

YORKSHIRE WATER DRAFT DROUGHT PLAN 2012

January 2012

EXECUTIVE SUMMARY

Drought is a naturally occurring phenomenon when rainfall levels are less than normally experienced, resulting in low river, reservoir and groundwater levels. Droughts have occurred in the past and are likely to be experienced in the future.

All water companies are required by the Government to produce a Drought Plan, which sets out what we would do to maintain water supplies to customers in the event of a drought. The plans are drawn up in agreement with our regulator, the Environment Agency (EA). The drought plans are reviewed and revised every three years.

This Drought Plan shows the actions we would take to maintain secure supplies to all customers during a period of drought.

As all droughts are different in terms of location, extent, severity and impact on the supply system, the Drought Plan needs to be flexible to account for a range of possible scenarios.

The Plan therefore gives a framework of actions to allow a drought to be best managed dependent on conditions.

Contents of the Plan

The Drought Plan includes the following elements to allow us to manage a drought situation:

- Measures that might be required to reduce customer demand
- Measures that might be needed to obtain extra water supplies
- Details of how we will monitor the effects of the drought and measures taken under the Drought Plan on the environment
- Our Communication Plan

Customer Demand Measures

In previous droughts we have reduced customer demand through requesting customers use less water and through implementation of hosepipe bans.

In 2010 the Flood and Water Management Act came into force. This new legislation has widened the uses water companies can restrict during drought beyond the previous hosepipe bans. Possible restrictions include washing of cars and buildings and watering of gardens with a hosepipe.

We will use publicity campaigns and additional leakage control to reduce demand. Formal restrictions on water use would only be considered after a concerted campaign to request a voluntary reduction and would be introduced progressively as a drought develops.

Supply Measures

There are a number of supply side measures that could be used to help support supplies during a drought. These actions include drought operation of water sources, inter-company resource transfers, re-commissioning of unused sources, changes to abstraction licence agreements and reduction in reservoir compensation flows.

In severe resource conditions, where drought orders or drought permits to alter abstraction licence conditions are required, there would be close consultation with the Environment Agency and relevant environmental organisations to ensure minimal impact on the environment.

Environmental monitoring

We are required to assess, monitor and mitigate the potential impacts of our supply side measures on the environment. Much of this work is set out and completed in advance of a drought, and is summarised within this document. Should we wish to apply for a drought order or permit, this environmental assessment must be submitted with the application, for consideration by the EA and/or Defra.

Communication Plan

The communication Plan sets out our proposals for increasing awareness of the water resources situation, what we as a company are doing and what customers can do to help mitigate the situation.

The plan includes direct communicating to customers and stakeholders and through the release of information via local and regional media. The key messages would include information on current water resource stocks, promotion of water efficiency and requests for responsible water use.

Management and Monitoring

During normal conditions we manage the use of available water supplies. In winter and spring river resources are used to preserve reservoir and groundwater storage. In summer, release from upland reservoir and groundwater storage is used to offset lower availability of river resources.

We provide households and businesses within the region with water services 24 hours per day, supplying water to 4.7 million domestic and 150,000 business customers. We supply an average of 1.3 billion litres of water to customers each day.

Currently our supply area is divided into 3 water resource zones for planning purposes. Over 96% of our customers are supplied by the Grid. This allows us great flexibility to supply customers from a number of sources, dependent on availability.

We continuously monitor water resources and produce a weekly water situation report. The weekly monitoring includes rainfall, river flows, groundwater levels, reservoir stocks, customer demands and water treatment works output. This report is used to manage available water supplies and to inform the Environment Agency about the current water resource situation.

The anticipation of future droughts and management during droughts are handled through the same processes, although the frequency of reporting and decision taking may be increased.

Drought warning trigger points have been developed based on historical data. This allows the current situation to be assessed against previous drought scenarios. For example, levels of groundwater sources are compared against historic levels to establish if levels are close to those experienced in a previous drought. Reservoir storage levels are also compared with control lines that show normal storage levels for the time of year.

When a potential drought has been identified a Yorkshire Water Drought Team will be convened to manage drought planning and to implement the Drought Plan.

Frequent liaison meetings with stakeholders and regulators, in particular the Environment Agency will be held until the water resources return to safe levels and normal operations can be resumed. It may take some time for water resources to return to normal, therefore the duration of drought measures can last well beyond the return to normal rainfall patterns. This recovery period needs careful monitoring and management before drought measures can be lifted.

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1

1 INTRODUCTION

1.1 Overview of Process

- 1.1.1 This Drought Plan is based on the extensive drought planning experience gained during 1995/96, 2003, 2010 and 2011, and formalises a process that has been successfully used in practice. It has been drawn up in accordance with the Environment Agency's water company drought plan guideline, published in June 2011. The Plan is consistent with our published Water Resources Management Plan (2009) and with Environment Agency and Defra requirements.

1.2 Water Resource Planning

- 1.2.1 We have made significant investments to improve the security of supplies to all our customers whilst taking great care to protect the natural environment. This has been achieved through listening to our customers' needs and delivering a balanced Water Resources Management Plan. The current Levels of Service have been in place since April 2001 and ongoing planning will provide an increased level of security of supply to customers. This plan explains the principles of managing the resources network in Yorkshire both in normal and in drought periods. A flexible and timely approach is adopted to identify and respond to the various stages of a drought.

- 1.2.2 Our Final Water Resources Management Plan presented three water resource zones until 2011/12, as shown in Figure 1-1 which currently make up the Yorkshire Water region;

- Grid Surface Water Zone (Grid SWZ)
- East Surface Water Zone (East SWZ)
- East Ground Water Zone (East SWZ)

We plan to connect the East GWZ to the Grid SWZ through construction of a new pipeline to be completed 2011/12. The East GWZ will become part of the Grid SWZ and we will operate two water resource zones, the Grid SWZ and the East SWZ.

- 1.2.3 Significant investment in new pipelines and pumping stations was made during and immediately after the 1995-96 drought, which had impacted significantly in Yorkshire. Major raw and treated water transmission pipelines were laid and by the end of 1996 around 95% of the population of Yorkshire were linked through a robust integrated grid network. At the same time, developments in computer modelling were implemented which enabled the optimisation of water supplies together with centralised production planning, management and control.

- 1.2.4 Since 1996 the grid has been extended such that in 2011 96% of all customers are connected. Figure 1-2 shows the current grid system with the new infrastructure added since 1996. This provides customers with a robust supply system capable of maintaining Levels of Service during severe, localised droughts. It also enables the benefits of drought orders and permits to be spread throughout the Yorkshire region, together with benefits from conservation measures and targeted enhanced leakage control.

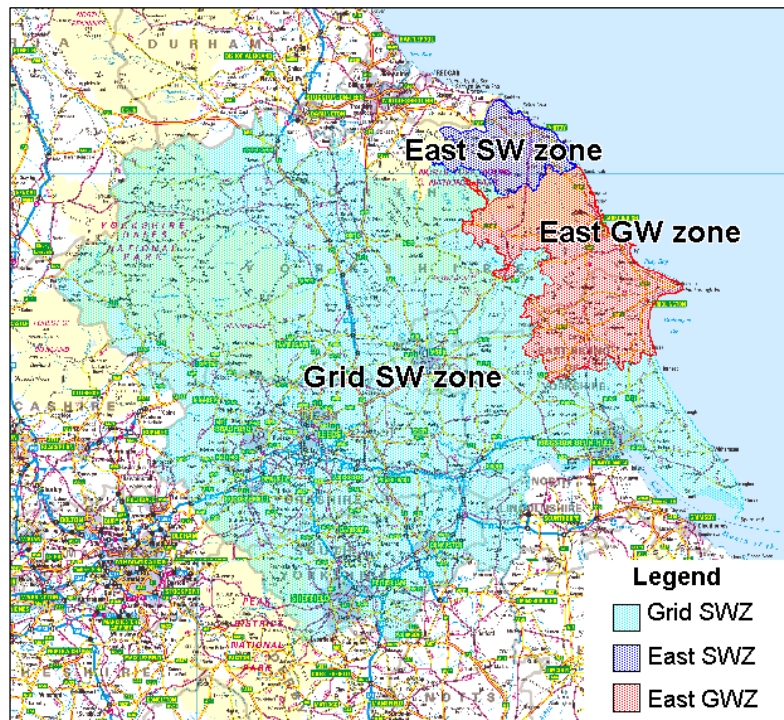


Figure 1-1: Current Yorkshire Water supply zones

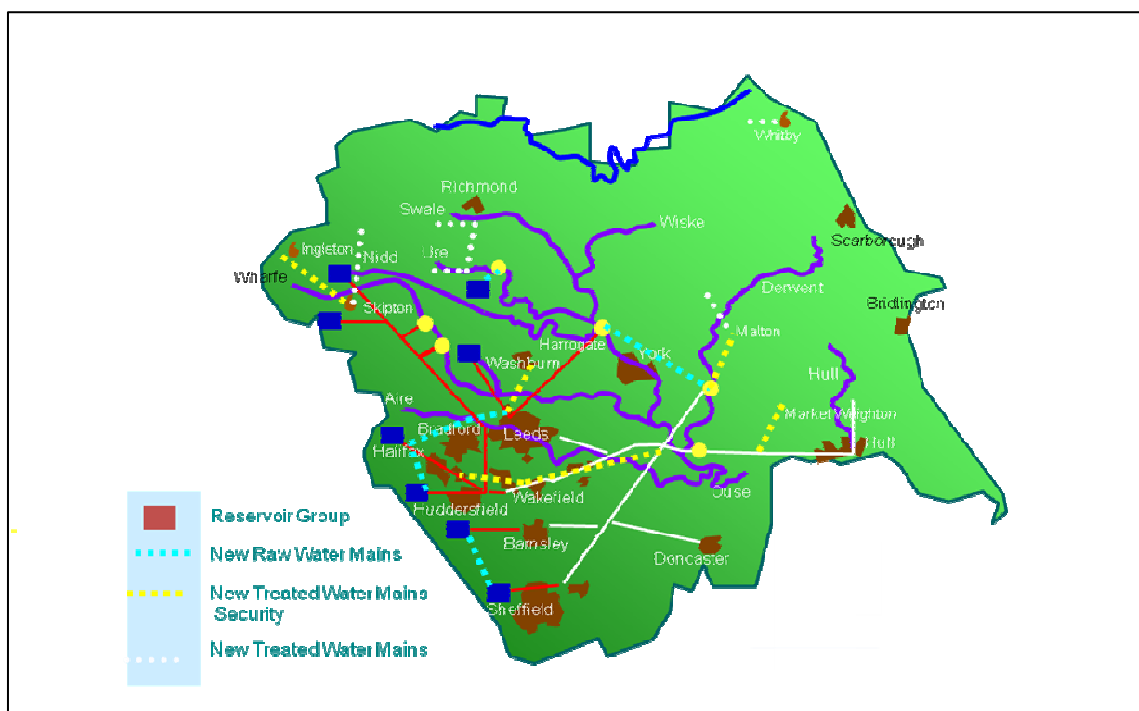


Figure 1-2: Yorkshire Water Grid system

1.3 Water Resources Management

- 1.3.1 The process of planning and managing water resources in Yorkshire is part of a fully integrated approach to operational planning from source to tap across the whole region. Our main objective is to ensure that good quality water is supplied at minimum cost to customers and the environment.
- 1.3.2 We have a weekly management process to determine key flow targets (reservoirs, rivers, boreholes, water treatment works and pipelines) for the week ahead. The process uses the WRAP (Water Resource Allocation Plan) computer model to determine the best use of available resources to meet demand and maintain security of supplies. Resources are selected to minimise costs, environmental impacts and carbon emissions.
- 1.3.3 The WRAP model takes account of expected demands, reservoir and groundwater operating rules, control curves and licensing constraints. Temporary constraints such as outages for maintenance work or water quality problems are also taken into account. The management of river resources is subject to licence conditions which restrict abstractions at times of low flow and permit increased abstractions during higher flows, typically in the autumn and winter.

1.4 Levels of Service

- 1.4.1 We plan our resources to meet customer demands for water. The available yield of sources has been estimated on the basis of a Level of Service to customers. The Level of Service relates to the frequency of restrictions. We calculate our Level of Service using historic weather patterns and previous worst case scenarios to meet forecast demands.
- 1.4.2 The Level of Service currently adopted by Yorkshire Water is:

Introduction of temporary bans on water use:	1 in 25 years on average
Drought permits / orders Implementation:	1 in 80 years on average
Rota cuts / standpipes:	1 in >500* years

* This is an estimate of an exceptionally rare event.
- 1.4.3 The frequency is an average over a long period of time and does not preclude a more frequent occurrence if there is a particular run of very dry years.
- 1.4.4 Our Level of Service has improved since 2001 through leakage reduction, grid extensions and additional abstraction licences. Customers place a high value on the reliability of water supply. The same Level of Service is adopted for customers not supplied by the grid network.
- 1.4.5 The management of our river resources is subject to licence conditions which restrict abstractions at times of low flow and permit increased abstractions during higher flows, typically in the autumn and winter. In the event of a severe drought additional abstractions may be sought through drought permits or drought orders.
- 1.4.6 The estimate of source yield is derived in our Water Resources Management Plan (2009) and is referred to as the deployable output of the available sources. Adjustments are made to this figure to allow for factors such as temporary plant failures or abstractions being prevented by pollution. This results in an estimate of Water Available for Use (WAFU). It is our strategy to

ensure that the WAFU is at all times sufficient to meet expected demand in a year with a prolonged dry period, subject to the Level of Service described above. Depending on the severity of a drought, measures as listed in Appendix 6 may be used to temporarily increase the system deployable output as required.

