

Evidence

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Climate change approaches in water resources planning – overview of new methods

Summary SC090017/S3

This report explores different ways in which the possible impacts of climate change could be incorporated into Water Resource Management Plans (WRMPs) in England and Wales.

The water resources management and planning framework used in England and Wales has developed considerably over the past decade. Methods for incorporating climate change into the analysis have become more advanced over this time, at a cost of time and complexity that may not always have been proportionate to the situation faced by individual water companies. This report presents a new framework that offers both flexibility and guidance on different climate change approaches. The authors made particular use of the detailed tools and data in UKCP09 and the information from the Future Flows project in formulating their recommendations.

The report itself covers:

- the current approach to incorporating climate change in water supply planning;
- assessing vulnerability to climate change impacts and its effect on deployable output;
- assessing the impact of climate change on demand for water;
- how to predict the impact of climate change on water resources in coming decades;
- discusses a new approach to decision-making in light of uncertainties around climate change – the adaptive management framework.

As a result of the project, the authors suggest a number of improvements to the current approaches used in water resources planning, including:

- Vulnerability assessments (basic or intermediate) to evaluate a water resource zone's vulnerability to climate and future climate change.
- Using the outcome from the vulnerability assessment to determine the level of modelling required to assess the future impacts of climate change.

- In low vulnerability zones, a minimum amount of impacts assessment is required using UKCP09 or Future Flows. For the climate change and hydrological analysis, this would involve using 5, 11 or 20 different climate change scenarios for the 2030s.
- In medium and high vulnerability zones, a greater level of analysis is recommended using UKCP09 or transient Future Flows data. This would involve using 20 or more different climate change scenarios for the 2030s.
- Alternative methods to scaling the impacts of climate change from the base year to the 2030s and beyond. The standard approach of applying a two stage interpolation (as per the Environment Agency WRPG) has been shown to be effective until the 2030s using UKCP09, but other methods of scaling are also valid, such as modelling the 2080s and temperature scaling back to 2012.
- Practical limitations to the number of climate change scenarios that can be applied to detailed groundwater models and the most complex water resources systems models. In such cases, sufficient climate and hydrological analyses should be completed to place a reduced number of runs in the full context of UKCP09 and Future Flows
- UKCP09 products (such as the Weather Generator) are suitable for modelling climate change impact on both average and peak water demand.
- Headroom assessment should clearly distinguish between climate and non-climate risks and report outputs for specific reference levels of headroom.
- More advanced decision-making methods are recommended for zones with moderate or high levels of climate risks.

The authors also provide a simplified checklist to help keep track of climate change impact assessments and record key decision points.

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