

# Drought Plan 2015

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## Main Report



July 2015

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## Preface



Our vision is to earn the trust of our customers every day. To achieve this trust, ensuring that we maintain safe and reliable supplies of drinking water to our customers is of paramount importance.

This document is Dŵr Cymru Welsh Water's Drought Plan which describes how we intend to maintain water supplies, particularly in times of drought, for all of our 1.2 million domestic and 110,000 business customers in Wales and those adjoining parts of England we serve.

This plan builds on our previous draft Drought Plan 2011 and will be effective for five years from the date of its final publication, when, in recognition of the importance of this document, and in line with legislation, we will review it.

The most significant improvements and updates in our 2014 plan from previous plans are:

- The inclusion of Temporary Use Bans and how we intend to use them to reflect recent legislative changes.
- Increased confidence in the setting of drought triggers and drought actions zones through scenario testing.
- Greater understanding of the environment through ongoing monitoring.

Welsh Water has a unique relationship with its customers as it is owned on behalf of them. By explaining to customers how their actions during drought conditions can help to reduce demand, and by being seen to implement the best available options to augment water supply, we hope to develop this relationship such that water supplies in Wales will be safeguarded for many years to come.

A handwritten signature in black ink that reads "Tony Harrington". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Tony Harrington  
Director of Environment  
Dŵr Cymru Welsh Water

# Executive Summary

## 1 Overview

Welsh Water is the provider of water and sewerage services to 1.2 million domestic customers and 110,000 business customers within Wales and parts of England. Our vision is to earn the trust of our customers every day, by delivering high quality, essential services that protect our customers' health, our communities and the environment around us. Maintaining water supply is essential to public health and the economy and therefore ensuring that we can continue to provide this service during times of drought is of paramount importance.

The attached Drought Plan sets out the practical steps that Welsh Water will take in each of its 24 water resource zones through the stages of 'Developing Drought', 'Drought', 'Severe Drought' and 'Post Drought Recovery'.

This Plan is intended to meet the requirements of the Water Act 2003 and Flood & Water Management Act 2010 and has been developed in accordance with the 'Water Company Drought Plan Guideline 2011' published by the Environment Agency in June 2011.

Within this plan we describe:

- How a drought would be defined and our triggers for action
- What measures we might need to take to restrain the demand for water within our area including how we might implement Temporary Use Bans (TUBs) under our new powers
- What measures we might need to take to obtain extra water from other sources
- How we will monitor the effects of the drought and the measures we take under the drought plan
- The management structure we will put in place during a drought and the communications strategy we will adopt to deliver key messages to the public
- The permits and approvals that may be necessary to take the measures identified in the drought plan
- The post drought actions which we will undertake following the end of a period of water stress

- Liaison arrangements with the bodies responsible for giving the permits and other responsible bodies.

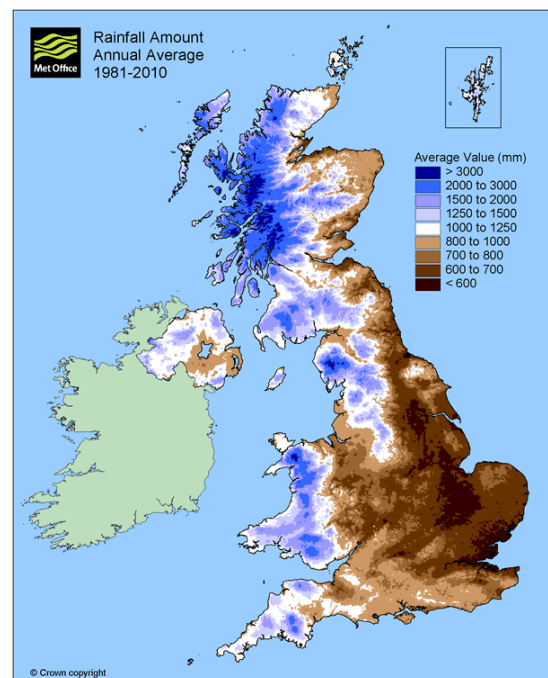
## 2 Background

Welsh Water supplies on average around 800 million litres of water every day. Nearly all of the water Welsh Water needs for public water supply comes from major rivers which are in turn regulated by some of the reservoirs owned by Welsh Water.

All of Welsh Water's abstractions are licensed by either Natural Resources Wales, or the Environment Agency. These licences set the maximum volume and rate of water that can be abstracted each day and each year.

Rivers in Wales enjoy high ecological status and licences are set to ensure this high status is maintained. Releases from Welsh Water's reservoirs during droughts helps to maintain river flows.

Wales has a relatively high rainfall compared to the rest of the UK. On average we receive around 1400mm of rainfall each year compared with around 700mm per year in the South-East of England. However, the annual rainfall can vary considerably and lead to drought occurring despite the high average figures.



In Wales, around a quarter of "effective rainfall" (i.e. the rainfall that becomes available in rivers for use) is licensed for abstraction.

Of this total, less than 15% is licensed for abstraction by Welsh Water for public water supply, the rest is licensed for hydropower, farming, industry, and export for public water supply in Merseyside and the West Midlands. This means that only around 3% of the “effective rainfall” in Wales is used for public water supply by Welsh Water. This compares with around 20% in the south and east of England.

Our actual abstraction has reduced by around 8% since 2000 as demand for water has fallen because of reduced industrial use and because Welsh Water has reduced leakage from its 27,000km network of pipes.

As the water undertaker for Wales we are faced with some unique challenges in developing our drought plan:

Because of the topography of Wales, Welsh Water has many more “water resource zones” than elsewhere in England. Our 24 water resource zones represent a fifth of the total for England and Wales. The landscape means that each of these zones is essentially self-contained with only limited opportunity to transfer water across zonal boundaries under normal operating conditions. This results in less flexibility to manage potential drought impacts and may require local measures to be put in place even if the overall position with regard to water availability in Wales is healthy.

Around 95% of our water resources originate as surface water either from reservoirs or river abstractions. We have very little dependence upon underground aquifers; this reliance on surface waters can increase vulnerability to short periods of low rainfall as rivers levels change more quickly than groundwater levels.

The aquatic environment in Wales is of exceptionally high quality, with many sites of special scientific interest and a number of our rivers are designated at a European level as Special Areas of Conservation; any drought measures therefore must balance our twin responsibilities of protecting the environment and maintaining public water supply.

These geographic and environmental constraints mean that, despite the relatively high rainfall in Wales, the Welsh Water drought plan is a significantly larger document compared to those of most other water companies.

This document sets out how we will deal with drought conditions within both urban and rural areas of Wales, and how we will monitor the effect of our actions on the natural environment.

## 3 Water Resource Plans and Drought Plans

Welsh Water monitors both the use of water by its customers throughout Wales and the water available from our existing resources in each of our 24 water resource zones. This information is used in our Water Resource Management Plan (WRMP) which sets out how we intend to maintain secure supplies of water to our customers over the next 25 years. Each year we review our WRMP and we are required to produce a full update of the WRMP every 5 years. We plan for the long term to ensure that we will have sufficient resources to maintain wholesome supplies to our customers in the light of increasing customer numbers, and changing water usage patterns.

Currently we aim to offer a level of service that would enable us to ensure that our customers continue to receive an uninterrupted water supply with the need for customer restrictions such as hose pipe bans only once in every 20 years on average.

Where we do identify current or potential future supply/demand deficiencies against this level of service, we design and implement schemes to fully resolve the forecast deficit. Such schemes are usually a mixture of reducing demand and increasing resource availability.

This resource planning process to maintain our adopted level of service enables Welsh Water to manage extended periods of dry weather without disruption to our customers’ supplies. However it is possible that we will be faced at some stage in the future with a drought event that is even more severe than 1976 or 1984.

In anticipation of such an event it is prudent for us to have a comprehensive Drought Plan to demonstrate how we would cope with such circumstances.

## 4 The Drought Plan

### 4.1 Introduction

The development of a Drought Plan is now a statutory requirement under which we are required to show how, during a drought event:

- We manage our resources,
- We would, if needed, restrain increasing demand for water,

- What we would do to make more water available, and
- How we would monitor the impact of our actions.

The drought plan has been developed using guidance provided by the Environment Agency.

The timetable for the production of the Drought Plan is:

31st March 2014
Submit draft plan to Welsh Government
From 5 <sup>th</sup> September 2014
As Directed by WG, we will undertake public consultation on the draft drought plan
Public consultation closes on 31 October 2014, 8 weeks after draft Drought Plan is published. Consultation window for stakeholders to submit consultation responses to WG WG to receive and forward representations to Welsh Water. 19 <sup>th</sup> December 2014 - 15 weeks after publishing draft drought plan: Welsh Water produces a Statement of Response detailing the consideration it has given to all the representations made.
Winter 2014
Welsh Water prepares final Drought Plan.
Winter 2014
Welsh Water publishes final Drought Plan.
Within 5 years
Start of cycle to review drought plan.

## 4.2 Changes and improvements since the last Drought Plan

Several changes and improvements have been made to this drought plan to reflect changes that have occurred to the drought planning legal and regulatory framework, and to comply with the latest Environment Agency Drought Planning Guideline. These changes include:

- The introduction of Temporary Use Restrictions (TUBs) enabling water companies to impose temporary water use restrictions without a drought order. We set out how we intend to use these new powers within this drought plan and what it means for our customers.
- The implementation of extensive scenario testing on our drought plan proposals to demonstrate that our drought triggers and actions are realistic and manageable.
- Improving and expanding the communications strategy we will use during a drought, and clearly setting out the management structure we will adopt in response to a drought situation.
- Maintaining an ongoing environmental monitoring programme to continue the development of Environmental Reports to support drought order and drought permit applications.

## 4.3 Elements of the Drought Plan

### 4.3.1 Triggers

The first stage in the Drought Plan is to demonstrate how we would identify that a drought event is developing in Wales.

To address this we have developed “triggers” within the Drought Plan that are measurable, and give a reliable indication that we may be entering a period of drought. These are generally highlighted by measured performance of:

- Rainfall
- Reservoir levels
- Levels of demand

### Rainfall

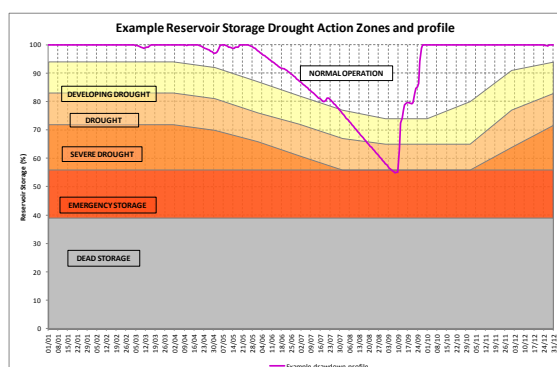
Whilst rainfall values do vary between water resource zones, we use a consistent trigger to identify the potential onset of drought by comparing monthly rainfall against its long-term average performance. We are able to identify significantly dry months (those that are likely to occur only one year in ten). If rainfall falls below the significantly dry month level for two consecutive months this would trigger the early stages of the Drought Plan liaison with Welsh Government and Natural Resources Wales.

## Reservoir storage

Whilst low rainfall is an early indicator of drought, river flows and reservoir storage provide a full picture of the water situation within each zone.

Welsh Water's reservoirs are governed by reservoir operating rule curves that indicate when storage levels are low for the time of year. If the level at a particular time of year crosses the drought control line then the Drought Plan is initiated.

The diagram below is an example of how these look for our reservoirs.



We continually monitor the volume stored in the reservoir. If the storage remains in the Normal zone, operational management continues as routine.

If storage declines into the yellow, developing drought area, we would commence meetings with Natural Resources Wales and Welsh Government. Being in the developing drought area is not a serious situation. The ordinary variation of weather in Wales can cause storage to move into this area and then recover back into the Normal area. However moving into this area does put the Company on the alert that a potential drought might develop.

Once we have gone into the Developing Drought zone, subsequent triggers reflect declining reservoir storage levels and indicate where we move into the Drought and then Severe Drought zones.

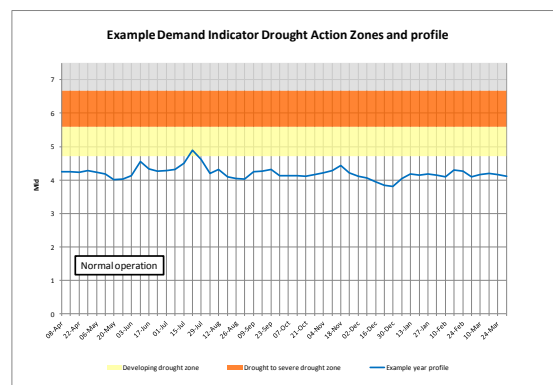
## Demand indicators

Some of our water resource zones do not have any reservoirs and hence no drawdown of storage. In these zones, drought is indicated by elevated demand levels, due to extended periods of hot dry weather.

We have developed more intelligent drought indicators in this updated drought plan, where

drought options are instigated as demand approaches our peak capability. Other factors will also be considered in these assessments, such as forecasts for weather patterns over the coming weeks (there is no point in starting drought options if two weeks of heavy rain is forecast).

The graph below shows an example of how we set triggers in non-storage zones.



As demand increases the water resource zone will increase in drought status.

## 4.3.2 Measures to be taken by Welsh Water under the Drought Plan

The Company has a range of potential actions that might be used at various stages of drought. These actions include demand side measures, i.e. actions to reduce the demand for water made by customers; and supply side measures, i.e. actions to increase the quantity of water that can be made available for public water supply.

With each of these actions come consequences for customers and the environment.

Maintaining water supply to customers is essential for public health and supporting the economy of Wales. For this reason we do not believe that it is appropriate to plan to rely on stand pipes or routine rota cuts in supply to constrain demand.

Our strategy therefore is to communicate with customers from the earliest stage of a Developing Drought to encourage them to conserve water wherever possible. As we move into Drought and Severe Drought conditions it will become necessary to impose restrictions upon use such as the introduction of hosepipe bans and a ban upon non-essential use of water.

For supply-side actions, we have identified where there are opportunities for a series of actions to increase the quantity of water that can be made available. This includes measures such as reduction in basic compensation releases from reservoirs

and reduction in support for river regulation schemes.

These actions are triggered at different stages of the Drought Plan. It is only at the stage of 'Severe Drought' that Welsh Water would intend to use Drought Permits and Drought Orders that would allow us to reduce compensation and regulation releases.

The actions to be taken at different stages of drought are set out and discussed in Section 3 'Drought Management Actions' with additional details being provided in the individual water resource zone summaries in Appendix 1

The table overleaf summarises the actions to be taken at different stages of drought.

These actions carry environmental consequences because of the impact they may have upon downstream river ecology, and for this reason we have included within the Drought Plan an Environmental Monitoring Plan programme.

#### **4.3.3 The Environmental Monitoring Plan**

The Environmental Monitoring Plan describes the environmental impact above and beyond what would normally be encountered in "natural" drought or low-flow conditions.

Contained within the Environmental Monitoring Plan is a description of everything that is known about the local ecology around each site at which we might need to have a Drought Permit or Drought Order, and an assessment of the environmental consequences of those permissions.

Environmental Monitoring has been scoped for all supply side options to increase the water available to us. Some of this work has been completed already by consultants undertaking flow, quality and ecological surveys of rivers reaches which would be affected by the implementation of a drought option.

The remainder of this work and the exact content of our environmental monitoring programme will be known once our Business Plan for AMP6 has been finalised with Ofwat.

#### **4.3.4 Management and Communication**

Communication with stakeholders during times of drought is a core component of the Drought Plan. In the plan we describe the management structure within Welsh Water that will be used to ensure that the actions undertaken during a drought match what is described within the Plan. In this version of our Drought Plan we have improved and expanded upon the communication strategy we will adopt in a drought, identifying media regions and key communications in greater detail.

We then describe in detail arrangements for communication to key stakeholders, and how, through the use of distinct media regions, we will send out pro-active messages to keep our customers and their representatives informed both of the water supply situation and how their actions can assist the community as a whole.

#### **4.3.5 End of drought**

Just as it is important to know that a drought is beginning, it is equally important to know when a drought has ended and to learn lessons from the experience.

In simple terms this is a return to the pre-trigger conditions, e.g. reservoir storage moves back into the normal zone and demand declines out of the drought zone, however the time of year will also play a factor, as recovery into the normal zone in November is more favourable than recovery at the start of April.

Communication would be made with stakeholders to explain the recovering situation. If a Temporary Usage Ban or Non Essential Usage Ban had been implemented, notice would be published to declare the return to the normal usage position through press releases and social media.

To ensure that we learn as much as possible from experiencing and dealing with a drought, we will undertake post-drought reviews following the end of a period of water stress. The review will ensure that we check the appropriateness of our drought triggers, quantify the demand savings from communications and customer restrictions, and assess the benefit and environmental impact of any supply side options we have implemented.

The production of a post-drought 'lessons learnt' report will enable us to improve on our next drought plan.

## Drought action sequence of events

Drought Action Zone	Demand Side Actions	Supply Side / Operational Actions	Communications Key Messages
Normal	<p>Weekly Monitoring of Rainfall, reservoir and demand levels</p> <p>Ongoing leakage maintenance and water efficiency work streams</p> <p>Pre planning for the implementation of 'Media Campaign with Water Efficiency Device Offering' and Enhanced Leakage Management Option.</p>	<p>Abstraction remains within Licence, within operational rules and within quality constraints</p>	<p><b>Use the water that we need but please don't waste it.</b></p> <p>General Water Efficiency Campaigns via</p> <ul style="list-style-type: none"> <li>- Radio</li> <li>- Education Centres</li> <li>- Water Efficiency Web Page</li> </ul>
Developing Drought	<p>Raise and increase the awareness of the importance of water conservation measures through the established media campaigns as per the communication plan which will include requests for voluntary restraint</p> <p>Undertake 'Media Campaigns with water efficiency Device Offering' Option</p> <p>Undertake Enhanced Leakage Management option</p> <p>Supply Demand situation continually monitored throughout the drought situation and the effectiveness of demand-side measures</p> <p>Continuation of pre ceding options</p> <p>Preparing for the implementation of TUBS</p>	<p>Commence increased liaison with colleagues in Operations and NRW in line with Management and Communications plan</p> <p>Review and implement where feasible tankering from neighbouring zones</p> <p>Preparation for implementation of Supply side Options</p> <p>Preparation for front Line customer facing staff.</p> <p>Prepare to Implement Environmental Monitoring</p> <p>Prepare / submit Drought permit/Drought Order Information</p>	<p><b>Use what you need but please don't waste water.</b></p> <p><b>We increasingly need your help to conserve water supplies</b></p> <p><b>We are also doing our bit by ensuring we fix leaks quickly to prevent waste</b></p> <p>Continuation of normal activities plus</p> <ul style="list-style-type: none"> <li>- Enhanced targeted water efficiency message</li> <li>- Local Radio</li> <li>- Target social Media</li> <li>- Prepare and Publish DCWW Drought Webpage</li> <li>- TUB consultation via Printed media</li> </ul>
Drought	<p>Continuation of the Preceding measures</p> <p>Increasing public awareness and content of new demand-side measures to be included in media campaign and as aligned with the communication plan.</p> <p>Introduction of TUBs (Saving of 0 – 5% demand).</p> <p>Preplanning for the implementation of Non Essential Usage Bans (NEUBs).</p>	<p>Continuation of the Preceding measures</p> <p>Implement Options not requiring a Drought Order or a Drought Permit.</p> <p>Implement Environmental Monitoring in Line with Monitoring Plan</p> <p>Prepare for Drought Permit and/or Drought Order applications</p>	<p><b>We've introduced a temporary hosepipe ban as a last resort to help conserve water supplies</b></p> <p><b>Ask you to respect this to ensure supplies to people in the area are conserved</b></p> <p><b>Thank you in advance for your cooperation</b></p> <p>Continuation of the Preceding measures</p> <p>Review and respond to the consultation to TUBS</p> <p>Prepare for the implementation of Non Essential Use Bans in the Media</p>

			<p>Call Centre briefed on key messages for customers</p> <p>Implement TUBS</p> <p>Continuation of Previous Techniques plus Enhanced messaging Via</p> <ul style="list-style-type: none"> <li>- Local Radio</li> <li>- Targeted social Media</li> <li>- Plus Call Centre Pre recorded Messages</li> <li>- Targeted messaging through texting service</li> <li>- Media interviews with Senior Managers produced via TV and Radio</li> </ul> <p>Preparation for NEUB Via Chamber of Commerce and Trade Bodies</p>
Severe Drought	<p>Continuation of the Preceding measures</p> <p>Increasing public awareness and content of new demand-side measures to be included in media campaign and as aligned with the communication plan.</p> <p>Introduction of NEUBs (Saving of 0 – 5% demand.</p> <p>Implementation of Emergency Drought Orders as Last Resort (Saving likely 0-10%)</p>	Continuation of the Preceding measures	<p>Continuation of Previous Activities with the enhanced message</p> <p><b>We appreciate your help so far in observing the temporary use restrictions</b></p> <p><b>Water levels are at very low so we ask you think carefully about the water you use</b></p> <p><b>Urge you not to waste any water</b></p> <p>Implementation of NEUB via:</p> <ul style="list-style-type: none"> <li>- Local Media</li> <li>- Letter Drop and or Text Service</li> <li>- Engagement with Chamber of Commerce and Trade Bodies</li> <li>- Preparation for Emergency Drought Orders</li> <li>- Media Campaign</li> <li>- Media Interviews with Senior Managers produced via TV and Radio</li> </ul> <p>Respond to Customers on the Non Essential Use Ban</p> <p>If a Hearing is required manage the implications to the Public</p> <p>Call centre briefed on key messages for customers</p>

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# 1 Introduction

## 1.1 Overview of drought plan process

Water undertakers in England and Wales are required to prepare and maintain Drought Plans under Section 39B and 39C of the Water Industry Act 1991, as amended by the Water Act 2003. Water companies were required to submit statutory drought plans for the first time in 2006. However, many companies, including Dŵr Cymru Welsh Water (DCWW), have been producing drought plans since 1999. This 2015 Drought Plan builds on our previous plans.

When producing a drought plan, water companies must follow any Regulations and Directions issued by the Secretary of State and/or Welsh Ministers that relate to drought planning. The legislation and guidance used to develop this drought plan is listed below:

- Wildlife and Countryside Act 1981.
- 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 and s.62 of the Water Act 2003 inserted new sections 37B-D into Water Industry Act 1991);
- Environmental Assessment of Plans and Programmes Regulations 2004 and (Wales) Regulations 2004;
- Drought Plan Regulations 2005;
- Flood & Water Management Act 2010 (s. 36 amends the Water Industry Act 1991 by substituting a new s. 76);
- Water Use (Temporary Bans) Order 2010;
- Conservation of Habitats and Species Regulations 2010;
- Drought Plan Direction 2011;
- Drought Direction 2011;
- Water company drought plan guideline (Environment Agency, June 2011);

The drought plan is consistent with the assumptions and company levels of service set out in our Water Resources Management Plan (2014) (WRMP). The WRMP is a strategic plan which describes our 25-year strategy for ensuring that we have enough water resources to meet demand during the worst case dry years and the timely development of cost effective solutions if there is a significant risk of demand exceeding capability over this period. The assessment of the supply demand balance within the plan takes account of demand management activity during times of drought such as company appeals for demand restraint through water efficiency media campaigns and more severe temporary use bans on activities such as use of hosepipes.

Although the WRMP does specify the triggers for demand management activities, it does not detail how these would be imposed in line with legislation. Neither does the plan examine what might be done nor the potential impact, if weather conditions are worse than those experienced historically or in the case of other unforeseen events.

The drought plan is an operational, 'tactical' plan which sets out the timely actions that we will take to protect water supplies for our customers and the environment during periods of low rainfall when water supplies become depleted. Each drought is different in terms of intensity, duration and spatial distribution. Our drought plan recognises this and is sufficiently flexible to allow us to respond appropriately to a wide range of drought situations.

## 1.2 Dŵr Cymru – Welsh Water

Dŵr Cymru Welsh Water (DCWW) is a statutory water and sewerage undertaker. We are owned by Glas Cymru, a single purpose, 'not-for-profit' company: there are no shareholders and any profits which arise are reinvested back into the business on behalf of our customers, or returned as a dividend in some form. This is a unique business model in the water industry. DCWW is the principal water company covering most of Wales. We also supply parts of England, including the majority of Herefordshire. We are the sixth largest of the ten regulated water and sewerage companies in England and Wales. We are responsible for providing over 3 million people with a continuous, high quality supply of drinking water and for taking away and properly disposing of the associated wastewater. We also have over 110,000 business customers, so our services are essential in supporting the economy in our supply area. In total, we deliver more than 800 million litres of drinking water every day.



For further information on the business, please visit our website: [www.dwrcymru.com](http://www.dwrcymru.com)

## 1.3 Baseline water resources situation and drought restrictions

### 1.3.1 Supply areas and water resource zones



Our baseline water resources situation is set out in our WRMP 2014. Our water supply area is divided into 24 water resource zones (WRZ's).

DCWW uses the same 24 WRZ's for operational management, water resources planning and drought planning. Each WRZ is a self-contained water supply unit and can be defined as the largest possible zone in which all resources, including external transfers, can be shared, and therefore the area within which all customers experience the same risk of supply failure from a resource shortfall. For the purposes of drought planning DCWW plans and manages its activities on a water resource zone basis.

Details of each water resource zone are set out in the individual water resource zone summaries in Appendix 1. We can divide the sources of supply within the resource zones into two broad categories, storage and non-storage. Figure 1 shows the major source of water supply within each water resource zone.

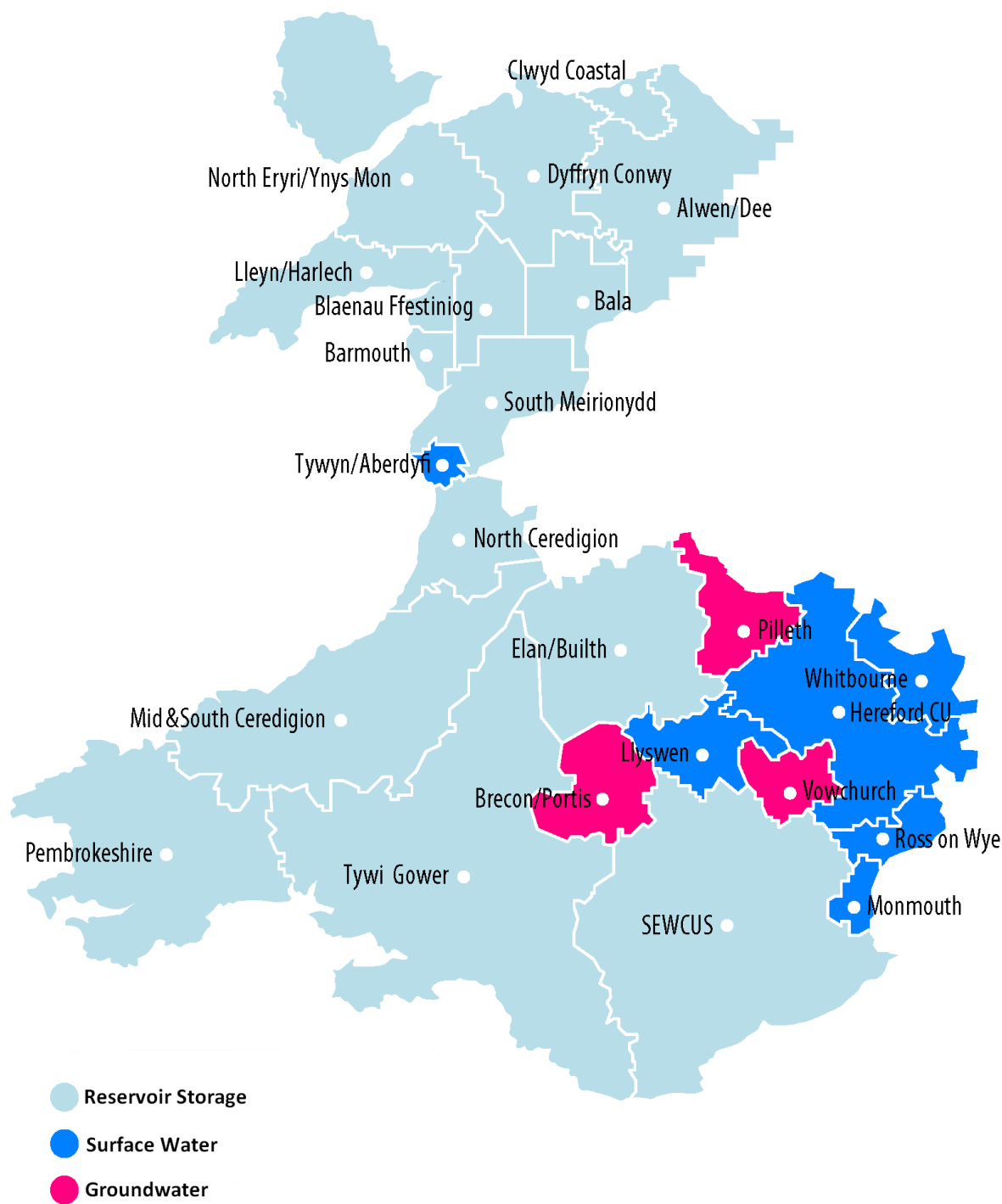


Figure 1 - Primary sources of water in WRZs

## Storage

There are two types of raw water storage reservoirs used by DCWW, impounding reservoirs and pump storage reservoirs. Our storage reservoirs are managed using operational control lines to monitor the transition from normal operation to a drought situation. Drought Action Zones have also been developed for our reservoirs to identify when important actions should commence during a period of low rainfall that starts to affect the water resource situation. The use of Drought Action Zones and triggers are discussed in detail in Chapter 2 Drought indicators, triggers and scenarios.

## Non-storage

The non-storage water resources used by DCWW are river abstractions and supported river abstractions, groundwater sources, and imports/exports from adjoining water resource zones and/or other companies.

We have abstraction licences that give us permission to take water from rivers and groundwater sources. During a drought, as well as the possibility of the source of water becoming depleted, supply difficulties can also be caused as a result of high demands making it difficult to maintain supply within the licensed abstraction quantities. In such cases, demand management measures would need to be implemented to control excessive demand from customers. The application of demand management during a drought is discussed in detail in Chapter 3 Drought management actions. If supply problems continue even after demand management measures have been put in place, it may be necessary to increase the licensed quantities DCWW is allowed to abstract through a drought permit or a drought order. The use of this type of drought action is discussed in detail in section 3.6.

## Bulk supplies and shared resources

### Severn Trent Water imports and exports

Dŵr Cymru Welsh Water receives two imports of potable water from Severn Trent Water plc:

A bulk supply of up to 9 MI/d from the Mitcheldean Water Treatment Works (WTW), which relies on the abstraction from the River Wye at Lydbrook in Gloucestershire.

Although Severn Trent Water holds the licence, it specifically identifies the 9 MI/d component of the total Lydbrook abstraction as dedicated to supplying water to Ross-on-Wye. It is a condition of the abstraction licence that any portion of the 9 MI/d not required for Ross-on-Wye is not available for use in the Severn Trent area. As such the total quantity abstracted should be curtailed to a total of Severn Trent Water's share of the licence plus the needs for Ross-on-Wye.

Since the agreement for this bulk supply was reached with Severn Trent Water following the drought of 1976, the bulk supply has always been available. Welsh Water continues to have confidence that this quantity will be available under drought conditions. This bulk supply agreement is consistent with that within Severn Trent's Drought Plan.

A second bulk supply of up to 0.5 MI/d is imported into the South Meirionnydd zone at Corris near Machynlleth.

The agreement authorising this arrangement has been in place since 1984 and there are no indications that the agreed quantities would not continue to be delivered during future exceptional droughts.

Dŵr Cymru Welsh Water exports water from the Elan Valley reservoirs to Severn Trent's Frankley WTW at Birmingham where this resource forms a significant component of the supply for the West Midlands area. The bulk supply agreement allows for the transfer of a maximum of 386 MI/d at an annual average rate of 360 MI/d. In addition Dŵr Cymru Welsh Water has a guaranteed 5 MI/d within the abstraction licence to meet local supply needs. As well as the quantities discussed above, the Elan Valley reservoirs provide up to 164 MI/d for river regulation purposes to the River Wye.

### **Albion Water & Scottish and Southern Energy**

Welsh Water also supplies water to Albion Water, a licensed undertaker, to supply their customer at Shotton Paper in our Alwen-Dee WRZ in North Wales. The arrangements for the operation of the abstractions from the River Dee are detailed in the Alwen-Dee WRZ section, Appendix 1.

Modelling of the river abstraction performance presumes that the bulk supply to Albion would be made under the severe droughts experienced from 1920 to 2003. Although, the legal agreement between the two companies absolves Welsh Water from financial responsibility for failure to maintain the supply as a result of drought difficulties, our plans and the plans for operations on the River Dee assume that the supply will be maintained.

We also have a bulk supply arrangement with Scottish and Southern Energy (SSE).

Llyn Cowlyd reservoir – shared resource

The storage in Llyn Cowlyd in the Dyffryn Conwy WRZ is managed between Welsh Water and RWE Innogy (who operate a Hydro Electric Power scheme).

### **1.3.2 Drought restrictions and levels of service**

During extended periods of dry weather, it may be necessary to encourage increased customer water efficiency and to restrict customer demand to ensure that water supplies are always maintained. Initial demand management actions include enhanced leakage management while encouraging customer restraint on water use through media campaigns.

As dry weather continues into drought conditions and the risk to water supply increases, more formal water use restrictions may then be required such as temporary use bans (TUBs). In extreme drought conditions, drought orders may be needed to further restrict water use for commercial purposes.

At the same time drought permits or orders can be used, which would allow additional water to be taken from the environment or the reduction of compensation flow to rivers from impounding reservoirs. Drought permits need to be approval by Natural Resources Wales for sites located in Wales, and the Environment Agency for sites located in England. Drought Orders need to be approved by Welsh Government for sites located in Wales and Defra for sites located in England. In taking additional water from the environment we need to demonstrate the potential environmental impact of the option and how we might mitigate against this. We already have Environmental Monitoring Plans (EMPs) in place for all supply side options and as an improvement we have a programme to develop Environmental Reports (ERs) which not only include environmental monitoring but also provide an understanding of impacts as well as options for mitigation. Further detail on environmental monitoring and assessment are contained within Chapter 4.

Natural Resources Wales and Welsh Government would only sanction these supply measures following enhanced demand management, including TUBs, being imposed. The full list of schemes identified that could be delivered to increase the available water is in Chapter 3.

To provide a consistent approach during drought periods, the water industry has produced a Code of Practice (CoP) on the implementation of Water Use Restrictions. Dŵr Cymru Welsh Water have used

this CoP in the preparation of its drought plan. The code of practice is based upon 4 principle and 5 actions. These are:

#### Principles:

- To ensure a consistent and transparent approach to implementation of drought restrictions
- To ensure that water use restrictions are proportionate
- To communicate clearly with customers and the wider public/users
- To consider representations in a fair way

#### Actions

- Companies, regulators and government to work together during periods of drought
- To coordinate communications
- Adopt a common phased approach to drought actions, considering socio-economic factors
- Adopt a common approach to exceptions to restrictions
- Promote understanding and good practice

The CoP provides guidance on implementation of TUBs and ordinary drought orders and advises on the staged approach to the implementation of restrictions and exceptions. The code provides discretion and some flexibility around the implementation of restrictions and exceptions to these. These are further discussed in Chapter 3.

Water companies are required by our regulators to both specify and report on our levels of service or frequency at which customers can expect to experience such restrictions on water use, and what types of restrictions these would be.

DCWW considers that it would be wrong to plan for a level of service that would guarantee there would never be any customer demand restrictions because this would require significant investment in additional water resource assets, which would be used very infrequently. We have consulted our customers as part of our WRMP process and our current level of service position has been generally supported. This is:

- Not more than once in every 20-years (1-in-20), on average, to impose temporary water use restrictions (hosepipe bans) and;
- Not more than once in every 40 years (1-in-40), on average, for drought permits or drought orders which would restrict the use of water for commercial purposes.

The company considers the imposition of rota cuts and standpipes, which represent more severe restrictions on customer use, as generally unacceptable but during unprecedented conditions these options are still available through emergency drought orders.

In practice the actual current level of service in each of the 24 water resource zones varies, and is determined using water resource modelling. This work was carried out to support the WRMP 2014, and in each case the result confirmed that the WRZ at least complies with the company's overall planned levels of service.

## 1.4 Consultation process

Under the Water Industry Act (1991) amended by the Water Act (2003) and in accordance with Environment Agency 'Drought Plan Guideline' (updated June 2011), we are required to undertake consultation prior to preparation of our draft Drought Plan. We were also required to begin preparation of a new drought plan no later than 3 years after publication date of previous plan.

### 1.4.1 Pre – draft Consultation

#### Who we consulted

In accordance with the Drought Plan Guideline, we consulted a range of stakeholders before preparing the draft plan, including statutory consultees, non-statutory consultees that may have an interest in the drought plan and are likely to be affected by actions within the plan, and neighbouring water companies with whom we have a bulk supply or shared resource agreements.

The following companies and organisations were contacted in August 2013 regarding the pre draft drought plan consultation:

- Consumer Council for Water
- Natural Resources Wales
- Environment Agency
- Ofwat
- Defra
- Welsh Government
- Drinking Water Inspectorate
- Natural England
- United Utilities
- Severn Trent
- Dee Valley Water
- Albion Water
- Bristol Water
- Scottish and Southern Energy

#### Feedback received and how this has influenced our Drought Plan

Responses were received from United Utilities, Severn Trent, Natural Resources Wales, the Environment Agency and Ofwat. The main points raised via the pre-consultation process are summarised below, along with a short description of how this has influenced our Drought Plan:

- **Triggers, Scenarios and Drought Action Zones:**

We received a number of comments from the Environment Agency and Natural Resources Wales which emphasised that we should review our drought control lines. In particular, it was suggested that we determine whether the use of a single set of control lines for the ‘Big 5’ reservoirs in our SEWCUS resource zone is still appropriate. As discussed during the pre-consultation process, we recognise that the drought control lines within SEWCUS may need reviewing from time to time in the light of licence changes or improvements to hydrological knowledge. We believe that the current rules provide an effective balance between environmental protection and customer service. We will work with NRW to re-examine control rules in time for any necessary amendments to be made prior to submission of both our next Drought Plan and Water Resources Management Plan in 2019.

The Environment Agency and Natural Resources Wales also requested that we assess scenarios which are more extreme than those which we have in the historical record, to show how the drought options would be implemented and to explore what additional drought actions could be

implemented in such an event. The drought scenario testing carried out for our drought plan has therefore included assessments of more severe droughts than those which are included in the historical record. We have applied two methodologies to generate artificial long duration droughts that have enabled us to look at the likely timing and implementation of drought options. Details of this work are set out in Section 2.3.

The Environment Agency also requested that we review the triggers set in the resource zones which were previously not modelled (Whitbourne, Hereford, Ross-on-Wye and Vowchurch) and offered to supply rainfall data which they possess for use when assessing Vowchurch and Whitbourne. Natural Resources Wales suggested that we review the rainfall, reservoir and abstraction triggers and suggested that as part of our scenario work we should demonstrate that our triggers do not delay implementation of drought actions. As part of the drought planning process we have carried out a review of our drought triggers and we have set out and explained them in Section 2.2. We have used scenario testing to demonstrate the validity of the drought triggers and to demonstrate how they could be used in a drought situation. Details of this analysis are presented and discussed in Section 2.3.

- **Communications:**

Natural Resources Wales requested that we provide information within our communications chapter on who has responsibility for deciding how and when the drought plan is implemented. This information is set out in Section 5 '*Management and communications strategy*'. Specific details of the management structure and roles and responsibilities during a drought are provided in Section 5.1.

The Environment Agency highlighted that the drought plan guideline recommends that water companies should monitor the effectiveness of any customer awareness campaigns implemented during a drought. In accordance with the guideline, we have set out in Section 5.2.11 the need to capture information on the demand savings that occurred as a direct result of the drought communications campaigns and the post-drought customer research that would be carried out.

Ofwat requested that we clearly set out what a drought is, what steps will be followed to manage it, and the levels of service in terms of restrictions on use that our customers can expect. They also commented that the drought plan needs to be easily accessible to customers. We have set out the indicators used to identify when a drought is developing in Section 2 & 2.1. We provide a high level description of the drought restrictions and customer levels of service in Section 1.3.2, with more detail on levels of service in Section 3.2, and demand side drought measures in Section 3.4. Our drought plan is published on our web site with an accompanying Non-Technical Summary, and is therefore easily accessible to customers.

- **Temporary Use Bans (TUBS):**

The Environment Agency highlighted that the guidelines recommend that we use the consultation stage of the drought plan to gain views from our customers on how the company should use its new wider powers. We made our customers aware of our forthcoming drought plan through our website during the initial consultation period and asked for representations by 13<sup>th</sup> September 2013. In expectation that few customers would respond, as part of our business planning process we have pro-actively undertaken customer research work to understand customers views on temporary use ban options. This included both domestic and commercial phone and e-mail surveys and focus group interviews. We have included a description of this research and a summary of the findings in Section 3.4.1 of the Drought Plan.

Natural Resources Wales referenced their guidance on how to incorporate the TUBS legislation within the drought plan. We have described the changes to the legislation since the last Drought Plan in Section 3.4.1 and the implications of these changes for water use restrictions. We have used the UKWIR voluntary Code of Practice and guidance to water companies on implementation of

water use restrictions during a drought to develop our approach to TUBs as set out in this drought plan.

Ofwat also commented that the drought plan needs to set out our liability for payments of compensation associated with drought permits. Details of the compensation claims process is set out in Section 3.4.5 and 3.6.1 of the Drought Plan

- **Demand Management:**

Natural Resources Wales requested that we provide details on the demand management actions we will implement during a drought. The Environment Agency provided similar comments that the plan needs more details on leakage management during a drought. Table 7 in Section 3.4 provides details of all the demand side measures we may implement during a drought, including a detailed options description, the trigger for implementing the option, the likely demand saving associated with the option, the implementation timetable, and the likely permissions required in order to impose the option.

- **Arrangements with other Water Companies:**

Severn Trent Water commented on Elan, the River Wye and the River Dee, where we have shared resources, and noted that they expect us to make reference to the management of these sources in the drought plan. Both Natural Resources Wales and Severn Trent Water mentioned that details of the impacts of the drought plan on our arrangements for bulk supply and shared resources should be covered within the plan, and that we need to continue to work closely together to establish the in-combination impacts of both companies' drought orders on the River Wye.

We have included details on the bulk supply and shared resource arrangements in Section 1.3.1. Further details on how these may be affected during a drought are given in Section 2.2.3. The assessment of in-combination impacts of both companies' drought orders on the River Wye will be addressed through the environmental assessment process for the specific drought order as set out in Section 4.

- **Environmental Assessment**

Natural Resources Wales commented that we are required to carry out an Environmental Assessment to determine the environmental sensitivity and likely environmental impact of each drought permit site.

The Environment Agency and Natural Resources Wales noted that where it is not possible for the Environmental Reports to be completed in time to feed in to the drought plan, we should include details of the timescales for their delivery within the plan. The Environment Agency cited updated guidance from Defra and Welsh Government on the requirements for Environmental Assessment under the Habitats Directive.

We have included details of our approach to environmental assessment and monitoring in Section 4 of the Drought Plan. This includes a timetable for the implementation of each phase of the assessment process. We are committed to preparing Environmental Assessment Reports (EARs) for each of the drought permit/order options identified in the Drought Plan. All EARs produced will be compliant with appropriate guidance documents including the Defra/Welsh Government Drought Order/Permit guidance (May 2011) and the Environment Agency Water Company Drought Plan Guidance (June 2011). The EARs will also address the requirements of the Water Framework Directive (WFD), Habitats Regulations (for sites where a drought order has the potential to impact on a European designated site), and Countryside Rights of Way Act (for sites where a drought permit/order has the potential to impact a SSSI).

The Environment Agency stated that it would be useful to discuss and agree whether Vowchurch and Whitbourne require Drought Order applications as it is their belief that Drought Permits may suffice. In relation to this, they also recommended that we revisit the wording in Section 12.4 of our previous Drought Plan and noted that an Environmental Report is produced for both Drought Permits and Drought Orders, while Appropriate Assessments may be required where Habitats Regulation Assessment (HRA) screening has been unable to rule out a likely significant effect on a Habitats Directive Site. We will maintain close liaison with the Environment Agency regarding the requirements relating to Vowchurch and Whitbourne as part of the ongoing Environmental Assessment process, details of which are set out in Section 4 of the Drought Plan.

#### **1.4.2 Draft drought plan public consultation**

Following the preparation of our draft drought plan, we submitted this to the Welsh Ministers to be checked for information contrary to national security and/or commercial confidentiality. The plan was then amended to reflect the comments from Welsh Government.

Once amended, the draft drought plan was published on our website, and a period of consultation on the plan commenced on the 5<sup>th</sup> September 2014 for 8 weeks. Consultation responses were sent to Welsh Government who will collate these and forward them to us.

The Drought Plan direction 2011 requires us to publish our statement of response to representations within 15 weeks of the publication date of the draft plan. We therefore prepared and published our statement of response by 19<sup>th</sup> December 2014. The statement of response document responded to all the consultation comments received, issue by issue, and identified whether we would make any changes to the drought plan based on the comments received. Appended to the statement of response document was a table containing every comment received and our direct response. The statement of response was published on our website.

We would like to thank our customers and stakeholders for their input and contribution to the consultation process. We value your comments and appreciate the time you have taken to respond to the consultation.

## 2 Drought indicators, triggers and scenarios

Every drought is different - droughts vary in their duration, intensity and regional distribution.

It is important that the water resource situation is monitored throughout the year and across our operating area to ensure we are aware of the onset of drought and the need for timely action. The resource position is monitored and described through indicators which not only provide a measure of relative 'dryness' but also the amount of water that is available for supply. This is based upon volumes of water in storage and the state of river catchments measured via a network of river gauging stations and rain gauges. A further indicator of prolonged dry weather is a sustained level of high demand.

We have used the data and information available from the historic hydrometric records for our reservoirs and the rivers that supply them, to develop a series of trigger levels for our reservoirs. These trigger levels identify storage zones within the reservoirs that indicate whether drought conditions are being experienced. The actions that we will implement under these conditions to maintain water supplies to customers are identified for each storage zone.

In water resource zones where there is no raw water storage, supply is maintained directly via river or groundwater abstraction. The volume of water that can be supplied is therefore governed by the amount available in the river/aquifer, the abstraction licence volume, and the operational system constraints. Drought triggers have been developed for these sources based on the level of demand that can be sustained during drought conditions.

Unique drought triggers have been developed for each water resource zone to reflect the specific hydrological conditions, operational constraints and experience within each zones. The drought triggers for each zone have been tested to demonstrate how the system responds to drought and that the timescales required for the implementation of proposed drought actions are achievable. This testing has been done by simulating operational performance using specific drought scenarios.

### 2.1 Drought Indicators

There are a number of indicators that a drought is developing. An important requirement of a drought plan is to identify the hydrological indicators for our water resource zones. The following indicators are used to identifying and measure the onset of drought in our water resource zones;

- Rainfall
- Reservoir storage
- River flows
- Level of demand

The regional water situation is monitored on a weekly basis. Reports on the situation are circulated widely both within DCWW and shared with external stakeholders, including NRW. Routine monitoring is also carried out by NRW and the Environment Agency, and any relevant data and information is shared with DCWW. NRW and EA water situation reports and associated data provided to us, give an indication of whether an environmental drought is likely and this data is also used to monitor the onset of a water resources drought. The results of the routine monitoring are used to track any decline in water resource availability during the year, with checks undertaken to monitor this position against specific drought triggers.

### 2.1.1 Rainfall



Rainfall is a primary indicator of drought severity, and one of the earliest indicators of the possible onset of drought. It has a direct effect on all other hydrological conditions (river flows, soil moisture deficit and groundwater recharge) and therefore effects the quantities of water available for abstraction.

Rainfall is recorded via a network of rain gauges across the UK. DCWW monitor and record rainfall data at a number of representative sites across our supply area. This data is reported to NRW, the Environment Agency and Welsh Government on a weekly basis in our water situation reports and shows a comparison of these levels against monthly long term averages or specific thresholds. Figure 2 shows where we monitor rainfall data and the spatial distribution of this monitoring network across our supply area. The period of record for each of these sites is shown in Table 1.



Figure 2 - Locations of DCWW rain gauges

Monthly rainfall data is also provided by NRW and EA within their 'Monthly water situation report'. This reports monthly rainfall totals for the three NRW Areas of Wales (North, South East and South West), and the Shropshire, Herefordshire, Worcestershire and Gloucestershire Area of the EA, and compares them to the 1961 to 1990 long term average for each area.