- 1.4.7 Levels of Service within the East GWZ and East SWZ are more difficult to simulate and for the purpose of the Drought Plan they are related to events where resource deployable output is insufficient to maintain demand within drought periods. For the East GWZ the deployable output is estimated using the UKWIR methodology which calculates source reliable output at times of minimum groundwater levels during known drought events. The deployable output for the East SWZ is based on an analysis of historic river flows and the ability to meet demand where output is constrained by abstraction licences. The Level of Service provided in all water resource zones meets our minimum standard of temporary bans i.e. not more frequently than 1 year in 25.

1.5 Pre-draft and draft consultation

- 1.5.1 In accordance with the Environment Agency guideline, statutory and non-statutory consultees were invited to comment prior to production of our draft Drought Plan.

- 1.5.2 Our statutory consultees are listed below:

- Environment Agency
- Ofwat
- Secretary of State

There are no licensed or appointed water suppliers who supply water in our area via our supply system.

- 1.5.3 Our non-statutory consultees are those who have an interest in our Drought Plan or are likely to be affected by actions within our plan, including our neighbouring water companies. They are listed below:

- Consumer Council for Water
- Natural England
- Anglian Water
- Northumbrian Water
- Severn Trent Water
- United Utilities

- 1.5.4 The pre-draft consultation was in the form of a letter sent to all consultees outlining the process and timelines for the publication of the draft Drought Plan.

- 1.5.5 All the pre-draft consultees are notified of the publication of our Drought Plan. We also notify a wider consultation group as listed in Appendix 9. Consultees are invited to send representations on the plan to Defra.

- 1.5.6 In considering demand side options we have consulted with our domestic and business customers and stakeholders on the wider uses that water

companies can ban during a drought. More details on this can be found in section 3.4.

- 1.5.7 We will receive a copy of all representations on our draft Drought Plan from Defra. Our response to representations will be published as a statement of response on our website within 15 weeks from the date we publish our draft plan.

2 DROUGHT TRIGGERS AND SCENARIOS

2.1 Groundwater and surface water triggers, data sources and arrangement

- 2.1.1 Reservoir stocks are monitored continuously and compared against control lines. These control lines have been calculated using historic reservoir inflow sequences from 1920 and are designed to minimise the risk of reservoir stocks falling below the marginal storage level. The control lines represent the value of reservoir storage that is required to guarantee a continuous rate of supply (equivalent to yield) such that the reservoir storage never falls below a critical storage line given the minimum historic inflows. The Drought Control Line (DCL) is designed such that stocks will never fall below marginal storage. The Normal Control Line (NCL) is designed such that stocks will never fall below the DCL.
- 2.1.2 The need for drought management action is determined by the DCL for groups of reservoirs in five areas of the company's supply region (East, North West, Central, South West and South). The North West, Central, South and South West groups all contain the region's surface water supply reservoirs. The East Group consists of the Hull Borehole group (which is modelled as a reservoir), and reservoirs which store water abstracted from the River Hull. We will apply for a drought order or permit for each of the five reservoir groups, as required. An order or permit will include all reservoir operations, associated releases and maintained flows in a particular reservoir group.
- 2.1.3 When reservoir stocks are predicted by the Water Resources Planning Report (WRPR) to be within typically 6 weeks of crossing the DCL (see 0) for a given resource group, we may introduce temporary restrictions of use. The length of time may vary depending on prevailing weather conditions and known resource availability. Prior to the introduction of temporary bans on water use we will have instigated publicity campaigns and other activities to reduce demand on resources. We will have started scoping outline drought permit or drought order plans and will be discussing these with the Environment Agency. Our policy is that temporary bans on water use would not be imposed during winter months. This would also include times when winter refill drought orders or permits were in place.
- 2.1.4 Figure 2-1 shows the control lines of the five reservoir groups and measured reservoir group stocks for 2010 and 2011. In 2011 the regional reservoir stocks crossed the Environment Agency early warning trigger line at the end of March, and the first Environment Agency liaison meeting was held in mid April.
- 2.1.5 We would adopt the following process in the selection, prioritisation and implementation of drought orders and permits in consultation with the Environment Agency:
- Assessment of drought monitoring
 - Assessment of risk (WRPR / drought scenarios)
 - Ranking of risks
 - Drought order / drought permit design – assessment of yield benefit
 - Drought order risk & benefit analysis (yield/environmental/ economic)

- Drought order prioritisation – programme development.

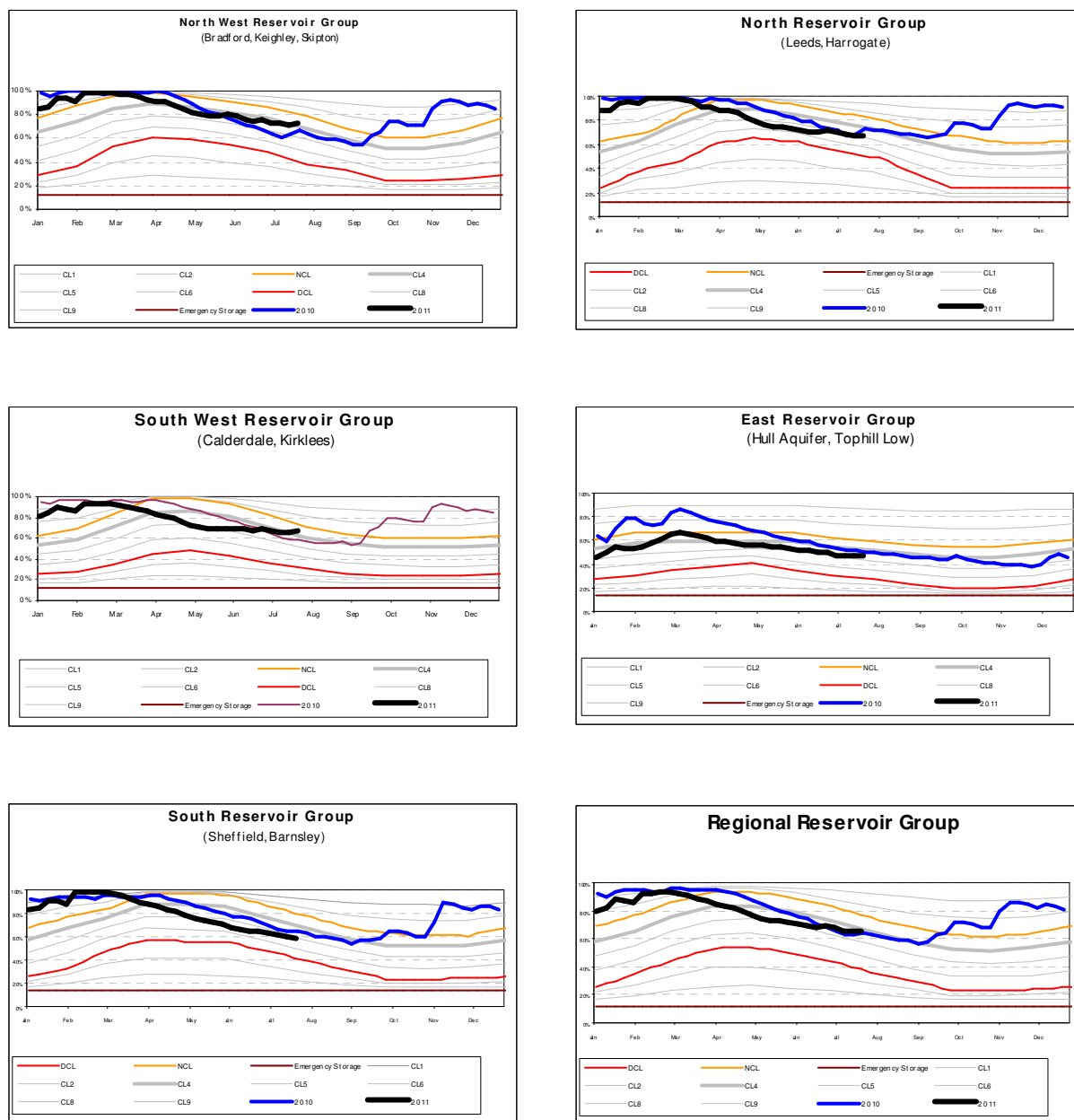


Figure 2-1: Drought monitoring in the weekly Water Situation Report

2.1.6 The standard we have adopted is that temporary bans on water use would normally only be imposed during the months of April and October inclusive. However, this policy will be reviewed in the event of droughts spanning two calendar years or more.

2.1.7 A temporary ban on water use will be imposed to reduce the demand and preserve stocks in preparation for drought order / permit applications, typically six weeks in advance of the planned implementation date for orders / permits. (The six week trigger is consistent with the Water Resources Management

Plan assessment of deployable output. Any increase in trigger length will reduce level of service).

- 2.1.8 Examples of likely sequences of drought measures are shown in section 2.10. The decision to impose restrictions will rest with Yorkshire Water.
- 2.1.9 The Drought Plan assumes that when reservoir stocks fall below the DCL for a given reservoir group, drought orders or permits will be implemented affecting demand zones, abstraction licences and compensation releases in the relevant area.
- 2.1.10 The exact timing of consultation and implementation of drought measures will be subject to the particular circumstances prevailing at the time, but in general will be broadly in line with the timing determined by the reservoir control lines.
- 2.1.11 The results of computer simulations for a number of different scenarios, showing reservoir storage and drought actions are shown in Appendix 2 in the same format as that provided in the weekly Water Situation Report.

2.2 Drought Scenarios

- 2.2.1 We have run a number of drought scenarios using examples of the timing and extent of drought measures under different storage conditions. The simulations have been “forced” with successively lower starting conditions receiving a repeat of various known low inflow years (e.g. 1929, 1995) in order to trigger more extensive drought actions including the implementation of the Tees Transfer. The reservoir stocks for the major reservoir groups for these scenarios are shown in Appendix 2.

1995-96 inflows

- 2.2.2 Appendix 2 (Figure A2.1) shows the predicted reservoir storage under a repeat of 1995-96 inflows. The simulation shows that although temporary bans on water use, a conservation campaign and additional leakage control would be required, no drought orders or permits would be implemented. The DCL is not crossed. The improved service, compared to the actual situation in 1995-96, is due to significant investment in leakage control, new water sources and a robust grid network.

1929 inflows

- 2.2.3 Appendix 2 (Figure A2.2) shows the predicted reservoir storage under a repeat of 1929 inflows. The DCL is crossed in the North reservoir group, and is very close to being crossed in the North West group.

Second year of serious two year drought

- 2.2.4 Appendix 2 (Figure A2.3) shows the predicted reservoir storage in the second year of a serious two year drought. This is based on the 1929 inflows, with reservoir stocks at 65% at the start of the year to represent a more extreme case.

Third year of extreme three year drought

- 2.2.5 Appendix 2 (Figure A2.4) shows the predicted reservoir storage in the third year of an extreme three year drought. This is based on the 1929 inflows,

with reservoir stocks at the level they were towards the end of 1996 before the winter recovery took place. This again represents a more extreme case than that experienced in either 1995-96 or 1929.

Grid SWZ Drought Scenarios with high level decisions and actions				
Not based on any specific historical drought				
Resource Zone	Scenario and Trigger	Action 1	Action 2	Action 3
Grid SWZ (Serious drought in autumn of year 1) (Rainfall Jul-Sep 42%-47% LTA)	Prolonged dry summer with total reservoir stocks below 45% full	Re-zone supplies to maximise grid, install temporary pumping and cross border transfers	Calls for restraint and conservation campaign, enhance leakage control	Consider winter refill drought orders after consultation with Environment Agency
Grid SWZ (Serious drought in spring of year 2) (Rainfall Jul-Apr 65%-69% LTA)	Dry winter following dry year with total reservoir stocks below 66% full	Enhance calls for restraint and conservation campaign, ensure leakage control on target	Prepare for temporary bans on water use	Prepare outline drought permit / drought order options
Grid SWZ (Severe drought in summer of year 2) (Rainfall Jul-Jun 65%-68% LTA)	Reservoir storage within 6 weeks of DCL	Temporary bans on water use	Enhance calls for restraint and conservation campaign, ensure leakage control on target	Apply for drought permit / drought orders Prepare outline Tees transfer plan
Grid SWZ (Severe drought in autumn of year 2) (Rainfall Jul-Oct 69%-72% LTA)	Reservoir storage below DCL	Temporary bans on water use, drought orders and permits	Enhance calls for restraint and conservation campaign, ensure leakage control on target	Implement Tees transfer. Prepare emergency drought orders

Table 2.1: Yorkshire Water drought scenarios

2.2.6 Further examples of various drought scenarios that have been experienced along with high level Yorkshire Water responses or actions are shown in Table 2.1.

2.3 Water Resources Management and Monitoring

- 2.3.1 Conjunctive use schemes work on the principle of using available river resources in the winter and spring to preserve reservoir or groundwater storage until the summer, when releases from reservoir and groundwater storage can offset the lower availability of river resources.
- 2.3.2 The combined yield of resources used conjunctively (i.e. by maximising river abstraction during high winter river flows) is greater than the sum of the yields from the resources operated independently from each other. We have operated conjunctive use for many years, particularly in relation to the use of reservoirs and river sources.
- 2.3.3 A number of routine reports and management processes are embedded into our routine operational production planning processes. These processes are used in the management of droughts, although the frequency of reporting and decision-taking may be increased.
- 2.3.4 The following sections describe the routine monitoring, reporting and water resources management processes which are in place.

