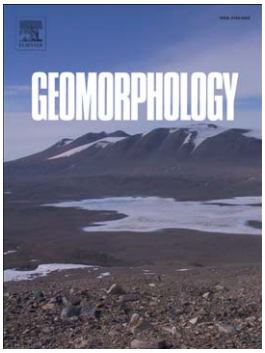

A watershed scale spatially-distributed model for streambank erosion rate driven by channel curvature

Mitchell McMillan, Zhiyong Hu

PII: S0169-555X(16)31013-3
DOI: doi: 10.1016/j.geomorph.2017.03.017
Reference: GEOMOR 5963

To appear in: *Geomorphology*

Received date: 11 November 2016
Revised date: 20 March 2017
Accepted date: 21 March 2017

Please cite this article as: McMillan, Mitchell, Hu, Zhiyong, A watershed scale spatially-distributed model for streambank erosion rate driven by channel curvature, *Geomorphology* (2017), doi: 10.1016/j.geomorph.2017.03.017

A watershed scale spatially-distributed model for streambank erosion rate driven by channel curvature

Mitchell McMillan*, Zhiyong Hu

The University of West Florida, Department of Earth and Environmental Sciences, Pensacola, FL

Abstract

Streambank erosion is a major source of fluvial sediment, but few large-scale, spatially distributed models exist to quantify streambank erosion rates. We introduce a spatially distributed model for streambank erosion applicable to sinuous, single-thread channels. We argue that such a model can adequately characterize streambank erosion rates, measured at the outsides of bends over a 2 yr time period, throughout a large region. The model is based on the widely-used excess-velocity equation and is comprised of three components: a physics-based hydrodynamic model, a large-scale 1-dimensional model of average monthly discharge, and an empirical bank erodibility parameterization. The hydrodynamic submodel requires inputs of channel centerline, slope, width, depth, friction factor, and a scour factor A; the large-scale watershed submodel utilizes watershed-averaged monthly outputs of the Noah-2.8 land surface model; bank erodibility is based on tree cover and bank height as proxies for root density. The model was calibrated with erosion rates mea-

*Corresponding author

Email addresses: mcmillan@students.uwf.edu (Mitchell McMillan), zhu@uwf.edu (Zhiyong Hu)