Areas of water stress: final classification

Reference number/code GEHO1207BNOC-E-E

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1 Introduction

This report sets out the methodology developed by the Environment Agency for the classification of areas of water stress as requested by the Secretary of State.

On 1st October 2007 Defra requested that we advise the Secretary of State which areas of the country we consider to be seriously water stressed, to inform the exercise of his powers under the Water Industry (Prescribed Condition) Regulations 1999 (as amended).

This report is our formal advice on which areas in England are areas of serious water stress. Our methodology looks at where:

(a) the current household demand for water is a high proportion of the current effective rainfall which is available to meet that demand; or
(b) the future household demand for water is likely to be a high proportion of the effective rainfall which is likely to be available to meet that demand

In this regard the Environment Agency consulted in January 2007[1] on proposals to classify areas of England according to their relative levels of water stress. Our consultation response was published in August[2].

In designating areas as water stressed, we have taken into account that water is a scarce resource across England. We believe that even in those areas designated as "low" water stress, there should be some activity to ensure that water is used more efficiently. Water companies and water users cannot disregard the environmental consequences of their abstractions and energy use.

[1] Identifying areas of water stress: consultation document. Environment Agency January 2007.
[2] Response to consultation on identifying areas of water stress. Environment Agency. August 2007.

2 Approach

The water stress method takes a long-term view of the balance between water availability and the demand for public water supply, rather than a snapshot of shorter or peak periods. It supports but does not replace established water resources planning processes.

It provides an indication of relative water stress through use of a simple formula that scores each water company area. The classification is designed to support decisions about metering at the present time. Although the classification is at a company-wide level we would expect any justification for compulsory metering to be developed from an assessment at a zonal level.

We have used the following criteria to determine the relative level of water stress for individual water company areas:

- Current per capita demand for water
- Forecast growth in per capita demand for water
- Forecast population growth
- Current water resource availability
- Forecast resource availability

The method identifies the overall resource balance for areas based on geographical and human factors. These factors broadly represent available resource and demand. The method is not intended to replace the assessment of a water company's security of supply nor to reflect its current performance.

In areas where steps have already been taken to save water and reduce consumption the results of the method reflects this. For example, Tendring Hundred Water Services Ltd has a different classification to its neighbours.

The method we have developed is based around water consumption and water availability per person. Details of the revised method are shown in Annex 1.

3 Final classification

The Environment Agency advises the Secretary of State that the areas classified as serious in Table 1, and shown on Map 1, should be designated as 'Areas of serious water stress' for the purposes of Regulation 4 of the Water Industry (Prescribed Condition) Regulations 1999 (as amended).

