

Appendices

1	Terms of Reference	274
2	Relevant legislation	275
3	References	277
4	Tables and figures	291
5	Acronyms and glossary	295
6	Communication and consultation	300
7	Technical Review Panel members	305
8	Indigenous Engagement Process Report	306
9	Methodology for economic analysis	314
10	Harvesting and management practices on private and public land	327



Appendix 1

Terms of reference



Premier of New South Wales Australia

Terms Of Reference

Assessment Of Riverina Red Gum Forests

The New South Wales Government intends to make a forest agreement with respect to the river red gum and woodland forests within the NSW Riverina IBRA and the South-Western Cypress State Forests in order to determine conservation outcomes and a sustainable future for the forests, the forestry industry and local communities in the region.

To inform that agreement and in accordance with section 13 (1)(e) & (g) of the *Natural Resources Commission Act 2003*, I request that the Commission:

1. Carry out a regional forest assessment of the scientific bioregion:
 - a) for the purposes of section 15 of the *Forestry and National Park Estate Act 1998* including an assessment of the following: environment and heritage values (including Indigenous heritage), economic and social values, ecologically sustainable forest management, and timber resources; and
 - b) otherwise such that the assessment will also meet the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
2. Recommend conservation, protection, economic and ecological sustainable use of public land in the bioregion.
3. Recommend water management and flooding requirements to sustain the forests and identified values and uses under the range of projected impacts of climate change.

The Commission should have regard to the following as they relate to the bioregion:

- nationally agreed criteria for a comprehensive, adequate and representative reserve system;
- other complementary methodologies for protecting conservation values;
- the impacts of drought and climate change on the forests and communities;
- opportunities for ongoing and future employment within affected local communities;
- appropriate forest management practices in order to promote long term productivity and forest health;

- international or intergovernmental obligations, agreements or arrangements;
- NSW Government policies, programs and Catchment Action Plans;
- opportunities for Indigenous involvement in forest management;
- appropriate access for commercial, recreational and community uses; and
- the existing science and body of knowledge about the region.

The Commission should consult with relevant NSW agencies including the Department of Environment, Climate Change and Water, the Department of Industry and Investment, the Land and Property Management Authority, the Treasury, the Department of Premier and Cabinet. The Commission should also consult with relevant Traditional Owners, Local Aboriginal Land Councils, Elders groups and local government. The Commission should liaise with officers from the Commonwealth Department of the Environment, Water, Heritage and the Arts to inform the design and conduct of the assessment.

The Commission should undertake public consultation to inform the assessment.

The Commission is to deliver the assessment in two phases:

1. The Commission is to deliver in relation to the Riverina IBRA:
 - an assessment under term of reference 1 by 30 September 2009; and
 - a report on terms of reference 2 and 3 by 30 November 2009.
2. The Commission is to deliver in relation to the South-Western Cypress State Forests:
 - an assessment under term of reference 1 by 31 December 2009; and
 - a report on terms of reference 2 and 3 in relation by 28 February 2010.

Appendix 2

Relevant legislation

Chapter 3 explains how forestry in the Riverina bioregion is conducted under a broad framework of Commonwealth and NSW legislation, policies and institutional arrangements. Table A2.1 provides more detail on the key relevant Commonwealth and NSW environmental legislation applying to forestry in the NSW Riverina bioregion. It also lists a range of other relevant legislation and conventions, treaties and agreements.

Key legislation for forestry		
Legislation	Key relevant provisions for forestry	Relevance to forestry in Riverina bioregion
<i>Forestry and National Park Estate Act 1998</i>	<ul style="list-style-type: none"> • Forest Assessment (Pt 3) • Forest Agreements (s 15) • Integrated Forestry Operations Approval (IFOA) (Pt 4) 	<ul style="list-style-type: none"> • Forestry Assessment on river red gum and woodland forests of the Riverina bioregion currently being undertaken by the NRC • The NSW Government intends to make a Forestry Agreement with respect to the river red gum and woodland forests of the Riverina IBRA (subject to the undertaking of a Forestry Assessment) • Currently no IFOA applies but will be developed subject to the establishment of a Forestry Agreement)
<i>Forestry Act 1916</i>	<ul style="list-style-type: none"> • Establishes Forestry Commission (Pt 1) • Classification and dedication of forest lands (Pt 2) • Establishes commercial elements such as licensing, royalties, permits and leases (Pt 3) 	<ul style="list-style-type: none"> • Commercial river red gum harvesting (timber, products and forest material) in State Forests of the Riverina bioregion
<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cth)</i>	<ul style="list-style-type: none"> • Establishes matters of national environmental significance (NES) (Pt 3) • Protection of the environment, especially NES (s 3) • Approval of activities that are likely to have significant impacts on NES (Pt 3) 	<ul style="list-style-type: none"> • NES in Riverina IBRA–Central Murray State Forests (RAMSAR) and listed threatened species and migratory birds • Currently no approvals apply for any activities in the Riverina IBRA
<i>National Parks and Wildlife Act 1974</i>	<ul style="list-style-type: none"> • Licensing of activities that harm any protected fauna (s 120) 	<ul style="list-style-type: none"> • Section 120 licence for forestry activities in the south-west (including Riverina IBRA)
<i>Environmental Planning and Assessment Act 1979</i>	<ul style="list-style-type: none"> • Encourage the protection of the environment, including threatened species, populations and communities (s 5(a)(vii)) • Environmental Impact Assessments (s 75f, Pt 5) 	<ul style="list-style-type: none"> • Environmental Impact Statement for forestry activities and associated roadworks (as per Land and Environment order) • Review of Environmental Factors for harvesting operations under Part 5
<i>Protection of the Environment Operations Act 1997</i>	<ul style="list-style-type: none"> • Licensing of activities that have the potential to pollute waters (Ch 3) 	<ul style="list-style-type: none"> • Currently no environment protection licences for operations in the south-west (including Riverina IBRA) • Guidelines and procedures established with the aim to minimise pollution from roadworks and harvesting operations
<i>Threatened Species Conservation Act 1995</i>	<ul style="list-style-type: none"> • Protection and conservation of threatened species, populations and communities (s 3) • Threatened species listing (Pt 2) • Requirements for species impact statements (Div 2) • Licences for the protection of threatened (Pt 6) 	<ul style="list-style-type: none"> • Recorded threatened species in river red gum forests in Riverina bioregion

Key legislation for forestry		
Legislation	Key relevant provisions for forestry	Relevance to forestry in Riverina bioregion
<i>Fisheries Management Act 1994</i>	<ul style="list-style-type: none"> • Conserve species, populations and ecological communities of fish (s 3(2)(b)) • Threatened species listing (Div 2) • Permits and licences for the protection of threatened species (Div 6) • Requirements for species impact statements (s 221k) 	<ul style="list-style-type: none"> • Currently no permits or licences for operations in the south-west (including Riverina IBRA) • Guidelines and procedures established with the aim to minimise potential impacts on threatened aquatic species and habitats
<i>Native Vegetation Act 2003</i>	<ul style="list-style-type: none"> • Regulate forestry on private land (Native Vegetation Amendment (Private Native Forestry)) 	<ul style="list-style-type: none"> • Not applicable to State Forests
Other relevant legislation, conventions, treaties and agreements		
<ul style="list-style-type: none"> • <i>Aboriginal Land Rights Act 1983</i> • <i>Catchment Management Authorities Act 2003</i> • <i>Crown Lands Act 1989</i> • <i>Game and Feral Animal Control Act 2002</i> • <i>Local Government Act 1993</i> • <i>Natural Resources Commission Act 2003</i> • <i>Nature Conservation Trust Act 2001</i> • <i>Noxious Weeds Act 1993</i> • <i>Rural Fires Act 1997</i> • <i>Rural Lands Protection Act 1998</i> • <i>Water Management Act 2000</i> • <i>Western Lands Act 1901</i> • <i>Water Act 2007(Cth)</i> • China–Australia Migratory Bird Agreement (CAMBA) • The Convention on Biological Diversity • The Convention on Wetlands of International Importance (Ramsar Convention) • Japan–Australia Migratory Bird Agreement (JAMBA) • Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) • United Nations Declaration on the Rights of Indigenous Peoples 		

Appendix 3

References

- ABS (2006), *Census of Population and Housing*, Australian Bureau of Statistics.
- ABC (2007), *SunRice job cuts begin this week*, ABC news report, 21 December 2007, available online at <http://www.abc.net.au/news/stories/2007/12/21/2124969.htm?site=news>.
- ABS (2008), *Water and the Murray-Darling Basin – A Statistical Profile, 2000–01 to 2005–06*. Available online at <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4610.0.55.007>.
- Alexander, JSA, Scotts, DJ and Loyn, RH (2002), 'Impacts of timber harvesting on mammals, reptiles and nocturnal birds in native hardwood forests of East Gippsland, Victoria: A retrospective approach', *Australian Forestry*, Vol. 65, pp. 182–210, available online at <http://www.forestry.org.au/pdf/pdf-members/afj/AFJ%202002%20v65/AFJ%20Sept%202002%2065-3/07Alexander.pdf>.
- Allen, CD, Savage, M, Falk, DA, Suckling, KF, Swetnam, TW, Shulke, T, Stacey, PB, Morgan, P, Hoffman, M and Klingel, JT (2002). *Ecological restoration of southwestern ponderosa pine ecosystems: a broad perspective*. *Ecological Applications*, Vol. 12, pp. 1418–1433.
- Allen Consulting (2005), *Climate Change: Risk and Vulnerability – Promoting an Efficient Adaptation Response in Australia: Final Report*, Department of Climate Change, available online at <http://whitepaper.climatechange.gov.au/impacts/risk-vulnerability.html>.
- Antos, MJ and Bennett, A (2006), 'Foraging ecology of ground-feeding woodland birds in temperate woodlands of Southern Australia', *Emu: austral ornithology*, Vol. 106, pp. 29–40.
- Arcidiacono, P, Bayer, PM, and Hizmo, A (2008), 'Beyond Signalling and Human Capital: Education and the Revelation of Ability', *NBER Working Paper No. 13951*, available online at <http://www.nber.org/papers/w13951>.
- Armstrong, JL, Kingsford, RT and Jenkins, KM (2009), *The Effect of Regulating the Lachlan River on the Booligal Wetlands – the Floodplain Red Gum Swamps*, University of NSW.
- Atkinson, WR (2005), 'Yorta Yorta occupation and the search for common ground', *Proceedings of the Royal Society of Victoria*, Vol. 117, pp. 1–22.
- Attwill, PM (1994), The disturbance of forest ecosystems: The ecologic basis for conservation management, *Forest Ecology and Management*, Vol. 63, pp. 247–300.
- Auditor-General of NSW (2009), *Sustaining Native Forest Operations*, Forests NSW, performance audit conducted by The Audit Office of New South Wales.
- Australian Greenhouse Office (AGO) (2002), *Living with Climate Change: An Overview of Potential Climate Change Impacts on Australia*, Australian Greenhouse Office.
- ANCA (Australian Nature Conservation Agency) (1996), *A Directory of Important Wetlands in Australia*, 2nd edition, ANCA, Australia.
- Ayers, D, Nash, S and Baggett, K (1996), *Threatened Species of Western New South Wales*, NSW NPWS, Hurstville, available online at <http://www.threatenedspecies.environment.nsw.gov.au>.
- Bacon, P (2009), 'Expert Advice, *Environmental Protection and Biodiversity Conservation Act 1999*, for Wetlands of International Importance, NSW Central Murray State Forest', unpublished report to Commonwealth Department of Environment, Heritage, Water and the Arts.
- Bacon et al (1992), Proceedings of the Floodplain Wetlands Management Workshop, Albury, 1992.
- Barker, RD and Vestjens, WJM (1990), *The Food of Australian Birds: Passerines*, CSIRO Division of Wildlife and Ecology, Canberra.
- Barrett, C (1931), 'Wildlife on inland waters', *The Australian Museum Magazine*, 16 April 1931, pp. 211–16.
- Baur, G (1983), *Notes on the Silviculture of the Major NSW Forest Types*, Forestry Commission of NSW.
- Baur, G (1984), *Notes on the Silviculture of Major NSW Forest Types – 5. Red Gum*, Forestry Commission of NSW.
- Baxter, CI, Reid, JRW, and Jaensch, RP (2001), 'First South Australian records of the Black-necked Stork, *Ephippiorhynchus asiaticus* and occurrence of vagrants in South-Western Queensland', *South Australian Ornithologist*, Vol. 33, pp. 164–9.
- Beardsell, C (1985), *The Regent Parrot. A report on the nest site survey in south-eastern Australia, September 1983 to January 1984*, Australian National Parks and Wildlife Service Report Ser. 1.
- Beare, S and Heaney, A (2002), 'Climate change and water resources in the Murray Darling Basin, Australia: Impacts and possible adaptation', ABARE Conference Paper, 2 November 2002, World Congress of Environmental and Resource Economists, Monterey, California, 24–27 June 2002, available online at <http://weber.ucsd.edu/~carsonvs/papers/353.pdf>.
- Beaumont, L and Hughes, L (2002), 'Potential changes in the distributions of latitudinally restricted Australian butterflies in response to climate change', *Global Change Biology*, Vol. 8, pp. 954–971.
- Beckley, T, Nadeau, S, Wall, E, Martz, D (2002), '*Multiple capacities, multiple outcomes: delving deeper into the meaning of community capacity*'. Paper presented at the Annual Meeting of the Rural Sociological Society, August 14–17. Congress Plaza Hotel, Chicago, IL .
- Beer, T and Williams, AAJ (1995), 'Estimating Australian forest fire danger under conditions of doubled carbon dioxide concentrations', *Climatic Change*, Vol. 29, pp. 169–88.
- Beier, P and Noss, RF (1998), 'Do habitat corridors provide connectivity?' *Conservation Biology*, Vol. 12, pp. 1241–52, available online at http://tongass-fpadjust.net/Documents/Beir_Noss_corridors.pdf.
- Bennett, AF (1998), *Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation*, IUCN, Gland, Switzerland and Cambridge, UK.

- Bennett, AF, Lumsden, LF and Nicholls, AO (1994), 'Tree hollows as a resource for wildlife in remnant woodlands: Spatial and temporal patterns across the northern plains of Victoria, Australia', *Pacific Conservation Biology*, Vol. 1, pp. 222–35.
- Benson, JS (2008), 'New South Wales Vegetation Classification and Assessment: Part 2 Plant communities of the NSW South-Western Slopes Bioregion and Update of NSW Western Plains Plant Communities, Version 2 of the NSWVCA database', *Cunninghamia*, Vol. 10, No. 4, pp. 599–673.
- Benson, JS and Redpath, PA (1997), 'The nature of pre-European native vegetation in South-Eastern Australia: A critique of Ryan, DG, Ryan JR and Starr, BJ (1995) *The Australian Landscape – Observations of Explorers and Early Settlers*', *Cunninghamia*, Vol. 5, pp. 285–328.
- Benson, JS, Allen, C, Togher, C and Lemmon, J (2006), 'New South Wales Vegetation Classification and Assessment: Part 1. Plant communities of the NSW Western Plains', *Cunninghamia*, Vol. 9, No. 3, pp. 383–451.
- Beveridge, P (1889), *The Aborigines of Victoria and the Riverina*, ML Hutchinson, Melbourne.
- Binning, C, Cork, S, Parry, R and Shelton, D (2001), *Natural assets: An inventory of ecosystem goods and services in the Goulburn Broken catchment*, Commonwealth Scientific and Industrial Research Organisation, Canberra.
- Biodiversity and Climate Change Expert Advisory Group (2009), *Australia's biodiversity and climate change: A strategic assessment of the vulnerability of Australia's biodiversity to climate change: Summary for policy makers*, a report to the Natural Resource Management Ministerial Council, Australian Government Department of Climate Change.
- BIS Shrapnel (2001), *Red gum industry development strategy*, unpublished report prepared for State Forests NSW and the Department of State and Regional Development.
- BOM (Bureau of Technology) (2009), *Australian Annual Mean Temperature*, available online at <http://www.bom.gov.au/climate/change/amtemp.shtml>.
- Borschmann and Poynter (2003), *Developing a Plantation-Based Firewood Industry in Low Rainfall Areas of North Eastern Victoria*, report prepared for Australian Forest Growers (NE Branch), Plantations North East Inc. and Department of Primary Industries, Australia.
- Bowler, JM and Magee, JW (1978), 'Geomorphology of the Mallee Region in semi-arid northern Victoria and western New South Wales', *Proceedings of the Royal Society of Victoria*, Vol. 90, pp. 5–21.
- Bowman, DMJS (1998), 'Tansley Review No. 101, The impact of Aboriginal landscape burning on the Australian biota', *New Phytologist*, Vol. 140, pp. 385–401.
- Bradley, R and Gans, JS (1998), 'Growth in Australian Cities', *Economic Record*, Vol. 74, No. 226, pp. 266–78.
- Brady, A, Shaikh, M, King, A, Ross, J and Sharma, P (1998), *The Great Cumbung Swamp: Assessment of water requirements*, Department of Land and Water Conservation, CNR 97.043, NRMS Project R-5048.
- Bren, L. (1990), *Red gum forests*. In: 'The Murray.' (edited by Mackay, N. and Eastburn, D.). Murray-Darling Basin Commission, Canberra, pp. 231–244.
- Brereton, R, Bennett, S and Mansergh, I (1995), 'Enhanced greenhouse climate change and its potential effect on selected fauna of South-Eastern Australia: A trend analysis', *Biology Conservation*, Vol. 72, pp. 339–54.
- Brigham, RM, Debus, SJS and Geiser, F (1998), 'Cavity selection for roosting and roosting ecology of forest-dwelling Australian Owlet-nightjars (*Aegotheles cristatus*)', *Australian Journal of Ecology*, Vol. 23, pp. 424–9.
- Brooks, N and Adger, N (2005), 'Assessing and enhancing adaptive capacity', in Chopra, K, Leemans, R, Kumar, P and Simons, H (eds), *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures*, Cambridge University Press, Cambridge, UK.
- Brown, B (undated), *Some Thoughts on the Socio-Economic Impacts of Climate Change*, Namoi Catchment Management Authority.
- Brown, CM and AE Stephenson (1991), 'Geology of the Murray basin, South-Eastern Australia', Bulletin No. 235, Bureau of Mineral Resources, Geology and Geophysics, Australian Government Publishing Service, Canberra.
- Burbidge, AA (1985), *The Regent Parrot: A report on the breeding distribution and habitat requirements along the Murray River in south-eastern Australia*, Report Series No. 4., Australian National Parks and Wildlife Service, Canberra.
- CARE (Centre for Agricultural and Regional Economics Pty Ltd) (2009), *Assessing the socio-economic impacts of climate change on selected regions of NSW: Final Report to the Department of Environment, Climate Change and Water*, prepared by Roy Powell, David Thompson and Linden Chalmers, October 2009.
- Cameron, M (2006), 'Nesting habitat of the Glossy Black-cockatoo in central New South Wales', *Biological Conservation*, Vol. 127, pp. 402–10.
- Capon, S, Reid, M, Thoms, M, Parsons, M (2009), *Ecological Character of the Lower Lachlan Floodplain and Wetlands*, Rivers and Wetlands Unit, NSW Department of Environment and Climate Change and Water.
- Chambers, LE, Hughes, L and Weston, MA (2005), 'Climate change and its impact on Australia's avifauna', *Emu*, Vol. 105, pp. 1–20.
- Chapin, FS, III, Folke, C and Kofinas, G (2009), 'A Framework for Understanding Change', in Chapin, FS, III, Kofinas, GP and Folke, C (eds), *Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World*, Springer Verlag, New York.