2.4 Weekly Water Situation Reports

- 2.4.1 These form part of the normal business of data gathering and presentation. The reports include the following information:
- Rainfall
 - River flows
 - Groundwater levels
 - Reservoir stocks
 - Demands
 - Water treatment works outputs
 - Flows in key grid pipelines
- 2.4.2 Should a drought become severe, the frequency of reporting will be increased. The initial trigger for increased reporting will be when reservoir stocks cross the Environment Agency early warning trigger line (shown in Figure 2-2). The frequency of reporting on critical hydrological features (such as rainfall and reservoir stocks) will increase to twice per week when permission is sought for drought permits / orders. The frequency will be increased to daily when permission is sought for further (emergency) drought power.
- 2.4.3 A Water Situation Report is produced weekly and is available electronically to Yorkshire Water colleagues including the Kelda Management Team (KMT). The report is e-mailed each week to our Environment Agency regional water resources contacts.
- 2.4.4 The report contains a drought monitoring section. This includes reservoir stocks within the key resource groups that are used to determine drought

management action (see section 5). An example of this is shown in Figure 2-1.

- 2.4.5 Our Drought Plan incorporates reservoir control lines for each of the key reservoir groups in Yorkshire. These control lines are included in our weekly Water Situation Report, and made available to the Environment Agency each week. The Environment Agency early warning trigger line is included to identify falling reservoir stocks and initiate discussions with the Environment Agency on the water supply situation.
- 2.4.6 When reservoir stocks fall below the Environment Agency early warning trigger line our Asset Policy (Water) Manager will contact the Environment Agency's Regional Drought Co-ordinator at Rivers House, Leeds.

2.5 Weekly Water Production Planning

- 2.5.1 A weekly management process determines key flow target settings (reservoirs, rivers, boreholes, water treatment works and pipelines) for the week ahead. The process takes information from the Water Situation Report and then, using the Water Resource Allocation Plan (WRAP) computer model, determines the best use of available resources to meet demand and maintain security of supplies. It takes account of expected demands, reservoir and groundwater operating rules, control curves and licensing constraints. In addition, temporary constraints such as outages for maintenance work or water quality problems are taken into account.
- 2.5.2 The output from WRAP is made available electronically across the company. Field staff implement the required flow output settings. Any unforeseen events are handled by the Risk Mitigation Manager in the Regional Operations and Communications Centre (ROCC).
- 2.5.3 Since 2006 we have also carried out daily production planning using a real time water resource planning model, RtWRAP. The RtWRAP model is run daily, and key Grid targets are automatically sent to the relevant assets and the flow rates at these assets are controlled. We still have the weekly production planning meetings and management process, but adjustments can be made on a daily basis to reflect any changes in asset availability.

2.6 Monthly Water Resources Planning Report

- 2.6.1 The operation of the highly integrated network of resources is planned and tested (3 to 18 months planning horizons are typical) using computer modelling software. These models can rapidly simulate the operation of the whole network against different rainfall, demand and operating conditions.
- 2.6.2 These reports identify future reservoir stocks for selected drought inflow sequences and predicted demands. The potential need for drought measures can be tested by comparing the stocks prognosis against control lines for each reservoir group. Remedial actions are identified to reduce and/or balance out demand on resource groups at risk.
- 2.6.3 Operational measures are planned to reduce the longer-term risk of imposing restrictions on customers or seeking drought permits / orders for increased abstraction or modifications to river flow conditions. Progress of the measures is monitored monthly.

- 2.6.4 In the event of drought measures becoming a reality, the frequency of planning reports would be increased.

2.7 Forecasting

- 2.7.1 Drought scenario planning is carried out using the Water Resource Allocation Plan Simulation (WRAPsim) and WRAP models. The models simulate the conjunctive use of our sources over an 87 year period at a daily time-step for given levels of demand. It contains over 1200 components including all river and reservoir sources, boreholes, water treatment works, pipelines and demand centres. WRAPsim output provides the modeller with an accurate assessment of the future behaviour of each source, its ability to meet demand and the frequency of restrictions that would need to be imposed.
- 2.7.2 The WRAPsim model can also be used to predict future water supply situations based on past weather patterns. This allows the modeller to predict when drought restrictions may be required and provides important support to drought planning. Typical output from WRAPsim for key resource groupings and scenario modelling are shown in Appendix 2.

2.8 Communication between Yorkshire Water and the Environment Agency

- 2.8.1 The Environment Agency receives our weekly Water Situation Report and is kept informed through regular discussions with relevant staff. The Environment Agency early warning trigger line (see Figure 2-2) is an early warning trigger which will instigate initial communication between Yorkshire Water and the Environment Agency's Regional Drought Co-ordinator. We will establish liaison meetings with the Environment Agency to keep them apprised of the water supply situation and the management measures that we have instigated.
- 2.8.2 Liaisons will reduce when reservoir stocks have risen above the trigger line for a period of two weeks. The frequency of the liaison meetings will be established after the first contact with the Environment Agency Regional Drought Co-ordinator.
- 2.8.3 The Environment Agency will provide information on their assessment of the severity of the drought. This is based on a number of statistics including rainfall and river flows and the Drought Severity Index (DSI) methodology. This information would be for each of the catchments in our supply region together with the Severn Trent catchments (Derwent, Idle and Torne).
- 2.8.4 We will agree with the Environment Agency when there has been an exceptional shortage of rain and identify triggers to initiate drought actions. Environment Agency drought classifications are described in Table 2.2.

Drought Stage	
Normal	Drought planning actions in a normal water resource situation, including routine monitoring
Potential drought	Drought actions required to prepare for drought once prolonged drier conditions are evident. Careful monitoring is necessary and there may be additional reporting.
Drought	Actions required to manage drought once localised drought conditions impact on people, business and the environment. Other activities may be reduced or stopped.
Post drought	Actions required to monitor and manage the return to normal water resources conditions. Assess outcomes and review Drought Plan as necessary.

Table 2.2 : Environment Agency drought stages

2.8.5 If a potential future need for restrictions or other measures is identified, the frequency of meetings will increase. The EA point of contact in severe droughts will be the Regional Drought Manager based at Rivers House, Leeds. Consultation on the sequence of any demand restrictions and the sequence and prioritisation of drought orders or permits is covered in this liaison process. The process will cover the following areas:

- Environmental assessment, mitigation and monitoring
- Data and information to be shared
- Relevant works in progress or works planned, including demand management measures.

2.8.6 Measures which may be triggered in the event of drought conditions developing throughout Yorkshire include drought orders or permits to increase the water available for supply to the company, by varying abstraction conditions or reducing reservoir compensation discharges. These would be granted by the Environment Agency (drought permits) or Defra (drought orders) following application. This process is described in Section 5.

2.9 Historic droughts

2.9.1 Our experience of historic droughts has helped us develop the processes and actions described in this Plan. Our modelling uses inflows which date back to 1920. This enables us to model our current system on significant droughts such as those that occurred in 1929, 1933-34 and 1959.

2.9.2 The concept of “grid management” followed on from the events of the 1975-76 drought. The drought of 1995-96 highlighted our reliability on the surface water reservoirs in the Pennines, and led to investment to increase the resilience of our system by laying major raw water transmission pipeline.

2.9.3 The summer of 2003 was hot and dry late into the autumn, with reservoirs not experiencing significant refill until November. In the summer of 2006, some very high temperatures led to extremely high peak demands. We have used this to reappraise our demand profile to reflect a worst case scenario of summer peak demands.

2.9.4 The springs of 2010 and 2011 were uncharacteristically dry, which have led to earlier than usual reservoir drawdowns. Both springs were preceded by unusually cold winters. When the data are available, we will analyse them to determine if any of these dry periods result in a change in the control lines we use to manage the system.

2.10 Links to actions/measures with timing information

2.10.1 Figure 2-2 represents regional stocks and provides an example of the drought actions we would take as stocks decline during a drought. This shows an example timeline for triggers and actions leading up to implementation of drought orders and permits. The timing of actions will vary depending on the rate of falling stocks. More information on these drought actions is provided in section 3.

2.10.2 In a normal year we would expect regional reservoir stocks to be above the NCL (as shown by the blue NCL line in Figure 2-2 below). When stocks fall below the NCL our first action is to reduce reservoir output where possible, in order to reserve stocks for later in the year. We will then maximise our river abstractions in preference to our reservoirs in order to preserve stocks.

2.10.3 As discussed above all our reservoir groups have an Environment Agency trigger line (as shown by the grey line in Figure 2-2). If regional stocks fall below this line we will meet with the Environment Agency and continue regular liaisons until stocks have recovered. We will also set up a Company Risk Management Team (CRMT). CRMT will monitor the performance of our assets to ensure we are maximising our available resources, see section 5.

2.10.4 If our regional stocks fall below 50% we will increase our communications with the public and request that our customers reduce water use to help preserve our stocks.

2.10.5 If stocks continue to decline we will complete Environmental Assessment Reports and commence environmental monitoring in case drought order/permits are required later in the year. We anticipate that this will be four weeks before the imposition of temporary use bans. This time period is dependent on the number and timing of anticipated drought order or permit applications and the scale and extent of the drought.

2.10.6 As stocks decline further we will start preparing for temporary bans on water use. This will involve preparing adverts then publishing them in time to allow customers to be consulted on the restrictions before they are imposed.

2.10.7 The representation period will be proportionate to the customer base likely to be affected by its implementation but will be typically 2 weeks.

2.10.8 Temporary bans on water use will be imposed if regional reservoir stocks are forecast to cross the DCL (as shown by the red line in Figure 2-2) in six weeks.

2.10.9 If reservoir stocks continue to decline once the temporary bans on water use are in place we will submit and advertise drought order or permit application(s). Drought order applications are submitted to Defra and drought permit applications submitted to the Environment Agency. Any applications we make will be open to public consultation so that interested parties have an opportunity to make representations and objections. It is possible that a

public enquiry may be held before Defra or the Environment Agency make a decision on granting the order or permit.

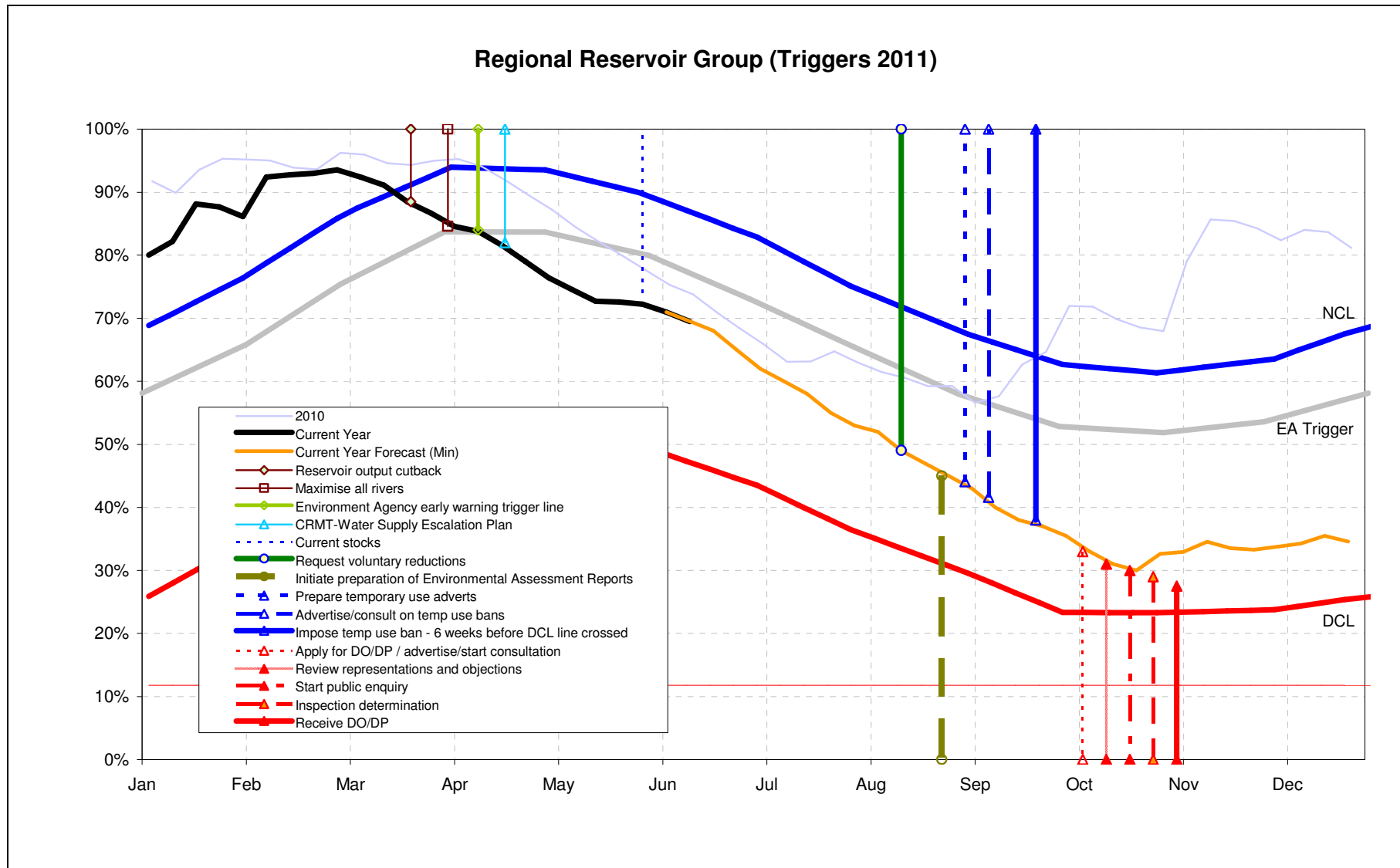


Figure 2-2 - Regional reservoir group triggers.

