EFFECT OF FUTURE CLIMATE CHANGE ON HYDROLOGICAL REGIMES: INFERENCES FOR CATCHMENT FLOW MANAGEMENT AND ATLANTIC SALMON

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Global climate models indicate that surface temperatures will increase significantly. This may enhance the hydrological cycle, leading to more intense rainfall events, increased variability and different spatial/temporal rainfall patterns. In the UK, regional climatic model data suggests that winters will become wetter and summers drier, with more frequent high summer temperatures. Such changes will inevitably lead to increased variability in hydrological regimes; with more frequent extreme high and low flows, and higher water temperature variations. The aim of this hydro-ecological study is to determine the effect of such hydrological changes on Atlantic salmon (Salmo salar) in the Eden catchment, northwest England. The physically-based, spatially-distributed, finite difference model SHETRAN, is used to provide detailed simulations of the flow in the river basin, making it a powerful tool for assessing the impacts of changes in climate. HadRM3 regional climate model data are used to create future precipitation and temperature data to simulate future river conditions for the period 2070-2100. This research will contribute to the development of the government initiative: Catchment Abstraction Management Strategies (CAMS), which aims to balance the needs of abstractors with those of the aquatic environment. It will generate optimum flow levels for salmon at various life-stages, thus providing information on suitable compensation flow and reservoir release levels during low flow events, and design flows for future flood management. Global climate models indicate that surface temperatures will increase significantly. This may enhance the hydrological cycle, leading to more intense rainfall events, increased variability and
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