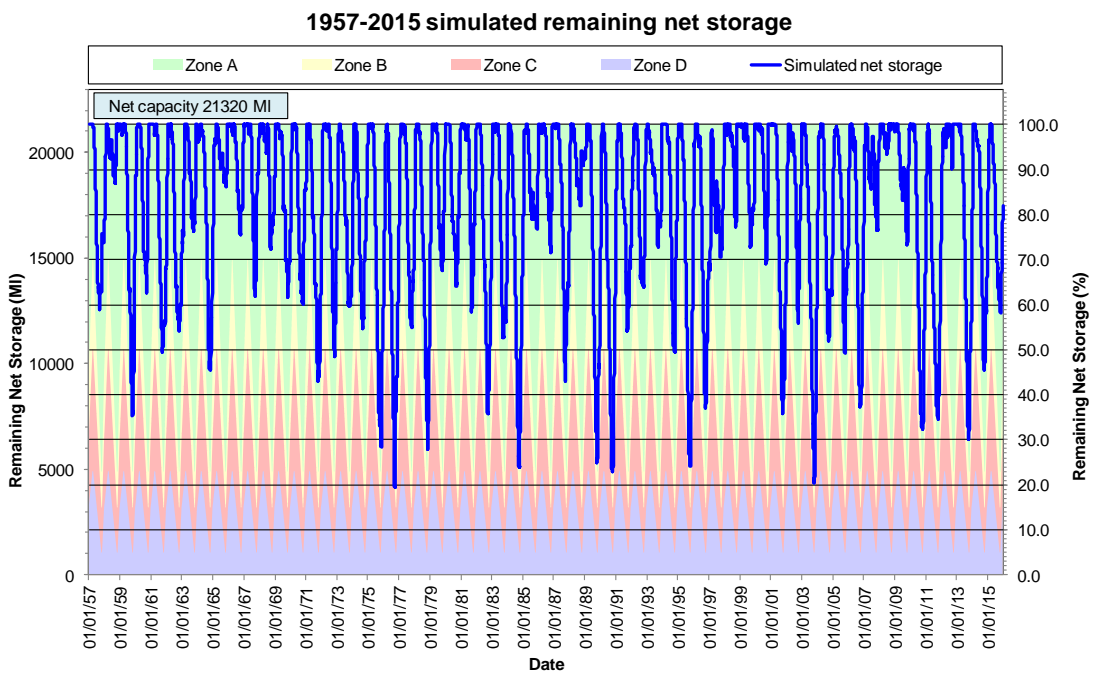


Figure F1.6: Example Roadford Reservoir single-season drought drawdown, with and without drought management actions



NB The use of Drought Orders or Drought Permits is not currently envisaged to be required within the lifetime of this Plan

Figure F1.7: Example Wimbleball Reservoir multi-season drought drawdown



Zone	Number of times reservoir drops into Zone	Notes
B	5 in 59 years*	<p>Equivalent to 1 in 11.8 years on average:-</p> <ul style="list-style-type: none"> <li>• Aug – Oct 1976</li> <li>• Sep – Oct 1984</li> <li>• Sep – Oct 1990</li> <li>• Sep – Oct 1995</li> <li>• Oct – Nov 2003</li> </ul> <p>However, note for most of the years, storage dips into Zone B towards the end of the summer, and therefore Zone B actions will be implemented as appropriate for the prevailing conditions and the time of year. We also have the ability to pump store Wimbleball over the winter period to assist with refill.</p>
C	0 in 59 years*	
D	0 in 59 years*	

\* 1957-2015 inclusive

Figure F1.8: Example Wimbleball Reservoir multi-season drought drawdown, showing 1975-1978 inclusive

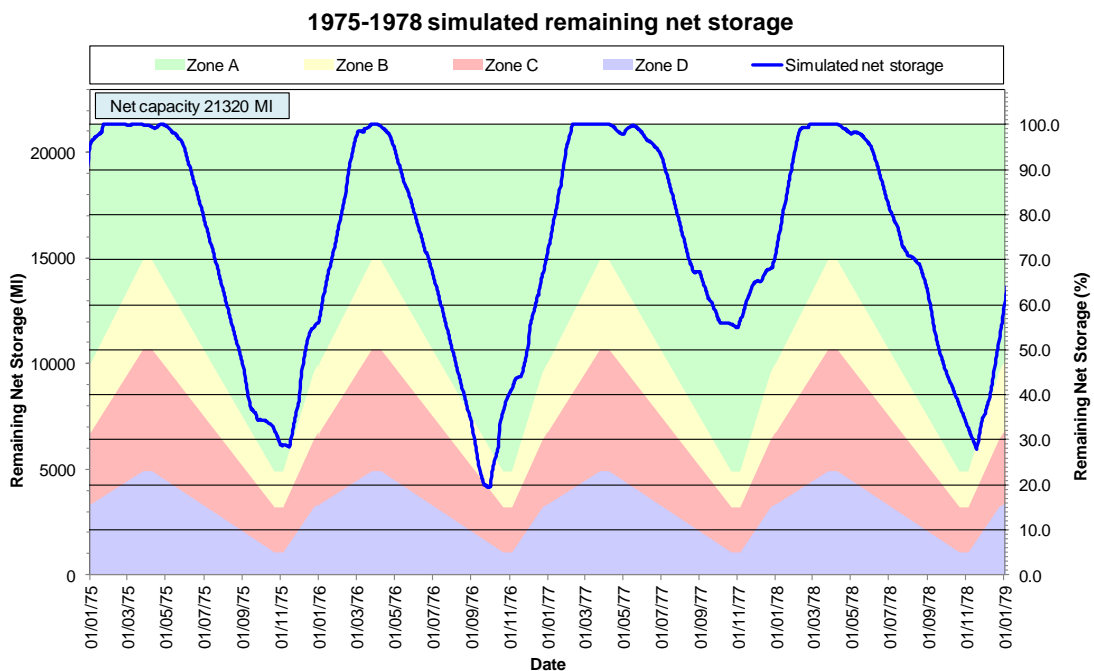
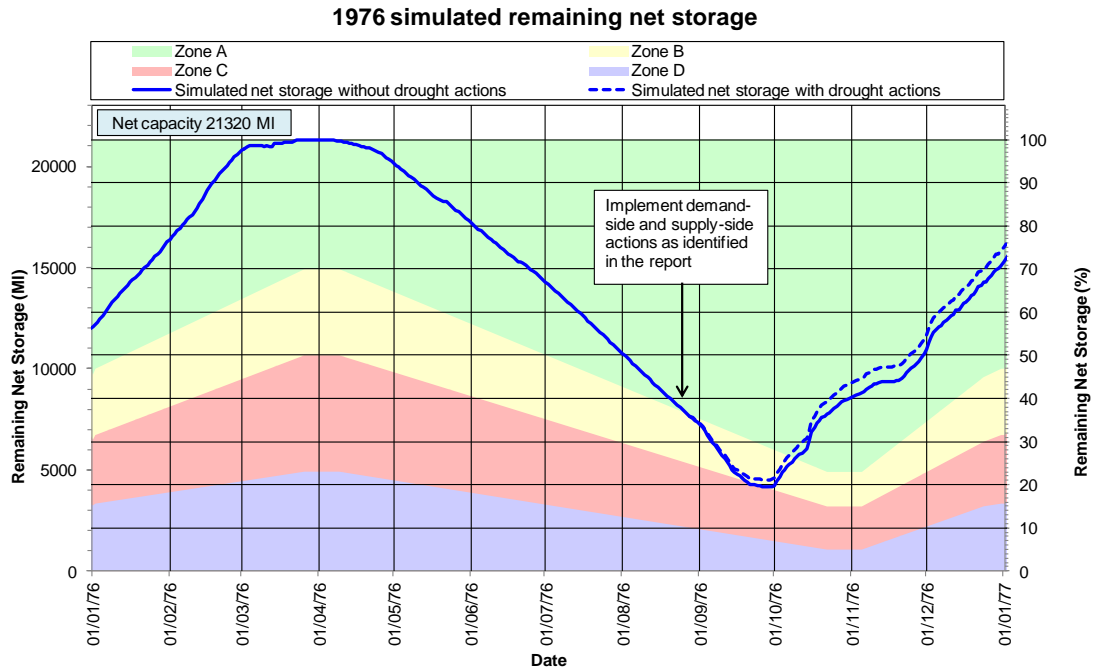


Figure F1.9: Example Wimbleball Reservoir single-season drought drawdown, with and without drought management actions

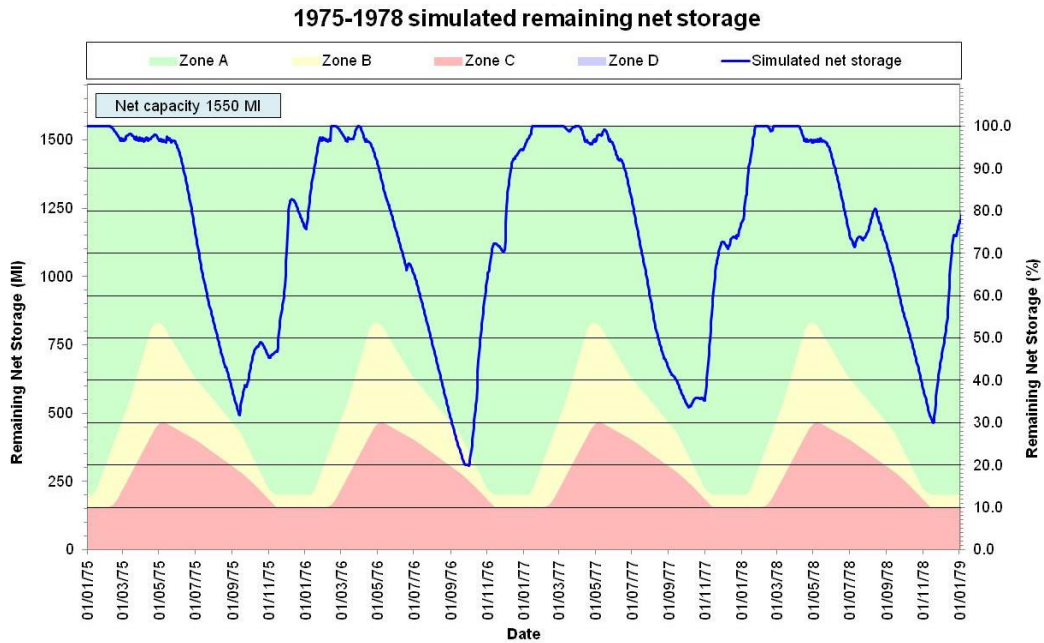


NB The use of Drought Orders or Drought Permits is not currently envisaged to be required within the lifetime of this Plan

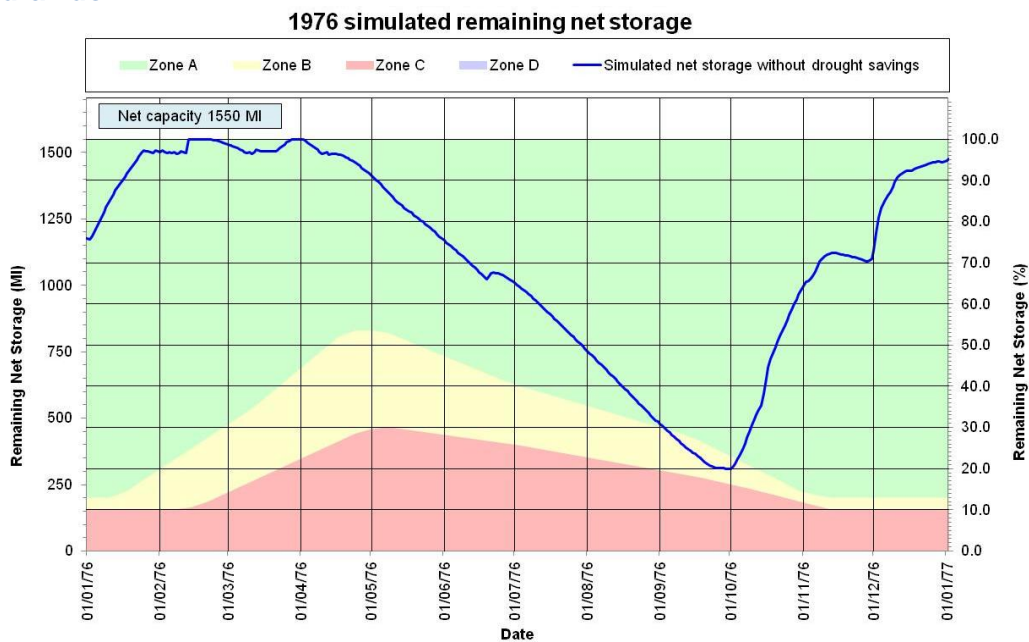
## F2 Historic droughts - Examples of local reservoir drought drawdowns

This section presents an example reservoir drawdown for local reservoirs during historic droughts.

