Guidelines for Connectivity Management and Restoration in Australia

Veronica A.J. Doerr, Erik D. Doerr and Micah J. Davies
CSIRO Sustainable Ecosystems

In a systematic review of evidence for the effectiveness of different types of landscape connectivity in Australia, we analysed data from 80 different studies. These analyses revealed new insights for how best to link small, fragmented remnants of native vegetation in Australia. This is a summary of the resulting management recommendations*. Our guidelines are built around a series of simple steps:

Step 1: Evaluate the landscape context to see if connectivity management and restoration is appropriate for the ecosystem in question. It is appropriate if multiple good quality patches of native vegetation at least 10-20ha in size can be connected, and those patches are no more than 1.1km apart. If patches are smaller than 10ha, further apart than 1.1km, or in poor condition, efforts might be better directed at improving patch size and quality.

Step 2: Determine which types of structural connectivity are likely to be most effective given your goals (facilitate movement between patches or provide additional habitat) and local environment (temperate or tropical). To facilitate movement between patches, the primary goal of connectivity, stepping stones (scattered trees, shrubs, etc.) may be slightly more effective than corridors in both temperate and tropical environments. Gaps between stepping stones should be no more than ~100m. However, to provide additional habitat, corridors or even patchily vegetated linear connections may be the best option in temperate environments. Width and vegetation/habitat quality may be important, and there is some evidence to suggest corridors need to be at least 350m wide and very high quality to provide habitat. To provide habitat in tropical environments, patchily vegetated linear connections can be very effective as long as gaps in them are no more than ~100m and they are at least 80-350m wide.

Step 3: Given the information above on effectiveness of connectivity options, select which option to pursue by also considering the other benefits desired in the landscape, such as shelter for stock, riparian restoration, and wind breaks, compared to the costs involved.

Step 4: Monitor the results of connectivity management actions and be prepared to adjust management activities based on data from this ongoing monitoring as well as any recommendations coming from new research. Even better, managers should whenever possible actively contribute to connectivity research by linking with researchers to apply management actions in an experimental framework with replication and to make their findings widely available to other managers and researchers.

We provide these guidelines for managing and restoring structural connectivity with the caveat that they are still based on a small number of studies that often rely on untested assumptions. Given this overall paucity of data on functional connectivity in Australian landscapes, an adaptive management approach involving links with researchers is absolutely crucial. It also must be stressed that most of the data on which these recommendations are based come from studies of mammals and birds living in woodland and forest ecosystems. These guidelines should thus be most applicable in similar systems and should be applied more broadly only with caution.

* For more information see Doerr, VAJ, Doerr, ED, and Davies, MJ. 2010. Systematic Review #44: Does structural connectivity facilitate dispersal of native species in Australia's fragmented terrestrial landscapes? Collaboration for Environmental Evidence: Bangor, UK. (available online at: http://www.environmentalevidence.org/Reviews.htm) or contact the authors via email (veronica.doerr@csiro.au or erik.doerr@csiro.au).