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Large wood (LW) and sediment (dis-)connectivity in river systems: Introducing the newly developed LW (dis-)connectivity and sediment storage potential indices and their application in river management contexts.

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In-stream large wood (LW) can have significant effects on channel hydraulics and thus water and sediment connectivity. The relationship between LW structures and their hydraulic function is generally quantified through drag force. Drag analyses, however, are often not straightforward, especially in complex debris jam settings where LW accumulations often consist of wood pieces of variable sizes. Here, we introduce simple LW (dis-)connectivity and sediment storage potential indices, especially developed for river management assessments. The LW (dis-)connectivity index (ID_{LW}) is calculated based on visually estimated, field-derived parameters such as the degree of channel blockage. The LW sediment storage potential index (IS_{LW}) is based on a classification scheme differentiating between different types of LW accumulation. Both indices were calculated and tested in two medium-sized mixed-load streams in Austria, further assessing fine sediment retention volumes behind LW structures. In both systems a variety of different types of LW accumulation with different degrees of blockage and storage potential have been detected. The larger system (river length = 5.7 km) had ID_{LW} and IS_{LW} values of 0,75 and 0,027, the smaller system (river length = 1.3 km) of 1,76 and 0,057. In the larger system in total 88.7 m³ fine sediment have been found to be retained by LW, while 4.7 m³ have been accumulated behind LW structures in the smaller river system. The application of the newly developed indices has shown to be a straightforward and valuable method to assess the effects of LW on water and sediment (dis-)connectivity, especially in a river management context.