**Figure F2.1: Example Wistlandpound Reservoir multi-season drought drawdown**



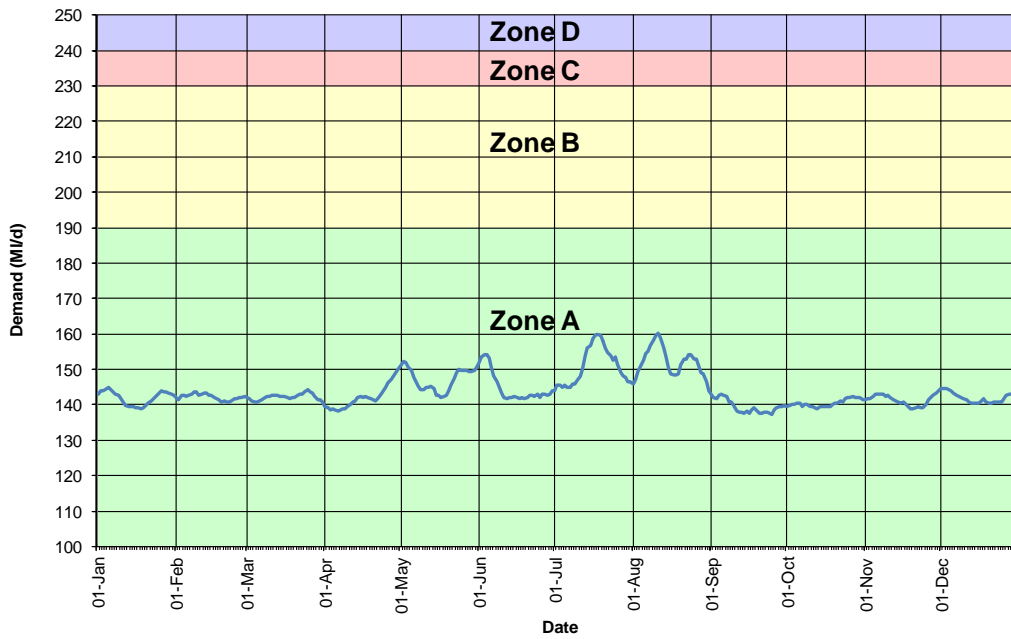
**Figure F2.2: Example Wistlandpound Reservoir single-season drought drawdown**



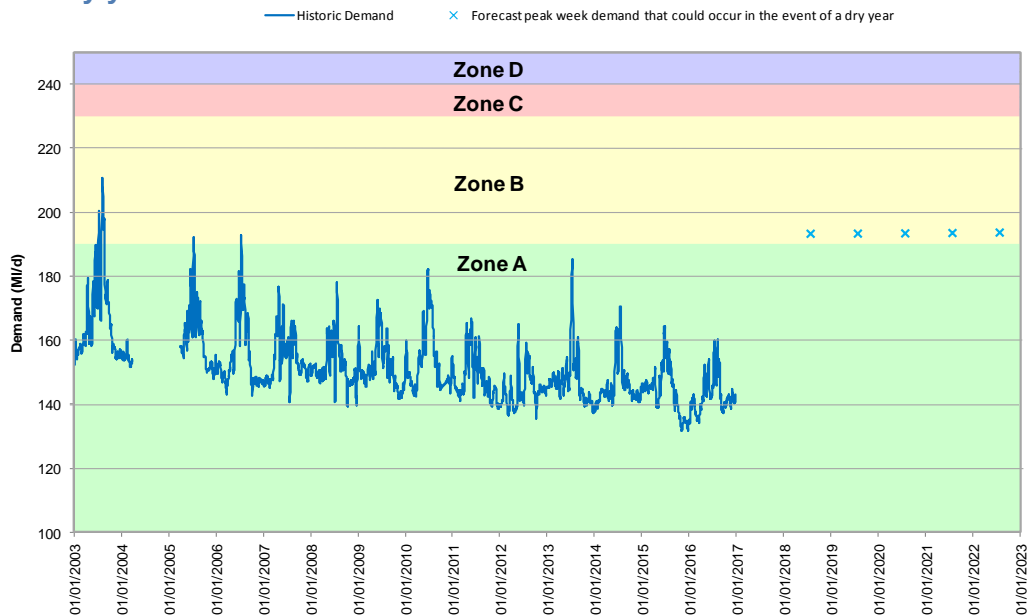
**F3 Historic demand compared to drought management zones for Bournemouth WRZ**

Figure F3.1 shows recent historical demand against the drought management curves. Figure F3.2 shows the longer term demand against the drought curve.

**Figure F3.1: Historic demand in 2016 (7-day rolling average) compared to the drought management zones**



**Figure F3.2: Historic demand 2003 - 2016 (7-day rolling average) compared to the drought management zones and forecast peak week demand in the event of a dry year**



Zone	Number of times dry year demand could go into Zone	Notes
B	> 1 in 10 years, see notes opposite	As can be seen in Figure 3.2, there is a downward trend in underlying demands.  Based on Table 5, estimated return period is likely to be greater than 1 in 10 years.  It should also be noted that even in a dry year, demand is forecast to only slightly cross into Zone B and therefore Zone B actions will be implemented as appropriate for the prevailing conditions and the time of year.
C	0	
D	0	

#### F4 Plausible droughts

The plausible drought scenarios are summarised in Table F4.1 below. The design drought for the SWW region is 1975/76, which is the worst drought in the historic flow record. 1978 was also dry. The worst drought in the historic flow record for BW is 1976.

**Table F4.1: Plausible drought scenarios**

Scenario	Description
PD-1	Actual August 1976 baseflow recession extrapolated for 30 days, i.e. removing early to mid September historic rainfall
PD-2	Extension of baseflow recession from 20 Sept 1976 for 30 days, i.e. removing the late September and early-mid October historic heavy rainfall
PD-3	Flows during the period 1 Nov 1975 to 31 Mar 1976 reduced by 10%
PD-4	1977 and 1978 records swapped around, i.e. to give a dry year following the 1975/76 drought

Example hydrographs for River Exe at Thorverton in the SWW region showing plausible drought scenario flows compared to historic flows are given in Figures F4.1 to F4.4 below. Figure F4.5 shows an example hydrograph for the Lower River Avon in the Bournemouth WRZ.

