



## **Modelling the Hydrological Impacts of Climate Change on Catchment Hydrology in the South East of England**

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The UK Environment Agency has the duty to conserve, augment, redistribute and secure the proper use of water resources in England and Wales. It is the central body with responsibility for long-term water resources planning in England and Wales. Limiting and adapting to climate change forms a central tenet of the Environment Agency's vision for "a healthy, rich and diverse environment in England and Wales, for present and future generations".

Water resources in the south east of England are delicately balanced. The region receives less rain, but consumes more water per person than most of the UK. In addition, the region is targeted for very substantial long-term development (up to 32,000 new homes per annum for the next 20 years). Implementation of European legislation, such as the Habitats Directive and Water Framework Directive are likely to place further environmental pressure on water resources. Current work on climate change suggests that the impacts will be more significant in the south east of England, particularly in terms of warming and drying. It is therefore vitally important that the Environment Agency tackles the issues raised by climate change, and assesses the likely impacts.

In the first instance, the UKCIP02 scenarios, derived from the UK Met Office Hadley Centre HadCM3 model, were used. These were downscaled to allow the scenarios to be applied at a catchment scale. Catchment specific climatic "change factors" were calculated from the downscaled scenarios. Good quality historic (1961-1990) climatic datasets were adjusted according to the change factors for the Low and High Emissions Scenarios for the 2020s, 2050s and 2080s.

Applying these climate change datasets to established water resources rainfall-runoff

models for key catchments across the south east of England allowed detailed assessment of the possible impacts of climate change.

The modelling work suggests that due to climate change, as represented by the UK-CIP02 scenarios, there will be significant impacts on the flow regimes and catchment hydrology of rivers in the south east of England. The indications are that groundwater dominated catchments will be less affected than surface water catchments. Summer recessions will increase in length and severity. Summer soil moisture deficits increase and last longer, with recharge starting later in the autumn. The major advance represented by this study is that these changes, which have been widely suggested, can begin to be quantified.