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Sediment Starvation from Dams in the Lower Mekong River Basin: Magnitude of the Effect and Potential Mitigation Opportunities

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ABSTRACT

The Mekong River is undergoing rapid dam construction. Seven mainstem dams are completed or under construction in China and 133 completed or proposed for the Lower Mekong River basin. These dams will trap sediment, with implications for reservoir sustainability and sediment supply to downstream reaches and the delta. To assess the likely effect of multiple dams on sediment supply to the delta, we developed geomorphically-based estimates of sediment yield from different geologic provinces and applied the 3W model to calculate the net sediment trapping from existing and future proposed dams, using improved methods and data over prior such estimates. Our results indicate that the 133 dams built as planned would trap 96% of the river's former sediment supply to the delta, a significantly greater trapping than prior estimates of 50-75%. The most significant downstream impacts of this sediment-starved water will be accelerated erosion and subsidence of the delta in response to the virtual elimination of its sediment supply. Upstream, the mostly bedrock channel upstream of Kratie will have its thin sediment deposits stripped away (with consequences for aquatic organisms dependent on the alluvium) and the bedrock reach of Vientiane will likely incise. The impacts of dam-induced sediment starvation can be partially mitigated by implementing strategies to pass sediment through or around dams (e.g., sediment sluicing, flushing, density current venting, and bypasses), and our team is currently working with staff of Laotian and Cambodian ministries to identify opportunities to relocate/redesign dams to make such sustainable sediment management feasible.