The ROSMan has fundamentally two capabilities: 1) hydropower reservoir operations without considering sedimentation (HydROR) and 2) accumulation and removal of sediment under hydropower reservoir operations and sediment management techniques (ResSMan) (Figure 1). Thus, the user can choose between the HydROR and ResSMan. If the main purpose of simulation is to predict energy generation and impacts on the hydrologic regime of a river due to operation of hydropower reservoirs under different policies at the river basin scale, then it is suggested to simulate with the HydROR. The HydROR calculates the water balance of a reservoir and energy generation of a hydropower plant using predefined rule curves and plant efficiency without considering the impacts of sedimentation on the storage capacity. On the other hand, if the main objective of the study is to assess the accumulation of sediment and its impact on reservoir storage capacity, then the user must simulate with the ResSMan. The ResSMan routine has capabilities to predict the accumulation of trapped sediment, its impacts on the storage-capacity of a reservoir, and losses in hydropower generation under user-specified operation policies. Furthermore, it allows to compute the restoration of storage volume due to the removal of sediment by flushing (removal of sediment from a reservoir by passing water and sediment through flush gates located at the low level of a dam) and sluicing (passing sediment before suspended sediment solids have settled down in reservoirs).

Cite:

Shrestha, J. P. (2021). "Development and application of a SWAT hydropower routine for flow, sediment, and energy management." PhD Thesis, University of Canterbury, Christchurch, New Zealand.

DOI: http://dx.doi.org/10.26021/11342