



Modelling the hydraulic impact of beaver dam complexes and cascades

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Beavers (*castor fiber*, *canadensis*) are ecosystem engineers, which means they modify their habitat so that it benefits their needs. Beavers modify the hydro-geomorphology of the rivers and floodplain they occupy in three ways: they build dams and ponds, construct burrows and canals, and add wood to streams. This then leads to a larger heterogeneity in flow, larger water storage, especially in low-order streams, which alters biogeochemical characteristics and diversifies river-floodplain habitat which results in the observed increase in biodiversity. Hence, the key of better understanding the influence of beavers on river-floodplain systems is the hydro-geomorphology. In this study, we model the hydraulic influence of beaver dams in two low-order streams, one of which is a beaver dam complex, the other a beaver dam cascade. In order to account for the high-spatial variability in beaver streams, we model three scenarios, which were reconstructed on the base of old aerial photography, interviews, SfM drone surveys, high resolution lidar data, dgps, and ADCP-derived beaver pond bathymetry. We then relate the outcome to measured discharge and sediment transport, and argue that beaver dam complexes and cascades can have a significant effect on flood attenuation, and can therefore play a large role in river and flood management.