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Evaluating environmental flows under climate variability and change

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How much river flow is needed to ensure healthy freshwater ecosystems? This is a question that has exercised environmental managers for decades and one that is being made even harder by the prospect of anthropogenic climate change. The response requires balancing the long-term water demands of society with the needs of the environment in a sustainable and least cost way. Meeting these challenges will require more flexible water management systems and processes that recognise changing environmental limits, incentivise more environmentally-sensitive behaviours by water users and abstractors during times of water scarcity, and a move away from capital intensive, supply-side solutions. This talk evaluates the sensitivity of river flows to decadal variations in rainfall, abstraction amounts, licensing regime, and climate change. The overall objective is to determine how achievable abstraction volumes vary with different e-flow standards and water licensing regimes, under climate variability and change. The River Itchen in southern England has historically experienced unsustainable levels of water abstraction and is used as a test basin. The talk will consider the extent to which a 'smarter' approach to abstraction licensing could ensure that e-flow standards are met despite large uncertainty in the future climate, whilst having a minimal impact on security of water supplies.