

THE CURRENT AND FUTURE IMPACT OF WATER RESOURCES DEVELOPMENT ON FLOWS AND LIVELIHOODS OF THE MEKONG RIVER

Cochrane, T.A.¹, Arias, M.E.,¹ and Piman, T.²

¹ *University of Canterbury, Christchurch, New Zealand*

² *Mekong River Commission*

The rapid rate of water resources development in the Mekong basin of Southeast Asia is a cause for concern due to potential impacts on highly valued fisheries and natural ecosystems. Historical water levels of the Mekong were analyzed by comparing pre and post 1991 daily data of 6 stations along the mainstream from Chiang Sean, in northern Laos, to Stung Treng, in Cambodia, and the Pre Kdam station in the lower Mekong floodplain. The year 1991 marks a turning point in the rate of development in the basin. Observed changes in water level patterns along the Mekong were linked to temporal and spatial water resources development from 1960 to 2010. Variations in climate are important, but they were not observed to be the main causes of changes in key hydrological indicators related to ecosystem productivity. The development of mainstream dams in the upper Mekong basin in the post 1991 period resulted in a significant change of seasonal water levels, raise rates, fall rates, and the number of water level fluctuations in Chiang Sean. This effect diminishes downstream until it becomes negligible at the Mukdahan monitoring station, which represents a drainage area of over 50% of the total Mekong Basin. Further downstream at Pakse station, changes in hydrological indicators post 1991 were observed to be significant again, which can be directly attributed to water resource development in the Chi and Mun River basins in Northeastern Thailand. A reduction of 23% and 11% in the raising rate and fall rate, respectively at Prek Kdam, provides clear evidence of a diminished flood pulse in the post 1991 period. Through subsequent modeling we infer how future development could further impact water flows and livelihoods. The analysis and methods can be translated to other river systems around the world undergoing rapid water resources development.