During dry conditions DCWW uses the Standard Precipitation Index (SPI) (McKee et. al. 1993) to analyse the rainfall record at each of our sites. The SPI allows the rarity of a period of low rainfall to be determined at a given timescale for any rainfall station with an historic record. Further details on what SPI is and how it is calculated can be found in Appendix 2.

**Table 1 - DCWW rainfall gauging stations and period of record**

Gauging station name	Water resource zone	Area	Period of record
Cefni	North Eryri/ Ynys Mon	North	1961 - 2014
Glascoed	Clwyd Coastal	North	1961 - 2014
Alwen	Alwen Dee	North	1911 - 2014
Brynhyfryd	Alwen Dee	North	1961 - 2014
Cwmystadrlllyn	Lleyn Harlech	North	1966 - 2014
Ysbyty Ifan	Dyffryn Conwy	North	1964 - 2012
Minafon	Blaenau Ffestiniog	North	1967 - 2014
Bala	Bala	North	1961 - 2014
Dolgellau	South Meirionydd	North	1968 - 2014
Dinas	North Ceredigion	South West	1998 - 2014
Pencader	Mid & South Ceredigion	South West	1989 - 2014
Maendochog	Pembrokeshire	South West	1981 - 2014
Gorslas	Tywi Gower	South West	1998 - 2014
Ystradfellte-Ty Llyn	Tywi Gower	South West	1995 - 2014
Nelson	SEWCUS	South East	1984 - 2014
Pontsticill	SEWCUS	South East	1998 - 2014
Tal y Maes	SEWCUS	South East	2000 - 2014
Crai	Brecon Portis	South East	1998 - 2014
Broomy Hill	Hereford CU	South East	1993 - 2014
Ciloerwynt	Elan Bulth	South East	1997 - 2014

### 2.1.2 River Flows

River flow as an indicator is primarily of use in zones where we utilise direct river abstraction (such as Llyswen), zones with borehole abstraction adjacent and hydrologically connected to a river (such as Pilleth) and zones where river abstractions are used to augment recharge in impounding reservoirs (such as Llandegfedd in SEWCUS).

NRW and EA report monthly mean river flows for their gauging station network across Wales and England in their 'Monthly water situation report'. As well as the monthly mean flow, data is also presented as a percentage of long term average for the reporting month. In addition, the monthly minimum and maximum flows on record are also reported. This enables us to quickly identify if river flows are receding in response to low rainfall and the onset of potential drought conditions. By looking at recession trends, we can also use river flows to anticipate the earliest point at which abstraction licence conditions may need to be varied under drought conditions.

If the river flows in the NRW and/or EA monthly report indicated the potential for drought conditions, we would put in place more frequent data requests with NRW and/or EA to enable us to closely monitor the conditions on rivers that we abstract from.

Table 2 lists the gauging stations that we use to monitor the rivers for abstraction licence compliance and river regulation releases.

**Table 2 - River gauging stations used by DCWW and period of record.**

Gauging station name	Gauging station number	River	Water Resource Zone	Area	Period of record
Redbrook	55023	Wye	SEWCUS/Herefordshire/Monmouth	South East	1936-present day
Trostrey Weir		Usk	SEWCUS/Brecon-Portis	South East	
Capel Dewi	60010	Tywi	Tywi CUS	South West	1958 – present day
Canaston Bridge	61002	Eastern Cleddau	Pembrokeshire	South West	1960 – present day
Pont y Garth	64012	Dysynni	South Meirionnydd	North	1997 to present. Data from Dysynni G.S also available from 1966
Bryn Aled	66003	Aled	Clwyd Coastal	North	
Dolbenmaen	65007	Dwyfor	Lleyn Harlech	North	1976 to present
Pont y Cambwll	66001	Clwyd	Clwyd Coastal	North	1984 to present

### 2.1.3 Groundwater

We are able to monitor water levels at our groundwater sources at Pendine, Lovesgrove, Brecon, Vowchurch, Pilleth, Leintwardine, Dunfield and Penderyn. We monitor water levels in all our Production boreholes. With the onset of dry weather and during a drought situation we will review the monitoring requirements for these sources to identify if there is likely to be any impacts at these sites. Table 3 lists the additional observation boreholes where monitoring can take place during a drought.

Table 3 - Groundwater monitoring sites

Site name	Water Resource Zone	Area
Pilleth 4.2S, 4.2D	Pilleth	South East
Vowchurch A4, D2, House Farm, Chanstone Mill, 89, 88, 88B, D3, A1	Vowchurch	South East
Brecon OBH2, OBH4, OBH8	Brecon Portis	South East
Lovesgrove OB2DS, OB2DD, OBH1	North Ceredigion	South West

#### 2.1.4 Reservoir storage

Although rainfall and river flows are a primary indicator of drought these can only provide an understanding of current hydrological conditions and not the complete water resources situation, which is also dependent upon water captured within reservoir storage. This is monitored through the regional telemetry system and reported on a weekly basis in the water resource situation report.

Most of DCWW's reservoirs are managed by reservoir operating control lines that indicate when storage levels are below normal for the time of year. These are used each year to trigger normal operational changes in order to optimise the use of stored water and to balance reservoir storage. Under normal water resource conditions and reservoir operation, the amount of water in storage in our reservoirs declines during the summer months and recovers again over the winter period.

In addition to the operating control lines, Drought Action Zones have been developed for reservoirs across our water resource zones. These action zones indicate when storage levels are reduced to a volume that may require the implementation of drought actions to preserve water supplies. The control lines are used as triggers for implementing these actions.

#### 2.1.5 Abstraction and demand

During dry weather conditions, customer demand increases. As demand increases, so does the pressure on our water resources. Abstraction and demand can therefore be used to indicate when our resources are being stretched. This is particularly important in water resource zone where there is no reservoir storage as demand should never exceed the capability of the supply system in these zones.

In accordance with our abstraction licence conditions, DCWW record the volume of water abstracted from each of our sources. Additionally, we continuously monitor the demand from our water treatment works and report this data on a daily basis using our telemetry network. In water resource zones without raw water storage reservoirs, triggers are set in relation to supply capability in order to ensure that demand management activity is undertaken where necessary if developing drought conditions occur.

## 2.2 Drought triggers

It is important to establish when action should be taken during droughts to protect public water supply. DCWW has developed drought triggers to identify when we should consider implementing specific drought actions to reduce demand and, if necessary, obtain additional water resource. These triggers are used as decision making tools as part of an overall drought management framework. In a drought situation, professional judgement, drought scenario modelling and available data and information in the form of the drought indicators discussed above, will also be used in the drought management decision making process.

Drought triggers have been developed to identify when the water resource situation is moving into a drought. Increasing levels of drought have been defined, aligned with drought guidance to ensure that that drought actions are proportionate to the level of drought risk. These are:

- Stage 1 - Normal operation
- Stage 2 - Developing drought
- Stage 3 - Drought
- Stage 4 - Severe drought
- Stage 5 - Post drought

Drought events are usually slow to develop, and can last for a long period of time from initial identification. Successful drought management therefore requires a methodology and approach that is able to clearly identify a developing drought without misinterpreting normal dry summer conditions.

This section describes the trigger levels used for DCWW's reservoir, river and groundwater sources, and how they have been developed. However, when using trigger levels it should be recognised that each drought is unique in terms of severity, duration and season. Trigger levels should therefore be used with caution, and in conjunction with an understanding of how they were defined, the uncertainties and limitations associated with them, and knowledge of the other drought indicators for the relevant drought situation.

As with the entry into drought, it is important to understand when a drought has ended. Premature lifting of drought options before true recovery could cause reputational damage which must be avoided.

For this reason, the initial recovery out of the drought zone would not typically be the point at which all measures would be lifted. A more likely point for declaring the end of a drought would be a return to the normal zone, where reservoirs are well stocked for the time of year and, in demand trigger zones, abstraction quantities fall below the developing drought level.

The time of year and the forecast weather conditions will be another indicator of the recovery – entering the normal zone in October would typically be followed by winter weather and replenishment of resource, but entering the normal zone in April is at the start of the anticipated summer dry period. For this reason, we may delay declaring the end of drought in later spring.

Equally, in a demand trigger zone, moving out of developing drought would be a useful trigger, but if the weather forecast was warm and dry or holiday periods were about to start, demand would be expected to rise again, so it would not be appropriate to call the end of drought.

### 2.2.1 Reservoir triggers

Reservoir triggers have been developed in the form of Drought Control Lines (DCL) for reservoirs or groups of reservoirs across DCWW's water resource zones. These define drought action zones (DAZs) within which we may implement specific drought actions. The drought control lines and zones have been developed and tested with the use of our WRAPSim water resource system computer modelling software. The DAZs for each of the reservoirs are shown in section 2.3 which details the testing of these against drought scenarios. These are also provided in the relevant water resource zone summaries in Appendix 1. An example of Drought Action Zones is provided in Figure 3. Table 4 summarises the reservoirs within each water resource zone that have DAZs.

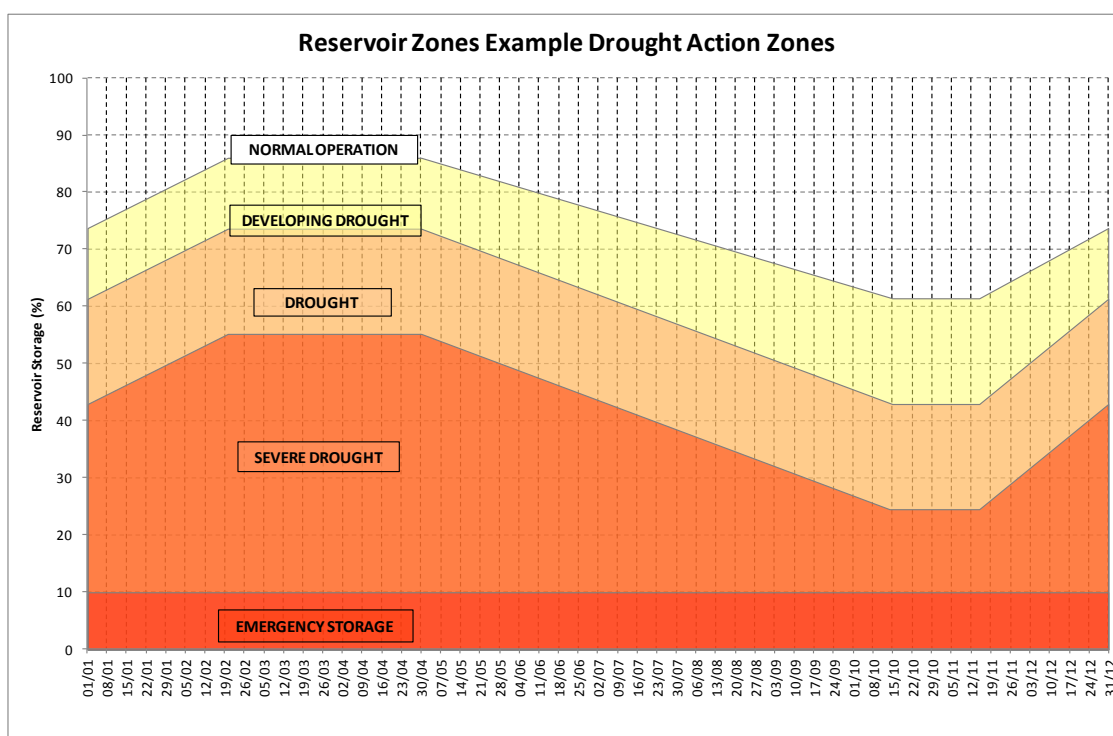


Figure 3 - Example Drought Action Zones

Table 4 - DCWW reservoirs with Drought Action Zones

Water resource zone	Reservoirs with Drought Action Zones
North Eryri/Ynys Mon	Llyn Cefni Llyn Ffynnon Llugwy Alaw Cwellyn
Clwyd Coastal	Llyn Aled & Aled Isaf combined
Dyffryn Conwy	Llyn Conwy Llyn Cowlyd
Alwen Dee	Alwen Reservoir
Bala	Llyn Arenig Fawr
Blaenau Ffestiniog	Llyn Morwynion
Barmouth	Llyn Bodlyn
Lleyn Harlech	Llyn Cwmystradllyn & Tecwyn Uchaf combined
South Meirionnydd	Llyn Cynwch
North Ceredigion	Craig y Pistyll & Llygad Rheidol combined
Mid & South Ceredigion	Teifi Pools
Pembrokeshire	Preseli Reservoir Llys y Fran Reservoir
Tywi Gower	Llyn Brienne Ystradfellte Reservoir Crai Reservoir
SEWCUS	'Big 5' combined storage

Three DAZs have been defined for each reservoir to represent the different stages of drought:

- Developing drought– if reservoir storage moves into this zone it indicates that the resource situation has deteriorated from normal operation (stage 1) to developing drought (stage 2). Implementation of the developing drought actions will be reviewed and implemented by the company to optimise use of resource and progress demand management options.
- Drought zone – if reservoir storage falls into this zone it indicates that the resource situation has deteriorated from developing drought (stage 2) into drought (stage 3). Implementation of drought actions to reduce demand and conserve resources should therefore be considered by the company.
- Severe drought zone– a fall of reservoir storage into the severe drought zone indicates that the resource situation has deteriorated still further, from drought (stage 3) to severe drought (stage 4). Implementation of the drought actions associated with severe drought such as options to reduce demand and increase available resource would be considered and implemented by the company.

The drought actions associated with each of the different stages of drought are outlined and discussed in detail in Chapter 3. Drought management actions are discussed at a water resource zone level in the Appendix 1 zonal summary tables.

Scenario testing has been used to demonstrate the validity of the DAZs and to demonstrate how they could be used in a drought situation. Details of this analysis are presented and discussed in Section 2.3.

## 2.2.2 River abstraction & groundwater triggers

The ten water resource zones that do not have reservoirs have their drought triggers defined using demand levels related to supply capability. These vary between zones and are related to the nature of the supply system and resultant risk. Decision making on required actions in all zones takes account of antecedent and forecast weather conditions using all drought indicators alongside drought triggers. Table 5 below shows these WRZs and the type of source.

**Table 5 - Non-storage zones and source types**

Zone Number	Zone Name	Type of source
8021	Tywyn Aberdyfi	River
8036	South Meirionnydd	Combined river, groundwater and reservoir
8101	Ross on Wye	Technically a bulk import from the River Wye
8102	Elan / Builth	Combined river and reservoir
8103	Hereford CUS	Combined river and groundwater
8105	Llyswen	River
8106	Monmouth	Combined river and groundwater
8107	Pilleth	Groundwater
8108	Brecon / Portis	Combined reservoir and groundwater
8110	Vowchurch	Groundwater
8111	Whitbourne	River
8202	Mid & South Ceredigion	Combined river and reservoir

In these zones, where there is no storage component, the risk to supply during drought periods relates to peak supply capability. The water resource available in these zone is primarily related to abstraction licence which in itself may be constrained by river flows.

Our WRMP process ensures that this risk is managed through the assessment of the critical peak supply/demand balance for these zones and where necessary, schemes put in place to maintain the supply demand balance. However, scenarios can be envisaged where water supply risk could be heightened for specific operational reasons (outages) combined with unprecedented levels of demand and or extreme climatic events. It is necessary to monitor the level of demand against peak supply capability/licensed quantity in these zones so that when required, actions can be taken to ensure that this balance is maintained. A combination of pre-defined triggers along with hydrometric

monitoring is required to aid effective decision making and allow sufficient time for actions to be taken once a trigger is reached.

There are times in the year when demand rises predictably. For example an initial demand spike is always observed near the end of May (related to the Whitsun bank holiday) and a second, more protracted period of high demand often occurs across the summer holidays from mid July through to the end of August during periods of fine weather. Before and during these times, it is particularly important to monitor customer demand, to ensure that normal hot weather isn't misinterpreted as developing drought.

If a drought occurs which is more extreme than any we've experienced before, we need measures to cope. To help in the identification of these drought scenarios, we have developed demand triggers based upon forecasts of peak demand in line with those used for our WRMP and practical timescales for implementation. We have also used historic demand data from key years as demand scenarios to test these trigger lines.

The first point at which a drought needs to be considered for these zones is mid June. At this point we would review the past two weeks of weather information based on the short term SPI figures calculated from Met Office statistics. If these confirm that the weather has been hot and dry, and we have tracked an associated increase in demand, we would start to prepare a media campaign and TUBS consultation process, but would not implement either of these at this stage.

The next key date is the first week of July, which is approximately two weeks in advance of the start of the summer holidays. The reason this date is important is that if a media campaign is started, we anticipate a lead in time of about two weeks before it impacts demand. Hence, starting a campaign two weeks before the beginning of the summer holidays affords us enough time to reduce the summer peak. If weather has remained hot and dry through to the end of June, a media campaign would be started in July along with a two week consultation on how we propose to implement TUBs

Throughout July, we would closely monitor the impacts of the media campaign on demand and track any savings. If demand remains high through this period, then the end of July would mark the point at which we would implement TUBs.

Based on the need for a flexible approach to drought management in these non-storage zones, we have developed Figure 4 which identifies the main decision points as a drought situation develops.

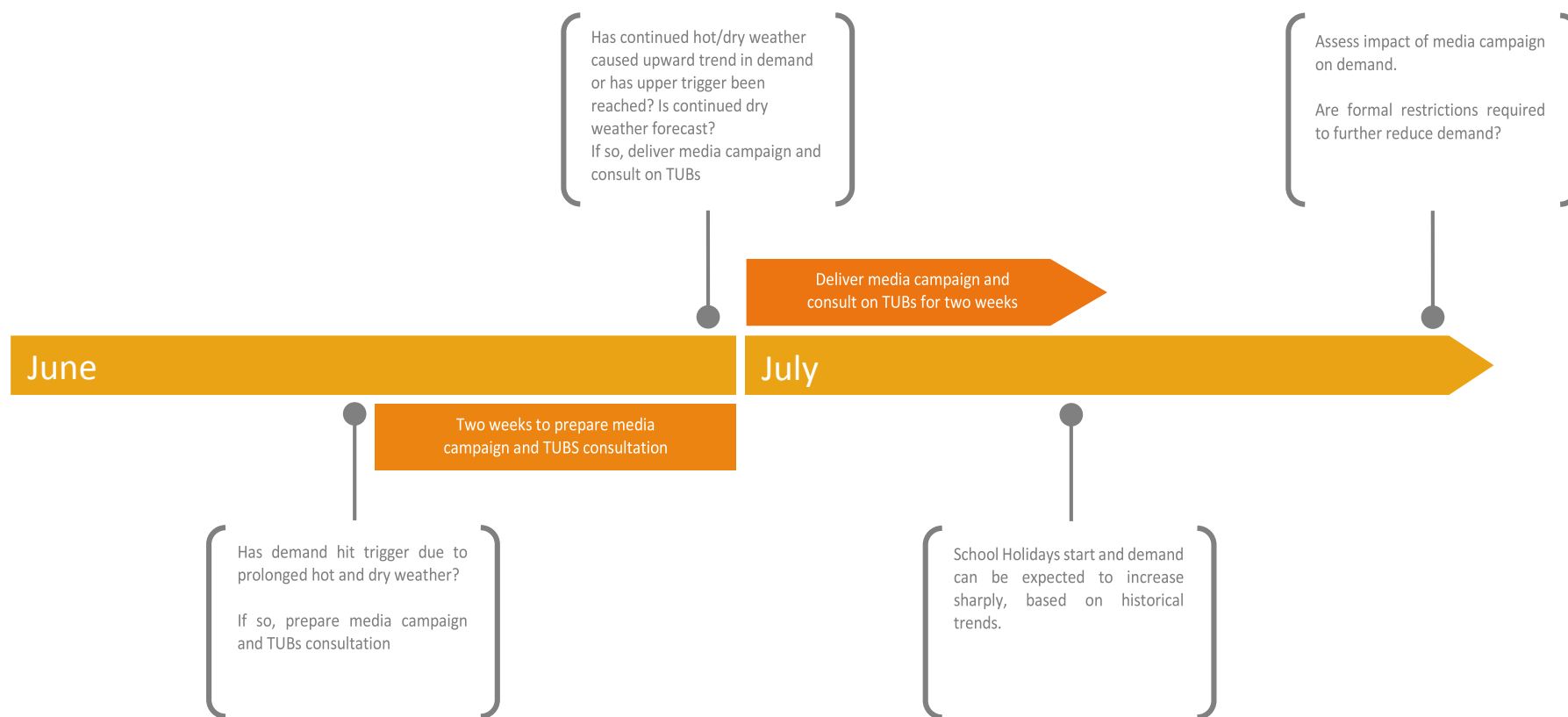
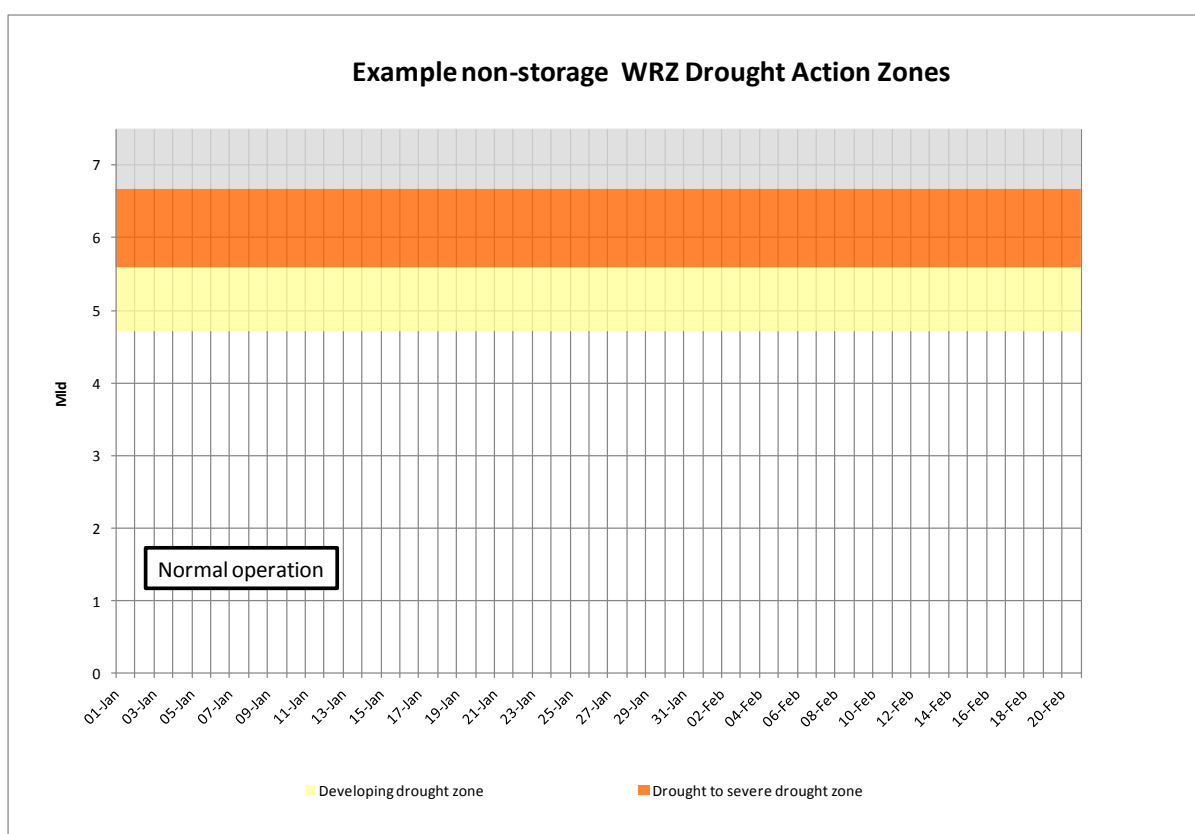


Figure 4 - Triggers and timescales for non-storage zone demand side options

To assist in the identification of drought, indicative drought zones have also been set based on the demand within the zones. This provides a quantitative confirmation of the impact of the antecedent weather conditions.

There are a number of ways in which drought control indicators can be set based on demand, and to use the same approach for each zone is not always appropriate. In some instances, indicators can be set from assessing the historical peak values or the peak of a synthesised dry year critical period demand profile. There are other instances where this approach will not produce a useful result, for instance if the historic and dry year critical period values are very close to the peak capability of the zone, they do not provide a useful indicator of drought as they do not afford sufficient opportunity to deliver demand side reductions or supply side measures.



**Figure 5 - Example drought indicators in non-storage zone**

### 2.2.3 Bulk supplies and shared resources

#### Elan Reservoirs

Within the Elan Valley abstraction licence a 'Lower Rule Curve' is defined based upon reservoir storage which when crossed, reduces the total volume available for abstraction at the Elan Reservoirs and at the Mitcheldean (SvT) and Wye Transfer (DCWW) abstraction on the lower River Wye as well as reducing the volumes of regulation release made, in order to preserve storage. The River Wye S.20 Operating Agreement makes provision for Drought Management, the details of which are then contained within the River Wye Operating Manual.

## Llyn Cowlyd reservoir

The top 47% of Llyn Cowlyd storage is shared between Welsh Water and RWE Innogy by means of separate raw water mains and control systems. The water abstracted by RWE Innogy flows to their hydro-generation site at Dolgarrog in the Conwy Valley, while the water abstracted for public water supply purposes by Welsh Water is delivered to the Bryn Cowlyd Water Treatment Works at Dolgarrog. Once the storage falls below 47% full, RWE Innogy cease abstraction from Llyn Cowlyd, leaving Welsh Water as the sole abstractor until such time that the storage recovers to the agreed control line.

## 2.3 Drought scenarios

The Environment Agency water company drought plan guideline (June 2011) requires us to test our drought triggers using drought scenario analysis. This scenario testing should be used to;

- Demonstrate that there is an appropriate lead-time for specific drought triggers and actions to take place;
- Demonstrate that the trigger points reflect the company's planned levels of service;
- Assess the likely effect of known historic drought events on the current water supply system;
- Assess both short, medium and long duration droughts;
- Test drought management triggers against selected scenarios, and use drought scenario assessment to demonstrate how drought actions will be implemented during a drought.

In line with this guidance, we have carried drought scenario analysis for both our reservoir triggers (Drought Action Zones) and for our river and groundwater triggers. The details of this work are set out in the following sections.

### 2.3.1 Scenario testing reservoir Drought Action Zones

Scenario testing has been carried out for all the reservoirs with Drought Action Zones using our water resources planning model, WRAPSim. This model is used to carry out all the water resource modelling required to support the Water Resources Management Plan. WRAPSim models have been developed for each water resource zone to reflect the current system set up and operational constraints (pumping and treatment capacities, abstraction licence quantities, storage capacities etc). The models use historic river flow records to simulate the operation of our current water resource zones if they experienced those river flows again today. The demand savings associated with entering each of the Drought Action Zones are also included in the modelling.

The scenario modelling carried out has assessed the likely effect of known historic drought events on the current water supply systems. These historic droughts include both short (one season) and medium duration (two season) droughts where appropriate. The historic river flow record used in our WRAPSim model does not contain any long duration droughts. We have therefore applied two different methodologies to generate an artificial long duration drought to assess the possible effect on our reservoir systems and the likely timing of the implementation of drought actions. Details of the assessments carried out for each water resource zone are provided in the following sections.

The timing of entering the drought action zones has been analysed for each resource zone to demonstrate that there is an appropriate lead-time for implementing the actions associated with entering each DAZ.

The 'Code of Practice and Guidance on Water Use Restrictions' (UKWIR, 2013) advises that there can be up to a period of at least 2 to 3 weeks between a company making the decision to impose a

Temporary Use Ban and being able to implement it. Similarly, the experiences of other water companies in the 2006 drought illustrated that for Drought Orders the process from first advertising the intention to apply for a drought order to receiving notice of the order, took around three months. These timescales have been considered in the analysis of the scenario assessments carried out.

Even under the most extreme scenarios generated to test our drought resilience, only two zones supported by reservoirs are at significant risk of having to utilise emergency storage. For these zones, we have demonstrated that options are available to help sustain storage through supply side measures and to enable us to maintain water supplies even through these extreme scenarios used to test the plan.

### North Eryri/Ynys Mon

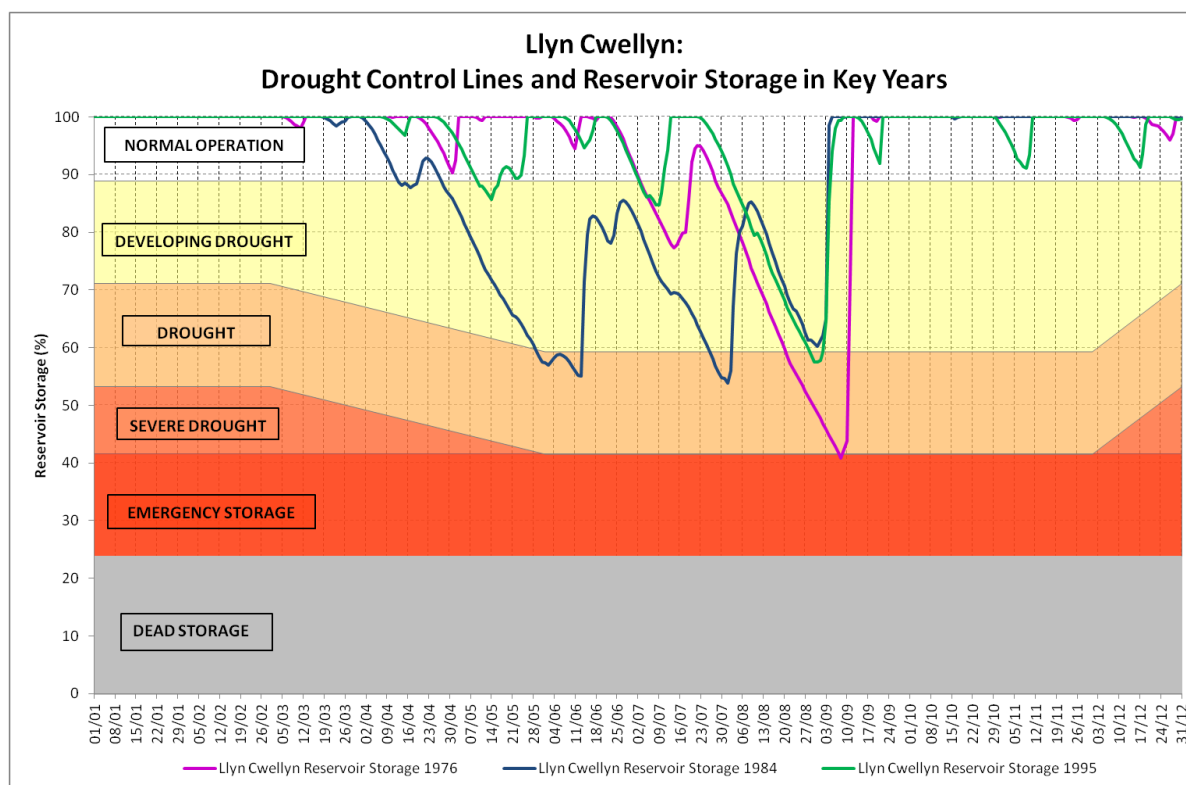
The flow record available for the North Eryri/Ynys Mon water resource zone covers the period from 1958 to 2011. This inflow record has been derived using Hysim rainfall runoff modelling. This period of record covers a wide range of historic drought events including the single season 1976 and 1984 droughts, as well as two season events in 1995/96. The critical drought year for NEYM is 1984.

The modelling carried out to support the WRMP demonstrates that this water resource zone is constrained by water company levels of service.

The analysis of our modelling assessments for North Eryri/Ynys Mon has focused on Llyn Cwellyn as the major reservoir within the water resource zone. If this reservoir (or any two of the other three reservoirs in the WRZ) drops into the Drought DAZ, the whole resource zone would be declared as being in drought. Figure 6 shows the drawdowns for historic droughts at Llyn Cwellyn. Similar plots have been included in Appendix 1 for the other sources in the NEYM WRZ; Llyn Cefni, Llyn Alaw and Fynnon Llugwy. In general these show that the risk to water resources on Ynys Mon is relatively low even though Llyn Alaw can be slow to refill. For example even though Llyn Alaw failed to refill during the winters of 1995/96 and 1996/97 the storage remained above the severe drought trigger during the following summers. In 1996 the storage entered the drought DAZ but in 1997 it stayed in the normal zone. The typical drawdown at Fynnon Llugwy is relatively slow, giving us enough time to respond with the appropriate drought actions.

The historic drought years assessed for NEYM show all the DAZs for Llyn Cwellyn being entered during the 1976 drought. It takes 23 days (3 weeks) to enter the drought DAZ after moving into developing drought, and it only takes a further 18 days (just over 2 weeks) to enter the severe drought DAZ after moving into drought. No further drought scenarios were assessed for this resource zone because the historic record provided examples to test the DAZs at the major reservoirs.

This assessment indicates that once the developing drought DAZ is entered for this zone at Llyn Cwellyn, measures should be put in place to act quickly to implement temporary use ban restrictions and drought permit and drought order applications under the subsequent stages of drought, due to the possibility of having a very limited timeframe in which to implement them once the DAZs are entered. Details of the drought action sequence of events for NEYM are provided in Appendix 1 and state that for Llyn Cwellyn drought order applications would be prepared during developing drought, and submitted at the appropriate time once the drought DAZ is entered, subject to forecast modelling and assessment of the specific drought circumstances at the time. Due to the environmental designations of this site (SAC & SSSI) it has been prioritised under our drought plan environmental monitoring and assessment programme of work, therefore we aim to have all the required environmental monitoring and reporting in place to support any drought order applications needed during a drought situation.



**Figure 6 - Llyn Cwellyn Drought Action Zones and historic droughts**

## Clwyd Coastal

The flow record available for the Clwyd Coastal water resource zone covers the period from 1920 to 2010. This inflow record is a naturalised flow record generated by the Environment Agency Wales (now Natural Resources Wales). This period of record covers a wide range of historic drought events, including the single season droughts in 1976 and 1984, as well as the two season 1995/96 drought.

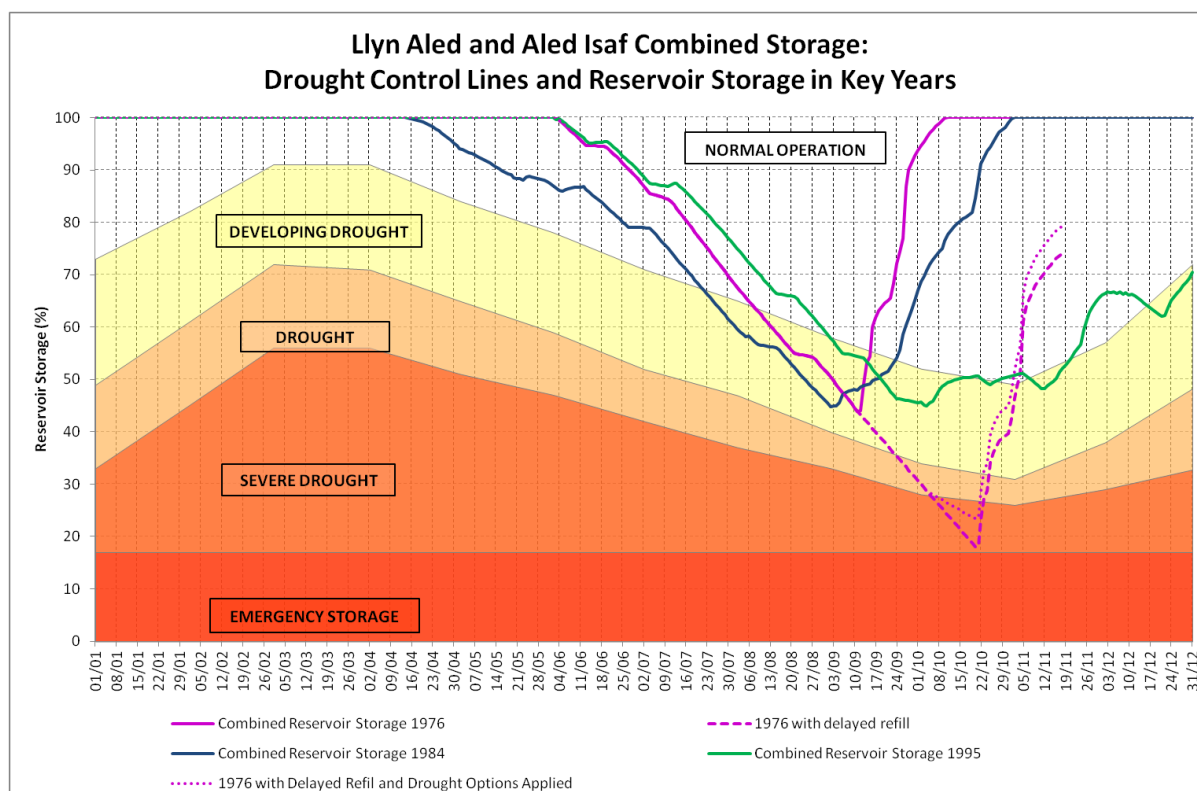
The modelling carried out to support the WRMP demonstrates that this resource zone is constrained by both annual licence conditions and levels of service.

The historic drought years assessed for Clwyd Coastal did not enter the drought DAZ for the Llyn Aled & Aled Isaf combined storage. Combined reservoir storage in 1976, 1984 and 1995 all dropped into the developing drought DAZ, but none of them reached the drought DAZ. In order to assess timing of the drought actions associated with each DAZ, a more severe drought than those on record was generated. This was done using a 'delayed refill' methodology. Under this scenario, the 1976 drawdown was maintained at a consistent rate for a longer period of time, until the day when the latest recorded refill started for the other droughts assessed. For Llyn Aled & Aled Isaf this was around the 18<sup>th</sup> October in the 1989 drought. Under this scenario the combined reservoir storage drops through the drought DAZ and into the severe drought DAZ, almost reaching emergency storage, before refilling. It takes 47 days (approximately 6 weeks) to enter the drought DAZ after moving into developing drought, and it takes just a further 12 days to enter the severe drought DAZ after going into drought.

This extreme scenario assessment indicates that once the developing drought DAZ is entered for this zone, measures should be put in place to act quickly to implement temporary use ban restrictions and drought permit and drought order applications under the subsequent stages of drought. This is due to the possibility of having a very limited timeframe in which to implement options once the DAZs are entered.

This zone is very resilient to the worst droughts experienced historically and even if we were to have a drought similar to the extreme event used in testing, we would be able to introduce supply side schemes to supplement water resources. As an example we have included in Figure 7 the potential effects the implementation of supply side options would have on reducing the rate of decline of reservoir storage enough to stave off the need to utilise emergency storage.

The supply side options which we could utilise in this scenario are listed in Table 6



**Figure 7 - Llyn Aled and Aled Isaf Drought Action Zones and historic droughts**

**Table 6 - Supply side options for Clwyd Coastal**

Drought Option	Detail	DO (MI/d)
1	Transfer water from Llyn Bran to Afon Aled.	1.45
2	Reduction of the compensation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled.	1.0
3	Pump water from Llyn Aled 'dead' storage.	1.0
4	Relaxation of the annual licences on Afon Aled and the Plas Uchaf and Dolwen reservoirs.	5.0
5	Relaxation of the Llannerch boreholes annual licence.	1.0
6	Pumped (winter) refill from Aled Isaf to Llyn Aled	N/A
	TOTAL	9.45 (0.33% of total storage)

## Dyffryn Conwy

The flow record available for the Dyffryn Conwy water resource zone covers the period from 1920 to 2010. This inflow record is a naturalised flow record generated by the Environment Agency Wales (now Natural Resources Wales). This period of record covers a wide range of historic drought events, including the single season 1976 and 1984 droughts, as well as the two season 1995/96 drought. The critical drought year for Dyffryn Conwy is 1933/34.

Historically Dyffryn Conwy has proved to be relatively resilient to drought, both in terms of the modelling assessments carried out and via operational experience. The modelling carried out to support the WRMP demonstrates that this water resource zone is not resource constrained, it is licence constrained. As a result, the reservoir drawdown for historic drought scenarios modelled and assessed do not enter the extreme drought DAZ, they only breach the drought DAZ during the winter refill period under the 1995 modelled scenario for Llyn Conwy and the developing drought DAZ for the 1976 modelled scenario for Llyn Cowlyd.

In order to assess timing of the drought actions associated with each DAZ, a more severe drought than those on record was generated. This was done using a 'delayed refill' methodology. Under this scenario for Llyn Conwy, the 1984 drawdown was maintained at a constant rate for an extended period of time, until the day when the latest recorded refill started for the other droughts assessed. For Llyn Conwy this was around the 22<sup>nd</sup> October in the 1995 drought. Under this scenario the reservoir storage only just touches the developing drought DAZ before refill commences.

Similarly for Llyn Cowlyd, the 'delayed refill' methodology was also used to assess the timing of the drought actions associated with each DAZ. Under this scenario for Llyn Cowlyd, the 1976 drawdown was maintained at a constant rate for an extended period of time, until the day when the latest recorded refill started for the other droughts assessed. For Llyn Cowlyd this was around the 4<sup>th</sup> October in the 1995 drought. Under this scenario the reservoir storage enters the developing drought DAZ and drops to within 1% of the drought DAZ, but does enter the zone. It takes 55 days (over 7 weeks) for the reservoir storage to get to within 1% of the drought DAZ.

The assessments carried out on Llyn Conwy and Llyn Cowlyd demonstrate that the Dyffryn Conwy water resource zone is resilient to drought, with enough time available once entering the DAZs to be able to implement the relevant drought actions.

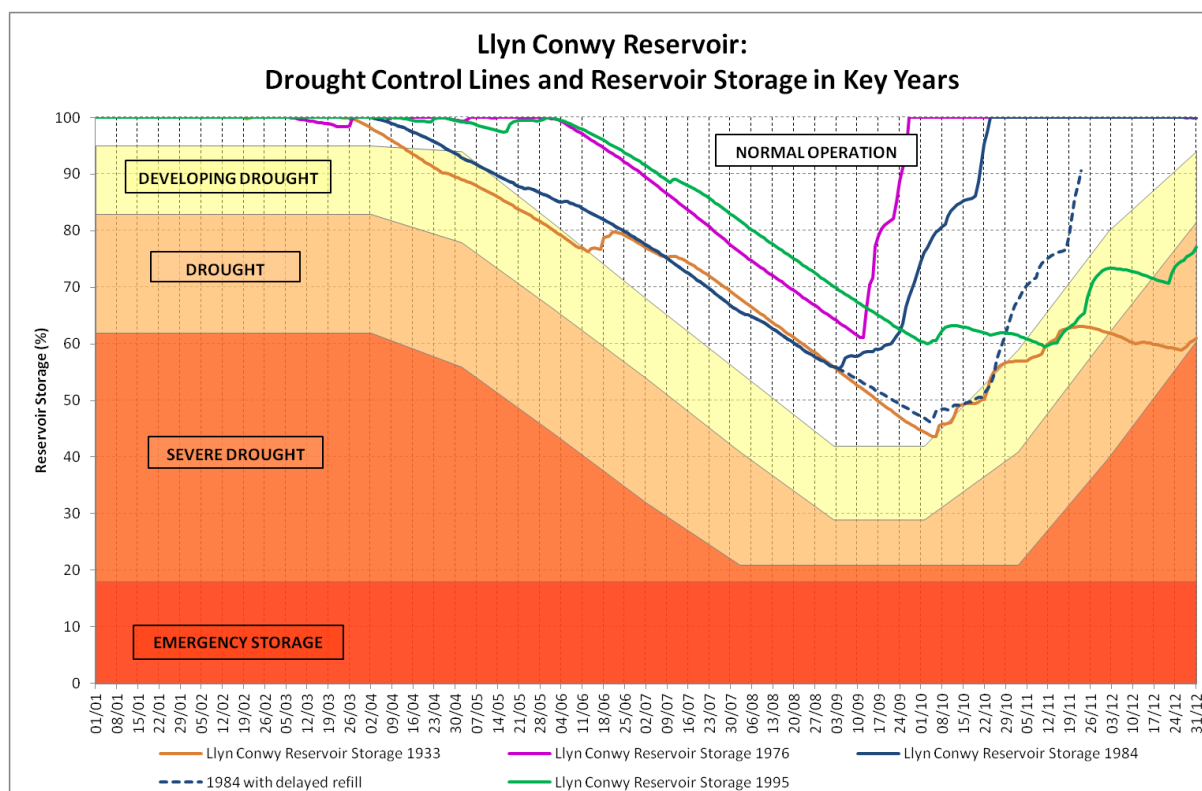


Figure 8- Llyn Conwy Drought Action Zones and historic droughts

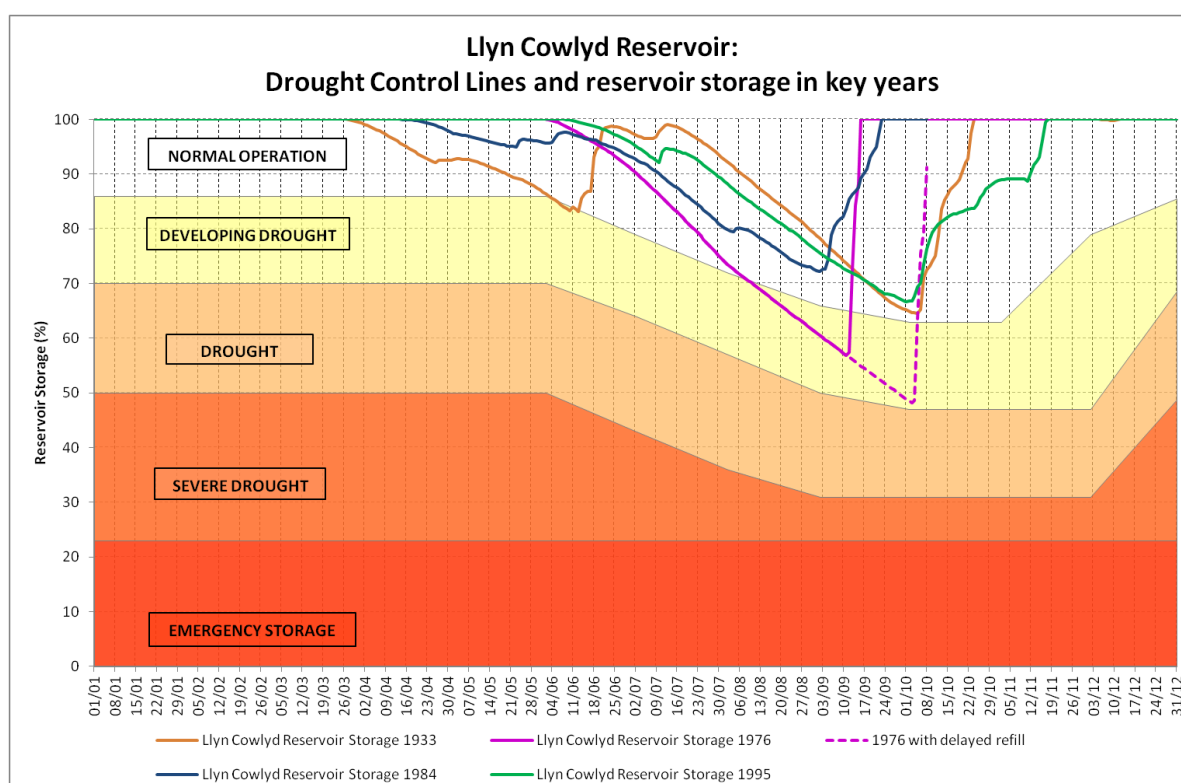


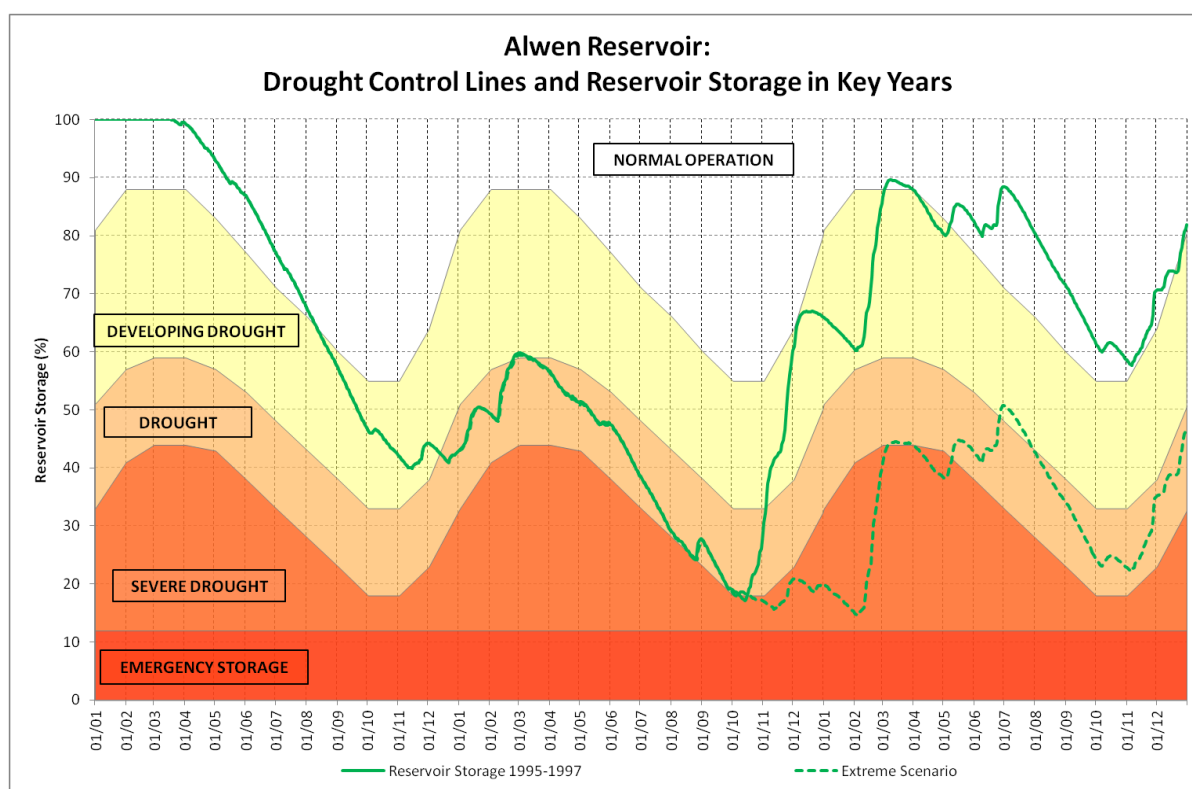
Figure 9 - Llyn Cowlyd Drought Action Zones and historic droughts

## Alwen Dee

The flow record available for Alwen Dee water resource zone covers the period from 1920 to 2010. This inflow record is a naturalised flow record generated by the Environment Agency Wales (now Natural Resources Wales). This period of record covers a wide range of historic drought events, including the single season 1984 drought, as well as the two season 1995/96 drought. The critical drought year for Alwen Dee is 1933/34.