**Figure F4.1: Scenario PD-1: actual 1975-76 drought extended into September**

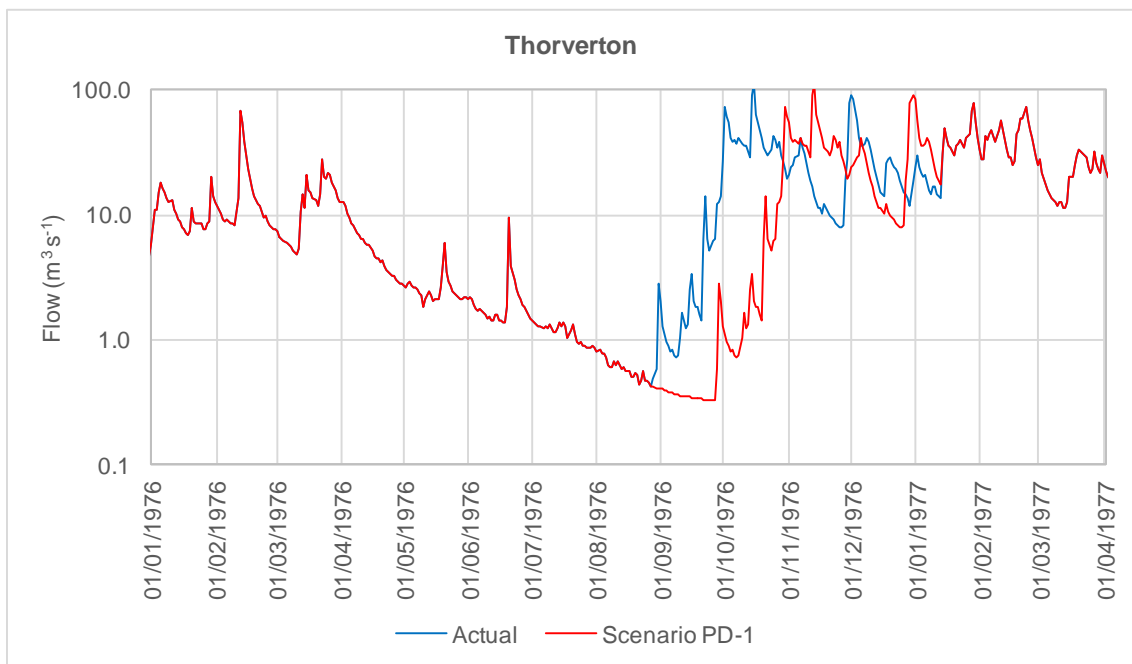


Figure F4.2: Scenario PD-2: actual 1975-76 drought extended into October

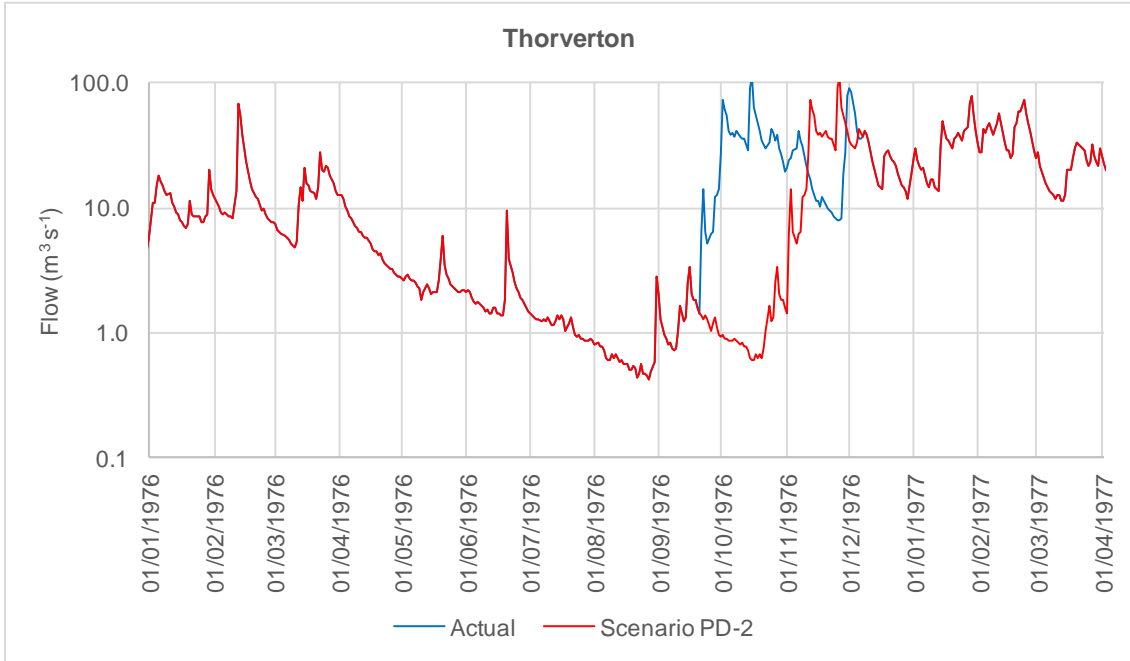
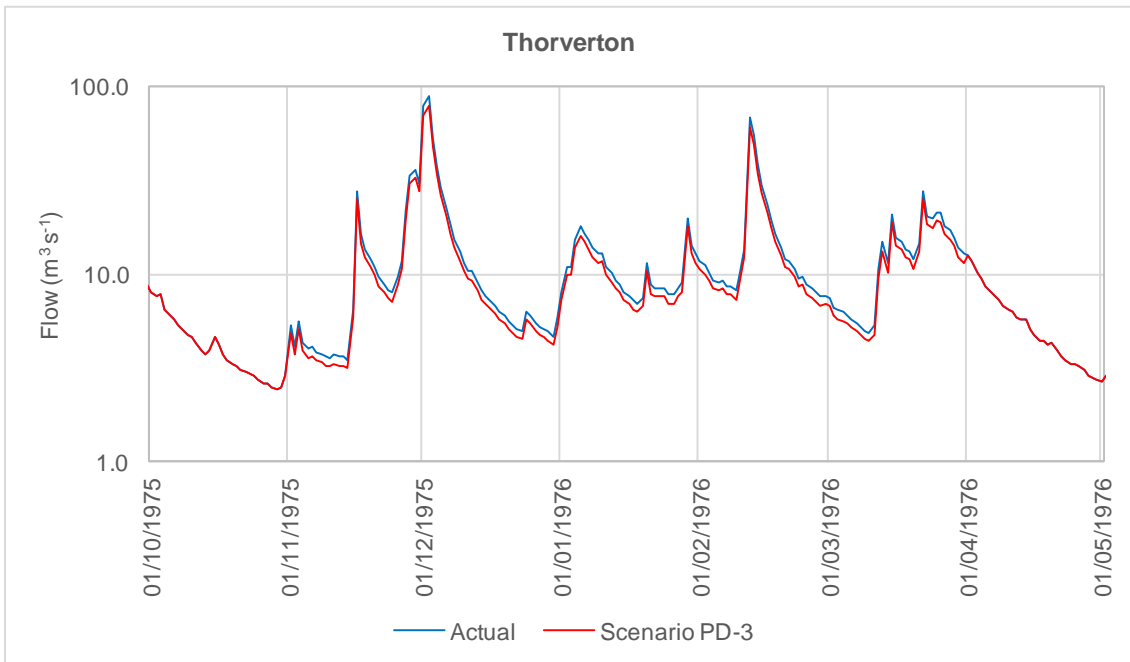
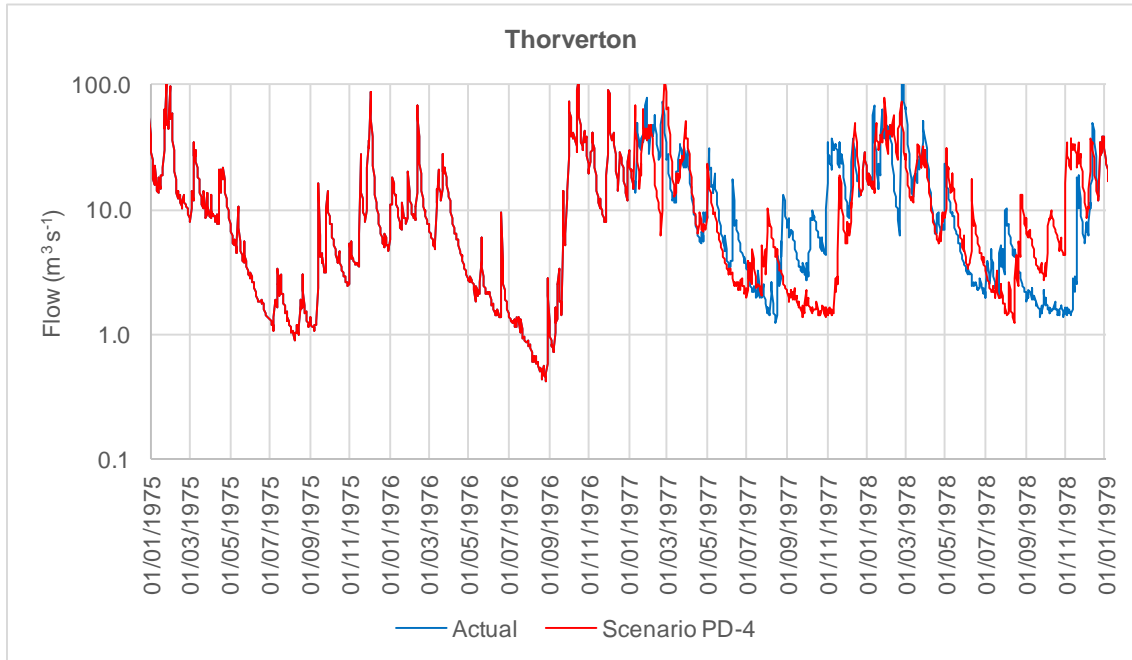


Figure F4.3: Scenario PD-3: 10% less flow 1 November 1975 – 31 March 1976

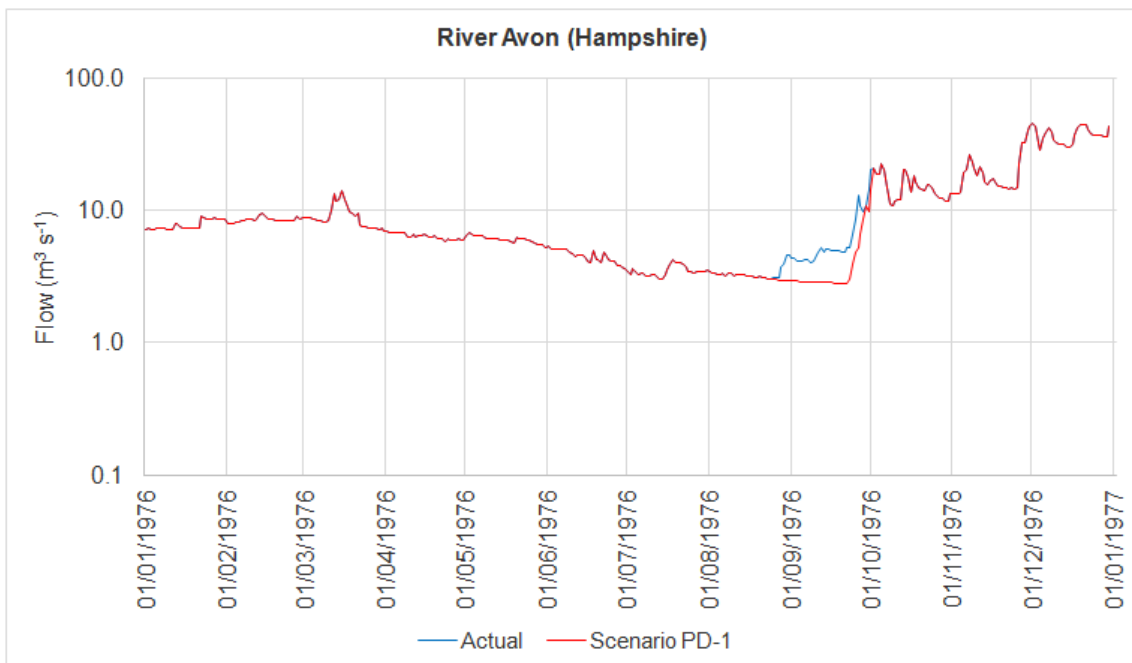




**Figure F4.4: Scenario PD-4: Swap 1977 and 1978 flows (to give three consecutive dry years)**



**Figure F4.5: Scenario PD-1: actual 1975-76 drought extended into September**



## Results

The results of the plausible droughts analysis for our WRZs are summarised below, together with the initial ranges of return periods associated with these droughts as estimated by the Met Office. The results show that our resources remain resilient to these droughts. The severity of the droughts means this is highly or exceptionally unlikely in any 5 year period.

As can be seen in Tables F4.2 to F4.5 below, the plausible droughts we considered are extreme drought events with a wide range of possible return periods. It was recognised in the Environment Agency guideline that assigning drought severities is complex particularly in integrated systems such as ours. We will endeavour to explore plausible droughts further for the next WRMP to help to further inform our water resources planning in the future.

### Colliford, Roadford and Wimbleball WRZs

**Table F4.2: Summary of initial results for Colliford WRZ**

Scenario Ref(s)	Scenario description(s)	Results	Return periods (years) EVA	For reference - Return periods (years) Tabony	Likelihood in 5 year period
PD-1 and PD-2	PD-1: remove early-mid September historic rainfall  PD-2: remove late September and early-mid October historic heavy rainfall	Although these plausible drought scenarios result in more supply releases from Colliford Reservoir and lower inflows, the resulting reduction in WRZ minimum storage is not large enough to impact on WAFU	PD-1: 500-1000  PD-2: 500-1000	PD-1: 35 – 140  PD-2: 65 – 250	PD-1: Exceptionally unlikely <0.1%  PD-2: Exceptionally unlikely 0.1 to 0.5%
PD-3	Flows during the period 1 Nov 1975 to 31 Mar 1976 reduced by 10%	Less winter inflow into reservoirs results in lower WRZ minimum storage, but the reduction is not enough to impact on WAFU	500-1000	40 – 150	Exceptionally unlikely <0.1%
PD-4*	1977 and 1978 records swapped around, i.e. to give a dry year following the 1975/76 drought	There is no change to WRZ minimum storage, hence there is no impact on WAFU	75-2000*	4 – 14	-

*Note* Return periods for PD-4 were not analysed by the Met office for Roadford and Wimbleball WRZ, as the impact of PD-4 was less severe than those of PD1-PD3. However, an analysis for Colliford WRZ was undertaken for general background information

**Table F4.3: Summary of initial results for Roadford WRZ**

Scenario Ref(s)	Scenario description(s)	Results	Return periods (years) EVA	For reference - Return periods (years) Tabony	Likelihood in 5 year period
PD-1 and PD-2	PD-1: remove early-mid September historic rainfall  PD-2: remove late September and early-mid October historic heavy rainfall	Less inflow into reservoirs and more supply releases needed from Roadford Reservoir in 1976 result in an impact on WAFU. However, given the forecast supply demand surplus, the estimated decrease in WAFU is unlikely to result in a supply demand deficit	PD-1: 1,500 - 4,000  PD-2: 400 – 430	PD-1: 500 - 2000  PD-2: 150 – 600	PD-1: Exceptionally unlikely (0.1% to 0.3%)  PD-2: Very unlikely (1.1% to 1.2%)
PD-3	Flows during the period 1 Nov 1975 to 31 Mar 1976 reduced by 10%	Less inflow into Roadford Reservoir in winter 1975-76 results in a slightly lower WRZ minimum storage in 1976. However, given the forecast supply demand surplus, the estimated decrease in WAFU is unlikely to result in a supply demand deficit	900 – 1,500	325 – 1300	Exceptionally unlikely (0.3% to 0.6%)
PD-4*	1977 and 1978 records swapped around, i.e. to give a dry year following the 1975/76 drought	There is no change to WRZ minimum storage, hence there is no impact on WAFU	-	8 – 32	-

