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A geomorphological framework for river characterization and habitat assessment

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ABSTRACT

1. Methods to assess the physical habitat available to aquatic organisms provide important tools for many aspects of river management, including river health monitoring, determination of river restoration/rehabilitation strategies, setting and evaluating environmental flows and as surrogates for biodiversity assessment.
2. Procedures used to assess physical habitat need to be ecologically and geomorphologically meaningful, as well as practicable. A conceptual methodological procedure is presented that evaluates and links instream habitat and geomorphology.
3. The heterogeneity of habitat potential is determined within geomorphic units (such as pools, runs, riffles) by assessing flow hydraulics and substrate character. These two variables are integrated as *hydraulic units* — patches of uniform flow and substrate.
4. This methodology forms a logical extension of the River Styles framework that characterizes river form and behaviour at four inter-related scales: catchments, landscape units, River Styles (reaches) and geomorphic units. As geomorphic units constitute the basis to assess aquatic habitat availability, and they form the building blocks of river and floodplain systems, intact reaches of a particular River Style should have similar assemblages of instream and floodplain habitat.
5. An application of the hydraulic unit procedure is demonstrated in gorge, partly-confined and alluvial River Styles from the Manning catchment in northern New South Wales, Australia.

KEY WORDS: classification; ecology; geomorphology; habitat; habitat assessment; River Styles