Historically Alwen Dee has proved to be relatively resilient to drought due to the demand on the resource zone being limited compared to the reservoir storage capacity. The modelling carried out to support the WRMP demonstrates that the resource zone is not resource constrained, it is infrastructure constrained. As a result, the historic drought scenarios modelled do not breach the severe drought DAZ. In order to test the reservoir DAZs, a more severe drought than those on record was generated by replacing the October, November and December 1996 flow sequence with that of October, November and December 1995, thus simulating a second dry autumn/winter period. The modelling assessment using this flow sequence breaches the severe drought DAZ, enabling us to analyse the timing of drought action implementation under this scenario.

Under the severe drought scenario modelled it takes 123 days (approximately 17 weeks) to enter the drought DAZ after moving into developing drought. It is not until 210 days (30 weeks) later that reservoir storage moves from drought to severe drought. These results confirm that there is more than enough time to implement the associated drought actions within the Alwen Dee water resource zone for each of the stages of drought.



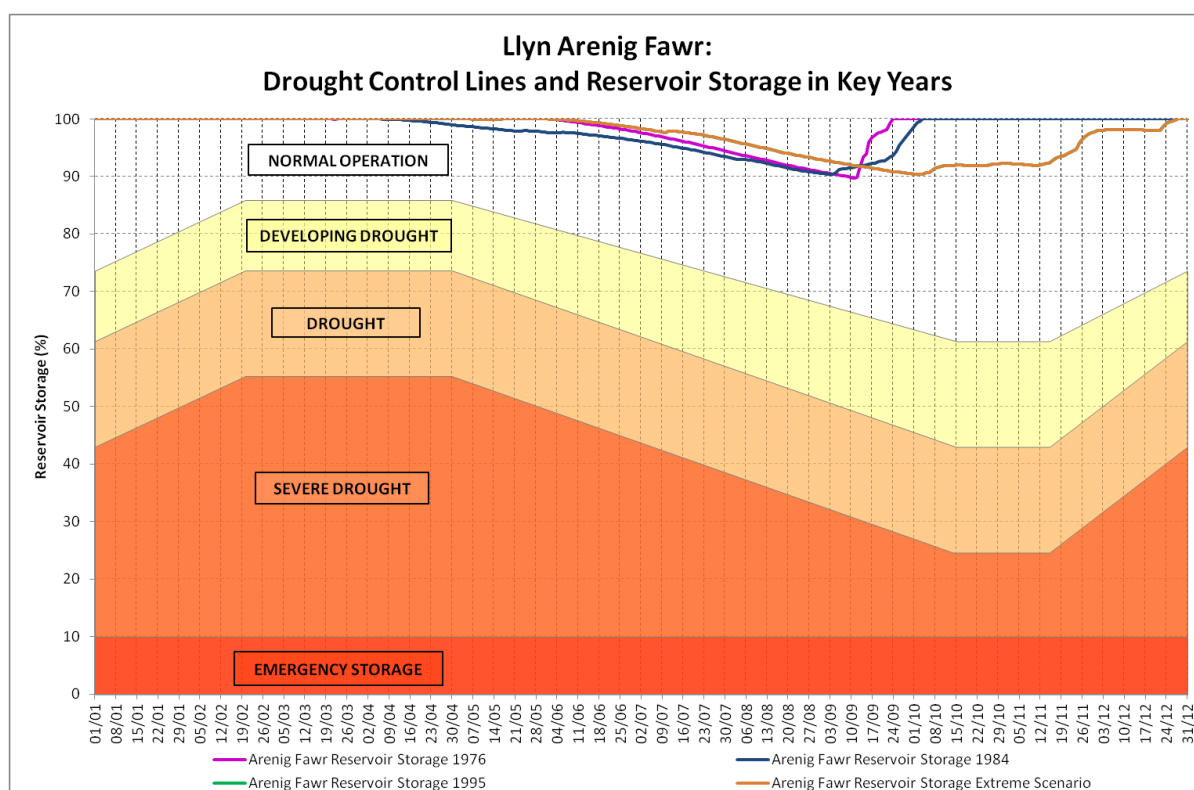
**Figure 10 - Alwen Reservoir Drought Action Zones and historic droughts**

## Bala

The flow record available for Bala water resource zone covers the period from 1920 to 2010. This inflow record is a naturalised flow record generated by the Environment Agency Wales (now Natural Resources Wales). This period of record covers a wide range of historic drought events, including the single season 1976 and 1984 droughts, as well as the two season 1995/96 drought.

Historically Bala has proved to be very resilient to drought, both in terms of the modelling assessments carried out and via operational experience. The modelling carried out to support the WRMP demonstrates that this water resource zone is not resource constrained, it is constrained by the daily licence volume. As a result Llyn Arenig Fawr drawdown does not approach any of the DAZs during the drought events assessed.

In order to test the reservoir DAZs, a more severe drought than those on record was generated by replacing the October, November and December 1996 flow sequence with that of October, November and December 1995, thus simulating a second dry autumn/winter period. However, this modelling assessment still did not result in Llyn Arenig Fawr drawing down across any of the DAZs. In fact, the modified flow sequence makes little difference to the drawdown and the extreme scenario is very similar to that in 1995. This therefore further demonstrates that Bala water resource zone is very resilient to drought.



**Figure 11 - Llyn Arenig Fawr Reservoir Drought Action Zones and historic droughts**

## Blaenau Ffestiniog

The flow record available for Blaenau Ffestiniog water resource zone covers a period from 1958 to 2011. This inflow record has been derived using Hysim rainfall runoff modelling. This period of record covers a wide range of historic drought events including the single season 1976 and 1984 droughts, as well as two season events in 1995/96. The critical drought year for Blaenau Ffestiniog is 1984.

The modelling assessment demonstrated that the single season drought in 1984 resulted in Llyn Morwynion storage entering the developing drought DAZ and the drought DAZ. It takes 69 days (approximately 9 weeks) to enter the drought DAZ after moving into developing drought. Reservoir storage starts to recover just before it reaches the severe drought DAZ (2.5% from the DAZ). However, if drawdown had continued it is likely that the severe drought DAZ would have been entered approximately two and a half months after entering drought. These results confirm that there is enough time to implement the associated drought actions within the Blaenau Ffestiniog water resource zone for each of the stages of drought.

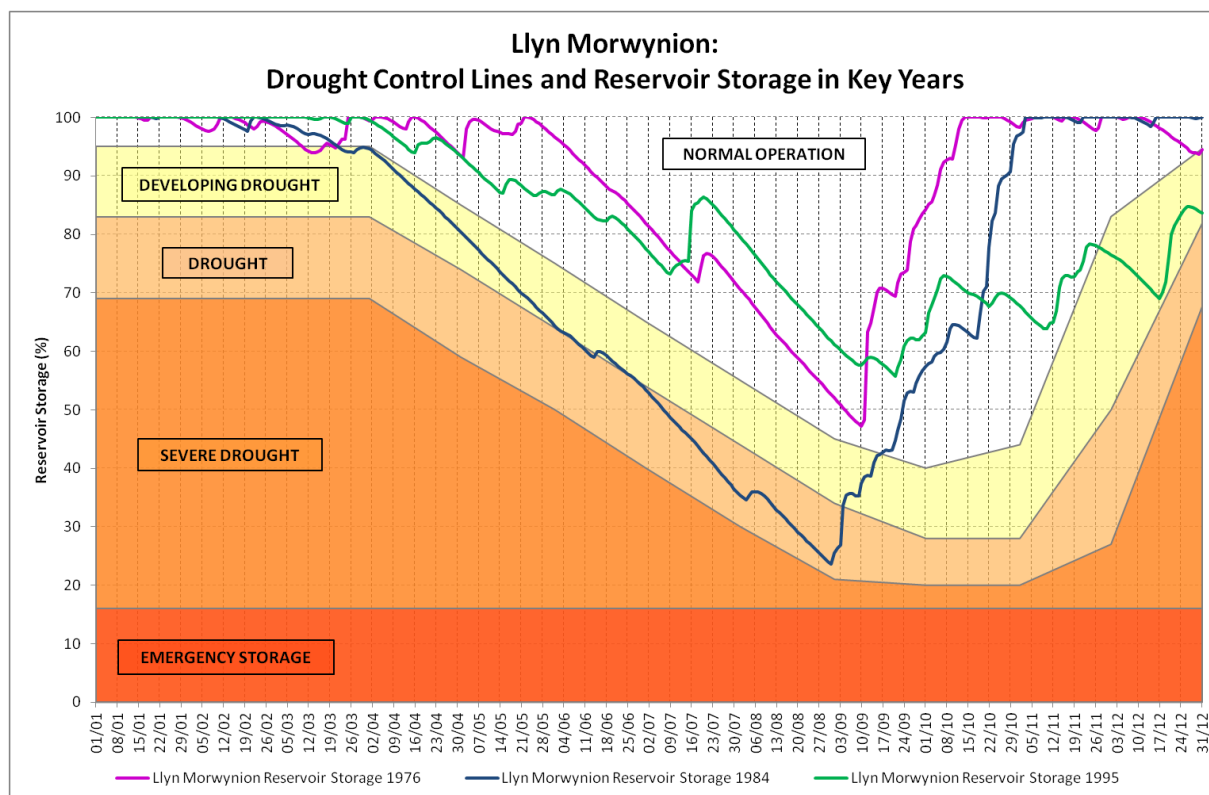


Figure 12 - Llyn Morwynion Reservoir Drought Action Zones and historic droughts

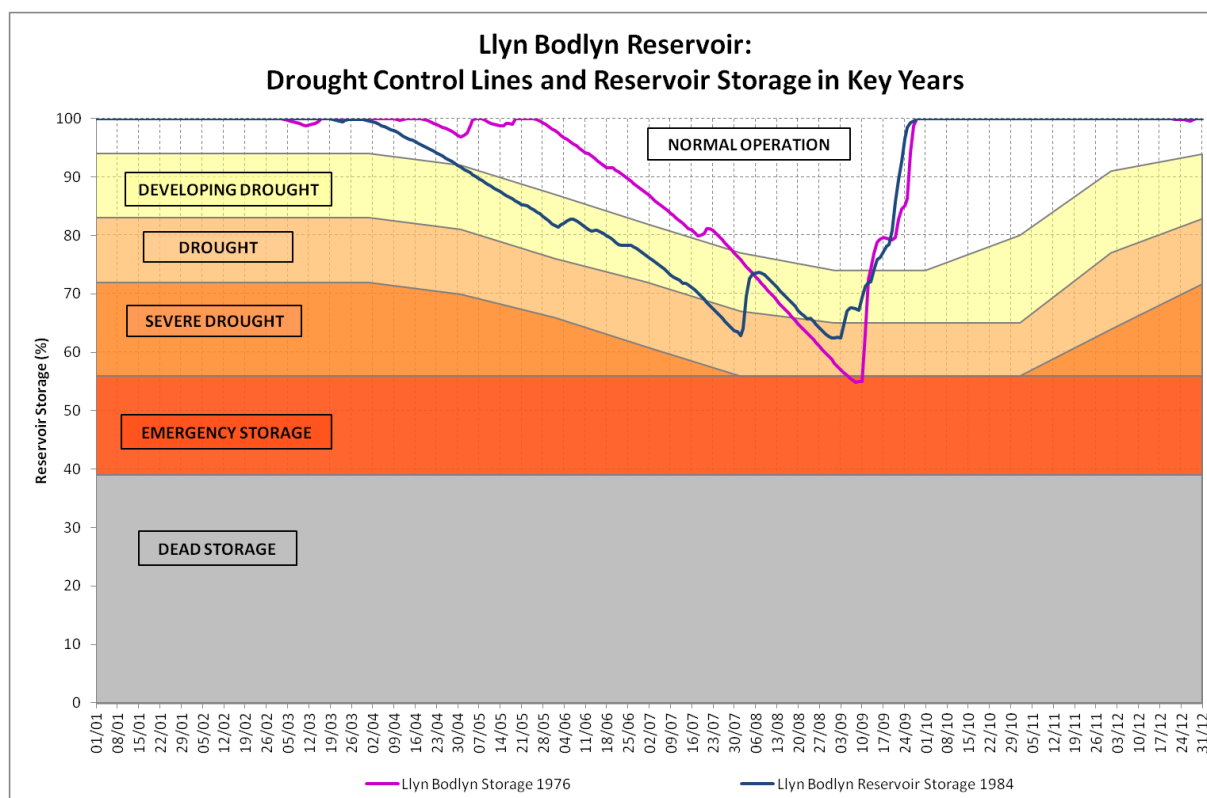
## Barmouth

The flow record available for Barmouth water resource zone covers a period from 1958 to 2011. This inflow record has been derived using Hysim rainfall runoff modelling. This period of record covers a wide range of historic drought events including the 1976 and 1984 droughts.

The modelling carried out to support the WRMP demonstrates that Barmouth water resource zone is constrained by the company levels of service.

The historic drought years assessed for Barmouth show all the DAZs for Llyn Bodlyn being entered during the 1976 drought. It takes 20 days (almost 3 weeks) to enter the drought DAZ after moving into developing drought, and it only takes a further 18 days (just over 2 weeks) to enter the severe drought DAZ after moving into drought. In addition, the developing drought and drought DAZs are crossed in the 1984 drought. In this example it takes 82 days (just over 11 weeks) to enter the drought DAZ after moving into developing drought. No further drought scenarios were assessed for this resource zone because the historic record provided examples to test the DAZs.

This assessment demonstrates that Barmouth is a high risk water resource zone in terms of drought. Details of the drought action sequence of events for Barmouth are provided in Appendix 1 and state that once the developing drought DAZ is entered, measures should be put in place to act quickly to implement temporary use ban restrictions. Drought permit and drought order applications would be prepared in advance during the developing drought stage, so that they are ready to submit as soon as required when reservoir storage is forecast to be likely to move into severe drought within a 3 week timeframe. This will ensure that there is enough time available to put the necessary measures in place to implement the drought management supply side options 8033.D1 and 8033.D2. The lower reach of the Afon Ysgethin (with the zone of influence of the drought order required for supply side option 8033.D2) flows through an important conservation area which is designated as both an SAC and SSSI. This option has therefore been prioritised under our drought plan environmental monitoring and assessment programme of work, and we aim to have all the required environmental monitoring and reporting in place to support this drought order application should it be needed during a drought situation.



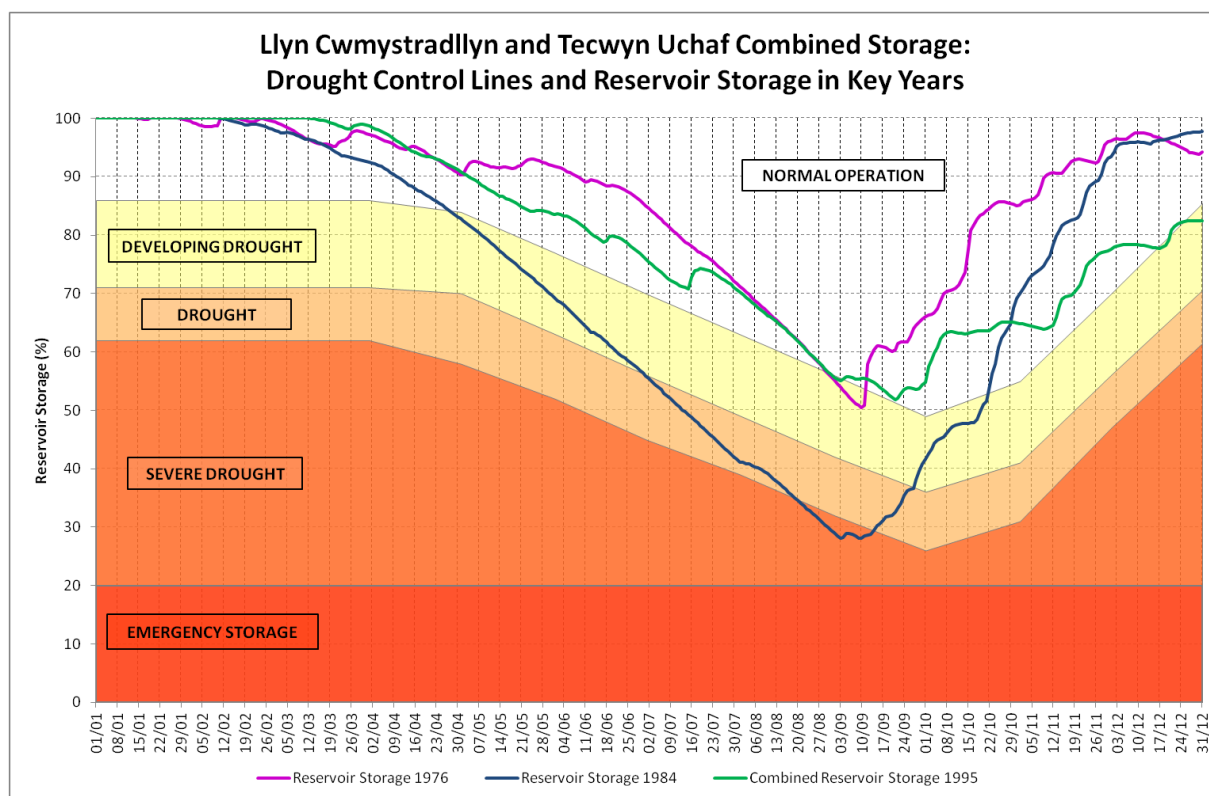
**Figure 13 - Llyn Bodlyn Reservoir Drought Action Zones and historic droughts**

## Lley Harlech

The flow record available for Lley Harlech water resource zone covers a period from 1958 to 2011. This inflow record has been derived using Hysim rainfall runoff modelling. This period of record covers a wide range of historic drought events including the single season droughts in 1976 and 1984 as well as two season events in 1995/96. The critical drought year for Lley Harlech is 1984.

The modelling carried out to support the WRMP demonstrates that Lley Harlech water resource zone is licence constrained.

The historic drought years assessed for Lley Harlech show all the DAZs for Llyn Cwmystradllyn & Tecwyn Uchaf combined storage being entered during the 1984 drought. It takes 64 days (9 weeks) to enter the drought DAZ after moving into developing drought. It then takes a further 50 days (7 weeks) to enter the severe drought DAZ after moving into drought. This assessment therefore demonstrates that Lley Harlech water resource zone is a high risk drought zone. Due to the relatively quick response of the reservoir drawdown to drought conditions, it will be necessary to ensure that all applications and evidence for demand and supply side actions are prepared during the developing drought phase to enable a prompt response to entering drought and extreme drought conditions.



**Figure 14 - Llyn Cwmystradllyn and Tecwyn Uchaf Reservoir Drought Action Zones and historic droughts**

## South Meirionydd

The flow record available for South Meirionydd water resource zone covers a period from 1958 to 2011. This inflow record has been derived using Hysim rainfall runoff modelling. This period of record covers a wide range of historic drought events including the single season droughts in 1976 and 1984 as well as two season events in 1995/96.

Historically South Meirionydd has proven to be very resilient to drought, both in terms of the modelling assessments carried out and via operational experience. The modelling carried out to support the WRMP demonstrates that South Meirionydd water resource zone is licence constrained. As a result Llyn Cynwch drawdown does not approach any of the DAZs during the drought events assessed.

In order to assess timing of the drought actions associated with each DAZ, a more severe drought than those on record was generated. This was done using a 'delayed refill' methodology. Under this scenario for Llyn Cynwch, the 1984 drawdown was maintained at a constant rate for an extended period of time, until the date when the latest recorded refill started for the other droughts assessed. For Llyn Cynwch this was around the 16<sup>th</sup> November in the 1995 drought. Under this scenario the reservoir storage only just moves into the developing drought DAZ before refill commences.

The assessment carried out on Llyn Cynwch therefore demonstrates that the South Meirionydd resource zone is resilient to the effects of drought.

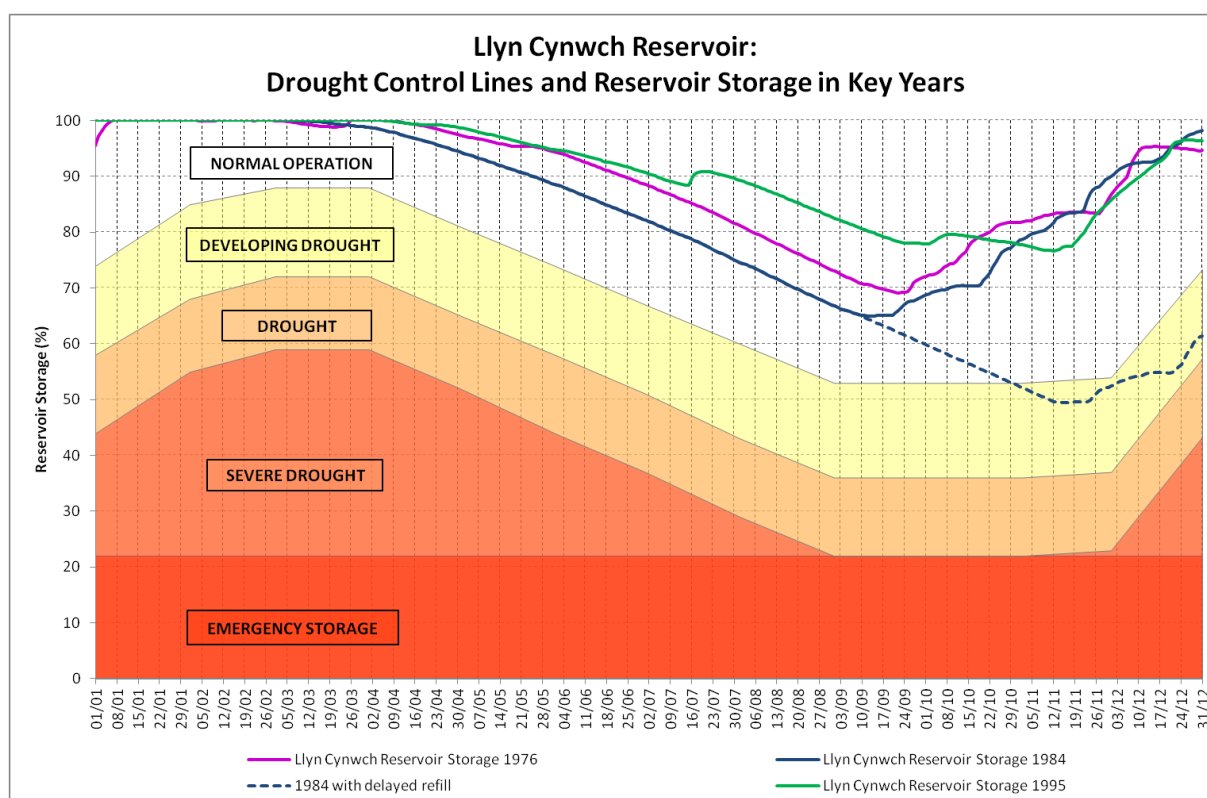


Figure 15 - Llyn Cynwch Reservoir Drought Action Zones and historic droughts

## North Ceredigion

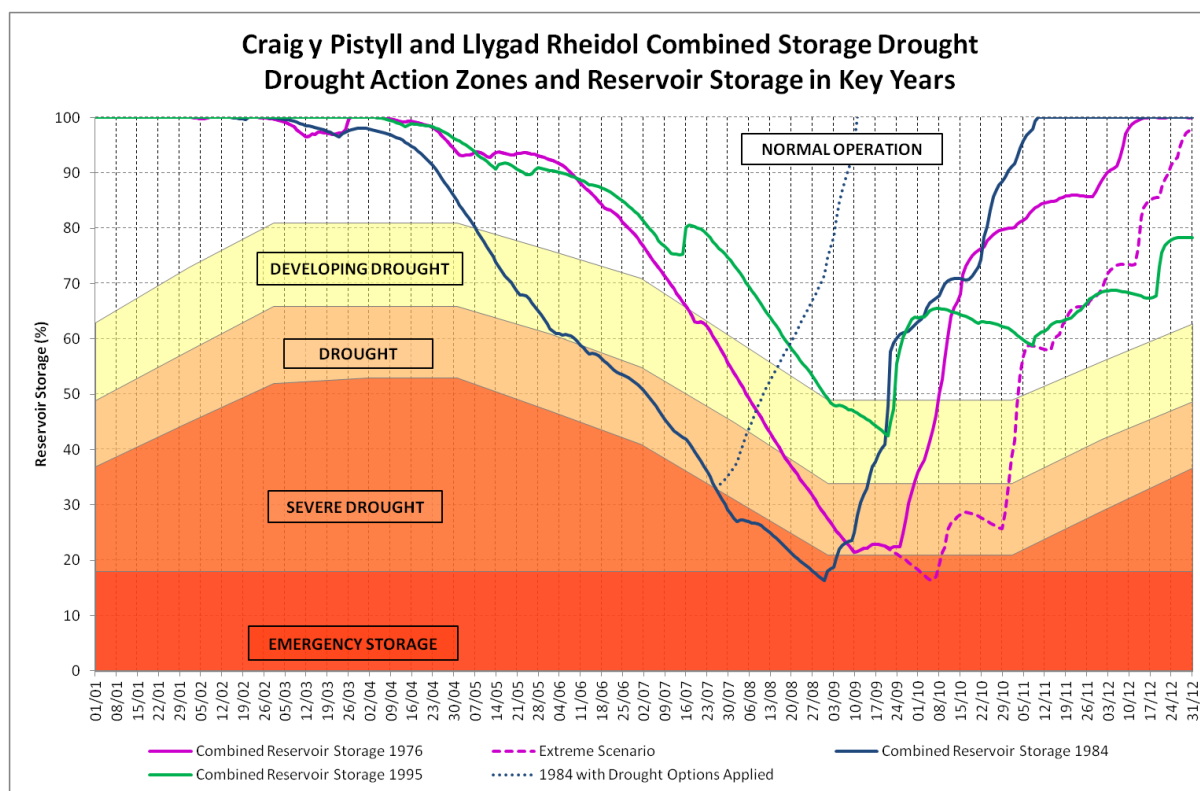
The flow record available for the North Ceredigion water resource zone covers a period from 1938 to 2011. The inflow records used in this resource zone are transposed gauged river flows. This period of record covers a range of historic drought events including the single season droughts in 1976 and 1984 as well as two season events in 1995/96. The critical drought year for North Ceredigion is 1984.

The modelling carried out to support the WRMP demonstrates that North Ceredigion is constrained by the company levels of service. However, operational experience indicates that this water resource zone is relatively resilient to drought due to the ability to meet any increasing demand by using the Lovesgrove borehole sources. In order to achieve this as soon as Craig y Pistyll reservoir starts to drawdown, the two small stream abstractions at Maesnant and Nantymoch need to be put into operation as well as Lovesgrove 2 borehole.

The historic drought years assessed for North Ceredigion show all the DAZs for Craig y Pistyll and Llygad Rheidol combined storage being entered during the 1984 drought. It takes 34 days (almost 5 weeks) to enter the drought DAZ after moving into developing drought DAZ. It then takes a further 46 days (6 and a half weeks) to cross the severe drought DAZ after moving into drought. 34 days (just over 4 weeks) later the reservoir reaches the emergency storage line. Due to the quick response of the reservoirs to drought conditions, it will be necessary to ensure that all applications and evidence for demand and supply side actions are prepared during the developing drought phase to enable a prompt response to entering drought and extreme drought conditions. As mentioned above, the Lovesgrove 2 groundwater sources would also be put into operation as soon as Craig y Pistyll reservoir starts to drawdown.

A further assessment was carried out to look at a more severe drought scenario than those on the gauged record. This was done by appending the flow record from September 2003 onwards onto the end of the 1976 drought record. This resulted in continued reservoir drawdown until October and a more delayed reservoir refill than has been experienced within the historic flow record. Under this scenario it takes 32 days (4 and a half weeks) to enter the drought DAZ after moving into developing drought. It then takes a further 38 days (5 weeks) to enter the severe drought DAZ after moving into drought. 7 days later the storage levels reach the emergency storage zone. This scenario suggests a more rapid reservoir drawdown response to drought than previously experienced, emphasising the need to ensure both demand and supply side actions are prepared well in advance of the reservoirs entering drought conditions.

Under the most extreme scenarios we would look to implement two significant supply side measures which would reduce the rate of reservoir storage decline as illustrated in Figure 16. These are increasing the annual abstraction quantity from Llyn Llygad Rheidol and enter discussions with the relevant parties regarding the use of a pumped abstraction from Nantymoch into Llyn Llygad Rheidol Reservoir.



**Figure 16 - Llyn Craig y Pistyll and Llygad Rheidol Drought Action Zones and historic droughts**

## Mid & South Ceredigion

The flow record available for the Mid & South Ceredigion water resource zone covers a period from 1938 to 2011. The inflow records used in this resource zone are transposed gauged river flows. This period of record covers a range of historic drought events including the single season droughts in 1976 and 1984, as well as two season events in 1995/96. The critical drought year for Mid & South Ceredigion is 1996.

The modelling carried out to support the WRMP demonstrates that Mid & South Ceredigion is licence constrained. Operational experience has identified this resource zone as being susceptible to the effects of drought due to the limited resource available within the zone.

The historic drought years assessed for Mid & South Ceredigion show the drought DAZ for Teifi Pools being entered in 1976 and 1984, and both the drought DAZ, and the extreme drought DAZ being entered in 1995 drought. In 1976 it takes 46 days (6 and a half weeks) to enter the drought DAZ after moving into developing drought. In 1984 it takes 80 days (11 weeks) to enter the drought DAZ after moving into developing drought. In 1995 it takes 73 days (10 weeks) to enter the drought DAZ after moving into developing drought, and a further 43 days (6 weeks) for the reservoir storage to enter the severe drought DAZ.

A further assessment was carried out to look at a more severe drought scenario than those in the gauged record. This was done by appending the flow record from September 2003 onwards onto the end of the 1976 drought record. This resulted in continued reservoir drawdown until the end of October and a more delayed reservoir refill than has been experienced with the historic flow record. Under this scenario it takes 46 days (6 and a half weeks) to enter the drought DAZ after moving into developing drought. It then takes a further 37 days (5 weeks) to enter the severe drought DAZ.

Due to the quick response of the reservoir to drought conditions, it will be necessary to ensure that all applications and evidence for demand and supply side actions are prepared during the developing drought phase to enable a prompt response to entering drought and extreme drought conditions.

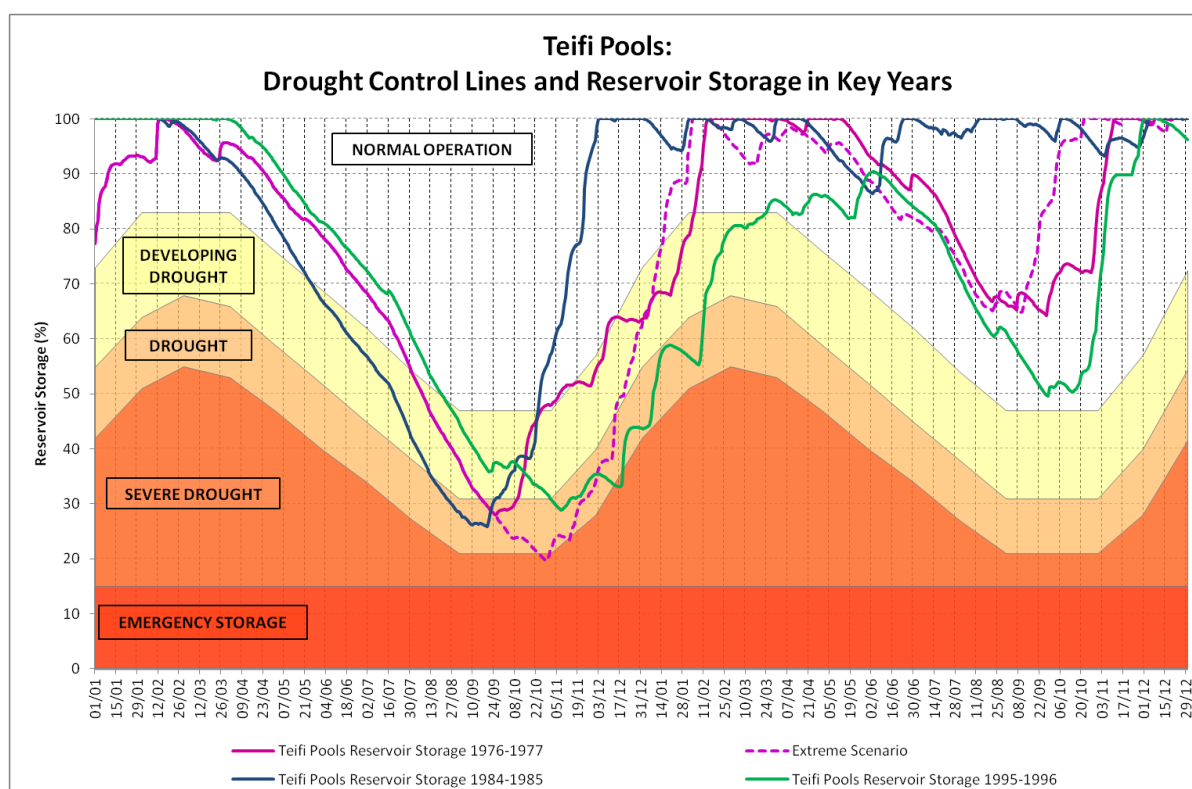


Figure 17 - Teifi Pools Drought Action Zones and historic droughts

## Pembrokeshire

The flow record available for the Pembrokeshire water resource zone covers a period from 1958 to 2011. The inflow records used in this resource zone are derived using Hysim rainfall runoff modelling. This period of record covers a range of historic drought events including the single season droughts in 1976 and 1984, as well as two season events in 1995/96.

The modelling carried out to support the WRMP demonstrates that Pembrokeshire is infrastructure constrained.

The historic drought scenarios assessed for Pembrokeshire do not enter the drought DAZ. They only enter the developing drought DAZ. In the 1976 drought scenario Preseli reservoir drawdown is within 0.25% of the drought DAZ, but then starts to refill. An assessment was carried out to generate a more severe drought than those on record by appending the flow record from September 2003 onwards onto the end of the 1976 drought record. However, although this delayed the end of the dry period, it did not result in the drought trigger line being crossed.

A further assessment was therefore carried out using the 'delayed refill' methodology. Under this scenario for Llys y Fran, the 1976 drawdown was maintained at a constant rate for an extended period of time, until the date when the latest recorded refill started from the other droughts assessed. For Llys y Fran this was around 1<sup>st</sup> October in the 1995 drought. Under this scenario the reservoir storage enters the drought DAZ, but does not reach the severe drought DAZ. It takes 43 days (6 weeks) for Llys y Fran to enter the drought DAZ after moving into developing drought.

The drought scenario assessments for the Pembrokeshire resource zone suggest from the historic record that the reservoirs are relatively resilient to drought. However, the assessment of a more severe drought scenario indicates that if the resource zone was to experience a prolonged drought period, then the reservoirs are likely to enter the various DAZs in relatively quick succession. It will therefore be necessary to ensure that all applications and evidence for demand and supply side actions are prepared during the developing drought phase to enable a prompt response to entering drought and extreme drought conditions.

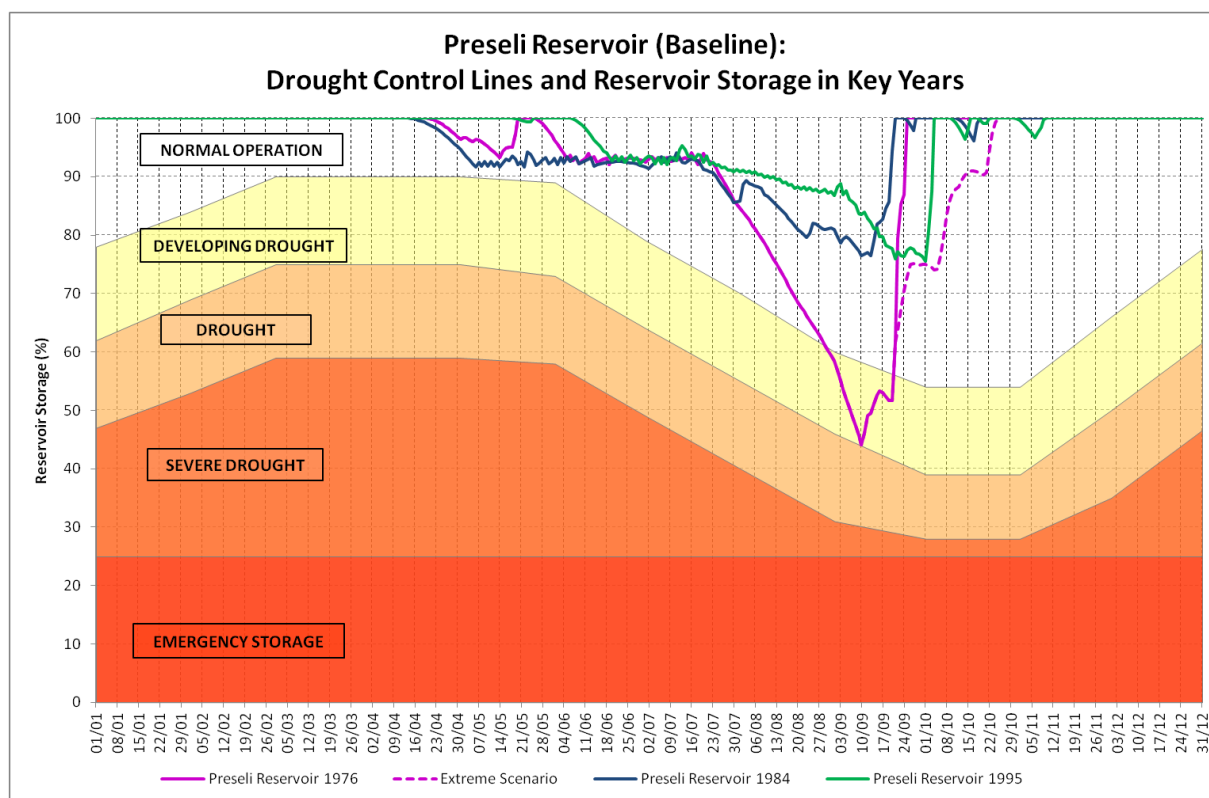


Figure 18 - Preseli Reservoir Drought Action Zones and historic droughts

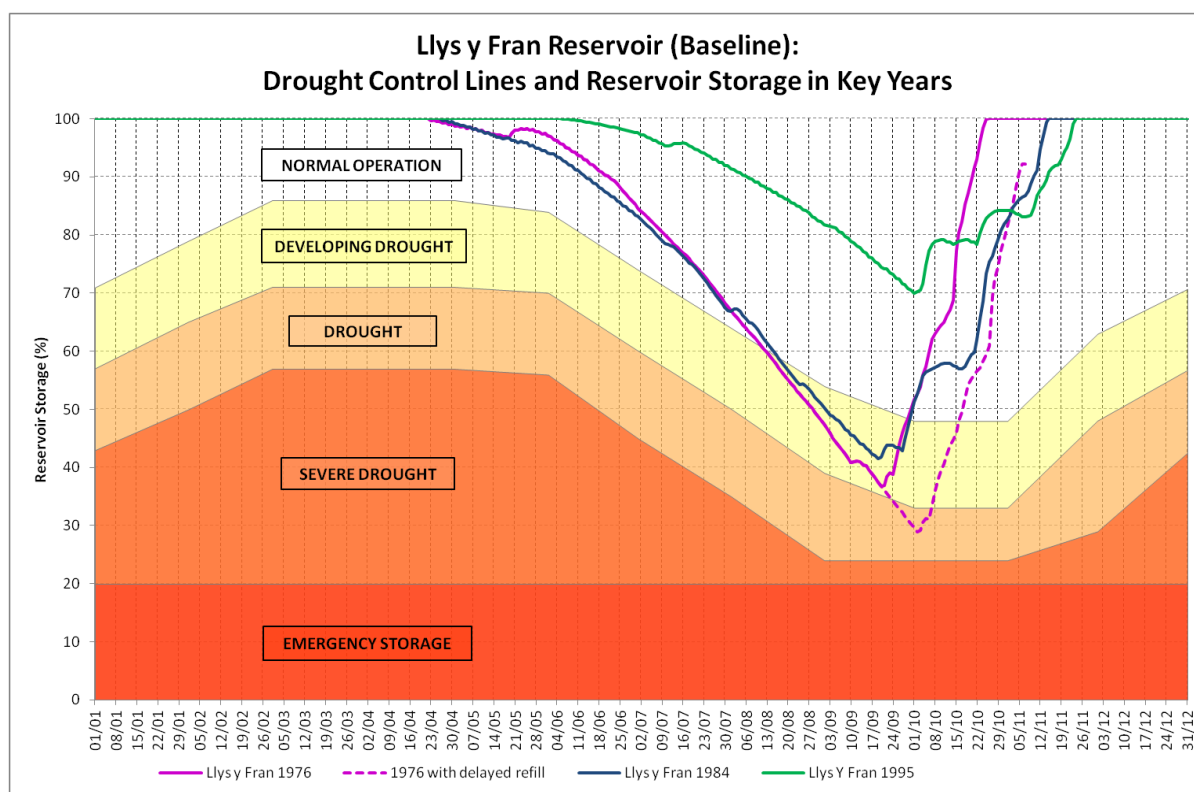


Figure 19 - Llys y Fran Reservoir Drought Action Zones and historic droughts

## Tywi Gower

The flow record available for the Tywi Gower water resource zone covers a period from 1971 to 2011. The inflow records used in this resource zone are transposed gauged river flows. This period of record covers a range of historic drought events including the single season droughts in 1976 and 1984 as well as two season events in 1995/95.

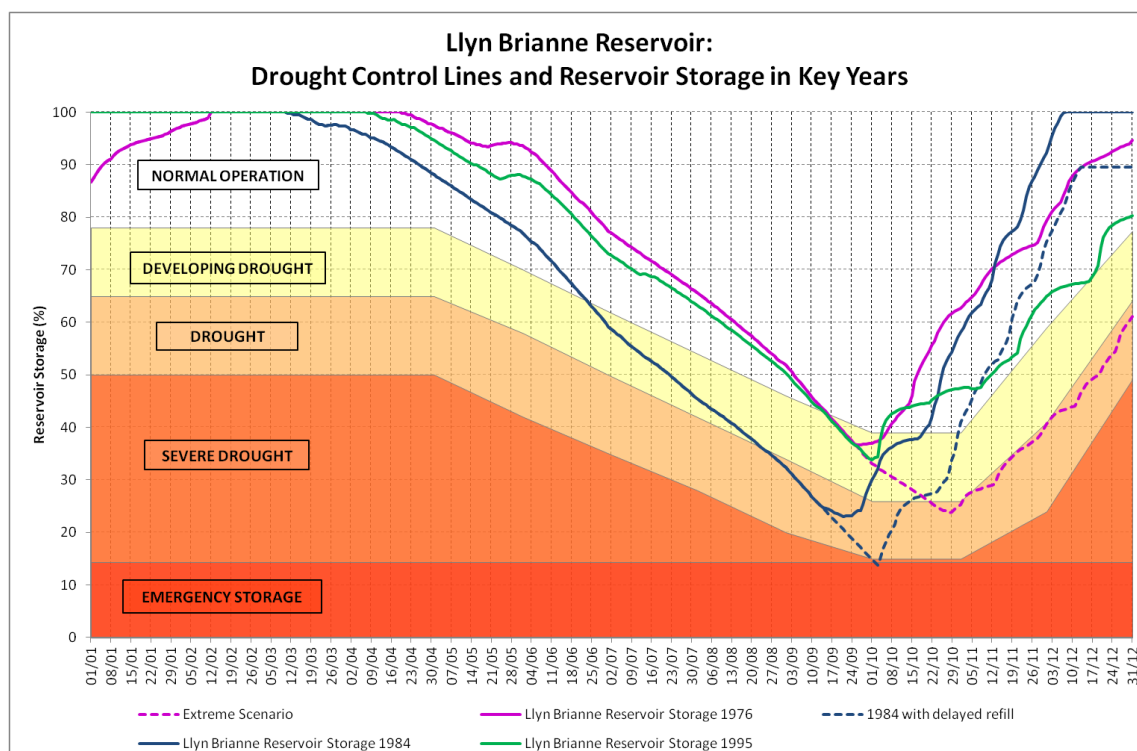
The modelling carried out to support the WRMP demonstrates that Tywi Gower is infrastructure constrained. Historically Tywi Gower has proven to be relatively resilient to drought, both in terms of the modelling assessments carried out and via operational experience. The analysis of our modelling assessments for Tywi Gower has focused on Llyn Brianne as the major reservoir within the water resource zone. If this reservoir drops into the drought DAZ, the whole resource zone would be declared as being in drought.

Figure 20 shows the drawdowns for historic droughts at Llyn Brianne. Similar plots have been included in the WRZ Summary in Appendix 1 for the other sources in Tywi Gower resource zone; Crai Reservoir and Ystradfellte Reservoir. These graphs show that none of the reservoirs crossed into the severe drought action zone in any of the historic droughts assessed, and Ystradfellte Reservoir did not enter the drought DAZ in any of the droughts assessed.

The historic drought scenarios assessed for Tywi Gower show the drought DAZ being entered at Llyn Brianne in the 1984 drought scenario. It takes 61 days (8 and a half weeks) to enter the drought DAZ after moving into developing drought. However, the severe drought DAZ is not entered. Therefore in order to test the timing of the drought actions associated with the severe drought DAZ, a more severe drought than those on record was generated by appending the flow record from September 2003 onwards onto the end of the 1976 drought record. However, although this delayed the end of the dry period, it did not result in the severe drought DAZ being entered.

A further assessment was therefore carried out using the 'delayed refill' methodology. Under this scenario for Llyn Brianne, the 1984 drawdown was maintained at a constant rate until 3<sup>rd</sup> October, which was when the refill started after the 1995 drought. Under this scenario the reservoir storage enters both the drought and the severe drought DAZs. It takes 61 days (8 and a half weeks) to enter the drought DAZ after moving into developing drought. It then takes a further 38 days (5 weeks) to enter the severe drought DAZ after moving into drought.

The 'delayed refill' assessment therefore suggests that there is a reasonable length of time to implementation of drought management actions, particularly when considering the large volume of storage within Brianne and that once developed, there are almost 40Ml/d of potential supply side schemes available not including the potential to balance Usk reservoir between the Tywi and SEWCUS zones in the short term. It must be remembered that this is an artificial drought scenario that has never occurred within the historic record. Interpretation of these results should therefore be done with caution and within the context of an understanding of the operation of the Tywi Gower water resource zone.



**Figure 20 - Llyn Brianne Reservoir Drought Action Zones and historic droughts**

## SEWCUS

The flow record available for the SEWCUS water resource zone covers the period 1973 to 2011. The inflow records used in this resource zone are generated from transposition of gauged river flows. This period of record covers a range of historic drought events including the single season droughts in 1976 and 1984 as well as two season events in 1995/96. The critical drought year for SEWCUS is 1984.

