BED MATERIAL CHARACTERIZATION OF THE SAN JOAQUIN RIVER USING PHOTOGRAPHIC TECHNIQUES

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Abstract As part of the San Joaquin River Restoration Program, sampling of the bed material in the San Joaquin River downstream from Friant Dam has been conducted over the past two years to establish baseline conditions for monitoring channel response to proposed altered flow patterns. One of the goals of the program is to reduce the fraction of fine material in the riverbed to potentially improve the quality of spawning gravels. Long-term monitoring of the fine material in the bed is the most direct method to determine if modified operations of Friant Dam are effective in reducing the fraction of fine bed material.

Sediment gradation of riverbed material can be measured by a variety of means. Some of the most common include surface bulk bed material sampling, pebble counts, and photographic techniques. Within the wet portion of the channel, bulk material sampling and pebble counts are limited by the ability to capture fine sediments. Recent advances in digital photographic techniques offer improved efficiencies to characterize bed material using repeatable, unbiased methods. Photogrammetric sampling using edge recognition algorithms has proven to closely match results of Wolman pebble counts for gravel sized material, and works particularly well on exposed, dry gravel bars. Other photosieving techniques using pixel intensity have been successfully applied to measure grain size distributions for sand beds. Within this paper, we explore the use of photographic techniques to characterize the mixed sand-gravel bed material and attempt to capture the percentage of fines present within the wetted channel and on exposed, dry gravel bars of the San Joaquin River.