

## Transport relationships between bedload traps and a Helley- Smith sampler in coarse-bedded streams

Kristin Bunte<sup>1</sup> and Steven R. Abt

Department of Civil and Environmental Engineering, Colorado State University, Fort Collins

**Abstract.** Sampling results obtained from a Helley-Smith (HS) sampler have been found to differ from those collected with other samplers, particularly those unrestricted by a small opening size, a small sampler bag, short sampling times, and direct contact with the bed. The ability to convert HS sampling results to those obtained from a sampler without those restrictions, such as bedload traps, would be beneficial because HS samplers are frequently used in field studies due to their widespread availability and ease of use.

This study compared sampling results from bedload traps with those collected in a 3-inch, thin-walled HS sampler over a wide range of transport rates at nine study sites. The ratios of transport rates collected with both samplers change over the range of sampled transport rates, approaching or intersecting the line of perfect agreement at high transport rates, and falling orders of magnitude below this line when transport is low. Inter-sampler transport relationships for all streams were quantified by regression functions.

Inter-sampler transport relationships segregated into two groups, and study streams differed significantly between groups with respect to the steepness of rating and flow competence curves, the amount of subsurface fines and bed armoring, transport rates and bedload  $D_{max}$  particle sizes collected at 50%  $Q_{bkf}$  and the bedload  $D_{max}$  at  $Q_b = 1 \text{ g/m}\cdot\text{s}$ . Threshold values for these attributes provide differentiations between stream groups. Regression functions fitted to group-averaged inter-sampler transport relationships can be used to convert HS transport rates to those that might have been measured with bedload traps.

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<sup>1</sup> Tel: (970) 491-3980

e-mail: [kbunte@engr.colostate.edu](mailto:kbunte@engr.colostate.edu)