3 DROUGHT MANAGEMENT ACTION

3.1 Introduction

- 3.1.1 In the event of a severe drought we will be required to carry out measures to ensure the provision of adequate supplies of wholesome water without the need for emergency drought orders.
- 3.1.2 Formal demand management options available to water companies have been extended following the Flood and Water Management Act 2010. Section 36 has amended the Water Industry Act 1991 and allows companies to temporarily restrict particular customer water use activities without requiring a drought order. The Drought Direction 1991 has been revoked and replaced by the Drought Direction 2011 which sets out those uses which still require a drought order to impose restrictions in a drought. A copy of the Drought Direction 2011 is shown in Appendix 3.

	No legal measures required	Legal measures required
Customer Management	<p>Demand management – water conservation promotion for domestic and business customers</p> <p>Support business customers with recycling and use of alternative sources e.g. boreholes</p> <p>Temporary ban on water use</p>	Drought orders through Defra
Distribution Management	Leakage reduction – increased find and fix, pressure management	
Resource Management	<p>Use of alternative supplies, underutilised licensed resources e.g. mothballed and recently abandoned sources.</p> <p>Tankering where appropriate</p>	<p>Drought permits through the Environment Agency</p> <p>Drought orders through Defra</p>

Table 3.1: Drought Management Actions

- 3.1.3 A number of drought management actions can be considered, and these will be implemented as appropriate depending on the severity and geographical extent of a particular drought event.
- 3.1.4 We will liaise with our regional Environment Agency contact to agree arrangements for implementing specific drought management actions. A summary of the actions we will take to ensure the provision of adequate supplies is given below. Details of these activities are provided in Table 3.1.
- 3.1.1 Applications for drought permits are made to the Environment Agency and for drought orders they are made to the Secretary of State at Defra. Consultation with the Environment Agency and other groups will normally be undertaken prior to the identification of the appropriate actions and to the applications being made.

3.2 Demand-side options

- 3.2.1 Possible drought management options to restrict demand for water are listed in Appendix 4. These include publicity campaigns, temporary bans on water use, leakage control and restriction of use drought orders, which would normally be introduced progressively as a drought develops.
- 3.2.2 We will increase liaison on water efficiency with business customers as well as domestic customers during a drought. Potential support to business customers in the event of a drought includes:
- Maintaining effective communications with business customers and trade bodies
 - Resources updates
 - Operational issues
 - Water quality changes
 - Support with conservation, re-cycling, re-use of grey water
 - Support with use of alternative sources, e.g. private boreholes
 - Initialise contingency plans for efficient water e.g. use of on site storage
 - Support customers with best practice guidance

If reservoir stocks cross the DCL we may apply for drought orders to restrict commercial non-essential use.

- 3.2.3 Our current Drought Plan is totally consistent with our Level of Service and the methodology that we use for the estimation of deployable output (yield).
- 3.2.4 Our policy for restrictions and drought orders is:
- Prior to the use of temporary restrictions of water use we will implement our communications plan, enhance our water conservation campaign and undertake additional leakage control, leading to demonstrable water savings.

- Temporary restrictions of water use will be implemented when reservoir stocks within key areas are within 6 weeks of the DCL.
- No restrictions will be imposed between the months of November and March.
- Drought orders for restrictions of non-essential use will be imposed when reservoir stocks fall below the DCL.
- We will also ensure that all available sources will be maximised, whilst ensuring that security of supply, drinking water quality and safety are not compromised.

All these activities will be discussed with the Environment Agency as a part of a joint planning process, instigated by the Environment Agency early warning trigger line.

3.2.5 The timing of actions is understandably a contentious issue. We will be required to demonstrate the effectiveness of all our drought management activities prior to the use of water supply drought orders or permits. Our analysis of previous droughts in the Water Resources Management Plan and our scenario modelling in the Drought Plan shows that drought orders and permits are likely to be phased in over a period of months.

3.2.6 There is likely to be intense interest in the activities we have implemented and the benefits that were achieved. The phasing will enable a continuous review of progress and an opportunity to modify future actions and drought orders. In addition, should the drought be prolonged for two years or more, we would review our policy on the benefits of temporary water use restrictions. The renewal of drought orders will require a similar benefit analysis and demonstration of demand management.

3.3 Temporary water use restrictions

3.3.1 Section 36 of the Flood and Water Management Act 2010 (FWMA 2010) allows water companies a wider range of temporary water use restrictions that they can implement during a drought without requiring a drought order. The Water Use (Temporary Bans) Orders 2010 provides details on certain types of customer water use which can be restricted in relation to these new powers. In addition, the updated Drought Direction 2011 sets out those uses which still require an ordinary drought order to restrict under drought conditions.

3.3.2 A UK Water Industry Research (UKWIR) project has been carried out to provide a voluntary Code of Practice and guidance to water companies on implementation of water use restrictions to manage demand during times of drought.

3.3.3 Under the Code of Practice we will act in accordance with four principles when considering whether and how we will implement water restrictions:

- Ensuring consistent and transparent approach
- Ensuring that water user restrictions are proportionate

- Communicate clearly with customers
- Consider representations in a fair way.

3.3.4 Under normal circumstances it is likely that temporary bans on water use will be put in place before any application for a water supply drought order or drought permit. However in certain circumstances (i.e. when reservoir stocks are rapidly declining) an application for a drought order or drought permit may be made at the same time as implementation of temporary ban on water use.

3.4 Consultation on Temporary Bans on Water Use

3.4.1 During preparation of our Drought Plan we have consulted with our customers and key interest groups on the new temporary bans on water use imposed by the Flood and Water Management Act 2010 (FWMA 2010). Research was commissioned to investigate customer awareness and understanding of the new powers and to seek views on the prioritisation and potential concessions for restrictions.

3.4.2 The results support a non-phased approach to implementation of temporary bans on water use. The majority of customers were of the opinion that the maximum water saving will be made from temporarily banning the washing of cars and watering of gardens with a hosepipe during drought. Temporarily banning other activities listed under the FWMA 2010 were perceived to be of little benefit to conserving water under drought conditions. More details of the findings can be found in Appendix 5.

3.4.3 Temporary bans which will be implemented under drought conditions are listed in Table 3.2

Temporary ban to be implemented in a drought:
watering a garden using a hosepipe
cleaning a private motor-vehicle using a hosepipe
watering plants on domestic or other non-commercial premises using a hosepipe
cleaning a private leisure boat using a hosepipe
filling or maintaining a domestic swimming or paddling pool
drawing water, using a hosepipe, for domestic recreational use
filling or maintaining a domestic pond using a hosepipe
filling or maintaining an ornamental fountain
cleaning walls, or windows, of domestic premises using a hosepipe
cleaning path or patios using a hosepipe
cleaning other artificial outdoor surfaces using a hosepipe.

Table 3.2 : Activities to be temporarily banned under drought conditions

- 3.4.4 We have considered guidance and incorporated UKWIR's Code of Practice in estimating the demand savings from imposing temporary bans on water use. Estimated savings from demand-side options can be found in Appendix 4.
- 3.4.5 Water companies may be required to make payments (or give credits) to customers if their supply of water is interrupted or cut off under the authority of a drought order. If payable, the payments for each day (or part day) during which a supply is interrupted or cut off would be £10 for household customers to a maximum of our average domestic water charge in the previous year. For commercial customers we will pay £50 per day to a maximum of the amount of water charges payable by the customer for the premises for the previous charging year. If this is not applicable, a maximum of £500 applies.
- 3.4.6 We will consider any representations received before we implement restrictions.
- 3.4.7 The estimated "dry-year-effect", i.e. the demand increase that could be expected if a 1995/96 drought reoccurred, is an increase of 50MI/d. This is included in the Water Resources Management Plan and used in establishing Levels of Service and in drought order modelling. The savings given in Appendix 4 indicate the reduction in dry year demand that could be achieved should demand saving measures be implemented.

3.5 Private supplies and vulnerable customers

- 3.5.1 We will consider the needs of private supplies and how we can meet their demands during a drought period.
- 3.5.2 We will consider the needs of vulnerable customers such as those on the helping hands register when implementing temporary bans on water use. Prioritisation will be given to maintaining water supply to these customers during a drought period. Staff at our customer contact centre will be able to provide information to vulnerable customers.

3.6 Supply-side options

- 3.6.1 Supply-side drought management actions are used to increase supply during a drought. During a drought we will consider using these options in addition to resources permitted under normal operating conditions.
- 3.6.1 Appendix 6 gives a summary of each supply-side action we would consider during a drought. Before we utilise these options we will look at ways to maximise our existing resources.
- 3.6.2 During normal operation it is not always necessary to fully utilise our existing abstraction licences. In a drought we would review our operations and where possible increase yield taken from sources within the existing abstraction licence.
- 3.6.3 We manage a routine programme of borehole yield testing to establish the actual and potential deployable output. Where additional yield is identified we will implement projects to achieve that yield within the abstraction licence. We

would also review and implement projects to maximise our river abstraction licences.

3.6.4 We have the following actions available to increase supply during a drought:

- Re-commissioning of unused sources
- Reducing compensation releases
- Increasing existing abstraction licences
- Inter-company bulk transfers
- Use of alternative sources

3.6.5 During a drought we will also consider how our normal operations can be varied to provide alternative compensation to rivers or to reduce our bulk transfer from Severn Trent Water if required.

3.6.6 A number of our supply side options will require a drought order or permit and are discussed in section 3.7. Those not requiring a drought order or permit are discussed below.

Re-commissioning of unused sources not requiring a drought order/permit

3.6.7 An option to maximise the use of any underutilised licensed resources will include mothballed and recently abandoned assets. These assets will be used to augment supplies or mitigate against the potential impact of drought orders or permits. They will only be used if there is no environmental, safety or drinking water quality risks in accordance with the Water Supply (Water Quality) Regulations.

Option name	Status	Drought option
Gorpley Reservoir	Gorpley WTW mothballed	Licence authorises annual quantity of 1823 MI/a (4.9 MI/d). Treatment works could be temporarily reinstated.
Cod Beck & Oakdale Lower Reservoirs	Licence reduced to a nominal value of 10 MI/a following closure of Osmotherley WTW	Potential to increase compensation to augment rivers downstream which are affected by other drought options. Cod Beck existing compensation 0.7 MI/d, Oakdale Lower existing compensation 1.1 MI/d.

Table 3.3: Unused sources not requiring a drought order/permit to re-commission

3.6.1 Table 3.3 gives the unused sources we could utilise without a drought order or permit. Gorpley Reservoir would provide additional supply and further information is provided in Appendix 6. Cod Beck and Oakdale Lower Reservoir could be used to provide compensation to mitigate against other

drought options. We would consult the Environment Agency on how this additional compensation could be of benefit.

- 3.6.2 Two additional unused sources could be available but these would require a drought permit or order. These are discussed in section 3.7 below.

Inter company bulk transfers

- 3.6.3 The Yorkshire Water region is bordered by four water companies; Anglian Water, Severn Trent Water, United Utilities and Northumbrian Water. We maintain a routine dialogue with each of these companies and in the event of drought would contact the relevant company water resource managers regarding their water supply situation and options for cross border support. The opportunities between Yorkshire Water, Anglian Water and United Utilities are minimal.
- 3.6.4 In 1989 we entered into an agreement with Severn Trent Water for an import of untreated water from Severn Trent Water reservoirs to a Yorkshire Water reservoir in South Yorkshire. The agreement secures a maximum of 21,550MI per year (59MI/d) until March 2084.
- 3.6.5 The amount that can be taken by both Yorkshire Water and Severn Trent Water is set in operating guidelines based on the principal that we are entitled to 24.1% of the available water. The minimum supply rate set in the guidelines between Severn Trent Water and Yorkshire Water is 35MI/d. However, there is provision in the agreement to modify these rules and this was carried out in 1995/96 and in 2003.
- 3.6.6 In the event of serious drought in Severn Trent we can assist by taking a reduced supply.
- 3.6.7 In operating the Severn Trent bulk supply we use five control lines, taking different amounts from the reservoirs depending on the time of year and the reservoir stocks. This is illustrated in Table 3.4 below. Severn Trent Water operates using several control lines, and the amount it takes depends on where reservoir stocks lie in relation to its “storage alert line”. These lines can be seen in which shows the maximum that will be taken by either Severn Trent Water or Yorkshire Water at any time, including in a drought situation. We have agreed with Severn Trent Water that we will endeavour to reduce our minimum transfer to 15MI/d in the lowest band (below State 5). However, in this event we would not impose demand restrictions on our customers even if they were in force in Severn Trent.
- 3.6.8 The decision to implement restrictions in Yorkshire is triggered by our own resources. The scale, timing and duration of any reduction in supply will depend on the scale and extent of drought impacts in Severn Trent and Yorkshire. We hold routine meetings with Severn Trent on the operation of the reservoir sources.
- 3.6.9 Likely changes to the supply rules will be agreed prior to any change being made.

