

Regular Article

# Hydroecology and river restoration: Ripe for research and synthesis

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hydroecology; river restoration; ecology; hydrology; geomorphology; engineering

[1] Research at the intersection of hydrology and ecology is central to a future in which human and ecological needs for water are met. We briefly identify several compelling research questions at this intersection, then focus on a critical research area central to hydroecology: river and stream restoration. Challenges in this area include the development of science to evaluate the effectiveness of restoration, particularly the cumulative effects of many small projects; to restore ecosystem processes under highly constrained conditions such as below dams or in urban settings; to push some aquatic ecosystems beyond “restoration” to boost their ability to perform functions of value to society; and to identify feedbacks associated with critical thresholds beyond which restoration is not possible. Meeting these research challenges requires research at the interface of social science and the disciplines of hydrology, geomorphology, ecology, and engineering, but hydroecology will be the central science.

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