- Chesterfield, EA, Loyn, RH and MacFarlane, MA (1984), 'Flora and fauna of Barmah State Forest and their management, *Victorian Forests Commission Research Bulletin*, Report No. 240.
- Cogger, HG (2000), *Reptiles and Amphibians of Australia*, Reed New Holland.
- Commonwealth of Australia (1992), *National Forest Policy Statement A New Focus For Australia's Forests*, Advance Press Pty Ltd, Perth.
- Commonwealth of Australia (1997), *Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia*, a report by the Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee.
- Commonwealth of Australia (2009), *Australia's Biodiversity and Climate Change. A strategic assessment of the vulnerability of Australia's biodiversity to climate change*, summary for policy makers.
- Commonwealth of Australia (2009a), *Australia's Strategy for the National Reserve System 2009–2030*. Available online at <http://www.environment.gov.au/parks/publications/nrs/pubs/nrsstrat.pdf>
- Cork, S (ed) (2009), *Brighter Prospects: Enhancing the Resilience of Australia*, Australia21, Canberra.
- Cork, S. (2001) *A framework for applying the concept of ecosystem services to natural resource management in Australia*. in Rutherford, I., Sheldon, F., Brierley, G., and Kenyon, C. (Eds), *Third Australian Stream Management Conference August 27-29, 2001*. Cooperative Research Centre for Catchment Hydrology: Brisbane. Pp 157-162. Available at http://www.ecosystemservicesproject.org/html/publications/docs/Framework_for_ecosystem_services.pdf.
- Cork, S, Shelton, D, Binning, C and Parry, R (2003), 'A framework for applying the concept of ecosystem services to natural resource management in Australia, in Rutherford, I, Sheldon, F, Brierley, G and Kenyon, C (eds), *Proceedings of the Third Australian Stream Management Conference 27–29 August 2001*, Cooperative Research Centre for Catchment Hydrology, Brisbane, pp. 157–62, available at http://www.ecosystemservicesproject.org/html/publications/docs/Framework_for_ecosystem_services.pdf.
- Coutts, PJF (1981), *Readings in Victorian Prehistory. Volume 2: The Victorian Aboriginals 1800 to 1860*, Victorian Archaeological Survey Ministry for Conservation, Victoria.
- Crosbie, RS, McCallum, JL, Walker, GR and Chiew, FHS (2008), *Diffuse groundwater recharge modelling across the Murray-Darling Basin*, a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, CSIRO, Australia, p. 108.
- CSIRO (1992), *Climate Change Scenarios for the Australian Region*, CSIRO Climate Impact Group, Aspendale, Victoria.
- CSIRO (2008), *Implications of Climate Change for the National Reserve System*, report by CSIRO Sustainable Ecosystems to the Australian Greenhouse Office, Canberra.
- CSIRO (2008a), *Water Availability in the Murray-Darling Basin*, a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, Australia.
- CSIRO (2008b), *Water Availability in the Murrumbidgee*, a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, Australia.
- CSIRO (2008c), *Water Availability in the Lachlan*, a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, Australia.
- CSIRO (2008d), *Water availability in the Murray*, a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, Australia.
- CSIRO, ANU Forestry, RIRDC, Olsen and Vickery, and Hester Gascoigne and Associates (2001) *The Contribution of Mid to Low Rainfall Forestry and Agroforestry to Greenhouse and Natural Resource Management Outcomes: Overview and Analysis of Opportunities*, Australian Greenhouse Office and MDBC.
- Cummerngunja (2009), transcribed initial submission from Kevin Atkinson on the River Red Gum Assessment, Monday 24 August, available online at <http://nrc.nsw.gov.au/content/documents/Forest%20assessment%20-%20Submission%20-%20Red%20gum%20ToR%20-%20Cummerngunja.pdf>.
- Cunningham, SC and Mac Nally, R (2009), submission to the Natural Resources Commission, available online at <http://nrc.nsw.gov.au/content/documents/Forest%20assessment%20-%20Submission%20-%20Red%20gum%20PAR%20-%20Australian%20Centre%20for%20Biodiversity.pdf>.
- Cunningham, SC, Read, J, Baker, PJ and Mac Nally, R (2007), 'Quantitative assessment of stand condition and its relationship to physiological stress in stands of *Eucalyptus camaldulensis* (Myrtaceae) in south-eastern Australia', *Australian Journal of Botany*, Vol. 55, pp. 692–9.
- Cunningham, SC, Mac Nally, R, Read, IJ, Baker, PJ, White, M, Thomson, JR and Griffioen, P (2009), 'A Robust Technique for Mapping Vegetation Condition Across a Major River System', *Ecosystems*, Vol. 12, pp. 207–19.
- Cunningham, SC, Thomson, JR, Read, J, Baker, PJ and Mac Nally, R (in press), 'Does stand structure influence susceptibility of eucalypt floodplain forests to dieback?', *Australian Ecology*.
- Curr, EM (1883), *Recollections of Squatting in Victoria from 1841 to 1851*. Melbourne University Press, 2nd edition (first published in 1883 by George Roberston).
- DAFF (2009), *Illegal logging*, available online at <http://www.daff.gov.au/forestry/international/illegal-logging>.
- Daily, GC, Soderqvist, T, Aniyar, S, Arrow, K, Dasgupta, P, Ehrlich, PR, Folke, C, Jansson, A, Jansson, BO, Kautsky, N, Levin, S, Lubchenco, J, Maler, KG, Simpson, D, Starrett, D, Tilman, D and Walker, B (2000), 'The Value of Nature and the Nature of Value', *Science*, Vol. 289, pp. 359–356.
- Daily, GE (1997), *Nature's Services – Societal Dependence on Natural Ecosystems*, Island Press, Washington.

DECC (2007), *DECC Annual Report 2006–07*, Department of Environment and Climate Change, available online at <<http://www.environment.nsw.gov.au/resources/whoweare/deccar07235ch4pt1.pdf>>.

DECC (2008), *Environmental Watering Plan for the Murrumbidgee Valley 2008/09*. NSW Department of Environment and Climate Change.

DECC (2009b), *Murray Darling Basin*, Department of Environment and Climate Change, available online at <http://www.climatechange.gov.au/climate-change/impacts/national-impacts/murray-darling-basin.aspx>.

DECCW (2008), *New South Wales National Parks Establishment Plan 2008: Directions for building a diverse and resilient system of parks and reserves under the National Parks and Wildlife Act*, Department of Environment, Climate Change and Water, NSW.

DECCW (2009), 'Internal draft report on water management in the NSW Riverina Bioregion', unpublished, Department of Environment, Climate Change and Water, NSW.

Department of the Environment, Sport and Territories (1996), *National Strategy for the Conservation of Australia's Biological Diversity*, available online at <http://www.environment.gov.au/biodiversity/publications/strategy/index.html>.

DEWHA (2008), *National Framework and Guidance for Describing the Ecological Character of Australia's Ramsar Wetlands*, Module 2 of the National Guidelines for Ramsar Wetlands – Implementing the Ramsar Convention in Australia. Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra.

DEWHA (2009), 'Biodiversity assessment – Riverina'. In: 'Australian Natural Resources Atlas', Department of the Environment, Water, Heritage and the Arts, available online at <http://www.anra.gov.au/topics/vegetation/assessment/vic/ibra-riverina.html#intro>.

DEWHA (2009a), *Toogimbe fact sheet*, available online at <http://www.environment.gov.au/indigenous/ipa/index.html>.

Dexter, B and Poynter, M (2005), Submissions to the VEAC river red gum forests investigation. Water, wood and wildlife – opportunities for the riverain red gum forests of the Central Murray, October 2005.

Dexter, BD (1970), *Regeneration of river red gum Eucalyptus camaldulensis Dehn*, Masters Thesis, University of Melbourne.

Dexter, BD (2009), *Regeneration, flooding growth study Barmah State Forest – Red Gum Field Day 27 October 2009*, submission to the Natural Resources Commission, Available online at <http://nrc.nsw.gov.au/content/documents/Forest%20assessment%20-%20Submission%20-%20Red%20gum%20PAR%20-%20Barrie%20Dexter.pdf>.

Dexter, EM, Chapman, AD and Busby, JR (1995), *The Impact of Global Warming on the Distribution of Threatened Vertebrates*, Australia and New Zealand Environment Conservation Council 1991, Environmental Resources Information Network, Australian Nature Conservation Agency, Canberra.

DHI Water & Environment Pty Ltd (2008), *Koondrook Ferricoota MIKE Flood Modelling*.

Di Stefano, J, (2001), *River red gum (Eucalyptus camaldulensis): a review of ecosystem processes, seedling regeneration, and silvicultural practice*, available online at <http://www.forestry.org.au>.

Dobson, A, Ralls, K, Foster, M, Soulé, ME, Simberloff, D, Doak, D, Estes, JA, Mills, LS, Mattson, D, Dirzo, R, Arita, H, Ryan, S, Norse, EA, Noss, RF and Johns, D (1999), 'Corridors: Reconnecting fragmented landscapes', in Soulé, ME and Terborgh, J (eds), *Continental Conservation: Scientific Foundations of Regional Reserve Networks*, The Wildlands Project, Island Press, Washington DC, pp. 129–70.

Doerr, VAJ, Doerr, ED and Davies, MJ, (in review), 'Systematic Review 44 – Does structural connectivity facilitate effective dispersal of native species in Australia's fragmented terrestrial landscapes?', in *Collaboration for Environmental Evidence*, available online at <http://www.environmentalevidence.org/SR44.html>.

Donovan, P (1997), *A history of the Millewa group of river red gum forests*, State Forests of New South Wales, Beecroft, NSW.

Doody, TM, Benyon, RG and Theiveyanathan, T (2006), 'Quantifying water savings from willow removal in creeks in south central NSW', paper for the 9th International River Symposium, Brisbane, 21–24 September 2006.

Dorrrough, J, Yen, A, Turner, V, Clark, SG, Crosswaite, J and Hirth, JR (2004), 'Livestock management and biodiversity conservation in Australian temperate grassy landscapes', *Australian Journal of Agriculture Research*, Vol. 55, pp. 279–95.

Drielsma, M, Manion, G and Ferrier, S (2007), 'The spatial links tool: Automated mapping of habitat linkages in variegated landscapes', *Ecological Modelling*, Vol. 200, pp. 403–11.

Driscoll, D, Milovits, G and Freudenberger, D (2000), *Impact and Use of Firewood in Australia*, CSIRO Sustainable Ecosystems, Canberra.

Driver, P, Chowdhury, S, Wettin, P and Jones, H (2005), 'Models to predict the effects of environmental flow releases on wetland inundation and the success of colonial bird breeding in the Lachlan River, NSW', in *Proceedings of the Fourth Annual Stream Management Conference*, Cooperative Research Centre for Catchment Hydrology, Launceston, Tasmania, 19–22 October 2004.

DSE (2004), *EVC/Bioregion Benchmark for Vegetation Quality Assessment Murray Fans Bioregion – EVC 106: Grassy Riverine Forest*, Department of Sustainability and Environment, April 2004.

DSE (2007), *EVC/Bioregion Benchmark for Vegetation Quality Assessment Murray Fans bioregion– EVC 56: Floodplain Riparian Woodland*, Department of Sustainability and Environment, Victoria.

DSE (2008), *Northern Region Sustainable Water Strategy: Draft for community comment*, Department of Sustainability and Environment, Victoria.

- DSE (2009), *Victorian Government response to Victorian Environmental Assessment Council's river red gum forests investigation*. Victorian Government Department of Sustainability and Environment Melbourne, March 2009. Available online at <http://www.dse.vic.gov.au>
- Dudding, M (1992), *Lindsay River Salinity Assessment – Progress Report No. 3*, Rural Water.
- Dudding, M (2004), 'Groundwater Trend Reversal in Northern Victoria', presentation to the 9th Murray-Darling Basin Groundwater Workshop, 2004.
- Dunlop M and Brown, PR (2008), *Implications of climate change for Australia's National Reserve System: A preliminary assessment*, Department of Climate Change, Canberra, Australia.
- Eamus, D, Hatton, T, Cook, PJ and Colvin, C (2006), *Ecohydrology: vegetation function, water and resource management*, CSIRO, Victoria, Australia.
- Eardley, KA (1999), 'A Foundation for conservation in the Riverina Bioregion', unpublished report, NSW National Parks and Wildlife Service.
- Earl, JM and Jones, CE (1996), 'The need for a new approach to grazing management – Is cell grazing the answer?' *Rangeland Journal*, Vol. 18, No. 2, pp. 327–50.
- En Chee, Y (2009), Peer review of Bacon (2009a), Research Fellow, School of Botany, The University of Melbourne, Victoria.
- Environment Australia (2001), *A directory of important wetlands in Australia*, 3rd edition, Environment Australia, Canberra, available online at <http://www.environment.gov.au/water/publications/environmental/wetlands/pubs/directory.pdf>.
- Environment Victoria (2001), *GKP Gunbower-Koondrook-Perricoota Storylines; personal stories of an iconic forest wetland on the Murray River*.
- Esplin, B, Gill, M and Enright, N (2003), *Report of the Inquiry into the 2002–2003 Victorian Bushfires*, Victorian Government, Melbourne.
- Evans, R, Bastiaanssen, W, Molloy, R and Hulbert, S (2009), 'Improving the picture for irrigation using SEBAL in Australia to measure evapotranspiration (ET)', paper presented at the Irrigation and Drainage Conference 2009, Irrigation Australia Ltd, Swan Hill, Victoria, Australia, 18–21 October 2009.
- eWater CRC (2007), *River Analysis Package (RAP) version 2.0.4.*, University of Canberra, ACT.
- Eyre, TJ, Smith, AP (1997), 'Floristic and structural habitat preferences of Yellow-bellied Gliders (*Petaurus Australis*) and selective logging impacts in southeast Queensland, Australia', *Forest Ecology and Management*, Vol. 98, pp. 281–95.
- Fensham, R. (2003), 'Grasslands', in Attiwill, P. and Wilson, B (eds) in *Ecology: An Australian perspective*, pp.247–262, Oxford University Press, South Melbourne.
- Fischer, J, Peterson GD, Gardner, TA, Gordon, LJ, Fazey, I, Elmqvist, T, Felton, A, Folke, C and Dovers, S (2009), 'Integrating resilience thinking and optimisation for conservation', in *Trends in Ecology and Evolution*, Vol. 24, Issue 10, pp. 549–554
- Florence, RG (1996), *Ecology and silviculture of eucalypt forest*, CSIRO Publishing, Australia.
- Folke, C, Chapin, FS and Olsson, P (2009), 'Transformations in ecosystem stewardship', in Chapin, FS, Kofinas, GP and Folke, C (eds), *Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World*, Springer, New York.
- Forestry Commission of NSW (1984), *Notes on the silviculture of major NSW. Forest types – 5. River red gum*, Forestry Commission NSW, Sydney.
- Forestry Commission of NSW (1985), *Management Plan for Murray Management Area – 1985*, Sydney, NSW.
- Forests NSW (2000), *Forest Practices Code. Part 4: Forest Roads and Fire Trails*, State Forests of NSW, Sydney.
- Forests NSW (2000a), *A grazing strategy for State Forests in the Riverina Region – August 2000*, submitted to Natural Resources Commission.
- Forests NSW (2001), *A review of the NSW Red Gum Industry – Part B: A detailed resource analysis State Forest and Western Land Leases*, February 2001 (unpublished).
- Forests NSW (2004), *The State Forests of the Riverina*, brochure provided by Forests NSW Information Centre, December 2004.
- Forests NSW (2005), *Living, working, playing forests: 2005–2009*, NSW Department of Primary Industries, available online at <http://www.dpi.nsw.gov.au/aboutus/resources/corporate-publications/living>.
- Forests NSW (2006), *Operational Guidelines for Aboriginal Cultural Heritage Management*.
- Forests NSW (2008), *Ecologically Sustainable Forestry Management Plan – Riverina Region NSW*, Department of Primary Industries, Sydney, NSW, available online at http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0010/266194/esfm-riverina.pdf.
- Forests NSW (2008a), *State Forests Native Forest Silviculture Manual*, NSW Department of Primary Industries, Sydney.
- Forests NSW (2008b), *Koondrook-Perricoota Forest Flood Enhancement Works Investment Proposal*.
- Forests NSW (2009a), *Harvesting and associated road work operations in South-Western NSW*, Environmental Impact Statement, available online at <http://www.dpi.nsw.gov.au/forests/info/riverinaea>.
- Forests NSW (2009b), *Koondrook-Perricoota Forest Flood Enhancement Works – Preliminary Environmental Assessment (Part 3A Application)*, Report DC09030 by Forests NSW and NSW Government Department of Water and Energy.
- Forests NSW (2009c), *Koondrook-Perricoota Presentation to National Resources Commission (NRC)*.

- Froend, RH, Bertuch, M (2007), 'A shift in the ecohydrological state of groundwater dependent vegetation due to climate change and groundwater on the swan coastal plain of Western Australia', in *Proceedings of the XXXV Congress of the International Association of Hydrogeologists. Groundwater and Ecosystems*, Lisbon 2007.
- Game Council of NSW (2009), 'Frequently asked questions. Conservation hunting on declared public land in NSW', available online at <http://www.gamecouncil.nsw.gov.au/portal.asp?p=Aug06DPLfaqs>.
- Garnaut, R (2008), *The Garnaut Climate Change Review – Final report. Chapter 22 – Transforming rural land use*, available online at www.garnautreview.org.au
- Garnett, ST and Crowley, GM (2000), *The Action Plan for Australian Birds 2000*, Environment Australia, Canberra.
- Gelletly, T (2009), 'Todd Gelletly's final submission regarding the Riverina Redgum Forests', submission to the Natural Resources Commission, available online at <http://nrc.nsw.gov.au/content/documents/Forest%20assessment%20-%20Submission%20-%20Red%20gum%20PAR%20-%20Todd%20Gelletly.pdf>.
- GHD (2009), *Draft Ecological Character Description – NSW Central Murray State Forests*, report prepared by GHD for Forests NSW, January 2009.
- GHD (2009a), '*The late Holocene origins of the modern Murray River course, South-Eastern Australia*'. School of Earth Sciences, University of Melbourne, Victoria.
- Gibbons, P and Lindenmayer, D (2002), *Tree Hollows and Wildlife Conservation in Australia*, CSIRO Publishing, Victoria.
- Gibbons, P, Lindenmayer, DB, Barry, SC and Tanton, MT (2002), 'Hollow selection by vertebrate fauna in forests of south-eastern Australia and implications for forest management', *Biological Conservation*, Vol. 103, pp. 1–12.
- Gibbons, P, McElhinny, C and Lindenmayer, DB (in review), 'Perpetuating old trees in forests managed for wood production: a case study on hollow-bearing trees in south-eastern Australia'.
- Gippel, CJ and Blackham, D (2002), *Review of environmental impacts of flow regulation and other water resource developments in the Murray River and Lower Darling River system*, Final Report by Fluvial Systems Pty Ltd, Stockton, to Murray-Darling Basin Commission, Canberra, ACT.
- GISCA Applications, *Accessibility Remoteness Index of Australia*, available online at http://www.gisca.adelaide.edu.au/web_aria/aria/aria.html.
- Goode, AM and Barnett, BG (2008), *Southern Riverine Plains Groundwater Model Calibration Report*, a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, p. 138.
- Green, K (2003), 'Impacts of global warming on the Snowy Mountains', in Howden, M. et al. (eds), *Climate Change Impacts on Biodiversity in Australia*, Outcomes of a Workshop Sponsored by the Biological Diversity Advisory Committee, 1–2 October 2002, Department of the Environment and Heritage, pp. 35–6.
- Gunningham, N (2007), 'The new collaborative environmental governance', paper for the International Meeting on Law and Society in the 21st Century, Humboldt University, Berlin, 25–28 July 2007.
- Hacker, R, Bowman, A, Fairweather, H, Hailstones, D, Hegarty, R, Holzapfel, B, Sinclair, K and Williamson, B (2006), *Climate Change Impacts and Priority Actions in the Agriculture Sector: Background Paper*, available online at http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0018/191520/Climate-change-and-agriculture---a-background-paper.pdf
- Hagen, R (1997), *Report to the Yorta Yorta Clans Group on Yorta Yorta Associations with the Claim Area*.
- Harden, GJ (ed.) (1993), *Flora of New South Wales Volume 4*, Royal Botanic Gardens and New South Wales University Press, Sydney.
- Hardwick, L, Maguire, J and Foreman, M (2001), 'Providing Water to Murrumbidgee Billabongs – Maximising Ecological Value', in *The Value of Healthy Streams*, Vol. 1. Proceedings of The Third Australian Stream Management Conference.
- Hatton TJ and R Evans (1998), *Dependence of ecosystems on groundwater and its significance to Australia*, LWRRDC Occasional Paper No. 12/98.
- Heinsohn, R, Murphy, S and Legge, S (2003), 'Overlap and competition for nest holes among Eclectus Parrots, Palm Cockatoos and Sulphur-crested Cockatoos', *Australian Journal of Zoology*, Vol. 51, pp. 81–94.
- Herron, N, Davis, R and Jones, R (2002), 'The effects of large-scale afforestation and climate change on water allocation in the Macquarie River catchment, NSW, Australia', *Journal of Environmental Management*, Vol. 65, pp. 369–81.
- Higgins, PJ (ed.) (1999), *Handbook of Australian, New Zealand and Antarctic Birds. Parrots to Dollarbird*, Oxford University Press, Melbourne, Column 4.
- Hillman, T, (2009), Former Director Murray Darling Freshwater Research Centre after O'Connell, 2003.
- Hillman, TJ, Koehn, JD, Mitchell, D, Thompson, D, Sobels, JD and Woodside, D (2000), *The Murrumbidgee: Assessing the health of a 'working river'*, report to Irrigated Agribusiness Taskforce and the Department of Land and Water Conservation.
- HO and DUAP (1996), *Regional Histories: Eegional histories of New South Wales Sydney*.
- Holland KL, Tyerman SD, Mensforth LJ and Walker, GR (2006), 'Tree water sources over shallow, saline groundwater in the lower River Murray, south-eastern Australia: Implications for groundwater recharge mechanisms', *Australian Journal of Botany*, Vol. 54, No. 2.
- Hope, J (1995), *Aboriginal Burial Conservation in the Murray Darling Basin*, Historic Environment, Vol. 11, No. 2 and Vol. 3, pp. 57–60.

