Modelling streambank erosion potential using maximum entropy in a central Appalachian watershed

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Abstract We used maximum entropy to model streambank erosion potential (SEP) in a central Appalachian watershed to help prioritize sites for management. Model development included measuring erosion rates, application of a quantitative approach to locate Target Eroding Areas (TEAs), and creation of maps of boundary conditions. We successfully constructed a probability distribution of TEAs using the program Maxent. All model evaluation procedures indicated that the model was an excellent predictor, and that the major environmental variables controlling these processes were streambank slope, soil characteristics, bank position, and underlying geology. A classification scheme with low, moderate, and high levels of SEP derived from logistic model output was able to differentiate sites with low erosion potential from sites with moderate and high erosion potential. A major application of this type of modelling framework is to address uncertainty in stream restoration planning, ultimately helping to bridge the gap between restoration science and practice.

Key words stream restoration; maximum entropy; LiDAR; streambank erosion