

**SIMON KILBANE**

**A National Green Network for Australia**

2013 | *Made in Australia: The Future of Australian Cities*

*UWA Publishing, Crawley, Western Australia*

Australia is currently witnessing a significant and relatively unplanned population growth. This growth is increasingly exerting pressure on urban areas, infrastructure and the fragile ecologies of the Australian continent. Concurrently, as signatory to the internationally binding United Nation agreement of the *Convention on Biological Diversity* a ubiquitous target of 10% protected area across the nation’s ecoregions must be maintained or created where lacking in coverage.

This research project case study argues for the benefits of a designed ecological network – the National Green Network – promoted as counterpoint to this rapid growth and crucial in securing the future ecological, environmental, social and economic resilience of Australia. While a multitude of benefits from such a plan are foreseeable, the central message posited is that planning of this type ideally should precede city expansion.

The significance of this research lies with its design methodology. This design project explores key targets as yet not explored for Australia and provides a design framework from which a new understanding of landscape planning and landscape can be considered. This includes questioning the potential of planning at a continental-scale; the utilisation of various technologies including *Geographic Information Systems*; and refinement of design ideas through a design charrette.

The big challenges outlined in *Made in Australia* command a set of solutions. This design project adds to this dialogue at the national scale. Its inclusion in this crucial text about Australia’s future supports its value.

*The Transect: complexity of the study area, detail.*

# A NATIONAL GREEN NETWORK FOR AUSTRALIA

SIMON KILBANE



Green Infrastructure is ...

An interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clear air and water, and provides a wide array of benefits to people and wildlife ... green infrastructure is the ecological framework for environmental, social, and economic health – in short, our natural life-support system.<sup>1</sup>

This essay summarises research into the planning and design of a national green infrastructure for Australia: the National Green Network. This is a framework, which can provide greater resilience for our landscapes, biota and peoples, in a country facing significant population growth, land conversion and the impact of climate change. This trans-continental system extends the notion of 'infrastructure' from 'grey' to green, from ports, roads and telecommunications to the health of our landscape systems. Without a healthy landscape this nation will not survive.

The Convention on Biological Diversity (CBD), of which Australia is a signatory, requires setting aside a minimum 10 per cent of terrestrial bioregions as protected areas; lands legislated primarily for the protection of biodiversity.<sup>2</sup> In line with this agreement, the Australian federal government strives for a 'Comprehensive, Adequate and Representative' National Reserve System (NRS).<sup>3</sup> However, despite this mandate, currently only 46 of Australia's 85 bioregions have this minimum degree of protection.

To secure the future of Australia's biodiversity, the NRS needs to be increased to meet these minimum targets, but also, such areas need to be interconnected. Despite some debate in the scientific community,<sup>4</sup> ecological connectivity has been embraced within specific policies at state and national level such as the *National Wildlife Corridors Plan Draft*<sup>5</sup> and *Australia's Biodiversity Conservation Strategy 2010-2020*,<sup>6</sup> which explicitly embrace connectivity as policy.

Worldwide, the popularity of ecological networks, greenways and green infrastructures is evident from local and regional initiatives to country-wide and even continental schemes.<sup>7</sup> In Europe and North America, bold planning moves such as the *Pan European Ecological Network (PEEN)* or the *Wildlands Project (USA)* attempt to plan for biodiversity protection and mobility via protected area networks, to theoretically provide continental-scale landscape connectivity. Such projects often employ persuasive mapping and graphics where geographical

<sup>1</sup> Benedict, M.A. & McMahon, E., 2006, *Green infrastructure: Linking landscapes and communities*, Island Press, Washington, DC.

<sup>2</sup> Protected areas by definition are those that have some legislative protection, and fit within one of the classes defined by IUCN 1994, *Guidelines for protected area management categories*, IUCN, Cambridge, UK, pursuant to the CBD. This includes, but is not limited to National and State Parks, Indigenous Protected Areas and Conservation Reserves, both private and public.