- Horner, GJ, Baker, PJ, Mac Nally, R, Cunningham, SC, Thompson, JR and Hamilton, F (in press), 'Forest structure, habitat and carbon benefits from thinning floodplain forests: managing early stand density makes a difference', *Forestry Ecology and Management*.
- Horner, G, Baker, P, Mac Nally, R, Cunningham, S, Thomson, J and Hamilton, F (2009), 'Mortality of developing floodplain forests subjected to a drying climate and water extraction', *Global Change Biology*, Vol. 15, pp. 2176–86.
- Horton (1996), 'Map of Aboriginal Australia', Aboriginal Studies Press, AIATSIS, available online at <http://www.aboriginaleducation.sa.edu.au/pages/Educators/aboriginalaustralia/?reFlag=1>.
- Howden, SM, Moore, JL, McKeon, GM, Reyenga, PJ, Carter, JO and Scanlan, JC (1999), *Dynamics in the Mulga Woodlands of South-West Queensland: Global Change Impacts and Adaptation*, Working Paper Series No.99/05. CSIRO Wildlife and Ecology, Canberra, available online at <http://www.mssanz.org.au/MODSIM99/Vol%203/Howden.pdf>.
- Hughes, L (2003), 'Climate change and Australia: trends, projections and impacts', *Australian Ecology*, Vol. 28, pp. 423–43.
- ID&A (2001), *Scoping Study: Waterway Management Plan Hume to Yarrawonga Reach of the Murray River*, report prepared for the Murray-Darling Basin Commission.
- Ife, D and Skelt, K (2004), *Murray-Darling Basin Groundwater Status 1990–2000: Summary Report*, Murray-Darling Basin Commission, Canberra.
- Inland Rivers Network (2007), *Wetlands in Crisis*, available online at http://www.irnsw.org.au/pdf/IRNNews_10_1.pdf.
- IPCC (2007), *Climate Change 2007: Synthesis Report*, Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Geneva, Switzerland.
- IPCC (2007a), *Climate change 2007: The physical science basis*, contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Solomon, S, Quin, D, Manning, M, Marquis, M, Averyt, K, Tignor, MMB, Miller, HL and Chen, Z (eds), Cambridge University Press, Cambridge, UK.
- IMFN (International Model Forests Network) (2009), 'Participatory Governance', available online at <http://www.imfn.net/?q=node/14>.
- Jaakko Poyry (2005), *Overview of illegal logging*, Report prepared for DAFF, Canberra.
- Jackson, S (2005), *Australasian Journal of Environmental Management*, Vol 12, No. 3, pp 136–46.
- Jacobs, MR (1955), *Growth habits of the eucalypts*, Forestry and Timber Bureau.
- Jansen, A and Healey, M (2003), 'Frog communities and wetland condition: Relationships with grazing by domestic livestock along an Australia floodplain river', *Biological Conservation*, Vol. 109, pp. 207–19.
- Jansen, A and Robertson, AI (2001), 'Relationships between livestock management and the ecological condition of riparian habitats along an Australian floodplain river', *Journal of Applied Ecology*, Vol. 38, pp. 63–75.
- Jansen, A, Robertson, AI (2005), 'Grazing, ecological conditions and biodiversity in riparian river red gum forests in south-eastern Australia', in *Proceedings of the Royal Society of Victoria*, Vol. 117, pp. 85–95.
- Johnson B (1998), 'Consequences for the Macquarie Marshes', in *Climate Change Scenarios and Managing the Scarce Water Resources of the Macquarie River*, prepared by Hassall and Associates Pty Ltd for the Australian Greenhouse Office, pp. 61–8.
- Jurskis, V (2008), 'Drought as a factor in tree declines and diebacks', in Sanchez, JM (ed.), *Droughts: Causes, Effects and Predictions*, Nova Science Publishers Inc., New York, pp. 331–41.
- Jurskis, V. (2009), 'River red gum and white cypress forests in south-western New South Wales, Australia: Ecological history and implications for conservation of grassy woodlands', *Forest Ecology and Management*, Vol. 258, pp. 2593–2601.
- Jurskis, V, Selby, M, Leslie, D and Jurskis, D (2005), *Health of river red gum, Eucalyptus camaldulensis, in NSW Central Murray State Forests*, Forests NSW.
- Kalcounis-Rüppell, MJ, Pysllakis, JM and Brigham, RM (2006), 'Tree roost selection by bats: An empirical synthesis using metadata-analysis', *Wildlife Society Bulletin*, Vol. 33, pp. 1123–32.
- Kavanagh, RP and Bamkin, KL (1995), 'Distribution of nocturnal forest birds and mammals in relation to the logging mosaic in southeastern New South Wales', *Australia. Biol. Conserv.* Vol. 71, pp. 41–53.
- Kavanagh, RP and Stanton, MA (1998), Bird population recovery 22 years after intensive logging near Eden, New South Wales, *Emu* Vol. 103, pp. 221–231.
- Kavanagh, RP and Stanton, M (2009), 'Conserving Barking Owls in the Pilliga Forests', *Wingspan*, Vol. 19, No. 2, pp. 28–30.
- Kavanagh, RP and Wheeler, RJ (2004), 'Home-range of the greater glider Petauroides volans in tall montane forest of south-eastern New South Wales, and changes following logging', in Goldingay, RL and Jackson, SM (eds), *The Biology of Australian Possums and Gliders*, Surrey Beatty and Sons, Sydney, pp. 413–25.
- Kavanagh, RP, Debus, SJS, Rose, AB and Turner, RJ (1995), 'Diet and habitat of the Barking Owl Ninox connivens in New South Wales', *Australian Bird Watcher*, Vol. 16, pp.137–44.
- Keatley, MR and Hudson, IL (2005), 'Change in flowering dates of Australian plants: 1983–2004', *Proc. Greenhouse 2005: Action on Climate Change*, Melbourne, Australia, CSIRO, p. 81.
- Keith, DA (2004), *Ocean shores to desert dunes: The native vegetation of New South Wales and the ACT*, NSW Department of Environment and Conservation, Sydney

- Keith, DA, Williams, JE, Woinarski, CZ, Williams, J, and Gill, AM (2002), *Fire management and biodiversity conservation: key approaches and principles*. In: 'Flammable Australia: The Fire Regimes and Biodiversity of a Continent'. (edited by R Bradstock), pp. 401–425, (Cambridge University Press, Cambridge, UK).
- Keith, H, Mackey, B and Lindenmayer, D (2009), 'Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests', available online at <http://www.pnas.org/content/106/28/11635.short>.
- Killey, P, McElhinny, C, Rayner, I and Woods, J (in press), 'Modelling fallen branch volumes in a temperate eucalypt woodland: implications for large senescent trees and benchmark loads of coarse woody debris', *Australian Ecology*.
- Kingsford, RT and Norman, F I (2002), 'Australian waterbirds – products of the continent's ecology', *Emu*, Vol. 102, pp. 47–69.
- Kingsford, RT and Thomas, RF (2001), *Changing water regimes and wetland habitat on the Lower Murrumbidgee floodplain of the Murrumbidgee River in arid Australia*, NSW National Parks and Wildlife Service Report to Environment Australia.
- Kingsford, RT and Thomas, RF (2004), 'Destruction of Wetlands and Waterbird Populations by Dams and Irrigation on the Murrumbidgee River in Arid Australia', *Environmental Management*, Vol. 34, pp. 383–96.
- Kingsford, RT, Thomas, RF and Wong, PS (1996), *Significant wetlands for waterbirds in the Murray-Darling Basin*, Murray-Darling Basin Commission.
- Kirby, KL (1992), 'Accumulation of deadwood – a missing ingredient in coppicing?', in Buckley, GP (ed.), *Ecology and Management of Coppice Woodlands*, Chapman and Hall, Melbourne, pp. 99–112.
- Kneebone, E (1992), 'Interpreting Traditional Culture as Land Management', in Birkhead, J, DeLacy, T and Smith, L (eds), *Aboriginal Involvement in Parks and Protection Areas*, Australian Institute of Aboriginal and Torres Straight Islander Studies, Canberra, p. 228.
- L&EC (2007), *Land and Environment Court, Short Minutes of Order*, National Parks Association vs. Forest Commission of NSW, case no. 40854 of 2007.
- Lada, H and Mac Nally, R (2008), 'Decline and potential recovery of yellow-footed Antechinus in parts of south-eastern Australia: A perspective with implications for management', *Ecological Management and Restoration*, Vol. 9, pp. 120–25.
- Lada, H, Thomson, JR, Mac Nally, R, Horrocks, G and Taylor, AC (2007), 'Evaluating simultaneous impacts of three anthropogenic effects on the floodplain-dwelling marsupial *Antechinus flavipes*', *Biological Conservation*, Vol. 134, pp. 527–36.
- Lambeck, RJ and Saunders, DA (1993), 'The role of patchiness in reconstructed wheatbelt landscapes', in Saunders D, Hobbs, R and Ehrlich, P (eds), *Nature Conservation 3: Reconstruction of Fragmented Ecosystems*, pp. 151–61.
- Law, BS and Dickman, CR (1998), 'The use of habitat mosaics by terrestrial fauna: Implications for conservation and management', *Biodiversity and Conservation*, Vol. 7, pp. 323–33.
- Lawler, IR, Foley, WJ, Woodrow, IE and Cork, SJ (1997), 'The effects of elevated CO₂ atmospheres on the nutritional quality of Eucalyptus foliage and its interaction with soil nutrient and light availability', *Oecologia*, Vol. 109, pp. 59–68.
- Lebbink J and Lewin K (2008), *Little River Red Gum Health Investigation*, prepared by Sinclair Knight Merz for Melbourne Water.
- Leslie, D (2005), 'Is the Superb Parrot *Polytelis swainsonii* population in Cuba State Forest limited by hollow or food availability?', *Corella*, Vol. 29, No. 4, pp. 77–87.
- Leslie, DJ (2001), 'Effect of river management on colonially-nesting waterbirds in the Barmah-Millewa Forest, south-eastern Australia', *Regulated Rivers: Research and Management*, Vol. 17, pp. 21–36.
- Leslie, D and Harris, K (1996), *Water Management Plan for the Millewa Forests*. State Forests of New South Wales, Deniliquin.
- Lewis, SE (1995), 'Roost fidelity of bats: A review', *Journal of Mammalogy*, Vol. 76, pp. 481–96.
- Lindenmayer, D, Hobbs, RJ et al. (2008), 'A checklist for ecological management of landscapes for conservation', *Ecology Letters*, Vol. 11, pp. 78–91.
- Lindenmayer, DB and Franklin, JF (2002), *Conserving Forest Biodiversity: A Comprehensive Multi-scaled Approach*, Island Press, Washington, USA.
- Lindenmayer, DB and Nix, HA (1993), 'Ecological principles for the design of wildlife corridors', *Conservation Biology*, Vol. 7, No. 3, pp. 627–30.
- Lindenmayer, DB and Noss, RF (2006), 'Salvage logging, ecosystem processes, and biodiversity conservation', *Conservation Biology*, Vol. 20, pp. 949–58.
- Lindenmayer, DB, Cunningham, RB, Donnelly, CF, Tanton, MT and Nix, HA (1993), 'The abundance and development of cavities in Eucalyptus trees: A case study in montane forests of Victoria, southeastern Australia', *Forest Ecology and Management*, Vol. 60, pp.77–104.
- Lindenmayer, DB, Cunningham, RB, Tanton, MT, Smith, AP and Nix, HA (1991), 'Characteristics of hollow-bearing trees occupied by arboreal marsupials in the montane ash forests of the Central Highlands of Victoria, south-east Australia', *Forest Ecology and Management*, Vol. 40, pp. 289–308.
- Lindenmayer, DB, Foster, DR, Franklin, JF, Hunter, ML, Noss, RF, Schmiegelow, FA and Perry, D (2004), 'Salvage harvesting policies after natural disturbance', *Science*, Vol. 303, p. 1303.
- Lindenmayer, DB, Franklin, JF and Fischer, J (2006), 'General management principles and a checklist of strategies to guide forest biodiversity conservation', *Biological Conservation*, Vol. 131, pp. 433–45.

- Lindenmayer, DB, Margules, CR and Botkin, DB (2000), 'Indicators of biodiversity for ecologically sustainable forest management', *Conservation Biology*, Vol. 14, pp. 941–50.
- Lochner, K, Kawachi, I and Kennedy, BP (1999), 'Social Capital: A guide to its measurement', *Health and Place*, Vol. 5, pp. 259–70.
- Lockwood, M, Davidson, J, Curtis, A, Stratford, R and Griffith, R. (2008), *Governance principles for natural resource management*, available online at <http://lwa.gov.au/files/products/social-and-institutional-research-program/pn30299/governance-principles-natural-resource-management.pdf>.
- Lumsden, L, Bennett, A and Silins, J (2002), 'Selection of roost sites by the lesser long-eared bat (*Nyctophilus geoffroyi*) and Gould's wattle bat (*Chalinolobus gouldii*) in south eastern Australia', *Journal of Zoology*, Vol. 257, pp. 207–18.
- Lumsden, LF and Bennett, AF (2000), *Bats in Rural Landscapes: a significant but largely unknown faunal component*, In: 'T. Barlow and R. Thorburn' (edited by Balancing conservation and production in grassy landscapes), Proceedings of the bushcare grassy landscape conference, Clare SA Environment Australia Canberra, pp.42–50.
- Lunt, ID (2005), *Effects of Stock Grazing on Biodiversity Values in Temperate Native Grasslands and Grassy Woodlands in SE Australia: A Literature Review*, Environment ACT, Canberra, Technical Report No.18.
- Lunt, ID, Eldridge, DJ, Morgan, JW and Witt, GB (2007), 'Turner Review No. 13. A framework to predict the effects of livestock grazing and grazing exclusion on conservation values in natural ecosystems in Australia', *Australian Journal of Botany*, Vol. 55, pp. 401–15.
- Lunt, ID and Morgan, JW (1999), *Effect of Fire Frequency on Plant Composition at the Laverton North Grassland Reserve, Victoria*, Victorian Naturalist Research Report, Vol. 116, No. 3, pp. 84–90.
- Lunt, ID and Morgan, JW (2002), 'The role of fire regimes in temperate lowland grasslands of south-eastern Australia', In: Bradstock, R, Williams, J and Gill, AM (eds) 'Flammable Australia : the fire regimes and biodiversity of a continent'. pp.177–196. (Cambridge University Press, Cambridge UK).
- Mac Nally, R (2006), 'Longer-term response to experimental manipulation of fallen timber on forest floors of floodplain forest in south-eastern Australia', *Forest Ecology and Management*, Vol. 229, pp. 155–160.
- Mac Nally, R And Horrocks, G (2007), 'Inducing whole-assemblage change by experimental manipulation of habitat structure', *J Animal Ecology*, Vol. 76, pp. 463–650.
- Mac Nally, R and Horrocks, G (2008), 'Longer-term responses of a floodplain-dwelling marsupial to experimental manipulation of fallen timber loads', *Basic and Applied Ecology*, Vol. 9, pp. 458–465.
- Mac Nally, R, Parkinson, A Horrocks, G and Young, M (2002), 'Current Loads of Coarse Woody Debris on South-Eastern Australian Floodplains: Evaluation of Change and Implications for Restoration', *Restoration Ecology*, Vol. 10, No. 4, pp. 627–35.
- Mac Nally, R, Parkinson, A, Horrocks, G, Conole, L and Tzaros, C (2001), 'Relationships between Terrestrial Vertebrate Diversity, Abundance and Availability of Coarse Woody Debris on South-Eastern Australian Floodplains', *Biological Conservation*, Vol. 99, pp. 191–205.
- Mackowski, CM (1984), 'The ontogeny of hollows in Blackbutt, *Eucalyptus pilularis* and its relevance to the management of forests for possums, gliders and timber', in Smith, AP and Hume, ID (eds), *Possums and Gliders*, Surrey Beatty and Sons, Sydney, pp. 517–25.
- Magrath, MJL (1992), *Waterbird study of the Lower Lachlan and Murrumbidgee Valley Wetlands in 1990/91*, NSW Department of Water Resources, Sydney.
- Maher, PN (1990), *Bird survey of the Lachlan/Murrumbidgee confluence wetlands*, report to NSW National Parks and Wildlife Service, p. 153.
- Marks, GC, Incoll, WD and Long, IR (1986), *Effects of crown development, branch shed and competition on wood defect in *Eucalyptus regnans* and *E. sieberi**, Australian Forest Research, Vol. 16, pp. 117–29.
- Marshall, GR (2008) *Community-based, regional delivery of natural resource management: Building system-wide capacities to motivate voluntary farmer adoption of conservation practices*, RIRDC Publication No. 08/175, Rural Industries Research and Development Corporation, Canberra, available online at <https://rirdc.infoservices.com.au/items/08-175>.
- Mattingley, AHE (1908), 'Wild Life of the Murray Swamps', *Victorian Naturalist*, Vol. 25, pp. 60–8.
- Maunsell Pty Ltd (2003), Mike 11 Hydraulic Model – Gulf Water Management Area: *Evaluation of Low Banks to Assist Forest Flooding*, report prepared for Barmah-Millewa Forum, Sydney, Australia.
- Mawdsley, JR, O'Malley, R and Ojima, DS (2009), *A review of climate-change adaptation strategies for wildlife management and biodiversity conservation*, Conservation Biology, Vol. 23, pp.1080–1089
- McCosker, R (2008), *Yanga Vegetation Mapping: Historical Community Extent and Condition*, report to DECCW, June 2008.
- McDougall, KL (2008), 'Evidence for the natural occurrence of treeless grasslands in the Riverina region of south-eastern Australia', *Australian Journal of Botany*, Vol. 56, pp. 461–8.
- McElhinny, C (2009), *Peer review of issues relating to the management of river red gum forests*, report to Director, EPBC Compliance Section, Department Environment Water, Heritage and the Arts, Canberra.
- McGregor, H (in press), 'Large forest owls in the river red gum State Forests of south-eastern New South Wales – an account of their 2008 status', *Australian Zoologist*.
- McGregor, H (2009), *The Distribution of Six Threatened Fauna Species within the Millewa and Barooga Group of River Red Gum State Forests*, a preliminary report prepared for the NSW National Parks Association, October 2009.