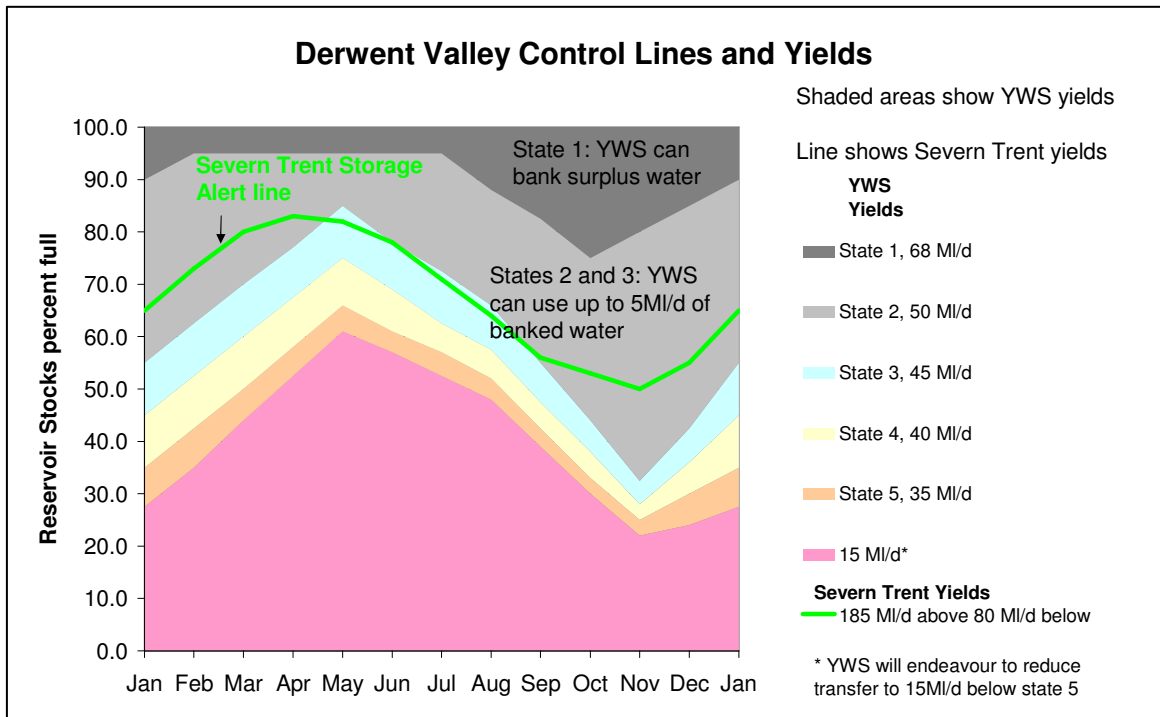


Table 3.4: Severn Trent reservoir control lines and yields

- 3.6.10 We currently import a small quantity of treated water from Northumbrian Water into the East SWZ. This import is planned to cease in 2012.
- 3.6.11 We have an option to import water from a Northumbrian Water abstraction on the River Tees in a prolonged drought. This import would be provided by Northumbrian Water and is discussed in section 3.9.

3.7 Drought orders and permits

- 3.7.1 Drought orders or permits will be required to obtain additional supplies of water over and above those available through existing unused sources discussed above. We will choose the most appropriate water supply options in consultation with the Environment Agency and other groups.
- 3.7.2 Our supply-side options will increase supply through reducing compensation, increasing abstraction or re-commissioning an unused site. Details of these potential options are given in Appendix 6. We also have an option to increase an abstraction to provide additional river compensation.
- 3.7.3 Central to the selection of the appropriate option will be the amount of water that would be made available; how effectively this water can be utilised; and the environmental impact of the option.
- 3.7.4 In the first stages of a developing drought, typically 20-75 MI/d of additional resources will be required. As the drought intensifies it may be necessary to

increase this to 100-150 MI/d. Only in very exceptional circumstances would more than 150 MI/d be required.

- 3.7.5 The trigger for temporary restrictions of water use, as discussed in section 2, is when we forecast a reservoir group to be six weeks away from crossing the drought control line. At this stage, if reservoir stocks begin to fall, there is potential we will need to submit a drought order/permit application. A drought order application will be submitted to Defra, whereas a drought permit application will be submitted to the Environment Agency.
- 3.7.6 In the weeks leading up to imposing temporary bans on water use we will monitor stocks and start to prepare drought order or permit applications in case they are required. By this stage we will already have started the preparation of environmental assessment reports.
- 3.7.7 To help us prepare a drought order or permit application in the time available we have prepared templates for both compensation release and river abstraction drought orders and permits. The templates will ensure we provide the supporting documentation that Defra and the Environment Agency will expect to be submitted with the applications.
- 3.7.8 The drought order or permit application will provide information on the following;
- Details of the drought management actions we will have taken before applying for a drought order/permit. This will include the demand management actions taken, as discussed in section 3.2.
 - An environmental assessment to show the likely impact the actions will have on the environment. We will prioritise actions where the environmental impact would be least damaging. A summary of the environmental approach taken is provided in section 4, and potential impacts are summarised in Appendix 6.
 - Details of environmental monitoring and mitigation requirements. A summary of the approach is provided in section 4 and details are included in Appendix 6.

3.8 Potential drought order and permit sites

Re-commissioning of unused sources requiring a drought order/permit

- 3.8.1 In addition to the mothballed sites listed in Table 3.3 there are two further unused sites that could be re-commissioned. These sites would require a drought order or permit and are listed in Table 3.5. The use of these sources would only be adopted if there are no drinking water quality, environmental or safety risks.
- 3.8.2 Silsden Reservoir would provide additional supply whereas Boshaw Whams Reservoir would be used to provide river compensation if required.

Reducing compensation releases

3.8.3 We have a number of reservoir groups providing compensation to rivers in our region. In the event of a drought we would consider applying for a drought permit or order to reduce the compensation releases in order to save water for supply.

Option name	Status	Drought option
Silsden Reservoir	Licence reduced to a nominal value of 10 MI/a. Silsden WTW is closed.	Application for drought order or permit to allow abstraction up to 10 MI/d, which could be transferred via a pipeline into the Nidd Aqueduct, when reservoir stocks remain above 55 MI. Maximum capacity when full is 555 MI. There is also a drought option to reduce the compensation release from Silsden Reservoir (see Appendix 6).
Boshaw Whams Reservoir	Not in use	The existing licence authorises a daily average transfer of 0.151 MI/d (max 0.45 MI/d) to Holme Styes reservoir. This licence is currently not in use but is an option in a drought to provide compensation to rivers affected by other drought options. A drought order or permit application would be required for an increased daily maximum abstraction to 7.0 MI/d.

Table 3.5: Drought options to re-commission unused sources

3.8.4 Details of these options are provided in Appendix 6 and information on the triggers for the options provided in section 2. The decisions on which orders or permits to apply for would be made in consultation with the Environment Agency and other interested parties. The environmental impacts of the options are discussed in section 4 and Appendix 6.

Increasing existing abstraction licence

3.8.5 It may also be possible to gain additional yield through increasing our existing abstractions. We have a number of river abstractions that could provide additional yield during a drought. We would require a drought order or permit to utilise our river abstraction options.

3.8.6 Details of these options and environmental impacts are provided in Appendix 6. The triggers for the options are discussed in section 2. The decisions on which orders or permits to apply for would be made in consultation with the Environment Agency and other interested parties.

- 3.8.7 Currently we have identified no sites where drought powers would be required to increase groundwater abstraction. Our experience in 1995/96 shows the potential for increasing supplies of potable water is limited by treatment capacity and mains infrastructure.

3.9 Alternative source - Inter company bulk transfer

- 3.9.1 We have an option to take water from Northumbrian Water's abstraction on the River Tees as an alternative source in a prolonged drought.
- 3.9.2 Surplus water resource is available in the Northumbrian Water supply area at certain times of the year, even during severe droughts. Discussions have taken place between Northumbrian Water and Yorkshire Water to quantify this potential surplus. These discussions concluded that a volume of 40 - 60MI/d could be made available to Yorkshire Water for use during periods of sustained dry weather.
- 3.9.3 The use of the transfer from the River Tees is a feasible option for water supplies in Yorkshire should there be an exceptional 2 to 3 year drought. The water would be made available under a bulk supply agreement with Northumbrian Water and the abstraction would be covered by the existing Northumbrian Water abstraction licence on the River Tees. Therefore, no drought order or permit would be required for this abstraction. Under the bulk supply agreement transfer would be made from the River Tees, using YWS infrastructure, to the River Swale.
- 3.9.4 At the time of considering the inter-company bulk transfer, an Environmental Assessment Report will be completed to consider any potential impacts and monitoring and mitigation arrangements will be set out in detail.
- 3.9.5 Since the previous drought plans were published, Northumbrian Water has relinquished a proportion of the electrical service capacity at a pumping station that transfers water from the River Tyne into the River Tees. This has reduced the maximum daily transfer into the River Tees from 360 MI/d to 270 MI/d. As a result, the potential available water in the River Tees for a bulk transfer to Yorkshire has been reduced to the current estimated volume of 40-60 MI/d.
- 3.9.6 In the event of a prolonged severe drought we would consider a scheme to increase the electrical service capacity at the pumping station, to allow transfer of additional water (up to the maximum daily transfer volume) from the Tees into Yorkshire if required.
- 3.9.7 The direct pipeline option which was included as a potential option in the Water Resources Management Plan is not included in the Drought Plan due to lengthy timescales associated with pipeline procurement and construction which are in excess of a year.

3.10 Emergency Drought Orders

- 3.10.1 The drought liaison meetings with the Environment Agency would consider emergency options for drought orders. In the event of an exceptional drought it may be necessary to consider emergency drought orders.

- 3.10.2 Emergency drought orders may cover river abstraction, compensation reductions and restrictions in supplies to customers e.g. rota cuts or standpipe use
- 3.10.3 Prior consultation and liaison with Local Authorities and the Consumer Council for Water will be an important component of the planning

4 ENVIRONMENTAL IMPACTS

4.1 Introduction

- 4.1.1 The Environment Agency's National Drought Plan Guideline (June 2011) requires that the Drought Plan is supported by a comprehensive level of environmental assessment. Much of this work is to be completed in advance of a drought, during the preparation of the Drought Plan, with a summary published within the Plan.
- 4.1.2 The Guideline sets out how a company should assess and mitigate the impacts of its supply-side drought management options on the environment, how it should monitor and measure these impacts, and outlines the requirement to consult relevant bodies where potential environmental impacts have been identified.

According to the Guideline, a water company is required to:

- Assess the potential environmental impacts of each supply-side drought management option, through undertaking a staged and risk-based environmental assessment. The environmental assessment will establish whether there are likely to be any environmental impacts from implementing the option. Further detail on the environmental assessment process is given in section 4.2.
- Prepare a monitoring plan for each supply-side drought option, providing details of any further surveys that are required to support completion of the environmental assessments, together with details of in-drought and post-drought monitoring requirements. Further detail is provided in section 4.3.
- Set out the details for any data sharing and monitoring agreements. Further detail is provided in section 4.3.
- Detail the mitigation or compensation measures which may be required for each supply-side drought management option, should environmental impacts be predicted from the environmental assessments. Further detail is provided in section 4.4.
- Determine whether any supply-side drought option, either alone or in combination, is likely to result in a significant effect on European sites, as designated under the Habitats Directive. This includes carrying out a Habitats Regulations Assessment (HRA) of the Plan, and if necessary, a Strategic Environmental Assessment. Further detail is provided in sections 4.5 and Appendix 7 (HRA), and section 4.6 and Appendix 8 (SEA).
- Provide a map showing the locations of potential drought permit or order sites together with important ecological sites that may be affected. See Appendix 6. (Note that the inter-company bulk transfer has not been included in the interests of national security).

- A summary of the environmental assessment, together with potential mitigation measures for each supply-side drought management option is given in Appendix 6.
 - Carry out a light touch review of the Drought Plan on an annual basis. Further detail is provided in section 4.7.
- 4.1.3 In preparing the environmental components of the Drought Plan, we have worked closely with the Environment Agency, following the recommended approach set out in the Guideline. The 2011 Guideline differs from its 2005 predecessor in that it requires a more comprehensive level of environmental assessment of each supply-side drought option, whilst weighting the level of detail against the risk posed by the potential drought action. The objective is to complete as much of the environmental work as is practical during the preparation of the Drought Plan.
- 4.1.4 We will work with the Environment Agency to agree the terms of any drought permit or drought order, to strike a balance between maintaining water supplies and protecting the environment. Selection of drought orders or drought permits, including the sequence of applications, considers a number of factors: the amount of water that the measure will make available; how effectively this water can be utilised within the grid; and the environmental impact of the measure. The majority of the measures within the Drought Plan have been utilised previously during the 1995/96 drought, where impacts detected through intensive baseline and post-drought monitoring were minimal.
- 4.1.5 Drought planning is a continuous process. We continually review reservoir stocks, rainfall data, river flows and demand on a weekly basis. The drought line triggers referred to in section 2 allow approximately 6 weeks to prepare an application for a drought permit or order. However, it would be known well in advance of this whether there has been a rainfall deficit, and that these measures are likely to be needed. Steps will be taken to update the environmental assessments and commence monitoring prior to this.
- 4.1.6 We have extensive experience of the monitoring and mitigation of drought and drought measures, and of assessing the environmental effects of river abstractions, river transfers and reservoir compensation releases. In considering the environmental requirements of the Drought Plan, we have drawn on this considerable experience including:
- Applications for drought permits and orders during the 1995/6 drought: Environmental Assessments together with extensive monitoring to support 36 drought order applications.
 - Applications for time limited abstraction licences on the Rivers Ouse, Ure and Wharfe 1998 and 2003: Full environmental assessments and associated monitoring programme.
 - Reservoir Compensation review project: Modification of compensation flows at 14 reservoirs, including supporting monitoring, flow model development and post-graduate studies.

- Tees Transfer feasibility study: Detailed environmental study (1997 to 2000) to provide an assessment of the construction and operational impacts of 3 pipeline and river transfer options.