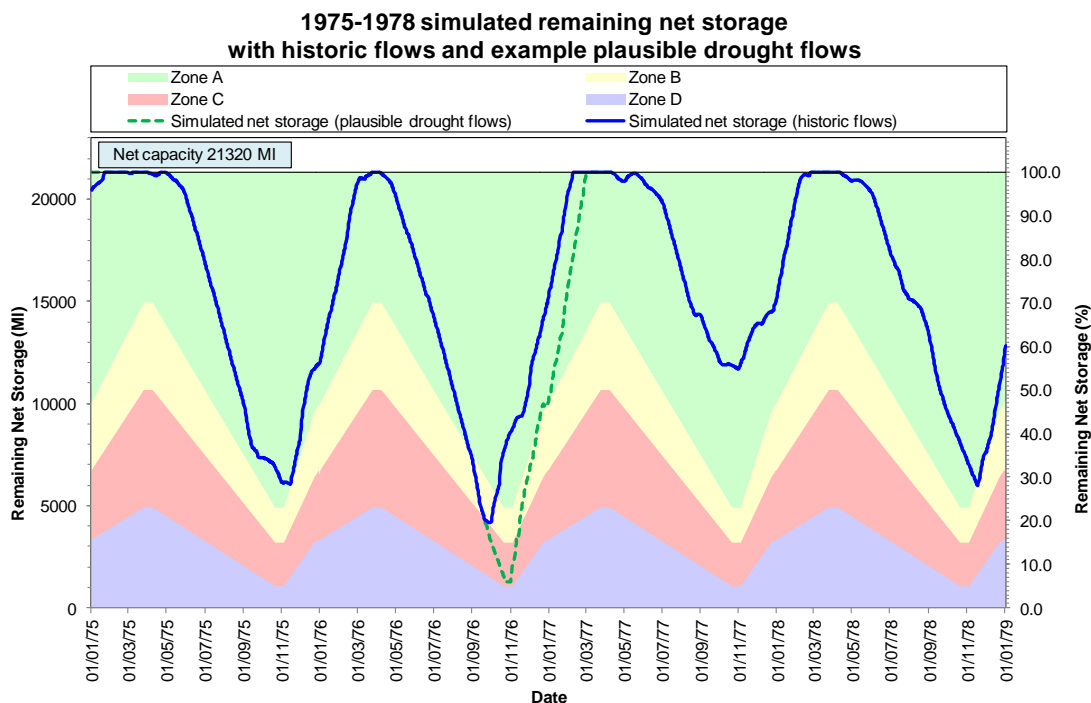
*Note* Return periods for PD-4 were not analysed by the Met office as the impact of PD-4 was less severe than those of PD1-PD3

Table F4.4: Summary of initial results for Wimbleball WRZ

Scenario Ref(s)	Scenario description(s)	Results	Return periods (years) EVA	For reference - Return periods (years) Tabony	Likelihood in 5 year period
PD-1 and PD-2	<p>PD-1: remove early-mid September historic rainfall</p> <p>PD-2: remove late September and early-mid October historic heavy rainfall</p>	<p>Less inflow into Wimbleball Reservoir and more supply releases needed in 1976 result in an impact on WAFU. However, given the forecast supply demand surplus, the estimated decrease in WAFU is unlikely to result in a supply demand deficit</p>	<p>PD-1: 1,250 – 2,500</p> <p>PD-2: 525 – 675</p>	<p>PD-1: &gt;&gt;1000</p> <p>PD-2: 500 – 2000</p>	<p>PD-1: Exceptionally unlikely (0.2% to 0.4%)</p> <p>PD-2: Exceptionally unlikely (0.74% to 0.95%)</p>
PD-3	Flows during the period 1 Nov 1975 to 31 Mar 1976 reduced by 10%	There is enough water available in winter 1975/76 to refill Wimbleball Reservoir, hence there is no impact on minimum reservoir storage and hence no impact on WAFU	700 – 1,000	500 – 2000	Exceptionally unlikely (0.5% to 0.7%)
PD-4	1977 and 1978 records swapped around, i.e. to give a dry year following the 1975/76 drought	There is no change to WRZ minimum storage, hence there is no impact on WAFU	-	5 – 18	-

Note Return periods for PD-4 were not analysed by the Met office as the impact of PD-4 was less severe than those of PD1-PD3.

Figure F4.6: Example Wimbleball Reservoir plausible drought drawdown<sup>20</sup>



### Bournemouth WRZ

Bournemouth WRZ is constrained by peak demand, not water available and there is a current surplus of supply against demand. Analysis of the plausible drought scenarios described in Table F4.1 indicates that there is no impact on WAFU.

For example, under the PD-1 scenario, flows on the lower River Avon are predicted to fall to  $2.8 \text{ m}^3 \text{ s}^{-1}$  (241.9 MI/day). At this river level, there would still be enough flow to abstract the combined maximum licensed abstraction for the two abstraction points on the River Avon of  $1.8 \text{ m}^3 \text{ s}^{-1}$  (154.5 MI/day). Similar results were obtained for the remaining plausible drought scenarios. The WRZ is therefore deemed resilient to the types of plausible droughts considered and abstraction can occur within its licence.

The return periods estimated by the Met Office<sup>21</sup> for the plausible droughts in Bournemouth WRZ are summarised in Table F4.5 below. As can be seen, none of the plausible droughts impact on WAFU and the likelihood of any of these plausible droughts being experienced within the life time of this Plan is extremely low.

<sup>20</sup> Plausible droughts scenario PD-2 (see Table F4.1 for details)

<sup>21</sup> Met Office (2017), *Severe Drought Analysis for Water Resources Management Plan and Drought Plan – v3.0.*

**Table F4.5: Summary of initial results for Bournemouth WRZ**

Scenario Ref(s)	Scenario description(s)	Results	Return periods (years) EVA	For reference - Return periods (years) Tabony	Likelihood in 5 year period
PD-1 and PD-2	PD-1: remove early-mid September historic rainfall  PD-2: remove late September and early-mid October historic heavy rainfall	Predicted minimum river flow is above the flow required to abstract the maximum licensed volume for all river sources. No impact on WAFU.	PD-1: 5,000 - >10,000  PD-2: 850 – 1,200	PD-1: >>1000  PD-2: 450 – 1800	PD-1: Exceptionally unlikely <0.1%  PD-2: Exceptionally unlikely (0.4% to 0.58%)
PD-3	Flows during the period 1 Nov 1975 to 31 Mar 1976 reduced by 10%	Predicted minimum winter 1975-76 river flow is above the flow required to abstract the maximum licensed volume for all river sources. No impact on WAFU.	350 – 550	500 – 2000	Highly Unlikely (0.9% to 1.4%)
PD-4	1977 and 1978 records swapped around, i.e. to give a dry year following the 1975/76 drought	Predicted minimum river flow is above the flow required to abstract the maximum licensed volume for all river sources. No impact on WAFU.	-	6 – 24	-

*Note* Return periods for PD-4 were not analysed by the Met office as the impact of PD-4 was less severe than those of PD1-PD3.

## Appendix G - Demand-side drought management actions

This appendix sets out the detail on the demand-side actions that would be undertaken during drought management.

**Table G1: Publicity, appeals for restraint, etc**

<b>Name</b>	<b>Publicity, appeals for restraint etc</b>
<b>Trigger(s)</b>	Reservoir storage entering Zone B
<b>Demand Saving</b>	Extremely difficult to quantify. However, for the purposes of drought planning we estimate this could give a demand saving of around 2.5%*
<b>Source of estimate</b>	<ol style="list-style-type: none"> <li>1. UKWIR / EA report 98/WR/06/2: <i>Evaluating the impact of restrictions on customer demand</i>, 1998</li> <li>2. UKWIR report 07/WR/02/3: <i>Drought and demand: Modelling the impact of the restrictions on demand during drought</i>, 2007</li> </ol>
<b>Location</b>	WRZ
<b>Implementation timetable</b>	<p>See also Section 5 of this Report (Management and Communications Strategy)</p> <p>We have a continual programme of water efficiency promotion, but during a drought, efforts are substantially increased. The timetable for the production and distribution of leaflets and other publicity material is very short but we would seek to gradually increase this area of work as a drought progressed and prepare at least 4-6 weeks before implementation.</p>
<b>Permissions required and constraints</b>	None
<b>Risks associated with option</b>	High level of confidence that savings can be achieved

\*The 2007 UKWIR report gives an average impact on annual demand of a local media campaign run between the end of May and June of between 3% and 5.6%. This value was for a WRZ with a neighbouring WRZ where restrictions were in place. The 1998 report gives a value of 2% for awareness and appeals campaigns and does not stipulate if surrounding WRZs have restrictions. We therefore base our assumptions on the lower value to avoid overestimating savings.

**Table G2: Company use of water**

Name	Company use of water
Trigger(s)	Reservoir storage entering Zone B
Demand Saving	Up to 2 MI/d (Although actual savings are unlikely to be significant, being seen to take action is important in keeping customers engaged with the water saving message.)
Source of estimate	Internal estimate
Location	Company-wide at Company premises
Implementation timetable	Approximately 1 to 4 weeks
Permissions required and constraints	
Risks associated with option	High level of confidence that savings can be achieved, although there is uncertainty over the extent of these savings

**Table G3: Leakage control, pressure management and metering**

Name	Leakage control, pressure management and metering
Trigger(s)	Reservoir storage entering Zone B
Demand Saving	In a severe drought intense leakage control activity could offer reductions in leakage in the order of up to 5 MI/d, or potentially even up to 10 MI/d, but with less certainty
Source of estimate	Internal estimate
Location	WRZ
Implementation timetable	Approximately 6 to 8 weeks
Permissions required and constraints	None
Risks associated with option	There is a high level of confidence in our continuing leakage control work  To mitigate any risks of low pressure affecting fire hydrant supply, we will liaise with the Fire Service or other authorities on our plans



**Table G4: Temporary Use Bans (TUBs, formerly termed hosepipe bans)**

Name	Temporary Use Bans (TUBs)
<b>Trigger(s)</b>	Reservoir storage entering Zone C
<b>Demand Saving</b> % reduction in peak week demand	5%
<b>Source of estimate</b>	UKWIR report 11/WR/33/3, <i>Code of practice and guidance on water use restrictions</i> , 2011
<b>Location</b>	WRZ
<b>Implementation timetable</b>	Advertising time and period for representations (see Section 3.2.4)  Typically the preparation would start 4-6 weeks prior to implementation.
<b>Permissions required and constraints</b>	As specified in Section 36 of the Flood and Water Management Act 2010
<b>Risks associated with option</b>	High level of confidence that savings can be achieved, although there is uncertainty over the extent of these savings

**Table G5: Demand-side Drought Orders (formerly termed bans on non-essential use)**

Name	Demand-side Drought Orders
<b>Trigger(s)</b>	Reservoir storage entering Zone D
<b>Demand Saving</b> % reduction in peak week demand	A further 5%, in addition to the 5% demand saving from imposing TUBs in the same demand area
<b>Source of estimate</b>	UKWIR report 11/WR/33/3, <i>Code of practice and guidance on water use restrictions</i> , 2011
<b>Location</b>	WRZ
<b>Implementation timetable</b>	Advertising time and period for representations (see Section 3.2.5)  Typically this would be 4-6 weeks prior to implementation.
<b>Permissions required and constraints</b>	Drought Order
<b>Risks associated with option</b>	High level of confidence that savings can be achieved, although there is uncertainty over the extent of these savings

It is highly unlikely that a demand-side Drought Order or further restrictions will have to be introduced within the lifetime of this Plan, particularly in the Bournemouth WRZ.

Table G6: Example Temporary Use Bans (TUBs) Representations Form

Temporary Use Bans (TUBs) Representations Form			
<b>Address:</b>			
<b>Email Address</b>		<b>Customer Account Number</b>	
<b>1. Is the representation on the grounds of health and safety</b>	<b>Yes</b>	<b>No</b>	
<b>Details:</b>			
<b>2. If not health and safety, what is the representation on the grounds of</b>			
<b>Details:</b>			
<b>Please complete the form and return to either address below:</b>			
George Jessel House Francis Avenue Bournemouth BH11 8NX		South West Water Peninsula House Rydon Lane Exeter EX2 7HR	
<b>FOR COMPANY USE ONLY</b>			
<b>Representation approved</b>	<b>Yes</b>		<b>No</b>
<b>Comments:</b>			
<b>Date</b>			
<b>Approved by:</b>			

## Appendix H - Supply-side drought management actions

This appendix presents a summary of the supply-side drought management actions. None of these actions require authorisation through Drought Permits or Drought Orders.

Licences that are included as supply actions in the Drought Plan would be used when we enter drought zones B and/or C (see Tables H3.1 to H5.1). They are included in the WRMP in the group of licences for each WRZ. Because we operate conjunctive use systems, individual source DO values do not reflect the overall DO that can be achieved from the system as a whole.

Our work on plausible droughts shows that whilst we are resilient to more extreme droughts than in the historic record, this would require the use of these licences over the next 25 years.