<sup>3</sup> Commonwealth of Australia & National Reserve System Task Group, 2009, *Australia's Strategy for the National Reserve System 2009-2030*, Commonwealth of Australia, Canberra.

<sup>4</sup> "...hard to imagine any realistic alternative that would be conducive to species persistence" Nally, J.A., Lallier, W.Z. & Moeninger, A.M. (eds), 2006, *Corridor Ecology: The Science and Practice of Linking Landscapes for Biodiversity Conservation*, Island Press, Washington, DC. See discussion of the benefits of ecological connectivity in Simberloff, D., Fan, J.A., Cox, J. & Malcom, D.W., 1992, 'Movement Corridors: Conservation Bargains or Poor Investments?', *Conservation Biology*, 6:4, pp. 483-504. Hobbs, E.J. 1992, 'The role of corridors in conservation: Solution or bandwagon?', *Trends in Ecology & Evolution*, 7:11, pp. 389-92.

<sup>5</sup> National Wildlife Corridors Plan Advisory Group, 2012, *Draft National Wildlife Corridors Plan*.

<sup>6</sup> National Resource Management Ministerial Council (Australia) & National Reserve System Task Group (Australia), 2010, *Australia's Biodiversity Conservation Strategy 2010-2030*, Australian Government, Department of Sustainability, Environment, Water, Population and Communities, Canberra.

<sup>7</sup> The vignettes: seven study areas sampling different land-uses were chosen to test the system at a finer grain.<sup>8</sup>

<sup>8</sup> Kilbane, S. Evaluation of the proposed NGN over three scales: Continental, Transect and Vignette. At each scale, the further resolution and move from abstract to real occurs.<sup>9</sup>



Kilbane, S. 2013, 'A National Green Network for Australia' in Weller, R. and Bolleter, J. (eds.), *Made in Australia: the future of Australian cities*, UWA Publishing, Crawley, Western Australia, pp.306-313.

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# A NATIONAL GREEN NETWORK FOR AUSTRALIA

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- 7 Pungitt, G. & Jongman, R.H., 2004, *Ecological Networks and Greenways: Concept, Design Implementation*, Cambridge University Press, New York, South, M.E., Terborgh, J. & Willdenko Project, 1998, *Continental Conservation: Scientific Foundations of Regional Reserve Networks*, Island Press, Washington, D.C., Worboys, G., Francis, W.L. & Lockwood, M., 2010, *Connectivity conservation management: a global guide*, Earthscan, London; Will, J.A., Lefcheck, W.J. & Merriam, A.M. (eds), 2006, *Corridor Ecology: The Science and Practice of Linking Landscapes for Biodiversity Conservation*, Island Press, Washington, DC.
- 8 (Western Australian Land Information Authority 2012; Commonwealth of Australia (Geoscience Australia) 2007).
- 9 (Western Australian Land Information Authority 2012; Commonwealth of Australia (Geoscience Australia) 2007).
- 10 Similar and significant Australian examples Whitten, S 2011, *A Compendium of existing and planned Australian wildlife corridor projects and initiatives, and case study analysis of operational experience: a report for the Australian Government Department of Sustainability, Environment, Water, Population and Communities*, CSIRO, Canberra, A.C.T. include the Gondwana Link, Koolberran to Coast and the Trans-Australia Eco-Links.
- 11 United Nations, Convention on Biological Diversity (CBD), www.cbd.int.

distance, land-use, boundaries and tenure are frequently disregarded through macro 'moves'. Currently, despite the science, global practice and supporting policy, the actual spatial planning or application of these principles to the Australian landmass has been limited.<sup>10</sup> Ideally, for Australia to meet its international obligations and to have a truly resilient ecology it would require an even distribution of interconnected protected areas replete across the nation. The intent of this research is to explore how this could occur. If we are serious about protection (and our obligation to the CBD suggests that we are) what could this look like?

The research method, illustrated on previous page, explains how this new green infrastructure, the National Green Network (NGN) could be configured as a vital new infrastructure, equally important as rail, road or broadband infrastructures.