- McIlroy, JC (1978), 'The effects of forestry practices on wildlife in Australia: A review', *Australian Forestry*, Vol. 41, pp. 78–94.
- MDBA (2009), *Issues Paper: Development of Sustainable Diversion Limits for the Murray-Darling Basin November 2009*, MDBA publication No. 48/09.
- MDBA (2009b), *Progress Report on The Living Murray Initiative – First Step*, report prepared by KPMG for Murray Darling Basin Authority, Canberra.
- MDBA (2009c), *Socio economic context for the Murray-Darling Basin*, available online at <http://www.mdba.gov.au/services/publications/more-information?publicationid=37>.
- MDBC (2002), *Lake Victoria Cultural Landscape Plan of Management*, Murray-Darling Basin Commission.
- MDBC (2003), *Inland Shipping The Navigation of the Murray-Darling River System*, Murray Darling Basin Commission.
- MDBC (2006a), *The Barmah-Millewa Forest Icon Site Environmental Management Plan 2006–2007*, Murray-Darling Basin Commission, publication No. 30/06.
- MDBC (2006b), *The Gunbower-Koondrook-Perricoota Forest Icon Site Environmental Management Plan 2006–2007*, Murray-Darling Basin Commission, Canberra.
- MDBC (2006c), *The Murray River Channel Icon Site Environmental Management Plan 2006–2007*, Murray-Darling Basin Commission, Canberra.
- MDBC (2007), *The Living Murray, watering the Wakool*, Fact sheet prepared by the Murray-Darling Basin Commission.
- MDBC (2007a), *Draft Gunbower Koondrook-Perricoota Forest Asset Environmental Management Plan 2007–2010*, Murray-Darling Basin Commission, Canberra.
- MCMA (Murray Catchment Management Authority) (2006), *Catchment action plan 2006*, available online at <http://www.murray.cma.nsw.gov.au>.
- MDBMC (1995), *An audit of water use in the Murray-Darling Basin*, Murray-Darling Basin Ministerial Council, Canberra.
- Menkhorst, P and Knight, F (2004), *A Field Guide to the Mammals of Australia*, 2nd edition, Oxford University Press.
- Mensforth, LJ, Thorburn, PJ, Tyerman, SD and Walker, GR (1994), 'Sources of water used by riparian *Eucalyptus camaldulensis* overlying highly saline groundwater', *Oecologia*, Vol. 100, pp. 21–2.
- Meredith, CW (1984), 'Possums or poles? – The effects of silvicultural management on the possums of Chiltern State Park, northeast Victoria', in Smith, AP and Hume, ID (eds), *Possums and Gliders*, Surrey Beatty and Sons, Sydney, pp. 575–7.
- Migration Heritage Centre (2009), *Statement of Significance, Jindera Timber Jinker c. 1900*, available online at <http://www.migrationheritage.nsw.gov.au/exhibition/objectsthroughtime/timberjinker/>.
- Miles, L and Kapos, V (2008), 'Reducing Greenhouse Gas Emissions from Deforestation and Forest Degradation: Global Land-Use Implications', *Science*, Vol. 320, pp. 1454–5.
- Millar, CI, Stephenson, NL and Stephens, SL (2007), 'Climate change and forests of the future: Managing in the face of uncertainty', *Ecological Applications*, Vol. 17, pp. 2145–51.
- Montreal Process Implementation Group (2008a), *Criteria and indicators*, available online at www.rinya.maff.go.jp/mpci.
- Morton, SR, Stafford-Smith, DM, Friedel, MH, Griffin, GF and Pickup, G (1995), 'The stewardship of arid Australia: Ecology and landscape management', *Journal of Environmental Management*, Vol. 43, pp. 195–217.
- Munday, TJ, Overton, I and Fitzpatrick, A (2008), 'Managing and protecting the local ecology and biodiversity of the Lower Murray River floodplains in SE Australia using biophysical data derived from airborne EM survey data', presentation at the 2nd International Salinity Forum, 'Salinity, water and society–global issues, local action', 31 March–3 April 2008, Adelaide, Australia.
- Murray Irrigation Limited (2009), *Murray Irrigation Limited Annual Report 2008–09*, available online at <http://www.murrayirrigation.com.au/files/3291653.pdf>.
- Murray, PA (2008), *Murrumbidgee Wetlands Resource Book*, Murrumbidgee Catchment Management Authority.
- Murrumbidgee CMA (2008), *Murrumbidgee Catchment Action Plan*, Murrumbidgee Catchment Management Authority and the NSW Government, available at <http://www.murrumbidgee.nsw.gov.au>.
- Murrumbidgee CMA (2009), *Murrumbidgee Catchment Management Authority, Schedule 3, water management*, available online at <http://www.murrumbidgee.cma.nsw.gov.au>.
- National Biodiversity Strategy Review Task Group (2009), *Australia's Biodiversity Conservation Strategy, Consultation Draft, March 2009*.
- National Parks Association of NSW (2008), 'The impact of River Red Gum logging and associated activities in NSW on matters of National Environmental Significance', unpublished report to Commonwealth Department of Environment and Heritage, NPA, Sydney.
- NWC (National Water Commission) (2007), 'River condition in the Murray-Darling Basin 2001', in: 'Australian Water Resources 2005', available online at http://www.water.gov.au/RiverandWetLandHealth/Assessmentofriverandwetlandhealth/Snapshotofriverandwetlandhealth/RiverconditionintheMurrayDarlingBasin/index.aspx?Menu=Level1_5_2_3_2.
- Navin Officer, Heritage Consultants Forests NSW Harvesting and Associated Road Work Operations in South-Western NSW (2009), *Environmental Assessment Aboriginal Cultural Heritage Desktop Review*, May 2009.
- Newton, I (1994), 'The role of nest sites in limiting the numbers of hole-nesting birds: A review', *Biological Conservation*, Vol. 70, pp. 265–76.

- Nias, D (2002), 'Managing Wetlands', in Kent, K, Earl, G, Mullins, B, Lunt, I and Webster, R (eds), *Native Vegetation Guide for the Riverina: Notes for land managers on its management and revegetation*, Charles Sturt University, Wagga Wagga.
- Noss, RF, O'Connell, MA and Murphy, DD (1997), *The Science of Conservation Planning: Habitat Conservation under the Endangered Species Act*, Island Press, Washington, DC.
- Noss, RK (2001), 'Beyond Kyoto: Forest Management in a Time of Rapid Climate Change', *Conservation Biology*, Vol. 15, No. 3, pp. 578–90.
- NPWS (2002), *Thick-billed Grasswren (eastern subspecies) Amytornis textilis modestus (North, 1902) Recovery Plan*, NSW National Parks and Wildlife Service, Sydney.
- NRC (2005), *Recommendations – State-wide Standard and targets, September 2005*, Natural Resources Commission, Sydney, available online at <http://www.nrc.nsw.gov.au/content/documents/Recommendations%20-%20State-wide%20standard%20and%20targets%20September%202005.pdf>.
- NRC (2007), *A landscape approach to vegetation management – Final Report, June 2007*, Natural Resources Commission, Sydney, available online at <http://www.nrc.nsw.gov.au/content/documents/LVP%20-%20Final%20report%20-%20Landscape%20approach%20to%20vegetation%20management.pdf>.
- NRC (2008), *Progress report on effective implementation of Catchment Action Plan, November 2008*, Natural Resources Commission, Sydney, available online at <http://www.nrc.nsw.gov.au/content/documents/Progress%20report%20on%20effective%20implementation%20of%20CAPs.pdf>.
- NRMCC (2006), *Framework for future NRM programmes*, endorsed by the Natural Resource Management Ministerial Council on 24 November 2006, available online at <http://www.nrm.gov.au/>.
- NSW Department of Commerce (2009), 'Koondrook-Perricoota Forest Flood Enhancement Works Project: Preliminary Operating Plan Draft Version 1, September 2009', unpublished.
- NSW Department of Planning (2009), *Draft Murray Regional Strategy*, available online at www.planning.nsw.gov.au.
- NSW DLWC (NSW Department of Land and Water Conservation) (2004), *Murrumbidgee Management Plan – Draft*, Murrumbidgee Region, Wagga Wagga, NSW.
- NSW DWE (NSW Department of Water and Energy) (2009), *Water sharing in the Murrumbidgee Regulated River. Progress Report 2004 to 2008*, available online at http://www.water.nsw.gov.au/Water-Licensing/About-licences/Which-Act-applies-/act_murrumbidgee/default.aspx.
- NSW Government (2008), *A new biodiversity strategy for NSW: Discussion paper*, Department of Environment and Climate Change and the Department of Primary Industries, October 2008, available online at <http://www.environment.nsw.gov.au/resources/biodiversity/08398biostr.pdf>.
- NSW Government (2009), *State Plan 2009*, available online at <http://more.nsw.gov.au/stateplan>.
- NSW MWWG (NSW Murray Wetlands Working Group) (2001), *Newsletter December 2001, Issue No. 2*, available online at <http://www.mwwg.org.au/news2.php>.
- NSW NPWS (National Parks and Wildlife Service) (2003), *The bioregions of New South Wales: their biodiversity, conservation and history*, NSW NPWS, Hurstville.
- NSW Office of Water (2009), *Critical water planning for the Lachlan Valley*, Issue 5, 9 November 2009, available online at http://www.water.nsw.gov.au/Water-Management/Water-sharing/plans_comenced/default.aspx.
- NSW Scientific Committee (2007), *Loss of hollow-bearing trees – key threatening process determination*, Gazettal date: 5 October 2007, available online at <http://www.environment.nsw.gov.au/determinations/LossOfHollowTreesKtp.htm>.
- NWC (2009), *Australian water reform 2009. Second biennial assessment of progress in implementation of the National Water Initiative*, National Water Commission, Canberra.
- O'Connor, P, Ward, K and King, A (2006), *Implementation of the Barmah-Millewa Forest Environmental Water Allocation 2005–2006, a case study of the successful delivery of the largest environmental water allocation in Australia and possibly the world*, paper presented to the 2007 International River Symposium.
- Overton IC, Jolly ID, Slavich PG, Lewis MM and Walker, GR (2006a), 'Modelling vegetation health from the interaction of saline groundwater and flooding on the Chowilla floodplain, South Australia', *Australian Journal of Botany*, Vol. 54, No. 2.
- Pardoe, C (1998), *Prehistoric Aboriginal cemeteries of the River Murray*, Institute of Aboriginal and Torres Strait Islander Studies, Canberra.
- Pardoe, C and Martin, S (2001), *Murrumbidgee Province Aboriginal Cultural Heritage Study: Report to New South Wales National Parks and Wildlife Service and Aboriginal Communities of the Region*.
- Parker, DG, Webster, R, Belcher, CA and Leslie, D (2007), 'A survey of large forest owls in State Forests of south-western New South Wales, Australia', *Australian Zoologist*, Vol. 34, pp. 78–84.
- Parks Victoria (2009), 'Box-Ironbark Ecological Management Strategy & Ecological Thinning', available online at http://www.parkweb.vic.gov.au/1process_content.cfm?section=76&page=27.
- Passfield, GRA, Simmons, CT and Doble, R (2008), 'Do artificial wetting and drying cycles for lower Murray wetlands prevent salt accumulation?', presentation to the 2nd International Salinity Forum, 'Salinity, water and society-global issues, local action'.
- Pearce, B (2009), 'Assessment of Riverina Red Gum Forests, August 2009', submission to the Natural Resources Commission, Available online at <http://www.nrc.nsw.gov.au>.

- Pels, S (1964), 'The present and ancestral Murray River system', *Australian Geographical Studies*, Vol. 2.
- Pels, S (1966), 'Late Quaternary Chronology of the Riverine Plain of South-Eastern Australia', *Journal of Geological Society Australia*, Vol. 13, No. 1, pp. 27–40.
- Pennay, M (2009), *Assessment of River Red Gum and Woodland Forest Health Using Multi-temporal Landsat TM Data Generated from the Statewide Landcover and Trees Study (SLATS) Central Murray Ramsar Site Trial*, Department of Environment Climate Change and Water NSW.
- Perault, DR and Lomolino, MV (2000), 'Corridors and mammal community structure across a fragmented, old-growth forest landscape', *Ecological Monographs*, Vol. 70, No. 3, pp. 401–22.
- Petheram, RJ, Stephen, P and Gilmour, D (2004), 'Collaborative forest management: A review', *Australian Forestry*, Vol. 67, No. 2, pp. 137–46.
- Pizzey, G (1980), *A Field Guide to the Birds of Australia*, Collins, Sydney.
- Possingham, HP (2001), *The business of biodiversity: Applying decision theory principles to nature conservation*. Earthwatch, South Melbourne.
- Powell (2009), *Fifteen Years of the Joint Venture Agroforestry Program – Foundation research for Australia's tree crop revolution*, Rural Industries and Research Development Corporation, Canberra, Australia.
- Price, P and Lovett, S (2002), 'River and riparian management fact sheet 6 – managing stock', Land and Water Australia, Canberra.
- Pritchard J, Evans R and Richardson S (2009), *Broad Salt Accessions for the River Reach between Locks 7 and 10*, prepared by REM part of Sinclair Knight Merz for the Mallee Catchment Management Authority.
- Purcell, P, Aboriginal Cultural Heritage Audit Riverina Bioregion (2003), *Project for RACD (Resource and Conservation Division) by NPWS Western Regional Assessment Unit*.
- Purcell, P (2003), *National Parks and Wildlife Service Aboriginal Cultural Heritage Audit Report, Riverina Bioregion*.
- Rhind, S (1998), 'Ecology of the Brush-tailed Phascogale in jarrah forest of south-eastern West Australia', PhD thesis, Murdoch University, Perth, Western Australia.
- Richards, GP, Borough, C, Evans, D, Reddin, A, Ximenes, FA and Gardner, WD (2007), Developing a carbon stocks and flows model for Australian wood products. *Australian Forestry*, Vol. 70, No.2, pp. 108–119.
- Richardson S, Haworth D, Overton I and Pritchard, J (2007), *Summary of floodplain processes and possible changes to groundwater conditions and salt loads associated with floodplain flow options*, prepared for the Mallee Catchment Management Authority.
- Roberts, J (2004), *Floodplain Forest and Woodlands in the Southern Murray-Darling Basin*, a report prepared for the Australia Conservation Foundation.
- Roberts, J and Marston, F, (2000), *Water regime of wetland and floodplain plants in the Murray-Darling Basin – a source book of ecological knowledge*, CSIRO Land & Water Technical Report 30/00.
- Robertson, AI (1997), 'Land-water linkages in floodplain river systems: The influence of domestic stock', in Klomp, N and Lunt, I (eds), *Frontiers in Ecology: Building the Links*, Elsevier Scientific, Oxford, UK, pp. 207–18.
- Robertson, AI (1998), 'The effect of cattle on wetlands', in Williams, WD (ed.), *Wetlands in a Dry Land: Understanding for Management*, Environment Australia and The Land and Water Resources Research and Development Corporation, Canberra, Australia, pp. 195–204.
- Rowe, M (2002), 'Current Status of Native Vegetation in the Riverina', in Kent, K, Earl, G, Mullins, B, Lunt, I and Webster, R (eds), *Native Vegetation Guide for the Riverina: notes for land managers on its management and revegetation*, Charles Sturt University, Wagga Wagga.
- Rowley, I and Chapman, G (1991), *The breeding biology, food, social organisation, demography and conservation of the Major Mitchell or Pink Cockatoo, Cacatua leadbeateri, on the margin of the Western Australian wheatbelt*, Australian Journal of Zoology, Vol. 39, pp.211–261.
- Rutherford, ID (1990), 'Ancient river, young nation', (edited by Mackay, N. and Eastburn, D.), The Murray, MDBC, Canberra, ACT, pp. 17–36.
- Salient Solutions (2007), *Assessment of salinity impacts of enhanced flooding in the Koondrook Perricoota Forest on the Wakool and Murray Rivers*, prepared by Salient Solutions for the NSW Department of Natural Resources.
- Salient Solutions (2008), *Koondrook Perricoota Forest Shallow Drilling Completion Report*, prepared by Salient Solutions for the NSW Department of Water and Energy.
- Saunders, DA, Smith, GT and Rowley, I (1982), *The availability and dimensions of tree hollows that provide nest sites for cockatoos (Psittaciformes) in Western Australia*, Australian Wildlife Research, Vol. 9, pp. 541–556.
- Scott, A (1997), *Relationships Between Waterbird Ecology and River Flows in the Murray-Darling Basin*. CSIRO Land and Water, Technical Report No. 5/97, June 1997.
- Scott, J (2006), *Murray Riverina Private Forestry (MRPF); Murray Riverina Development Committee (PFDC)*. In: 'Murray Regional Development Board Annual Report 2005–2006'. Murray Regional Development Board, Albury, p.8, available online at http://www.murraynow.com.au/home/_download/annrep2005-06.pdf.
- Scotts, D and Drielsma, M (2003), *Developing landscape frameworks for regional conservation planning: an approach integrating fauna spatial distributions and ecological principles*. Pacific Conservation Biology, Vol. 8, No.4, pp. 233–254.
- SEACI (2009), *Global warming linked to rainfall decline in south-east Australia (Media Release)*. South Eastern Australian Climate Initiative, 1 May 2009.
- Simpson, K and Day, N (2004), *Field Guide to the Birds of Australia*, 7th edition, Princeton University Press.

