

## **Determining environmental flow requirements for substrate maintenance in cobble and boulder bed rivers in South Africa**

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**Abstract.** To ensure a healthy and biodiverse ecosystem in cobble and boulder bed rivers, it is imperative that the channel bed is maintained. In pristine catchments this is achieved by the range of flows characteristic of the natural flow regime, which typically incorporates “maintenance” flood flows of different timing, duration and frequency. The construction of dams however, leads to a change in the flow regime, the flooding magnitude and frequency, and the sediment transport capacity. In order to maintain a healthy and productive substrate environment it is necessary that the environmental flow requirement for these rivers accommodate a “substrate maintenance flow component”. This paper presents the findings of a project to develop guidelines for determining substrate maintenance flows in cobble and boulder bed rivers in South Africa. The study developed a model for predicting incipient motion based on unit stream-power theory and used this model to investigate the impact of particular flood events on invertebrate population densities.

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