4.2 Environmental Assessment

- 4.2.1 In order to understand the effects of any proposed drought measure, we have carried out an environmental assessment for each supply-side drought management option. The environmental assessments consider the potential impacts of each proposed measure on a range of receptors. The scope and content of the environmental assessment follows the Environment Agency's Guideline (specifically section 7 and Appendix H). In addition, regular liaison with key specialists within the Environment Agency has been carried out throughout development of the plan, to ensure appropriate methodologies have been applied and all relevant potential impacts have been assessed.
- 4.2.2 As recommended by the Guideline, a staged and risk-based approach to the environmental assessments has been followed, which means that the level of environmental assessment carried out for a particular option depends on the likelihood and severity of its impacts.
- 4.2.3 The suggested activities that we need to complete in order to assess the likely environmental impacts of our supply-side drought management options are presented in Figure 4-1 below, which has been sourced from the Environment Agency's Guideline.
- 4.2.4 The environmental assessment begins with an environmental impact screening exercise, which fulfils the Guideline requirement to "assess how sensitive each feature is to the likely flow/level impacts caused by the supply-side drought management option". Screening involves two stages:
- | | |
|---------|--------------------------------------|
| Stage 1 | Hydrological impact assessment |
| Stage 2 | Environmental sensitivity assessment |
- 4.2.5 Three types of supply-side drought management options have been assessed: Reservoir compensation release reductions, increased river abstractions and an inter-basin transfer. The first two of these results in a reduction in flow in the river downstream, and the third results in an increase in flow before the transferred water is abstracted further downstream.
- 4.2.6 Stage 1 determined the zone and extent of hydrological influence of each supply-side drought management option, both on an individual basis, and taking into account cumulative effects of simultaneous option deployment where options are located within the same catchment and across catchments. Stage 1 also considered cumulative effects of other discharges and abstractions using abstraction licence and discharge consent information from the Environment Agency.
- 4.2.7 Using the outputs from Stage 1, sites and features which could be impacted by the hydrological changes were identified, together with their sensitivity to those changes, based on the risk of them being impacted by the drought management option during the period of its operation (Stage 2).

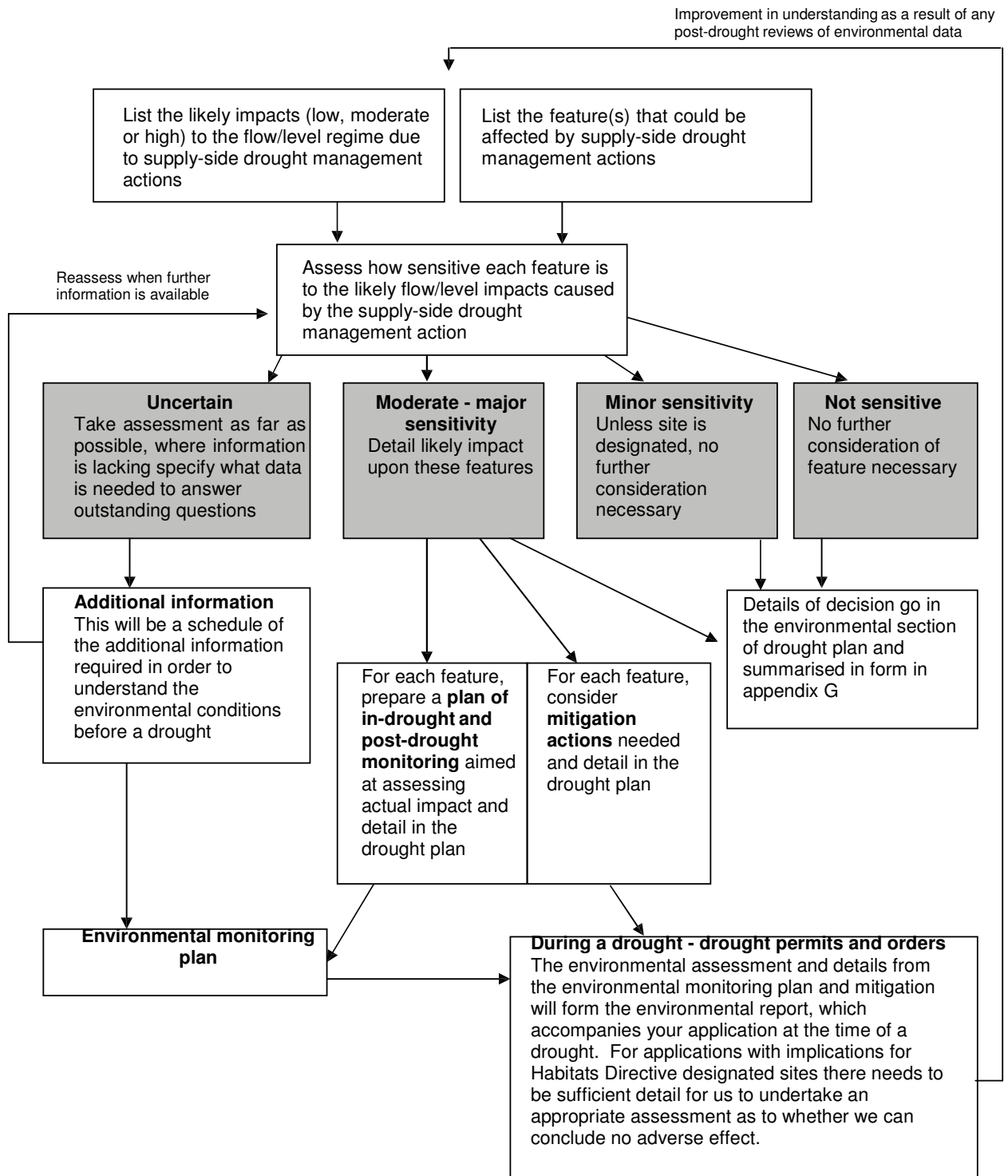


Figure 4-1 Environmental impacts activities flowchart

4.2.8 Sensitivity of receptors has been assessed considering the context that when drought options are actually implemented, the baseline conditions are likely to be characteristic of a severe drought. The basis for assessment therefore compares the impacts of drought option implementation against those that would occur naturally in an actual drought.

- 4.2.9 The environmental impact screening identifies the outcome for each listed feature, categorised in Figure 4-1 as either uncertain, moderate-major sensitivity, minor sensitivity or not sensitive, and identifies appropriate next steps.
- 4.2.10 In accordance with the Guideline, results of the screening will also be used to inform the Habitats Regulations Assessment (HRA) and a decision as to whether the Drought Plan requires a Strategic Environmental Assessment. See sections 4.5 and 4.6.
- 4.2.11 The screening process has considered relevant data types as specified in the Environment Agency's Guideline. These include:
- Hydrometric data (various modelled and measured flow data)
 - Designated site citation information (accessed from JNCC and MAGIC websites)
 - Water Framework Directive (WFD) status information, including status classifications for fish and invertebrates
 - Freshwater Fish Directive (FFD) designation status
 - Biodiversity Action Plan (BAP) species distribution
 - MAGIC website (for scheduled ancient monuments, recreational resources and landscape features)
 - Environment Agency local knowledge
- 4.2.12 The scope, methodologies and findings of the environmental impact screening were agreed with the Environment Agency and are presented in a series of Options Impacts Screening Reports (OISRs). The outcomes are also presented in summary form within Appendix 6 of this draft Drought Plan (which equates to Appendix G in the environmental impacts activities flowchart (Figure 4-1)). The full OISRs, whilst not published with the draft Drought Plan, can be made available on request.
- 4.2.13 The OISRs form the preliminary stages of the environmental assessment and inform which sensitive features are to be carried forward for further assessment. Where an option includes at least one feature identified as either: 1) uncertain; 2) moderate-major sensitivity; or 3) minor sensitivity in a designated site; in accordance with the Environment Agency's Guideline, these features will be screened in for consideration during further environmental assessment, monitoring and mitigation.
- 4.2.14 Where an option includes at least one feature identified as either 4) minor sensitivity (BAP species); or 5) not sensitive, no further work is required. For such features, the information contained within the OISRs alone will form the supporting environmental information to accompany an application for a drought permit or order.
- 4.2.15 Following screening, the types of sensitive features which remained were:
- WFD Status: Fish and aquatic macroinvertebrates

- Freshwater Fish Directive: Salmonid waters; Cyprinid waters
 - BAP species (individually): crayfish; brown trout; Atlantic salmon; grayling; lamprey; European eel; otter.
 - Designated sites
 - Navigation; angling; canoeing
- 4.2.16 As identified in the screening process, Environmental Assessment in the Environmental Assessment Reports (EARs) only investigates the potential impacts of the drought option for these sensitive features, and only at those sites where screening has included them.
- 4.2.17 Each type of sensitive feature forms a chapter within the EAR, with key components of the assessment based on the 2005 Defra guidance (Table 4-1).
- 4.2.18 The further assessment work is presented in separate Environmental Assessment Reports (EARs), which are prepared in accordance with Government regulations and good practice guidance, including:
- Environment Agency (2011) Water company drought plan guideline.
 - Defra (2005) Drought Orders and Drought Permits – information from the Department for the Environment, Food and Rural Affairs (Defra), Welsh Assembly Government and the Environment Agency.
 - Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Assessment
 - UKWIR (2007, updated 2011) Strategic Environmental Assessment – Guidance for Water Resources Management Plans and Drought Plans.
- 4.2.19 The scope of the EARs is set out in a separate Environmental Assessment Scoping Report, the principles and methodologies within which have been agreed with the Environment Agency.

Environmental report contents		Additional information notes
1	A summary of the main environmental report using non-technical language	
2	This should include a synopsis of major conclusions, controversial issues, unresolved issues and options selected	Include maps and plans
3	A description of the proposal including details of the site, location and duration	This can be kept brief as the detail will be elsewhere in application
4	Details of alternative sources considered	This should demonstrate justification for the proposed option
5	Description of the current environment (such as the aquatic and physical environment and associated habitats) and its setting in a national/regional/local context	This should include existing features and, if already in a prolonged drought, whether there are any recognised impacts. Key information includes: <ol style="list-style-type: none"> 1. the importance of the site (international and domestic designations) 2. Water Framework Directive classification status and any associated issues relating to the site 3. surface flow and groundwater data 4. ecological and habitat sensitivity to flow/level changes and supporting data 5. heritage/culture value 6. current abstractions
6	Identification and prediction of impacts on the current environment	This should include short and long term (acute and chronic) direct and indirect, cumulative, and permanent and temporary effects. It should be at the point of change and downstream and include water quality, in-river needs, associated wetlands, other water users and navigation and recreation. The assessment should focus on the features sensitive to flow/level alteration and should be quantified where possible, showing change from base level Details on the quality of the data used, analysis/modelling and interpretation methods and the range of uncertainty should be included as well as appendices to present data and references to data source
7	Mitigation measures	Where significant effects are identified, a description of the measures to be taken to avoid, reduce or remedy these effects should be included. Any proposed or actual agreements to minimise impacts on other users (for example lawful abstractors) should also be included
8	Additional information to enable an appropriate assessment of environmental impacts, where a proposal could have an adverse impact on a Habitats Directive site	The scope and content of this assessment will vary depending on the case but it must relate to the specific site and its conservation objectives
9	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	The scope and content of this assessment will vary depending on the case but it must relate to the specific site and its conservation objectives. See box two for further information
10	Monitoring plan, where proposed	This should include details of what evidence/data collection will be undertaken including locations, timings and frequency
11	Any further information relevant to impact on water users and environment	
2	Conclusions	This should draw together and summarise the reasoning (for and against) the proposals
13	Appendices	Such as methodologies used; data/evidence and surveys taken or planned

Table 4-1:Environmental Assessment Report contents

- 4.2.20 EARs will provide the results of the assessment of potential impacts arising from the drought measure, and inform monitoring and mitigation actions to protect rivers, ecology and industrial and recreational users. The EARs are not published as part of this Drought Plan, but are to be completed as far as is reasonably practicable in advance of a drought, in parallel with the preparation of this Drought Plan. The EARs are finalised in the run up to a drought and then submitted alongside an application for a Drought Permit or Drought Order.
- 4.2.21 This approach ensures that much of the environmental information is collated in advance of a drought, whilst ensuring that the environmental assessment is based on the specific environmental and hydrological conditions occurring at the time, which cannot be predicted in advance. This enables the Environment Agency to make a swifter determination of Drought Orders or Permits and ensures that any issues may be dealt with early.
- 4.2.22 For the purposes of reporting, the supply-side drought management options considered for environmental screening and assessment are grouped as follows:

Compensation release reductions:

- North area reservoir drought options
- South area reservoir drought options
- Calder area reservoir drought options
- North West area reservoir drought options

River abstractions:

- River Ouse drought option
- River Ure drought option
- River Wharfe drought option
- River Hull drought option

Inter-basin catchment transfer:

- Tees-Swale transfer drought option

- 4.2.23 Cumulative impacts of options both within groups and across groups have also been considered, as outlined within the Cumulative OISR and each Environmental Assessment Report, with the outputs summarised in Appendix 6.

4.3 Environmental Data Provision and Monitoring Plan

- 4.3.1 To monitor the effects of any implemented drought measure, the guideline requires that we develop an Environmental Monitoring Plan (EMP). The EMP uses outputs from the EARs to confirm the features for which further monitoring is required, and is designed to differentiate the impacts of the

drought measure from those of natural drought. It would monitor the range of potential receptors in the reaches that would be affected by the drought measure, to identify effects and, where necessary, trigger the introduction of mitigation measures.