The modelling carried out to support the WRMP demonstrates that SEWCUS is currently asset constrained.

The historic drought scenarios assessed for SEWCUS do not enter the drought DAZ. They only enter the developing drought DAZ for a short period before refill commences. Therefore, in order to assess timing of the drought actions associated with each DAZ, a more severe drought than those on record was generated by appending the flow record from September 2003 onwards onto the end of the 1976 drought record. This resulted in continued reservoir drawdown until the end of October, and the reservoir storage entering the drought and severe drought DAZs, enabling us to analyse the timing of drought action implementation under this scenario.

The more extreme drought scenario assessed for SEWCUS shows all the DAZs for the 'Big 5' reservoir group being entered. It takes 37 days (5 weeks) to enter the drought DAZ after moving into developing drought. It then takes a further 29 days (4 weeks) to enter the severe drought DAZ after moving into drought. This assessment therefore suggests that SEWCUS water resource zone could be vulnerable to needing relatively quick response times in terms of the implementation of drought management actions due to the potential to quickly drop through the DAZs. However, it must be remembered that this is an artificial drought scenario that has never occurred within the historic record. Interpretation of these results should therefore be done with caution and an understanding of the operation of the SEWCUS water resource zone. During a drought situation we will closely monitor the reservoir stocks within the SEWCUS water resource zone, and use forecast modelling techniques to assess the likelihood of entering the DAZ's, and the timeframe within which this may occur. If the modelling forecasts that reservoir stocks are likely to enter severe drought within a four week timeframe, we would ensure that the relevant drought permit and drought order applications are made to support the appropriate drought management supply side options. The supporting environmental monitoring required for the SEWCUS drought management supply side options has been prioritised according to likelihood of use and taking account of environmental sensitivity. Details of this work are set out in Section 4. All environmental monitoring and assessment will be completed and available to inform the update of the next drought plan in 2020.

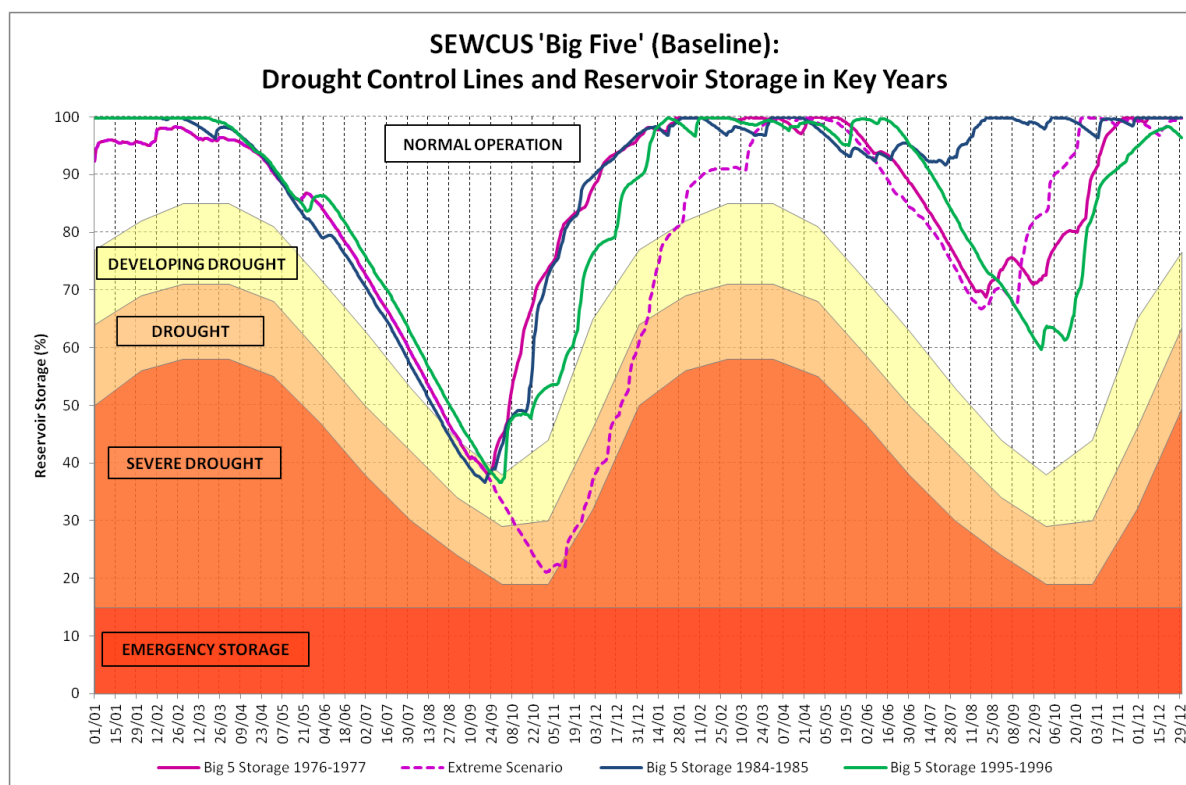


Figure 21 - SEWCUS (Big 5) Drought Action Zones and historic droughts (Baseline)

### 2.3.2 Scenario testing river abstraction & groundwater triggers

Scenario testing has been carried out for all the direct river abstraction and groundwater sources using an assessment of the demand triggers. Our water resource plan deployable output assessments demonstrate that these water resource zones are licence constrained, not resource constrained, when assessed against the worst historic drought on our records. It is for this reason that the drought triggers for these zones are defined using demand levels as the constraint to supply, rather than resource constraints. It is when demand starts to exceed licenced capacity that water resource issues will occur within these zones. Therefore, within these water resource zones, drought actions have a strong focus on demand side measures such as enhanced leakage management, water efficiency campaigns, and the implementation of TUBS and NEUB's.

We have carried out a review of our historic records for our direct river abstractions and groundwater sources and this has shown that we have not experienced any issues with being able to maintain supplies from our river sources, and there is no historic evidence of issues at groundwater sites. We recognise that any drought order or permit applications made relating to water resource zones where demand is used as a drought trigger indicator would need to be accompanied by clear evidence demonstrating that an exceptional shortage of rain has been experienced. This would be done using the data and information set out in Section 2.1 'Drought indicators'.

#### Tywyn Aberdyfi

The Distribution Input (DI) data available for the Tywyn Aberdyfi water resource zone covers the period from 1997 to 2013. This period of record covers the high demand years of 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

The plotting of the demand profiles against the drought indicators showed that the Dry Year Critical Period would exceed the peak capability of the zone. The difficulty faced in supplying this zone is consistent with the content of our Water Resources Management Plan which identified Tywyn Aberdyfi as being in deficit and hence proposed a supply side scheme to increase the water available in the zone.

Due to the quick transition from developing drought through to the peak capability, it will be necessary to ensure that all applications and evidence for demand and supply side actions are prepared during the developing drought phase to enable a prompt response to entering drought conditions. The zonal summary for Tywyn Aberdyfi reflects these pressures on timescales for implementation of options, with tankering assessments being undertaken at an early stage in the sequence of actions.

The demand side savings in this zone could total 0.16 MI/d and the supply side increase in DO could total 0.3 MI/d.

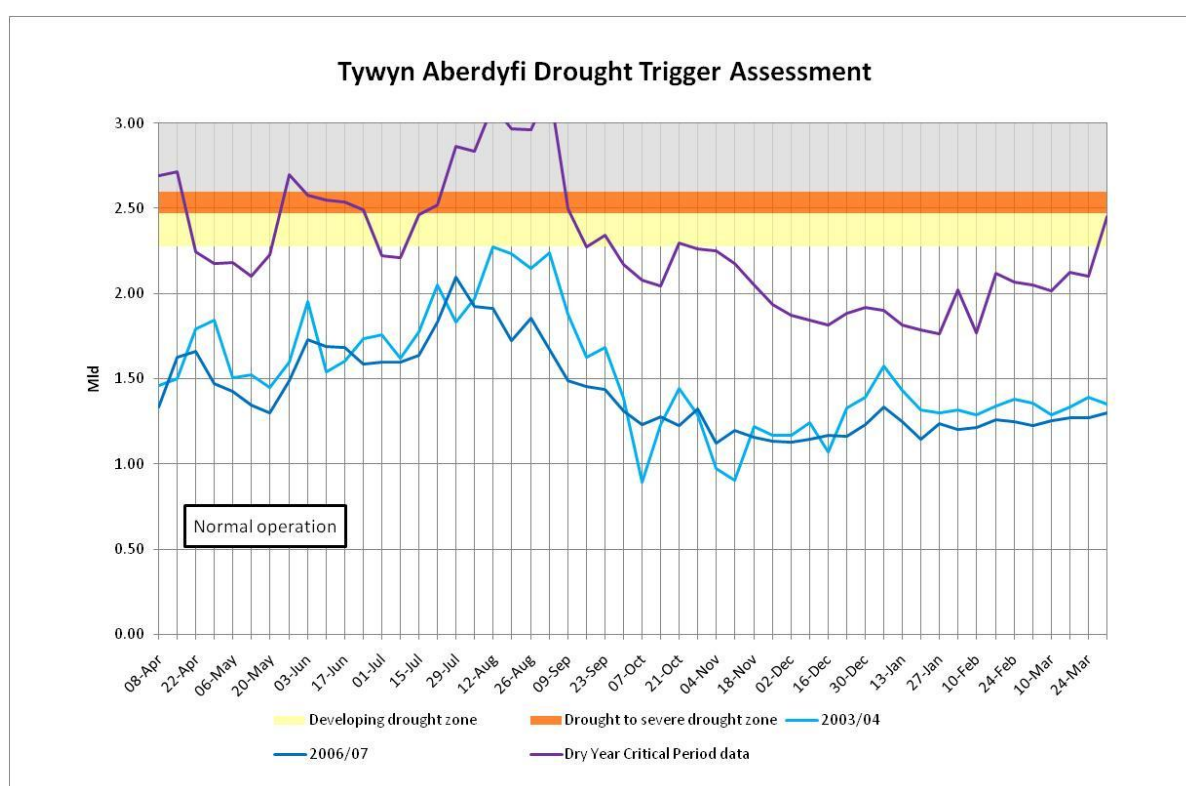


Figure 22 - Tywyn Aberdyfi drought indicators and historic droughts

## Ross on Wye

The DI data available for the Ross on Wye water resource zone covers the period from 1995 to 2013. This period of record covers the high demand years of 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

The WRZ is supplied in its entirety by the Bulk Supply of potable water from Severn Trent Water's Mitcheldean WTW. The licence held by Severn Trent for this abstraction specifies that 9MI/d are for supplying the Ross on Wye WRZ. If demand is high, an import of water from the Hereford WRZ is possible which provides a further 0.6 MI/d. Peak capability is therefore considered to be 9.6 MI/d. Historically, supply has reached 10 MI/d through agreement with Severn Trent Water.

The plotting of the demand profiles against the drought indicators showed that the Dry Year Critical Period enters the drought DAZ in both the May bank holiday and the summer holiday starting in July. The 2003 profile enters the drought DAZ and reaches, but does not exceed, the capability of the zone. Whereas the 2006 demand peaks just below the drought DAZ.

This zone has a robust treatment works and import of water, but there is not a great deal of freeboard in the indicators. It is therefore particularly important that when the indicators are reached, action is triggered to look at demand reductions and to start discussions with Severn Trent Water.

To test the effectiveness of the options for this zone, the graph below also shows the effect of implementing demand side reductions through the use of Media Campaigns, and Media Campaigns with Enhanced Leakage Management, with the savings being achieved 3 weeks after entry into drought. It can be seen that the savings prevent re-entry into the drought zone. Demand savings are estimated to achieve up to 1.33 MI/d and supply options could increase DO by 4.1 MI/d.

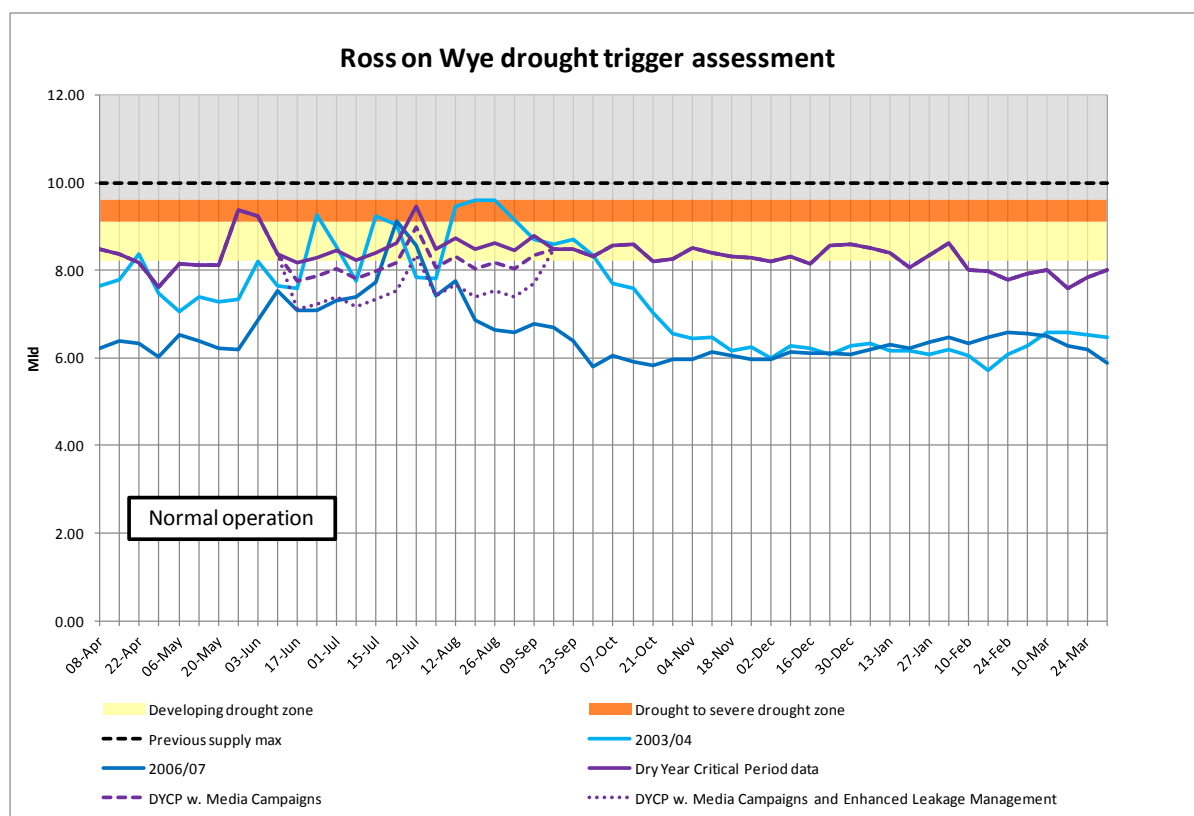


Figure 23 - Ross on Wye drought indicators and historic droughts

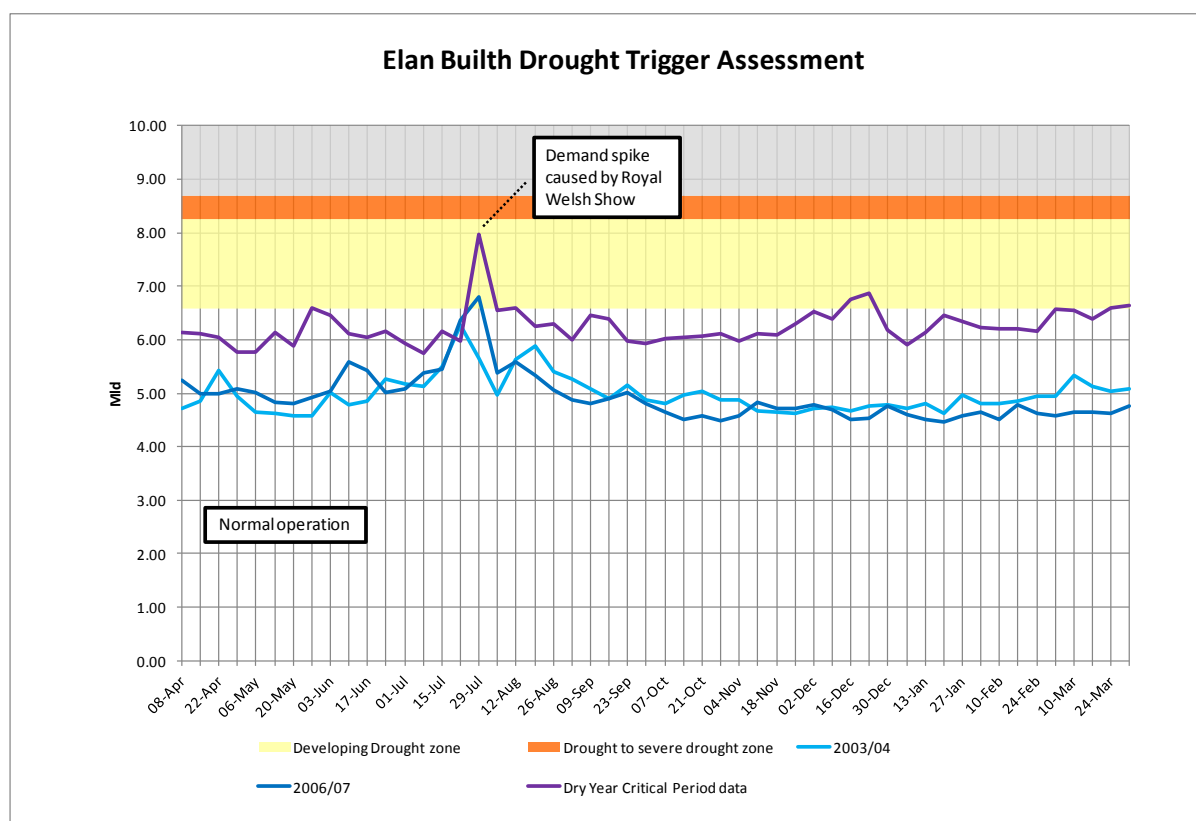
## Elan Builth

The DI data available for the Elan Builth water resource zone covers the period from 1995 to 2013. This period of record covers the high demand years of 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

The peak of the Dry Year Critical Period profile corresponds to marginally more than 90% of the peak capability, but is not considered in the same way as normal demand values as it is generated by the Royal Welsh Show – an annual event which is predictable (hence production can be ramped up in advance) and short in duration (hence ongoing measures are not required to control rising demand). The second highest summer peak of the Dry Year Critical Period profile is a more useful indicator of high demand and reaches about 75% of peak capability.

The plotting of the demand profiles against the drought indicators showed that the historic events of 2003 and 2006 did not enter into the drought DAZ, reaching less than 80% of the capability of the zone.

The drought scenario assessments for the Elan Builth resource zone suggest from the historic record that the zone is very resilient to drought. In addition to this, demand side options could reduce demand by 0.94 MI/d and supply side options could increase DO by 1 MI/d.



**Figure 24 - Elan Builth drought indicators and historic droughts**

## Hereford CUS

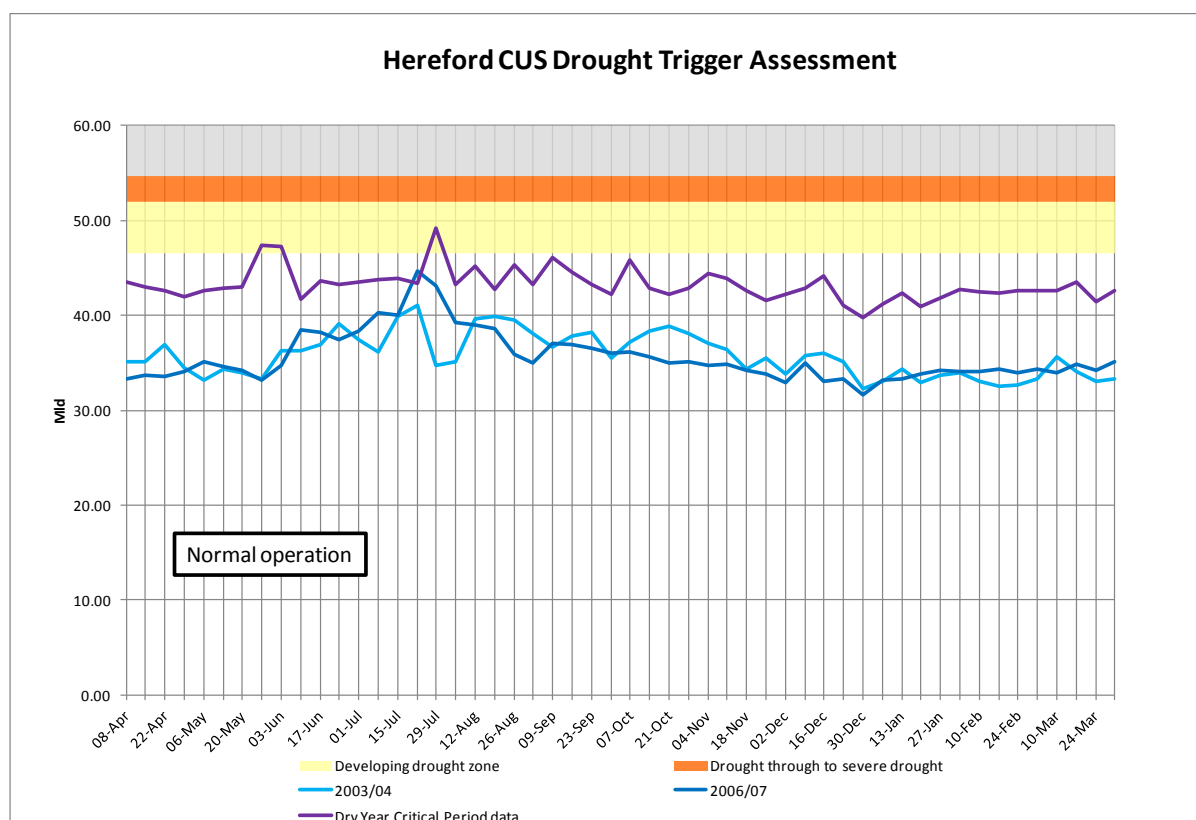
The DI data available for the Hereford water resource zone covers the period from 1997 to 2013. This period of record covers the high demand years of 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

The zone can export water to the Ross on Wye, Vowchurch and Whitbourne WRZs in summer. To account for these, the peak capability has been reduced in the Hereford CUS trigger assessment.

The plotting of the demand profiles against the drought indicators showed that the historic events of 2003 and 2006 did not enter into the drought DAZ. The drought scenario assessments for the Hereford water resource zone suggest from the historic record that the zone is of a moderate resilience to drought.

The demand side savings in this zone could total 4.87 MI/d and the supply side increase in DO could total 3.1 MI/d.

As demonstrated in our Water Resources Management Plan, this source is not resource constrained. The EA river flow gauging station at Belmont on the River Wye (Station no. 55002) is located approximately 1.2km upstream of our intake at Broomy Hill. The abstraction licence for this source allows for a daily abstraction of up to 52 MI/d with no flow related constraints. We have no concerns hydrologically with this volume being available during drought, the calculated Q95 for the Belmont gauging station is 543.37 MI/d (<http://www.ceh.ac.uk/data/nrfa/data/meanflow.html?55002>).



**Figure 25 - Hereford CUS drought indicators and historic droughts**

## Llyswen

The DI data available for the Llyswen water resource zone covers the period from 1997 to 2013. This period of record covers the high demand years of 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

The plotting of the demand profiles against the drought indicators showed that the historic events of 2003 and 2006 did not reach the developing drought DAZ.

The drought scenario assessments for the Llyswen water resource zone suggest from the historic record that the zone is of a moderate resilience to drought.

The demand side savings in this zone could total 0.54 MI/d and the supply side increase in DO could total 1 MI/d.

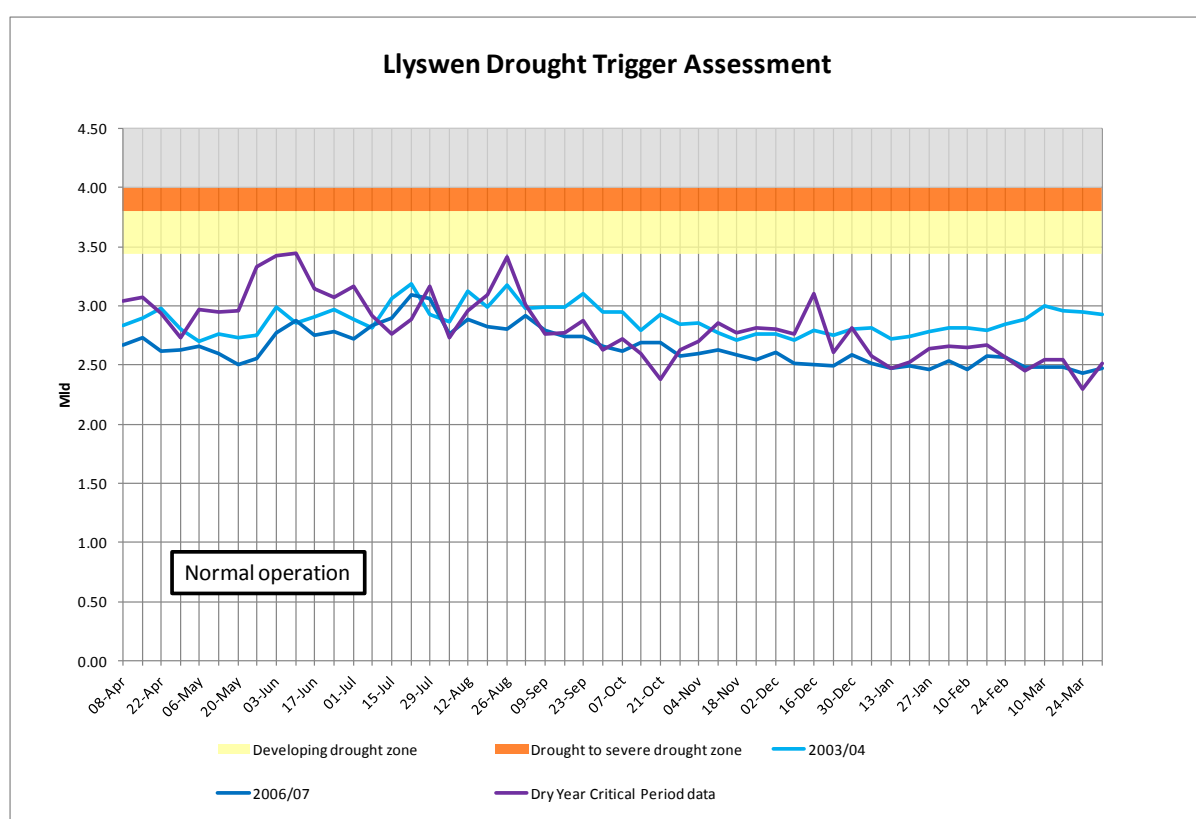


Figure 26 - Llyswen drought indicators and historic droughts

## Monmouth

The DI data available for the Monmouth water resource zone covers the period from 1994 to 2013. This period of record covers the high demand years of 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

The Dry Year Critical Period profile exceeds the developing drought DAZ therefore indicating that rapid implementation of demand side reduction measures would be required to ensure the savings are achieved before crossing into the drought zone.

Historical events have never reached this level so it is reasonable to infer that the zone is moderately resilient to drought. The effectiveness of demand side measures was tested. A three week lead in time was factored in for the savings from a Media Campaign to be realised. This was effective in reducing the summer peak.

The demand side savings in this zone could total 0.38 Ml/d but there are no supply side measures available.

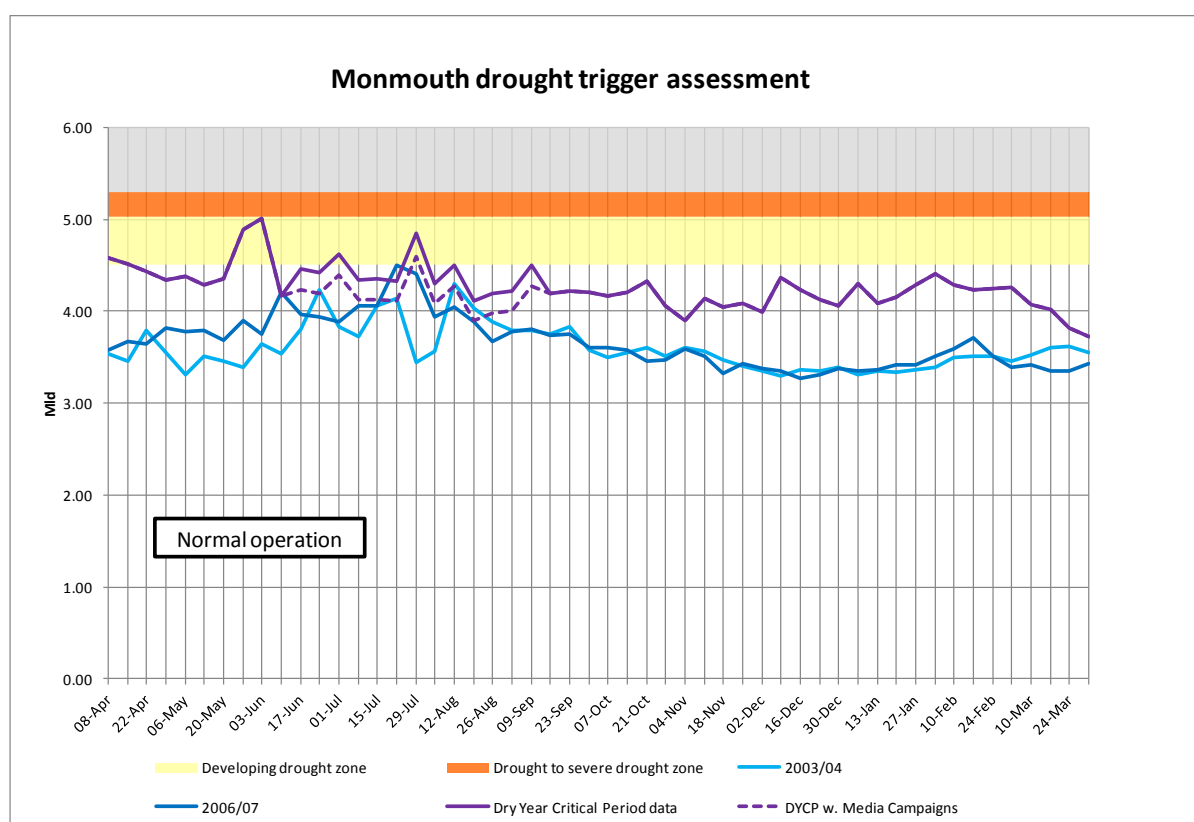


Figure 27 - Monmouth drought indicators and historic droughts

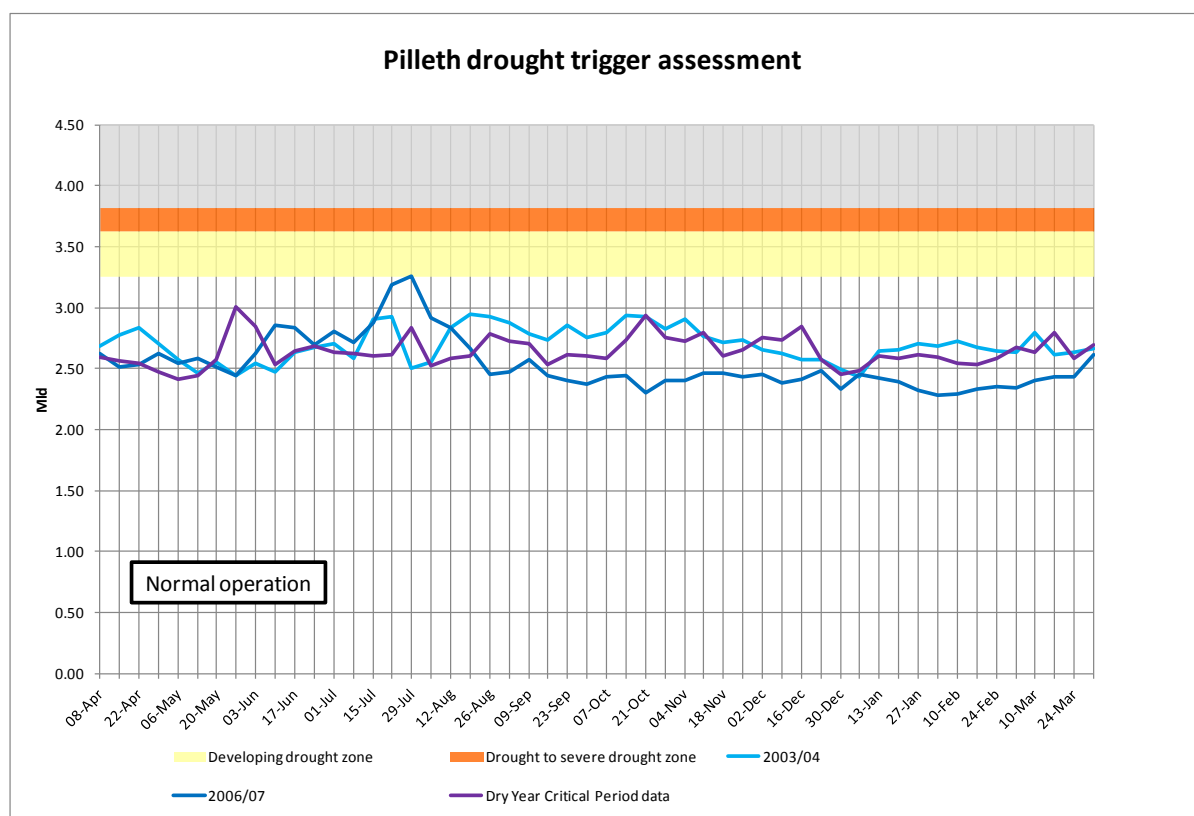
## Pilleth

The DI data available for the Pilleth water resource zone covers the period from 1995 to 2013. This period of record covers the high demand years of 1995/96, 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

Due to significant leakage reduction in Pilleth since the 1995 dry year, the data from this record is not considered appropriate for use in analysis and testing in this zone. Industrial use in Presteigne is a disproportionately large component of demand in this WRZ and we supply a large number of industrial users of water.

There has been a permanent reduction in demand of about 0.5 MI/d in the Pilleth zone since the 2006 profile, so the Dry Year Critical Period profile is now below the historic levels. As such, the zone is now considered to be very resilient to drought, as the peak Dry Year Critical Period value falls more than 0.8 MI/d short of the peak capability.

The demand side savings in this zone could total 0.62 MI/d and the supply side increase in DO could total 1 MI/d.



**Figure 28 - Pilleth drought indicators and historic droughts**

## Brecon Portis

The DI data available for the Brecon Portis water resource zone covers the period from 1995 to 2013. This period of record covers the high demand years of 1995/96, 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

Due to significant leakage reduction in Brecon Portis since the 1995 dry year, the data from this record is not considered appropriate for use in analysis and testing in this zone. The zone also has other changes occurring through the Review of Consent process which will take effect in 2015. This change will be offset by the delivery of the 'River regulation from Usk reservoir' water resource scheme, identified in our Water Resources Management Plan. The lines shown in the graph below are predicated on the scheme being in place.

The Dry Year Critical Period profile did not exceed the levels seen in the summer of 2006. Demand in the zone is typically quite flat throughout the year, with the usual demand peaks at the Whitsun May bank holiday and the start of the summer holidays having a much less significant impact on demand than in other zones.

The drought scenario assessments for the Brecon Portis water resource zone suggest from the historic record that the zone is very resilient to drought. The apparent spare capacity at the point of the developing drought needs to be retained however, because despite spare capacity existing at a zonal level, Portis WTW may be pushing closer to its capability. In the event that the developing drought DAZ is reached, we may need to transfer between Brecon and Portis, so we would need to look at this transfer capability.

The demand side savings in this zone could total 0.44 Ml/d and the supply side increase in DO could total 4.1 Ml/d.

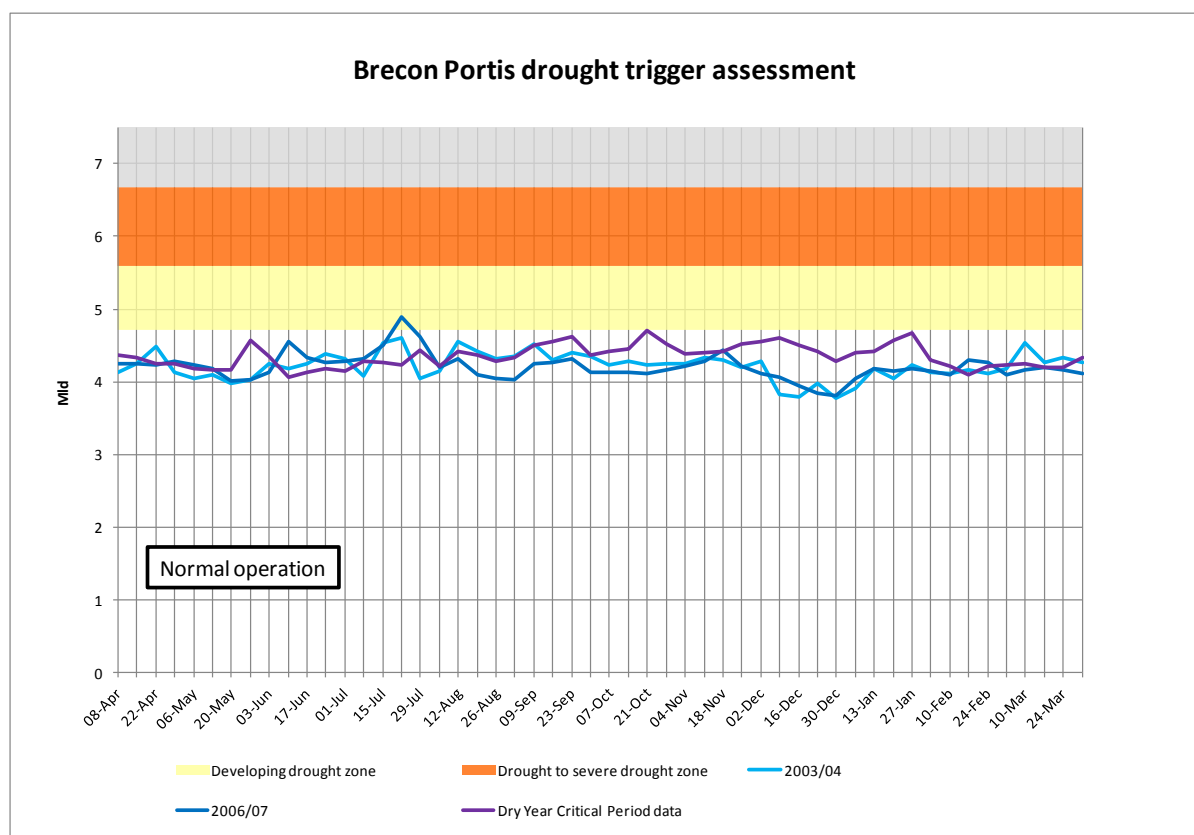


Figure 29 - Brecon Portis drought indicators and historic droughts

## Vowchurch

DCWW has invested significantly in network developments in Vowchurch as a result of the 2009 WRMP deficit, to transfer water (0.5 MI/d) from the Hereford WRZ, as well as leakage and water efficiency measures to significantly reduce customer demand.

The DI data available for the Vowchurch water resource zone covers the period from 1995 to 2013. This period of record covers the high demand years of 2003/04 and 2006/07. Due to significant leakage reduction in Vowchurch since the 1995 dry year, the data from this record is not considered appropriate for use in analysis and testing in this zone. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

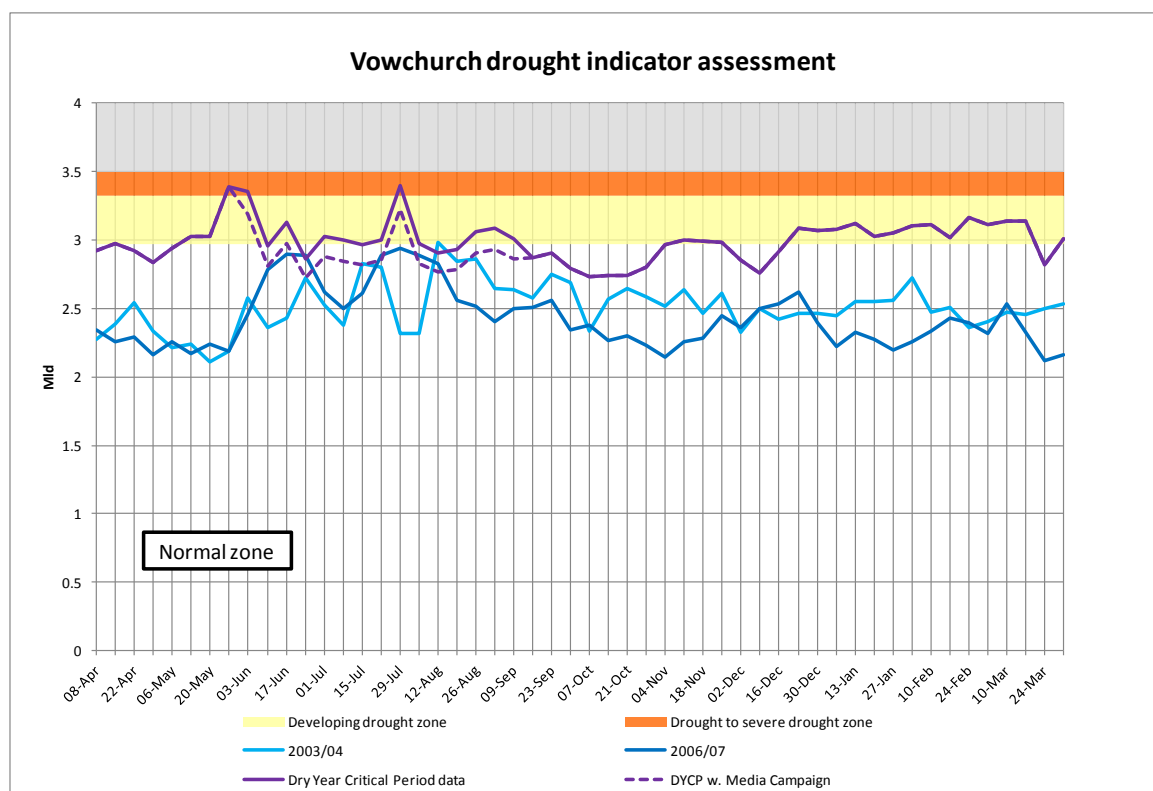
The plotting of the demand profiles against the drought indicators showed that the Dry Year Critical Period produced a peak demand of 3.40 MI/d compared to a peak capability of 3.5 MI/d, and crossed into the drought DAZ in the May bank holiday and summer holidays.

Due to the quick transition from developing drought through to drought, it will be necessary to ensure that all applications and evidence for demand and supply side actions are prepared during the developing drought phase to enable a prompt response to entering drought conditions. The zonal summary for Vowchurch reflects these pressures on timescales for implementation of options with tankering assessments being undertaken at an early stage in the sequence of actions. The normal operations have been amended to comment that a tankering plan should be maintained in the normal operation zone.

The effectiveness of demand side measures was tested. A three week lead in time was factored in for the savings from a Media Campaign to be realised and this was then effective in reducing the summer peak. Tankering would have a shorter lead in time and could reduce summer spikes further.

The demand side savings in this zone could total 0.34 MI/d and the supply side increase in DO could total 1 MI/d.

As demonstrated in our Water Resources Management Plan, this source is not resource constrained. Our daily abstraction volume from the boreholes at Vowchurch is reduced from 4MI/d to 3MI/d when the flow in the River Dore adjacent to our boreholes reaches 12 MI/d (~ Q90). We monitor river flows at a downstream gauging station near Moorhampton Bridge where the calculated Q95 is approximately 8 MI/d, we do not therefore envisage any hydrological restrictions on our abstraction.



**Figure 30 - Vowchurch drought indicators and historic droughts**

## Whitbourne

The DI data available for the Whitbourne water resource zone covers the period from 1995 to 2013. This period of record covers the high demand years of 1995/96, 2003/04 and 2006/07. A further demand profile was generated by scaling the demand data from 2012/13 to provide a Dry Year Critical Period profile.

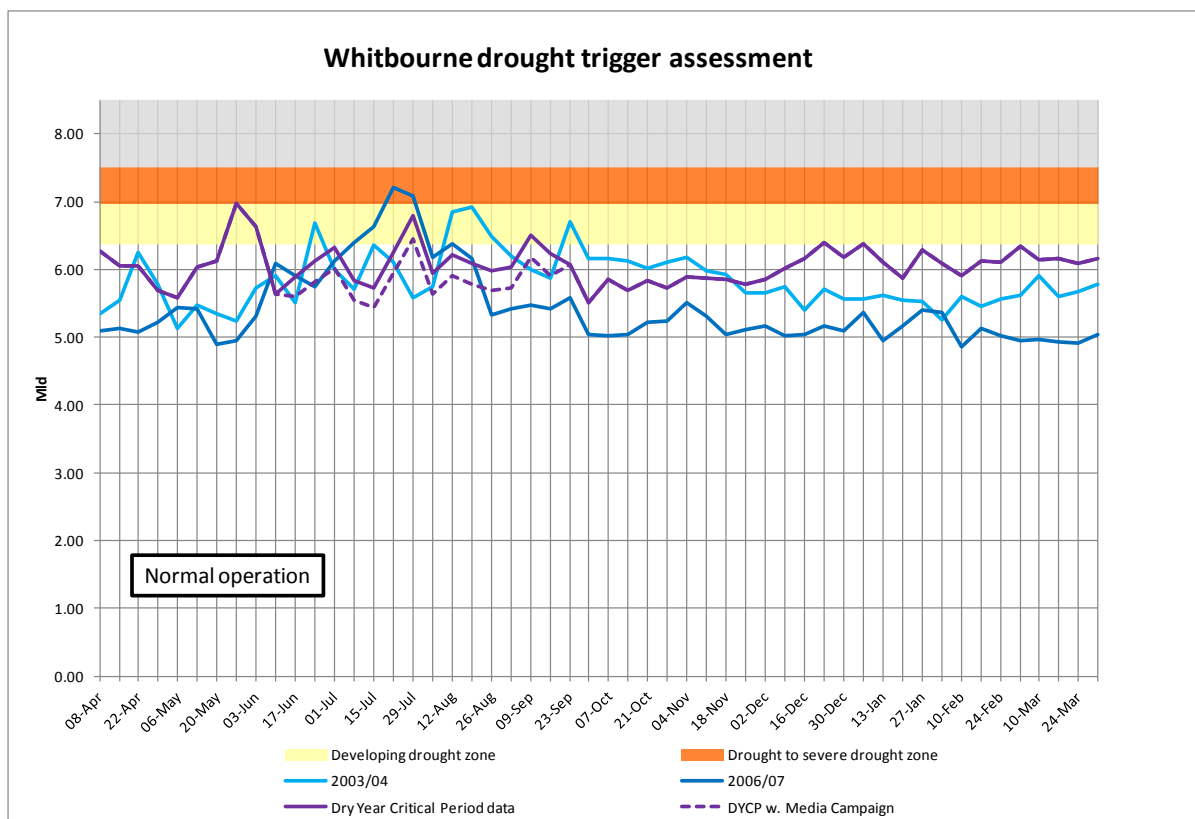
The drought scenario assessments for the Whitbourne resource zone suggest from the historic record that the zone is of moderate to low drought resilience. The plotting of the demand profiles against the drought indicators showed that all demand profiles enter the developing drought DAZ during the summer holidays.

The 2006 drought event was the only event which entered the drought DAZ, but it did not exceed the peak capability, indicating that the implementation of demand side measures will be effective in maintaining supply to customers.

The DYCP scenario was also tested with water efficiency campaigns in place, delivering savings three weeks after initial entry into the drought DAZ. These savings, which reduce peak demands by 5%, resulted in the scenario remaining in the developing drought DAZ rather than re-entering the drought DAZ.

The demand side savings in this zone could total 0.65 MI/d and the supply side increase in DO could total 1.5 MI/d.

As demonstrated in our Water Resources Management Plan, this source is not resource constrained. The EA river flow gauging station at Tenbury on the River Teme (Station no. 54008) is located approximately 26km upstream of our intake at Whitbourne. The abstraction licence for this source allows for a daily abstraction of up to 9 MI/d subject to a prescribed flow condition of 159 MI/d as defined at the Tenbury flow gauge. When the 159 MI/d condition is reached our daily abstraction is then constrained to the volumes discharged into the River Teme catchment by Severn Trent Water in the preceding 12 month period from the 1<sup>st</sup> October to 30<sup>th</sup> September. We have no concerns hydrologically with this volume being available during drought, the calculated Q95 for the Tenbury gauging station is 133.57 MI/d (<http://www.ceh.ac.uk/data/nrfa/data/meanflow.html?54008>).



