CROSS-SECTIONAL PROGRESSION OF APPARENT BEDLOAD VELOCITIES

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Abstract: An acoustic Doppler current profiler was used to measure apparent bedload velocities as river discharge increased from 5,400 to 19,400 cubic feet per second at a cross section of the Green River near Green River, Utah. Apparent bedload velocities were obtained through the exploitation of the bottom-track bias of acoustic Doppler current profilers. A divergence in the progression of apparent bedload velocities along the cross section was identified. As discharges steadily increased, apparent bedload velocities on one side of the river channel increased while velocities on the other side initially increased and then approached zero. Cross-sectional average apparent bedload velocities were computed from each of the 13 composite sets of apparent bedload velocities. These average cross-sectional apparent bedload velocities were compared with river discharge and suspended-sediment conditions measured during the event. Although no calibration of the apparent bedload velocities to actual bedload-transport rates was conducted, the dataset acquired offers an interesting look at bedload behavior during unsteady flow and suspended-sediment conditions. Of particular significance is the cross-stream variability of apparent bedload velocities at the larger observed discharges. With the shortcomings of physical bedload samplers and conventional techniques, further field and laboratory investigations into the utility of acoustic technology for the acquisition of bedload-transport data are needed.