### H1 Summary of supply-side drought management actions

**Table H1.1: Supply-side drought management actions list**

WRZ	Option No.	Option Description	Type
General	1	Distribution zone management	SWW internal management
	2	Emergency capital works	SWW internal management
Colliford	3	Boswyn Shaft, Boswyn Stream, Copper Hill Adit	Existing licence
	4	Cargenwyn Reservoir	Existing licence
	5	Carwynen Stream (Botetoe)	Existing licence
	6	Porth Reservoir and Rialton Intake	Existing licence
Wimbleball	7	Coleford and Knowle Boreholes	Existing licence
	8	Stoke Canon and Brampford Speke	Existing licence
	9	Uton Borehole	Existing licence
Bournemouth		Wimborne	Existing licence

In developing our response to a drought we would examine other options on existing sources to improve supply reliability, e.g. installation of temporary pumps to facilitate abstraction at the required rates when reservoir storages drop below certain levels.

## H2 General supply-side drought management actions

Table H2.1: Distribution zone management

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Distribution zone management</b> Reduce the demand on sources under stress and transfer the demand to sources with relative abundance
	<b>Trigger(s)</b>	Zone B
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	Depends on specific actions
	<b>Location</b> (Area affected or whole supply zone)	Wimbleball, Colliford, Roadford and/or Bournemouth supply zones
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Minimal lead-in time.</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	None
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	None
	<b>Summary of likely environmental impacts</b>	None
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

Table H2.2: Emergency capital works

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Emergency capital works</b> e.g. emergency pumps and pipelines
	<b>Trigger(s)</b>	Zone B and/or C
	<b>Deployable Output / Resource Benefit of action (Ml/d)</b>	Depends on specific actions.
	<b>Location</b> (Area affected or whole supply zone)	Wimbleball, Colliford, Roadford and/or Bournemouth supply zones
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated operational lead-in time of 6 – 8 weeks, to install equipment and connect to supply system.</li> <li>Operate option for as long as necessary.</li> </ul>
	<b>Permissions required and constraints</b>	<ul style="list-style-type: none"> <li>Planning permission may be required.</li> <li>Permission would be required if capital works requires access to private land</li> </ul>
	<b>Risks associated with option</b>	None
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	None
	<b>Summary of likely environmental impacts</b>	None
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

H3 Colliford WRZ supply-side drought management actions

Table H3.1: Boswyn Shaft, Boswyn Stream and Copper Hill Adit

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Boswyn Shaft, Boswyn Stream and Copper Hill Adit</b> To restart abstractions from these licensed resources
	<b>Trigger(s)</b>	Zone C
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	In aggregate, maximum licensed abstraction of 6.546 MI/d
	<b>Location</b> (Area affected or whole supply zone)	Whole supply zone
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated lead-in time of 6 – 12 weeks to install pumps, pipelines, etc as required.</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	A high level of confidence can be associated with the anticipated benefits
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	No significant risk
	<b>Summary of likely environmental impacts</b>	None. These sources have operated for many years historically without any environmental concerns
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

Table H3.2: Cargenwyn Reservoir

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Cargenwyn Reservoir</b> To restart abstractions from this licensed resource
	<b>Trigger(s)</b>	Zone C
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	105 MI available in total, maximum licensed abstraction rate 2.182 MI/d
	<b>Location (Area affected or whole supply zone)</b>	Whole supply zone
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated lead-in time of 6 – 12 weeks to install pumps, pipelines, etc as required.</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	A high level of confidence can be associated with the anticipated benefits
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	No significant risk
	<b>Summary of likely environmental impacts</b>	None. These sources have operated for many years historically without any environmental concerns
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

Table H3.3: Carwynen Stream (Botetoe)

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Carwynen Stream (Botetoe)</b> To restart abstractions from this licensed resource
	<b>Trigger(s)</b>	Zone C
	<b>Deployable Output / Resource Benefit of action (Ml/d)</b>	Abstraction of up to 3.409 Ml/d, subject to a prescribed flow and other flow conditions
	<b>Location (Area affected or whole supply zone)</b>	Whole supply zone
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated lead-in time of 6 – 12 weeks to install pumps, pipelines, etc as required.</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	A high level of confidence can be associated with the anticipated benefits
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	No significant risk
	<b>Summary of likely environmental impacts</b>	None. These sources have operated for many years historically without any environmental concerns
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-



Table H3.4: Porth Reservoir and Rialton Intake

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Porth Reservoir and Rialton Intake</b> Re-commence abstractions from this licensed resource
	<b>Trigger(s)</b>	Zone C
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	514 MI available in total, maximum licensed abstraction rate 8.19 MI/d
	<b>Location (Area affected or whole supply zone)</b>	Whole supply zone
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated lead-in time of 6 – 12 weeks to install pumps, pipelines, etc as required</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	A high level of confidence can be associated with the anticipated benefits
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	No significant risk
	<b>Summary of likely environmental impacts</b>	None. These sources have operated for many years historically without any environmental concerns
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

**H4 Wimbleball WRZ supply-side drought management actions**

**Table H4.1: Coleford and Knowle Boreholes**

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Coleford and Knowle Boreholes</b> To restart abstractions from these licensed boreholes.
	<b>Trigger(s)</b>	Zone B
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	Additional supplies of 1.2 MI/d
	<b>Location</b> (Area affected or whole supply zone)	Whole supply zone
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated operational lead-in time of 6 – 8 weeks, to reconnect to supply system and review treatment arrangements.</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	A high level of confidence can be associated with the anticipated benefits
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	The risk to the environment is low
	<b>Summary of likely environmental impacts</b>	None. Whilst these sources have not been used for a number of years, they previously did so without any environmental concerns
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	Stream flow and groundwater level monitoring specified on the licence would be recommenced
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

Table H4.2: Stoke Canon and Brampford Speke

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Stoke Canon and Brampford Speke</b> To transfer water directly to Pynes WTW using existing licensed sources
	<b>Trigger(s)</b>	Zone B
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	Additional supplies of 4.546 MI/d (Stoke Cannon) plus 3.45 MI/d (Brampford Speke)
	<b>Location (Area affected or whole supply zone)</b>	Whole supply zone
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated operational lead-in time of 6 – 8 weeks, to construct an overland pipeline.</li> <li>Operate option for as long as necessary.</li> </ul>
	<b>Permissions required and constraints</b>	Landowner permission for overland pipeline.
	<b>Risks associated with option</b>	A moderately high level of confidence can be associated with the anticipated benefits.
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	The risk to the environment is low
	<b>Summary of likely environmental impacts</b>	None. Whilst these sources have not been used for a number of years, they previously did so without any environmental concerns
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

Table H4.3: Uton Borehole

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Uton Borehole</b> To restart abstractions from these licensed boreholes.
	<b>Trigger(s)</b>	Zone B
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	Additional supplies of 0.8 MI/d
	<b>Location (Area affected or whole supply zone)</b>	Whole supply zone
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated operational lead-in time of 6 – 8 weeks, to reconnect to supply system and review treatment arrangements</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	A high level of confidence can be associated with the anticipated benefits
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	The risk to the environment is low
	<b>Summary of likely environmental impacts</b>	None. Whilst these sources have not been used for a number of years, they previously did so without any environmental concerns
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

H5 Bournemouth WRZ supply-side drought management actions

Table H5.1: Wimborne

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Wimborne</b> To restart abstractions from this licensed source
	<b>Trigger(s)</b>	Zone B and/or C
	<b>Deployable Output / Resource Benefit of action (MI/d)</b>	Additional supplies of 4 MI/d
	<b>Location</b> (Area affected or whole supply zone)	Bournemouth WRZ
	<b>Implementation timetable</b>	<ul style="list-style-type: none"> <li>Estimated operational lead-in time could be of the order of 12 weeks, to reconnect to supply system and review treatment arrangements</li> <li>Operate option for as long as necessary</li> </ul>
	<b>Permissions required and constraints</b>	None
	<b>Risks associated with option</b>	A reasonable level of confidence can be associated with the anticipated benefits
<b>Environmental Assessment</b>	<b>Risk to the Environment</b>	The risk to the environment is believed to be low
	<b>Summary of likely environmental impacts</b>	None known
	<b>Baseline information used</b>	-
	<b>Summary of additional baseline monitoring requirements</b>	-
	<b>Mitigation measures</b>	-
	<b>Impact on other activities</b>	-

**H6 For information - historical Drought Orders/Permits granted or seriously considered in previous droughts**

In previous severe droughts such as 1976, 1984, 1989 and 1995, Drought Orders / Permits such as those listed in Table H6.1 below were either granted or seriously considered. Information on these actions and potential environmental monitoring was included in our 2007 Drought Plan.

Since 2007, infrastructure improvements, along with increased reservoir storage through the purchase of two former china clay pits has resulted in the following drought options no longer needing to be considered within the planning horizon of this current Drought Plan.

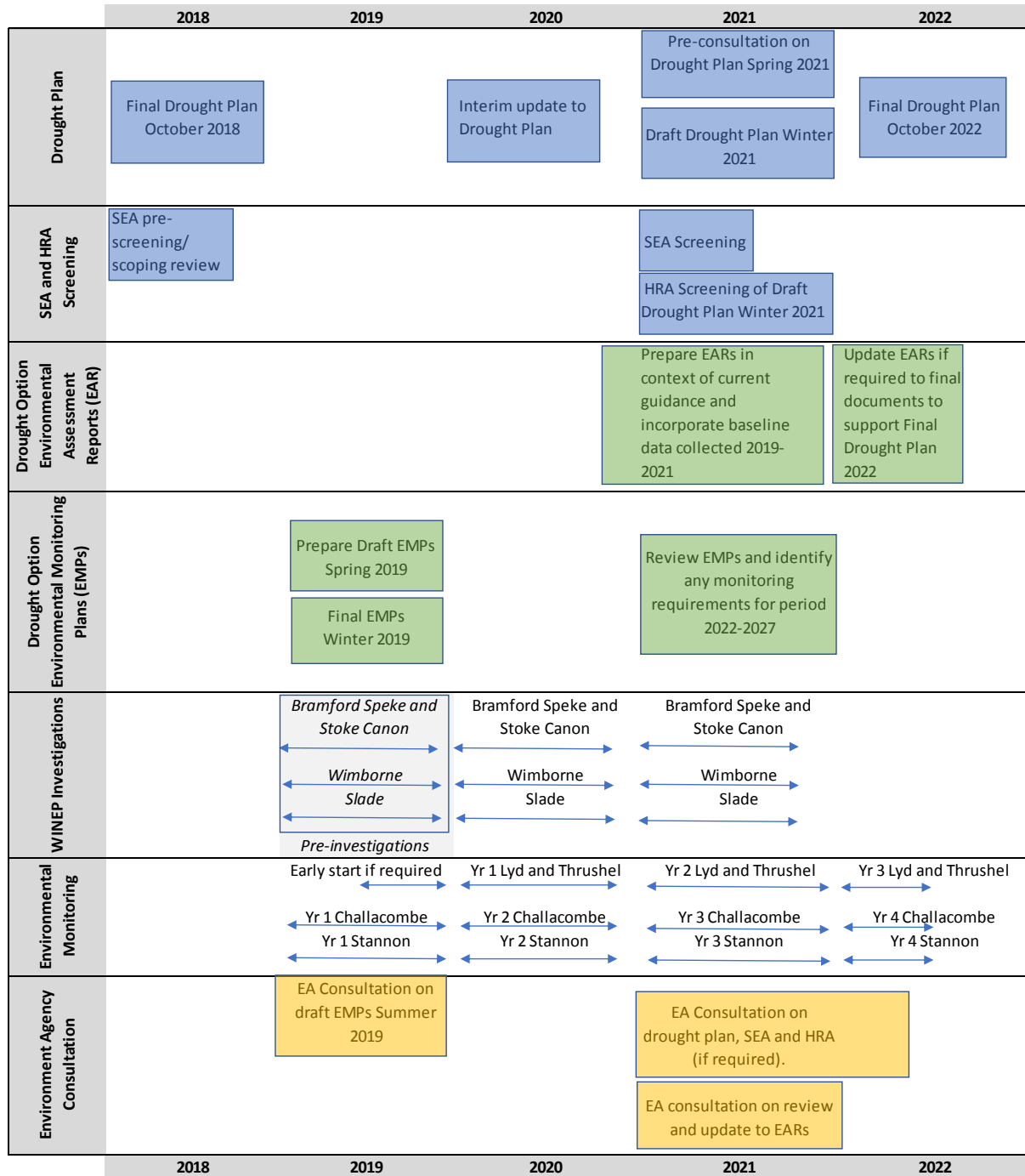
This section is therefore purely for information, which could be of use in the event of the area experiencing an unprecedented extreme drought within the lifetime of this plan.

