

Abstract Submitted
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Energy losses induced by channel-spanning brush accumulations¹

ELIZABETH FOLLETT, Cardiff University, ISABELLA SCHALKO, HEIDI NEPF, Massachusetts Institute of Technology — Channel-spanning, porous accumulations of instream wood form naturally in some rivers or may be intentionally placed in the river channel in order to increase floodwater storage and infiltration as a natural flood management intervention. The accumulation of instream wood pieces acts as a porous obstruction, so that flow progressing through the structure experiences frictional losses due to drag on wood elements. Using flume measurements of channel-spanning wood accumulations that varied wood diameter, discharge, water depth, and structure porosity, we show that the spatially averaged energy loss occurring due to drag on wood elements can be described by a quadratic drag law proportional to a drag coefficient C_D , the frontal area per volume a [L^{-1}], and the structure porosity ϕ , similar to flow through emergent rigid canopies. An additional energy loss occurred, associated with the free falling water exiting the structure, which generated significant turbulence. This loss was dependent upon the magnitude of the water fall height. An energy-based model is developed to predict the backwater rise behind a jam.

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