The NGN is designed according to two guiding principles:

- **10 PER CENT OF AUSTRALIA'S BIOREGIONS.** In accordance with the International Convention on Biological Diversity (CBD), a minimum 10 per cent of Australia's existing bioregions must be protected.<sup>11</sup> This theoretically means that legislated 'protected areas', those lands allocated primarily to the protection of biodiversity, should be evenly distributed across the entirety of Australia's landmass.
- **ECOLOGICAL CONNECTIVITY.** The spatial configuration of protected areas should maximise ecological connectivity, maintaining or reconnecting otherwise isolated fragments of existing habitat and hence maximising the potential for genetic exchange.

The research creates and evaluates the proposed NGN through increasingly fine resolution over three scales: continental, transect and vignette. At each scale, the further resolution and move from abstract to real occurs.

The system of national green infrastructure begins as a hypothetical (policy) 'grid' of protected areas cast over the entire landmass of the nation. This grid is 25 km square, its bandwidth is 1,280 metres and it is scaled accurately to represent an allocation of (re) vegetated land, protected so as to meet our commitments to the CBD. This mechanistic approach of course ignores any appreciation of the existing landscape but it is not intended as a plan, it simply articulates policy and represents an allocation of space to biodiversity. The project then becomes one of adjusting this grid across the nation to meet local specificity.

To test the practical complexity of such a national system, a 25 km wide and 1,250 km long transect establishes a detailed study area. This transect includes representation of the typical range of Australian land uses from 'urban' to 'wilderness' over the breadth of its

journey from coastal Perth towards the interior. Here a detailed investigation of the transect's character through a site analysis process reveals its heterogeneity and questions the potential for application see image overleaf.

From this transect, seven study areas were chosen to test the system at a finer grain. The seven vignettes from west to east sample urban, suburban, peri-urban, agricultural, peri-agricultural, wilderness and rangelands land uses. In each case the grid is adjusted to link remnant, fragmented habitat in the most efficient manner to the requisite 10 per cent (CBD). This occurs objectively through utilisation of 'Linkage Mapper',<sup>12</sup> a GIS-based conservation planning software and then by 'ground-truthing' of results by a landscape architect in conjunction with relevant stakeholders through design charette workshop. This represents the 'expert human dimension' as suggested by Remm et al.<sup>13</sup> and moves the project from the theoretical to the real. Fine-tuning in response to existing urban areas, high-productivity farmland and areas of high ecological significance articulate a potential for the approach to be implemented nationally.

The idea of an NGN is more than habitat restoration to protect the Australian gene pool against climate change. As well as protecting biodiversity the system has other benefits. It creates recreational greenways and cultural corridors that can be related to indigenous culture. Through agro-forestry such a system sequesters carbon and could help regional landscapes deal with salinity and water security. This system sets out the ecological superstructure for a megaregion.

A broad spectrum of landscape possibilities such as these will help to establish greater ecological and cultural resilience to future climate change shocks and land conversion, related to Australia's population projections. Planning of this sort needs to be in place prior to the expansion of our cities.

Note: All imagery reproduced by permission of the Western Australian Land Information Authority, Perth, Western Australia, P507/2012.

12 McKee, B.H. & Kavanagh, D.M., 2011, *Linkage Mapper Connectivity Analysis Software*, The Nature Conservancy, Seattle.

13 Remm, K., Kivik, M., Mander, U. & Saep, K. 2004, 'Design of the Pan-European Ecological Network: a national level attempt', in *Ecological Networks and Greenways*, eds RHG Jongman & G. Pungitt, Cambridge University Press.