- Sinclair Knight Merz (2001), *Environmental Water Requirements of Groundwater Dependent Ecosystems. Environmental Flows Initiative*, Technical Report Number 2, Commonwealth of Australia, Canberra.
- Sinclair Knight Merz (2009), *Water Balance Study for Murrumbidgee River*, Draft Report in preparation for NSW State Water.
- Smith, AP and Lindenmayer, D (1988), *Tree hollow requirements of leadbeater's possum and other possums and gliders in timber production ash forests of the Victorian central highlands. Australian Wildlife Research*, Vol. 15, pp. 347–362.
- Smith, AP Andrews, SP and Moore, DM (1994), 'Terrestrial fauna of the Casino and Grafton State Forest Management Areas – descriptions and assessment of forestry impacts Northern Region State Forests of New South Wales, Casino Management Area EIS supporting document no. 6.', Forestry Commission of New South Wales, Coffs Harbour.
- Soderquist, T (1993), *Survey Methods for Tuans in Southeast New South Wales*, Unpublished report to the Forestry Commission of New South Wales.
- Soderquist, T (1995), *Brush-tailed Phascogale tapoatafa*, In: 'The Mammals of Australia' (edited by Strahan, R.), Reed Books, Chatswood.
- Soderquist, T, Lumsden, L and Bennett, A (1999), Size does matter... Large old trees in box-ironbark forests. *Wildlife in Box-Ironbark Forests Information Kit*, Department of Natural Resources and Environment, Heidelberg.
- State Forests of NSW (1999a), *Managing Our Forests Sustainably*, Forest Management Zoning in NSW State Forests Operational Circular 99/10.
- State Library of NSW (2008), *Public Libraries in NSW: Directory 2008*, available online at http://www.sl.nsw.gov.au/services/public_libraries/docs/pl_directory_08.pdf.
- Stephens, N, Wood, M, Allison, B and Howell, C (2002), 'Farmer and landowner contributions to Australia's commercial plantations', paper to 2002 Fenner Conference on the Environment, Australian Academy of Science, Canberra.
- Stern, H, de Hoedt, G and Ernst, J (2000), *Objective Classification of Australian Climates*, Bureau of Meteorology, Melbourne.
- Stott, P (1994), *Climate change and its implications for the terrestrial vertebrate fauna*, *Trans. Roy. Soc. SA*, Vol. 118, pp. 59–68.
- Strahan, R (1995), *The Mammals of Australia*. Reed Books, Sydney.
- Sutherland, L, Lunt, I and Mullins, B (2004), *Regrowth Management for Biodiversity: a Review of the Ecological Effects of Thinning Dense Regrowth Stands in Woodlands and Forests of South East Australia*, State Forests of New South Wales, Riverina Region, Johnstone Centre, Research In Natural Resources and Society, Environmental Consultancy, Report No. 42.
- Teese, N and Wright, L (2000), *The Barmah Forest In Our Blood*.
- Thackway, R and Cresswell ID (1995), *An Interim Biogeographical Regionalisation for Australia: a Framework for Setting Priorities in the National Reserves System Cooperative Program*. Australian Nature Conservation Agency, Canberra, ACT.
- Thorburn PJ, Hatton TJ and Walker, GR (1993), *Combining measurements of transpiration and stable isotopes to determine groundwater discharge from forests. Journal of Hydrology*, Vol. 150, pp. 563–587.
- Tindale, NB (1974), *Aboriginal Tribes of Australia*. University of California Press, Berkeley, LA. Available online at http://www.aboriginaleducation.sa.edu.au/files/pages/aboriginal_aust/ab_aust_south_east.pdf.
- TLM (2008), *The Living Murray – Works and Water Modelling, Stage 2 Draft Report*, Unpublished, 13 October 2008.
- Tourism NSW (2009a), *Travel to the Murray (Year Ending March 2009)*, available online at <http://corporate.tourism.nsw.gov.au/Sites/SitelD6/objLib18/The%20Murray%20YE%20Mar%2009.pdf>.
- Tourism NSW (2009b), *Travel to Riverina (Year Ending March 2009)*, available online at <http://corporate.tourism.nsw.gov.au/Sites/SitelD6/objLib18/Riverina%20YE%20Mar%2009.pdf>.
- Tourism NSW (2009c), *Travel to Outback NSW (Year Ending March 2009)*, available online at http://corporate.tourism.nsw.gov.au/Outback_NSW_p919.aspx.
- Tourism Research Australia (2008a), *Tourism Profile for Balranald Shire*. Available online at <http://www.tra.australia.com/content/documents/LGA%20Profiles/NSW/Balranald%20LGA.pdf>.
- Tourism Research Australia (2008b), *Tourism Profile for Murray Shire*, available online at <http://www.tra.australia.com/content/documents/LGA%20Profiles/NSW/Murray%20LGA.pdf>.
- Tourism Research Australia (2008c), *Tourism Profile for District of Deniliquin*, available online at <http://www.tra.australia.com/content/documents/LGA%20Profiles/NSW/Deniliquin%20LGA.pdf>.
- Tourism Research Australia (2008d), *Tourism Profile for Wakool Shire*, available online at <http://www.tra.australia.com/content/documents/LGA%20Profiles/NSW/Wakool%20LGA.pdf>.
- Tourism Research Australia (2008e), *Tourism Profile for Gannawarra Shire*, available online at <http://www.tra.australia.com/content/documents/LGA%20Profiles/VIC/Gannawarra%20LGA.pdf>.
- Tourism Research Australia (2008f), *Tourism Profile for Mildura*, available online at <http://www.tra.australia.com/content/documents/LGA%20Profiles/VIC/MilduraRural%20LGA.pdf>.
- Trall, B (1991), *Box-ironbark forests: tree hollows, wildlife and management*. In 'Conservation of Australia's forest fauna' (edited by Lunney, D.), Royal Zoological Society of New South Wales, Sydney, pp.119–124.

Turner, R and Kathuria, A (2008), *Forest health assessment with satellite multi-spectral imagery in the Gunbower-Koondrook-Perricoota Icon Site (GKPIS)*, Forests NSW.

URS (2001) *NSW Red Gum Timber Industry and State Forests Options*, Report prepared for State Forests of NSW, June 2001.

URS (2008), *Groundwater Status Report 2000–2005 – Technical Report*, prepared by URS Australia for the Murray-Darling Basin Commission, Canberra.

VEAC (2006), *River Red Gum Forests Investigation*, Discussion Paper, Victorian Environment Assessment Council.

VEAC (2008), *River Red Gum Forests Investigation*, Final Report, Victorian Environment Assessment Council.

Walker, B and Salt, D (2006), *Resilience Thinking – sustaining ecosystems and people in a changing world*. Island Press, Washington, DC, p. 192.

Walker, BH, Abel, N Anderies, JM and Ryan, P (2009), *Resilience, adaptability, and transformability in the Goulburn-Broken Catchment, Australia. Ecology and Society*, Vol. 14, No. 1, p.12.

Wallin, DO, Swanson, FJ, Marks, B, Cissel, JH and Kertis, J (1996), *Comparison of managed and pre-settlement landscape dynamics in forests of the Pacific North-West, USA. Forest Ecology and Management*, Vol. 85, pp.291–309.

Ward, N (2008), *Effective Indigenous Involvement in the Living Murray – Introducing A New Methodology*, available online at <http://www.riversymposium.com/index.php?element=WARD>

Water Technology (2009), *Barmah-Millewa Hydrodynamic Modelling. Model Re-calibration*, report by Water Technology for the Goulburn Broken Catchment Management Authority.

Webb, SG (1984), *Intensification, Population and Social Change in South-Eastern Australia: The skeletal evidence*. Aboriginal History, Vol. 8, pp.154–172.

Webster, R (1988), *The Superb Parrot. A survey of the breeding distribution and habitat requirements*, Australian National Parks and Wildlife Service, Report Series No. 12.

Webster, R (1991), *The Biology and Management of the Regent Parrot (Polytelis anthopeplus) in New South Wales*, NSW National Parks & Wildlife Service, Sydney.

Webster, R and Ahern, L (1992), *Management for Conservation of the Superb Parrot (Polytelis swainsonii) in NSW and Victoria*, NSW National Parks and Wildlife Service and Victorian Department of Conservation and Natural Resources.

Webster, R, Belcher, C and Leslie, D (2003), *A survey for threatened fauna in south western New South Wales. Australia Zoologist*, Vol. 32, No. 2, pp. 214–228.

Wentworth Group of Concerned Scientists (2008), *Senate Submission: The Urgent Provision of Water to the Coorong and Lower Lakes, September 2008*, available online at <http://www.wentworthgroup.org/blueprints/441>.

Wentworth Group of Concerned Scientists (2009), *Optimising Carbon in the Australian Landscape*, available online at http://www.wentworthgroup.org/docs/1270%20Optimising_Terrestrial_Carbon-9bfinal.pdf.

Wilkes, J (1982), *Pattern and process of heartrot in Eucalyptus microcorys*. *Australian Forestry*, Vol. 45, pp.51–56.

Williams, AAJ, Karoly, DJ and Tapper, N (2001), *The sensitivity of Australian fire danger to climate change, Climatic Change*, Vol. 49, pp.171–91.

Williams, SE, Bolitho, EE and Fox, S (2003), *Climate change in Australian tropical rainforests: an impending environmental catastrophe*, Proc. R. Soc. Lond. B., Vol. 270, pp.1887–1892.

Wormington, KR, Lamb, D, McCallum, HI and Moloney, DJ (2003), *The characteristics of six species of living hollow-bearing trees and their importance for arboreal marsupials in the dry sclerophyll forests of southeast Queensland, Australia. Forest Ecology and Management*, Vol. 182, pp. 75–92.

WSC (2009), *Continuous low Flow in Wakool River System – John Williams Urges Government*, Wakool Shire Council, Moulamein, 13 May 2009.

Ximenes, FA, Gardner, WD and Kathuria, A (2008), Proportion of above-ground biomass in commercial logs and residues following the harvest of five commercial forest species in Australia. *Forest Ecology and Management*, Vol. 256, pp. 335-346.

Yarkuwa Indigenous Knowledge Aboriginal Corporation (2009), Submission to Natural Resources Commission, available online at <http://www.nrc.nsw.gov.au/content/documents/Forest%20assessment%20-%20Submission%20-%20Red%20gum%20PAR%20-%20Yarkuwa%20Indigenous%20Knowledge%20Centre%20Aboriginal%20Corporation.pdf>.

Yates, CJ and Hobbs, RJ (1997), *Temperate eucalypt woodlands: a review of their status, processes threatening their persistence and techniques for restoration. Australian Journal of Botany*, Vol.45, pp. 949–973.

Young, M and McColl, J (2008), *A future-proofed Basin*, The University of Adelaide.

Appendix 4

Tables, figures and boxes

List of tables

Table 2.1	River red gum forest area in the Riverina bioregion	Table 5.10	Employment in the red gum timber industry reliant on public land (FTE) by business type
Table 2.2	Flow variability of some major rivers	Table 5.11	Employment in surveyed commercial operations directly related to public land (FTE) by category
Table 2.3	Murray River average discharge compared to other rivers worldwide	Table 5.12	Employment in commercial operations directly related to public land (FTE) by town
Table 2.4	Water management units	Table 5.13	Quota mill employment by length of tenure (FTE)
Table 2.5	State Forests in the NSW portion of the Riverina bioregion	Table 5.14	Previously published estimates of employment
Table 2.6	State Forests located outside of defined WMUs	Table 5.15	Direct contribution of the red gum timber industry reliant on public land
Table 3.1	Responsibilities of Australian Government agencies in forest and water management	Table 5.16	Breakdown of assets by category
Table 3.2	Responsibilities of NSW Government agencies in forest and water management	Table 5.17	Summary of base allocation of river red gum wood from NSW State Forests and Western Lands Leases
Table 3.3	State Forest zone types	Table 5.18	Base allocation volumes by Management Areas
Table 3.4	National Parks Estate reserve types	Table 5.19	Overview of total tourism in the region
Table 3.5	National Parks Estate in the Riverina bioregion	Table 5.20	Overview of the visitor source for each tourism region
Table 4.1	Area and threat status of vegetation types occurring in the bioregion's State Forests	Table 5.21	Visitor numbers and estimated expenditure in LGAs related to towns of interest
Table 4.2	Vegetation groups identified in the Riverina bioregion	Table 6.1	Traditional tribal groups or nations of the Riverina bioregion
Table 4.3	Health of the Millewa, Koondrook and Werai forests	Table 6.2	Local Aboriginal Land Councils in the Riverina bioregion
Table 4.4	Role of river red gum forests in river floodplain ecosystems	Table 6.3	Desktop audit of Indigenous heritage sites in the Riverina bioregion
Table 4.5	EPBC- and TSC-listed fauna species of the Riverina, and their broad habitat requirements	Table 6.4	Types of Indigenous archaeological sites found in the Riverina bioregion
Table 4.6	EPBC-listed CAMBA, JAMBA and ROKAMBA bird species of the Riverina	Table 6.5	Number of Indigenous heritage site recordings in State Forests with greater than 25 recorded sites
Table 4.7	TSC- and EPBC-listed flora species of the Riverina	Table 6.6	Indigenous communities consulted
Table 4.8	Key species recorded in the river red gum forests of the Riverina	Table 7.1	DECCW expert panel assessments of likely changes in biodiversity
Table 4.9	Area statistics for river red gum and other woodland types	Table 8.1	Mean and median annual flows during natural and current conditions since 1892
Table 4.10	JANIS targets for river red gum types in the Riverina	Table 8.2	Forecasted available TLM water 2009-2010
Table 5.1	Summary of forest resources utilised by the timber industry	Table 8.3	Analysis of flood flows at Yarrowonga for four climate and water resource development scenarios
Table 5.2	Description of licences issued for industry activities on public land	Table 8.4	Flood frequencies of the major Barmah-Millewa forest vegetation communities before river regulation
Table 5.3	Summary of business types	Table 8.5	Critical limits of acceptable change for red gum in NSW Central Murray State Forests
Table 5.4	Distribution of timber volumes from public land by business type	Table 8.6	Desired flow magnitude and flooding extent for Barmah-Millewa forests
Table 5.5	Percentage of total timber sourced from public land	Table 8.7	Requirements to meet Barmah-Millewa ecological objectives in relation to red gum forests based on preliminary MDBA analysis
Table 5.6	Number and location of operations	Table 8.8	Barmah-Millewa beneficial flow event definition
Table 5.7	Location of mills and sources of quota sawlogs	Table 8.9	Barmah-Millewa forests results for floods exceeding 18,300 ML/day under scenarios A, B and C, plus percentage change (from Scenario A) in indicator values for scenario Cmid
Table 5.8	Description of river red gum products	Table 8.10	Modelled inundation extent of river red gums in Millewa forests at various design flows (based on flow at Yarrowonga) that have been mapped
Table 5.9	Estimated volume and range of unit prices		

Table 8.11	Flood frequency assessment under climate-change scenarios	Table 10.13	Range of possible yield estimates from the Millewa, Koondrook-Perricoota and Campbells Island forests, by timber quality (m ³ /year)
Table 8.13	Natural (pre-regulation) flood frequencies of the Koondrook-Perricoota Forest vegetation communities	Table 10.14	Indicators, Analysis/Measurement procedures and Data source
Table 8.14	Target water requirements for meeting ecological objectives of the Flood Enhancement Project	Table 10.15	Results for CSI indicators for each of the towns as well as the outer regional NSW area
Table 8.15	Environmental indicator values under scenarios A, B and Cmid, plus percent change (from Scenario A) in indicator values for scenario Cmid	Table 11.1	Physical processes that underpin the Murray-Darling Basin's key ecosystem functions
Table 8.16	Koondrook-Perricoota operating strategies assessed in TLM model	Table 11.2	Principles for river red gum floodplain ecosystem management
Table 8.17	Flow component for steady state runs	Table 11.3	Principles and rationale for ecological thinning
Table 8.18	Vegetation groups inundated under 2,000 ML/d and 6,000 ML/d	Table 11.4	Principles and rationale for fire management
Table 8.19	Summary of environmental water releases for Murrumbidgee environmental assets since suspension of the WSP in November 200	Table 11.5	Principles and rationale for grazing management
Table 8.20	Definition of environmental indicators (wetland commence to flood flows) assessed by CSIRO	Table 11.6	Principles and rationale for river red gum silviculture
Table 8.21	Environmental indicator values under climate change scenarios A, B and Cmid, and percentage change (from Scenario A) in indicator values under scenarios B and Cmid	Table 11.7	Principles and rationale for firewood collection
Table 8.22:	Definition of environmental indicators assessed by CSIRO		
Table 8.23:	Environmental indicator values under A and Cmid, and percentage change (from Scenario A) in indicator values under scenario Cmid		
Table 9.1	Likely impact of reduced flows on TSC- and EPBC-listed fauna species in river red gum forests		
Table 10.1	Possible climate change impacts and implications for the Riverina bioregion		
Table 10.2	Proportion of Murray Management Area (MA) wood yields by Water Management Unit (WMU)		
Table 10.3	Area (ha) by Site Quality (SQ) in the Millewa forests and Koondrook-Perricoota forests		
Table 10.4	Modelled extent of flooding in the Millewa forests by Site Quality (SQ)		
Table 10.5	Modelled extent with flood enhancement works in the Koondrook-Perricoota forests by Site Quality (SQ)		
Table 10.6	Growth rates of Quota grade timber assumed in NRC modelling of long-term sustainable yields		
Table 10.7	Range of reported growth rates or production rates for river red gums		
Table 10.8	Likelihood of modelled flow rates being achieved for the Millewa forests		
Table 10.9	Likelihood of modelled flow rates being achieved for the Koondrook-Perricoota forests		
Table 10.10	Reference flooding frequency		
Table 10.11	Modelled frequency of flooding in the Millewa forests		
Table 10.12	Summary of yield estimates for the combined Millewa, Koondrook-Perricoota and Campbells Island forests		

List of figures

- Figure 1.1 NRC's analytical framework for assessment and recommendations for the river red gum forests of the NSW Riverina bioregion
- Figure 2.1 Extent of river red gum forests on public and private land in the NSW part of the Riverina bioregion
- Figure 2.2 Subregions of the Riverina bioregion
- Figure 2.3 Known mineral resources in the Riverina bioregion
- Figure 2.4 NSW Central Murray State Forests Ramsar site
- Figure 2.5 Indicative vegetation associations, geomorphic setting and flood regime
- Figure 2.6 Water management units in the Riverina bioregion
- Figure 2.7 Extent of river red gum forests on public and private land within the Millewa forests
- Figure 2.8 Extent of river red gum forests on public and private land within the Koondrook-Perricoota forests
- Figure 2.9 Extent of river red gum forests on public and private land within the Werai forests
- Figure 2.10 Extent of river red gum forests on public and private land within the Murrumbidgee region forests
- Figure 2.11 Extent of river red gum forests on public and private land within the Lowbidgee/Yanga/Western Land Lease regions
- Figure 2.12 Extent of river red gum forests on public and private land within the Lachlan region forests
- Figure 2.13 Extent of river red gum forests on public and private land within the Upper Murray River riparian zone – Albury to Tocumwal
- Figure 2.14 Extent of river red gum forests on public and private land within the Edward and Wakool rivers riparian zone
- Figure 2.15 Extent of river red gum forests on public and private land within the Lower Murray River riparian zone – downstream of Edward/Murray Junction
- Figure 3.1 Catchment Management Authorities in the NSW Riverina bioregion
- Figure 3.2 Local Government Areas in the NSW Riverina bioregion
- Figure 4.1 Broad distribution of woody and non-woody vegetation in the NSW Riverina
- Figure 4.2 Distribution of vegetation groups within all State Forests in the Riverina
- Figure 4.3 Distribution of vegetation groups within the Millewa forests
- Figure 4.4 Distribution of vegetation groups within Koondrook-Perricoota and Campbells Island forests
- Figure 4.5 Distribution of vegetation groups within the Werai forests
- Figure 4.6 Distribution of vegetation groups within the Murrumbidgee forests
- Figure 4.7 Distribution of vegetation groups within the Murrumbidgee River – Lowbidgee/Yanga/Western Land Lease regions
- Figure 4.8 Distribution of vegetation groups within the Lachlan forests
- Figure 4.9 Distribution of vegetation groups within the Upper Murray River riparian zone forests
- Figure 4.10 Distribution of vegetation groups within the Wakool and Edward rivers riparian zone forests
- Figure 4.11 Distribution of vegetation groups within the Lower Murray River riparian zone forests – downstream of Edward/Murray junction
- Figure 4.12 Relative 20-year change in projected foliage cover within the Millewa, Koondrook-Perricoota and Werai forests
- Figure 4.13 Interactions between the riverine landscape and ecological processes
- Figure 4.14 Potential habitat corridors linking river red gum refugia
- Figure 4.15 Potential distribution of EECs within State Forests in the NSW Riverina
- Figure 4.16 Distribution of wetland-dependent bird species in the Riverina (I)
- Figure 4.17 Distribution of wetland-dependent bird species in the Riverina (II)
- Figure 4.18 Distribution of threatened raptors and large forest owls in the Riverina
- Figure 4.19 Distribution of two threatened frogs and two restricted plants in the Riverina
- Figure 4.20 Distribution of threatened red gum-dependent birds in the Riverina
- Figure 4.21 Distribution of threatened mammals in the Riverina
- Figure 5.1 Towns of interest and Statistical Local Areas (SLAs) included in the regional economy
- Figure 5.2 Timber industry value chain
- Figure 5.3 Grazing Permits
- Figure 5.4 Tourism regions (by LGA)
- Figure 6.1 Indicative traditional Indigenous language groups
- Figure 6.2 Map of Local Aboriginal Land Councils in the NSW section of the Riverina bioregion
- Figure 7.1: Normalised distribution of annual rainfall at Burrinjuck Dam
- Figure 7.2: Cumulative probability of flows in the Murrumbidgee River at Wagga Wagga
- Figure 7.3 River Murray inflows 1895–2005
- Figure 7.4 Rainfall deciles for the Murray-Darling Basin, for seven years from 1 January 2002 to 31 August 2009
- Figure 7.5 Murray system inflows, excluding Snowy and Menindee inflows
- Figure 7.6 Annual mean temperature anomalies for Australia
- Figure 7.7 Relationship between means and extremes for previous climate and new climate
- Figure 7.8 Forecast NSW/ACT temperature change 2030 summer
- Figure 7.9 Forecast rainfall changes based on A2 climate-change 2050 scenario

