

Effects of Dam Construction on Suspended Sediment and Dissolved Solids Transport in the Ca River, North-Central Vietnam

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The regime laws on hydraulic properties in the cross-section at two hydrological stations (Dua and Yen Thuong) along the Ca River, North-Central Vietnam are combined into the power functions with exponents of 1.46–1.85 by using the roughness coefficient (n) and the settling velocity or the particle size (D) to simulate suspended sediment load. Nash-Sutcliffe efficiency (NSE), percent bias (PBIAS), and ratio of the root mean square error to the standard deviation of measured data (RSR) were used to evaluate the calibration process for a pre-dam period (1994-2004) and the validation for a post-dam period (2005-2014). One of the effects of dam construction is a reduction in Manning's roughness coefficient and in sediment particle size. As the results, the observed sediment load decreased after dam construction at both stations with the annual decrease rate of approximately 20-40%. The power function with exponents of 0.83 of dissolved solid load was applied to calculate long-term annual TDS. Average value of TSS/TDS decreased from 3.0 to 1.6 at Yen Thuong and from 2.4 to 1.8 at Dua after dam construction.

Keywords: Suspended sediment transport, Dissolved solids transport, Ca River, Dam construction