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LES of a large-scale river with arbitrarily complex bathymetry and wall-mounted structures KEVIN FLORA, ALI KHOSRONEJAD, Stony Brook University — High-fidelity numerical simulation of flow in natural riverine environments is essential for understanding the potential impacts of flood events on infrastructure and the potential morphological changes to the channel. However, due to the bathymetric complexity and unique shapes of man-made structures located in the flow, it is very challenging to create high-fidelity models which accurately depict the dominant three-dimensional flow structures. Such flow dynamics often lead to the erosion of the banks, scour of infrastructure foundations and overall transport of sediment in the flow. As a result, simplified models are often used in engineering practice, but these models fail to accurately simulate important features of flow. We employ a large eddy simulation (LES) code to model flow around four bridges in the American River in California to study the qualitative and quantitative differences in the resulting data. Specifically, this study compares the results of the LES code with more simplified hydrodynamic models to assess the difference in the estimated bed shear stress distribution and the overall impacts of the bridge structures on the turbulence.

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