- Figure 7.10 Assessment and reporting regions within the Murray-Darling Basin
- Figure 7.11 Run-off projections for 2030, 2050 and 2070 relative to 1990 for entire Murray-Darling Basin
- Figure 7.12 Percentage change in mean annual runoff (2030) in the Murray region under the 45 Scenario C simulations relative to Scenario A runoff
- Figure 7.13 Framework for considering uncertainty of modelled predictions
- Figure 8.1 Murray-Darling Basin annual water availability, consumptive diversion, environment/loss and flows to sea over four climate and water resource development scenarios
- Figure 8.2 Cross section view of ecological functions and the hydrology of red gum forests
- Figure 8.3 Oblique view of ecological functions and the hydrology of red gum forests
- Figure 8.4 The Living Murray's six icon sites
- Figure 8.5 Millewa Forests' eight WMAs (Leslie and Harris, 1996) plus four general management areas (red outlines)
- Figure 8.6 Barmah-Millewa modelled inundation extents for NSW (NSW regulators open for flows < 25,000 ML/d, all regulators open for flows > 25,000 ML/d)
- Figure 8.7 Millewa-modelled inundation extent of floodplain vegetation communities for 15,000 ML/d (at Yarrawonga Weir), all NSW regulators open
- Figure 8.8 Millewa-modelled inundation extent of floodplain vegetation communities for 25,000 ML/d (at Yarrawonga Weir), all regulators open
- Figure 8.9 Millewa-modelled inundation extent of floodplain vegetation communities for 45,000 ML/d (at Yarrawonga Weir), all regulators open
- Figure 8.10 Millewa-modelled inundation extent of floodplain vegetation communities for 60,000 ML/d (at Yarrawonga Weir), all regulators open
- Figure 8.11 Modelled maximum inundation extents for Koondrook-Perricoota – 2,000 ML/d
- Figure 8.12 Modelled maximum inundation extents for Koondrook-Perricoota – 6,000 ML/d
- Figure 8.13 Conceptual diagram illustrating hydrological links between the Werai forests and Millewa forests
- Figure 8.14 Landuse and key environmental assets in the Murrumbidgee River region
- Figure 8.15 Landuse and key environmental assets in the Lachlan River region
- Figure 8.16 Geomorphic regions of the Murray Basin
- Figure 8.17 Conceptual model of shallow groundwater recharge
- Figure 8.18 Location of Southern Riverine Plains groundwater model
- Figure 8.19 Preliminary results of evapotranspiration from two red gum communities and comparison with dryland using SEBAL
- Figure 11.1 Trees marked for removal or retention using STS
- Figure 11.2 Indicative stand composition following removal of trees using STS
- Figure 11.3 Trees marked for retention or removal using AGS
- Figure 11.4 Indicative stand composition following removal of trees using AGS
- Figure A6.1: NRC inspections and consultation

Appendix 5

Acronyms and glossary

List of acronyms

ABC	Australian Broadcasting Corporation	IFOA	Integrated Forestry Operations Approval
ABS	Australian Bureau of Statistics	ILUA	Indigenous Land Use Agreement
ACT	Australian Capital Territory	IPA	Indigenous Protected Area
AGS	Australian Group Selection	IPCC	Intergovernmental Panel on Climate Change
AHIMS	Aboriginal Heritage Information Management System	IU	Improved Utilisation
ANCA	Australian Nature Conservation Agency	IUCN	International Union for the Conservation of Nature
BOM	Bureau of Meteorology	JAMBA	Japan–Australia Migratory Bird Agreement
CAMBA	China–Australia Migratory Bird Agreement	JANIS	Joint ANZECC National Forest Policy Statement Implementation Sub-Committee
CAP	Catchment Action Plan	LALC	Local Aboriginal Land Council
CAR	Comprehensive Adequate and Representative	LGA	Local Government Area
CEWH	Commonwealth Environmental Water Holder	LPMA	NSW Land and Property Management Authority
CMA	Catchment Management Authority	MA	Management area
CSIRO	Commonwealth Scientific and Industrial Research Organisation	MDB	Murray-Darling Basin
DAFF	Australian Government Department of Agriculture Fisheries and Forestry	MDBA	Former Murray-Darling Basin Authority
DECC	Former NSW Government Department of Environment and Climate Change	MDBC	Murray-Darling Basin Commission
DECCW	NSW Department of Environment, Climate Change and Water	MDBMC	Murray-Darling Basin Management Committee
DEWHA	Australian Government Department of Environment, Water, Heritage and the Arts	MDBSY	Murray-Darling Basin Sustainable Yields projects
DII	NSW Department of Industry and Investment	MLDRIN	Murray Lower Darling Rivers Indigenous Nations
DPC	NSW Department of Premier and Cabinet	NES	National environmental significance
DLWC	Former NSW Department of Land and Water Conservation	NGO	Non-government organisation
DSE	Victorian Department of Sustainability and Environment (Victoria)	NPA	National Parks Association
DWE	Former NSW Department of Water and Energy	NPWS	NSW National Parks and Wildlife Service
ECD	Ecological Character Description	NRC	Natural Resources Commission
EEC	Endangered Ecological Community	NRM	Natural resource management
EIS	Environment impact statement	NRMMC	Natural Resource Management Ministerial Council
EIA	Environment Impact Assessment	NSW	New South Wales
EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>	NSWVCA	NSW Vegetation Classification and Assessment
ENSO	El Niño Southern Oscillation	NWC	National Water Commission
ESFM	Ecologically Sustainable Forest Management	RFA	Regional Forest Agreement between the Australian Government and a State Government
EVC	Ecological Vegetation Class	ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
EWA	Environmental Water Allowance	SEACI	South Eastern Australian Climate Initiative
EWMP	Environmental Works Measures Program	SLATS	State Landcare and Trees Study
FAMC	Forests Aboriginal Management Committee	STS	Single Tree Selection
FMZ	Forestry Management Zone	TLM	The Living Murray
FNPE	<i>Forestry and National Park Estate Act 1998</i>	TSC	<i>Threatened Species Conservation Act 1995</i>
FRAMES	Forest Resource Management Evaluation System	UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
FTE	Full-time equivalent	VEAC	Victorian Environmental Assessment Council
GDE	Groundwater dependent ecosystem	VCA	Vegetation Classification Assessment
GL	Gigalitre or 1 billion litres	VIC	Victoria
HQ	High quality	WMA	Water management area
IBRA	Interim Biogeographic Regionalisation of Australia	WMU	Water management unit
		WSC	Wakool Shire Council
		WSP	Water Sharing Plan

Glossary

Term	Description
Adaptive management	A systematic and iterative process for decision-making that focuses on learning-by-doing.
Alluvial fan	A fan-shaped deposit formed where a fast-flowing stream flattens, slows, and spreads onto a flatter plain.
Alluvium	Soil or sediments deposited by a river or other running water.
Anabranch	A secondary channel of a river or stream that leaves the main stream and rejoins it downstream.
Apiary	Beekeeping operations.
Arboreal	An animal which spends most if not all of its life in trees.
Australian Group Selection	A silvicultural practice where specific regeneration gaps are created within forest stands.
Benchmark vegetation condition	A term which commonly refers to the condition of an undisturbed or minimally disturbed patch of vegetation.
Billabong	A small lake or a section of still water adjacent to a river, cut off by a change in the watercourse. Billabongs are usually formed when the path of a creek or river changes, leaving the former branch with a dead end.
Bioclimate	A small-scale climatic condition generated by living organisms.
Biodiversity	The variety of all life forms: different plants, animals and microorganisms, the genes they contain and the ecosystems in which they live.
Bioregion	A broad-scale unit that captures large, geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities. The bioregions are described in the Interim Biogeographic Regionalisation for Australia (IBRA) framework. See http://www.environment.gov.au/parks/nrs/science/bioregion-framework/index.html
Biotic resources	Renewable resources such as plant biomass.
Calcareous	Mostly or partly composed of calcium carbonate, that is, containing lime or being chalky.
Carbon footprint	A measure of the impact activities have on the environment, in particular climate change. Relates to the amount of greenhouse gases produced by an activity through burning fossil fuels for electricity, heating and transportation etc.
Carbon sequestration	Storage of carbon dioxide to prevent its release into the atmosphere where it contributes to global warming.
Climate change	Any change in climate over time (generally considered to be as a result of human activity).
Coarse woody debris	Fallen dead trees and the remains of large branches on the ground in forests.
Comprehensive, Adequate and Representative	Principles for the establishment a national reserve system. Comprehensive: being a network of forest parks protecting the full range of native forest communities found within the state. Adequate: being a reserve system large enough to protect the cast range of forest dwelling plants. Representative: being a reserve system including all natural varieties within each forest type or species.
Coppice	A thicket or dense growth of stems, small trees, or bushes from a stump.
Ecological burning	A form of prescribed burning. Treatment with fire of vegetation in nominated areas to achieve specified ecological objectives.
Ecological community	An assemblage of two or more populations of different species occupying the same geographical area.
Ecologically sustainable development	Development which aims to meet the needs of current populations, while conserving ecosystems for the benefit of future generations.
Ecological thinning	Where the primary aim of forest thinning is to increase growth of selected trees, favouring development of wildlife habitat (such as hollows) rather than focusing on increased timber yields.
Ecosystem	The combined physical and biological components of an environment. An ecosystem is generally an area within the natural environment in which physical (abiotic) factors of the environment, function together along with interdependent (biotic) organisms, within the same habitat. Ecosystems can be permanent or temporary.
Ecosystem productivity	The ability of an ecosystem to produce, grow or yield products – whether trees, shrubs or other organisms.

Term	Description
Ecosystem services	Benefits people obtain from ecosystems, including provisioning services such as food, water, timber, and fibre; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis and nutrient cycling.
Ecotone	A transition area between two adjacent but different plant communities.
El Niño	Extensive warming of the central and eastern tropical Pacific Ocean, which leads to a major shift in weather patterns across the Pacific. Generally this occurs every three to eight years and is associated with drier conditions in eastern Australia.
El Niño Southern Oscillation	The oscillation between the El Niño and La Niña (or opposite) phases.
Environmental water	An amount of water allocated to the environment under an environmental entitlement.
Environmental stewardship	A concept that people have a duty to manage and care for the whole natural environment and are responsible for the continued health of the whole ecosystem. It involves integrating and applying environmental values into a process.
Ephemeral stream	Stream that flows for only short periods and then dries up.
Floodplain	Flat land besides a river that is inundated when the river overflows its banks during a flood.
Forest condition	The capacity of a forest stand to support the key elements of ecosystem function that operate in and underpin a reference stand. Condition takes into account forest health, but also includes structural and floristic changes to the forest arising from human activities such as continuous grazing, inappropriate use of fire and logging.
Forest health	Relates to the vigour of the tree canopy, where poor health is denoted by canopy dieback relating to stress factors such as drought, insects, disease, or soil chemical imbalance.
Forest Management Zone	Identifies significant environmental assets and directs how these should be managed.
Functional corridors	A linkage between resource habitats of a species consisting of landscape structures that are different from the matrix, resulting in a favourable effect on the exchange of propagules (individuals seeds genes) of the species.
Geomorphology	The study of the arrangement and form of the Earth's crust and the relationship between these physical features and the geologic structures beneath.
Geosequestration	The storage of carbon dioxide in underground geological formations.
Groundwater-dependent ecosystems	Ecosystems that use groundwater as part of survival, and can potentially include wetlands, vegetation, mound springs, river base flows, cave ecosystems, playa lakes and saline discharges, springs, mangroves, river pools, billabongs and hanging swamps.
Habitat	A place or environment in which an organism naturally occurs.
Habitat connectivity	The provision of habitat islands or micro-refuges across which biota can move across variegated landscapes. It is a key feature of natural environments.
Herbivorous	Herbivory is a form of predation in which an organism consumes principally autotrophs such as plants, algae and photosynthesizing bacteria.
Hydrogeology	The area of geology that deals with the distribution and movement of groundwater in the soil and rocks of the Earth's crust.
Hydrology	The science that deals with surface and groundwater – their occurrence, circulation and distribution, their chemical and physical properties and their reaction with the environment.
Improved utilisation logging/harvesting	Designed to remove a high proportion of the remaining mature to over-mature trees by logging or ringbarking and also thinning the regrowth.
Integrated Forestry Operations Approval	Describes the forestry operations and area to which a Forest Agreement applies. It may contain the terms of relevant licences under the <i>Protection of the Environment Operations Act 1997</i> , the <i>Threatened Species Conservation Act 1995</i> and the <i>Fisheries Management Act 1994</i> . The approval may also contain other relevant conditions. It is granted by the Ministers for the Environment, for Planning, for Forestry and, where necessary, the Minister for Fisheries.
Inundation	To cover with water, usually by the process of flooding.
JANIS criteria	The criteria for achieving the principles of comprehensiveness, adequacy and representativeness in Australia's reserve system developed by the Commonwealth and state governments.

Term	Description
Lagoon	A body of comparatively shallow salt or brackish water separated from a deeper waterbody by a shallow or exposed sandbank, reef or similar feature.
Landscape	Comprises the visible features of an area of land, including physical elements such as landforms, living elements of flora and fauna, abstract elements like lighting and weather conditions, and human elements like human activity and the built environment.
Lunette	Crescent or semi-circular shaped aeolin deposits of fine sediment located on the eastern (or lee) side of lake beds in semi-arid areas.
National Water Initiative	An initiative of the Council of Australian Governments that aims to achieve a nationally compatible market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use by optimising economic, social and environmental outcomes.
NSW Forest Agreements	Formal agreements between the NSW Minister for Environment and Climate Change, and the Minister for Primary Industries setting out how forests in particular regions will be managed as part of the NSW reserve system or as State Forests.
Overstorey	The upper level of the forest created by the crowns of trees or shrubs.
Phenological	Of or pertaining to phenology the study of periodic plant and animal life cycle events and how these are influenced by seasonal and inter-annual variations in climate.
Prescribed burning	The controlled application of fire under specified environmental conditions to a predetermined area and at the time, intensity, and rate of spread required to attain planned resource management objectives.
Quaternary period	The youngest of three periods of the Cenozoic era in the geologic time scale. It follows the Neogene period, spanning from approximately 2.588 million years ago to the present. The Quaternary includes two geologic epochs: the Pleistocene and the Holocene epochs.
Ramsar Convention	The Convention on Wetlands of International Importance is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
Ramsar site	A wetland nominated and listed on the Ramsar List of Wetlands of International Importance.
Regional Forest Agreements	20-year plans for the conservation and sustainable management of Australia's native forests to provide certainty for forest-based industries, forest-dependent communities and conservation.
Remnant vegetation	Vegetation remaining after an area has been cleared or modified.
Resilience	A measure of a system's capacity to cope with shocks and undergo change while retaining essentially the same structure and function.
Ringbarking	A process of completely removing a strip of bark around a tree's outer circumference, causing its death.
River catchment	The area of land drained by a creek or river system, or a place set aside for collecting water which runs off the surface of the land.
Riverina bioregion	The Riverina bioregion lies in south-west NSW, extending into central-north Victoria. It is approximately 9,576,964 hectares and extends from Ivanhoe in the Murray Darling Depression bioregion south to Bendigo, and from Narrandera in the east to Balranald in the west. Within its boundaries lie the towns of Hay, Coleambally, Deniliquin, Leeton, Mossgiel, Hillston, Booligal and Wentworth, while Griffith, Ivanhoe, Narrandera and Albury lie just outside its boundary in neighbouring bioregions.
River red gum	A tree of the genus <i>Eucalyptus Camaldulensis</i> . It is one of around 800 in the genus. It is a plantation species in many parts of the world but is native to Australia where it is widespread, especially beside inland water courses.
Refugia	A refugium is a biological community or geographic entity, which, because of its moderating structural characteristics and/or physical isolation, provides a sanctuary to which species or groups of species have retreated or been confined in response to threatening processes, including climatic change.
Semi-arid	A climatic region that receives low annual rainfall (200–500 mm).
Senescence	Biological changes related to aging, with special emphasis on plant, animal, and clinical observations which may apply to humans.

Term	Description
Silviculture	The art and science of controlling the establishment, growth, composition, health, and quality of forests to meet diverse needs and values of the many landowners, societies and cultures.
Stand	A group of trees in a forest that can be distinguished from other groups by their age, species composition and condition.
Tenure	A broad concept that includes ownership, tenancy and other arrangements for the use of forests.
Thinning	Cutting down and removal of a proportion of trees in a forest to provide more growing space for the remaining trees, which leads to an increase in volume of individual trees.
Threatened species	Native plants and animals in danger of becoming extinct.
Understorey	The layer of vegetation that grows below the canopy formed by the tallest trees in the forest.
Vegetation classes	Groupings of vegetation communities based on floristic, structural and ecological features.
Vegetation mosaic	The pattern of different plant communities, or stages of the same community – the term is applied particularly to communities that show cyclical change, with examples of all stages being present together in a typically extensive and well-developed community.
Viticulture	The specific branch of agriculture relating to the raising of grapes and grape vines.
Water management unit	Relatively discrete geographical areas that have varying restrictions on flow delivery and manipulation, and have stands of high-value forest.
Western Lands Lease	A contract for sustainable land management in the Western Division of NSW, under the <i>Western Lands Act 1901</i> .

Appendix 6

Communication and consultation

Communication and consultation

The NRC's communication and consultation on the river red gum forest assessment included meetings with a cross-section of interested parties, inviting written and verbal submissions, tours of the Riverina bioregion in the company of stakeholders, media releases, information updates and public forums – three in the bioregion and one in Sydney. The NRC communicated and consulted on the process for assessment as widely as possible, given the timeframe of the assessment.

The NSW Government provided the Terms of Reference for the assessment on 12 August 2009 and two days later we circulated a 'Notice of Assessment' to forestry industry representatives, relevant government agencies and their Ministers, and posted it on the NRC's website.

The Notice of Assessment outlined the timeline, scope and process for the assessment, included the Terms of Reference and invited people to register their interest in the NRC's forest assessment. Individuals and organisations who registered were kept informed of the progress of the assessment through regular updates that were sent electronically and posted on our

website. Updates were sent on 4 September, 18 September, 9 October and 6 November 2009.

Table A6.1 shows the timeline for consultation and communication.

We also sent out media releases to announce the receipt of the Terms of Reference from the Premier and to announce the release of the preliminary assessment report.

We invited public submissions through our website – first on the Terms of Reference in August 2009 and then on the preliminary assessment report in September 2009. The NRC received 5,534 submissions, of which 259 were unique and the remainder were form letters or emails.

The NRC reviewed and considered every submission during the preparation of this final assessment report and the recommendations report. Individuals, interest groups and organisations representing a broad cross-section of the community made submissions to the assessment. Several submissions provided detailed information including technical reports to support opinions or proposals.