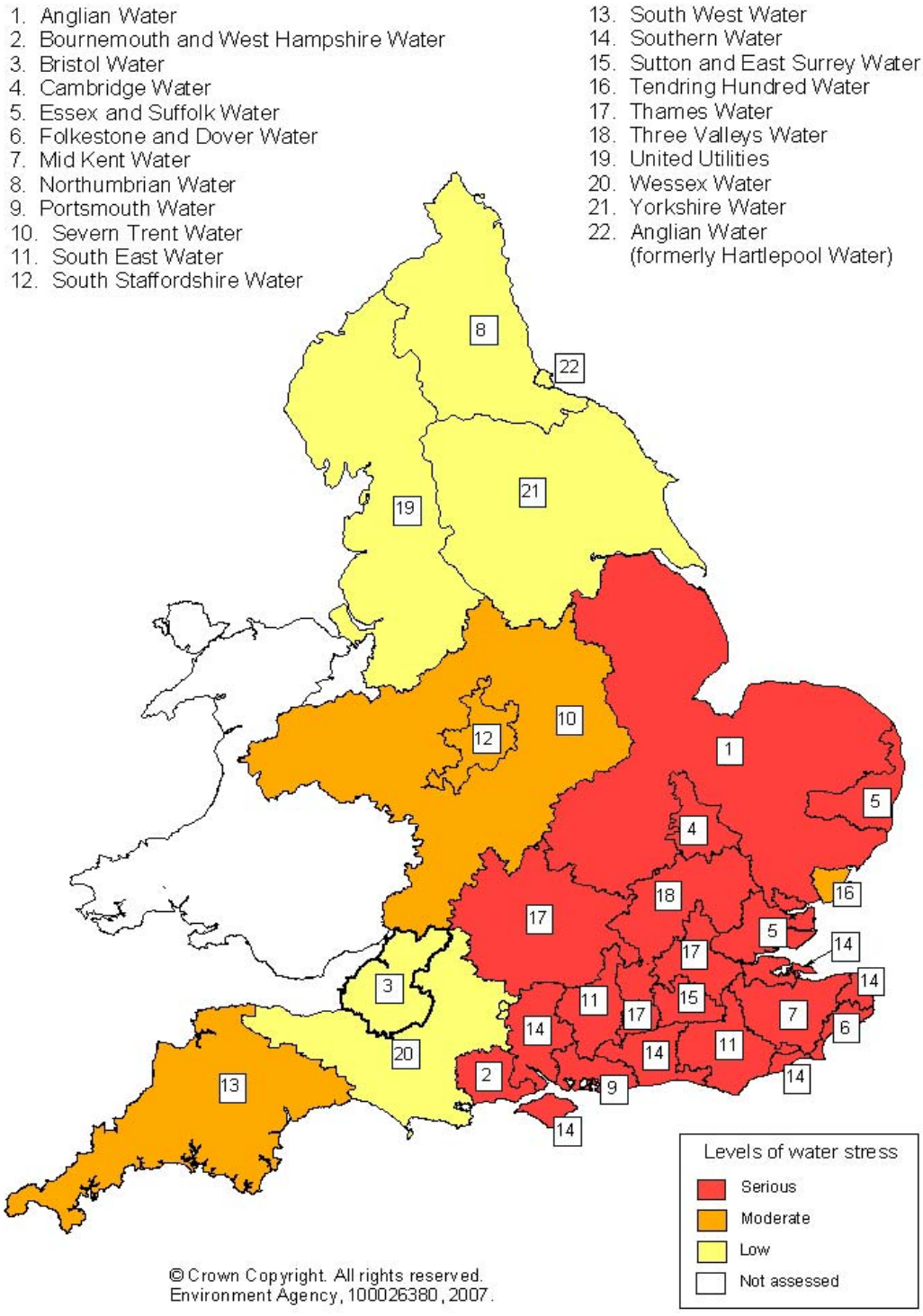
Table 1: Water company scores and classification

Water company area	Score	Classification
Essex & Suffolk Water	41	Serious
Folkestone & Dover Water	41	Serious
Southern Water	40	Serious
Thames Water [3]	40	Serious
Three Valleys Water	40	Serious
Portsmouth Water	39	Serious
Sutton & East Surrey Water	39	Serious
Cambridge Water	36	Serious
South East Water	36	Serious
Mid Kent Water	36	Serious
Bournemouth and West Hampshire Water	34	Serious
Anglian Water	34	Serious
South Staffordshire Water	32	Moderate
South West Water	31	Moderate
Tendring Hundred Water	31	Moderate
Severn Trent Water	29	Moderate
United Utilities	27	Low
Bristol Water	25	Low
Northumbrian Water	25	Low
Yorkshire Water	25	Low
Cholderton and District Water [4]	24	Low
Wessex Water	22	Low
Anglian Water (formerly Hartlepool Water) [5]	n/a	Low

Low stress is less than 28
Moderate stress is between 28 and 33
Serious stress is 34 or over

[3] Excluding Tidworth resource zone.
[4] Estimated score due to incomplete data.
[5] Included in the low stress category due to geographical split of company zones.

Figure 1: Map of areas of relative water stress



We have not carried out assessments and classifications for Dŵr Cymru / Welsh Water or Dee Valley Water areas because the request from Defra specifically relates only to England. Therefore, these areas appear white on the map.

