



Impact of river weirs on bedload dynamics in low to medium energy rivers

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Assessing the impact of weirs in low- to medium-energy rivers, especially their influence on the bedload continuity, is an important issue for the understanding and management of river hydrosystems. The implementation of European regulations has for example led to an increasing number of restoration projects involving the total or partial dismantling of weirs. The effect of weirs on sedimentary continuity is beginning to be studied but remains poorly understood. In this study we present the results of monitoring over three hydrological seasons of 900 particles equipped with PIT tags set up around two weirs on the Rognon river (France) and the Amblève river (Belgium). For the two sites studied, and while floods were relatively frequent (max 5 return-interval years for the Rognon River and 2 return-interval years for the Amblève River), nearly 80% of the tagged particles positioned just upstream of the weirs were exported downstream of them during the study period. However, the tagged particles in the control reaches, non-influenced by weirs, travelled distances 2 to 2.5 times greater than the particles injected in the impoundment. Mobilisation rates are also significantly higher in the control reaches. Whereas the size of the mobilised particles (D50, D90) is similar between the impoundment and the control reaches in the Amblève river, mobilised particles are significantly smaller in the impoundment reach in the Rognon river. This data indicates that these weirs can have a significant effect by slowing down the bed load velocity, especially its coarsest part. Nevertheless, in the current weir operating, weirs do not interrupt the bedload continuity. This type of structure does not seem to constitute a real obstacle to sedimentary continuity and the question of their dismantling may be raised in view of the potential impacts they could have on the other components of ecological continuity.