- 4.3.2 The EMP has been produced as a separate document, which is not published with the draft Drought Plan. However, a summary of the approach is provided below and copies of the EMP can be made available on request.
- 4.3.3 The approach within the EMP is staged, so that the coverage and frequency of monitoring is progressively increased as the drought proceeds, low flows are experienced and the potential for impact from the drought measure increases. The triggers for increasing this targeted monitoring are based on flow and have regard to the most sensitive sites. As flows recover, so monitoring intensity decreases, extending into a drought recovery period. The duration and context of the post-drought monitoring will depend on the severity of impacts detected and the recovery time for the various receptors. This flexibility is essential during a drought as no two droughts are the same and environmental conditions change over time, necessitating a robust and flexible approach. All additional monitoring and mitigation measures would be agreed through liaison with the Environment Agency Drought Event Managers and Fisheries and Environment Teams.
- 4.3.4 Baseline monitoring within each of the rivers potentially affected by a drought measure is an essential part of the EMP and the EARs. A large amount of baseline monitoring of the rivers in the Yorkshire region is routinely carried out by both the Environment Agency and Yorkshire Water. This includes biological monitoring in the form of macro-invertebrate, fish and River Habitat Surveys, chemical water quality monitoring and flow gauging.
- 4.3.5 Our water resource modelling indicates that it is highly likely that no supply-side options would be required until the second year of a drought event. This therefore allows sufficient time for collation and basic analysis of the baseline dataset to be undertaken in advance of the trigger that indicates that additional pre-drought monitoring is required, in addition to completing the EARs.
- 4.3.6 Typically, analysis of the data would commence 1-2 months before the drought line triggers are crossed. In some circumstances e.g. reservoir stocks being low at the start of the year following a poor winter recharge, preliminary data analysis could start much earlier.
- 4.3.7 We have a data exchange process in place with the Environment Agency, by which baseline monitoring data from work carried out by either the Environment Agency or ourselves is made available to the other organisation. We will collate this baseline data to ensure the data set remains up to date.
- 4.3.8 We meet the Environment Agency at least annually to discuss the data exchange process and to review the baseline monitoring programme, to ensure their effectiveness.

4.4 Environmental Mitigation Measures

- 4.4.1 The Environment Agency's National Drought Plan Guideline specifies that any serious impacts on the environment that are predicted to occur through the implementation of any drought management actions are mitigated against. The environmental assessments undertaken (described in section 4.2) identify the sensitive features for which mitigation may be required and also specify associated monitoring requirements.
- 4.4.2 Discussions were held with the Environment Agency to identify serious impacts and to agree appropriate mitigation measures that are both available and practicable. Details of these are documented in the Environmental Assessment Reports (not published but available on request) and summarised in Appendix 6. The Environment Agency and other relevant parties will also be consulted further, prior to applying for an individual drought permit.
- 4.4.3 Details of potential mitigation measures and targeted monitoring are provided in Table 4-2.

4.5 Habitats Regulations Assessment and SSSI Screening

- 4.5.1 As set out in the Drought Plan Guideline, each water company is required to ensure that its Drought Plan meets the requirements of the Habitats Regulations (Conservation of Habitats and Species (Amendment) Regulations 2010), through undertaking a Habitats Regulations Assessment (HRA).
- 4.5.2 The purpose of the HRA is to determine whether implementing the Plan could result in adverse effects on the integrity of European sites which are designated under the Habitats Directive. Such sites include:
- Special Protection Areas (SPA)
 - Special Areas of Conservation (SAC)
 - Candidate Special Areas of Conservation (cSAC)
 - Sites of Special Scientific Interest (SSSI)
 - National Nature Reserves (NNR)
 - Ramsar Sites

Potential Mitigation Option		WFD (Inverts)	Fish (& WFD)	FFD (Salmonid)	F-L pea mussel	Otter	Water vole	W-C crayfish	Potential targeted monitoring
1. Working with form and function	1-1	Creation of alternative refuges in deeper water						x	A Walkover survey to identify and characterise pools at low flow prior to DP
	1-2	Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive taxa.	x	x					B One-off measurement of pool depth under DP conditions
									C Ground-truthing of Lidar data of pools at low flow prior to DP
									D Walkover survey to locate flow types (notably riffles) at low flow prior to DP
	1-3	Artificial channel narrowing to provide functional refuges to support species and enable swift re-colonisation.	x	x		x	x		E Targeted cross-section measurements at low flow without DP
									F Targeted cross-section measurements under DP conditions
									G Fixed point photography of in-channel features to catalogue changes to key features over time
2. Structural modification	2-1	Modification to barriers and/or flows to improve passage		x					H Walkover survey to identify and characterise in-channel barriers at low flow prior to DP
	2-2	Screening of intakes to reduce entrainment with regular inspection		x				x	I Walkover survey to characterise barriers under DP conditions
									J Visual inspection of screens
	2-3	Provision of freshets to ensure fish are capable of migrating		x					K Installation of underwater cameras at barriers
									L Installation of telemetered pressure transducers u/s barriers
									M Installation of fish counters at fish passes
								N Tagging of migratory fish	
3. Operations and maintenance	3-1	Gravel washing		x					O Review of routine EA water quality monitoring data (WFD compliance) immediately following analysis
	3-2	Enhancement of WwTW treatment to improve quality of discharged effluent		x	x				P Review of routine EA ecological monitoring data (WFD compliance) immediately following analysis
	3-3	Aeration of watercourse	x	x	x		x	x	Q Deployment of fine sediment traps with routine inspection programme
	3-4	Appropriate techniques to prevent transfer of invasive species					x	x	R Installation of telemetered turbidity sensors
	3-5	Appropriate vegetation control techniques	x		x				S Installation of telemetered DO probes
	3-6	Piscivorous bird scarers		x					T Installation of telemetered temperature sensors
									U Programme of water quality monitoring (in situ analysis - DO, temperature, ammonia, turbidity, conductivity, pH)
									V Programme of water quality monitoring (lab based analysis - BOD, ammonia, suspended solids)
									W Fixed point photography of margins/in-channel vegetation
									X Avian survey (piscivorous birds) during DP
								Y Invasive species survey prior to DP	
								Z Invasive species survey during DP	
								AA Invasive species survey post DP	

Potential Mitigation Option			WFD (Inverts)	Fish (& WFD)	FFD (Salmonid)	F-L pea mussel	Otter	Water vole	W-C crayfish	Potential targeted monitoring	
4. Water management	4-1	Artificial freshet releases to provide temporary variation in the flow regime		x		x	x	x	x	AB	Walkover survey to locate areas of flow-sensitive physical habitat at low flow prior to DP
	4-2	Gradual phase in of compensation release to avoid displacement of flow sensitive taxa.							x	AC	Walkover survey at time of DP implementation to identify flow-stressed physical habitat
	4-3	Gradual phase in of compensation release to avoid stranding or displacement of individuals	x	x	x		x	x	x	AD	Targeted visual inspection at time of DP implementation at flow-sensitive physical habitat
	4-4	Gradual phase in of reduction in water volume/flows to avoid stranding of individuals	x	x	x					AE	Fixed point photography of extent of exposure (wetted width)
	4-5	Temporary reduction in volume of abstraction or increase in compensation release		x						AF	Visual observation of water depth over spawning habitats
	4-6	Freshet release to dilute/displace water quality reduction		x						AG	Review of flow/level gauge network data
5. Ecological intervention										AH	Targeted spot flow gauging
										AI	Installation of telemetered pressure transducers
	5-1	Capture and relocate across barrier (taking into account migratory periods)		x					x	AJ	Walkover survey at time of DP implementation to identify flow-stressed fish communities
	5-2	Fish rescue in consultation with Environment Agency		x						AK	Fisheries survey at low flow prior to DP implementation to characterise fisheries community present
	5-3	Relocation of adults		x						AL	Fisheries survey during DP implementation to quantify DP impact
	5-4	Relocation of individuals to less impacted suitable habitat						x		AM	Fisheries survey at low flow post DP to characterise fish community loss
	5-5	Relocation of juveniles		x						AN	Walkover survey prior to DP implementation to identify suitable habitat for relocations
	5-6	Relocation of populations by trapping and retention for later release		x						AO	Monitoring of spawning habitats to ensure favourable conditions remain
	5-7	Restocking coarse fish		x						AP	Monitoring of nursery habitats to ensure they are not eroded by elevated flows
5-8	Restocking using juvenile ammocoetes within the catchment		x						AQ	Monitoring of marginal habitats to ensure no erosion of sensitive habitats	
5-9	Restocking using offspring of broodstock from the catchment		x								
6	6-1	Habitat enhancement beyond impacted reach		x	x	x		x	x		
7	7-1	Changes to navigation controls to reduce disturbance/damage	x	x							
8. Education											
9. No mitigation feasible											

Table 4-2: Potential mitigation measures and targeted monitoring

- 4.5.3 If the HRA concludes that significant effects on one or more European sites are likely, or if we cannot be certain whether the plan will result in likely significant effects, then an Appropriate Assessment will be required.
- 4.5.4 As described in section 4.1, the Drought Plan requires a more comprehensive level of environmental assessment of each supply-side drought option. This includes the requirement to identify the sites and features which could be impacted by the Drought Plan, including European sites and SSSIs, and the consideration of cumulative effects.
- 4.5.5 In addition, all protected sites within a catchment will be assessed for potential impact in more detail during the EAR process during the lead in to an application for a specific drought measure. This will include SSSI, SAC and SPA already covered in the screening process, with more detailed information provided about why there is no impact where a site has been screened out, and a full impact assessment for all sites remaining. The EAR will also assess any impact of the drought permit/order option on other local statutory sites, for example Sites of Importance to Nature Conservation and Local Nature Reserves.
- 4.5.6 A copy of the 2011 Drought Management Plan HRA and SSSI Screening is provided in Appendix 7.
- 4.5.7 For the 2008 Drought Plan, we employed a process of sequential elimination to determine which designated sites could be impacted by the Drought Plan. The screening process considered all nationally and internationally protected sites in the catchment and moved progressively through a series of steps to establish whether a site could be affected by a proposed drought measure. Factors such as proximity to the river, the nature and designation of the site and its hydrological connectivity to the river were considered. This process has been summarised within the HRA and SSSI screening document in Appendix 7.
- 4.5.8 The 2008 Drought Plan protected sites screening concluded that the only European Site which has the potential to be affected is the Humber Estuary SAC/SPA/Ramsar. A HRA of the 2008 Drought Plan was carried out which was finalised and signed off by the Environment Agency and Natural England in March 2011. The HRA concluded that there would be no likely significant effects of the Drought Plan on any of the interest features of the Humber Estuary.
- 4.5.9 HRA screening was again carried out for this Drought Plan, to ascertain whether any of our supply-side drought options, either alone or in combination, were likely to result in significant effects on European designated sites. Since there are no new European designated sites within the operational area of our Drought Plan, and because the Plan includes essentially the same options as the Drought Plan 2008, the screening process concluded that there would be no likely significant effects and hence the 2011 Drought Plan would not affect the integrity of the Humber Estuary European site. As a result, there is no requirement to undertake an Appropriate Assessment.

- 4.5.10 The HRA process also informs our decision as to whether a Strategic Environmental Assessment (SEA) is required (see section 4.6), in that the requirement for Appropriate Assessment is one of the criteria that can trigger the requirement for SEA of the Plan. Since our plan does not require an Appropriate Assessment, this has informed our decision to not undertake an SEA of the 2012 plan.
- 4.5.11 As the statutory consultee for the process, Natural England was consulted on the approach taken in the HRA and to confirm the outcomes.

4.6 Strategic Environmental Assessment

- 4.6.1 The Strategic Environmental Assessment Directive (2001/42/EC) requires a formal environmental assessment of certain categories of plans and programmes which are likely to have significant effects on the environment. The aim of the SEA Directive is “to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes, with a view to promoting sustainable development”.
- 4.6.2 In England, the Directive has been transposed into the Environmental Assessment of Plans and Programmes Regulations 2004. We have considered the applicability of the Strategic Environmental Assessment (SEA) Directive to the 2012 Drought Plan. We have reviewed the Directive, the Environmental Assessment of Plans and Programmes Regulations (2004), the Practical Guide to the Strategic Environmental Assessment Directive issued by the Office of the Deputy Prime Minister in September 2005, and the National Drought Plan Guideline 2011 issued by the Environment Agency.
- 4.6.3 For certain plans, SEA is likely to be required (see Figure 4-2, adapted from the Practical Guide). These would include those plans that contain options that will require appropriate assessment under the Habitats Directive (box 4), and are likely to have a significant effect on the environment (box 8).
- 4.6.4 Our Drought Plan has been reviewed against the criteria detailed in Figure 4-2 and a screening exercise was undertaken against the criteria set out in the Environmental Assessment of Plans and Programmes Regulations 2004 to assess whether the plan is likely to have significant effects on the environment.
- 4.6.5 Having reviewed the characteristics of the Drought Plan 2012 against the SEA screening criteria set out in the Regulations, we have concluded that SEA is not required for the Drought Plan 2012. The rationale behind this decision is set out within our SEA Screening Statement, a copy of which is provided in Appendix 8.