Annex 1

Method

The following section provides technical details of the method we have used.

We obtained the data for each of these measures from audited data sets, generally produced by water companies and checked by regulators (Environment Agency and Ofwat). They are shown in the following table:

Table 2: Criteria and measures used for identifying areas of water stress

Criteria	Supporting measures	Comments
Current household demand for water	Current measured household per capita consumption (pcc) Current unmeasured household pcc	Based on three year average pcc figures from water company annual return data 2002-2005. **Data source:** water company annual reviews.
Forecast growth for household demand for water	Forecast measured household pcc for years 2015 and 2030 Forecast unmeasured household pcc for years 2015 and 2030	Using current household demand as baseline. **Data source:** water company plans
Forecast population growth	Forecast population figures for years 2015 and 2030.	Using 2004/5 annual data as baseline. **Data source:** water company plans
Resource availability - current	Effective rainfall (1971-2000) Current population figures Water company area measurements	**Data source**: MORECS rainfall data best matched to water company areas. **Data source**: water company plans **Data source**: Environment Agency Geographical Information System
Resource availability - forecast	As above - using 2015 and 2030 population figures	As above

Scoring
A scoring system was applied to each criterion, resulting in a ranking of 1, 2 or 3 for each company. These rankings for each criterion were then combined to form the final score. To reflect the importance of the criterion that indicate current stress, these scores were doubled before being included in the final score. The tables below set out the thresholds for the scores.

Table 3: Current household per capita consumption

Measure	Scoring criteria and thresholds			
Doubled	**Score 2**	**Score 4**	**Score 6**	**Max. score**
Current unmeasured household pcc	< 150 l/h/d	150-160 l/h/d	>=160 l/h/d	6
Current measured household pcc	< 140 l/h/d	140-150 l/h/d	>=150 l/h/d	6
We have set these thresholds based on our view of levels of acceptable water use and levels of demand that can reasonably be achieved.				

Table 4: Forecast per capita consumption and population

Measure	Scoring criteria and thresholds			
	Score 1	**Score 2**	**Score 3**	**Max. score**
Forecast growth in unmeasured household pcc 2015	Zero growth	0.1-5% growth	>=5% growth	3
Forecast growth in measured household pcc 2015	Zero growth	0.1-5% growth	>=5% growth	3
Forecast growth in unmeasured household pcc 2030	Zero growth	0.1-5% growth	>=5% growth	3
Forecast growth in measured household pcc 2030	Zero growth	0.1-5% growth	>=5% growth	3
Population growth to 2015	Zero growth	0.1-10% growth	>=10% growth	3
Population growth to 2030	Zero growth	0.1-10% growth	>=10% growth	3
We have set these thresholds based on our view of levels of acceptable water use and levels of demand that can reasonably be achieved.				

Table 5: Water availability, current and forecast

Measure	Scoring criteria and thresholds			
	Score 1	**Score 2**	**Score 3**	**Max. score**
Current water availability: 2005 (Doubled)	>2000 m^3/head	1000–2000 m^3/head	<1000 m^3/head	6
Forecast water availability: 2015	>2001 m^3/head	1000–2000 m^3/head	< 1000 m^3/head	3
Forecast water availability: 2030	>2001 m^3/head	1000– 2000 m^3/head	< 1000 m^3/head	3
We calculated water availability using effective precipitation data (1971- 2000)[6], population figures and water company area. This gives us an indication of the amount of resource available per person per year. The thresholds have been set based on the analysis of results for water availability across England and to reflect the regional variations. To reflect the importance of current conditions, the scores for present resource availability are multiplied by two.				

We added the scores for each measure together to achieve an overall score for setting the final classification.

Scores: the division of company areas into categories is derived from the ranked scores. Company areas with scores less than 28 are classified as “low” stress, areas with scores between 28 and 33 are “moderate”, areas which have scores equal to or higher than 34 are classed as “serious”.

[6] This is based on MORECS effective precipitation data for 1971 - 1990

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