**Figure 31 - Whitbourne drought indicators and historic droughts**

## 3 Drought management actions

### 3.1 Overview

This chapter describes the options that Welsh Water has at its disposal to ensure that water supply is maintained in the event of an exceptional drought period.

Demand side drought options can be broadly divided into two categories. Firstly, those that reduce demand for water including measures such as leakage or water treatment works loss reduction which are under our control, and secondly, those which encourage customers to reduce water usage through engagement methods and water efficiency products. These also include the more extreme measures such as temporary use bans (TUBs) on hosepipes, or non-essential use bans placed on our commercial customers through application of drought orders.

Options that increase water supply capability include the reinstatement of mothballed sources, permits to amend abstraction license conditions, the reduction of reservoir compensation arrangements, and drought orders to abstract water at new sites.

Chapter 2 has described the way in which we define the stages of a drought and the importance of having flexibility in terms of the options we have for addressing drought due to the potential geographic and temporal variations experienced.

In general terms the actions taken during a drought should be proportionate to the severity of a specific drought event. Welsh Water will manage each drought with respect to the circumstances that emerge as the drought develops, and will always try to adopt the options with the least environmental effects first. This would typically mean that demand options such as water efficiency, media campaigns, and enhanced leakage management would be implemented prior to using supply side measures that require drought permits or orders. This chapter describes the order in which we will implement the drought actions associated with each DAZ.

We have developed our drought options from both a regulatory and operational perspective. To this end we have undertaken a variety of assessments to ensure that our options are fully viable, which include:

- Internal review of all options with operational, customer liaison and communications staff.
- Completion of volumetric assessments of supply option yields through hydrological monitoring of water bodies within catchments, and the assessment of the catchment as a whole.
- Meetings with NRW and EA to discuss environmental issues related to supply side options.
- Development of a programme of environmental monitoring plans and reports to understand and mitigate against potential environmental impacts
- Commissioning and completion of our Strategic Environmental Assessment of the Plan

Table 7, provides a list of both demand and supply side options available to us and the order in which they would be implemented during a drought event. For completeness we have also included the key messages that would be communicated to customers prior to implementation. These are also presented in our communications plan in Section 5.2.

Table 7 - Drought action sequence of events

Resource Position	Demand Side Actions	Supply Side / Operational Actions	Communications Key Messages
Normal	<p>Weekly monitoring of rainfall, reservoir and demand levels.</p> <p>Ongoing leakage maintenance and water efficiency work streams.</p> <p>Preplanning for the implementation of 'Media Campaign with Water Efficiency Device Offering' and 'Enhanced Leakage Management' option.</p>	<p>Abstraction remains within licence, within operational rules and within quality constraints</p>	<p><b>Use the water that you need but please don't waste it</b></p> <p>General Water Efficiency Campaigns via:</p> <ul style="list-style-type: none"> <li>- Radio</li> <li>- Education Centres</li> <li>- Water Efficiency Web Page</li> </ul>
Developing Drought	<p>Raise and increase awareness of the importance of water conservation measures through the established media campaigns as per the communication plan which will include requests for voluntary restraint.</p> <p>Undertake 'Media Campaigns with Water Efficiency Device Offering' option.</p> <p>Undertake 'Enhanced Leakage Management' option</p> <p>Supply / demand situation continually monitored throughout the drought situation and the effectiveness of demand-side measures.</p> <p>Continuation of preceding options.</p> <p>Preplanning for the implementation of Temporary Use Bans (TUBs) and Non Essential Use Bans (NEUBs)</p>	<p>Commence increased NRW and operational liaison in line with Management and Communication Plan.</p> <p>Undertake dry year re-zoning to optimise and balance water resources.</p> <p>Review availability of mothballed/emergency sources.</p> <p>Review and prepare tankering activity to support lower resource from neighbouring zones.</p>	<p><b>Use the water that you need but please don't waste water.</b></p> <p><b>We increasingly need your help to conserve water supplies.</b></p> <p><b>We are also doing our bit by ensuring we fix leaks quickly to prevent waste</b></p> <p>Continuation of Normal Activities plus:</p> <ul style="list-style-type: none"> <li>- Enhanced targeted Water Efficiency Messaging</li> <li>- Local Radio</li> <li>- Target social media</li> <li>- Prepare and Publish DCWW Drought Web Page</li> <li>- TUB consultation via printed media</li> </ul>
Drought	<p>Increasing public awareness and content of new demand-side measures to be included in media campaign and as aligned with the communication plan.)</p> <p>Introduction of TUBs</p> <p>Continuation of preceding options.</p> <p>Preplanning for the implementation of NEUBs. (Saving of up to 5% of demand anticipated).</p>	<p>Implement environmental monitoring in line with Monitoring Plan.</p> <p>Bring emergency/mothballed supply side options on line where practicable (Constrained by scheme lead times and maintenance of wholesome water quality).</p> <p>Continue to review current operational activities to preserve resource.</p>	<p><b>We've introduced a temporary hosepipe ban as a last resort to help conserve water supplies</b></p> <p><b>Ask you to respect this to ensure supplies to people in the area are conserved</b></p> <p><b>Thank you in advance for your cooperation</b></p> <p><b>Implement TUBS</b></p> <p>Continuation of Previous Techniques plus Enhanced messaging via:</p>

Resource Position	Demand Side Actions	Supply Side / Operational Actions	Communications Key Messages
		<p>Continue to review and implement where feasible tankering to support lower resource and/or from neighbouring zone.</p> <p>Prepare Drought Order/ Permit applications.</p> <p>Apply for drought orders as severe drought zones are reached</p>	<ul style="list-style-type: none"> <li>- Local Radio</li> <li>- Targeted social Media</li> <li>- Plus Call Centre Pre recorded Messages</li> <li>- Targeted messaging through texting service</li> <li>- Media interviews with Senior Managers produced via TV and Radio</li> </ul> <p>Preparation for NEUB Via Chamber of Commerce and Trade Bodies</p>
Severe Drought	<p>Continuation of preceding options.</p> <p>Increasing public awareness and content of new demand-side measures to be included in media campaign and as aligned with the communication plan.</p> <p>Introduction of NEUBs</p> <p>All actions saving up to an additional 5% of demand</p> <p>Implementation of Emergency Drought Orders as Last Resort (Saving an additional 0-10%of demand)</p>	<p>Bring emergency sources on line with customer notices in place where there is a risk that aesthetic quality of water might be affected.</p> <p>Once demand management measures are in place implement supply side options that require drought permits or orders.</p>	<p><b>Continuation of Previous Activities with the enhanced message</b></p> <p><b>We appreciate your help so far in observing the temporary use restrictions,</b></p> <p><b>Water levels are at very low levels so we ask you think carefully about the waster you use</b></p> <p>Urge you not to waste any water</p> <p>Implementation of NEUB via:</p> <ul style="list-style-type: none"> <li>- Local Media</li> <li>- Letter Drop and or Text Service</li> <li>- Engagement with Chamber of Commerce and Trade Bodies</li> <li>- Preparation for Emergency Drought Orders</li> <li>- Media Campaign</li> <li>- Media Interviews with Senior Managers produced via TV and Radio</li> </ul>

We will, as a matter of course, monitor the effectiveness of drought actions within each zone through current day-to-day processes of monitoring supply capability and demand. However, the reporting frequency will increase in line with the drought management process. To ensure that the communications techniques employed to manage demand are as effective as possible, we will undertake in-drought monitoring and review of our messaging strategy. The measures we would undertake in a drought could include, but would not be limited to:

- Measurement of the level of reduction in water use during drought stages as actions commence and against anticipated demand
- Feedback from representative customer groups
- Website hit statistics and feedback from both our website, and key stakeholder websites such as NRW and CCWater's.

This evidence base and the assessed effectiveness of the drought options implemented would be used to support future refinements of the drought plan and the options it contains as well as, in times of drought, to support any applications for the implementation of more severe drought options (such as drought orders or emergency drought orders).

### 3.2 Maintaining Customers Levels of Service

Our level of service with regard to customer side water use restrictions such as hosepipe bans have been set through public consultation on our Water Resource Management Plan (WRMP). The benefits assumed from our demand side drought actions are intrinsically aligned with these levels of service to the customer, which is to implement temporary use ban (TUBs) no more than once in every 20 years on average, and the implementation of a non-essential use ban no more than one in 40 years on average.

Table 8 below provides a summary of the existing actual levels of service for our water resource zones.

**Table 8 - Summary of Level of Service of all WRZs**

Water Resource Zone		Constraint	Levels of Service <sup>1</sup>	
			HPB	DO-DP
8014	Alwen Dee	Infrastructure	1 in 46	1 in 46
8020	Bala	Licence	1 in 91	1 in 91
8033	Barmouth	Resource	1 in 27	1 in 54
8026	Blaenau Ffestiniog	Infrastructure and Licence	1 in 54	>1 in 54
8108	Brecon Portis (Current licence)	Licence	>1 in 39	>1 in 39
8108	Brecon Portis (post-Roc licence)	Licence	>1 in 39	>1 in 39
8012	Clwyd Coastal	Licence and Resource	1 in 23	1 in 46
8035	Dyffryn Conwy	Licence	1 in 91	1 in 91

<sup>1</sup> That "> 1 in 39" denotes a better level of service than 1 in 39, not a frequency that is greater than 1 in 39. Also, it should be pointed out that ">1 in 39" refers to those situations where we have records for the last 39 years, during which there have been no restrictions.

Water Resource Zone		Constraint	Levels of Service1	
			HPB	DO-DP
8102	Elan Builth	Licence	>1 in 39	>1 in 39
8103	Hereford	Licence	>1 in 39	>1 in 39
8034	Lleyn Harlech	Licence	1 in 27	1 in 54
105	Llyswen	Licence	>1 in 39	>1 in 39
8106	Monmouthshire	Licence	>1 in 39	>1 in 39
8202	M&S Ceredigion	Licence and Infrastructure	1 in 37	>1 in 74
8203	North Ceredigion	Resource	1 in 37	1 in 74
8001	NEYM	Resource	1 in 27	1 in 53
8206	Pembrokeshire (Current licence)	Infrastructure	>1 in 54	>1 in 54
8206	Pembrokeshire (post-RoC licence)	Resource	1 in 27	1 in 54
8107	Pilleth	Licence	>1 in 39	>1 in 39
8101	Ross	Licence	>1 in 39	>1 in 39
8121	SEWCUS (Current licence)	Infrastructure	>1 in 39	>1 in 39
8121	SEWCUS (post-RoC licence)	Resource	>1 in 39	>1 in 39
8036	South Meirionnydd	Licence and Infrastructure	>1 in 54	>1 in 54
8201	Tywi CUS	Infrastructure	>1 in 41	>1 in 41
8021	Tywyn Aberdyfi	Licence	>1 in 54	>1 in 54
8110	Vowchurch	Licence	>1 in 39	>1 in 39
8111	Whitbourne	Licence	>1 in 55	>1 in 55

### 3.3 Water Resource Zone Summaries

Our operating area contains 24 Water Resource Zones (WRZs), and there are numerous physical constraints which limit how extensive and integrated our network is between water resource zones, from source through to distribution. The reasons for this include the areas of sparse population, very rural and mountainous areas, and being bordered on three sides by the sea.

We have generated water resource zone summary documents for each of our 24 WRZs (Appendix 1).

Water resource zone summaries are stand alone documents that our managers can use as a reference guide to view available actions. These contain all the relevant information relating to drought management within each zone such as:

- Location plan of our sources
- Abstraction licences.
- Drought triggers to compare with resource position.

- The sequence of drought actions (both demand and supply side) that would be implemented based on the drought position and the associated key communication messages and media routes that would be used.
- Full details of demand and supply side options available including their estimated savings. The options are presented in the format set out in the drought plan guideline, (EA/NRW June 2011, Appendix F and G), and therefore also include the required environmental assessment information relevant to the supply option being implemented. Further detail regarding the demand options is also included in Appendix 1 in the company level demand options summary.
- Potential savings from demand side activities

## 3.4 Demand side measures

### 3.4.1 Temporary water use restrictions

Managing customer demand is of primary importance in ensuring the security of supply during times of drought. This section sets out our plan for the water use restriction measures we will implement with any exception criteria that may be applied.

The Flood & Water Management Act (FWMA) October 2010 provided water companies with new powers to impose a wide range of temporary water use restrictions/bans (TUBs) during a drought without requiring a drought order (Section 76 within the Water Industry Act 1991). The powers under the original Section 76 were generally referred to as a “hosepipe ban”. The Drought Direction 2011 replaced the Drought Direction 1991 and set out the range of water uses that can be restricted under an Ordinary Drought Orders (commonly known as a non-essential use ban (NEUB)).

As part of our business planning process, we have proactively undertaken customer research work through independent consultants (Accent) to understand our customers’ views on TUB options. This was a quantitative willingness to pay survey with the aim of understanding customer preferences in relation to the types of restrictions that might be imposed during a drought.

Eight different types of water use restrictions were included in the survey. These were:

- Watering a garden using a hosepipe
- Cleaning a private vehicle using a hosepipe
- Watering plants using a hosepipe
- Cleaning a private leisure boat using a hosepipe
- Filling a swimming pool or paddling pool with a hosepipe
- Drawing water using a hosepipe for domestic recreational use
- Filling or maintaining an ornamental fountain
- Cleaning household walls or windows using a hosepipe.

A discrete choice experiment was designed to measure customers’ views on the types of water uses that would be allowed and prohibited if a temporary use ban was put in place. In this exercise, the options were combinations of water use restrictions that would be put in place during a temporary use ban, coupled with the expected duration of the ban that would result.

This enabled us to obtain estimates of customers’ relative ‘willingness to pay’ for alternative water uses during a temporary use ban, in terms of the additional duration of the temporary use ban that would be acceptable to customers if a certain water use were allowed than if it were prohibited during the ban. The more that customers valued a particular water use, the more extra time they would be expected to be ‘willing to pay’ to see that water use allowed rather than prohibited.

This research included both domestic and commercial customers, using both phone and e-mail surveys, and focus groups and interviews. The findings of the research have been used to inform our approach to implementing TUBs, further details of which are provided in Section 3.4.2.

A UK Water Industry Research (UKWIR) project was completed in 2013 to provide a voluntary Code of Practice (CoP) and guidance to water companies on implementation of water use restrictions to manage demand during times of drought. This CoP provides guidance on implementation of TUBs and Ordinary Drought Orders and advises on the staged approach to the implementation of restrictions and exceptions, with the aim of creating a more consistent approach across UK water companies. This general approach seeks to minimise the social and economic effects of water use restrictions, with restrictions placed initially on domestic customers before affecting commercial customers.

The CoP provides a level of individual company discretion over the implementation of TUBs and NEUBs in terms of the phasing of restrictions and choice of different exceptions for domestic and commercial customers.

DCWW agree with the approach detailed in the UKWIR Code of Practice and Guidance on Water Use restrictions and we have followed the guidance provided in developing our Drought Plan. There are four principles outlined in the CoP. These are:

- Ensuring a consistent and transparent approach
- Ensuring that water use restrictions are proportionate
- Communicating clearly with customers
- Considering representations in a fair way

There are also five actions set out in the CoP that have been developed following drought experience (in the south-east of England during 2011-2012) to help establish a more consistent approach in terms of implementing water use restrictions. These are:

- For companies, regulators and government to work together
- To coordinate communications
- To adopt a common phased approach, considering socio-economic factors
- To adopt a common approach to exceptions
- To promote understanding and good practice

DCWW will endeavour to meet these requirements during drought. We will liaise closely with our neighbouring water companies during times of drought and will work together wherever possible to align messages to customers on the need for water conservation and water use restrictions.

### **3.4.2 Temporary Use Bans**

The initial phase of drought action is intended to reduce demand by encouraging voluntary customer restraint on water use and enhanced leakage management. TUBs on water use may then be imposed following advertisement as drought conditions prevail and drought action trigger levels are reached.

Legislation sets out specific requirements for notifying the public prior to the introduction of the new TUB measures. Section 76 of the Water Industry Act 1991 stipulates:

- Notice must be given to those affected (no time requirement is imposed)
- As a minimum, notice must be advertised in two newspapers circulating in the area to which the restrictions apply and advertised on DCWW's website

In regard to phasing of Temporary Use Bans, a single phase in which all eleven legally prescribed activities are simultaneously banned at the start of the restriction period is considered by DCWW to be the most appropriate approach. Table 10 provides detail around a common phased approach to TUBs and identifies the exemptions that we would consider for customers when implementing water use restrictions. A single phase will help to maximise water savings as well as send out a strong simple message that the situation is worsening. This approach is supported by our customer research work on TUBs, which helped us understand our customers' priorities with regard to TUB implications and to test our proposed implementation strategy against these.

The findings from these studies were as you might have anticipated with customers valuing those activities such as watering plants or cleaning vehicles which provide the greatest water savings. Both domestic and commercial customers would prefer, for example, bans on the filling of swimming pools and cleaning of boats to be implemented in preference although the banning of these activities saves far less water. It is clear that if the higher demand saving options are to be imposed such as restricting plant watering and vehicle cleaning with a hosepipe, then our customers would like all the other restriction categories to be imposed at the same time. In addition, both our experienced communications and customer service teams emphasised that restrictions would be most effective if the strategy is simple to understand by customers.

Maximum flexibility will be applied when imposing water use restrictions geographically as action triggers have been produced for each of our 24 Water Resource Zones rather than for the regions as a whole. TUBs may be implemented concurrently within groups of WRZs aligned to regional media coverage areas, but this is dependent upon specific drought circumstances. For further details on these regional media coverage areas please refer to the Communications Plan.

We recognise that there is merit in consistency in imposition of TUBs between water companies, which is why all the water companies operating in Wales have signed up to the CoP covering these actions. However, all companies have also expressed the need for a flexible approach given that each drought is different and conditions across each company's supply area may be different. We acknowledge that there are some minor differences in the approach taken to discretionary exemptions by Severn Trent Water and ourselves. However, these are minor and we do not consider that the differences will lead to customer confusion.

The CoP identifies 3 types of exceptions whereby customers would not be restricted during the implementation of TUBs. These are:

- Statutory Exceptions that must be made to restrictions. These are specified through legislation and exempt restrictions for commercial uses of hosepipes, and on H&S or environmental grounds.
- Discretionary Universal Exceptions whereby these are agreed in line with the CoP to ensure a consistent approach to imposition of restrictions. These primarily relate to exemption of blue badge holders.
- Discretionary concessional Exceptions which are granted by individual water companies. DCWW will grant concessions on the grounds of protection of the environment and for those on the DCWW Vulnerable Customer list. These exceptions will require customers to write or make representation to the water company to obtain permission.

The exceptions that would be granted by DCWW in the event of implementing TUBs are provided in Table 11. DCWW has adopted a policy to maintain all exceptions once Drought Orders are in place to maintain a clear and consistent message to our customers on water use restrictions, except in extreme drought circumstances where rescinding of certain concessions may be required.

In relation to cases of non-compliance with TUBs, any enforcement strategy or legal action in respect of any drought restrictions would be subject to Dŵr Cymru's Enforcement and Prosecution Policy, which takes a number of factors into consideration. When considering a matter for Prosecution,

Dŵr Cymru complies with the Code of Crown Prosecutors. If customers wish to appeal in relation to the implementation of TUBs they are able to do so by application for Judicial Review of the order. Any customer wishing to pursue this route must take their own independent legal advice.

### 3.4.3 Non essential Use Bans

If the severity of the drought continues to increase following the implementation of TUBs, DCWW may need to apply for a Drought Order to further restrict water use through the implementation of 10 types of Non Essential Use Bans (NEUBs) under the Drought Direction 2011.

All 10 Non-Essential Use Bans will be implemented at the same time within any WRZ and will not be phased (see Table 10), in order to maximise water savings and provide a clear message to our customers on the need and timing of these restrictions.

As with TUBs, DCWW will grant limited exceptions to Non-Essential Use Bans (Table 11 and Table 12). The main concessions granted are:

- Concessions on the grounds of protection of the environment (relating specifically to the spread of non-native and/or invasive species)
- Concessions for those on the DCWW Vulnerable Customer list
- Concessions for small businesses which may be affected (on a case by case basis)

Discretionary concessional exceptions will require customers to write or make representation to the water company to obtain permission.

### 3.4.4 Rota Cuts

Rota cuts and standpipes would only be employed in very exceptional circumstances under emergency drought order and are viewed outside of these circumstances as an unacceptable practice for anything other than exceptional emergency circumstances. However, our position will be reviewed as required by changing guidance and regulation, the severity of the drought, and how well the company has managed with its existing drought control measures.

### 3.4.5 Representations

As discussed in section 4.3.4 above and detailed within the CoP, customers may be granted exemption from TUBs and NEUBs. Customers who meet the criteria for statutory and discretionary universal exceptions can continue to use water without restriction and do not need to make a representation to DCWW.

With regard to discretionary concessional exceptions, customers will need to make a representation to enable them to continue to use water for the specific purposes laid out in tables 8 and 9. These will only be granted to individual users on a case by case basis and on their individual merit via our representation process. Our customers should contact us to seek more information on the imposition of demand restrictions, or request specific exceptions when we advertise that we intend to impose water use restrictions. We would also review whether it is appropriate for us to vary our exception policy in light of representations received. When representation are received we will:

- Log the receipt of the representation and acknowledgement to the customer;
- Review the representation against our policy based upon table 9 and 10 in line with the CoP;

- Representations that meet the criteria of our policy will normally be granted an exception from the water use restriction and this will be logged and the customer informed of this decision;
- More complex or higher water demand impact representations will be highlighted, logged as such and taken forward for consideration by a review panel;
- The customer will be informed of the review decision and reason for this.

We would be pleased to receive representations in Welsh or English and these should be made in writing to:

**Water Use Restriction Exceptions**

**The Drought Co-Ordinator**

**Dŵr Cymru Welsh Water**

**Pentwyn Road**

**Nelson**

**CF46 6LY**

Table 9 - Demand side measures

Option Name	Media Campaign with Water Efficiency Device Offering
Option Description	<p>The implementation of increased engagement with the customer regarding the efficient use of water through media campaigns, combined with offering and the distribution of water efficiency products. The company's existing engagement streams will also be used to manage interest, such as its website and water efficiency portal (the website and portal would also inform customers of water saving tips).</p> <p>The media campaign will focus on raising customer awareness of the water resource and drought situation and to promote the efficient use of water through local radio, television, website and social media, as per the detail contained within the communication plan. The type of media campaign triggered would evolve based on the stage of drought entered into and would include additional information regarding the relevant demand-side restrictions being implemented.</p> <p>The management of water efficiency falls within our water efficiency / demand management strategy and is a normal operation that is effective all year round. We have existing water efficiency work streams which include soft measure engagement and the distribution / fitting of water efficient products. We considered increasing its focus but based on the likely additional water savings that would be derived from this we do not view it as a viable or an effective option when compared to the media campaign. However should there be increased interest from customers involved in our existing work streams regarding becoming engaged in water efficiency, as a result of the media campaign, we would look to capitalise on this.</p> <p>The areas targeted within the company will range from individual water resource zone (s), to media region level, to company wide, and the approach of delivery will be dependent on the scale of the supply / demand situation under normal to developing drought conditions.</p>
Trigger(s) (or preceding actions)	<p><b>Trigger</b></p> <p>Moving from 'Normal Operation' zone into the 'Developing Drought' zone, Based on a decision from the Operational Drought Management Team.</p> <p>Additionally, there may be a link with demand levels that show sustained increases above baseline levels, which would trigger a review of the supply / demand situation and subsequent action would be taken if required.</p>

	<p><b>Preceding action</b></p> <p>Normal Operation - Demand levels would be monitored on a daily / weekly basis.</p> <p>When moving towards the severe drought zone, Supply / demand situation will be continually monitored and the effectiveness of all demand-side measures estimated.</p>
<p>Demand Saving Litres per day or % reduction of Peak Week demand.</p>	<p>Estimated Demand Saving is 0 – 5% but would increase with drought severity and messaging.</p> <p>The media campaign would be enhanced as the drought situation developed (and could be accompanied by enhanced leakage detection). Previous media campaigns offering water efficient devices have experienced an average uptake rate of c.20% of customers targeted. The savings are dependent upon a number of factors including:</p> <ul style="list-style-type: none"> <li>• The scale of the area targeted by the campaign, which is linked to the number of customers and uptake rates.</li> <li>• The duration of supply demand situation and the duration of the subsequent campaign.</li> <li>• The products that are ordered and installed.</li> <li>• The time of year the campaign is implemented.</li> <li>• The savings per day and for a typical property: (assumed saving per device taken from Ofwat guidance) are: <ul style="list-style-type: none"> <li>▪ Aerated Shower head – 30 litres/day</li> <li>▪ Shower Timer – 5 litres/day</li> <li>▪ Tap Saver Kit – 36 litres / day (based on 2 taps)</li> <li>▪ ‘Save A Flush’ Bag – 10 litres / day</li> <li>▪ Hose Trigger Gun – 2 litres / day</li> <li>▪ Plant Gel (Water Retention) – 0.5 litres / day</li> <li>▪ Total (if all products Installed) – 83.5 litres / day</li> </ul> </li> </ul> <p>It is unlikely that all products would be ordered and installed to yield the maximum saving. By far the most popular device is the aerated shower head followed by the ‘Save a Flush’ and tap saver kits. Depending on the combination of products installed it is estimated that a saving of anything up to 10% per property may be achieved. Once products are installed they would be effective year round.</p>

Location Area affected or whole supply zone	Applicable to entire WRZs / media region levels / company wide.
Implementation timetable Preparation time, time of year effective, duration	<p>Media Campaign &amp; Device Promotion:</p> <p>1 to 2 weeks - Preparation and implementation time (liaison with local media may delay communication and extend implementation timescale to 3 to 4 weeks). The media campaign can be implemented year round, irrespective of a drought situation. It may have the most impact during early spring / summer prior to garden watering increasing, but the key messages would align with the communication plan and would be cognisant of the season in which the campaign falls and would ensure key messages are in keeping (i.e. discuss lagging pipes in winter, discuss watering activities in summer etc).</p> <p>2 to 3 weeks - Water efficient device turnaround i.e. orders being made through to implementation of products and savings being realised.</p> <p>This demand-side measure will be prepared as much as possible in the time leading up to the 'Developing Drought' stage, which will minimise the lead time to implement the demand-side measure in the 'Developing Drought' and 'Drought' stages. The preparation works undertaken would align with the communication plan as required.</p>
Permissions required and constraints Including details of liaison carried out with bodies responsible for giving any permits or approvals	<p>We expect there to be limited constraints, however we will be mindful of the following:</p> <ul style="list-style-type: none"> <li>• Maintenance and closer monitoring of our systems to engage with public i.e. online portal, to ensure they are functioning as required.</li> <li>• Promotion of media campaign to be embedded in other relevant departments such as DCWW call centre, meter optants etc, as directed within the communication plan.</li> <li>• Awareness that supporting resource may be required with respect to our existing water efficiency work streams to ensure sufficient engagement with customers as required, and water efficiency devices are available, and delivered within the identified timeframes.</li> <li>• The magnitude of devices that would have to be issued to produce significant demand saving, the cost and effort in terms of widespread distribution of products to customers versus savings of other demand management options, the timescales to acquire products and distribution on a large scale, the scale of use within customers homes, and product wastage.</li> </ul>
Risks associated with option	Effectiveness of a media campaign in terms of actual demand reductions.

Option Name	Enhanced Leakage Management
Option Description	<p>Leakage management and the strategy driving it is a year round activity, with an aim to achieve a policy minimum level (PML) of leakage. PML is the level of leakage which can be economically achieved based on the current economic level of leakage calculations. This is set at the start of each 5 year asset management programme (AMP) with an aim of achieving PML through the 5 year period.</p> <p>There are circumstances in which the company needs to accelerate leakage management activities to maintain their forecasted level of leakage, for example as a result of events like a very harsh winter, or very wet periods in which ground saturation has accelerated ground movement leading to bursts. The circumstances affecting leakage are numerous; however we have existing processes to deal with an increased or enhanced need to manage leakage. Additionally enhanced leakage management activities could be implemented with a view to achieving PML of leakage earlier within an AMP cycle rather than forecasting this over the 5 year period.</p> <p>In times of drought our existing internal protocols would be capitalised upon to reduce demand through enhanced leakage management. This process would include:</p> <ul style="list-style-type: none"> <li>Enhanced Active Leakage Control (ALC) activity including increased leakage detection and repair activity to reduce leak run times (applicable to detected and reported leaks), and targeting customer side leakage.</li> <li>Enhanced Pressure Management (PM) activity including the review of existing pressure management schemes performance and optimise profiles, and also the acceleration / bringing forward of new schemes ahead of planned schedule.</li> </ul> <p>The areas targeted within the company will range from water resource zone (s), to media region level, to companywide, and the approach of delivery will be dependent on the scale of the supply / demand situation under normal to developing drought conditions.</p> <p>The media campaigns that would already be in progress include water efficiency device offers, and as outlined in the communication plan, would evolve to inform customers of the new leakage measures being undertaken as a result of worsening drought.</p>

Trigger(s) (or preceding actions)	<p><b>Trigger</b></p> <p>Supply /demand situation moving from the 'Normal Operation' zone into the 'Developing Drought' zone and through subsequent drought and severe drought stages.</p> <p><b>Preceding action</b></p> <p>Normal Operation - Demand levels would be monitored on a daily / weekly basis          Developing to severe drought - Supply / demand situation continually monitored throughout drought situation and the effectiveness of all demand-side measures.</p>
Demand Saving MI/day or % reduction of Peak Week demand.	<p>Estimated Demand Saving is 0.5 – 2% of the volume above our policy minimum leakage (PML) level</p> <p>The approach to more accurately estimate savings will be to assess the current leakage levels against policy minimum leakage (PML) levels at the time of option implementation for the specific water resource zone / media region level / other company configuration.</p>
Location Area affected or whole supply zone	Applicable to WRZ specific areas, through to media region level and company level.
Implementation timetable Preparation time, time of year effective, duration	<p>1 – 2 weeks - Preparation / planning time to affect enhanced leakage management.</p> <p>1 – 2 weeks – The length of time required for leakage savings to be realized following an ALC intervention (dependant on leak detection and repair cycle).</p> <p>1 – 3 months – Investigation, analysis and planning of additional pressure management activity.</p>
Permissions required and constraints Including details of liaison carried out with bodies responsible for giving any permits or approvals	<p>There are few constraints anticipated, however we will be mindful of the following:</p> <ul style="list-style-type: none"> <li>• Time required for liaison with local authorities regarding traffic management and working in highways. If a reduction in notification time could be achieved, this would facilitate a reduction in the leak repair time cycle.</li> <li>• The estimated savings from the implementation of enhanced leakage management are dependent upon the characteristics of the network / WRZ / area where the option is to be implemented.</li> <li>• Any realised savings are dependent upon the duration of the supply / demand situation and the scale and length of deployment of resources to the zone / area.</li> </ul>

Risks associated with option	<p>We should not place too much reliance on the savings estimated through enhanced leakage management because there are many variables that could impact the effectiveness of this option, for example, leakage levels at the time of drought, the status of operational resource pool, and the increased man hours required in targeting more difficult leakage to bring down to policy minimum levels. Droughts also have the potential to generate additional leakage through ground drying and movement and / or subsidence, in which case additional resource may be required just to maintain an existing level of leakage without managing to reduce leakage beyond pre-drought levels.</p> <p>There are a number of considerations regarding the level of resource which we will need to manage:</p> <ul style="list-style-type: none"><li>• It's likely that the level of available resources at critical times (such as during spring / summer) may be lower due to holidays.</li><li>• The timescales for the recruitment of additional ALC resources to deal with enhanced leakage management.</li><li>• Resource redeployment may reduce resources in other WRZs and leakage levels may increase over the duration of the drought situation.</li><li>• Leakage resources may become involved with non-leakage related activities such as customer liaison.</li></ul>
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Option Name	Temporary Use Bans See – TUBS Section 3.5
Option Description	The introduction of a wide range of domestic water use restrictions including things like watering a garden using a hosepipe, cleaning a private motor vehicle using a hosepipe, and filling / maintaining a domestic swimming or paddling pool. The TUBs processes will align with the four principles outlined in the UKWIR Code of Practice and Guidance on Water Use Restrictions’.
Trigger(s) (or preceding actions)	<p><b>Trigger</b></p> <p>Moving from the ‘Developing Drought’ zone into the ‘Drought’ zone and as per the information communicated by the Operational Drought Management Team.</p> <p><b>Preceding actions</b></p> <p>Normal Operation - Demand levels would be monitored on a daily / weekly basis Enhanced leakage detection, and a media campaign capturing this as well as water efficiency and situation awareness, which are actions associated with supply /demand situation moving from the ‘Normal Operation’ scenario into the ‘Developing Drought’ scenario. The media campaign will also focus on voluntary restraints and increasing customer awareness. ‘Developing Drought’ to ‘Severe Drought’ - Supply / demand situation continually monitored throughout drought situation and the effectiveness of all demand-side measures.</p>
Demand Saving Ml/day or % reduction of Peak Week demand.	<p>Estimated Demand Saving up to 5%.</p> <p>Demand savings from a TUB are difficult to estimate, due to there being limited real-life data regarding the effects of TUBs in Wales. DCWW has not implemented a TUB since the mid 1990s and no data is available to estimate savings from the implementation of an actual restriction during this time.</p> <p>Estimated savings will be dependent upon the time of year that TUBs is implemented, and it’s likely that the higher range of savings would be achieved during the spring to early summer period in line with increase outside water use.</p>
Location Area affected or whole supply zone	Maximum flexibility will be allowed in imposing restrictions geographically, which will range from water resource zone, to media region level, to company wide. It’s likely that the size of implementation would range from media region level to companywide, as this will be a simpler message to convey to the public and to manage.

<p>Implementation timetable</p> <p>Preparation time, time of year effective, duration</p>	<p><b>2 – 4 weeks</b></p> <p>We will start the implementation as we move toward the drought zone and allow 2 to 4 weeks for the process dependent upon the extent of the affected area. The decision will be made through the Drought Management Leadership Team.</p> <p>Implementation will be delayed by the consultation process and requirements to advertise the TUB proposals in the local press. The Code of Practice suggests that there can be a period of at least 2 to 3 weeks between a company making the decision to impose a TUB and being able to implement it.</p> <p>This accounts for the drought scenario falling into the DAZ, the discussion needed within the Drought Management Group, links, both externally with the regulator and internally as outlined in the communication plan, and the amendment of media campaigns to include information and a reasonable notice period regarding TUBs and its planned implementation. The notice period will need to take into account the possible other customer engagements that may be required through increased calls to our customer contact centres and engagement with front line staff.</p> <p>TUBs can be imposed at any time during the year and retain some effectiveness, however they will be the most effective if they are implemented during spring / early summer to coincide with growing seasons and increased outside watering. This demand-side measure will be prepared as much as possible in the time leading up to the 'Developing Drought' stage, which will minimise the lag time to implement the demand-side measure in the 'Developing Drought' and 'Drought' stages. The preparation works undertaken would align with the communication plan as required</p>
<p>Permissions required and constraints</p> <p>Including details of liaison carried out with bodies responsible for giving any permits or approvals</p>	<p>No third party permissions are required. However, notification to the customer will be made prior to full implementation in line with legislative requirements.</p> <p>Liaison with local media regarding and communication of the restriction phases may also determine communication of media campaigns and restrictions being fully implemented</p> <p>Consultation with regulator as required will occur prior to implementation of this option.</p>
<p>Risks associated with option</p>	<p>Effectiveness of TUBs.</p> <p>The resources required to effectively monitor and enforce TUBs.</p> <p>Public relations as a result of imposing a restriction on customers</p>

Option Name	Drought Order Restrictions – Non Essential Use Ban (NEUB) See Section 3.6
Option Description	The introduction of a wide range of commercial water use restrictions including things like watering outdoor plants on a commercial premises, filling or maintaining a non-domestic swimming or paddling pool, or filling and maintaining a pond.
Trigger(s) (or preceding actions)	<p><b>Trigger</b></p> <p>Moving from the ‘Drought’ DAZ into the ‘Severe Drought’ zone, and as per the information communicated by the Drought Management Leadership Team.</p> <p><b>Preceding actions</b></p> <p>Normal Operation - Demand levels would be monitored on a daily / weekly basis Enhanced leakage detection, a media campaign capturing this as well as water efficiency and situation awareness which are actions associated with the supply/ demand situation moving from the ‘Normal Operation’ zone into the ‘Developing Drought’ zone, and the implementation of TUBs as a result of the supply /demand situation moving from the ‘Developing Drought’ zone into the ‘Drought’ zone.</p> <p>The media campaigns undertaken would evolve based on the drought situation. They would be updated to increase customer awareness, to always aim to appeal for customer constraint, and include whatever additional control measures need to be implemented.</p> <p>‘Developing Drought’ to ‘Severe Drought’ - Supply / demand situation continually monitored throughout drought and the effectiveness of all demand-side measures.</p>
Demand Saving Ml/day or % reduction of Peak Week demand.	<p>Estimated demand savings will range from up to 5%.</p> <p>Demand savings from a Non-Essential Use Bans are difficult to estimate, due to there being limited real life data. DCWW has not implemented a Drought Order in recent years and so there is no data available to estimate savings from the implementation of an actual restriction during this time. The time of year will also have an impact on the likely savings that could be realized from a drought order, and it’s likely that the higher range of savings would be achieved during the spring to early summer period in line with increased outside water use.</p>
Location Area affected or whole supply zone	Maximum flexibility will be allowed in imposing restrictions geographically, which will range from water resource zone, to media region level to companywide. It’s likely that the size of implementation would range from media region level to

	companywide, as this will be a simpler message to convey to the public and to manage, and will align with the TUBs all ready in place.
Implementation timetable Preparation time, time of year effective, duration	<p><b>1 – 3 months</b></p> <p>Implementation of Non-Essential Use ban is in line with the Code of Practice. Notice of a restriction will be given prior to full implementation. Sufficient time would be required to prepare the statement of reasons, to complete the public consultation, to undertake the public hearing if required, and for the Determination by Welsh Ministers.</p> <p>This demand-side measure will be prepared as much as possible in the time leading up to the ‘Drought’ zone, which will minimise the lag time to implement the demand-side measure in the ‘Drought’ zone. The preparation works undertaken would align with the communication plan as required</p>
Permissions required and constraints Including details of liaison carried out with bodies responsible for giving any permits or approvals	<p>Permission required from the Welsh Government.</p> <p>A public hearing is also likely to be required in order to enable objectors’ representations to be heard.</p>
Risks associated with option	<p>Effectiveness of enforcement of Drought Order</p> <p>Order not passed by Welsh Government</p> <p>Public Relations as a result of imposing a restriction on customers</p>

Option Name	Emergency Drought Order
Option Description	<p>The introduction of further demand side restrictions above and beyond that mentioned within TUBs and NEUBs / Drought Orders.</p> <p>This stage of restriction would require Welsh Government approval and amounts to undertaking activities to restrict water usage further within our network, which is justified because of the ‘overriding public interest’. This level of drought is extremely serious and in basic terms amounts to water reserves which would only stretch for a month or so.</p> <p>The type of demand-side measures implemented will depend on the situation of the drought but may include things like rota cuts in water use and the erection of water standpipe filling points. These are last resort actions, which at any other time we would deem unacceptable, and would only be used when all other reasonable drought measures have been implemented.</p>
Trigger(s) (or preceding actions)	<p><b>Trigger</b></p> <p>Levels dropping into the ‘Severe Drought’ DAZ and measured against the time of year and likelihood of continued dry spell but prior to falling into the ‘Emergency Storage’ DAZ, and as per the information communicated by the Drought Management Group.</p> <p><b>Preceding actions</b></p> <p>Normal Operation - Demand levels would be monitored on a daily / weekly basis</p> <p>Enhanced leakage detection, a media campaign capturing this as well as water efficiency and situation awareness which are actions associated with moving from the ‘Normal Operation’ zone into the ‘Developing Drought’ DAZ, the implementation of TUBs as a result of moving from the ‘Developing Drought’ DAZ into the ‘Drought’ DAZ, and the implementation of NEUBs / Drought Orders as a result of moving from the ‘Drought’ to ‘Sever Drought’ DAZ.</p> <p>The media campaigns undertaken would evolve based on the situation of drought and update to increase customer awareness, to always aim to appeal for customer constraint and also include with whatever additional control measures need to be implemented.</p>

	'Developing Drought' to 'Severe Drought' - Supply / demand situation continually monitored throughout drought situation and the effectiveness of all demand-side measures.
Demand Saving Ml/day or % reduction of Peak Week demand.	Estimated demand savings up to 17.5%  Demand savings from an Emergency Drought Order are difficult to estimate, due to there being limited real life data. DCWW has not implemented an Emergency Drought Order previously to enable an accurate determination of savings to be made. However, the savings are anticipated to be higher under this restriction than a Drought Order due to the increased restrictions that can be imposed.
Location Area affected or whole supply zone	Maximum flexibility will be allowed in imposing restrictions geographically, which will range from water resource zone, to media region level to company wide. It's likely that the size of implementation would range from media region level to company wide, as this will be a simpler message to convey to the public and to manage and most likely aligns with the TUBs, and Drought Orders already in place.
Implementation timetable Preparation time, time of year effective, duration	<b>1 – 3 months</b>  Notice of a restriction will be given prior to full implementation. Preparation time would be required to prepare the statement of reasons, for the public consultation, the public hearing if required, and the Determination by Welsh Ministers. This demand-side measure will be prepared as much as possible in the time leading up to the 'Severe Drought' stage, which will minimise the lag time to implement the demand-side measure as soon as practicable. The preparation works undertaken would align with the communication plan as required
Permissions required and constraints Including details of liaison carried out with bodies responsible for giving any permits or approvals	Permission required from the Welsh Ministers.  A public hearing is likely to be required in order to enable objectors representations to be heard.
Risks associated with option	Effectiveness of the enforcement of Emergency Drought Order Order not passed by Welsh Government Potentially significant public health and public order risks associated with the imposition of Emergency Drought Orders Public relations with company may be affected.

Table 10 - A common phased approach to water use restrictions

Phase	The Restrictions	Notes	Summary of exceptions
Phase 1 Inter-drought period	No restrictions implemented	Period of routine monitoring of water resources and environmental baseline by water companies. Usual company water efficiency and leakage activities	None required
Phase 2 Impending Drought	Voluntary restraint requested	Awareness raising of water resource situation to promote efficient use of water through effective use of Comms. Enhanced water efficiency campaigns with customers Enhanced leakage detection and repair activity	None required
Phase 3 Early Drought	Temporary Use Bans Section 76(2) of the WIA 1991, as amended by section 36 of the FWMA 2010, states the following 11 uses of water can be restricted: <ul style="list-style-type: none"> <li>- Watering a garden using a hosepipe;</li> <li>- Cleaning a private motor-vehicle using a hosepipe;</li> <li>- Watering plants on domestic or other non-commercial premises using a hosepipe;</li> <li>- Cleaning a private leisure boat using a hosepipe;</li> <li>- Filling or maintaining a domestic swimming or paddling pool;</li> </ul>	Restrictions apply to domestic customers i.e. a domestic customer could not undertake these activities unless subject to an exception Enhanced water efficiency campaigns with customers Enhanced leakage detection and repair activity	Statutory Exceptions are common to all water companies. Discretionary Universal Exceptions are common to all water companies and relate to: <ul style="list-style-type: none"> <li>- Blue Badge Holders</li> <li>- Customers using an approved drip or trickle irrigation system fitted with a PRV and timer systems</li> <li>- Commercial customers that use hosepipes as part of their business for some TUB categories, e.g.</li> </ul>

Phase	The Restrictions	Notes	Summary of exceptions
	<ul style="list-style-type: none"> <li>- Drawing water, using a hosepipe, for domestic recreational use;</li> <li>- Filling or maintaining a domestic pond using a hosepipe;</li> <li>- Filling or maintaining an ornamental fountain;</li> <li>- Cleaning walls, or windows, of domestic premises using a hosepipe;</li> <li>- Cleaning paths or patios using a hosepipe; and</li> <li>- Cleaning other artificial outdoor surfaces using a hosepipe.</li> </ul>		<p>hand car washing, window cleaning, graffiti removal).</p> <ul style="list-style-type: none"> <li>- Discretionary Concessional Exceptions can be granted by individual water companies.</li> </ul>
Phase 4 Escalating Drought	<p>Drought Order restrictions The Drought Direction 2011 defines the range of 10 water use activities that may be prohibited with the successful application of a Drought Order.</p> <ul style="list-style-type: none"> <li>- Watering outdoor plants on commercial premises;</li> <li>- Filling or maintaining a non-domestic swimming or paddling pool;</li> <li>- Filling or maintaining a pond;</li> <li>- Operating a mechanical vehicle-washer;</li> <li>- Cleaning any vehicle, boat, aircraft or railway rolling stock;</li> <li>- Cleaning non-domestic premises;</li> <li>- Cleaning a window of a non-domestic building;</li> <li>- Cleaning industrial plant;</li> <li>- Suppressing dust; and</li> </ul>	<p>Restrictions apply to all customers (domestic and commercial)</p> <p>Enhanced water efficiency campaigns with customers</p> <p>Enhanced leakage detection and repair activity</p>	<p>Statutory Exceptions are common to all water companies.</p> <p>Discretionary Universal Exceptions relate to Blue Badge Holders.</p> <p>The Discretionary Concessional Exceptions in Phase 3 may be rescinded.</p>

Phase	The Restrictions	Notes	Summary of exceptions
	- Operating a cistern in any building that is unoccupied and closed.		
Phase 5 Severe Drought	Emergency Drought Order Implement Emergency Drought Order permissions. These are the same as ordinary drought orders but with additional powers.	Period of increased restrictions as a water company sees fit Enhanced water efficiency campaigns with customers Enhanced leakage detection and repair activity	Major restrictions on customers.
Phase 6 Drought Recovery	All restrictions are lifted	Period of awareness raising of water resources and lifting of restrictions Usual company water efficiency and leakage action.	None required

Table 11 - Restricted activities for TUBs and the expected exceptions

<b>TUB Category</b>	<b>Statutory Exception</b>	<b>Discretionary Universal Exception (granted by all water companies)</b>	<b>Discretionary Concessional Exception (granted by DCWW on obtaining permission)</b>
Watering a garden using a hosepipe	Using a hosepipe to water a garden for health or safety reasons. NB In this category, the definition of “a garden” includes “an area of grass used for sport or recreation”. Therefore it should be noted that watering areas of grass, which are used for sport or recreation, is covered by a Statutory Exception for health & safety only in relation to the active strip/playing area, not the entire ground.	To Blue Badge holders on the grounds of disability Use of an approved drip or trickle irrigation system fitted with a pressure reducing valve (PRV) and timer	To customers on the company’s Vulnerable Customers List who have mobility issues but are not in possession of a Blue Badge
Cleaning a private motor-vehicle using a hosepipe	A “private motor-vehicle” does not include (1) a public service vehicle, as defined in section 1 of the Public Passenger Vehicles Act 1981(c), and (2) a goods vehicle, as defined in section 192 of the Road Traffic Act 1988(d)	To Blue Badge holders on the grounds of disability Use of a hosepipe in the course of a business to clean private motor vehicles where this is done as a service to customers	To customers on the company’s Vulnerable Customers List who have mobility issues but are not in possession of a Blue Badge
Watering plants on domestic or other non-commercial premises using a hosepipe	Does not include watering plants that are (1) grown or kept for sale or commercial use, or (2) that are part of a National Plant Collection or temporary garden or flower display.	To Blue Badge holders on the grounds of disability Use of an approved drip or trickle irrigation system fitted with a PRV and timer	To customers on the company’s Vulnerable Customers List who have mobility issues but are not in possession of a Blue Badge
Cleaning a private leisure boat using a hosepipe	(1) Cleaning any area of a private leisure boat which, except for doors or windows, is enclosed by a roof and walls.	Commercial cleaning Vessels of primary residence	To prevent or control the spread of non-native and/or invasive species

TUB Category	Statutory Exception	Discretionary Universal Exception (granted by all water companies)	Discretionary Concessional Exception (granted by DCWW on obtaining permission)
	(2) Using a hosepipe to clean a private leisure boat for health or safety reasons	Cases where fouling is causing increased fuel consumption Engines designed to be cleaned with a hosepipe.	
Filling or maintaining a domestic swimming or paddling pool	(1) filling or maintaining a pool where necessary in the course of its construction (2) filling or maintaining a pool using a hand-held container which is filled with water drawn directly from a tap (3) filling or maintaining a pool that is designed, constructed or adapted for use in the course of a programme of medical treatment (4) filling or maintaining a pool that is used for the purpose of decontaminating animals from infections or disease (5) filling or maintaining a pool used in the course of a programme of veterinary treatment (6) filling or maintaining a pool in which fish or other aquatic animals are being reared or kept in captivity	None	None
Drawing water, using a hosepipe, for domestic recreational use	None	None	None
Filling or maintaining a domestic pond using a hosepipe	Filling or maintaining a domestic pond in which fish or other aquatic animals are being reared or kept in captivity	Blue Badge holders on the grounds of disability	None

<b>TUB Category</b>	<b>Statutory Exception</b>	<b>Discretionary Universal Exception (granted by all water companies)</b>	<b>Discretionary Concessional Exception (granted by DCWW on obtaining permission)</b>
Filling or maintaining an ornamental fountain	Filling or maintaining an ornamental fountain which is in or near a fish-pond and whose purpose is to supply sufficient oxygen to the water in the pond in order to keep the fish healthy	None	To operate water features with religious significance
Cleaning walls, or windows, of domestic premises using a hosepipe	Using a hosepipe to clean the walls or windows of domestic premises for health or safety reasons	To Blue Badge holders on the grounds of disability Commercial cleaning	None
Cleaning paths or patios using a hosepipe	Using a hosepipe to clean paths or patios for health or safety reasons	To Blue Badge holders on the grounds of disability Commercial cleaning	To customers on the company's Vulnerable Customers List who have mobility issues but are not in possession of a Blue Badge
Cleaning other artificial outdoor surfaces using a hosepipe	Using a hosepipe to clean an artificial outdoor surface for health or safety reasons	To Blue Badge holders on the grounds of disability Commercial cleaning	To customers on the company's Vulnerable Customers List who have mobility issues but are not in possession of a Blue Badge

Table 12 - Restricted activities for Non essential use bans and expected Drought Order Exceptions

Drought Order Purpose of Use	Statutory Exception	Discretionary Universal Exception (granted by all water companies)	Discretionary Concessional Exception (granted by DCWW on obtaining permission)
Purpose 1: watering outdoor plants on commercial premises	The purpose specified does not include watering plants that are: (a) grown or kept for sale or commercial use; or (b) part of a National Plant Collection or temporary garden or flower display	None	None
Purpose 2: filling or maintaining a non-domestic swimming or paddling pool	The purpose does not include: (a) filling or maintaining a pool that is open to the public; (b) filling or maintaining a pool where necessary in the course of its construction; (c) filling or maintaining a pool using a hand-held container which is filled with water drawn directly from a tap; (d) filling or maintaining a pool that is designed, constructed or adapted for use in the course of a programme of medical treatment; (e) filling or maintaining a pool that is used for the purpose of decontaminating animals from infections or disease; (f) filling or maintaining a pool that is used in the course of a programme of veterinary treatment; (g) filling or maintaining a pool in which fish or other aquatic animals are being reared or kept in captivity; (h) Filling or maintaining a pool that is for use by pupils of a school for school swimming lessons.	None	Swimming pools serving industrial training if considered justified Pools with religious significance;

<b>Drought Order Purpose of Use</b>	<b>Statutory Exception</b>	<b>Discretionary Universal Exception (granted by all water companies)</b>	<b>Discretionary Concessional Exception (granted by DCWW on obtaining permission)</b>
	Note that a pool is not open to the public if it may only be used by paying members of an affiliated club or organisation.		
Purpose 3: filling or maintaining a pond	The purpose does not include: (a) filling or maintaining a pond in which fish or other aquatic animals are being reared or kept in captivity (b) filling or maintaining a pond using a hand-held container which is filled with water drawn directly from a tap	To Blue Badge holders on the grounds of disability	None
Purpose 4: operating a mechanical vehicle-washer	Operating a mechanical vehicle-washer for health or safety reasons	None	None
Purpose 5: cleaning any vehicle, boat, aircraft or railway rolling stock	Cleaning any vehicle, boat, aircraft or railway rolling stock for health or safety reasons	None	Small businesses whose sole operations are cleaning of vehicles using hosepipes To prevent or control the spread of non-native and/or invasive species
Purpose 6: cleaning non-domestic premises	Cleaning of any exterior part of a non-domestic building or a non-domestic wall for health or safety reasons	None	Small businesses whose sole operations are cleaning of non-domestic buildings using hosepipes
Purpose 7: cleaning a	Cleaning a window of a non-domestic building using a hosepipe for health or safety reasons	None	Small businesses whose sole operations are cleaning of non-

<b>Drought Order Purpose of Use</b>	<b>Statutory Exception</b>	<b>Discretionary Universal Exception (granted by all water companies)</b>	<b>Discretionary Concessional Exception (granted by DCWW on obtaining permission)</b>
window of a non-domestic building			domestic buildings using hosepipes
Purpose 8: cleaning industrial plant	Cleaning industrial plant using a hosepipe for health or safety reasons	None	None
Purpose 9: suppressing dust	Suppressing dust using a hosepipe other for health or safety reasons	None	None
Purpose 10: operating cisterns (in unoccupied buildings)	None	None	None

### 3.4.6 Demand management savings

In terms of calculating demand savings, we have referred to reports produced by the United Kingdom Water Institute Research (UKWIR, 1998), 'Evaluating the impact of restrictions on customer demand' and UKWIR (2007) 'Modelling the impact of restrictions on demand during drought'. There are also methodologies of reference contained within UKWIR (2009) 'Estimating the Water Savings for Baseline Water Efficiency Activities'. Although there is little data available from previous drought incidents within Wales, best available information has been used to support our estimate of demand savings including guidance from Ofwat, Waterwise and UKWIR where possible.

