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QUANTIFYING AND UTILIZING UNCERTAINTY IN STREAM RESTORATION DESIGN

JONATHAN PATRICK RESOP¹, W. CULLY HESSION¹, TESS M. WYNN¹

¹J.P. RESOP, Virginia Tech Institute, Biological Systems Engineering, United States, resop@vt.edu.

¹ W.C. HESSION, chession@vt.edu

¹ T.M. WYNN, thwynn@vt.edu.

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ABSTRACT Public agencies are spending significant funds on stream restoration projects to improve the quality of impaired stream reaches. However, the parameters used for stream restoration design are based on field measurements and calculations that can exhibit a large degree of error and variability. These errors, as well as other uncertainties, such as natural stochasticity and model-structure uncertainty, propagate through to the final design. For this study uncertainty analysis was performed on a stream restoration that took place on 1.5 km of Stroubles Creek in Blacksburg, VA. Monte Carlo simulations were used to calculate a range of design solutions including bench width, bench height, and roughness from measurements such as bankfull flow, slope, shear stress, and grain size. Results of this research indicate the final stream restoration design outcomes can vary over an order of magnitude, reinforcing the high uncertainty and risk associated with stream restoration.

Keywords: Stream Restoration, Uncertainty, Ecological Engineering, Stream Design.