

The East St. Louis Creek debris basin: serving a variety of research questions

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Abstract. In the 1980ies, Chuck Troendle used data of continuous streamflow and annual sediment load collected in the Fraser Experimental Forest weir pond/debris basins to analyze how logging, different cut patterns, snow accumulation and reforestation affect runoff and sediment yield. He then worked on predicting measured annual sediment loads, e.g., from annual water yield, annual peak flow, peakflow duration and effective discharge. Chuck also realized that the weir pond/debris basins could serve as a calibration tool to evaluate the sampling efficiency of different bedload sampling devices.

Several studies have since been carried out at the East St. Louis Creek debris basin. One study evaluated if different placement of Helley-Smith samplers affected their catch. Another compared if different types of Helley-Smith samplers collected different amounts. A third study analyzed bedload transport rates collected in hanging baskets, while two other studies evaluated the sampling efficiency of bedload traps.

The 2001 bedload trap study showed that a higher accuracy was needed in the estimate of the debris basin gravel mass and the computation of annual load from bedload samples before sampling efficiency could be correctly evaluated. After substantial refinements (e.g., lining the debris basin, excavating and sieving its sediment, collecting a large number of bedload samples, and summing loads of hourly time increments), the bedload trap gravel load in the 2003 study was within -1.8 to 1.2 times the debris basin gravel load. Improvements in the remaining uncertainty require bedload to be sampled continuously over the entire highflow season.

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