We do, however, note that much of the data quoted in the reports may not be immediately transferable to Wales. The UKWIR (2007) report acknowledges that its results only reliably provide an indication of the savings made in the 2005/06 drought in the South East of England and that caution is needed when applying them elsewhere.

At this stage we, in common with some of the water companies in the UK, are uncertain as to the volumes that demand-side measures are likely to save. We have not had to employ drought measures in Wales since 1990 and as such we have little substantive data with which to quantify the impacts of these measures. However, the demand-side measures we have outlined within the drought plan reflect the requirements within guidance and legislation as best practicable.

To provide an indication of estimated savings included in the water resource zone summaries,

Table 13, summarises the estimated savings related to actions within each WRZ.

**Table 13 - Estimated savings of Enhanced Leakage Management, and Emergency Drought Order**

		Demand Saving Options (all figures in MI/d)				
		Developing Drought		Drought	Severe Drought	
Zone	Forecast Name	1. Media Campaign with W/E device offering (up to 5%)	2b. Enhanced Leakage Management (2% above PML Level).	3. TUBs (Up to 5%)*	4. Drought Order (0 - 5%)*	5. Emergency Drought Order (0 - 10%)*
8014	Alwen / Dee	0-2.12	0.00	0-2.12	0-2.12	0-4.24
8020	Bala	0-0.07	0-0.06	0-0.07	0-0.07	0-0.14
8033	Barmouth	0-0.07	0.00	0-0.07	0-0.07	0-0.15
8026	Blaenau Ffestiniog	0-0.08	0-0.09	0-0.08	0-0.08	0-0.16
8108	Brecon / Portis	0-0.18	0.00	0-0.18	0-0.18	0-0.36
8012	Clwyd Coastal	0-0.99	0.00	0-0.99	0-0.99	0-1.98
8035	Dyffryn Conwy	0-1.43	0-0.16	0-1.43	0-1.43	0-2.85
8102	Elan / Builth	0-0.23	0-0.19	0-0.23	0-0.23	0-0.46
8103	Hereford C.U. Area	0-1.62	0.00	0-1.62	0-1.62	0-0.32
8034	Lleyn / Harlech	0-0.60	0.00	0-0.60	0-0.60	0-1.20
8105	Llysven	0-0.11	0.00	0-0.11	0-0.11	0-0.22
8202	Mid - South Ceredigion	0-0.83	0-0.01	0-0.83	0-0.83	0-1.67

		Demand Saving Options (all figures in MI/d)				
		Developing Drought		Drought	Severe Drought	
Zone	Forecast Name	1. Media Campaign with W/E device offering (up to 5%)	2b. Enhanced Leakage Management (2% above PML Level).	3. TUBs (Up to 5%)*	4. Drought Order (0 - 5%)*	5. Emergency Drought Order (0 - 10%)*
8106	Monmouth	0-0.17	0.00	0-0.17	0-0.17	0-0.33
8203	North Ceredigion	0-0.40	0-0.01	0-0.40	0-0.40	0-0.80
8001	North Eryri / Ynys Mon	0-1.85	0-1.21	0-1.85	0-1.85	0-3.70
8206	Pembrokeshire	0-1.82	0-2.15	0-1.82	0-1.82	0-3.64
8107	Pilleth	0-0.10	0.00	0-0.10	0-0.10	0-0.20
8101	Ross-on-Wye	0-0.29	0-0.56	0-0.29	0-0.29	0-0.59
8036	South Meirionnydd	0-0.10	0-0.00	0-0.10	0-0.10	0-0.21
8201	Tywi C.U. Area	0-8.39	0-0.00	0-8.39	0-8.39	0-16.79
8021	Tywyn / Aberdyfi	0-0.07	0-0.00	0-0.07	0-0.07	0-0.13
8110	Vowchurch	0-0.11	0-0.00	0-0.11	0-0.11	0-0.21
8111	Whitbourne	0-0.22	0-0.01	0-0.22	0-0.22	0-0.45
8121	SEWCUS	0-18.19	0-4.42	0-18.19	0-18.19	0-36.38
<b>Total</b>		<b>0-40.06</b>	<b>0-8.88</b>	<b>0-8.88</b>	<b>0-40.06</b>	<b>0-77.20</b>

\*Details of what is included in a TUB, Drought Order and Emergency Drought Order are set out in Table 9

### 3.4.7 Compensation

The compensation payments that we make to customers for interruptions to their supplies are as specified in the DCWW document 'Your Welsh Water' available from the following link:  
[http://www.dwrcymru.com/library/leaflets\\_publications\\_english/Your\\_Welsh\\_Water.pdf](http://www.dwrcymru.com/library/leaflets_publications_english/Your_Welsh_Water.pdf)

This document outlines compensation to household customers (whilst not including hosepipe restrictions) and business customers as below:

'We will compensate you if your water supply is interrupted due to drought. We will give household customers £10 per day or part day (up to the limit of last year's average household bill) and business customers £50 per day or part day (up to the limit of last year's water charges for the premises or up to £500 if you were not liable for last year's charges).'

Anyone who is affected by the taking of water under a Drought Order may make a claim, which must be made within six months of the date of expiry of the order according to the rules which are set out in Schedule 9 to the WRA 1991.

We are not required to pay compensation to customers if the circumstances are so exceptional that, in Ofwat's view, it would be unreasonable to expect the interruption to supply to be avoided and under the WRA 1991, customers are not entitled to compensation in respect of loss or damage sustained as a result of the implementation of Drought Permits/Orders.

Further information on the guaranteed standards scheme (GSS) payments is available from the Ofwat website ([https://www.ofwat.gov.uk/mediacentre/informationnotes/gud\\_pro\\_gss08.pdf](https://www.ofwat.gov.uk/mediacentre/informationnotes/gud_pro_gss08.pdf)).

### 3.5 Supply-side measures

Under normal operating conditions, we optimise our water resources to minimise the supply cost of water to customers. During drier conditions conservation of resource becomes a higher priority, hence we move from the cost optimisation of sources to the maximisation of water resource.

Our Water Resource Management Plan identifies the sources and associated water treatment works that provide our 'base' water supply capability. This plan ensures that our water supply capability is sufficient to meet demands during the most severe historic droughts. However, as a precaution against encountering a drought or sequence of droughts not experienced within our records, we have identified a number of options to increase the supply-side capability beyond normal levels. These options fall into two categories:

1. those which utilise water sources which have been removed from operation but retained for drought or longer term emergency use; or
2. those where we might abstract more water from existing or new water sources or where we could reduce environmental compensation water. These options are outside of our current environmental permissions and we would need to obtain drought permits or orders prior to their operation.

Table 14 identifies the supply options available.

It should be emphasised that the priority for us will be to maintain wholesome water supplies and to minimise any disruption to our customers. We will take a flexible approach to the timing and use of emergency sources which will be dependent on the conditions during any specific drought event. In principle we will look to use of our permitted sources where practicable before turning to supply side options requiring drought permits or orders. However, given the lead times for bringing some supply side options online, temporary use bans may be required prior to the use of emergency supply side measures.

The primary factors which affect the preference of a supply side measure are the practical barriers of bringing sources online within water quality standards and legal barriers to implementation such as the need for drought permits. Figure 32 shows how various options might score against these two criteria.

In response to the public consultation process and our drought exercise, we have carried out a full review of our supply side options. Appendix 1 identifies the schemes that require some further feasibility work in order to understand implementation within the timeframes set out. This is either the need for a feasibility study or simply a method statement and implementation plan. A small number of options have been further considered not to be viable for delivery within drought timescales and on this basis have been removed from the plan. Appendix 1 also lists which options have been removed and why.

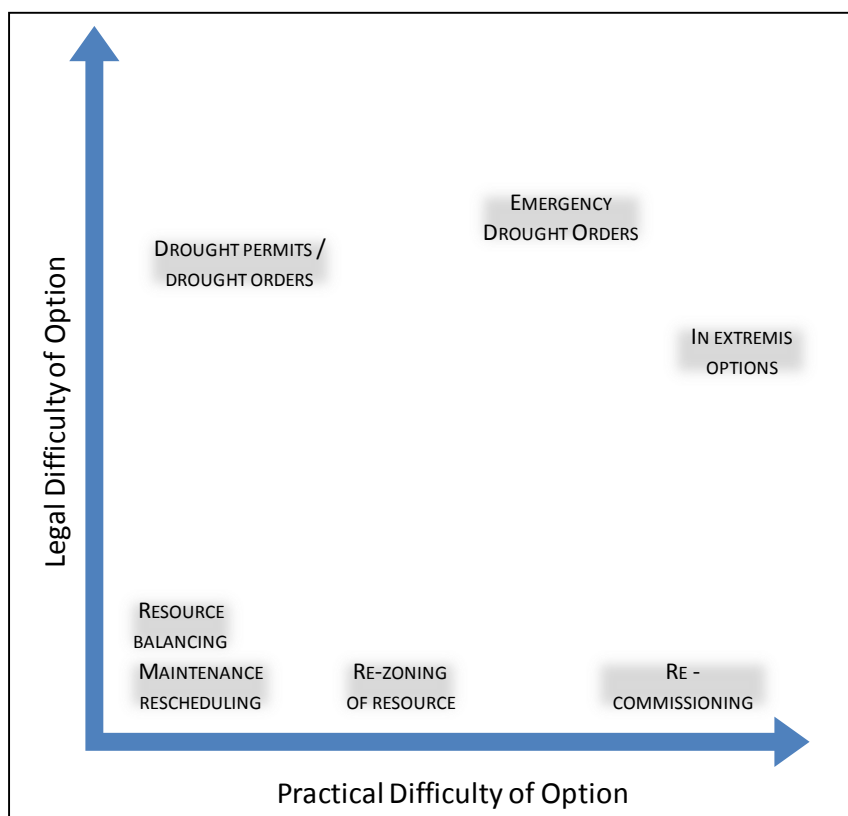


Figure 32 - Comparison of difficulty of implementing supply side options

Table 14 - Description of types of supply options available

Drought Status	Supply Side Option	Description
Normal and developing drought	Resource Balancing	Network re-configuration to enable the balancing of water resources across water resource zone.
Developing to Severe drought	Re-Zoning of Resource	In all circumstances we will aim to re-balance available resources to meet demand. Beyond normal resource balancing, this can be achieved through small scale tankering operations or as above by valving operations between water resource zones. Tankering will be considered at larger scale as drought severity increases in combination with the construction of temporary pipelines where appropriate. The timing of these operations will also be dependent upon the risk of customer disruption and need for customer notification over risk to the aesthetics of water supplied but within water quality standards.

Drought Status	Supply Side Option	Description
Developing Drought	Maintenance Rescheduling	In any specific year, there may be asset maintenance activity which will temporarily reduce water resource availability. Examples are where maintenance would require the draw-down of reservoirs or where this might constrain the full use of pumping stations. As drought develops we will review the risks around these maintenance operations and where possible re-schedule to a later date.
Drought	Re-Commissioning of emergency/ mothballed sources	<p>A number of DCWW water sources have been removed from operation but retained for drought or longer term emergency use. The most common reason for mothballing a site is the technical obstacles to the economic production of good quality potable water. Although these practical reasons will remain in a drought scenario it may be necessary to overcome the barriers to production without typical consideration to the normal economics of water supply or aesthetic water quality. The use of these sources will be dependent upon the time available to bring sources on line and the risk to water quality and associated customer disruption.</p> <p>We would look to reinstate those that can be implemented more easily as drought status is approached. These are source that require limited treatment or network development and without the need for customer notification over risk to aesthetic water quality.</p>
Severe Drought	Re-Commissioning of emergency/ mothballed sources	As above but those emergency sources that require treatment prior to implementation or significant infrastructure development. In some circumstances a change in source water may change the aesthetic water quality received by some customers (for instance an increase or decrease in water hardness). Dependent upon the level of change, we would need to inform customers of this risk of change in water quality.
Severe drought	Additional abstraction or reduction in environmental compensation	<p>Options are available whereby we would abstract more water from existing or new water sources or where the reduction in environmental compensation water will preserve reservoir storage for public water supply.</p> <p>These activities are outside of our current environmental permissions and so we would need to obtain a drought permit or drought order. NRW guidance dictates that demand side options should be in place prior to applying for this category of supply side option.</p>
In Extremis Options (e.g. Emergency)	In Extremis Options (e.g. Emergency)	Should all the above measures fail to meet the demand from an ongoing drought, radical alternatives such as the import of bulk quantities by tanker or ships would be

Drought Status	Supply Side Option	Description
Drought Orders)	Drought Orders)	considered but such alternatives are heavily dependent on having the assets in place to use them.

Our water resource zonal summary documents, in Appendix 1, provide information on our supply side options. To give an indication of the level of detail present in these summaries, Table 15 gives an example from the Clwyd Coastal water resource zonal summary document.

**Table 15 - Example supply side option details**

<b>Option Implementation Assessment</b>	<b>Option Name</b>	<b>Reduction of the compensation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled.</b>
	<b>Trigger(s)</b> (or preceding actions)	Drought- Prepare drought permit applications Severe Drought- Welsh Water Executive to consider application for Drought Permit(s)
	<b>Yield of action</b> MI/day unless stated otherwise	1.0 MI/d
	<b>Location</b> Area affected or whole supply zone	Welsh Water would be releasing water from the Aled Reservoirs to support the Bryn Aled abstraction. The gain in supply will be made by slowing the drawdown of the Aled Reservoirs, enabling the regulation release to be sustained for longer to the whole WRZ.
	<b>Implementation timetable</b> Preparation time, time of year effective, duration	We assume a decision from NRW within 14 days of submitting the Drought Permit application. The practical implementation of the option could be effected within 1 week. The option is most likely to be implemented during the summer and autumn period, although it could be implemented at any time during the year. The drought permit would be in place for up to 6 months.
	<b>Permissions required and constraints</b> Including details of liaison carried out with bodies responsible for giving any permits or approvals	Drought Permit- NRW At the time of implementation we will liaise with NRW, the Local Authority, landowners and other relevant environmental groups (i.e. Wildlife Trusts) regarding any permissions that may be required relating to the environmental monitoring and mitigation work associated with this option. It is anticipated that the following permissions may be required: <ul style="list-style-type: none"> <li>• NRW consent for operations on designated sites (e.g. under Section 28H of the Wildlife &amp; Countryside Act 1981)</li> <li>• If appropriate consent from managers of the designated sites (Wildlife Trusts, Local Authorities)</li> <li>• Permission to access land may be required from landowners.</li> </ul>

Environmental Assessment		<ul style="list-style-type: none"> <li>Flood Defence Consent may be required depending on the measures implemented.</li> <li>FR1 Consent from NRW to introduce fish</li> <li>FR2 Consent from NRW to electric fish (if necessary)</li> </ul>
	<b>Risks associated with option</b>	The application, as applied for, is not approved.
	<b>Risk to the Environment</b> (High/Medium/Low or unknown)	Low
	<b>Summary of likely environmental impacts</b>  Include details for features of moderate and major sensitivity and minor sensitivity features from designated sites	<p>An Environmental Monitoring Plan (EMP) was prepared for this drought permit in 2007. The EMP does not constitute an Environmental Assessment Report (EAR) which would describe the potential impacts of drought permit implementation on sensitive features. However, the EMP does present a hydrological assessment which lists the likely impacts of drought permit implementation on the flow/level regime in the impacted waterbodies. In the absence of an EAR, professional judgement has been used to determine the likely significance of the effects of flow/level regime changes on sensitive ecological receptors.</p> <p>The zone of hydrological influence during drought permit implementation includes the Afon Aled from the outflow of Aled Isaf Reservoir to the Bryn Aled intake (negligible hydrological impact) and from the Bryn Aled intake to the confluence with the Afon Elwy (minor hydrological impact). Resulting impacts of negligible to minor changes to the flow regime on ecological features including macrophytes, macroinvertebrates and fish are considered unlikely to be significant.</p> <p>Llyn Aled and Aled Isaf Reservoirs are located within the water associated SSSI, Mynydd Hiraethog. However, the drought permit will conserve the longevity of reservoir storage, therefore, no impacts on this designated site are anticipated.</p>
	<b>Baseline information used</b>	An EMP was prepared for this drought option in 2007 and utilised available information from surveys and investigations undertaken by DCWW and NRW.
	<b>Summary of additional baseline monitoring requirements</b>	The EMP for this drought permit was agreed by DCWW and NRW (then Environment Agency Wales and CCW). The EMP recommended baseline monitoring, and monitoring that should be undertaken during and after implementation of a drought permit for: river flows, physico-chemical water quality and phytoplankton, fish, macrophytes and macroinvertebrates (including white-clawed crayfish, if present).

	<b>Mitigation measures</b>	Mitigation measures were identified in the EMP. These include: If necessary, fish rescues in consultation with NRW, restocking using offspring of broodstock from the catchment, flow deflectors may be used to ensure gravel remains silt free, creation of alternative refuges in deeper water, gradually phase in alterations to compensation flow to avoid species occupying shallow water becoming stranded and restocking of coarse fish.
	<b>Impact on other activities</b> e.g. fisheries, industry etc	It is anticipated that there will be no significant effects to landscape and visual amenity, recreation (excluding angling) and archaeology and cultural heritage.

### 3.5.1 Water Sharing Arrangement

Welsh Water shares some of its water with neighbouring water companies through bulk supply agreements. We have confidence that the security of the bulk supplies that we import and export will remain in times of drought conditions and are covered by contractual agreements. Further details regarding our bulk supplies can be obtained through reviewing our latest water resource management plan.

Welsh Water also holds contract agreements for 'inset appointment' areas, which is an agreement with private companies situated within our operational area, who manage a group of customers that are fed through one of our 'bulk meters' i.e. we supply the water, the private company pay for the water and are then responsible for the billing of customers that the water feeds (additional criteria would be governed by the contractual detail).

Our general principles regarding water sharing arrangements are that under the circumstances when we supply water to an inset appointee who supplies domestic customers, when we impose water use restrictions within our operational area, this also applies to the domestic customers within the inset. Under the circumstances of supplying water to an inset appointee who then supplies commercial customers, when we impose water use restrictions within our operational area, this does not necessarily mean it applies to the commercial customers contained within the inset, and would depend on the detail contained within the contract agreement.

Specifically, we have supply arrangements with Albion Water and Scottish and Southern Energy (SSE)

In the case of Albion Water, there are clauses within the agreement that could be invoked that would allow us to reduce our supply if we were not able to maintain flows under exceptional circumstances, but we would need to justify this position. Albion Water's drought plan states that they would endeavour to use water as efficiently as they are able during a drought period.

Regarding the SSE inset appointment, when water restrictions are imposed within the surrounding operational area, there is a clause within our agreement that commits SSE to impose restrictions upon its customers at the same time. We are currently in discussions with SSE regarding the update of this agreement and we aim to retain the drought clauses within future arrangements.

### 3.6 Supply side drought permits, drought orders and emergency drought orders

On average, once in every forty years, we may be faced with a drought scenario which is significant enough to require restrictions above and beyond that of customer side demand management.

Drought permits or orders are required to amend abstraction permit provisions, for instance to increase the rate of refill of a reservoir or reduce the rate of drawdown during heavy demand.

Operational challenges to the implementation of this would be relatively simple, such as:

- Valves being adjusted and mitigation measures recommended in the environmental report which corresponds to the drought option being implemented before, during, and after the period of reduced compensation flow; or,
- Monitoring as recommended by the environmental report, before, during and after the option has been implemented, plus the required mitigation to be identified for implementation later.

As well as restricting water supplies, drought orders can also include permissions to abstract more water than is agreed via our abstraction licenses, or the reduction of compensation flow to rivers from impounding reservoirs.

It is estimated that the formal process of publishing public notices, allowing time for receiving and resolving objections and obtaining the appropriate authorisation may take up to 6 weeks for a Drought Permit. In applying for a Drought Order where the impact to the environment may be more significant and a public inquiry could be required, we have allowed 8 weeks to process the application.

At present, it is highly unlikely that Welsh Water will consider applying for anything over and above a Drought Order, such as an Emergency Drought Order. We believe that the existing drought options presented are robust and feel it is inappropriate to plan for the imposition of stand pipes or rota cuts for our customers' water supply as part of the drought planning process. We do not anticipate the need to implement any Emergency Drought Orders at this time. However, in the event of extreme circumstances, emergency drought measures may be unavoidable and need to be considered.

For comparison purposes, Table 16 summarises the principle similarities and differences between Drought Permits and Drought Orders. The need for either a permit or an order relates to the designation of sites that the drought action might impact.

**Table 16 - Comparison of Drought Permits and Drought Order**

Category	Drought Permit	Drought Order (ordinary)	Drought Order (emergency)
Who Can Apply?	Water company	Water company or Environment Agency / Natural Resources Wales	Water company or Environment Agency / Natural Resources Wales
Granting authority	Environment Agency / Natural Resources Wales	Welsh Government and Defra (for English WRZ's only)	Welsh Government and Defra (for English WRZ's only)
Application criteria	Serious deficiency of supplies of water in any area; or,  Such a deficiency in the flow or level of	Serious deficiency of supplies of water in any area; or,  Such a deficiency in the flow or level of water in any	Additional to ordinary drought orders:  The deficiency is likely to impair the economic

Category	Drought Permit	Drought Order (ordinary)	Drought Order (emergency)
	water in any inland waters as to pose a serious threat to any of the flora or fauna which are dependent on those waters. The reason for the deficiency is an exceptional shortage of rain.	inland waters as to pose a serious threat to any of the flora or fauna which are dependent on those waters.  The reason for the deficiency is an exceptional shortage of rain.  If the application is likely to affect a site designated under European Legislation, then it is advised that a Drought Order is applied for.	or social well-being of persons in the area.  Have made suitable use of Drought Permits and Drought Orders (ordinary).
Supporting criteria	Environmental Report Must be specified in the Drought Plan	Environmental Report Must be specified in the Drought Plan	Environmental Report n/a
Approx processing time	6 weeks No provision for Public Inquiries	8 weeks Provision for Public Inquiries	8 weeks Provision for Public Inquiries
General powers	Authorise a water undertaker to take water from specified sources. Modify or suspend restrictions or obligations to which that undertaker is subject relating to the (existing) taking of water from any source	Deal with discharges of water, abstractions and discharges by people other than the undertaker affected, supply, filtration and treatment obligations. They can allow water undertakers to prohibit or limit particular uses of water (as listed in the Drought Direction 1991).	The water undertaker has complete discretion on the uses of water that may be prohibited or limited. Authorise supply by stand-pipes or water tanks.
Implementation timetable	Last up to six months, though can be extended to last up to a total of a year.	Last up to six months, though can be extended to last up to a total of a year.	Expire after three months, though can be extended up to a total of five months.

### 3.6.1 Compensation to other abstractors due to a Drought Order

At the time of a drought order being granted to DCWW, other abstractors being affected by that action can approach DCWW under Schedule 9, Section 79(2) of the Water Resources Act 1991, for compensation for any loss or damage sustained by reason of the taking of the water.

Anyone wishing to make a claim for compensation should refer to Schedule 9 of the Water Resources Act 1991 for details of entitlement to compensation. However, for clarity we have set out some of the details of the process below:

Those entitled to apply for compensation include owners and occupiers of the land affected by any drought order, owners of the source of water, all persons interested in the source of the water, owners of the place of discharge, all persons interested in the place of discharge.

A claim for compensation under Schedule 9 of the Water Resources Act 1991 can be made by serving upon the applicant a notice stating the grounds of the claim and the amount claimed. Claims for compensation must be made at any time not later than six months after the end of the period of which the order is effective.

Any claim for compensation would be reviewed by DCWW on a case by case basis. Any question as to the right of a claimant to recover compensation, or as to the amount of compensation recoverable shall, in default of agreement, be referred to, and determined by, the Lands Tribunal.

## 4 Environmental monitoring and assessment

### 4.1 Background

Wales is highly valued for the extent of its unspoilt natural environment. A significant proportion of the region has been recognised for its conservation value, with designated sites of European conservation importance e.g. over 90 sites afforded protection as Special Areas of Conservation (SACs) or Special Protection Areas (SPAs), nationally designated sites e.g. over 1,000 Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNRs) and locally designated sites (e.g. Local Nature Reserves (LNRs)). Proportionately the area supplied by Welsh Water has more designated SAC's than the area supplied by any other water company.

Our Drought Plan has identified a number of supply side options that may need to be implemented during a drought should our normal operations become resource constrained. Many of these options involve us operating outside of our standard abstraction licence conditions and will therefore, require application to NRW/EA or the Welsh Ministers/Secretary of State for a drought permit/drought order as appropriate, in order to vary these conditions. We have identified a significant number of drought permit/order options within our water resource zones across our supply area. In some WRZs the likelihood of using the options is small, but we believe that by adopting the approach set out in the following sections we have undertaken the necessary preparatory work in the unlikely event that they are needed. Detailed descriptions of the options and their implementation are provided by WRZ in Appendix 1 and a summary of the locations of the options presented in Section 4.4.2.

The requirements for environmental assessment of the Drought Plan are explicitly laid out in the EA's Water Company Drought Plan Guideline (DPG)<sup>2</sup> which advises companies to be mindful of environmental legislation such as the Conservation of Habitats and Species Regulation 2010, Wildlife and Countryside Act 1981 & Countryside Rights of Way Act 2000, Habitats Directive and Strategic Environmental Assessment Directive. As such, supporting environmental assessments of the Drought Plan are required. These include:

- Strategic Environmental Assessment of the Drought Plan
- Habitats Regulations Assessment of the Drought Plan
- Environmental Assessment Reports (incorporating assessment of impacts on designated sites under the Habitats Regulations Countryside Rights of Way Act) and Environmental Monitoring Plans.

These assessments are described in Sections 4.2, 4.3 and 4.4 respectively. A summary of the Drought Plan process and the timing of completion of the environmental assessments listed above is provided in Section 4.5.

### 4.2 Strategic Environmental Assessment

The Strategic Environmental Assessment (SEA) Directive was transposed in Wales into The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004.

Guidance documents have been prepared by a number of organisations to facilitate the determination of the requirement for SEA to plans and programmes, including guidance from the Office of the Deputy Prime Minister<sup>3</sup>. UK Water Industry Research (UKWIR) have also prepared

<sup>2</sup> Environment Agency (2011). Water Company Drought Plan Guideline. June 2011.

<sup>3</sup> Office of the Deputy Prime Minister (2005) *A Practical Guide to the Strategic Environmental Assessment Directive*.

guidance to the UK Water Industry concerning the application of SEA and HRA to drought plans and Water Resources Management Plans (WRMPs)<sup>4</sup>.

The screening tool within the UKWIR guidance was applied to DCWW's Drought Plan. The outcome of the screening assessment was that a SEA of the Drought Plan was required, primarily due to the potential 'significant effects' of measures within the plan on sites designated under the Habitats Directive. It was also considered that the measures proposed within the Drought Plan could have a range of potentially significant effects on people and wider biodiversity from changes in river flows and groundwater levels. We have therefore completed an SEA Environmental Report<sup>5</sup> which has been published and consulted upon alongside our draft Drought Plan.

The SEA Environmental Reports presents an assessment of the likely economic, social and environmental effects of the Drought Plan and identifies ways in which adverse effects can be avoided, minimised or mitigated and how positive effects can be enhanced.

On publication of the Drought Plan, DCWW will also published a Post Adoption Statement in reference to the Drought Plan SEA. The SEA Post Adoption Statement sets out how the SEA and any views expressed by the consultation bodies or the public have influenced the Drought Plan.

## 4.3 Habitats Regulations Assessment

### 4.3.1 Introduction

Under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended)<sup>6</sup>, referred to as the Habitats Regulations, any plan or project which is likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and is not directly connected with or necessary for the management of the site, must be subject to an Appropriate Assessment to determine the implications for the site in view of the site's conservation objectives.

The Habitats Regulations Assessment (HRA) refers to the assessment of the potential effects of a development project on one or more European sites, including SPAs and SACs:

**SPAs** are classified under the European Council Directive 'on the conservation of wild birds' (2009/147/EC) for the protection of wild birds and their habitats (including particularly rare and vulnerable species listed in Annex 1 of the Birds Directive, and migratory species).

**SACs** are designated under the Habitats Directive and target particular habitats (Annex 1) and/or species (Annex II) identified as being of European importance.

The Government also expects potential SPAs (pSPAs), candidate SACs (cSACs) and Ramsar sites to be included within the assessment<sup>7</sup>:

**Ramsar** sites support internationally important wetland habitats and are listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971).

Defra Guidance states that it should be noted that where a Habitats Directive site is impacted it would usually be more appropriate to apply for a drought order rather than a drought permit.

<sup>4</sup> UKWIR (2012) *Strategic Environmental Assessment and Habitats Regulations Assessment of Drought Plans* (UKWIR Project WR/02/A). Prepared by Cascade Consulting.

<sup>5</sup> DCWW (2014) *Dŵr Cymru Welsh Water Strategic Environmental Assessment of Draft Drought Plan - Environmental Report*. Prepared by AMEC Environment & Infrastructure UK Limited, August 2014.

<sup>6</sup> Including the Conservation of Habitats and Species (Amendment) Regulations 2011 and 2012.

<sup>7</sup> Planning Policy Statement 9: Biodiversity and Geological Conservation. OPDM, 2005.

### 4.3.2 Stages of HRA

The first stage in HRA is a Screening stage to determine whether any part of the plan or project in question is likely to have a significant effect on any European site, and thus if a full Appropriate Assessment of the project is required.

The Appropriate Assessment stage (if required) then has to conclude whether or not the plan or project would adversely affect the integrity of the European site in question. This is judged in terms of the implications of the plan or project for a site's conservation objectives, which relate to its 'qualifying features' (i.e. those Annex I habitats, Annex II species, and Annex I bird populations for which it has been designated). Significantly, HRA is based on a rigorous application of the precautionary principle. Where uncertainty or doubt remains, an impact should be assumed, triggering the requirement for Appropriate Assessment of that scheme to determine any significant impacts on European sites.

If significant adverse effects are identified at the Appropriate Assessment stage, alternative options would be examined to avoid any potential significant effects on the integrity of the European site as Stage 3 of the HRA.

Stage 4 comprises an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest, it is deemed that the plan or project should proceed.

### 4.3.3 HRA of the Drought Plan

Welsh Water is the competent authority for the Drought Plan, including the SEA and HRA. Regulation 9(5) of the Conservation of Habitats and Species Regulations 2010 (as amended) requires every competent authority, in the exercise of any of its functions, to have regard to the requirements of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna).

Under Regulation 61 of the Habitats Regulations, any plan or project which is likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and is not directly connected with or necessary for the management of the site, must be subject to an Appropriate Assessment to determine the implications for the site in view of the site's conservation objectives. The responsibility for undertaking the Appropriate Assessment lies with Welsh Water as the Plan making authority. HRA Stage 1 Screening of the draft Drought Plan was undertaken and is reported separately<sup>8</sup>.

Habitats Regulations Stage 2 Appropriate Assessments will be prepared as part of the EARs/pEARs and is described in Section 4.4.5.

## 4.4 Environmental Assessment Reports and Environmental Monitoring Plans

### 4.4.1 Introduction

The EA DPG states that for each drought permit/drought order application, companies should:

“consider and include where necessary[...] likely environmental impacts of the drought actions on the environment, through an environmental assessment and an environmental monitoring plan”.

We have already undertaken a significant amount of drought environmental monitoring and assessment studies in advance of preparation of our Drought Plan. This includes preparation of

<sup>8</sup> DCWW (2014) Dŵr Cymru Welsh Water HRA of the Draft Drought Plan – Draft Screening Report. Prepared by AMEC Environment & Infrastructure UK Limited, February 2014.

Environmental Monitoring Plans (EMPs) for 41 drought options, environmental monitoring (including hydrology, water quality and ecological monitoring) at several of the drought permit/order sites which we have considered to be more likely to be implemented in a future drought event. These studies were undertaken in consultation with NRW and the EA.

Going forward, it is our intention to complete full Environmental Assessment Reports (EARs) for all of our drought permit/ order options listed within the Drought Plan, in line with Defra, WG and EA Guidance taking full account of designated sites and in-combination affects with other options, and building on the studies we have already undertaken. The EARs will be template or 'shelf-copy' reports which would be updated to support an application to NRW/Welsh Ministers or the EA/Secretary of State for a drought permit/ order, should one be required in the future.

The preparation of EARs for drought permit/order options will be prioritised into two tiers. Those options which were more likely to be implemented in the future will be described as 'Tier 1', and a full, stand-alone EAR will be prepared. The preparation of these EARs will be prioritised. Options that are less likely to be implemented will be referred to as 'Tier 2' options and the EARs that will be prepared are referred to as 'pEARs'. Tier status has been initially undertaken through review of drought scenario simulations as described in section 2.3 of the plan also taking account of potential environmental sensitivity. Tier status will be reviewed for time to time as supply, demand and risk information changes.

The difference between the two types of reports is in the level of detail provided. The Tier 2 pEARs are not quite detailed enough to be used directly for a drought permit/order application (as for Tier 1 EARs) and will require a more comprehensive description of the baseline environment and discussion of impact assessment sections should an "application-ready" report be required in the future. However, they will be compliant with all relevant guidance. It is currently proposed that the pEARs are presented in three reports, one for each of our three Operating Areas which are North Wales, South West Wales and South East and Mid Wales (including Herefordshire), rather than producing a stand-alone report for each option.

This section of the Drought Plan describes the approach to environmental assessment and monitoring that will be adopted going forward. A timeline which summaries the programme for preparation of the assessments and associated environmental monitoring is provided in Section 4.5.

#### 4.4.2 Drought Options

The location of our drought options in relation to statutory designated sites, including SACs, SPAs, Ramsar sites, SSSIs and NNRs are shown on Figure 33, Figure 34, Figure 35, Figure 36, Figure 37 and Figure 38. Figure 33 - North Operating Area highlighting the Supply Option locations and nationally designated areas. The locations are derived using our Welsh Water Operating Areas which are North Wales, South West Wales and South East and Mid Wales (including Herefordshire). The maps show the large number of designated sites within our operating area and this means that in the majority of cases an option is likely to reside within or near a designated area.

Drought permit/order options have been prioritised into Tier 1 and Tier 2 options based on the likelihood of implementation in the future as described in Section 4.4.1 and Table 17. EARs have already been prepared for some of the Tier 1 options, however, it is noted that some of the EARs pre-date current guidance. Where an EAR exists, it will be reviewed and amended as required to ensure compliance with current guidance, including the EA DPG.

The details of the supply side drought options sensitivity assessment and environmental receptors are provided within Appendix 3 – Supply Side Drought Option Sensitivity Assessment and Environmental Receptors and summarised on Table 17.

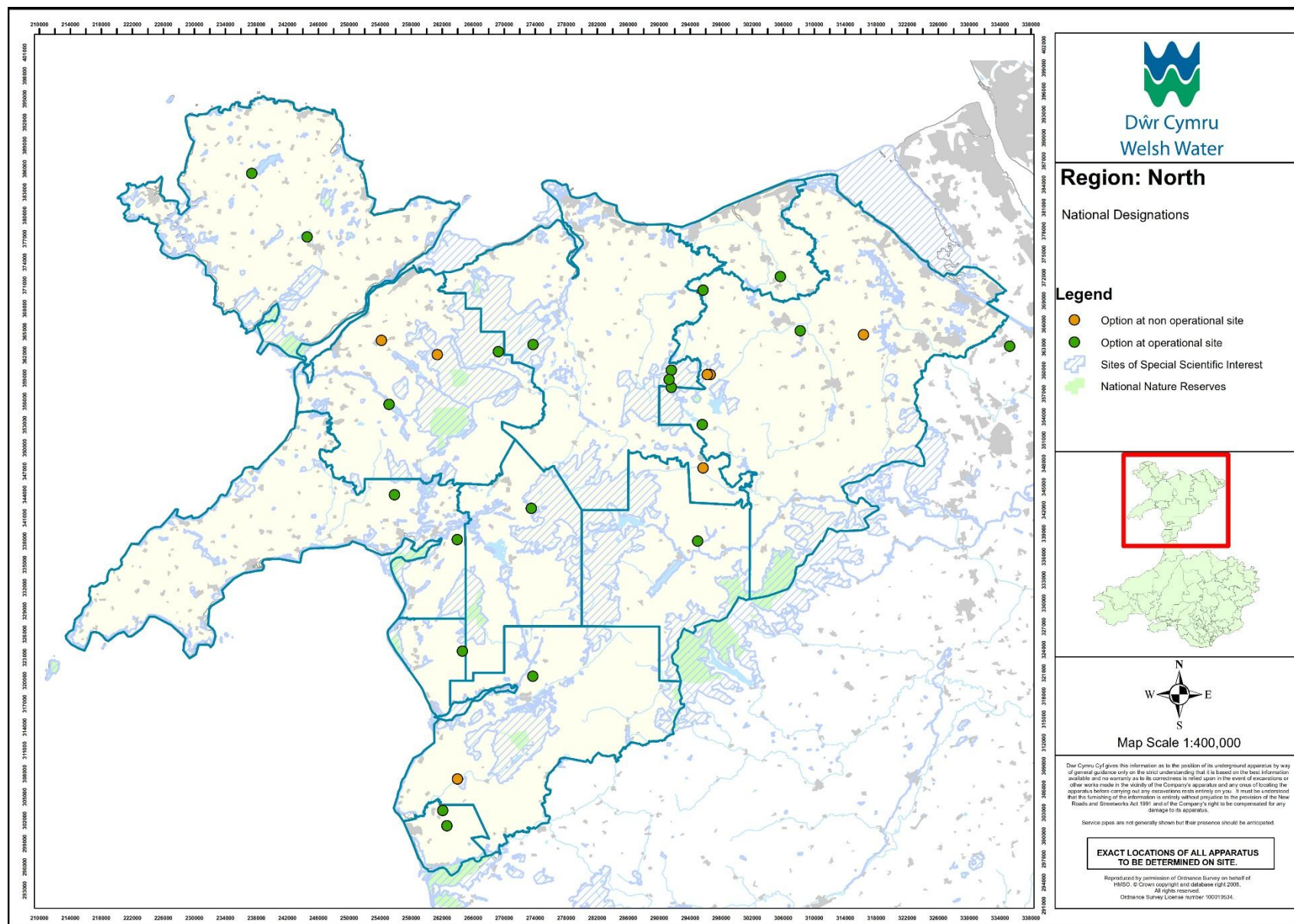
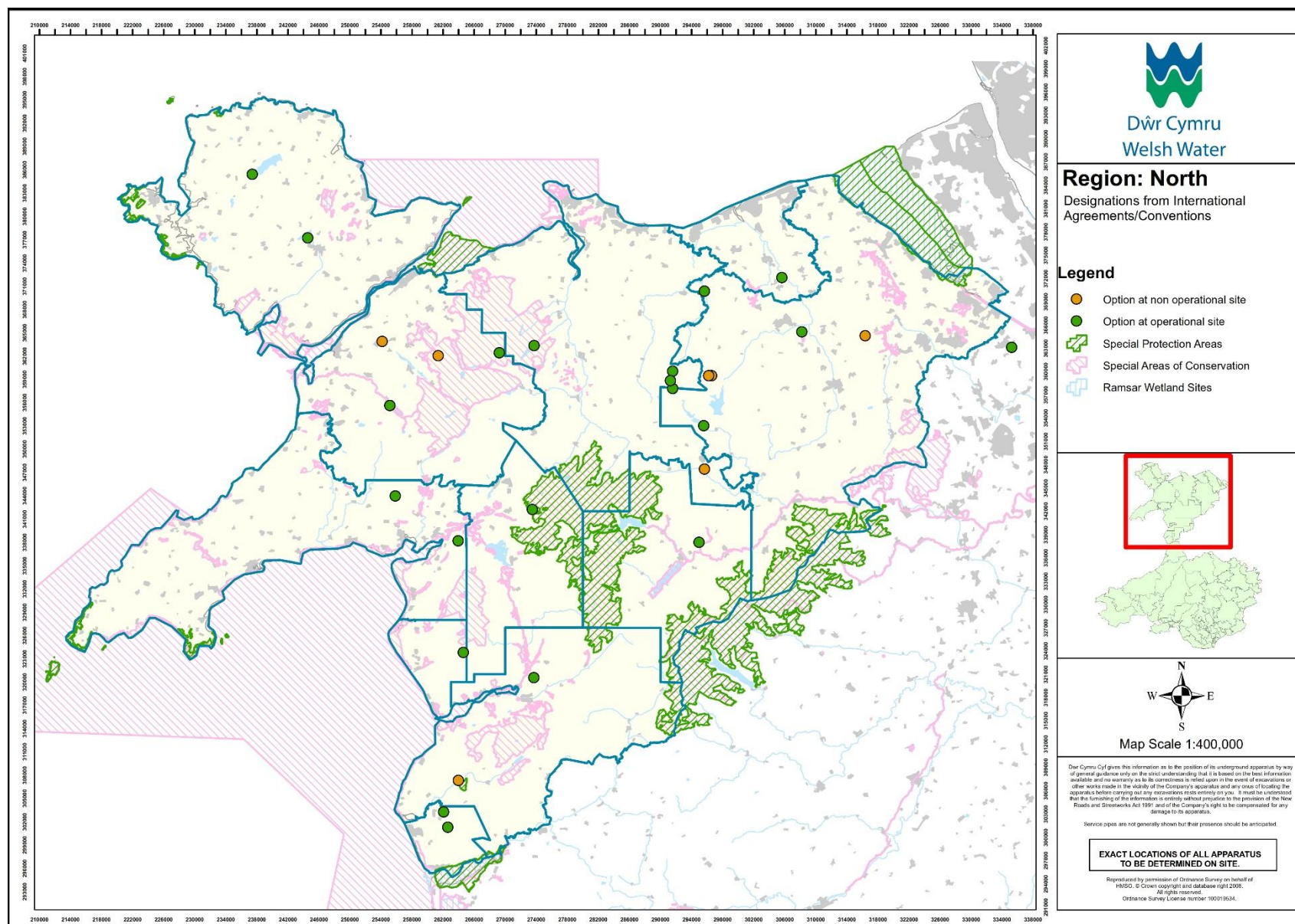


Figure 33 - North Operating Area highlighting the Supply Option locations and nationally designated areas



