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Abstract: The aim of this modelling study has been to assess Dissolved Organic Carbon (DOC) in the River Thames and River Severn and the impacts of water transfers from in drought or low flow years. The transfer of water from the River Severn to the Thames is a water resource option under consideration by Thames Water as part of Water Resource Management Plan 2014. Rising trends of DOC in upland rivers in Wales have been observed over the past 15 years and with the proposed water transfer there is a chance that high DOC concentrations might be transferred across to the Thames. From a water industry perspective, higher concentrations of DOC in freshwater system can be an issue for drinking water supply. It potentially leads to the production of carcinogenic trihalomethanes as by-products of drinking water treatment processes. The risk of increase in freshwater DOC concentrations is therefore of interest due to the likelihood of it leading to increased costs for water treatment. The Integrated Catchments Model for Carbon (INCA-C) model has been set up for both the River Severn and the River Thames and the model calibrated against observed flow and quality data for the purpose of study. A set of hypothetical water transfers have then been considered. The impacts of the water transfers are fairly minimal under normal flow conditions. However, during drought years a rise in Thames DOC is likely to occur. This increase has been quantified using the proposed modelling approach. Although the model results do not show an imminent issue, future drought conditions and climate change might stress the system towards a more problematic situation.

Keywords*:* Water Quality, Dissolved Organic Carbon (DOC), Water Transfer, Low flow, Drought