

## **Measuring impact of water management on ecological health of a river: Poudre River, Colorado, USA**

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**Abstract** The Cache la Poudre River (Poudre River) has its upper watershed in the Rocky Mountains and its lower watershed in the transition zone between the mountains and the Great Plains to the east. The river flows through the City of Fort Collins where it is a significant riverine attribute. Streamflows in the Poudre River have been greatly modified by diversions to the river and from the river, and by storage reservoirs. Analysis of the ecological health of a river should start by creating an understanding of the links between the physical habitat and the streamflows and use this understanding to develop functions that transform the streamflows to an annual index that can be used to better understand how hydrological changes impact factors limiting the aquatic ecosystem. Indices considered here include: (1) changes in the river's capacity to maintain the river channel, (2) changes in flashiness of the river during the winter, (3) percent of annual flow required to remain in the river to significantly increase the health of the river, and (4) unnaturally high flows in October attributable to water accounting.

**Key words** rivers; water management; channel maintenance; hydraulic alteration; riverine ecological health; aquatic ecosystems; Cache la Poudre River