**Figure 34 - North Operating Area highlighting the Supply Option locations and internationally designated areas**

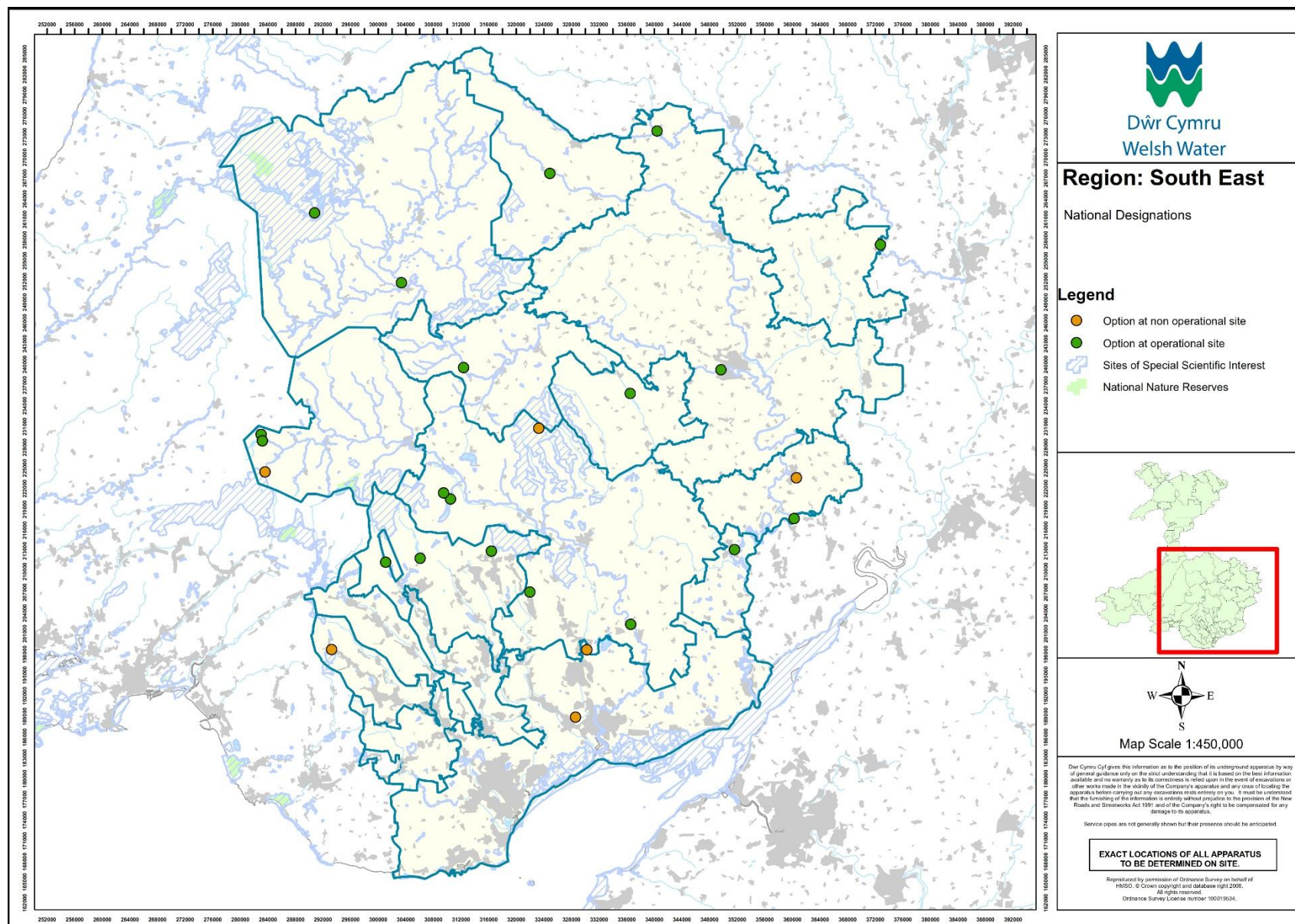


Figure 35 - South East Operating Area highlighting the Supply Option locations and nationally designated areas

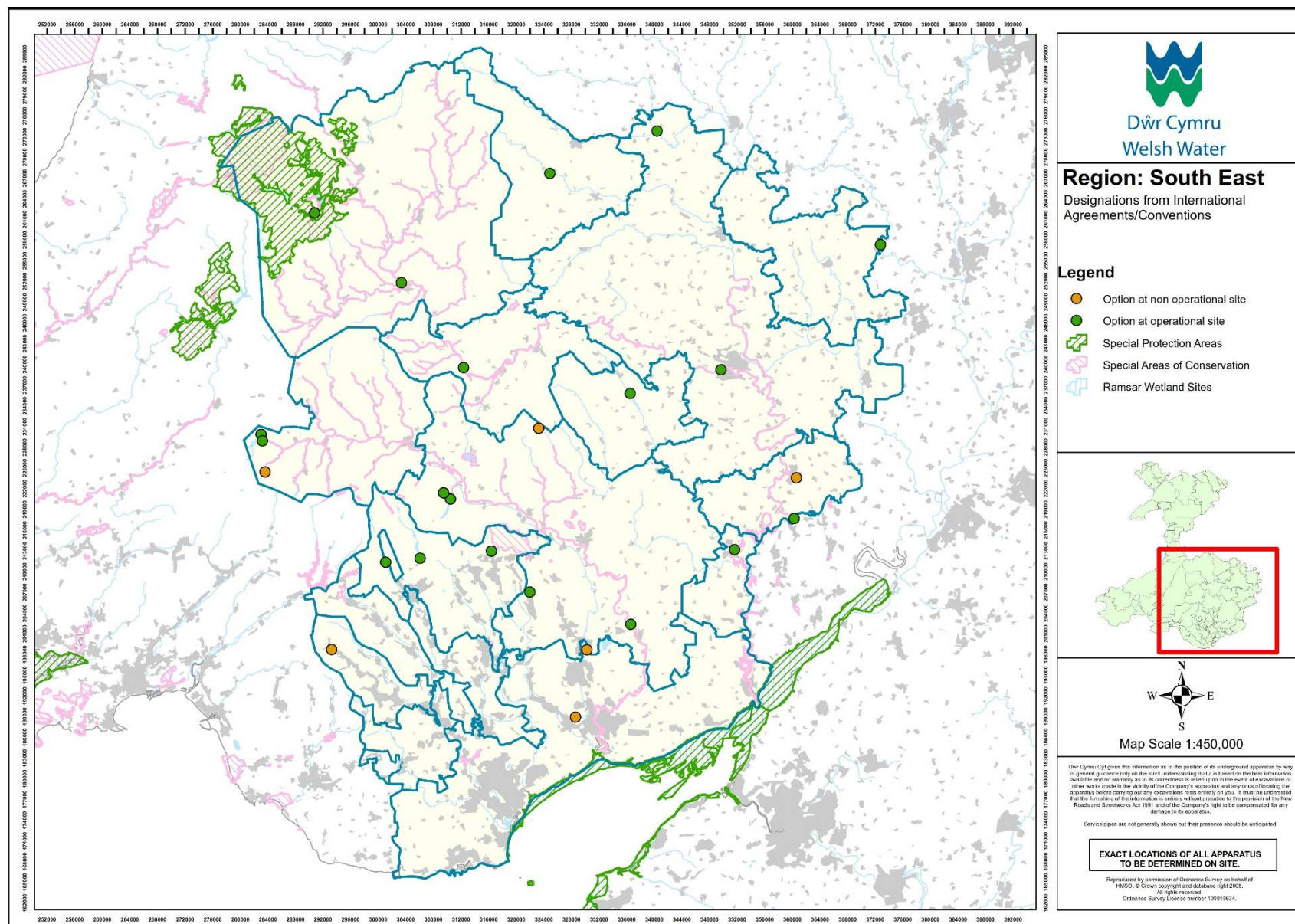


Figure 36 - South East Operating Area highlighting the Supply Option locations and internationally designated areas

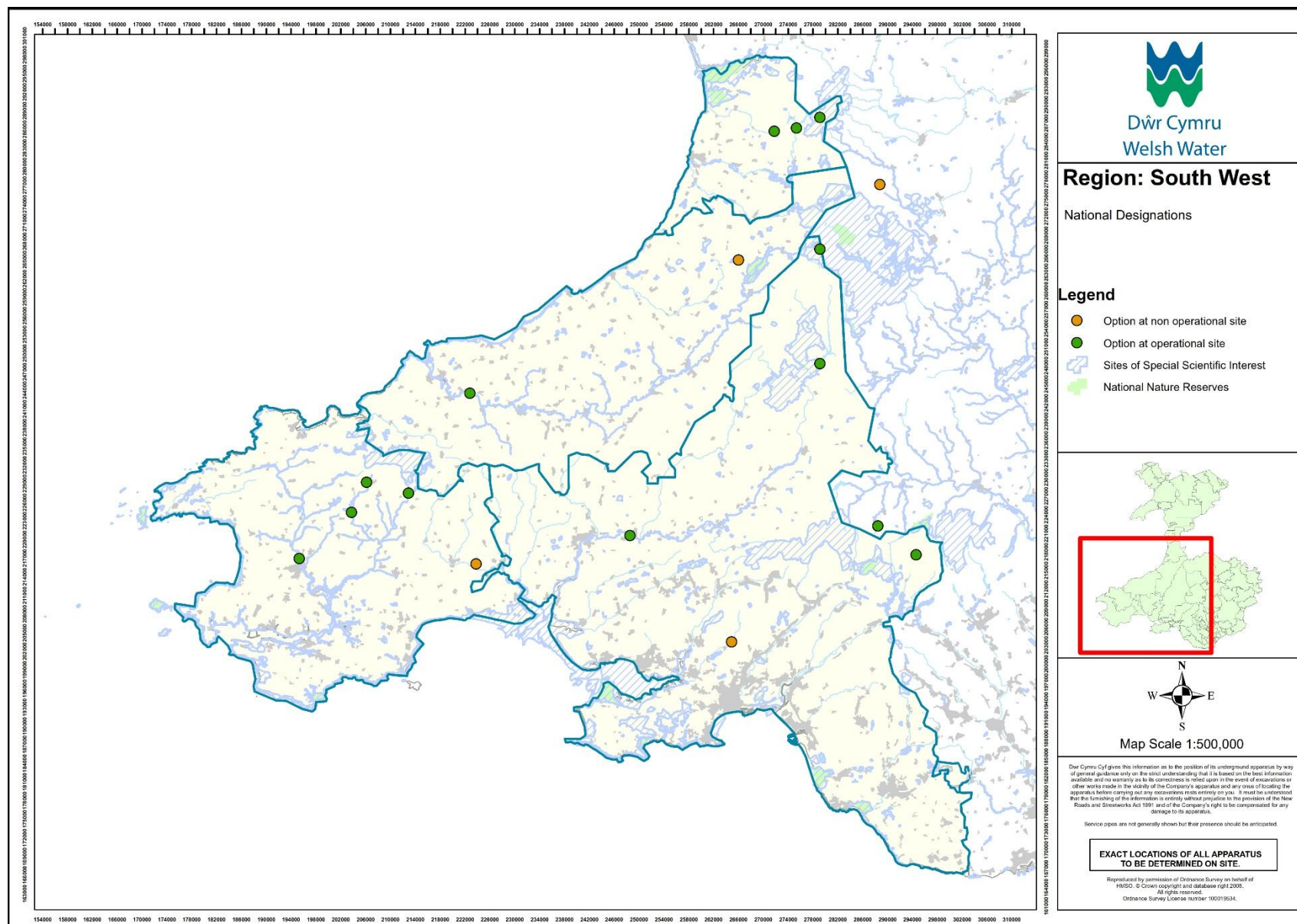


Figure 37 - South West Operating Area highlighting the Supply Option locations and nationally designated areas

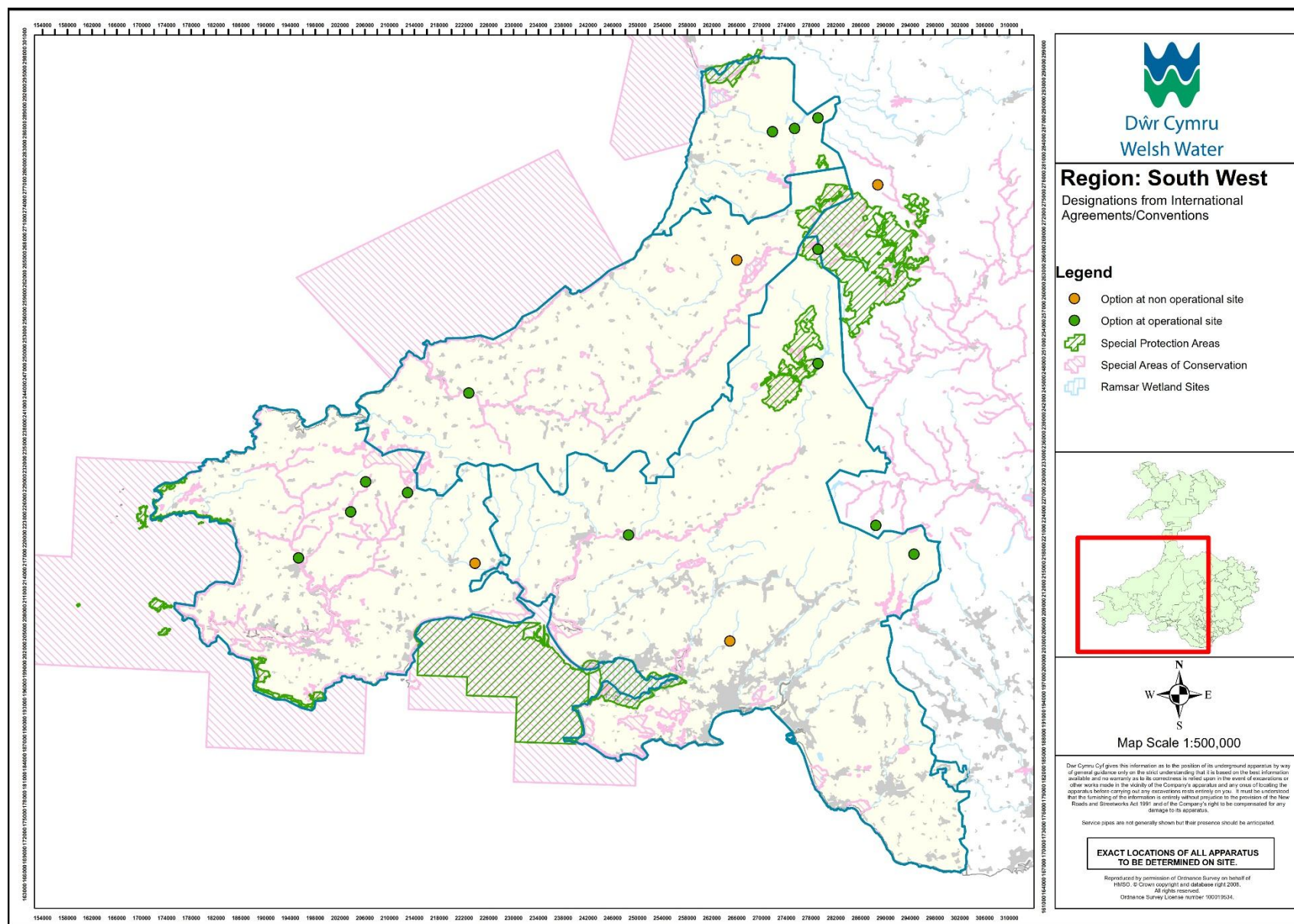


Figure 38 - South West Operating Area highlighting the Supply Option locations and internationally designated areas

Table 17 - Drought permit/order option preliminary sensitivity screening and prioritisation

WRZ	Area	Drought Option		EMP No.	Permission Required	Existing EAR?	Designation	Hydrological Impact (preliminary)	Environmental Sensitivity (preliminary)	Tier 1 / Tier 2
8001	North Eryri/Ynys Mon	2	Removal of Llyn Cwellyn 10 MI/d abstraction limit	N9	Drought Order	Yes	National Park, SAC and SSSI	Minor	Major	1
		3	Reduction of Alaw Compensation water	N4	Drought Permit	No	SSSI	Major	Moderate	2
		4	Reduction of Ffynnon Llugwy Compensation water	N6	Drought Permit	No	National Park, SAC and SSSI	Major	Moderate	1
		5	Reduction of Cefni reservoir Compensation water	N5	Drought Permit	No	SSSI and reservoir is a key wetland site in the Anglesey Wetland Strategy	Major	Moderate	2
		7	Abstraction from Llyn Cwellyn below the pump intake level.	N9	Drought Order	Yes	National Park, SAC and SSSI	Minor	Major	2
8012	Clwyd Coastal	1	Transfer water from Llyn Bran to Afon Aled	N1	Drought Permit	No	SSSI	Major	Moderate	1
		2	Reduction of the compensation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled	N7	Drought Permit	No	SSSI	Major	Moderate	1
		3	Pump water from Llyn Aled 'dead' storage	N7	Drought Permit	No	SSSI	Major	Moderate-Major	2
		4	Relaxation of the annual licences on Afon Aled and the Plas Uchaf and Dolwen Reservoirs	N1 & N7	Drought Permit	No		Minor	Minor	2
		5	Relaxation of the Llannerch boreholes annual licence	N10	Drought Permit	No	No designation-Species protected under the	Minor/unknown	Minor	2

WRZ	Area	Drought Option		EMP No.	Permission Required	Existing EAR?	Designation	Hydrological Impact (preliminary)	Environmental Sensitivity (preliminary)	Tier 1 / Tier 2
							European Habitats Directive (92/43/EEC) Annex II and Priority Section 42 species and habitats (WAG section 42 list NERC Act 2006)			
		6	Pumped (winter) refill from Aled Isaf to Llyn Aled	N7	Drought Permit	No	SSSI	Major	Moderate-Major	1
8021	Tywyn/Aberdyfi	1	New abstraction (tankering) from Afon Dysynni at Pont Y Garth (to Pen Y Bont WTW)	<i>To be done</i>	Drought Permit	No		Unknown	Unknown	1
		2	Relaxation of annual licences on the Afon Fathew and the Nant Braich Y Rhiw	<i>To be done</i>	Drought Permit	No		Unknown	Unknown	2
8026	Blaenau Ffestiniog	1	Pumped abstraction of Dead Storage from Llyn Morwynion and Increase annual abstraction licence to fully utilise Emergency Storage Volume	N11	Drought Permit	No	National Park, SAC, SSSI and SPA	Minor	Minor	2
8033	Barmouth	1	Pumped abstraction of Dead Storage from Llyn Bodlyn	N8	Drought Permit	Yes	National Park	Major (lake)	Moderate	2
		2	Reduce compensation water releases from Llyn Bodlyn	N8	Drought Order	Yes	National Park, SAC and SSSI	Major (river)	Moderate	1

WRZ	Area	Drought Option		EMP No.	Permission Required	Existing EAR?	Designation	Hydrological Impact (preliminary)	Environmental Sensitivity (preliminary)	Tier 1 / Tier 2
8034	Lleyn/Harlech	1	Reduce compensation flow releases from Llyn Cwmystradllyn	N3	Drought Permit	Yes	ESA and National Park	Minor	Moderate	1
		2	Reduce regulation releases from Llyn Cwmystradllyn	N3	Drought Permit	Yes	ESA and National Park	Minor	Moderate	1
		3	Extension of the syphon arrangement to exploit the Dead Storage in Llyn Tecwyn	N12	Drought Permit	Yes	No designation-SAC and SSSI areas border the study area.	Minor	Minor	2
8035	Dyffryn Conwy	1	Increase annual abstraction licences from Llyn Cowlyd	<i>To be done</i>	Drought Order	No	SAC and SSSI	Unknown	Unknown	2
8036	South Meirionnydd	1	Increased abstraction from Llyn Cynwch Penyrcefn WTW to support tankering to outlying source areas	N13	Drought Permit	No	National Park	Negligible	Minor	2
8101	Ross-On-Wye	1	Exchange of spare Wye Regulation water to Severn Trent Water's Lydbrook abstraction point		Drought Order	Yes	SSSI, SAC and AONB	Minor	Major	1
8103	Hereford C.U. Area	1	Increase the abstraction at Broomy Hill by 3 MI/d	SE5	Drought Order	No	SSSI and SAC	Negligible	Negligible	1
		2	Increase the abstraction at Leintwardine by 0.1 MI/d	SE1	Drought Order	No	SSSI, SAC and ESA	Minor	Major	1
8105	Llyswen	1	Increase the abstraction at Llyswen	SE4	Drought Order	No	SSSI and SAC	Negligible	Negligible	1

WRZ	Area	Drought Option		EMP No.	Permissio n Required	Existing EAR?	Designation	Hydrological Impact (preliminary)	Environmental Sensitivity (preliminary)	Tier 1 / Tier 2	
8107	Pilleth	1	Increase the authorised Pilleth abstraction	SE8	Drought order	No	SSSI and Withybeds Nature Reserve	Moderate	Moderate	1	
8108	Brecon/Portis	1	Maintain the reduced Usk Compensation discharge of 5.7MI/d and relax the requirement to ensure the average compensation discharge of 9MI/d for the year.	SE13 (original option)	Drought Order	No	SSSI and SAC	Major	Major	1	
8110	Vowchurch	1	Removal of flow condition on the River Dore	SE7	Drought Order	No	No designation- SSSI about 44 km downstream	Moderate	Moderate	1	
8111	Whitbourne	1	Removal of flow condition on the River Teme	SE2	Drought Order	Yes	SSSI	Minor	Moderate	1	
8121	SEWCUS	Rhondda	1	Emergency abstraction from the River Rhondda at Treherbert	SE11	Drought Permit	Yes	No designation	Moderate	Moderate	1
		Talybont	1	Further reduction in Talybont Compensation Water release and reduction of Nant Clydach residual flow.	SE14	Drought Order	No	National Park, SSSI and SAC	Major	Major	1
			2	Reduction in the Cwntillery Reservoir Compensation Water release	SE16	Drought Permit	No	No designation	Minor	Minor	2
			3	Utilise the Dead Storage in Talybont Reservoir		Drought Order	No	National Park, SSSI and SAC	Major	Major	2
		Llwyno	1	Reduce compensation water releases from Llwynon Reservoir	SE20	Drought Permit	Yes	No designation	Major	Minor	1

WRZ	Area		Drought Option		EMP No.	Permissio n Required	Existing EAR?	Designation	Hydrological Impact (preliminary)	Environmental Sensitivity (preliminary)	Tier 1 / Tier 2
			2	Unsupported abstractions from the River Usk at Prioress Mill	SE9	Drought Order	No	SSSI, SAC and Biodiversity Action Plan (BAP) habitats	Major	Major	2
			3	Unsupported abstractions from the River Wye at Monmouth	SE6	Drought Order	Yes	SSSI, SAC and AONB	Minor	Major	2
			4	Emergency abstraction from the Afon Lwyd at New Inn	SE23	Drought Permit	Yes	No designation-tributary of a SSSI and SAC	Moderate	Moderate	2
			6	Use Grwyne Reservoir, as a regulating reservoir, to support abstraction at Proioress Mill or Llantrisant	SE15	Drought Order	No	National Park, SSSI and SAC	Major	Major	2
			8	Reduce the compensation water releases from the Elan Reservoirs	SE12	Drought Order	No	SSSI, SAC and AONB	Major	Major	2
		Pontsticill	1	Compensation Water Reduction of 50% at Pontsticill Reservoir	SE19	Drought Permit	Yes	Cwm Taf Fechan Woodlands SSSI	Major	Minor	1
			2	Compensation Water Reduction of 50% at Lower Carno Reservoir	SE17	Drought Permit	No	No designation	Minor	Minor	2
8201	Tywi C.U. Area		1	Reduce Crai compensation flow by 50%	SW4	Drought Order	No	National Park, SSSI and SAC	Major	Major	2
			2	Reduce Ystrafdfellte compensation flow by 50%	SW5	Drought Permit	No	National Park	Major	Moderate	1
			3	Remove the maintained requirement below the Nantgaredig intake on the River Tywi	SW1	Drought Order	No	SAC and SSSI	Major	Major	2
			4	Reduce Brianne compensation flow by 50%	To be done	Drought Order	No		Major	Major	2

WRZ	Area	Drought Option		EMP No.	Permission Required	Existing EAR?	Designation	Hydrological Impact (preliminary)	Environmental Sensitivity (preliminary)	Tier 1 / Tier 2
8202	Mid - South Ceredigion	1	Increase the Llechryd abstraction from 19 MI/d to 21 MI/d and obtain variation of annual licence amounts	SW2	Drought Order	Yes	SAC and SSSI	Minor	Minor to Moderate (seasonal)	2
		2	Increase the Teifi Pools annual abstraction licence to fully utilise the Emergency Storage volume	<i>To be done</i>	Drought Order	No		Unknown	Unknown	1
8203	North Ceredigion	1	Increase the annual abstraction quantity from Llyn Llygad Rheidol	SW7	Drought Permit	No	SSSI	Minor	Minor	2
		2	Pumped abstraction from Nantymoch (a HEP reservoir) into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW	To be done	Drought Permit	No		Minor	Minor	2
		3	Reduce the compensation release from Llyn Craig Y Pistyll by 50%	To be done	Drought Permit	No		Moderate	Moderate	2
8206	Pembrokeshire	1	Reduce the required prescribed flow below the Crowhill Abstraction	SW3	Drought Order	No	SSSI and SAC	Major	Major	1
		2	Reduce the Compensation release from Preseli Reservoir by 50%	SW6	Drought Permit	No	SSSI, SAC and ESA	Minor	Moderate	2
		3	Increase the direct abstraction from Llys-y-Fran reservoir	To be done	Drought Order	No		Unknown	Unknown	2

WRZ	Area	Drought Option		EMP No.	Permission Required	Existing EAR?	Designation	Hydrological Impact (preliminary)	Environmental Sensitivity (preliminary)	Tier 1 / Tier 2
		4	Reduce the Prescribed flow required at the Pont Hywel abstraction	To be done	Drought Order	No		Major	Major	2
		5	Abstraction from the Afon Taf	SW9	Drought Order	Yes	SAC and SSSI	Minor	Moderate	2
		6	Reduction in the statutory compensation release from Llys y Fran Reservoir to the Afon Syfynwy of 7.64 MI/d from 13.64MI/d to 6MI/d	SW8	Drought Order	Yes	SSSI and SAC	Major	Major	1

Table 17 - Drought permit/order option preliminary sensitivity screening and prioritisation

### 4.4.3 Environmental Sensitivity Screening

Environmental sensitivity screening will be undertaken for each of the drought permit/order options using the Environment Agency's (EA's) DPG; specifically Section 7 and Appendix H. Figure 5 of the DPG (replicated in Figure 39 below) identifies the environmental impact activities required.

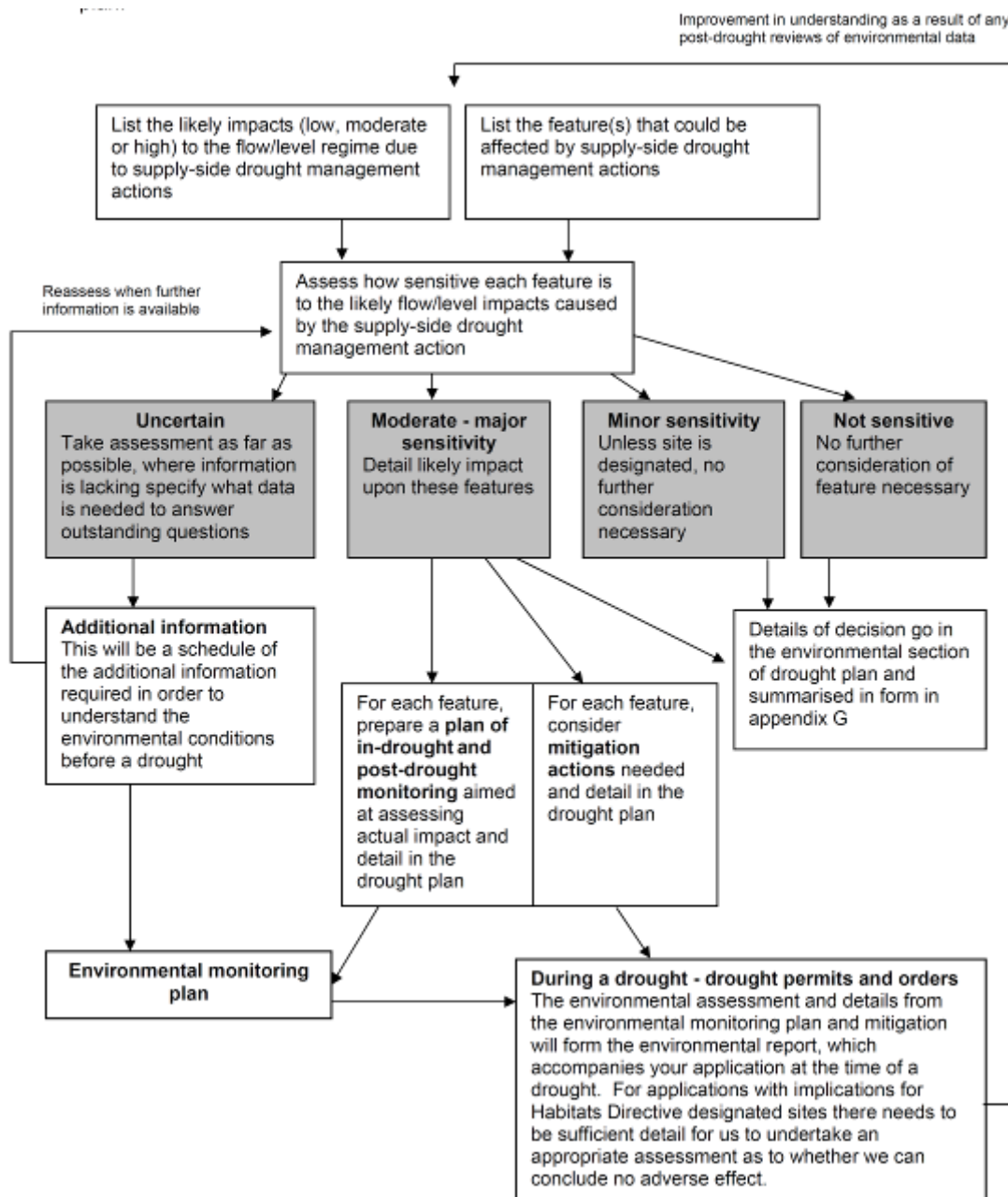


Figure 39 - Environmental Impact Activities Identified in the Environment Agency DPG

**Stage 1** - The first stage in the assessment will fulfil the requirement to “List the likely impacts (minor, moderate or major) to the flow/level regime due to supply-side drought management actions” for each drought option. Consideration is required (by the DPG) of the likely changes in flow/ level regime due to implementing the drought management action, specifically:

- the perceived extent of potential impact;

- the nature and duration of the potential impact; and
- the timing of the potential impact.

The output from this stage provides an understanding of the geographic extent and the scale of change in the hydrological characteristics of waterbodies as a result of implementing the drought action. Where changes are identified, the potential significance of adverse or beneficial impacts will be assessed. It is important to acknowledge the basis of the assessment; i.e. impacts of drought action implementation should be considered in the context of what would occur without drought action implementation.

**Stage 2** - With the geographical extent and level of flow impact identified, potentially sensitive receptors (sites/features) located within the extents of drought action impact will be identified. Potentially sensitive features that will be investigated in the screening will be drawn from Appendix H of the EA DPG and through discussions with NRW, the EA and Natural England. This stage of the assessment will fulfil the requirement to “*List the feature(s) that could be affected by supply side drought management actions*”. These will include:

- designated biodiversity sites (SAC, SPA, Ramsar, SSSI, NNR and LNR) and BAP species/habitats which are located on or within 500m of the impacted reaches;
- ecological communities and, where identified, Water Framework Directive (WFD) status of designated waterbodies which contain the impacted reaches;
- classified fisheries (using WFD waterbodies) with designations under the Freshwater Fish Directive;
- sensitive ecological features as advised by the NRW, the EA and Natural England; and
- wider features which should be taken into account in determining the potential impacts of drought action implementation – specifically landscape, recreation and heritage.

**Stage 3** - Screening will fulfil the requirement to “*Assess how sensitive each feature is to the likely flow/level impacts caused by the supply-side drought management option*”. Each of the identified sensitive receptors within the extent of impact will be listed, alongside a brief summary of their potential susceptibility to flow impacts. For designated sites, screening will include an indication as to whether the sites have water dependent qualifying interests. The result of screening will be documented as moderate – major sensitivity, minor sensitivity, not sensitive or uncertain, in line with EA DPG requirements.

We have undertaken a preliminary review of sensitivity screening for each of the drought permit/order sites, and this is presented in Table 17.

#### 4.4.4 Environmental Assessment Reports

The DPG identifies that Environmental Assessment Reports (EARs) are required as supporting documents to any drought permit/order application. They are relevant to those drought options where sensitive features are likely to be subject to a major or moderate impact, or a minor impact for designated features (as described in Section 4.4.3). EARs are not required for those drought options where there is certainty that there are no such impacted sensitive features.

The aim of the EARs and the preliminary EARs (pEARs) is to provide:

1. A clear summary of the outcome of each assessment (per feature) from which NRW/EA or Welsh Ministers / Secretary of State can readily identify the significance of the impact when determining the drought permit/order application
2. Identification of those predicted impacts which are to be taken forward to consider additional monitoring and mitigation actions.

The EARs and pEARs will be prepared in accordance with Government regulations and good practice guidance, including:

- Environment Agency (2011) Water Company Drought Plan Guideline (DPG);
- Defra (2011) Drought Permits and Drought Orders – Information from the Department for Environment, Food and Rural Affairs (Defra), Welsh Assembly Government and the Environment Agency;
- UKWIR (2007, updated 2011) Strategic Environmental Assessment – Guidance for Water Resources Management Plans and Drought Plans. Prepared by Cascade Consulting.

All aspects of the drought permit/order of potential environmental significance will be considered in the EARs and pEARs, including operational impacts and impacts of any construction activities that may be required.

Each EAR or pEAR will provide an overview of the environmental baseline, i.e. habitats and environmental pressures (including flow and water quality) in the identified zone of impact without the drought option in place, utilising a description of the catchment, geomorphology, anthropogenic features and water quality. EARs and pEARs will utilise existing environmental data, e.g. from environmental monitoring we have previously taken and data available from NRW and the EA from their routine monitoring programmes.

Key changes to the physical environment as a result of implementing the drought permit/order will be identified and described and this information will be used to frame and support the assessments of impacts on sensitive features.

The impact assessment for sensitive features will be feature specific and is dependent on the availability and resolution of available data. Where possible, quantitative assessments will be undertaken. However, for many features, it is acknowledged that the assessments will be qualitative and based on professional judgement, and using, where relevant, experience of local knowledge and reference to literature. This will necessarily introduce uncertainty into the impact assessment. A precautionary approach will be used to assigning impact significance where data are absent or found not to be robust.

The assessment of impacts on designated sites will be undertaken using professional judgement with reference to conservation objectives and condition status of habitats and species, for which a site has been designated (see Section 4.4.5). The ecological assessments will be undertaken recognising the IEMA<sup>9</sup> and the IEEEM study guidelines<sup>10</sup>. The assessment of impacts on other environmental receptors e.g. recreation and landscape will be carried out largely by qualitative expert judgement.

The assessments presented in each EAR and pEAR will confirm the features requiring consideration of environmental monitoring, mitigation and appropriate monitoring triggering mitigation. This is described further in Sections 4.4.7 and 4.4.8 respectively. In addition, each EAR and pEAR will identify any significant data limitations and data gaps, and make recommendations for any additional environmental baseline monitoring required to fill any data gaps (see Section 4.4.8).

#### **4.4.5 Habitats Regulations Assessment and Countryside Rights of Way Assessment** **Habitats Regulations Assessment Stage 2 Appropriate Assessment**

Welsh Water have an obligation under the Habitats Regulations to undertake Appropriate Assessments in support of the drought plan itself (see Section 4.3). However, it is also the case that the responsibility for undertaking the Appropriate Assessments for future applications for drought

<sup>9</sup>IEMA (1999) Guidelines for Ecological Assessment. Institute of Environmental Management and Assessment.

<sup>10</sup>IEEM (2006) Guidelines for Ecological Impact Assessment in the United Kingdom (version 7 July 2006).

orders lies with the authority granting the consent, i.e. Welsh Ministers/Secretary of State respectively. However, under the Habitats Regulations, the applicant (in this case, Welsh Water) has an obligation to provide the competent authorities with such information as the authority may reasonably require for the purposes of the assessment or to enable them to determine whether an Appropriate Assessment is required. Competent authorities also have an obligation to consult with the nature conservation body, in this case NRW/Natural England.

To fulfil our obligations under the Habitats Regulations, the EARs/pEARs prepared for drought orders will also present Habitats Regulations Assessments Stage 2 Appropriate Assessments. Specific consideration will be given to the potential impacts on European designated sites and whether drought order options have the potential to comprise site integrity. The assessment will focus on sensitive interest features, i.e. those features sensitive to drought option actions e.g. water dependent features. The assessments will include consideration of the operational impacts of drought orders as well as those arising from the commissioning and decommissioning of the infrastructure required to implement the drought order.

Conservation objectives that have been prepared by NRW/Natural England for the European sites will be reviewed and an assessment made on the impact of implementation of a drought orders on achievement of each objective. The assessment will reference other sections of each EAR where appropriate to do so. Any outstanding uncertainties will be discussed and the level of certainty for the assessments defined.

The assessment will include consideration of impacts of the drought order both alone, and cumulative effects in combination with other plans and projects, as described in Section 4.4.6.

### **Countryside Rights of Way Act**

Guidance identifies that the EAR that is submitted alongside the application for a drought permit/order should include additional information to enable the Authority under section 28G of Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) to fulfil its duties, where a proposal can affect a SSSI site. As described above for the Habitats Regulations Assessment, the Countryside Rights of Way Act assessment will focus on sensitive interest features and include consideration of the operational impacts of drought permit/order as well as those arising from the commissioning and decommissioning of the infrastructure required to implement the drought permit/order.

Conservation objectives that have been prepared by NRW/Natural England for SSSIs will be reviewed and an assessment made on the impact of implementation of a drought permit/order on achievement of each objective. The assessment will reference other sections of each EAR where appropriate to do so and include consideration of cumulative or in-combination effects. Any outstanding uncertainties will be discussed and the level of certainty for the assessments defined.

#### **4.4.6 Cumulative and In-Combination Effects**

In accordance with the DPG and the Habitats Regulations, consideration will be given as to how each proposed drought permit/order may affect the environment both alone and in combination with the effects of existing licences, consents and plans. At present, it is considered that assessment of the potential cumulative effects of the following will be included in each EAR:

- Welsh Water's existing abstraction licences that operate within the hydrological zone of influence of the drought options, as well as other abstraction and discharge consents, as identified in the NRW/EA Review of Consents reports;
- Assessment of the most likely cumulative impacts of the drought order with other Welsh Water supply side and drought permit/order options within the hydrological zone of influence (including both intra- and inter- zone options);

- Drought options from other neighbouring water company Drought Plans and NRW/EA Drought Plans.
- National Policy Statements for Wastewater and Renewable Energy Infrastructure.

The EARs will also take account of the abstraction changes and supply side schemes proposed within the WRMP.

#### 4.4.7 Mitigation

Section 7.3 of the EA DPG describes the requirement to provide details of likely mitigation or compensation needed against serious impacts on the environment as a result of implementation of supply-side drought management actions. Mitigation may be defined as a measure to limit the effect of an identified impact or ideally avoid the adverse impact altogether. Compensation (for environmental impacts) is usually, but not exclusively, considered for off-site measures that provide environmental benefits commensurate with the predicted environmental impacts of a given scheme.

Mitigation measures will be feature, location, species and community specific, and will be targeted only to those impacts that arise specifically as a result of drought permit/order implementation (as opposed to those arising due to environmental drought pressures). Similarly, monitoring and the targeting of mitigation measures to impacts that arise specifically as a result of drought permit/order implementation will help identify the responsible party for the specific actions relating to the associated measure.

Specific details of mitigation or compensation for environmental impacts may only be confirmed once the nature of the drought, timing of drought permit/order implementation and firm proposals for the drought action are understood. In addition, environmental assessment prior to implementation to determine the predicted environmental impacts of the drought action will identify those environmental features for which serious impacts are anticipated, and therefore, mitigation or compensation required. Consequently the mitigation proposed in the drought option WRZ summaries for each drought permit/order is currently largely generic, reflecting the fact that it is not possible to specify exact detail prior to the implementation of a drought permit/order. In the event of a future drought permit/order application, further consultation with NRW and/or the EA and Natural England will be undertaken to confirm implementation of mitigation and/or compensation measures as appropriate.

Appendix 4 – Table of Mitigation Actions, sets out the range of mitigation actions that have been proposed for key environmental features and details of permits and approvals that are potentially required to implement these measures. Where possible, monitoring has been linked to mitigation actions with a threshold that would require the mitigation measure to be put into place. Non-invasive methods (revised or amended survey techniques that do not involve entering the water and/or handling organisms) are preferred during drought conditions to avoid additional stress to sensitive features, particularly fish. The duration and frequency of monitoring should be determined in consultation with NRW/EA and Natural England at time of future application for drought permits/orders.

#### 4.4.8 Environmental Monitoring Plans

The EA DPG identifies the specific requirements for monitoring. The assessments undertaken in each EAR and pEAR (described in Section 4.4.4) will confirm the features requiring consideration for monitoring prior to, during, or after implementation of the drought permit/order. The EMP for each drought permit/order will include the following:

- the feature/s to be monitored and the methods used

- the location of survey sites (including a map)
- the timing and frequency of monitoring
- who will undertake the monitoring
- monitoring required linked to any specific mitigation actions
- monitoring required for post-drought assessment of site.

The EA DPG states that mitigation and/or monitoring is not required for features where minor (unless a site is designated) or negligible impacts are identified. However, the requirement for monitoring and/or mitigation will be reviewed on a case-by-case basis.

The mitigation and monitoring proposals (see Section 4.4.7 and 4.4.8) will act as a safeguard that responds and is responsive to both predicted and unpredicted drought impacts. Future data collection and monitoring can then be focused to identify the aquatic ecosystem interaction to better quantify the potential impacts where gaps in the evidence base are identified and ensure the appropriate targeting of monitoring and mitigation response.

The EARs and EARs will include specification of baseline environmental monitoring requirements, where data available is considered insufficient for the purposes of assessment. Data and results from this baseline monitoring will increase the robustness of the assessment, and will be incorporated at the time of EAR preparation to support any future application for drought powers. The impact assessment will adopt a precautionary approach where baseline data limitations are identified.

It is intended that environmental monitoring to address baseline data gaps will be undertaken after each EAR/pEAR has been completed, and the monitoring programme agreed with NRW and the EA. However, it is anticipated that a programme of 'early start' monitoring will be commissioned during EAR/pEAR preparation to ensure any low flow events that occur during this period are captured and surveyed where appropriate, or to focus on any key sensitive receptors that are identified by sensitivity screening. For some environmental features, baseline data collection may be required for several consecutive years, and for some, monitoring may be limited to one year or event to fill a particular baseline data gap. The frequency of monitoring will be recommended on a case by case basis and reviewed annually.

A programme of environmental monitoring has already been initiated for some of our drought permit/order options, for example, where an EAR has already been prepared. Baseline data collected for these sites to date will be reviewed, and the requirements for continuation of monitoring confirmed.

#### **4.4.9 Consultation**

Consultation is identified as an essential exercise in the preparation of the Drought Plan. Consultation on the Scoping stage of the SEA of our Drought Plan was undertaken with statutory consultees, including NRW, Cadw the EA, Natural England and English Heritage, and the SEA Environmental Report and HRA Screening was published for public consultation alongside the draft Drought Plan.

NRW and Natural England have been key consultees for drought permit/order assessments and monitoring which we have previously undertaken, and we will continue to work with them to develop, agree and undertake the programme of environmental assessment and monitoring we have proposed.

## 4.5 Summary and Programme

We currently anticipate that our next Drought Plan will be published in 2020. We have made a commitment to complete the EARs and pEARs of all of our drought permit/order options and subsequent environmental monitoring in time for the revision of the Drought Plan.

A programme and timeline which indicates all the environmental studies which will be undertaken in parallel with Drought Plan revision is illustrated in Figure 40.

## 4.6 Application Ready Environmental Assessment Reports

We have prioritised the programme to complete template or 'shelf-copy' assessment for all of our drought permit/order options into Tier 1 options (those options most likely to be implemented) and Tier 2 options (those options less likely to be implemented). The programme is summarised in Figure 40, and proposes completion of Tier 1 EARs by the end of 2015, and Tier 2 pEARs by the end of 2016. We will work closely with NRW and EA to develop the finer details of the monitoring programme across the AMP to ensure that the programme will be adequate to inform the Environmental Reports. This will include liaison 'start-up' meetings for the annual monitoring programmes between ourselves, the regulators and our consultants commissioned to implement the monitoring.

In the event of an application for drought powers, the 'shelf-copy' EARs or pEARs would be updated to support an application to the Welsh Ministers/Secretary of State for a drought order or NRW/EA for a drought permit. Each EAR/pEAR will be reviewed and revised to reflect the actual timing of drought permit/order implementation specified in the application, and to include consideration of any environmental monitoring data which has been collected in the intervening period. It is noted that for some of the Tier 1 options, EARs have already been prepared. These EARs would be reviewed and revised to be application ready. In the case of the pEARs for Tier 2 drought options, a stand-alone report will be prepared to support each application (from the compiled report per Operating Area which will be prepared for shelf-copy purposes), and baseline data described in more detail, where appropriate to do so.

In the event of a drought event in 2015-2016 which requires applications for drought permits/orders, we would endeavour to prepare compliant application ready EARs to support the applications in consultation with NRW and EA.

## 4.7 Compensation for other Abstractors

In accordance with the provisions of Schedule 9 of the Water Resources Act 1991, where a drought permit/order has been made, compensation for any loss or damage sustained by reason of the taking of the water shall be payable by DCWW to the owners of a source of water and all other persons interested in a source of water or injuriously affected by the taking of water from a source. Any claim for compensation must be made by serving notice on DCWW setting out the grounds of the claim and the amount claimed. Any claims for compensation must be made in accordance with the provisions of, and within the time limits set out in Schedule 9 of the Water Resources Act 1991. Claims for compensation will be assessed by DCWW on a case by case basis.

Customers are not entitled to compensation in relation to any loss or damage sustained as a consequence of a drought order.

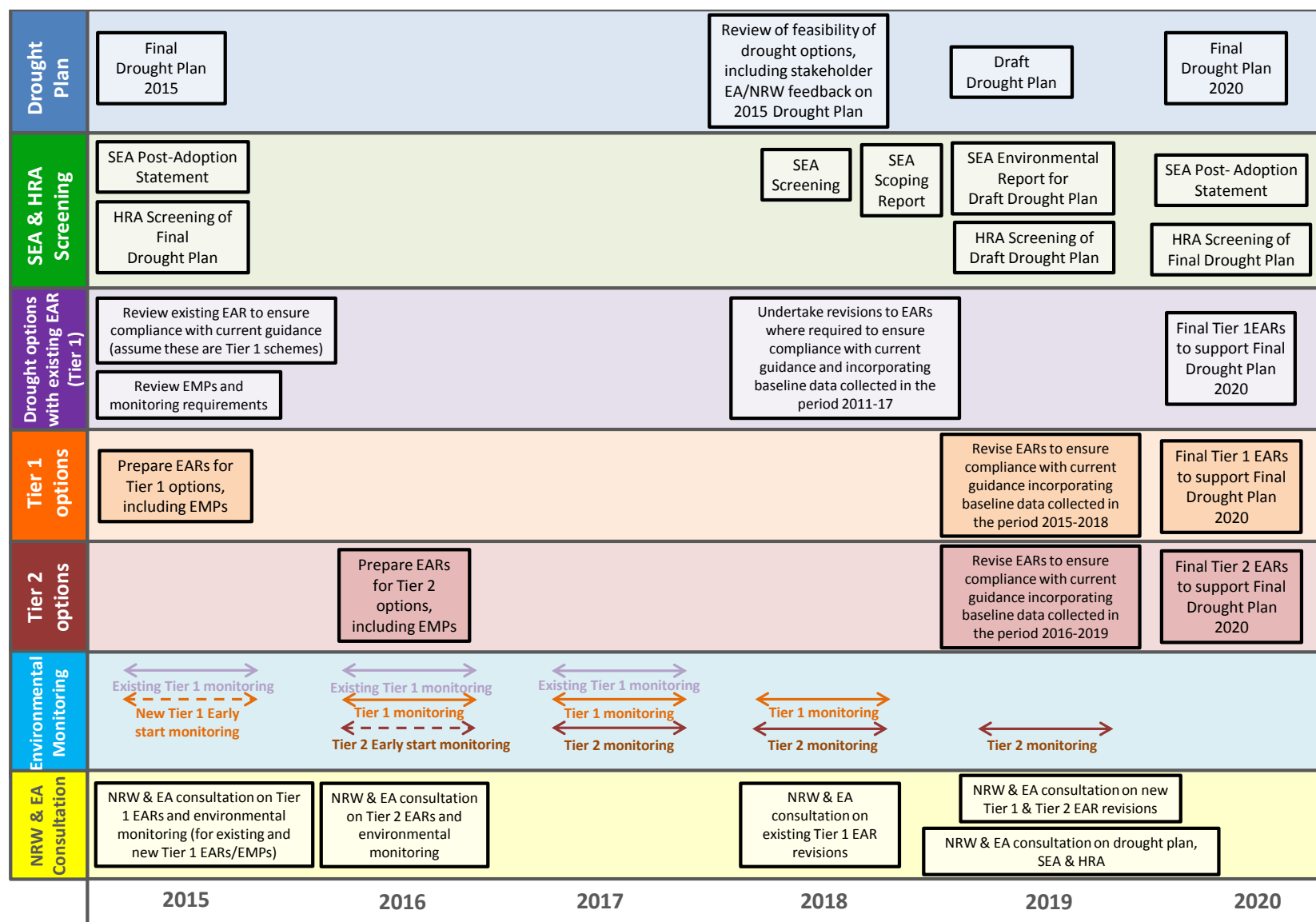


Figure 40 - Programme for drought plan revision and environmental assessments and monitoring

## 5 Management and communications strategy

### 5.1 Management structure/ roles and responsibilities

DCWW has a clear management structure that will be put in place during a drought period. This will enable efficient and informed decision making to take place so that drought actions can be agreed and implemented in a timely manner

Under normal conditions, routine discussions take place between DCWW Water Resource Managers and Operational Production Managers to communicate ongoing operation and asset issues and to relate these to the water resource situation and any need for action. The regional water situation is monitored and reported on a weekly basis, circulated both within DCWW and shared with external stakeholders including Natural Resources Wales (NRW).