**Table H6.1: Drought Orders/Permits either granted or seriously considered historically**

<b>WRZ</b>	<b>Drought Order</b>	<b>Type</b>
Wimbleball	Wimbleball Reservoir	abstraction of compensation flow
Colliford	Colliford Reservoir	abstraction of compensation flow
	Colliford Reservoir	annual abstraction increase
	River Fowey at Restormel	annual abstraction increase
	Leswidden Pool	emergency abstraction
	Hawkstor Pit	emergency abstraction
	Disused mines, adits etc	emergency abstraction
	Drift Reservoir	compensation flow reduction
	Stithians Reservoir	compensation flow reduction
	Crowdy Reservoir	compensation flow reduction
	Witheybrook Stream	prescribed flow reduction
	River Cober	prescribed flow reduction
Roadford	Roadford Reservoir	abstraction of compensation flow
	River Lyd & River Thrushel	emergency abstraction
	River Torridge at Torrington	emergency abstraction
	Exe-Taw transfer	emergency abstraction
	Meldon Reservoir	compensation flow reduction
	Upper Tamar Lake	compensation flow reduction
	Avon Reservoir	compensation flow reduction
	Fernworthy Reservoir	compensation flow reduction
	Venford Reservoir	compensation flow reduction
	Upper Tamar Lake	annual abstraction increase
	Wistlandpound Reservoir	annual abstraction increase
General	Desalination	new works

The following figure shows the timeline we will work to deliver drought permit ready applications for our next formal Drought Plan update for the period to 2022.

Drought Plan Timetable to 2022



## Appendix I - Significant ecological sites

This appendix provides an overview of significant ecological sites in our region.

Figure I1: Significant ecological sites in Colliford WRZ

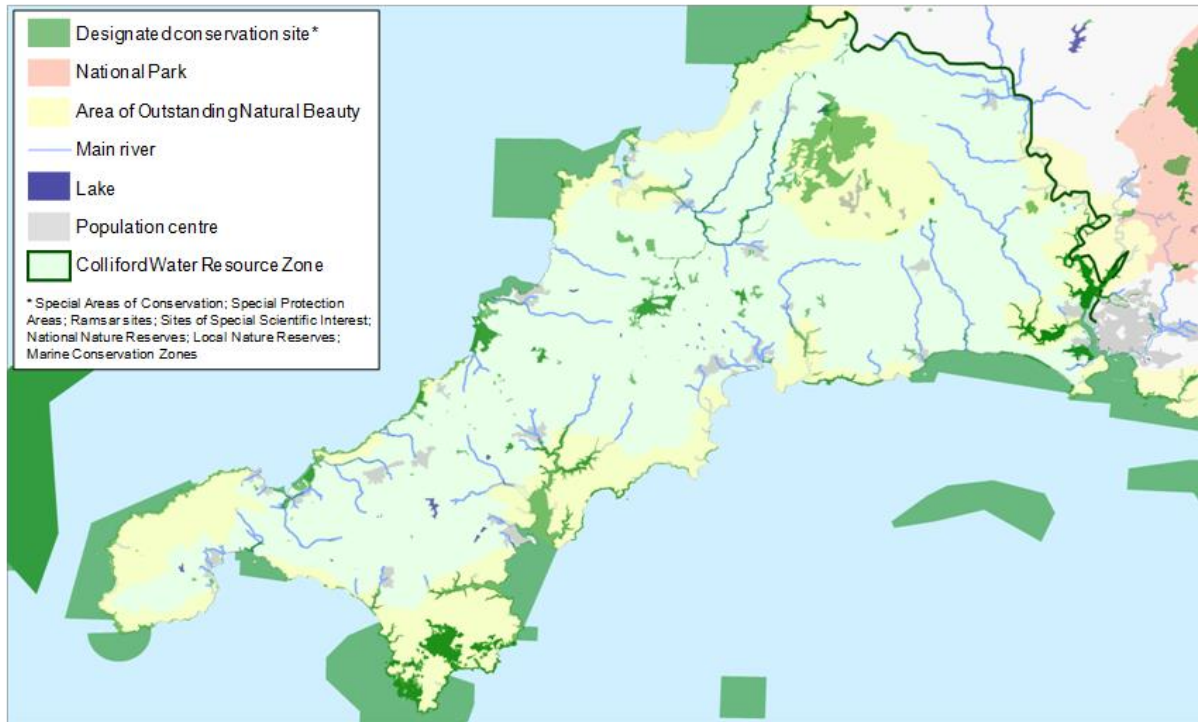




Figure I2: Significant ecological sites in Roadford WRZ

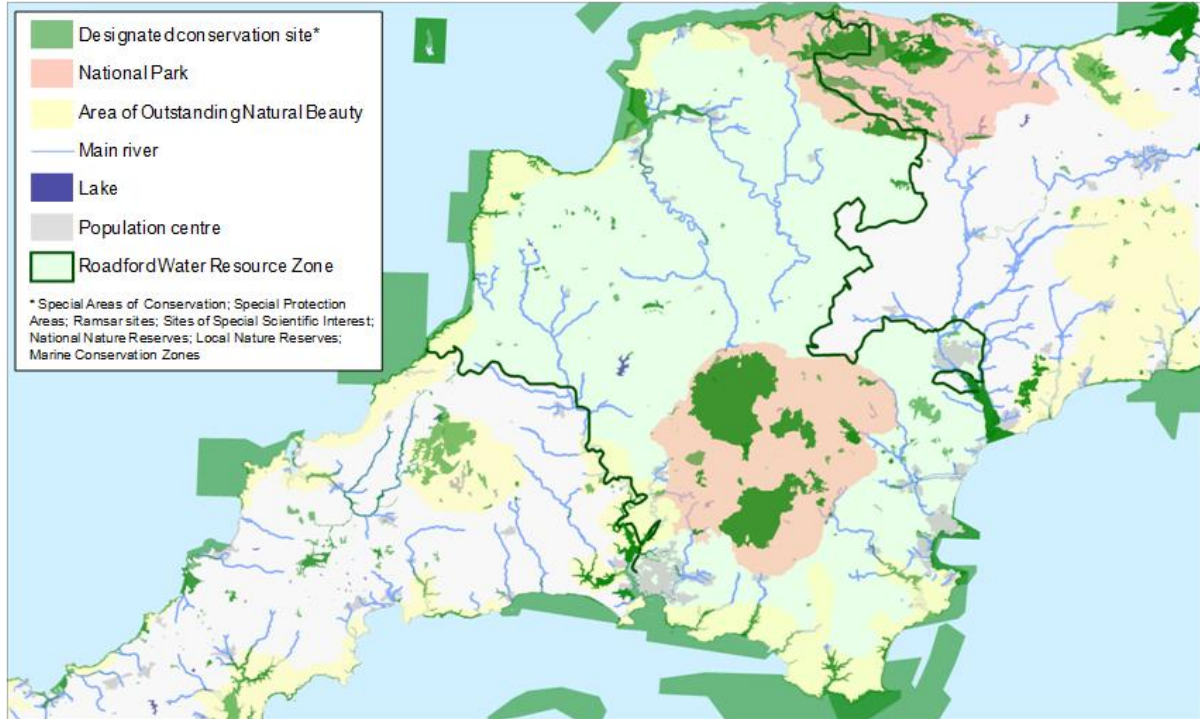


Figure I3: Significant ecological sites in Wimbleball WRZ

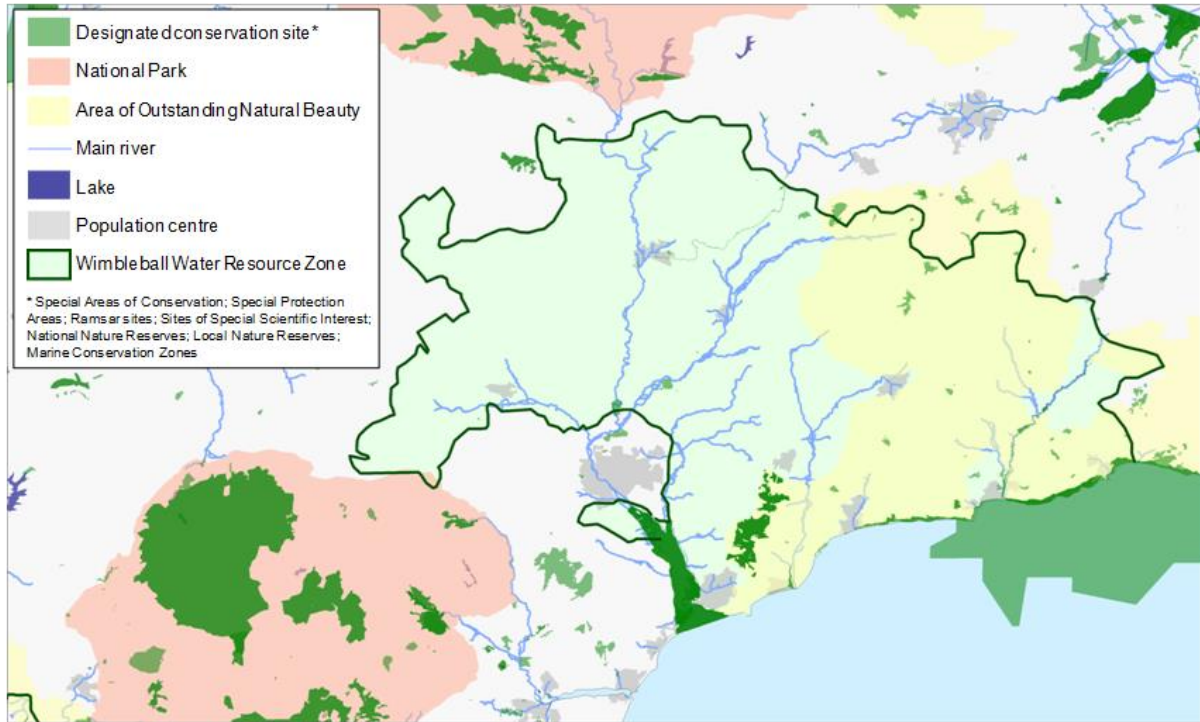
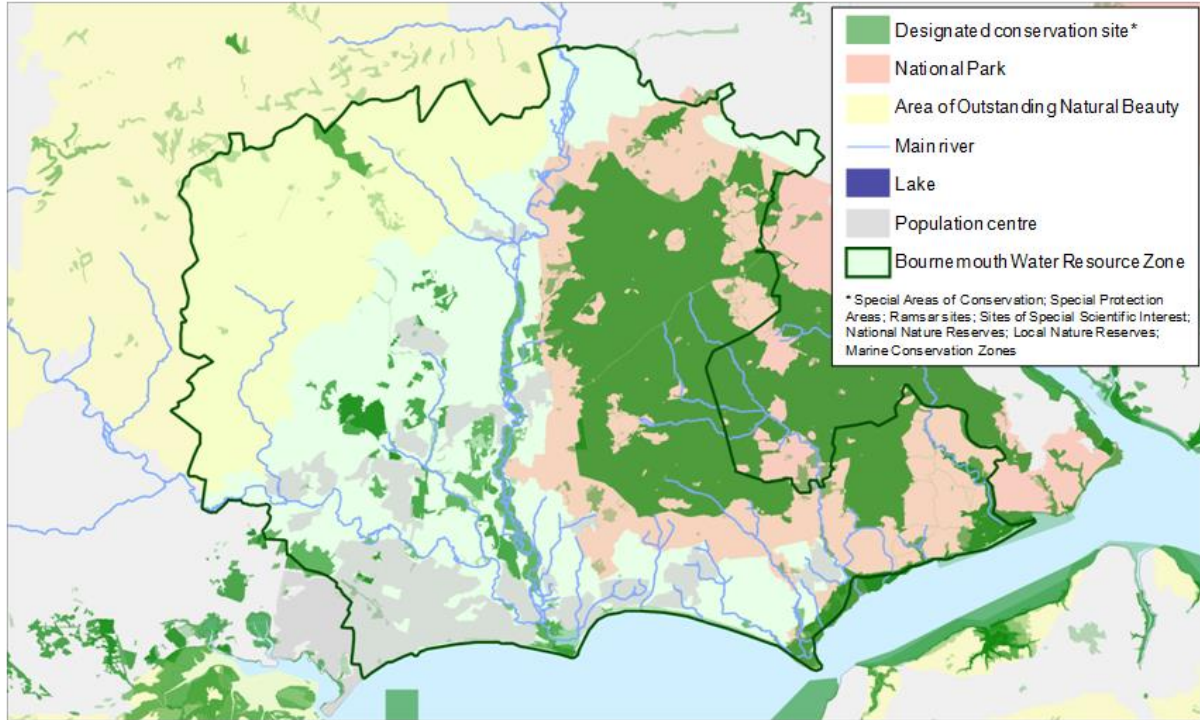


Figure I4: Significant ecological sites in Bournemouth WRZ



## Appendix J - Communications

This appendix sets out details of the communications we would undertake with different stakeholders.

