Determining Vegetation Condition Trajectory: A tale of two diversions

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Constructed waterway diversions on Queensland coal mines have been evolving over the last 50 years, from crude linear trenches cut using large-scale mining machinery, to designed channels that mimic natural features. Mines in central Queensland often present a suite of limitations to creating stable landforms and successfully establishing vegetation. Catchments are large and often contain Permian sedimentary rock over topped by dispersive clays, and have the potential to generate substantial amounts of sediment. Natural vegetation is fragmented, or has been highly modified through grazing, limiting natural recruitment which is usually restricted to hardy riparian species on active geomorphic surfaces. The expectation is that the diversion license will be relinquished back to the state upon mine closure, and will be functioning as a stable and self-sustaining landscape feature. As the time it takes for planted vegetation to mature is longer than the average age of the mines, how do you prove that vegetation community has the potential to be self-sustaining in order to relinquish the diversion license?

By developing the vegetation condition trajectory method, vegetation communities within diversions can be placed within an expected scoring range, based on the specific limitations identified for that site. When repeat monitoring is conducted, vegetation condition can be placed within the site specific condition trajectory, allowing timely adaptive management actions to be implemented if scores sit below the expected range.

The method was developed and trialed using two case study diversions which had extended periods of geomorphic and vegetation monitoring data, but also relied upon a decade of diversion monitoring data across Central Queensland. While further improvements can be made to the method, the initial case studies prove that when specific and targeted vegetation data is framed within the limitations of a site, a realistic evolution pathway for vegetation communities within diversions can be predicted.