The DCWW Water Resource Manager meets on a regular basis with NRW and will discuss the resource situation when required. DCWW Area Water Resource Managers also meet with NRW officers on a regular basis to discuss environmental monitoring issues. The routine monitoring carried out by both DCWW and NRW enables any decline in the resource situation to be quickly identified and necessary action taken. As part of the routine monitoring, the current water resource position is checked against the relevant drought zones and triggers as detailed in Section 2.2.

If the routine monitoring indicates the resource situation is in decline, DCWW will form both *'Leadership'* and *'Operational'* "Drought Management Teams" to manage the ongoing situation.

The Leadership Team will be led by the Chief Operating Officer with direct support from operational colleagues, the Environment, Customer, Communications and Capital Delivery teams. The *'Operational Team'* will be determined by the Leadership Team but will consist of members of the above teams with a geographic area focus if required. The operational team will be responsible for delivering the actions detailed within the drought plan under direction from the Leadership Team. This will include but not be restricted to:

- Changes to operations; production and network planning and work scheduling
- Increased scrutiny of the water situation and potential water quality impacts
- Briefing of changes in customer messaging and service
- Development of capital solutions in response to drought
- Emergency planning development
- Briefing of environmental monitoring and stakeholders

Dependent upon the geographical extent of the drought there may be a requirement to convene separate Operational teams. This will be a Leadership Team decision, however an indicative relationship diagram is provided below in Figure 41- Drought Management Structure.

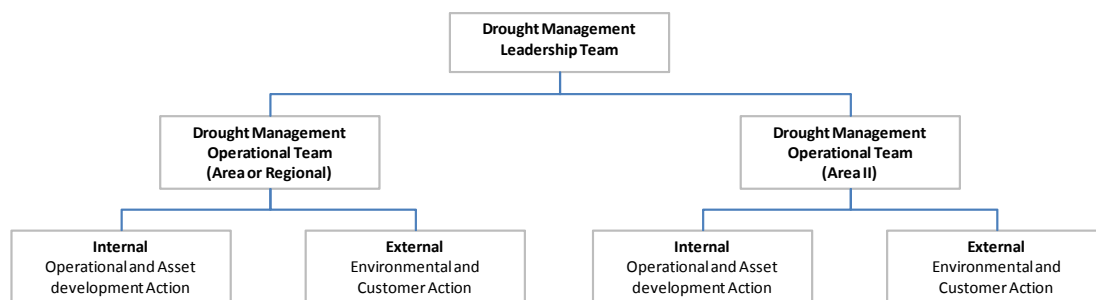


Figure 41- Drought Management Structure

The roles and areas of responsibility and/or expertise likely to be represented on the Drought Management Teams are set out in the table below:

Table 18 - DCWW Drought Management Leadership team

Area of Responsibility	Job Title	Department
Accountability for drought management	Chief Operating Officer	Executive Team / Operations
Drought management responsibility	Director of Water Services	Executive Team / Operations
Legal Compliance	General Counsel	Executive Team
Customer service	Customer Services Director (or deputy dependant on status)	Executive Team DCCS
Communications	Communications Director	Executive Team
Capital delivery	Water Investment Manager	Executive Team
Environmental Impact	Director of Environment	Executive Team
Water Production	Head of Water Production	Operations
Water distribution	Head of Water Distribution	Operations
Water Resources Strategy	Water Resources Manager	Environment
Administrative support and governance	Drought Co-Ordinator	Operations &/or Environment

Table 19 - DCWW Operational Management Team

Area of Responsibility	Job Title	Department
Management Responsibility	Director of Water Services	Executive Team / Operations
Asset Delivery	Head of Water Assets	Operations
Water Production	Head of Water Production	Operations
Water distribution	Head of Water Distribution	Operations
Water Resources Strategy	Water Resources Manager	Environment
Demand Forecasting, water demand management	Supply Demand Manager	Operations
Capital delivery	Capital Delivery Lead	Capital Delivery
Communications	Communications Lead	Communications
Water Production (area specific depending on where is affected by drought)	Production Manager Central	Production
	Production Manager North West Wales	
	Production Manager North East Wales	
	Production Manager Hereford & Mid Wales	
	Production Planner	
Distribution (area specific depending on where is affected by drought)	Distribution Manager North West	Distribution
	Distribution Manager Central	
	Distribution Manager Eastern	
	Distribution Manager North East	
	Distribution Manager WS220 (Swans Area)	
	SEWCUS Distribution Manager	
	Distribution Manager WS221 (West Wales)	
Water Resources situation reporting & forecasting/system modelling (area specific depending on where is affected by drought)	Area Water Resources Manager (South East)	Water Resources
	Area Water Resources Manager (North)	
Environmental Monitoring and Assessment	Environmental Water Resources Planner	Water Resources
Customer Contact	Customer Services Lead	Customer Services
Water quality issues	Drinking Water Quality Lead	Drinking Water Quality
Emergency Planning	Emergency Planning Manager	Operational Development

A secretariat will be established to record actions and decision making and these will be widely circulated within DCWW. On formation of Drought Management Teams, a suitable 'stand in' will be identified for each role within the teams. This puts in place the necessary succession planning processes should any of the leadership team members become unavailable over the course of the drought.

In addition to the internal Drought Management Teams, as drought conditions are encountered, the NRW, EA, Welsh Government (WG) Drought Liaison Group will be convened as laid out within the NRW Drought Plan. The Director of Environment, Communications Lead and Water Resources Manager will attend these meetings in the first instance with the requirement for further liaison between all parties decided as the drought develops.

Similarly, face to face meetings and or teleconferences will be held with neighbouring water companies, including Severn Trent, Dee Valley Water and United Utilities and inset appointments within the DCWW operating area as these companies are likely to be affected by drought conditions in a similar way. This liaison process will also ensure consistency of messaging for customers and provide the opportunity for joint working with the potential for joint press releases and press conferences, joint advertising campaigns, and joint stakeholder briefings and newsletters. The Water Resources Manager and Communications Lead will be responsible for calling these meetings.

The Environmental Monitoring Plan supports the drought planning process. Any monitoring being undertaken as part of this programme of work will continue throughout the drought and once water resource conditions have returned to normal. The data and information gathered for this work will support relevant drought permit and drought order applications, should they be required.

Table 20 - Drought Management Team Process, summarises the Drought Management Group process, and the frequency of meetings and other liaison at different stages of a drought.

**Table 20 - Drought Management Team Process**

<b>Water resource position:</b>	<b>Actions:</b>
<b>Normal Operation</b>	Routing monitoring of water resource situation
	Weekly reporting on water resource situation by DCWW
	Regular liaison meetings between Water Resources Manager and NRW
<b>Developing Drought</b>	Drought Management Teams convened: <ul style="list-style-type: none"> <li>Initial meeting held and further meetings arranged for every fortnight under the developing drought conditions.</li> <li>Projections for future resource position discussed. Drought production plans agreed and asset development options progressed.</li> <li>Communications plan enacted as detailed in Section 5.2.</li> <li>Temporary use ban and environmental monitoring plans developed as thought required.</li> </ul>
	Fortnightly liaison meetings of the Drought Liaison Group
	Face to face meetings or teleconferences with adjoining water companies. Frequency to be agreed in response to drought situation.
<b>Drought</b>	Drought Management Team meets once a week: <ul style="list-style-type: none"> <li>Projections for future resource position discussed. Management and tracking of drought actions being implemented (demand and supply side actions).</li> <li>Agree further actions to be progressed – communications, prepare drought permits and drought orders as thought required.</li> </ul>
	Fortnightly liaison meetings of the Drought Liaison Group continue

Water resource position:	Actions:
	Face to face meetings or teleconferences with adjoining water companies continue.
<b>Severe Drought</b>	Drought Management Group meets up to three times a week: <ul style="list-style-type: none"> <li>• Close monitoring of the ongoing situation</li> <li>• Management of the drought actions being implemented (demand and supply side actions)</li> </ul>
	Water Resource Team to submit drought permit and drought order applications as agreed by the Drought Management Groups.
	Meetings/teleconferences between DCWW and NRW/WG may increase in frequency to one a week.
	Face to face meetings or teleconferences with adjoining water companies continue and may need to increase in frequency.
<b>Post Drought</b>	De-brief meeting/workshop of Drought Management Teams to discuss and record lessons learnt from the drought and identify whether any elements of the drought plan need reviewing or updating based on the most recent drought experience. A 'lessons identified' report will be produced by the Water Resources team within 3 months of the end of the drought.
	If post drought environmental monitoring is required as a result of drought permit or drought order applications, this will continue as long as necessary.
	Compare experiences with neighbouring water companies and assess if level of joint working was effective/where modifications or improvements could be made.

## 5.2 Communications Plan

### 5.2.1 Background

Dŵr Cymru Welsh Water has developed a Drought Communications Plan (DCP) to ensure the effective flow of information to customers and stakeholders during a drought.

Successful engagement with customers, stakeholders and neighbouring companies is a key part of effective drought management. Customer co-operation during periods of dry weather is essential to helping protect water resources.

Our DCP needs to be flexible and able to adapt to different drought situations. The communications tools and methods outlined in this plan will therefore be used taking into account the prevailing conditions and adapted appropriately as a drought develops. We will also consider the language we use in our communications, and where appropriate we will use Welsh as well as English.

### 5.2.2 Approach

Our guiding principle in developing the DCP is to ensure that information on the water situation is provided in a timely and accurate manner. It is also essential that we offer advice and guidance on how the particular audience groups can play their role in helping us manage the situation. Our objectives are to:

- Promote and enhance ongoing water efficiency messaging

- Inform customers and stakeholders on how they can help to minimise the potential impact of a drought
- Inform customers and stakeholders of the drought development as well as progression into the further drought stages
- Inform customers and stakeholders about what actions Dŵr Cymru Welsh Water has implemented during the drought in order to help maintain supplies
- Provide information on how to prepare for and adapt to water usage restrictions
- Liaise with neighbouring companies and environmental regulators on messaging strategies.

While these objectives form the core basis of our strategy, tailored communications plans will be implemented to meet the requirements of an escalating drought situation. More information on these plans is provided below.

The need for reliable and accurate information is essential – particularly as inaccurate and inappropriate reporting by the media during drought periods is a very real possibility. Our approach to customer communication is therefore governed by the need to keep customers informed of the current situation and importantly what this means for them. For this reason we need to ensure that the tactics we employ, and tone of messaging we use, is appropriate to the situation we are in.

### 5.2.3 ‘Be Waterwise’ campaign

Dŵr Cymru takes its role as guardian of the local environment seriously and already does a lot of work to protect water resources.

One of the main challenges the company faces is the perception that Wales has plenty of water. However, water is equally as finite a resource here as anywhere else. Furthermore, as a company we are only allowed to abstract 3% of the water available in reservoirs and rivers for use in the drinking water network.

Dŵr Cymru Welsh Water promotes water efficiency throughout the year through its ‘Be Waterwise’ campaign. The main focus of the campaign is to encourage customers not to waste water with the key message being ‘use as much water as you need but please don’t waste it.’ To achieve the objectives of the campaign, messaging is promoted throughout the course of the year using the following methods:

- Gardening tips in local newspapers and via short films featuring BBC Radio 2’s Terry Walton
- Working in partnership with Eco-Schools to promote sustainable water use in schools
- Delivery of water efficiency lessons at our Environment Education Centres across Wales
- Podcasts offering tips on how to conserve water
- Discounted water butts
- Media activity to inform and remind customers about the campaign
- Offer free leak repair scheme for leaks on private supply pipes
- Promotion of hippo bags to save water used in toilets
- Water efficiency displays at national shows and similar community events
- Providing water efficiency advice on the website

### 5.2.4 Regional Flexibility

The DCP has been developed to enable it to be implemented and used on three levels:

- Implementation of the DCP across our whole operating area to address a widespread drought;
- Ability to respond appropriately to regional variations in drought conditions;
- Flexibility to use the DCP for a single water resource zone (WRZ).

To achieve the flexibility required to respond to the level 2 regional variations, we have split our operating area to mirror the geographic areas covered by the relevant regional media as follows:

- Herefordshire
- Lower Mid Wales
- South East Wales
- South West Wales
- North East Wales
- North West Wales

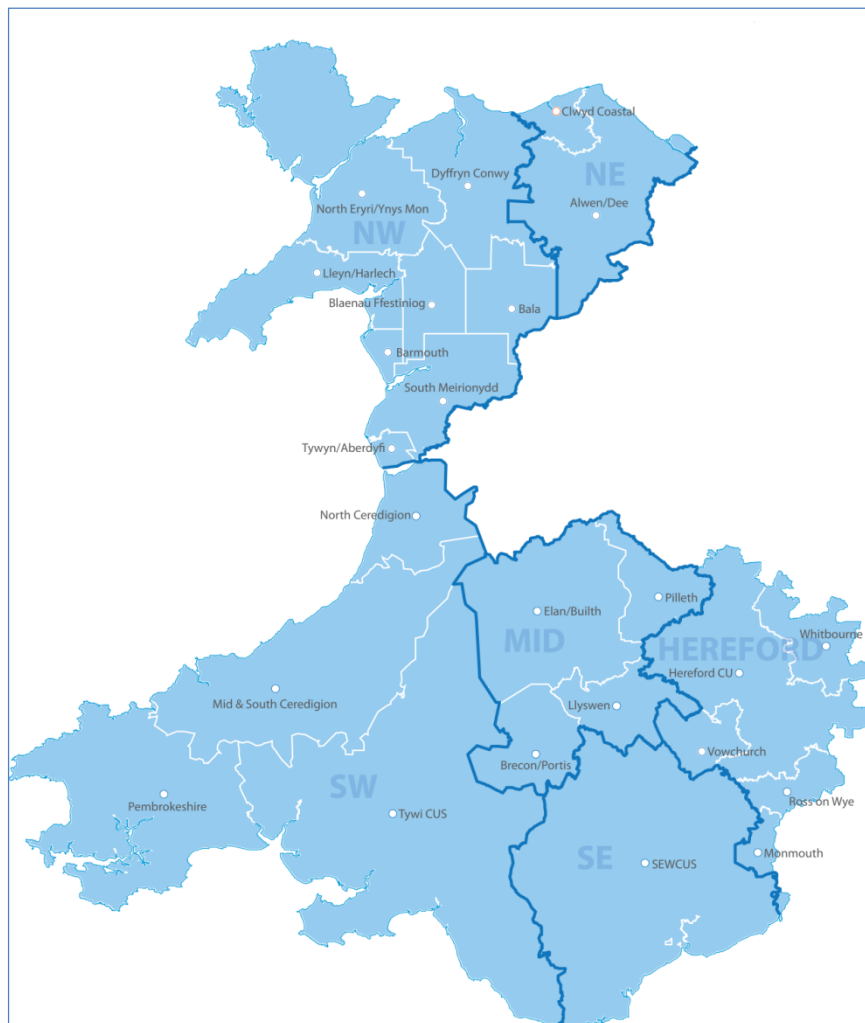


Figure 42 Map showing the cross reference of media area versus the company's water resources zones

### 5.2.5 Water company cooperation

Our operating area adjoins the operating areas of a small number of other water companies. These include Severn Trent, Dee Valley Water and United Utilities. We also have arrangements in place to supply inset agreements which are contracts that could supply commercial or domestic properties. A drought situation that may be affecting a region of ours may well be affecting an adjoining water company in the same way. For this reason, we will ensure we work closely with these companies that adjoin our area.

Joint working will help ensure best practices along with lessons learnt are shared amongst each company which ultimately will assist with the effective management of drought situations. As set out in table 18, from the onset of developing drought we will increase our level of communication with neighbouring water companies via face to face meetings and/or teleconferences, to ensure more joined up working, and will share, as appropriate, information such as reservoir storage levels and forecasts, SPI data, and changes to operations.

This joint working is strengthened by all of our neighbouring companies signing up to the CoP and guidance on water use restrictions. Our respective communication departments will work closely together to ensure that customers receive clear and consistent messaging particularly where there are water use restrictions in adjacent company areas.

To assist in the delivery of consistent communications messages across our customer base, we will also include CCWater, NRW, EA and Welsh Government in the co-ordination of a joint approach to water efficiency communications.

Joint working will include:

- Joint press releases
- Dedicated area on websites of each company partaking in any joint working and use of portals such as Welsh Government's *Resource efficient Wales* website ([Resource Efficient Wales | Water supply and management](#)).
- Joint press conferences
- Joint advertising campaigns
- Joint stakeholder briefings and newsletters.

### 5.2.6 Convention of the Dee Consultative Committee

As described in Section 1.3.1, DCWW has a joint interest in the River Dee water resource system. Good communication between those that use this resource will be essential during a period of drought to ensure the sustainable management of the resource.

Section 2.1.7 of the Dee General Directions specifies that:

*“When system storage is expected to fall below the Systems Conservation Rule Curve, the Dee Consultative Committee will meet to discuss the implementation of Drought General Directions. This meeting must take place within 7 days of the storage falling below the SCRC”.*

Furthermore, should the system storage cross the ‘stage 1’ or ‘stage 2’ trigger lines, then the Dee Consultative Committee will also be convened at each of these stages. The committee could also decide to meet more often, depending on the severity of the drought, but this is not specified in the Directions.

### 5.2.7 Communication and data exchange with Natural Resources Wales

During a drought the Natural Resources Wales (NRW) Drought Manager, and the NRW Water Resources Planning Technical Specialist, are responsible for ensuring that DCWW follows its drought plan within Wales (which excludes some areas of Water Resource Zones around Herefordshire and Deeside). . DCWW will keep NRW informed of the actions we are going to take as a drought progresses. The first point of contact at NRW during a drought is the Water Resources Planning Technical Specialist.

In the initial stages of a developing drought there will be regular communication between DCWW, NRW and Welsh Government. When we start implementing measures that are beyond normal operation to maintain the security of water supply the Drought Liaison Group will be convened. This group will include the NRW Drought Manager, DCWW Director of Environment, DCWW Water Resources Manager and the Welsh Government's Water Branch Drought Lead. The Communications Managers from NRW and DCWW may also be invited to attend.

Data and information exchange with NRW occurs regularly under normal operating conditions, and it is anticipated that this will increase during the course of a drought. As the drought progresses and the resource situation declines the NRW Water Resources Planning Technical Specialist will contact DCWW Water Resources Manager to discuss the situation. They may also request the following information depending on the severity of the drought situation:

- Reservoir scenario projections (refill over the winter)
- Current estimates of leakage in supply or resource zones
- Details of unplanned outage (temporary loss of a source of water) events and the effect of any planned outages
- Details of water company drought management actions being implemented such as publicity campaigns, temporary water use restrictions and enhanced leakage detection and repair.

If required, the NRW drought manager will organise meetings with DCWW during a potential drought or drought situation to discuss the current water situation, the data and information on the resource situation supplied by DCWW, and how the company is following its drought plan.

Additional meetings or briefing sessions will be held with individuals or groups of stakeholders as appropriate.

### 5.2.8 Communication and data exchange with the Environment Agency

During a drought the Environment Agency Shropshire, Herefordshire, Worcestershire and Gloucestershire (EA SHWG) Area Drought Manager, and the EA SHWG Area Drought Co-ordinator, are responsible for monitoring how DCWW is following its drought plan within England. DCWW will keep EA SHWG Area informed of the actions we are going to take as a drought progresses. The first point of contact at the Environment Agency during a drought is the SHWG Area Drought Co-ordinator.

In the initial stages of a developing drought there will be regular communication between DCWW and EA SHWG Area. When we start implementing measures that are beyond normal operation to maintain the security of water supply the Drought Liaison Group will be convened. This group will include representation from the EA SHWG Area, DCWW Director of Environment, DCWW Water Resources Manager, and representation from DEFRA if appropriate. The Communications Managers from EA SHWG Area and DCWW may also be invited to attend.

Data and information exchange with the EA occurs regularly under normal operating conditions, and it is anticipated that this will increase during the course of a drought. As the drought progresses and the resource situation declines the EA SHWG Area Drought Co-ordinator will contact DCWW Water

Resources Manager to discuss the situation. They may also request the following information depending on the severity of the drought situation:

- Any relevant reservoir scenario projections.
- Regulated river levels and trends
- Groundwater levels and trends
- Current estimates of leakage in supply or resource zones
- Details of unplanned outage (temporary loss of a source of water) events and the effect of any planned outages
- Details of water company drought management actions being implemented such as publicity campaigns, temporary water use restrictions and enhanced leakage detection and repair.

If required, the EA SHWG drought Co-ordinator will organise meetings with DCWW during a potential drought or drought situation to discuss the current water situation, the data and information on the resource situation supplied by DCWW, and how the company is following its drought plan.

Additional meetings or briefing sessions will be held with individuals or groups of stakeholders as appropriate.

### 5.2.9 Employee Information Programme

At every stage, all of our employees – both customer facing and those that do not deal directly with customers - will be briefed to ensure full awareness of any emerging drought situation. It is imperative that employees are fully briefed to ensure consistent messaging from the company on any drought situation we experience. Keeping staff informed will be done through a variety of techniques which will include:

- Internal newsletter
- Internal internet
- Team briefings

The key customer facing personnel will be given a 1 page briefing note showing how the drought affects their customers supply area and what it will mean for customers within that area.

### 5.2.10 Target audiences

The table below sets out who the target audiences are that our communications actions will apply to.

**Table 21 - Target audiences for Communications actions**

Audience Group	Specific details
Customers	<ul style="list-style-type: none"> <li>• Domestic</li> <li>• Commercial</li> </ul>
Stakeholders	Statutory <ul style="list-style-type: none"> <li>• Natural Resources Wales</li> <li>• Environment Agency</li> <li>• Ofwat</li> <li>• Consumer Council for Water Wales</li> <li>• Drinking Water Inspectorate</li> <li>• Water UK</li> </ul>

Audience Group	Specific details
	<ul style="list-style-type: none"> <li>Welsh Government</li> <li>Defra</li> <li>Natural England</li> </ul> <p>Non-statutory</p> <ul style="list-style-type: none"> <li>Neighbouring water companies (Severn Trent Water, Dee Valley Water, United Utilities)</li> <li>Inset appointees</li> <li>Political representatives e.g. MPs, AMs, MEPs, local councillors, community councils</li> <li>Local Authorities</li> <li>Local Resilience Forums</li> <li>National Park Authorities</li> <li>Navigation Authorities (including the Canal &amp; River Trust)</li> <li>Environmental Organisations (including but not limited to; Wye &amp; Usk Foundation, Wildlife Trusts, Wildfowl and Wetlands Trust, WWF Cymru, Friends of the Earth Cymru, CADW, Angling Trust)</li> <li>Fire Services</li> </ul> <p>Other</p> <ul style="list-style-type: none"> <li>Press and Media</li> </ul>
Other water users	<ul style="list-style-type: none"> <li>Tourists</li> </ul>
Staff	<ul style="list-style-type: none"> <li>Direct Employees of Dŵr Cymru Welsh Water – which will include customer facing staff at contact centre and working across operating area</li> <li>Contractors providing services to Dŵr Cymru Welsh Water</li> </ul>

### 5.2.11 Communication actions and techniques

The table below lists all of the possible communications campaigns that can be deployed in our area and the specific actions we would take as part of our DCP. This is an overall list of techniques that can be used and how they would change and vary their messaging as the drought continued and gained in intensity and severity. Details on specific messaging that would be used at an individual water resource zone level is provided in the WRZ summaries in Appendix 1. In some areas where demand is affected by bank holidays and school summer holiday, drought messaging would be timed appropriately to make the most impact.

The principles detailed in Table 22 have been written to allow as much flexibility as possible. The type and severity of a specific drought will dictate the techniques used.

Table 22 - Water efficiency and drought communications campaigns

Drought Situation	Audience	Communications Techniques	Key Messages
Normal	Customers	<p>Website Water Efficiency page - contains practical advice on ways customers can use water efficiently in the home and in the garden.</p> <p>Press Releases – promoting water efficiency and issued on a national, regional and local levels across our operating area.</p> <p>Organised events - strong branded presence at such events (e.g. Royal Welsh Agricultural Show, National Eisteddfod) to promote water efficiency.</p> <p>Education Centres – lessons on water efficiency delivered at our education centres across Wales throughout the academic year and feed into the national curriculum.</p> <p>Social Media – activity via Welsh Water’s own Twitter, Facebook and YouTube pages to promote useful information on using water wisely.</p>	<p>As a responsible company, we want to work with customers to protect our finite resource</p> <p>Our advice is <b>use the water you need but please don’t waste it</b></p> <p>We are also doing our bit to save water by reducing leakage. Ask customers to help us by reporting any leaks to us immediately.</p> <p>Improved water efficiency also benefits the environment as producing treated water is an energy intensive process so reducing the amount of water we treat in turn reduces our carbon footprint.</p> <p>Improved water efficiency also helps reduce our operating costs which in turn helps us keep bills low for customers</p>
		Water efficiency offers e.g. water butts for domestic customers, water audits for business / commercial customers.	
Normal	Stakeholders	Face to face meetings – form part of structured stakeholder engagement programme and provide opportunity to update on steps we take to promote water efficiency.	<p>As a responsible company, we want to work with customers to protect this finite resource</p> <p>We are also doing our bit to save water by reducing leakage and urge customers to report leaks.</p>

Drought Situation	Audience	Communications Techniques	Key Messages
		Social media – this will be used to update stakeholders who follow our activity on these platforms. Also encourage stakeholders to cascade our updates to their own friends / followers.	Improved water efficiency also benefits the environment as producing treated water is an energy intensive process  Please help us communicate our advice on using water efficiently
Developing Drought	Customers Other water users	Website – dedicated web page ready to go live as soon as required as <i>developing drought</i> stage is triggered and verified. Link to page will be clearly visible on Welsh Water's homepage and will contain update on water resource situation. Crucially will also contain information on what customers can do to help conserve supplies. Will also contain relevant contact details should people have further queries.	Weather has been drier than normal therefore reservoir levels aren't as high as we would expect for time of year, either in a Media SPECIFIC AREA, WATER RESOURCES ZONE or ACROSS OPERATING AREA.
		Press releases - to be issued to relevant media. Target media will consist of print, broadcast and online. The media selected will depend on whether developing drought is on a local or regional level or is applicable to our entire operating area.	If situation does not improve, will need to look at introducing temporary use restrictions to help secure supplies until the situation improves.
		<p>Paid for adverts – to appear in relevant media. Would include adverts in newspapers and on relevant radio stations.</p> <p>Organised events - strong branded presence at such events (e.g. Royal Welsh Agricultural Show, National Eisteddfod) to promote water efficiency.</p> <p>Social media activity via Twitter or Facebook. Dependent on where drought is, activity can be targeted to specific areas or across wider operating area.</p>	<p>Introducing temporary use restrictions is a last resort. We would like to avoid this so are asking customers to work with us to help conserve water resources.</p> <p>As a responsible company, we want to work with customers to protect this finite resource</p> <p>We are also playing our part by reducing leakage and urge customers to report any leaks they come across to us immediately.</p>

Drought Situation	Audience	Communications Techniques	Key Messages
		<p>Roadshow / local exhibition – to take place in areas where water resource is localised problem.</p> <p>Letters to customers – where a water resource issue is relevant to a confined area in our operating area, letters will be issued advising of this and asking customers to help conserve water by using it wisely.</p> <p>Billing call centre telephone message - recorded messages to explain to customers that we are experiencing a dry spell and ask customers to help us conserve supplies to help prevent the need to introduce restrictions.</p>	<p>Customers can order a water savers pack through our website to help conserve supplies in the area - <a href="http://www.dwrcymru.co.uk/en/My-Water/Water-Efficiency.aspx">www.dwrcymru.co.uk/en/My-Water/Water-Efficiency.aspx</a></p>
<b>Developing Drought</b>	<b>Stakeholders</b>	<p>Face to face briefings – to be held as soon as developing drought stage triggered. Offer opportunity to explain the situation we are in and steps being taken to help conserve supplies. Also need to explain we have powers to introduce temporary use bans which we will exercise if situation does not improve. Also an opportunity to encourage them to help us communicate these messages.</p> <p>Direct mailing – these letters would be issued following meetings to confirm topic of conversation and situation relating to water resources.</p> <p>Social media activity – as above.</p>	<p>Weather has been drier than normal therefore reservoir levels and supplies aren't as high as we would expect for time of year, either in a Media specific area, water resources zone or across the operating area.</p> <p>If situation does not improve, will need to look at introducing temporary use restrictions to help secure supplies until the situation improves.</p> <p>Introducing temporary use restrictions is a last resort. We would like to avoid this so are asking customers to work with us to help conserve water resources.</p> <p>We are also playing our part by reducing leakage and urge customers to report any leaks they come across to us immediately.</p> <p>Please help us in communicate information about the situation and the possible introduction of temporary use restrictions.</p>

Drought Situation	Audience	Communications Techniques	Key Messages
<b>Drought</b>	<b>Customers Other water users</b>	<p>Website – as above and tailored with appropriate messaging (see next column)</p> <p>Press Releases – as above and with appropriate messaging (see next column)</p> <p>Media interviews with senior managers – would proactively approach relevant media to try and secure TV and radio interviews with main news programmes</p> <p>Paid for adverts – as above and with appropriate messaging (See next column)</p>	<p>Due to very recent dry weather, water resources are lower than we would expect for time of year</p> <p>To protect supplies we are in the process of consulting on the introduction of temporary use restrictions. You can have your say on these by contacting us.</p> <p>Plus (if applicable)</p> <p>To protect supplies, we have now introduced temporary use restrictions. These are essential to ensure supplies are maintained to customers in the area.</p>
		<p>Letters to customers – where a water resource issue is relevant to a confined area in our operating area, letters will be issued advising of this and asking customers to help conserve water by using it wisely.</p> <p>Presence at organised events e.g. Royal Welsh Agricultural Show, National Eisteddfod</p> <p>Water efficiency lessons at Welsh Water's Education Centres</p> <p>Social media activity – including social media site advertising</p> <p>Water efficiency roadshows at shopping centres etc</p> <p>Billing call centre messages / recorded messages</p>	<p>We are also playing our part by reducing leakage and urge customers to report any leaks they come across to us immediately.</p>

Drought Situation	Audience	Communications Techniques	Key Messages
Drought	Stakeholders	Regular face to face briefings – to follow same format as above	Due to very recent dry weather, water resources are lower than we would expect for time of year
		Direct Mailing – as above	To protect supplies we are in the process of consulting on the introducing temporary use restrictions. You can have your say on these by contacting us.
Drought	Stakeholders	Social media activity	Plus (if applicable) To protect supplies, we have now introduction of temporary use restrictions. These are essential to ensure supplies are maintained to customers in the area.
			We are also doing our bit to save water by reducing leakage and urge customers to report leaks Please help us in promoting our water efficiency messaging.
Severe Drought	Customers Other water users	Radio / tv advertising / bill board notices – these can be tailored to relevant areas or be applicable to the entire operating area.	Water resources are exceptionally low and unlikely will be able to sustain supplies to all users in the short term.
		Website – as above Letters to customers – where a water resource issue is relevant to a confined area in our operating area, letters will be issued advising of this and asking customers to help conserve water by using it wisely.	Non-essential use restrictions will be implemented. This is a last resort but essential if going to conserve supplies for customers.
Severe Drought	Customers Other water users	Press Releases – as above and with appropriate messaging (see next column)	Temporary use restrictions remain in place. We thank customers for observing these and ask they continue to work with us to protect supplies.

Drought Situation	Audience	Communications Techniques	Key Messages
		<p>Media interviews with senior managers – as above</p> <p>Paid for adverts – as above and with appropriate messaging (See next column)</p> <p>Presence at organised events e.g. Royal Welsh Agricultural Show, National Eisteddfod</p> <p>Water efficiency lessons at Welsh Water's Education Centres</p> <p>Social media activity – including social media site advertising</p> <p>Water efficiency roadshows at shopping centres etc</p> <p>Billing call centre messages / recorded messages</p>	<p>Drought permits / orders are in place.</p> <p>Ask that customers continue to work with us to help protect supplies</p>
Severe Drought	Stakeholders	<p>Regular face to face briefings – to follow same format as above</p> <p>Direct Mailing – as above</p> <p>Social media activity</p>	<p>Water resources are exceptionally low and unlikely will be able to sustain supplies to all users in the short term.</p> <p>Non-essential use restrictions will be implemented. This is a last resort but essential if going to conserve supplies for customers.</p> <p>Temporary use restrictions remain in place. We thank customers for observing these and ask they continue to work with us to protect supplies.</p> <p>Drought permits / orders are in place.</p> <p>Ask that customers continue to work with us to help protect supplies.</p> <p>Please help us in promoting our water efficiency messaging</p>

Drought Situation	Audience	Communications Techniques	Key Messages
End of Drought	Customers Other Water Users	<p>Press Releases – announcing the end of the drought and issued on a national, regional and local levels across our operating area.</p> <p>Social Media – activity via Welsh Water’s own Twitter, Facebook and YouTube pages to announce the end of the drought.</p> <p>Website Water Efficiency page - contains practical advice on ways customers can use water efficiently in the home and in the garden.</p> <p>Organised events - strong branded presence at such events (e.g. Royal Welsh Agricultural Show, National Eisteddfod) to promote water efficiency.</p> <p>Education Centres – lessons on water efficiency delivered at our education centres across Wales throughout the academic year and feed into the national curriculum.</p>	<p>Thank you for your support during the period of drought. Our Water Resources Position has improved and we are now able to remove the restrictions on water use.</p> <p>As a responsible company, we want to work with customers to protect our finite resource.</p> <p>Our advice is <b>use the water you need but please don’t waste it.</b></p> <p>We are still working hard to save water by reducing leakage. We ask customers to help us by reporting any leaks to us immediately.</p> <p>Improved water efficiency also benefits the environment as producing treated water is an energy intensive process so reducing the amount of water we treat in turn reduces our carbon footprint.</p>

### 5.2.12 Consultation on implementation of temporary use restrictions

Water companies now have extended powers which will allow them to introduce temporary water restriction use without the need for a Drought Order. It is essential that stakeholders are informed of these new powers and what this means for our customers.

Customers and interested parties will be given the opportunity to make representations prior to any temporary use restrictions being implemented during a drought. While a 14 day consultation period will apply, the introduction of any temporary use restrictions would not come as a total surprise to customers. Our communications actions and techniques will already have raised awareness amongst customers of the severity of the water resource situation.

The company will work to raise awareness amongst customers about its new powers at roadshows and other customer facing events it features in.

As part of our on-going drought planning, and to minimise the potential for delays to the introduction of water efficiency measures and TUBs during a drought, we will use the example notifications for water use restrictions under a temporary use ban provided in Appendix C of the Code of Practice and Guidance<sup>11</sup> as a template for communications that will be used during a

<sup>11</sup> UKWIR (2013): *Managing Through Drought: Code of Practice and Guidance for Water Companies on Water Use Restrictions (incorporating lessons from the 2011-12 drought)*. Report Ref No. 14/WR/33/6

drought to inform customers of the introduction of a temporary use ban. We will consult with CCWater on the use and development of these communications prior to issuing them during a drought.

The 14 day in-drought consultation period for temporary use restrictions, provides the opportunity for customers and stakeholders to comment on the proposals. The proposals will be communicated via:

- Notices in local newspapers and on local broadcast media
- Company website
- Company's social media channels

A clear deadline will be included for when representations will need to be received by. The Water Resources team will be responsible for compiling all representations received and presenting these to the Drought Group for consideration. Customers will have the option of either emailing or writing in with their representations.

The introduction of any temporary use restrictions will be publicised before they are implemented.

### **Communication with vulnerable customers on TUBs**

Blue badge holders are universally granted exceptions to certain temporary use ban categories, such as watering a garden with a hosepipe. Customers on our Vulnerable Customer List can apply for a Discretionary Concessional Exception from DCWW. The Discretionary Concessional Exception is a mechanism by which customers on our Vulnerable Customer List who have mobility issues can be granted exception from certain temporary usage ban categories, such as watering a garden with a hosepipe.

During a drought, communication with vulnerable customers will be enhanced to ensure they are aware of the exceptions they may be entitled to when temporary use bans are imposed. This will be done by undertaking activities such as direct mailing to those whose details are on our internally held vulnerable customers' database. Inclusion on this list is voluntary so to ensure comprehensive coverage, we will also co-ordinate with third parties such as Local Authorities and organisations such as Age Cymru. Vulnerable customers who are not already registered on our Vulnerable Customer List can apply at any time to be included on the list via our 'Here to Help' scheme. Details of this scheme are available on our web site ([Here to Help | My Account | Dwr Cymru Welsh Water](#)).

### **5.2.13 Communication During and Post Drought Actions**

A true evaluation of the management of a drought situation can only be undertaken once drought conditions have subsided. The recovery or potential recovery from a drought will be monitored by the Communications, Water Resources, and Water Demand teams. It is imperative that lifting of drought actions only takes place once there is certainty that the water resource situation is secure. The early lifting of drought actions would be damaging to DCWW's reputation because it would raise doubt in customer's minds of the company's competency to deal with such a serious situation.

To enable a post drought review, drought monitoring will have to occur. Information will have to be recorded on dates of communication campaigns and demand saving as a direct result of that campaign need to be captured. Similarly some during drought questionnaires will be required to gauge customer's thoughts and capture any impacts from changes in messaging.

A post drought review will enable DCWW to evaluate the effectiveness of the communication plan in terms of what worked well and what did not work well. As a company committed to continuous

improvement, the findings of the review will help shape future communications plans. The findings may also identify the need for future investment to limit the impact of future similar drought conditions as well as the need for any additional monitoring.

The main objectives of the post drought review are to:

- Evaluate effectiveness of information being passed to External Relations Team about emergence and development of the drought situation e.g. was information received in a timely manner or too late / too early?
- Evaluate the communication tools that worked well / not so well during drought
- Evaluate the effectiveness of reaching target audiences with key messages
- Measure success of communications plan in reducing demand, and
- Obtain feedback from customers and stakeholders on the communication methods used and their effectiveness. This will also include measurement of clarity of messages.

To evaluate the effectiveness of the DCP we will:

- Measure the level of reduction in water use during drought stages and compare against expected normal use for time of year
- Undertake surveys with customers living in affected regions - during and post drought - to establish effectiveness of communication techniques and clarity of messaging.
- Conduct post drought workshops with statutory and non-statutory stakeholders to canvass views on management of the DCP and clarity of messaging
- Conduct brand evaluation exercise (either across entire operating area or in regions affected) to assess impact of drought and the management of the situation on the company's brand
- Compare experiences with neighbouring water companies to gauge the effectiveness of joint working and where any modifications could enhance effectiveness of DCP.

#### 5.2.14 Lessons learned from previous droughts

During the summers of 1976, 1984 and 1989 DCWW had to restrict our customers' use of water using a combination of customer restrictions and drought orders/drought permits to ensure that we were able to maintain supplies. The 1976 drought is the most severe drought we have on record. During this drought supplies were only maintained for large areas of South East Wales by imposing a series of rota cuts over a period of several weeks, which denied customers water supplies for 12 hours each day. However, since 1976 there has been significant investment in DCWW's infrastructure to reduce the risk of such restrictions happening again.

We have experienced some notably dry conditions since customer restrictions were last imposed in 1989. 1995 was a significantly dry year for much of England and Wales, with large areas of South East England subject to customer restrictions. DCWW's systems were tested during this drought and in some areas infrastructure changes were made in response to issues identified. However, customer supplies were maintained without the need for restrictions. Similarly the dry autumn event in 2003 and the dry spring of 2010 both tested our systems and enabled us to identify areas for further infrastructure improvement. Drought permits were required in 2003 to aid winter refill of Pontsicill and Talybont reservoirs. The operational constraints identified during these dry periods have been incorporated into our assessments of system deployable output and accounted for in the water resource planning process.

The legal and regulatory framework within which drought restrictions are applied has changed significantly since DCWW last implemented customer restrictions and used drought order/drought permits. We have therefore looked to the more recent droughts experienced by other water companies to learn lessons and make improvements to our drought plan. We have given consideration to the UKWIR *Code of Practice and Guidance on Water Use Restrictions* when

developing our drought plan. The Code of Practice provides guidance to water companies on the effective implementation of water use restrictions by way of Temporary Use Bans (TUBs) and Drought Orders to help manage demand during times of drought, and includes lessons learnt from experiences arising from the 2011-12 drought.

In addition we have also sought advice from consultants who worked closely with water companies and the Environment Agency during the most recent droughts. Their experience of drought planning and management has been used to incorporate lessons learned by other water companies into our drought plan, specifically in relation to our communications strategy and the environmental assessment work.

### Testing the drought plan – DCWW Drought Exercise

In October 2014, whilst the draft Drought Plan was out for public consultation, we carried out an internal drought exercise. The aim of the exercise was to test the draft Drought Plan, specifically the management and communications strategy, to raise awareness of the drought plan and processes across the business, and to identify lessons learned to be included within our Drought Plan. The exercise focused on implementing the drought plan and the key decisions that would need to be made during the development of a drought. It did not focus on the detailed operational issues that may arise during a drought.

The drought exercise took place over the course of a single day, and was a desk-top time lapse exercise. It focused on four water resource zone – Llyn Harlech, Barmouth, Mid & South Ceredigion and Pembrokeshire. Detailed drought scenario information was produced for the four water resource zones that were the focus of the exercise and high level data and information was provided regarding the drought situation in the remaining 20 water resource zones across our supply area.

Ideas and suggestions for the drought plan were recorded by means of lessons learned during the exercise. A summary of those that have influenced our Drought Plan are provided below:

- Inclusion of Local Resilience Forums as Stakeholders in our communications plan.
- Some supply side options were identified as no longer being viable. A review of the supply side options has therefore been implemented and is reflected in the Drought Plan.
- Drinking Water Safety Plans need to be in place for some of the supply side options in order to be able to implement them within the timeframes specified in the drought plan.
- It was recommended that the drought plan should not include any resource options that may take longer than 3 months to implement/deploy unless these are for winter refill purposes.
- Feasibility studies and implementation plans need to be identified and developed for some supply side options in order for them to be implemented within the timeframes specified within the drought plan.
- The need for clear succession planning to be in place for the Drought Leadership Teams.

## 6 Post-drought actions

### 6.1 Drought recovery

As the water resources situation at the end of a drought returns to the normal level, a number of different metrics can be used to assess this recovery, for instance an extended period of good rainfall or reservoir stocks rising to the level associated with normal operating conditions provide a strong positive indication.

It is important to recognise, however, that individual hydrological conditions during recovery may not be reflective of the broader water resources situation and so have to be interpreted with expertise and experience. We would seek to engage with other water companies, the Environment Agency and Natural Resources Wales in advance of the decision to relieve drought restrictions and drought status.

There is a reputational risk if drought actions are lifted prematurely (i.e. in advance of imminent re-deterioration into drought conditions), in that it would raise doubt in customers' minds of the company's competency to deal with such a serious situation. Hence, caution will be taken in deciding when, as conditions return to normal, any restrictions upon use can be lifted and appropriate communication issued to customers.

In some of our zones, drought onset is more likely to occur later in the year. In these zones, although the summer will end, drought options may need to be looked at to restore reservoir storage level through the implementation of drought options to support winter refill. Although these are technically not post drought actions (as the reservoir level could still indicate that the zones is in drought), they are used to support and accelerate the rate of recharge through the winter.

Throughout the post-drought stage as conditions recover, post-drought environmental monitoring will be undertaken as part of the suite of actions to ensure we have the fullest possible understanding of the impact supply side drought actions have. This post-drought environmental monitoring also informs our decision making so that appropriate measures can be taken to support the recovery of the environment after a period of drought.

### 6.2 Post drought review

In accordance with EA guidelines, a meeting to review the effectiveness of the drought plan will convene once water stress is relieved to the point where customer restrictions can be removed. This first event review will be focused to achieve two main aims: Firstly, to review the effectiveness of options which were implemented, in order to be prepared in case drought is re-entered and secondly, to scope the content of a 'lessons learnt' report.

The 'lessons learnt' report will be prepared in advance of a second review meeting, and would include information on:

- The appropriateness and efficacy of the hydrological triggers used to determine entry into drought, looking at where triggers gave early warnings, reliability of triggers, etc
- An assessment of the demand reductions resulting from the communications strategy, quantifying savings as percentages of zonal DO and absolute values and correlation between media strategy elements and savings.
- The effectiveness of demand management measures (eg leakage, active pressure management, etc) in reducing demand, including variables impacting the savings achieved

- Outcomes of operation ‘mop-up’ sessions and workshops to identify unforeseen system constraints, etc
- Capturing of operational learning from drought option delivery, including asset performance, operation restrictions, procurement of service.
- Supply side measures, operational details around the implementation, including barriers to delivery, opportunities to streamline process and where options should not be included in the future
- Review of the environmental monitoring of supply side drought options and the mitigations measures which were pursued
- The management and communications strategy adopted during the drought
- Cooperation during the drought between various key stakeholders, such as NRW, EA, other water companies, etc.
- Relationship between drought plan and total loss contingency plans (TLCPs) to identify potential for drought actions to feed into TCLPs

It is anticipated that the content of the ‘lessons learnt’ report will inform the second review meeting to promote improvements in practice in drought and to ensure that improvements are made to the drought plan, to reflect the greater understanding of activities in a drought. This review process is outlined in Figure 43.

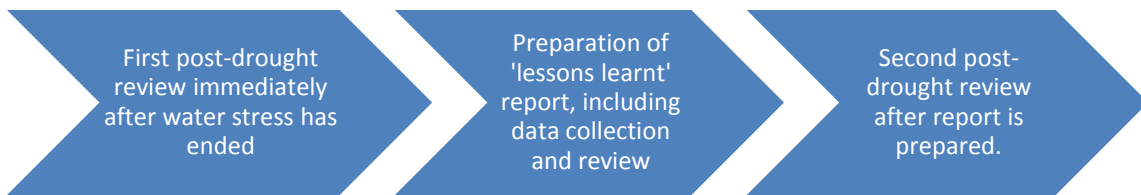


Figure 43 - Post review process

## 7 Drought Plan Security Statement

This statement is to confirm that the DCWW Emergency Planning and Security Team have examined Dŵr Cymru Welsh Water's Drought Plan 2015, the Strategic Environmental Assessment of the Drought Plan Environmental Report, the Habitats Regulations Assessment of Drought Plan 2015 Draft Screening Assessment, and supporting documents.

Following this examination the team advised that the public domain documents, itemised below, meet the requirements of 'The Control of Sensitive Information – Advice Note 11 Edition 1, Defra (November 2006), Designated Site Document Designation Handling and Storage Advice Note 2, Defra (November 2006)' of the SEMD as well as the Redacting Rules with clarifications from the Welsh Assembly Government to Dŵr Cymru Welsh Water, dated 19<sup>th</sup> November 2008. Specifically for Advice Note 2, no Designated Site is mentioned in the Drought Plan, the Strategic Environmental Assessment or the Habitats Regulations Assessment.

In coming to this view it is recognised that in one or two instances some highly generalised information on locations have been given in the public domain documents but it is not believe that they can be construed as 'locations and details' as defined in Advice Note 11.

### **Public domain documents**

- Drought Plan 2015 – Non-Technical Report
- Drought Plan 2015 – Main Report
- Appendix 1 – Water Resources Zone Summary Tables
- Appendix 2 – Standard Precipitation Index
- Appendix 3 – Supply Side Drought Option Sensitivity Assessment for Environmental Receptors
- Appendix 4 – Table of Mitigation Actions
- Strategic Environmental Assessment (SEA) of Drought Plan – Environmental Report
- Habitats Regulations Assessment (HRA) of the Drought Plan – Draft Screening Assessment
- Habitats Regulations Assessment (HRA) of the Drought Plan – Draft Screening Assessment Appendices

No documents have been marked as 'confidential'.

## Appendix 1 – Water Resource Zone Summary Tables

## Appendix 2 – Standard Precipitation Index

## **Appendix 3 – Supply Side Drought Option Sensitivity Assessment and Environmental Receptors**

## Appendix 4 – Table of Mitigation Actions