The exact detail of any messaging would depend on the specific characteristics of any drought. This communication plan includes updates for the non-household retail market that came into force in April 2017.

### J1 Audience and key messages

Table J1.1: Audience and key messages summary

Audience type	Audience	Key messages	Timing	Subsequent actions	Tailoring
<b>Domestic and commercial customers</b>	Private customers	Use water wisely UKWIR positive messages Temporary restriction FAQs	Early water supply campaign and following drought triggers	Website promotion, mail-drops, ongoing media and social media campaign	Ensure all customer-facing staff have FAQ information
	Consumer Council for Water	Water Situation Report Use water wisely UKWIR positive messages Temporary restriction FAQs	Weekly	Briefing on customer communications plan	Regular briefing as drought develops as necessary to regional officer
	Consumer Council for Water – regional chair	Water Situation Report Use water wisely UKWIR positive messages Temporary restriction FAQs	Ongoing	Personalised email from Managing Director providing thorough briefing	
<b>Citizens Advice Bureaux</b>	Use water wisely	UKWIR positive messages Temporary restriction FAQs	As drought develops	Further briefing as drought develops	Request support with explaining customer messages
<b>Customer challenge Group</b>	Water Future Customer panel (SWW) and Customer View Group (BW)	Water Situation Report and media messages	As drought develops	Further briefing as drought develops	
<b>Regulators</b>	Environment Agency	As per Drought Plan	Ongoing dialogue		
	Ofwat	As per Drought Plan	Ongoing dialogue		
	Defra	As required			
	Drinking Water Inspectorate	As required			

<b>Audience type</b>	<b>Audience</b>	<b>Key messages</b>	<b>Timing</b>	<b>Subsequent actions</b>	<b>Tailoring</b>
<b>Non-Household retailers</b>	Specific companies	As per Drought Plan and market codes	Ongoing dialogue	Further briefings as drought develops	Reflect any specific sensitive customers or site specific arrangements
<b>Water UK</b>		Water Situation Report and further updates	March onwards	Weekly reports	
<b>Environmental and other relevant interest organisations and groups</b>	Natural England	Water Situation Report	March onwards	Weekly reports	As requested
	Devon and Cornwall Wildlife Trusts	Water Situation Report	March onwards	Weekly reports	As requested
	South West Lakes Trust	Use water wisely UKWIR positive messages Temporary restriction FAQs	March onwards	Treat as customer-facing staff with regular updates	Further information on impact on water sports and other aspects of their business
	WWF RSPB CPRE Angling Trust WaterWise	We would work with Water UK to brief national bodies	As drought develops	Water Situation Report	
	Local fisheries bodies and groups	We are working with our customers to reduce demand and we are committed to environmental improvement however in a drought situation continued provision of potable water is essential	From March onwards	Regular briefing on abstractions and river levels	

Audience type	Audience	Key messages	Timing	Subsequent actions	Tailoring
<b>MPs and local authorities</b>	Councils	Use water wisely UKWIR positive messages Temporary restriction FAQs Water Situation Report	From March onwards	Regular briefing as drought develops	Councils may also get asked FAQs; ensure they receive briefing similar to frontline staff
	MPs	Use water wisely UKWIR positive messages Temporary restriction FAQs Water Situation Report	From March onwards	Regular briefing as drought develops	Personalised email from Managing Director providing thorough briefing
	MEPs	Water Situation Report	As requested	Use water wisely FAQs	
<b>Representative bodies</b>	Confederation of British Industry, NFU, Chambers of Trade and Commerce, Countryside Landowners and Business Association, Horticultural Trade Association	Use water wisely UKWIR positive messages Temporary restriction FAQs	From March onwards	Further engagement with MOSL	Tailored for non-household customers in line with market codes
<b>Community based institutions and organisations</b>	Parish Councils Town Councils	Use water wisely Signpost to website	As drought develops	Further water conservation information	Make use of community newsletters where we can
<b>Public services</b>	Fire service Police services	Temporary restriction FAQs.			Information on exemptions for emergency services
	Health authorities	FAQs Tailored information for health providers	In preparation for temporary restrictions	Ongoing support as required	Information tailored for health providers
<b>Press and media</b>	Newspapers TV Radio Online	Press releases Briefings Interview opportunities Background information	Pro-active media relations work	Ongoing as required	Briefings with editors to promote accurate reporting

Audience type	Audience	Key messages	Timing	Subsequent actions	Tailoring
<b>Water companies</b>	Wessex Water and Southern Water	Our only neighbouring water companies. We would remain in regular dialogue with Wessex Water particularly about our shared resource (Wimbleball Reservoir)	Ongoing	As required	
	Other water companies	We would work with Water UK to brief other water companies			
<b>Sports and interest groups</b>	Canoe clubs Angling clubs	We are working with our customers to reduce demand and we are committed to environmental improvement however in a drought situation continued provision of potable water is essential	As drought develops	Use water wisely messages; we need to work together during a drought .	Information focused on river levels
<b>Waterways and navigation</b>	Canal and River Trust (formerly British Waterways) Other canal authorities	We are working with our customers to reduce demand and we are committed to environmental improvement however in a drought situation continued provision of potable water is essential	As drought develops	Water Situation Report	Information focused on river levels

## J2 Example press release

Below is an example of the type of press release we would produce before, during or after a drought.

NEWS



09 July 2015

For Immediate Release

### No water restrictions in the South West this summer

The water company supplying Devon and Cornwall says it does not envisage water restrictions in the region this summer.

South West Water says total net reservoir storage is 82.7%, which is normal for the time of year.

Resources Strategist Glenis Pewsey said: "Surface water sources, such as reservoirs and river intakes, provide approximately 90% of the South West Water region's water supply. It is part of our strategy to use local reservoirs first - like Burrator - to keep down our pumping costs because they are closest to centres of population.

"But all our major towns and cities are also supported by three large strategic reservoirs: Colliford, Roadford and Wimbleball, which between them hold over 84,000 Mega litres of water. These huge reservoirs are all over 80% full, and we do not envisage any water restrictions in the region this summer."

Find out more about how SWW has reduced leakage and invested in an interconnected water supply network here: [www.southwestwater.co.uk/reservoirs](http://www.southwestwater.co.uk/reservoirs)

#### Notes to Editor

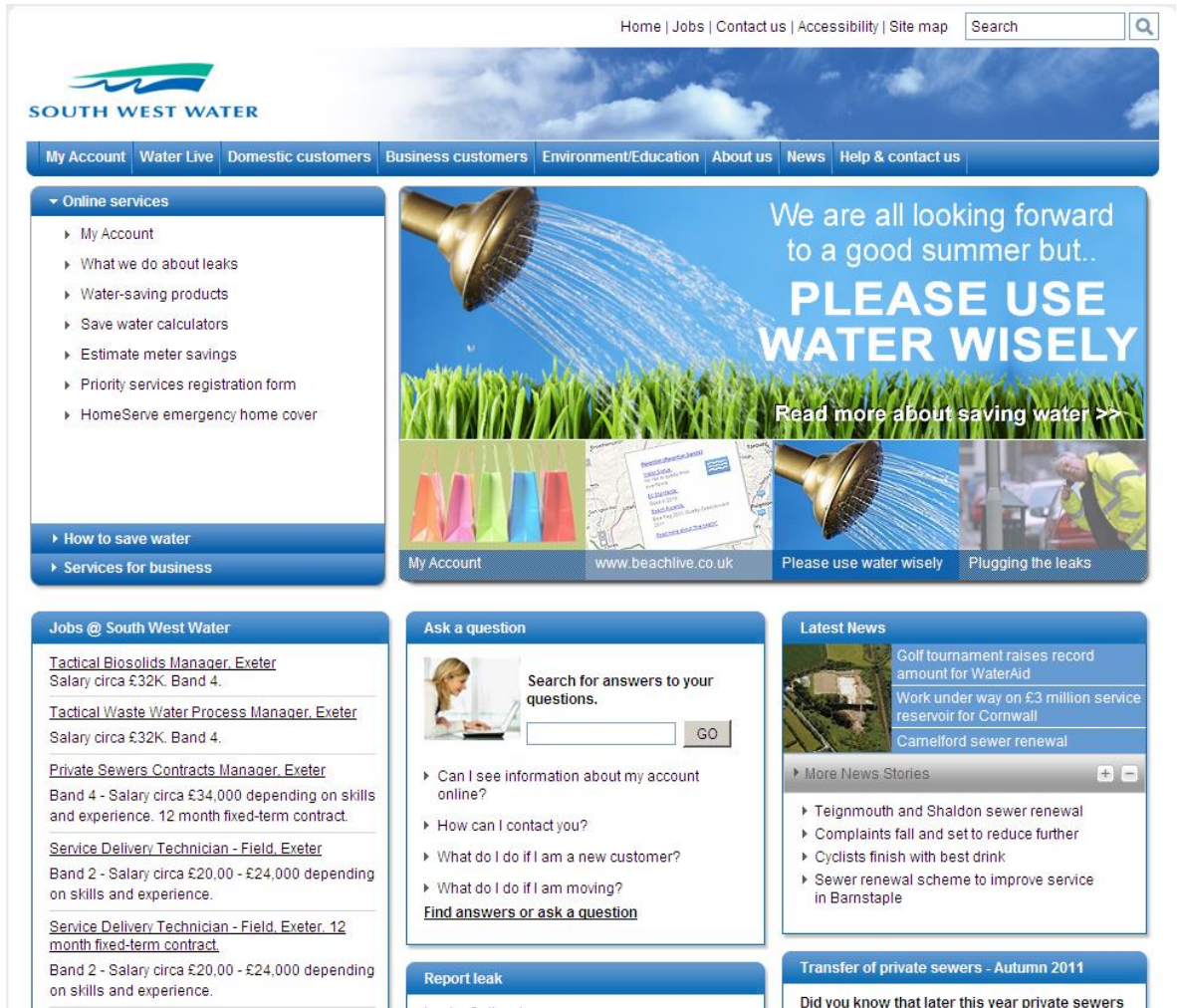
1. South West Water also supplies small parts of Somerset and Dorset.
2. You can check our reservoir levels on our website which is updated weekly at [www.southwestwater.co.uk/reservoirlevels](http://www.southwestwater.co.uk/reservoirlevels)
3. 82.7% is the latest figure for total net storage for the week ending 5 July 2015.

For further information please contact the Communications Team on 01392 443017



**J3 Example SWW website screenshot**

Below is an example of the type of information we would include on our website before, or during a drought.



