



River channel instability in East Anglia as a result of increasing water demand

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Both climate change and population growth are having an increasing effect on the morphodynamics of lowland rivers in East Anglia, mainly due to the rising water demand and the increasing magnitude of climate extremes such as droughts or floods. The region has had the UK's highest percentage increase in population in recent years and it is projected to rise by a further 20% over the next 15 years. East Anglia is also already the driest region in the UK. It receives only half of the national average annual rainfall in a normal year and most catchments are over-abstracted. The naturally-available water supply is low and therefore water has to be transferred from neighbouring catchments via pipelines and existing rivers, adding a significant amount of extra water to the natural river flows. Inadequate research is available to explain the spatial and temporal relationships of these additional flows on the affected river channels.

A four year field study has been recently undertaken to explore the rates and causes of river channel instability on the River Stour in East Anglia. A river bank retreat of up to 1.3 m/year was recorded, which is much higher than the maximum rate of 0.2 m/year interpreted from an analysis of historical maps since 1886. The field study employed a unique combination of four geomorphologic field methods including the use of innovative photo-electronic erosion pins system for detailed continuous bank research. The studied river channel is used to transport additional water to supply, which was found to create 40% of all effective flows in the upstream reaches during the study period. The impact of this transferred water decreased downstream. The frequency of effective flows due to the water transfer scheme was examined against the river bank erosion retreat data considering the complexity of the channel boundary processes. Clear morphological evidence has also been collected that proves the effect that the water transfer flows are having on the river channel.