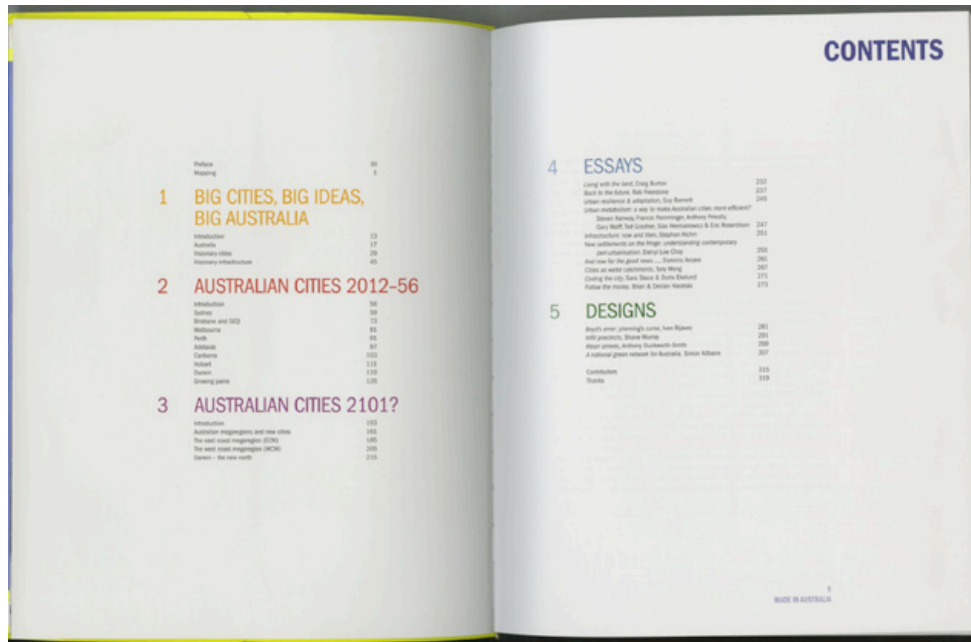
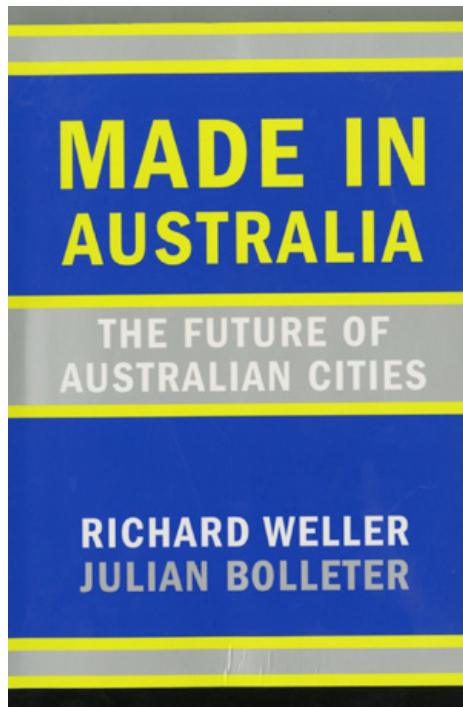
14 (Western Australian Land Information Authority 2012; Commonwealth of Australia (Geoscience Australia) 2007).

FOLLOWING PAGE The Transect: complexity of the study area.<sup>14</sup>

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Australian Design Review (australiandesignreview.com)

Features

Book review: Made in Australia

September 25, 2013

Craig Allchin reviews new publication, Made in Australia: The Future of Australian Cities, which asks: Where do we fit the extra 20 million people currently not planned for?

Author Craig Allchin

Made in Australia: The Future of Australian Cities Richard Weller, Julian Bolleter The University of Western Australia Publishing Paperback 1 318pp | \$49.99

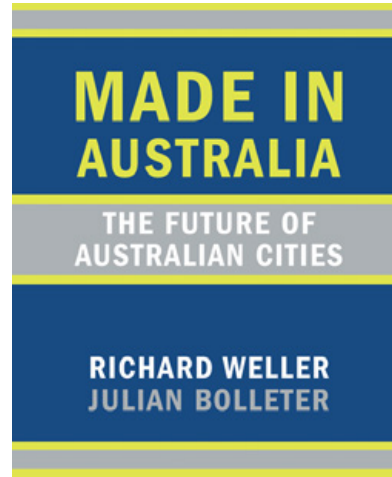
Made in Australia (MIA) is a refreshingly 'big picture' book that asks the question critical to the next one hundred years in Australia, where do we fit the extra 20 million people currently not planned for?

