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Linking geomorphic character, behaviour and condition to fluvial biodiversity: implications for river management

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ABSTRACT
1. The River Styles1 framework is a geomorphic approach to the classification of river types, assessment of the physical condition of rivers, and planning of physical rehabilitation. However, the linkages between River Styles and aquatic biodiversity conservation are still only weakly developed.
2. In this study, 41 sites in the Bega River basin in New South Wales, Australia, were classified according to River Style and geomorphic condition, and surveyed for four biological assemblages: diatoms, aquatic and semi-aquatic macrophytes, aquatic macroinvertebrates and fish.
3. Each assemblage differed significantly among River Styles. However, in the case of diatoms and fish, these differences could be accounted for by geographic clustering of sites in the same River Style, and a tendency for River Styles to occupy particular altitudinal zones and sizes of streams. This result was attributed to the overriding influences of water quality on diatoms and of altituderelated variation in water temperature and distance from the ocean on fish. For macrophytes and macroinvertebrates, geomorphic river type appeared to exert a direct influence, probably via
variation in physical habitat characteristics.
4. Geomorphic condition, judged as good, moderate or poor by reference to the inferred natural condition of each River Style, was also significantly associated with differences in biological assemblages other than fish. Twice as many taxa appeared to favour sites in good geomorphic condition as favoured sites in poor condition. Many of the taxa associated with sites in poor condition are alien taxa introduced to Australia since European settlement.
5. These findings imply that protection of reaches that are in good geomorphic condition is likely to be critical for the maintenance of indigenous biodiversity, and that rehabilitation of geomorphic condition can assist in the rehabilitation of native riverine biota.

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River Style