## Appendix K<sup>22</sup> - Glossary

<b>Abstraction</b>	The removal of water from any source, either permanently or temporarily.
<b>Abstraction licence</b>	The authorisation granted by the Environment Agency to allow the removal of water from a source.
<b>Baseline</b>	Information on the environment that details conditions prior to implementation of a drought action.
<b>Bulk transfers</b>	A legal agreement for exporting and importing water between a donor and recipient operator.
<b>Business Plan</b>	The Business Plan sets out a water company's business strategy and how they will provide value-for-money water and wastewater (if applicable) services to their customers.
<b>Civil emergency</b>	Civil emergency is defined in the Water Industry Act, Section 208 (point 7).
<b>Control curves</b>	A diagram or graph presenting drought triggers levels.
<b>Demand management</b>	The implementation of policies or measures which serve to manage control or influence the consumption or waste of water.
<b>Designated sites of conservation importance</b>	Nature sites and areas of countryside can be 'designated', which means they have special status as protected areas because of their natural and cultural importance.
<b>Drought management area</b>	The area (within a WRZ) that a particular drought management action will apply to as specified.
<b>Deployable Output</b>	The output of a commissioned source or group of sources or of bulk supply as constrained by: <ul style="list-style-type: none"> <li>• environment</li> <li>• licence, if applicable</li> <li>• pumping plant and/or well or aquifer properties</li> <li>• raw water mains and/or aquifers</li> <li>• transfer and/or output main</li> <li>• treatment</li> <li>• water quality</li> </ul>
<b>Drought Order</b>	An authorisation granted by the Secretary of State (England) or Welsh Ministers (Wales) under drought conditions which imposes restrictions upon the use of water and/or allows for

<sup>22</sup> Environment Agency (2016c)

	abstraction/impoundment outside the schedule of existing licences on a temporary basis.
<b>Drought Permit</b>	An authorisation granted by the Environment Agency (England) or Natural Resources Wales (for sites in Wales) under drought conditions which allows for abstraction/impoundment outside the schedule of existing licences on a temporary basis.
<b>Environmental assessment</b>	An assessment of environmental sensitivity and likely impacts from implementing drought management actions.
<b>Environmental monitoring plan</b>	The plan of how the company will address: <ul style="list-style-type: none"> <li>• gaps in the environmental assessment of the supply-side drought management action</li> <li>• in-drought monitoring</li> <li>• post drought monitoring</li> </ul>
<b>Environmental report</b>	The report that accompanies an application for a Drought Order or Drought Permit. It should be based on the information from within the environmental assessment and updated with any additional information.
<b>Extreme Value Analysis (EVA)</b>	EVA is a branch of statistics dealing with the extreme deviations from the median of probability distributions. It seeks to assess the probability of events that are more extreme than any previously observed. EVA can be used in the field of hydrology to estimate the probability of an unusually large event, such as a severe drought.
<b>Feature</b>	A way of describing an ecological, chemical, habitat or morphological element to be assessed. For example a species of plant or animal, habitat type or sub-habitat type.
<b>Government</b>	In this guideline Government refers to central Government (Defra) and the Welsh Government.
<b>Habitats Regulations</b>	The Conservation of Habitats and Species Regulations 2010. The domestic legislation which transposes the EU Habitats and Wild Birds Directives into UK law and replaces the Conservation (natural habitats &c) Regulations 1994.
<b>Habitats Regulations Assessment (HRA)</b>	An HRA will identify whether or not your actions will have an adverse effect on a site's integrity.
<b>In-drought monitoring</b>	Monitoring that is undertaken during the implementation of a drought management action.

<b>Levels of Service</b>	The standard of service that water company customers can expect to receive from their water company, commonly setting out the frequency of restrictions that a company expects to apply to its customers.
<b>NNR</b>	National Nature Reserve - designation to protect the most important areas of wildlife habitat and geological formations in Britain, and as places for scientific research.
<b>RBMP</b>	River Basin Management Plan. River Basin District (RBD) plans aim to protect and improve the water environment for the benefit of people and wildlife. The plans set out how organisations, stakeholders and communities will work together to achieve an improved water environment for each RBD.
<b>Ramsar site</b>	Internationally important wetland site.
<b>Resilience options</b>	Additional options to deal with plausible droughts worse than those in the recorded record. A case should be made for these in the Drought Plan but they should be included and funded through your next WRMP.
<b>Resource zone</b>	The largest possible zone in which all resources, including external transfers, can be shared and hence the zone in which all customers experience the same risk of supply failure from a resource shortfall.
<b>Return period</b>	A recurrence interval typically in years. It is a measure of the severity of an extreme event.
<b>SAC</b>	Special Area of Conservation - Designated under the European Habitats Directive (1991)
<b>SPA</b>	Special Protection Area - Classified under the European Birds Directive (1979)
<b>SSSI</b>	Site of Special Scientific Interest - A site given a statutory designation by English Nature or the Countryside Council for Wales because it is particularly important, on account of its nature conservation value.
<b>Strategic Environmental Assessment (SEA) Directive</b>	The Strategic Environmental Assessment Directive ensures significant environmental effects arising from proposed plans and programmes are identified, assessed, subjected to public participation, taken into account by decision-makers and monitored.
<b>Water resource management plan or WRMP</b>	A water company long-term strategic plan for water supply and demand over 25 years.

**Water Resource  
Zone (WRZ)**

See Resource Zone

## Appendix L - Relevant legislation for water company Drought Plans

### L1 Core water resource planning legislation:

- **Water Industry Act 1991 and Water Act 2003**  
(s.63 of the Water Act 2003 inserted new sections 39B & 39C into the Water Industry Act 1991)  
<http://www.legislation.gov.uk/ukpga/2003/37/section/63>  
(s.62 of the Water Act 2003 inserted new sections 37B-D into Water Industry Act 1991)  
<http://www.legislation.gov.uk/ukpga/2003/37/section/62>
- **Drought Plan Direction 2011 and 2015, and subsequent Defra and EA guidance**  
<http://archive.defra.gov.uk/environment/quality/water/resources/documents/plan0510.pdf>  
<https://www.gov.uk/guidance/write-a-drought-plan#state-what-you-plan-to-do-after-a-drought>
- **Drought Plan Regulations 2005**  
<http://www.legislation.gov.uk/uksi/2005/1905/contents/made>
- **Drought Direction 2011**  
<http://archive.defra.gov.uk/environment/quality/water/resources/documents/droughtdirection2011.pdf>
- **Flood and Water Management Act 2010**  
(s.36; amends the Water Industry Act 1991 by substituting a new s.76)  
<http://www.legislation.gov.uk/ukpga/2010/29/contents>
- **Water Use (Temporary Bans) Order 2010**  
<http://www.legislation.gov.uk/uksi/2010/2231/made>
- **Water Resources Management Plan Regulations 2007**  
<http://www.legislation.gov.uk/uksi/2007/727/contents/made>

### L2 Other relevant legislation:

- **Environmental Assessment of Plans and Programmes Regulations 2004 and (Wales) Regulations 2004**  
(from Strategic Environmental Assessment Directive 2001/42/EC)  
<http://www.legislation.gov.uk/uksi/2004/1633/contents/made> (England)  
<http://www.legislation.gov.uk/wsi/2004/1656/contents/made> (Wales)
- **Conservation of Habitats and Species Regulations 2010**  
<http://www.legislation.gov.uk/uksi/2010/490/contents/made>

- **Wildlife and Countryside Act 1981**  
(as amended by the Countryside and Rights of Way Act 2000, Section 28G).  
<http://www.legislation.gov.uk/ukpga/2000/37/contents>

## Appendix M - Report checklist

This appendix provides a summary checklist of where the elements of the Drought Plan guidance are covered in our Drought Plan. These are listed in Table M1 below.

**Table M1: Summary checklist**

What	Specific elements	Where	Comment
<b>Hold Preliminary Discussions</b>	What you want to include in the Plan	Appendix A	One pre-consultation letter response received.
	What you intend to do differently	Appendix A, Section 1.4	Updated BW Levels of Service to include demand-side Drought Order and emergency Drought Order standards
	Previous recommendations from statutory consultees	-	None received
	Any advice from Government	-	No specific SWW/BW advice received
	Lessons learned from previous droughts	Section 5.4	
<b>What to include in your Drought Plan</b>	Chosen Drought triggers and actions	Section 2	
	What you will do during a drought	Section 3	
	The details of Drought Orders or Drought Permits	Section 3.2.5 and 3.3.4	
	How you will monitor and assess the adverse effects of your actions	Section 4	
	What you will do to minimise the impact of your actions before, during and after a drought	Section 1.3.2	
	How you will communicate with your customers and others during a drought	Section 5	Includes the new non-household retail market impacts
	What you will do when the drought is over	Section 6	
<b>Maps you should include</b>	The management areas and WRZs	Section 1.3.2, Appendix B	
	The alternative resources you would use in a drought	Appendix H	
	The location of potential Drought Permit and Drought Order sites	-	None proposed



What	Specific elements	Where	Comment
	Important ecological sites that your actions may affect	Section 4	
<b>What else you should consider</b>	Any data exchange arrangements with the Environment Agency or Natural Resources Wales	Sections 5.3.11, 5.3.16	
	Any consultations you have carried out with other water companies	Section 1.3.2, 5.3.1, Appendix A	No formal consultations, but we work closely with our neighbouring companies
	Any agreements you have made with other water companies about bulk supplies or division of shared resources	Section 1.3.2	Wimbleball reservoir is a shared resource with Wessex Water
	How you have tested your Drought Plan against different drought scenarios	Section 2.3, Appendix F	
	How you have produced the drought events used in your scenarios	Section 2.3, Appendix F	
	Information on how you will mitigate reductions in supply to fixed fire hydrants as a result of your actions, e.g. due to pressure reduction	Appendix G, Table G3	
<b>What to include with your Plan</b>	Non-technical summary of the Drought Plan	Yes	Separate documents for SWW and BW produced
	Present detailed technical information as an appendix	Yes	
<b>Check your Plan consistency</b>	WRMP	Sections 1.3, 1.4, 2.1, 3.2, 6.2	
	Business Plans	Same as for WRMP above	
	Emergency Plans	Section 1.3.5	
	Test if information is commercially sensitive or risk to national security	Executive summary, Section 7	

## Technical Elements<sup>23</sup>

What	Specific elements	Where	Comment
<b>Drought triggers</b>	Why we have chosen the WRZs for Drought Triggers	Section 2	
	Drought triggers are consistent with the WRMP	Section 2	
	Tests should cover short-term, medium term and long-term droughts	Appendix F	All WRZs simulated
<b>How you will reduce demand</b>	Must set out what you will do to reduce demand	Section 3 and Appendix G	
	Must set out how you will temporarily restrict water use during a drought	Section 3 and Appendix G	
	Temporary use bans	Section 3 and Appendix G	
	Potential exemptions	Section 3.2, Appendix J (Table J1.1)	
	Balance between adverse effects on customers and businesses	Section 3.2	
	Time set aside for consultation period before using a TUB	Section 3.2.4, Appendix G	
	How you will tell customers in neighbouring companies	Appendix J	
	How you will prove to customers, partners and government you have acted proportionately	Section 6	
<b>Estimate water savings you can make</b>	-	Section 3.2, Appendix G	
<b>How you will maintain supply during a drought</b>	Recommissioning of unused sources	Appendix H	
	Transfer water in from other water companies	Section 1.3.2	
	Use of alternative satellite sources	Appendix H	
	Lower pumps or deepen boreholes	Appendix H	
	Carry out engineering work	Appendix H	
	Use of Drought Orders and Permits	-	None planned. Details of past sites included in

<sup>23</sup> Source: Defra (2015). *Write a Drought Plan*. 7/12/15

What	Specific elements	Where	Comment
			Appendix H for information
<b>Include details of Drought Permits and orders</b>		-	None planned. Details of past sites included in Appendix H for information
<b>How you will communicate during a drought</b>	How proposed communication activities are linked to drought triggers	Appendix J	
	How we will make sure the activities are cost efficient	Section 5.2	
	How you will promote the positive work you will do during a drought	Appendix J	See section on Press and Media
	What information you've agreed to share with the Environment Agency	Section 5.3	
	The different audiences that specific communications apply to	Appendix J	Includes the new non-household market
<b>Your communications lead and management structure</b>	Roles and responsibilities	Section 5.2	
	How often drought teams meet	Section 5.2	
<b>What you will do after a drought</b>	The triggers you will use to identify the end of a drought	Section 6.1	A drought ends when the risk to security of supply and the environment is no greater than in a normal year
	How you will review the processes you've followed during a drought	Section 6.2	
	Your processes for stopping your drought management actions	Section 6.1	
	How you will communicate this information to customers	Section 6.1	
<b>Review your Plan performance after a drought</b>		Section 6.2	