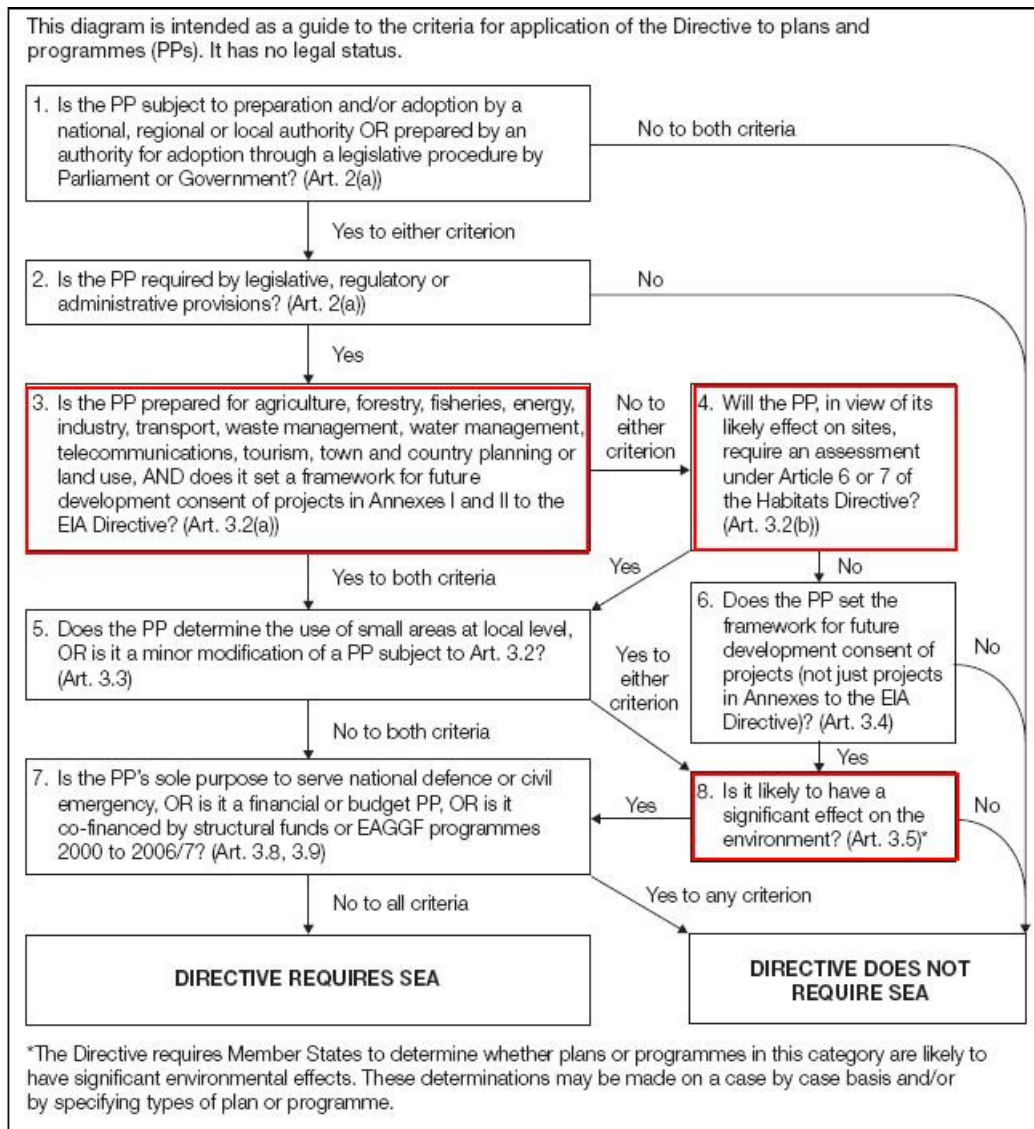


Figure 4-2 Application of SEA Directive to Plans and Programmes

4.6.6 Although an SEA has not been carried out, the principles behind SEA have been considered in the development of the Drought Plan. SEA requires that environmental factors are taken into account in the preparation of plans in order to minimise environmental impacts. The environmental screening and assessment of drought options (including identification of mitigation measures) effectively delivers the same outcomes.

4.6.7 We have consulted on our SEA Screening Statement with our statutory consultees; Natural England, the Environment Agency and English Heritage for a period of 3 weeks. Their comments, together with our response are set out alongside the SEA Screening Statement in Appendix 8.

5 MANAGEMENT AND COMMUNICATIONS STRATEGY

5.1 Management Structure

- 5.1.1 We continuously monitor our stocks and operations during normal conditions. Falling reservoir stocks trigger changes in source outputs and we review our operations to manage the situation and react to these changes.
- 5.1.2 If reservoir groups cross the Environment Agency early warning trigger line a Company Risk Management Team (CRMT) will be formed. The CRMT will be chaired by the Water Resources Manager and include representatives from teams responsible for managing resources. CRMT will meet weekly until stocks recover.
- 5.1.3 If the situation does continue CRMT will be escalated to CIMT (Company Incident Management Team). The CIMT will be chaired by Manager of Production Assets and be held twice weekly. Table 5.1 gives the criteria for moving from CRMT to CIMT.
- 5.1.4 If reservoir stocks fall below the DCL, CIMT will be escalated to CMT (Crisis Management Team) and the meetings will be led by the Kelda Management Team (KMT).

5.2 Roles and Responsibilities

- 5.2.1 The structures of the teams responsible for drought management can be found in Appendix 10.
- 5.2.2 CRMT will include key contacts as shown in Appendix 10. The key contacts will include representatives from water supply management teams responsible for planning, optimal supply and asset management. The structure of these teams is also provided in Appendix 10.
- 5.2.3 CRMT will review available resources and asset performance to ensure we maximise our resources to meet increased demand and where possible reserve stocks that may be required if the situation continues. A representative from our external communications team will provide an update on customer and media communications.
- 5.2.4 The details of key contacts will be provided to the Environment Agency at the first drought trigger during the initial Environment Agency / Yorkshire Water liaison meetings. Further details will be provided as the drought escalates.
- 5.2.5 The Manager of Production Assets will head CIMT. The structure of this team includes all representatives from CRMT and additional input from customer services and legal services.
- 5.2.6 The CMT will include all contacts included in CIMT and be headed by KMT.

<i>YW Trigger</i>	<i>CRMT</i>	<i>CIMT</i>	<i>CMT</i>
<i>Reservoir Stocks</i>	Below Environment Agency early warning trigger line	Predictions show summer restrictions are necessary	DCL crossed and Drought Plan is fully implemented
		Serious shortage likely in a supply area	
		Reservoir stocks are likely to cross DCL in 6 weeks	
<i>Demand</i>		Weekly demand crosses 75%ile high (weekly) trigger	
<i>Asset</i>		Loss /failure of critical asset leading to supply shortfall	
<i>Water Companies</i>		Restrictions imposed in neighbouring company (Severn Trent, Anglian, UU, NWL)	
<i>Drought Measures</i>		Planned/plan in progress	Implemented
<i>Environment Agency</i>	Environment Agency early warning trigger line crossed	Environment Agency Drought Status "Potential Drought"/"Drought"	
<i>Defra</i>		Water Summit (including Yorkshire Water)	
<i>Media</i>		Heightened media campaign regarding local/national water supply situation	

Table 5.1: Criteria for CRMT, CIMT and CMT

5.3 Communication Plan

- 5.3.1 We promote water efficiency to customers throughout the year through our website, customer events and use of social media. In the event of a drought developing we will increase communications with our customers regarding the water supply situation and the need to reduce demand.

- 5.3.2 Publicity would start well before a drought develops to encourage water conservation and keep customers and stakeholders informed.
- 5.3.3 The nature of forward contingency planning is that publicity is considered early. The critical factor is the weather pattern, particularly rainfall and high temperatures, and choosing the most appropriate timing can be complicated. In the light of experience we would always take a prudent precautionary approach to ensure that customers are fully aware of the latest situation.
- 5.3.4 Full details of our Drought Communication Plan are given in Appendix 9.
- 5.3.5 When reservoir stocks cross the Environment Agency early warning trigger line we would increase our normal water efficiency activity, for example increased city centre events offering advice and water saving devices.
- 5.3.6 If reservoir stocks continue to fall (to 50%) we will use various communication channels to raise awareness to customers. This is likely to include the following;
- briefing updates on the water supply situation
 - information about water supply improvement schemes including leakage control measures
 - briefing on the weather for awareness of potential drought sequences
 - water saving advice for domestic and business customers
 - temporary bans on water use, restrictions and drought permit advertisements.
- 5.3.7 We will communicate this information through local meetings, newspaper adverts, media press releases, press conferences and our website. To ensure customers are kept informed and receive appropriate advice we will liaise with local authorities, parish councils and other groups.
- 5.3.8 We will consider joint press releases and advertising campaigns with the Environment Agency and other water companies affected by drought. This will help enhance the water saving messages and may be more cost effective.
- 5.3.9 When reservoir stocks are forecast to fall to within six weeks of crossing the Drought Control Line we will initiate the implementation of temporary bans on water use. Notifications will be published in advance offering customers the opportunity to make representations. These notices will explain the restrictions included under the Flood and Water Management Act 2010.
- 5.3.10 We will provide details of water supply areas where restrictions are being considered to Ofwat, the Consumer Council for Water, local authorities, health authorities and other interested parties using appropriate means. e.g. meetings, email, telephone media and press releases.
- 5.3.11 We will consider joint press releases and advertising campaigns with the Environment Agency and other water companies affected by drought. This will help enhance the water saving messages and may be more cost effective.

- 5.3.12 It is likely that the level of calls to the customer contact centre will increase during a period of drought. Provision will be made to ensure that all staff in the contact centre are fully aware of the situation and are able to provide comprehensive information and advice to customers.
- 5.3.13 As the situation develops we will provide regular updates to our customers and stakeholders. This would include notification of when stocks recover and the removal of any restrictions if required.
- 5.3.14 All drought communication activities will be monitored to assess which are most effective. This will include recording website hits, number of devices requested and number of phone calls. We will request feedback on our communications from customer focus groups and the Consumer Council for Water.

6 LESSONS LEARNT FROM PREVIOUS DROUGHTS

- 6.1.1 Our previous Drought Plan was based on experience gained during the 1995/96 drought during which there was extensive use of drought orders and permits to manage supply and demand.
- 6.1.2 We have incorporated lessons learnt by other water companies during the drought in the south of England in 2005/06 and United Utilities in 2010.
- 6.1.3 We have considered the guidance for preparing drought applications and have reviewed the timescales required for preparing a drought order or permit.
- 6.1.4 Our demand-side options incorporate demand savings from the UKWIR Code of Practice 2011 which is based on experience gained in previous droughts.

7 POST-DROUGHT ACTIONS

- 7.1.1 De-escalation timetables for lifting demand restrictions and drought orders / permits would be discussed with the Environment Agency at regular intervals. We would generally retain a drought order or permit for its duration; however, it may expire due to pre-determined de-escalation triggers within the order.
- 7.1.2 Temporary bans on water use would be lifted when the risk of seeking further drought powers passed. Customers will be informed when restrictions on use are lifted through local meetings, press releases and our website.
- 7.1.3 In the event of a drought occurring which leads to enhanced drought planning between ourselves and the Environment Agency, a “lessons learnt” report will be produced. This will be followed within a year by evidence that recommendations have been acted on. The report will review the drought, actions taken, drought planning, communications, environmental impacts, the effectiveness of drought options that were adopted, and alternative strategies that could be adopted in future droughts.

8 CONCLUSION

- 8.1.1 This Drought Plan sets out how we would manage resources, mitigate impacts and communicate with our customers during a drought. It is based on previous experience of droughts and has been collated in accordance with the Environment Agency's Water company drought plan guideline 2011.
- 8.1.2 We will review our Drought Plan annually to determine if it is still fit for purpose and if any events in the preceding year result in a change to the plan.
- 8.1.3 If there is a material change in circumstances that affects our plan or if directed to do so by the Secretary of State we will republish a revised plan within 12 months of the change.
- 8.1.4 Our annual review will include a review of the supporting environmental assessments and monitoring plan. Specifically, we will consider whether there are any new designated sites or additional records for BAP species, over and above those already considered. Discussions will be held with the Environment Agency and Natural England, should any drought orders or permits have the potential to impact on designated sites.
- 8.1.5 In any event, in accordance with Environment Agency guidelines, we will revise and republish our Drought Plan no later than three years and six months after the date our final Drought Plan is published.

9 References

1. Water company drought plan guideline, Environment Agency, June 2011.
2. Drought orders and permits, Defra, Welsh Government and Environment Agency, 2011
3. Code of practice and guidance on water use restrictions, UKWIR, final report ref 11/WR/33/3, 2011
4. Estimating the water savings for baseline water efficiency activities, UKWIR, final report ref 09/WR/25/4, 2009
5. Water Resources Management Plan, Yorkshire Water, 2009
6. Joint Nature Conservation Committee <http://jncc.defra.gov.uk>
7. MAGIC <http://magic.defra.gov.uk>

10 Appendices

The following appendices are available in a separate document

- Appendix 1 Example control curves**
- Appendix 2 Example control curves plus scenario lines**
 - Appendix A2.1: 1995-1996**
 - Appendix A2.2: 1929 or 1959**
 - Appendix A2.3: 2nd year of serious 2 year drought**
 - Appendix A2.4: 3rd year of extreme 3 year drought**
- Appendix 3 The Drought Direction 2011**
- Appendix 4 Demand-side drought management actions**
- Appendix 5 Temporary bans on water use consultation**
- Appendix 6 Supply-side drought management actions**
- Appendix 7 Habitats Regulations Assessment and SSSI Screening**
- Appendix 8 Strategic Environmental Assessment Screening**
- Appendix 9 Drought communication audiences**
- Appendix 10 Company drought management structure**
- Appendix 11 Communications plan**
- Appendix 12 Glossary of terms and abbreviations**