To better understand the issues facing the river red gum forests in the bioregion and the communities which rely on them, the NRC visited the region nine times and visited 50 State Forests between August and November 2009. **Figure A6.1** shows the areas visited by the NRC.

Table A6.1: Timeline for consultation and communication

12 August 2009	Government provides Terms of Reference
14 August 2009	NRC issues Notice of Assessment
20 – 22 August 2009	Regional tour (Deniliquin)
28 August 2009	Public submissions close on Terms of Reference
4 September 2009	Information Update 1
10 – 15 September 2009	Regional tour (Deniliquin/Balranald)
18 September 2009	Information Update 2
30 September 2009	Preliminary Assessment Report to Government
9 October 2009	Information Update 3
19 – 22 October 2009	Regional tour (Albury/Deniliquin) including workshops
23 October 2009	Public submissions close on Preliminary Assessment Report
26 October 2009	Balranald public forum
27 October 2009	Barham public forum
28 October 2009	Deniliquin public forum including workshop
2 November 2009	Sydney public forum
6 November 2009	Information Update 4
21 December 2009	Final Assessment Report to Government

**natural
resources
commission**
Assessment of Red Gum Forests
Riverina Bioregion
NRC Inspections and Consultation

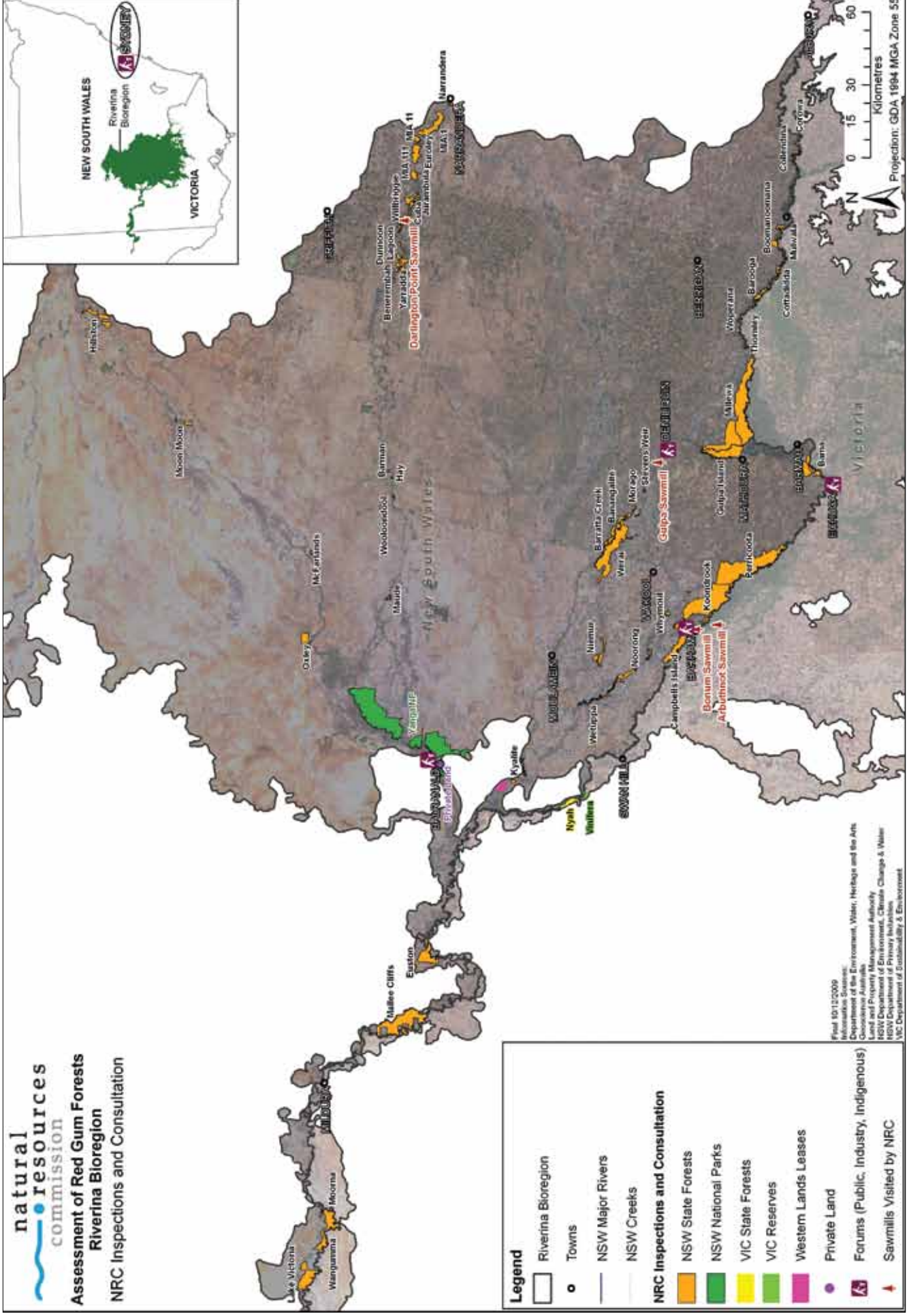


Figure A6.1: NRC inspections and consultation

The local Indigenous communities, forest industries, local government, state agencies and community representatives generously gave their time and expertise to help the NRC understand the issues concerning the river red gum forests. The NRC:

- observed silvicultural practices, and mill operations, including timber processing for high-value timber veneers
- met with Indigenous people, who shared their stories and history
- visited sites of environmental and cultural significance and observed the close connections between the forests and the communities that rely on them
- visited Yanga National Park and saw the contrast of healthy river red gum forests with non-flooded areas of drought-stressed trees
- visited interpretative centres on the history and heritage values of the rivers and their floodplain forests
- visited areas important for tourism and the recreation of locals.

Through these activities we were able to ‘view’ the forests from a diversity of perspectives. While aspirations for the forests may have differed, it was clear that everyone we consulted was concerned about the condition of the forests and wanted to see them healthy again.

Table A6.2: Organisations consulted

Organisations consulted
Government agencies
Australian Government Department of Environment, Water, Heritage and the Arts
Department of Environment, Climate Change and Water
Land and Property Management Authority
Forests NSW
Forest industry representatives
Campbell Sawmills
Darlington Point Sawmill
Forests Products Association
Merbene Sawmill
O'Brien's Sawmill
Local government
Balranald Shire Council
Berrigan Shire Council
Conargo Shire Council
Deniliquin Council
Jerilderie Shire Council
Murray Shire Council
Murrumbidgee Shire Council
Riverina and Murray Organisation of Regional Councils
Wakool Shire Council

Table A6.3: Regional consultations

Date	Event/Group consulted	Location
19 – 21 August 2009	Regional tour	
10 – 15 September 2009	Regional tour	
19 – 22 October 2009	Regional tour	
19 and 28 October 2009	Forestry Industry	
19 and 28 October 2009	Riverina and Murray Regional Organisation of Councils	
19 October 2009	Environmental groups (National Parks Association and The Wilderness Society)	
21 – 22 October 2009	Murray Lower Darling Indigenous Nations	
26 October 2009	Public forum	Balranald
27 October 2009	Public forum	Barham
28 October 2009	Public forum	Deniliquin

Table A6.4: Submissions received

Submissions on Terms of Reference – from organisations	
Arbuthnot Sawmills Pty Ltd	Murray Shire Council
Balranald Shire Council	Nambucca Valley Conservation Association
Berrigan Shire Council	National Parks Association of NSW
Bird Observation and Conservation Australia	Nature Conservation Council NSW
Bullatale Creek Landholders	North East Forest Alliance
Bullatale Creek Trust	Northern Inland Council for the Environment
Bushwalking Victoria	NSW Forest Products Association
Citizens Wildlife Corridors Armidale Inc.	NSW Red Gum Forest Action Inc.
Combined submission – Farmers, irrigators and landholders	Save Manly Dam Catchment Committee Inc.
Conargo Shire Council	South East Forest Rescue
Culpra Milli Aboriginal Corporation	The Colong Foundation for Wilderness Ltd
Cummergunja	The Friends of Eastern Otways
Ecological Surveys and Planning	The Nationals, Member for Burrinjuck
Falbrook Wildlife Refuge	The Wilderness Society Sydney
Friends of the Earth Australia	Timber Communities Australia
Hunter Community Environment Centre	Total Environment Centre Inc.
J and G Coulter Pty Ltd	Victorian National Parks Association
Lower Murray-Darling CMA	Wirralgal

Table A6.4: Submissions received (cont.)

Submissions on preliminary assessment report – from organisations	
ANGAIR Inc.	National Parks Association of NSW
Australian Centre for Biodiversity	National Parks Association – Coffs Harbour and Bellingen
Australian Conservation Foundation	National Parks Association – Reserve Committee
Balranald Shire Council	National Parks Association – Three Valleys
Bird Observation and Conservation Australia	Nature Conservation Council of NSW
Bird Observation and Conservation Australia – Echuca	North Central Catchment Management Authority
Byron Environmental and Conservation Organisation	North Coast Environment Council Inc.
Campi Bulk Transport Pty Ltd	North East Forest Alliance
Canopy Native Forest Committee	Northern Beaches Greens
Central West Environment Council	Northern Inland Environment Council
Clarence Environment Centre	NSW Apiarists Association Inc.
Clarence Valley Conservation Coalition Inc.	NSW Forest Products Association
Conargo Shire Council	NSW Red Gum Forest Action Inc.
Deniliquin Council	Oatley Flora and Fauna Conservation Society Inc.
Department of Agriculture, Fisheries and Forestry	Pikapene and Cherry Tree Environment Centre Inc.
Environment groups	Rainforest Information Centre
Firewood and Log Residue Working Group	Redgum Timber Producers (Australia) Pty Ltd
Friends of the Earth Australia	Riverina and Murray Regional Organisation of Councils
Friends of the Koala Committee	Rivers and Red Gum Environment Alliance
Glen Eira Environment Group	Shire of Wakool
Gulpa Sawmills Pty Ltd	South East Forest Rescue
Hay Shire Council	STEP Inc.
High Country Conservation Alliance Inc.	Terania Native Forests Action Group
Humane Society International	The Colong Foundation for Wilderness
Hunter Environment Lobby Inc.	The Habitat Advocate
Inland Rivers Network	The Institute of Foresters of Australia
Mathoura Chamber of Commerce and Citizens Inc.	The Nationals
Mudgee District Environment Group	The Wilderness Society Sydney
Murray Catchment Management Authority	Victorian Apiarists Association Inc.
Murray-Darling Basin Authority	Wingham Forest Action
Murray Lower Darling Rivers Indigenous Nations	Wombat Forestcare Inc.
Murrumbidgee Field Naturalists	Yarkuwa Indigenous Knowledge Centre Aboriginal Corporation
Nambucca Valley Conservation Association Inc.	

Appendix 7

Technical review panel members

Technical Review Panel member	Title and organisation
Professor Andy Bennett	Head of School, School of Life and Environmental Sciences Deakin University
Ms Di Bentley	Natural Resources Commission
Mr Ian Burns/Mr Michael Jones	Director, Environmental Works and Measures Program Murray-Darling Basin Authority
Associate Professor Leon Bren	Department of Forest and Ecosystem Science University of Melbourne
Dr Matthew Colloff	Project Leader Floodplain Ecosystem Function Commonwealth Scientific and Industrial Research Organisation
Dr Michael Harris	Senior Lecturer and Discipline Leader Faculty of Agriculture Food and Natural Resources The University of Sydney
Emeritus Professor Barry Hart	Water Studies Centre Monash University
Professor Terry Hillman	Adjunct Professor La Trobe University
Professor Peter Kanowski (Chair)	Fenner School of Environment and Society The Australian National University
Dr Glen Kile	Director Plant Health Australia
Dr Ian Lunt	Senior Lecturer School of Environmental Sciences Charles Sturt University
Dr Brian Walker	CSIRO Research Fellow Resilience Alliance Program Director and Chair of Board
Dr David Williams	Senior Lecturer in Vegetation Science Institute for Applied Ecology University of Canberra

Appendix 8

Indigenous Engagement Process Report



Report for the
Natural Resources Commission of NSW
Riverina Bioregion Regional Forest Assessment
River Red Gums and Woodland Forests

INDIGENOUS ENGAGEMENT PROCESS REPORT

NOVEMBER 2009

Prepared by:

Steven Ross
steven.ross@mldrin.org.au
Phone: 02 6051 9948
Mobile: 0428292506

Contents

Background

Themes and messages

Outputs and Outcomes

Appendices

Notes from Indigenous Engagement Meeting

Notes from Facilitator

Meeting Agenda

Submission Template

Allowable Activities Table

**Murray and Lower Darling Rivers Indigenous Nations and the Natural Resource
Commission of NSW**
**Riverina Bioregion Regional Forest Assessment
River Redgum and Woodland Forest Assessment
Indigenous Engagement Process**

Background

Murray Lower Darling Rivers Indigenous Nations

As a confederation of 10 traditional owner groups along the Murray and Lower Darling Rivers, the Murray Lower Darling Rivers Indigenous Nations (MLDRIN) has the responsibility to facilitate processes that reflect the holistic and cooperative nature of Indigenous relationships along these vital eco-systems including the forests.

The MLDRIN principles of Caring for Country are:

- Healthy, clean and alive;
- Restocked and re-vegetated;
- Free flowing with natural cycles;
- Access rights for Indigenous people so they can move freely to continue cultural practice;
- Traditional fishing/hunting;
- Indigenous people and Nations recognised and respected for what and who we are;
- The rivers and tributaries are respected and cared for;
- Indigenous Nations recognised as sovereign entities in their own country; and
- The Forests must be appropriately watered including water allocations for a cultural purpose.

With these principles in mind a meeting with was held with relevant traditional owners and the NRC on 21 October 2009 at Deniliquin.

Natural Resources Commission of NSW

The Natural Resources Commission of NSW (NRC) has carriage of the assessment into Riverina Redgum and Woodland Forests. As part of its terms of reference:

“The Commission should also consult with relevant Traditional Owners, Local Aboriginal Land Councils, Elders groups and local government”.

MLDRIN initially approached the NRC to run an Indigenous engagement similar to that undertaken for the Redgum investigation by the Victorian Environmental Assessment Council (VEAC) in 2006-2008.

MLDRIN's role in the proposal was to:

- Disseminate information on the NRC assessment process;
- Facilitate the relationship between the NRC and the relevant Indigenous parties;
- Organise meetings of and between the parties ;
- Develop templates for responses by the parties and assist in submissions;
- Gather relevant information such as cultural sites mapping and other hard data;
- Source and provide technical and expert knowledge on the bio-region and key issues
- Provide information on different forms of land tenure; and
- Any other tasks deemed necessary by the parties.

It was also offered to extend the engagement process beyond traditional owners to include land councils and other indigenous organisations within the bio-region study area.

Due to limited time and resources the NRC and MLDRIN agreed to a more focused engagement process that would still engage relevant traditional owners and endeavor to capture their history, connections, concerns, issues, interests and aspirations in these significant forest areas.

Facilitator

MLDRIN and the NRC agreed to employ the services of an independent facilitator. It was agreed to engage Tony McAvoy, an Indigenous barrister from Sydney. Tony has experience in Native Title negotiations and the establishment of joint management and agreement making throughout Australia.

Tony has also working extensively with MLDRIN including facilitating joint management workshops, water engagement process and drafting of MLDRIN's *Echuca Declaration on Cultural Flows*.

Themes and messages from the Engagement Meeting

- Ancient relationship and affinity traditional owners have with land and waters and these forests in particular;
- Ongoing and contemporary connection including exploitation by traditional owners within the forests including hunting, collection of native foods and cultural activities;
- A recognition of inherent rights of traditional owners needs to occur;
- Illustration of ecological devastation and associated the effects cultural livelihoods of traditional owners;
- The cultural character, as well as the ecological character of these forests must be understood by non-Indigenous peoples;
- Cultural heritage must be protected, including improved access to and management of cultural sites;
- Emerging environmental issues such as mining and climate change will have further adverse impacts on traditional owners;
- Engagement should use informed consent principles;
- There is a history of lack of engagement with traditional owners for example with Forests NSW;
- Access into these forests, wetlands and the Rivers and waterways is an important issue;
- A change of tenure, protected by legislation is need to protect the forests;
- Water, including cultural flows must be included in the final recommendations;
- Economic development including jobs creation for Indigenous peoples must be considered;
- International obligations such as Ramsar should be adhered to;
- Access and benefit sharing and intellectual property should be considered;
- Strategic alignment between the NRC assessment and other processes such as the Murray Darling Basin Authority Basin Plan, needs to occur; and
- The need for a process beyond the final report to ensure appropriate and legitimate Indigenous involvement in whatever land tenure changes are recommended.

Outputs and Outcomes

The NRC, MLDRIN and most importantly traditional owners have seen the following outputs and outcomes:

- The NRC received 3 submissions from traditional owner groups and/organizations representing traditional owners – Yorta Yorta, Yarkuwa Indigenous Knowledge Centre and MLDRIN;
- The NRC also received individual submissions from Jimmy Ingram, Stewart Taylor and Neville Williams;
- There has been a definite increase in the knowledge of the NRC assessment within traditional owner groups;
- A greater understanding of NRC processes including constraints, limits and expectations;
- A greater awareness of the cultural, social, economic rights of indigenous peoples within these forests;
- A greater understanding of the diversity of opinion and aspirations within traditional owner groups;
- Improved relationships between NRC, MLDRIN and traditional owners.

Appendices

Document 1: Notes from the Indigenous Engagement Meeting 21 October 2009

Participants

Natural Resources Commission of NSW:

John Williams, Felicity Calvert, Di Bentley.

Facilitator:

Tony McAvoy

Indigenous participants:

Fred Egan (Wamba Wamba)	Neville Whyman (Barapa Barapa)
Pat Moore (Wamba Wamba)	Ramsay Freeman (Wirdjuri)
Debbie Flower (Wamba Wamba)	Jim Ingram (Wirdjuri)
Ken Stewart (Wamba Wamba)	Neville Williams (Wiradjuri)
Stewart Taylor (Wamba Wamba)	Jeannie Charles (Mutthi Mutthi)
Stephen Charles (Wamba Wamba)	Jason Pappin (Mutthi Mutthi)
Darren Baxter (Wamba Wamba)	Mary Pappin (Mutthi Mutthi)
Steven Ross (Wamba Wamba/MLDRIN)	Jeanette Crew (Wamba Wamba)
Denise Morgan-Bulled (Yorta Yorta)	Laura Ross (Wamba Wamba)
Marlene Taylor (Barapa Barapa)	Sharnie Hamilton (Wamba Wamba)
Dawn Smith (Barapa Barapa)	Esther Kirby (Barapa Barapa)
Grace Smith (Barapa Barapa)	Lillian Smith (Barapa Barapa)
Roland Smith (Barapa Barapa)	

- 30 November is the final report deadline and the NRC need a process forward beyond the final recommendations.
- Should be River Country – not “forests”.
- Lachlan River
 - A lot of deforestation has occurred with no River flow.
 - Lake Cowal Gold Mine should never have proceeded.
 - No lining of toxic waste on pool – cyanide leaking pool.
- Water is the key point in the preliminary report.
- Survey areas should be put in – the percentages are really low and need to be included.
- Cultural flows needs be included in the document.
- Human remains and repatriation needs to be included.
- 5 November 2009 is a public meeting in Sydney where all are invited.
- Where are cultural flows going to be acknowledged?
- Preparation on the preliminary report – what indigenous involvement has there been? Engagement in the preliminary report was only limited in Werai and Millewa.
- It will difficult to capture the depth of feeling from the damage to these forests.
- Logging on crown land is occurring in Barham including near the River and including canoe trees.
- Anna Flanagan from NSW Forestry has been contacted about this issue. Barapa Barapa has an incorporated body and should be negotiated with.
- NSW Forestry won't talk to Barapa Barapa.
- Legislation should be changed to fully protect cultural heritage and include Indigenous interests – including rangers from the Traditional Owners.
- Freehold title should be considered for Forestry tenure.
- Photos can be taken but must come with a disclaimer that they are in no way an endorsement of NRC reports or processes.
- Contemporary value and uses – restoration of the river and NRM through CMAs.
- Jobs for young people should included as part of recommendations – more broad jobs than logging jobs.
- Should include rehabilitation work for the forests.
- Some Elders carry the burden of ring barking and destroying the environment.
- Under traditional lore the traditional owners have the inherent right to speak for country.
- Cultural flows – share of environmental allocation.
- 1. Holistic management and 2. International mechanisms including Ramsar and the Declaration on the Rights of Indigenous Peoples.
- Access to and protection of native medicines and foods should be looked at.
- Culture can be respected as a walking track.
- Intellectual property is a major issue and should rest with Traditional Owners.
- Access and Benefit sharing should also be considered.
- Haven't even got access to the Rivers.
- Permit under the *Aboriginal Land Rights Act* (section 47) gives you access to anyone's land for the purposes of cultural activity.