Two options are outlined: four megacities with populations of 10 million plus, or, alternatively, a number of new cities. Both options are diagrammatically and historically shown to be high unlikely if our cities are to remain liveable and productive, with a national population of over 60 million by 2100. A new solution is proposed here: megaregions.

As globalisation would have it, in reading MIA over a few days spent on the Panhandle of Florida (also known as SoFlo), it is intriguing to draw comparison between SoFlo as one of the forty global megaregions, as defined by US urban studies theorist Richard Florida, and to that of the models outlined in MIA. SoFlo is 600 kilometres long with a population of 15.1 million and includes five large cities dotted along an almost continuous coastal settlement.

Driving around guided by smart phone navigation, visitors are constantly directed back to the ten-lane freeway, the I-95, moving between the high-hedged homes of Palm Beach and the high alcohol cocktails of Miami Beach, via gated golf course retirement communities. The I-95 is the infrastructural backbone that enables this megaregion to function. It is part of the Interstate Highway System in the US, a super-grid of freeways laid across the country from 1956 and costing (on the 2006 matrix) US\$425 billion. It is probably the defining infrastructure project of the twentieth century, which has enabled Americans to live the suburban dream.

But what a city killer it turned out to be: clogged freeways, car-based sprawl and isolated shopping malls. This is not the solution for twenty-first century Australia.



http://www.australiandesignreview.com/wp-content/uploads/2013/09/Richard-Weller-Julian-Bolleter-Made-in-Australia-The-Future-of-Australian-Cities.jpg

Richard Weller and Julian Bolleter are starting the important national conversation about what sort of spatial arrangement Australia needs for the next century and what infrastructure will be needed to make it work.

High-speed rail (HSR) is likely to be the defining infrastructure project of this century. Weller states that it is "the key to forming megaregions... [to]... enable decentralisation and simultaneously enhance economic agglomeration". China has built almost 10,000 kilometres of HSR in two decades and plans to increase that to 25,000 kilometres by 2020.

The Australian Federal Government is currently considering a \$114 billion estimate for a 1,750-kilometre Brisbane to Melbourne fast train. MIA names this area the East Coast Megaregion, which, along with a west coast HSR-based megaregion and increased settlement in The New North around Darwin, is the spatial proposition of the book.

Substantial, civic infrastructure projects are usually controversial and drawn out. The Paris Métro was argued over for fifty years before construction started in 1896 — the catalytic event was the Paris Expo of 1900. But it has since facilitated Paris to become, and remain for over a century, one of the world's great and prosperous cities.

HSR in Australia cannot suffer a similar fate of endless debates and budgetary wrangling, waiting for a catalytic event. In MIA, Weller and Bolleter have made the game-changing argument.

This is not about costing the construction of HSR as if it were a Public-Private Partnership (PPP) toll road, nor about competing with airlines for interstate passengers. Such arguments will condemn it to never stack up and condemn our cities to stagnation. This is about enabling Australian urban development into the next century.

MIA includes fourteen contributor essays. Starting with the Aboriginal notion of living as a custodian of the land, the essays cover a history of urban settlement, regional resilience, urban metabolism (cities as organisms), transport infrastructure, the fringe, urban renewal, water, urban policy, global finance, speculations on urban aesthetics, suburban infill in precincts and along streets, and finally, green infrastructure. Read individually the essays are interesting. But placed after Weller and Bolleter's comprehensive and inspirational outline of our challenges, they also work towards filling in the complex pieces of the national settlement jigsaw puzzle.

MIA outlines a sparkling vision for an Australia of over 60 million people, living in economically and environmentally sustainable megaregions. It is vital that the built environment professions take up this challenge and lead the process of how we comprehensively budget, govern and build the twenty-first century infrastructure we need. Starting with high-speed rail

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Supporting evidence

Australian Design Review

Weblinks:

http://www.australiandesignreview.com/features/34423-book-review-made-in-australia

http://uwap.uwa.edu.au/products/made-in-australia-the-future-of-australian-cities