

Where to rehabilitate? Using geomorphology to identify corridors of river recovery for landscape-scale management prioritisation.

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By connecting corridors of river recovery, resilience can be built into river systems to mitigate the impacts of climate and anthropogenic change on aquatic ecosystems. However, identifying where these corridors can be built is still lacking in river management practice. For coastal catchments of NSW, Australia, that cover an area of 129,000 km², the Open Access NSW River Styles database contains comprehensive information on geomorphic river condition and recovery potential for >84,000 km of stream length. The database can be used to systematically analyse where corridors of river recovery could be created when working with geomorphic river recovery via conservation or rehabilitation. We identified ~5,000 km of 'reach' connections, defined as upstream to downstream sections of river connected end-to-end, and >17,000 km of 'loci' connections defined as more isolated sections of river from which recovery can be seeded and extended into adjacent reaches (Agnew and Fryirs, 2022). By considering connections with adjacent and surrounding reaches, the corridors approach to river management is an up-scaling of working with geomorphic recovery from the reach-scale where most on-ground works currently takes place, to the catchment-scale where river rehabilitation needs to take place for mitigation. Combined with local on-ground knowledge, this information forms an important input to evidence-based prioritisation and decision making in river management.

To undertake corridor analysis, a simplified GIS workflow was developed using publicly available proprietary GIS software, standard GIS tools, and a packaged digital elevation model (Agnew, Graves et al., 2022). Using the workflow, non-technical GIS users in river management can establish where corridors of geomorphic river recovery occur or could be built at-scale. The workflow, published on protocols.io, could also be adjusted and applied to other river monitoring and condition datasets where polyline data layers are available.

Further prioritisation is being undertaken using the estimated costs of geomorphologically-informed rehabilitation within the conservation planning tool MARXAN. This more holistic approach provides optimal solutions of where to undertake rehabilitation to improve geomorphic condition and enhance recovery potential at the landscape-scale. Geomorphologically-informed decision making becomes more cost effective, consistent across landscapes, adaptive to local circumstances and changing river management priorities.

REFERENCES

Agnew, D., Fryirs, K., 2022. Identifying corridors of river recovery in coastal NSW Australia, for use in river management decision support and prioritisation systems. PLOS ONE 17(6): e0270285.

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