Sediment Transport Following Dam Removal in Low Order Mountain Streams

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There are approximately 14,000 small dams within the northeast U.S. These dams limit waterway connectivity and sediment transport leading to recent efforts resulting in the planned removal of many small dams both with and without consideration for localized landscape reconditioning. This study examines sediment deposits, channel erosion, cross-section topography, repeat photographs, sediment budgets, and stream power derived from GIS digital elevation models to investigate sediment erosion and deposition dynamics up- and downstream of a removed dam after one year. The objective was to relate stream power to identify potential trends of depositional environments downstream of the dam. The former reservoir was largely dominated by erosion (~25 m3/m); however, there were pockets of deposition similar to control reaches indicating a complex response. Downstream of the dam, there was an immediate increase in deposition (~19 m3/m) that dropped to control levels after ~500 m. Deposition in control reaches was concentrated in locations where slope began decreasing in value indicating stream power influence. Patterns of stream power-influenced deposition did not hold in the downstream reach likely due to increased bedload. Ninety percent of eroded material is assumed to be carried further into downstream watersheds. By understanding low order transport and deposition patterns, it allows an understanding of the mobilization of nutrients and contaminants through the system to be considered during the removal of small dams and the subsequent remediation efforts.

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