



## **Impact of beaver ponds on river discharge and sediment deposition along the Chevral River, Ardennes, Belgium**

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With the recovery of the European beaver (*Castor fiber*) and their capacity to engineer fluvial landscapes, questions arise as to how they influence river discharge and sediment transport. The Chevral river (Ardennes, Belgium) contains two beaver dam sequences which appeared in 2004 and count now about 30 dams. Flow discharges and sediment fluxes were measured at the in- and outflow of each dam sequence. Volumes of sediment deposited behind the dams were measured. Between 2004 and 2011, peak flows were topped off, and the magnitude of extreme events decreased. 1710 m<sup>3</sup> of sediment were deposited behind the beaver dams, with an average sediment thickness of 25 cm. The thickness of the sediment layer is related to the area of the beaver ponds. Along the stream, beaver pond sediment thickness displayed a sinusoidal deposition pattern, in which ponds with thick sediment layers were preceded by a series of ponds with thinner sediment layers. A downstream textural coarsening in the dam sequences was also observed, probably due to dam failures subsequent to surges. Differences in sediment flux between the in- and outflow at the beaver pond sequence were related to the river hydrograph, with deposition taking place during the rising limbs and slight erosion during the falling limbs. The seven-year-old sequences have filtered 190 tons of sediment out of the Chevral river, which is of the same order of magnitude as the 374 tons measured in pond deposits, with the difference between the values corresponding to beaver excavations (60 tons), inflow from small tributaries, and runoff from the valley flanks. Hydrogeomorphic effects of *C. fiber* and *C. canadensis* activity are similar in magnitude. The detailed analysis of changes to hydrology in beaver pond sequences confirms the potential of beavers to contribute to river and wetland restoration and catchment management.