# The applicability of using fractional bedload transport modelling as a tool to predict geomorphic change: A novel framework for practitioners using commonly available data

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Gravel-bed rivers are known to have different phases of bedload transport, depending on the dominant grain-size in motion, as well as the degree of channel armouring. Phase one transport is defined as sand moving over a static gravel bed. Phase two transport is considered as phase 1 transport and an additional partial mobility of the gravel surface layer. Phase three transport is equal mobility of the gravel surface.

The fractional occurrence of each of these transport phases in a given time scale will dictate the resulting surface texture and change in bed morphology, which can have potential impacts on bank erosion, sediment yield, flooding and aquatic ecology. It is of interest to determine the degree of influence by each transport phase on changes to channel form, and how discrete phases or combinations thereof influence morphological change over long periods. In the case of urban streams, this is of particular importance due to the large number of rehabilitation projects that are undertaken in these systems. Understanding how these fluvial processes influence channel form can assist practitioners in rehabilitation design and sediment budgeting, as well as evaluate possible changes to aquatic habitat.

This study incorporates a temporal dataset of metrics commonly measured in channel monitoring programs and fractional based bedload transport modelling to identify how the temporal distribution of bedload transport phases influences measured channel change. A simple framework is developed which can provide additional insight into how gravel-bed channels, common to Southern Ontario, are temporally evolving. The key to this framework is using data that are commonly available, and often mandated, in stream monitoring and rehabilitation projects. Preliminary results from a case study using data from two gravel-bed rivers in the GTA are presented and discussed in terms of the proposed framework.