Appendix

Landscape function in central Australia assessed with grazing gradient analysis

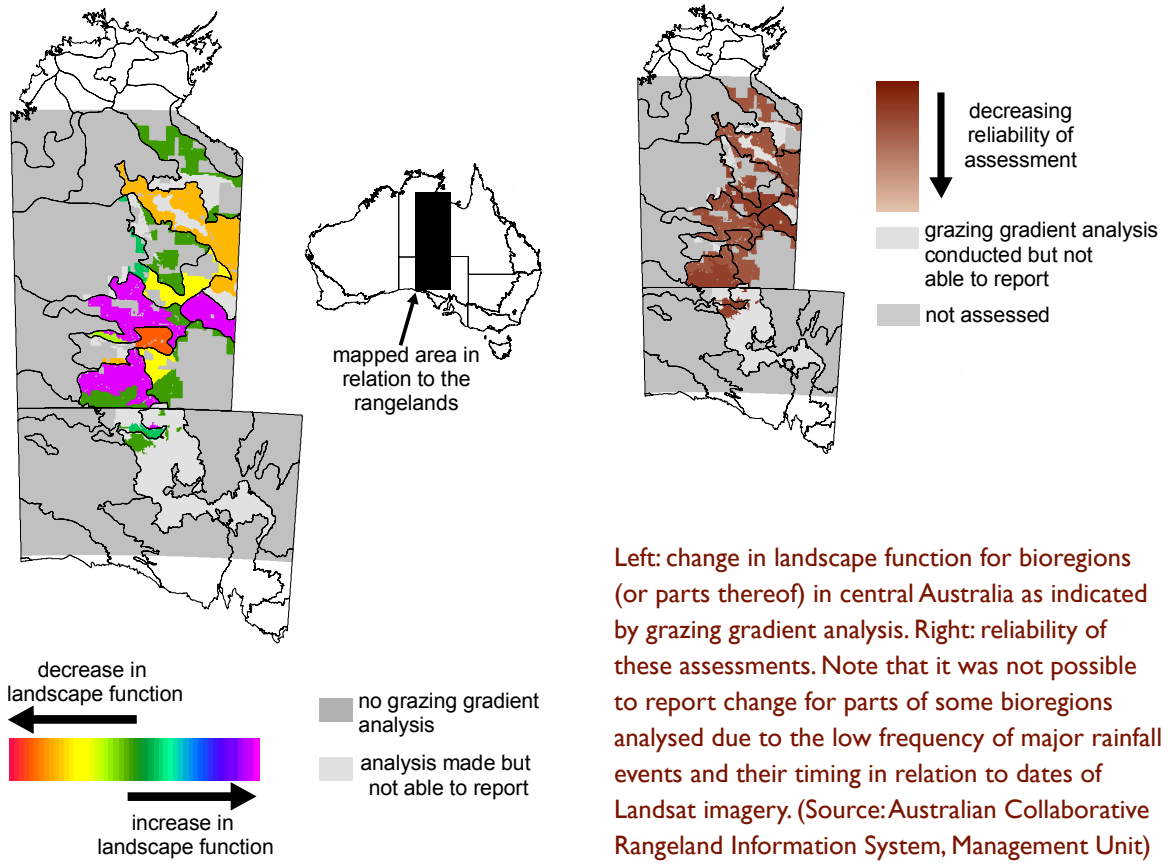
Background

Grazing gradients describe patterns of grazing impact on the vegetation and soil. In the arid rangelands, paddocks are generally large, and stock depend on water sources provided by management. Vegetation cover, monitored with remote sensing, typically increases with increasing distance from these stock waterpoints. Cover also increases after good rains, and grazing gradients should largely disappear after very good rainfall. An index of cover production loss (%CPL) (Bastin et al 1993) was used to quantify the extent to which distance from water gradients persisted after such rainfall and to indicate loss of landscape function related to grazing.

Results

Grazing gradient analysis has been used to supplement reporting of change in landscape function in northern South Australia (SA) and the southern and central parts of the Northern Territory (NT) (see Figure A1).

Figure A1



Left: change in landscape function for bioregions (or parts thereof) in central Australia as indicated by grazing gradient analysis. Right: reliability of these assessments. Note that it was not possible to report change for parts of some bioregions analysed due to the low frequency of major rainfall events and their timing in relation to dates of Landsat imagery. (Source: Australian Collaborative Rangeland Information System, Management Unit)

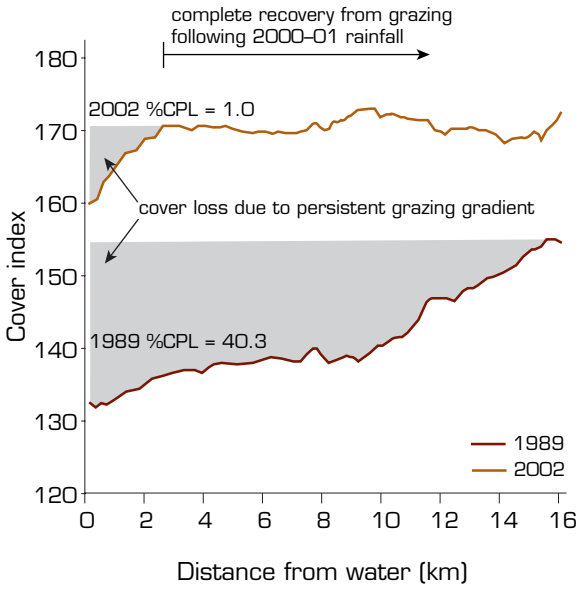
These analyses should only be made after periods of much above-average rainfall and, because these events are relatively infrequent in the arid interior, there is limited opportunity to report change in landscape function using this method. The right-hand panel in Figure A1 indicates the reliability of landscape function change based on the adequacy of rainfall and indicator value of cover-based grazing gradients for landscape function.

These analyses indicated that, where two suitably wet periods were experienced, most bioregions had either maintained or improved landscape function. There were minimal persistent grazing gradients in sub-Interim Biogeographic Regionalisations for Australia (IBRA) of the Mitchell Grass Downs bioregion (NT) following good wet-season rainfall. Thus, %CPL values were small and generally stable over time, indicating good landscape function. The very good rainfall across the southern NT and far northern SA in 2000 and 2001 meant that any persistent grazing gradients in sub-IBRAs of the Finke, Burt Plain and MacDonnell Ranges bioregions generally were diminished, producing smaller %CPL values compared with earlier analyses in the 1990s.

Bioregion example: Finke (NT)

The southern NT experienced above-average rainfall in 1989 and an extended wet period during 2000 and 2001. The Finke P2 sub-IBRA had a very large persistent grazing gradient following the 1989 rainfall event (extending to almost 16 km from water) and a correspondingly high %CPL value (see Figure A2), indicating reduced landscape function to a considerable distance from water. The 2000–2001 wet period produced higher average cover at all distance intervals from water compared with 1989; a much reduced persistent grazing gradient; and a much smaller %CPL value. Landscape function was interpreted as being much better in 2002 compared with 1989.

Figure A2



Finke, P2 sub-IBRA: change in landscape function inferred from grazing gradient analysis. A large grazing gradient persisted after above-average rainfall in 1989, producing a large %CPL value (40.3, lower grey shaded area). Average vegetation cover was higher and more uniform beyond two kilometres from water in 2002 following the extended wet period of 2000–2001. This produced a smaller %CPL value (1.0, smaller shaded polygon). Landscape function was inferred as being better across the sub-IBRA, on average, in 2002 compared with 1989. (Source: ACRIS-MU)