Action: get a copy of the forms for the meeting participants.

- We need licenses to access State Forests to hunt and practice our Traditional practices.
 - Section 211 of the Native Title Act states that you do not need a permit to practice culture – claimant or holder?
 - Exercising traditional rights – marine agreements.
 - Interconnectedness of the marine and submerged aquatic plants and the trees.
 - We want to be involved in the zoning process including those under the *Native Vegetation Act*.
 - Water should not be privatized and sold overseas.
 - You must have water for the trees.
 - Trying to align the NRC report with the MDBA Basin-wide plan.
 - Water should be allocated to traditional owners for cultural flows.
-

Document 2: Note from Facilitator

**A L MCAVOY
BARRISTER**

FREDERICK JORDAN CHAMBERS

Ground Floor, 53 Martin Place
Sydney NSW 2000
DX 450 SYDNEY
Tel: 02 92297395
Fax: 02 9221 6944
mcavoy@fjc.net.au

**Re: Indigenous Engagement Session – River Red Gum Assessment –
21 October 2009, Deniliquin, NSW**

I confirm that I attended at the Intercentre at Deniliquin on 21st October 2009 as facilitator for the purposes of a meeting between the NSW Natural Resources Commissioner, Mr John Williams, and the Indigenous Nations affected by the River Red Gum assessment.

It appears to me from the discussions which occurred on the day with Mr Williams, and his staff who were in attendance, that he is of the view there are significant opportunities for Indigenous people to either own or participate in management of the Crown Estate in which the remnant River Red Gum presently exists. In order to capitalise on this opportunity, it would seem to me that the Indigenous nations ought to ensure that the final report includes recommendations regarding further Indigenous engagement and development of management options and models in a detailed form.

It would appear the prospects of survival for the River Red Gum are of great concern to the NSW Government. The degree to which it will make use of Indigenous options in the solutions to this problem will, in part, be limited by the Indigenous community's ability to resolve internal disputes.

The difficulty some of the MLDRIN Nations face is that there are no tribunals for resolving boundary disputes, other than the Federal Court which can only do so in respect of competing native title applications. There are some options if the competing interests are prepared to be bound by the decision of a third party. Such solutions only work where the parties are willing to seek a resolution. I am not certain that those circumstances exist in the present disputes.

I am happy to discuss methods of resolution of the existing difficulties with you.

Document 3: Indigenous Engagement Meeting Agenda

Agenda: Wednesday 21 October 2009

9:30am	Welcome and Introduction
10:00am	Background to NRC Riverina Redgum Assessment
10:30am	Broad discussion on rights and interests in Traditional Owners in Forest Management
11:00am	<i>Morning Tea</i>
11:30am	Where to from Here?
12:30pm	<i>Lunch</i>

Split Session – 1 on 1 with Traditional Owners and NRC (John Williams or Felicity Calvert)

1:30pm	Session 1	Wiradjuri	Mutthi Mutthi
3:00pm	Session 2	Yorta Yorta	Barapa Barapa
4:30pm	Session3	Wamba Wamba	

Document 4: Submission Template



**Template Submission for Indigenous Nations
NSW Natural Resource Commission
Regional Assessment of River Redgum Forests in the Riverina Bio-Region**

Opening Statement from Organisation's Chairperson

Points to include:

- An overall statement about the process;
- An acknowledge of other organisations that have supported your work;
- An acknowledgement of similar submissions;
- The aspirations of your people; and
- Perhaps an invitation to be involved further in the process.

Background

Points to include:

- Profile of your peoples including relevant information such as genealogical information, boundaries, maps and general or specific cultural information [this section depends largely on how much information you want to give – base this on what is already public and what your people want to state about themselves]; and
- History of your Nation's organisation including when you were incorporated, your governance arrangements and how you make decisions, your executive structure and your achievements.

Substantive Argument

Points to include:

- State clearly what land tenure you want to see for the relevant River Redgum Forest in your traditional country;
 - State the benefits you can see coming to your Nation from the land tenure you have chosen [this may include cultural and socio-economic benefits such as employment and other enterprise developments];
 - Outline the disadvantages of not changing or changing to another form of tenure;
 - Outline what process you have undertaken to reach this decision; and
 - General summary and/or appendix of your submission including contact details and any supporting documents.
-

Document 5: Allowable Activities Table



SUMMARY OF MAJOR PUBLIC LAND TENURES IN NSW

Tenure	Allowable Activities	Descriptions
National Park	No logging, grazing, mining, or firewood collection allowed. Camping allowed in designated camp sites only. Fishing allowed. Hunting and gathering by Indigenous people for domestic uses (not commercial) is allowed – except for collection of threatened species or communities.	National parks are relatively large areas of land set aside to identify, protect and conserve areas containing outstanding and representative ecosystems, and natural and cultural features, while providing opportunities for sustainable visitor use and enjoyment. They are permanently reserved for conservation and public appreciation, education and recreation, and apart from essential management and visitor facilities, are preserved in their natural state.
Nature Reserve	No logging, grazing, mining, or firewood collection allowed. Recreation mostly discouraged, often no camping allowed. Hunting and gathering by Indigenous people for domestic uses (not commercial) is allowed – except for collection of threatened species or communities.	Nature reserves are protected and conserved for their unique or representative ecosystems, species, communities or other natural values. They also protect and conserve any cultural values that occur on the site. Management practices aim to maximise the value of nature reserves for appropriate scientific research and monitoring, and to promote understanding of their natural and cultural values. Due to their significant natural and cultural values, visitor use of nature reserves is often limited.
State Conservation Area	No logging, grazing or firewood collection allowed. Mineral exploration and mining are permitted. Camping allowed in designated camp sites only. Fishing allowed. Hunting and gathering by Indigenous people for domestic uses (not commercial) is allowed – except for collection of threatened species or communities.	State conservation areas are permanently reserved areas that contain significant or representative ecosystems, landforms or natural phenomena, or places of cultural significance. Provided these activities are compatible with the conservation of the area's natural and cultural values, state conservation areas can provide opportunities for sustainable visitor use and enjoyment, for the sustainable use of buildings and structures, and for appropriate research and monitoring. [#]
Aboriginal Area	No logging, grazing, mining or firewood collection. Camping generally allowed in designated camp-sites only. Fishing allowed. Aboriginal people may be provided with special access to Aboriginal areas for cultural purposes.	Aboriginal areas are associated with a person, event or historical theme, or contain a building, place, feature or landscape of cultural significance to Aboriginal people or that is of importance in improving public understanding of Aboriginal culture and its development and transitions. They are reserved to protect and conserve these cultural values, both from before and after European settlement, as well as natural values that are present. Aboriginal areas are also used for the promotion of public understanding and appreciation of the significance of their natural and cultural values, where appropriate.
State Forests	Logging, grazing, mining and firewood collection allowed and encouraged. Camping generally permitted almost anywhere. Fishing allowed. Public access can be restricted when logging is occurring. Access restricted to mine sites and leases. Some protection from logging provided for small areas by Flora Reserves and Special Management Zones within State Forests.	State Forests are for the exploitation of timber and mineral resources with relatively unconstrained recreational use also allowed (subject to extractive activities). There are some conditions on logging but these are generally inadequate to protect environmental or cultural values.

NB. The hunting and gathering rights of Indigenous Australians in National Parks and reserves are set down in the NSW *National Parks and Wildlife Regulation 2002* (Part 6). Regulations are not as secure as an Act of Parliament, and can be changed without opportunity for amendment by the parliament.

[#] All forms of permanent reserve estate gazetted under the *National Parks and Wildlife Act 1974* are available for Aboriginal Ownership and joint management.

Appendix 9

Methodology for economic analysis

This appendix describes the methods that were used to undertake the economic analysis reported in **Chapter 5**.

A9.1 Industry survey

To inform the assessment and the development of the industry impact models, Arche Consulting conducted an industry survey on behalf of the NRC. The survey population was identified with the assistance of Forests NSW. Forests NSW provided a contact list of all businesses that hold base licence allocations (quota, ex-quota, residue) to access timber resources on public land (including Western Lands Leases).

A9.1.1 Survey population

Table A9.1 provides a summary of industry participation in the survey.

Some businesses hold licences for more than one type of base allocation (e.g. quota and ex-quota), more than one licence of the same allocation type, or both. Therefore the total number of businesses in the population is less than the sum of the

number of businesses in each category. In total, there are 32 businesses that are licensed by Forests NSW. Of the total number of businesses, 25 (78%) were contacted to participate in the survey. Of the total number of businesses, 19 (59%) were respondents to the survey. **Table A9.2** provides a breakdown of the number of businesses by allocation held.

A9.1.2 Survey questionnaire

Two surveys were designed:

- a detailed face-to-face survey for quota holders
- a less detailed telephone survey for ex-quota and residue holders.

Both surveys collected the following information:

- business background and history
- timber sources and harvest activity
- products and markets
- revenue
- employment.

Table A9.1: Summary of industry participation in survey

	Quota	Ex-quota	Residue
Number of businesses	6	8	23
Number completed	6	6	12
Number contacted, not completed	-	1	5
Number not contacted		1*	6
% total volume completed	100	92	70
% total volume contacted, not completed	-	6	21
% total volume completed/contacted	100	98	91
% volume not contacted	-	2	9

* Contact details provided not current.

Table A9.2: Summary of businesses and survey responses for each allocation type

	All	Respondents
Number of businesses with only quota and ex-quota	4	4
Number of businesses with quota, ex-quota and residue	2	2
Number of businesses with only ex-quota	5	3
Number of businesses with only ex-quota and residue	3	2
Number of businesses with only residue	18	8
TOTAL	32	19

In addition to this data, the detailed survey of quota holders collected information relating to:

- employee age and tenure
- expenditure
- assets.

The Timber Survey Questionnaire is attached at the end of this appendix.

A9.2 Regional input-output analysis

A9.2.1 Methodology

Regional economic impact assessment is primarily concerned with the effect of an impacting agent on an economy in terms of a number of specific indicators, such as gross regional output, value-added, income and employment. These indicators can be defined as follows:

- gross regional output – the gross value of business turnover
- value-added – the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output
- income – the wages paid to employees including imputed wages for the self employed and business owners
- employment – the number of people employed (including full-time and part-time).

An impacting agent may be an existing activity within an economy or may be a change to a local economy (Jensen and West, 1986). This assessment is concerned with the impact of the existing timber industry along the Murray River reliant on the NSW river red gum timber resource.

A9.2.1.1 Selection of method

Four general methods are available for estimating direct and indirect regional economic impacts of an activity, namely economic base multipliers, regional Keynesian multipliers, econometric models and input-output models.

Input-output analysis is generally considered to be methodologically superior to the simpler techniques such as the economic base approach or the use of regional Keynesian employment multipliers. This superiority is generally considered to be attributable to the following factors (Jensen and West, 1986):

- In terms of the incidence of impact, the economic base and the Keynesian approaches normally provide impact measurement only in aggregate terms, i.e. the total impact felt by all sectors collectively. Input-output multipliers allow the analyst to examine the manner in which the total impact is distributed among the sectors of the economy. This is a reflection of the internal linkages and interdependencies in the economy which are specified in the input-output table.

- Input-output multipliers also allow the identification of the components of the multiplier; the economic base and Keynesian models do not, in their standard form, provide all of these details. The components are:

– the initial effect, which is the stimulus for the impact analysis – normally assumed to be a dollar change in sales to final demand;

– the first-round effect, which refers to the purchases of inputs required from other sectors in the economy in order to produce the additional output;

– the industrial-support effect, which refers to second, third and subsequent-round industrial flow-on effects triggered by the purchases in the first round; and

– the consumption-induced effects, which stem from the spending of household income received as payments for labour used in producing the additional output.

– regional econometric models, including models of the general equilibrium family, were not readily available for the region or project in question, and were not considered necessary for the impact assessed in this study.

A9.2.1.2 Definition of region

The economy on which the impact is measured can range from a township to the entire nation. In selecting the appropriate economy, regard needs to be had to capturing the local expenditure and employment associated with the river red gum timber industry but not making the economy so large that the impact of the proposal becomes trivial (Powell and Chalmers, 1995).

Based on the location of mills utilising the NSW river red gum timber resource and the location of employees, the region was defined as comprising:

- Wentworth SLA, NSW;
- Balranald SLA, NSW;
- Wakool SLA, NSW;
- Murray SLA, NSW;
- Deniliquin SLA, NSW;
- Conargo SLA, NSW;
- Murrumbidgee SLA, NSW;
- Griffith SLA, NSW;
- Berrigan SLA, NSW;
- Mildura Rural City Part A – SSD, Victoria; and
- Gannawarra SLA, Victoria.

A9.2.1.3 Development of input-output table

A 2005–06 input-output table of the regional economy was developed using the Generation of Input-Output Tables (GRIT) procedure using a 2005–06 NSW input-output table (developed by Monash University) as the parent table. ABS 2006 employment data was used to develop an equivalent table at the regional level. The regional input-output table was then indexed to 2009 values. The 109 sector input-output table of the regional economy was aggregated to 30 sectors and 6 sectors for the purpose of describing the economy.

The GRIT system was designed to:

- combine the benefits of survey-based tables (accuracy and understanding of the economic structure) with those of non-survey tables (speed and low cost)
- enable the tables to be compiled from other recently compiled tables
- allow tables to be constructed for any region for which certain minimum amounts of data were available
- develop regional tables from national tables using available region-specific data
- produce tables consistent with the national tables in terms of sector classification and accounting conventions
- proceed in a number of clearly defined stages
- provide for the possibility of ready updates of the tables.

The resultant GRIT procedure has a number of well-defined steps. Of particular significance are those that involve the analyst incorporating region-specific data and information specific to the objectives of the study. The analyst has to be satisfied about the accuracy of the information used for the important sectors; in this case the river red gum sawmilling sector. The method allows the analyst to allocate available research resources to improving the data for those sectors of the economy that are most important for the study.

An important characteristic of GRIT-produced tables relates to their accuracy. In the past, survey-based tables involved gathering data for every cell in the table, thereby building up a table with considerable accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some are not important because they are of very small value and, therefore, have no possibility of having a significant effect on the estimates of multipliers and economic impacts. Others are not important because of the lack of linkages that relate to the particular sectors that are being studied. Therefore, the GRIT procedure involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. These represent the main targets for the allocation of research resources in data gathering. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen, 1980). That means a generally accurate representation of the economy is provided by the table, but does not guarantee the accuracy of any particular cell. A summary of the steps involved in the GRIT process is shown in **Table A9.3**.

Table A9.3 The GRIT Method (Bayne and West, 1988)

Phase/Step	Action
Phase I	Adjustments to national table
1	Selection of national input-output table (106-sector table with direct allocation of all imports, in basic values)
2	Adjustment of national table for updating
3	Adjustment for international trade
Phase II	Adjustments for regional imports
4	Calculation of 'non-existent' sectors
5	Calculation of remaining imports
Phase III	Definition of regional sectors
6	Insertion of disaggregated superior data
7	Aggregation of sectors
8	Insertion of aggregated superior data
Phase IV	Derivation of prototype transactions tables
9	Derivation of transactions values
10	Adjustments to complete the prototype tables
11	Derivation of inverses and multipliers for prototype tables
Phase V	Derivation of final transactions tables
12	Final superior data insertions and other adjustments
13	Derivation of final transactions tables
14	Derivation of inverses and multipliers for final tables

A9.2.1.4 Underlying assumptions and interpretation of input-output multipliers

The basic assumptions in input-output analysis include the following:

- There is a fixed input structure in each industry, described by fixed technological coefficients (evidence from comparisons between input-output tables for the same country over time have indicated that material input requirements tend to be stable and change slowly; however, requirements for primary factors of production, that is labour and capital, are probably less constant).
- All products of an industry are identical or are made in fixed proportions to each other; each industry exhibits constant returns to scale in production.
- Unlimited labour and capital are available at fixed prices; that is, any change in the demand for productive factors will not induce any change in their cost (in reality, constraints such as limited skilled labour or investment

funds lead to competition for resources among industries, which in turn raises the prices of these scarce factors of production and of industry output generally in the face of strong demand).

- There are no other constraints, such as the balance of payments or the actions of government, on the response of each industry to a stimulus.

The multipliers therefore describe average effects, not marginal effects, and thus do not take account of economies of scale, unused capacity or technological change. Generally, average effects are expected to be higher than the marginal effects.

The input-output tables underlying multiplier analysis only take account of one form of interdependence, namely the sales and purchase links between industries. Other interdependence such as collective competition for factors of production, changes in commodity prices (which induce producers and consumers to alter the mix of their purchases) and other constraints which operate on the economy as a whole are generally not taken into account.

The combination of the assumptions used and the excluded interdependence means that input-output multipliers are higher than would realistically be the case. In other words, they tend to overstate the potential impact of final demand stimulus. The overstatement is potentially more serious when large changes in demand and production are considered.

The multipliers also do not account for some important pre-existing conditions. This is especially true of Type 2 multipliers, in which employment generated and income earned induce further increases in demand. The implicit assumption is that those taken into employment were previously unemployed and were previously consuming nothing. In reality, however, not all new employment would be drawn from the ranks of the unemployed; and to the extent that it was, those previously unemployed would presumably have consumed out of income support measures and personal savings. Employment, output and income responses are therefore overstated by the multipliers for these additional reasons.

The most appropriate interpretation of multipliers is that they provide a relative measure (to be compared with other industries) of the interdependence between one industry and the rest of the economy which arises solely from purchases and sales of industry output based on estimates of transactions occurring over a (recent) historical period. Progressive departure from these conditions would progressively reduce the precision of multipliers as predictive devices (ABS, 1995).

A9.2.2 Estimated size of the regional economy

A highly aggregated 2009 input-output table for the regional economy is provided in Table 4. The rows of the table indicate how the gross regional output of an industry is allocated as sales to other industries, to households, to exports and other final demands (OFD - which includes stock changes, capital expenditure and government expenditure). The corresponding column shows the sources of inputs to produce that gross regional output. These include purchases of intermediate inputs from other industries, the use of labour (household income), the returns to capital or other value-added (OVA - which includes gross operating surplus and depreciation and net indirect taxes and subsidies) and goods and services imported from outside the region. The number of people employed in each industry is also indicated in the final row.

Gross regional product (GRP) for the regional economy is estimated at \$4,845 million, comprising \$2,383 million to households as wages and salaries (including payments to self employed persons and employers) and \$2,462 million in other value added (OVA).

The employment total in the region was 47,511 people.

A9.2.3 Estimated contribution of the red gum timber industry reliant on public land

The red gum timber industry (based on the NSW river red gum timber resource from public land) provides a stimulus to the regional economy through the purchase of inputs to the production process and the purchases of the employees of the industry. A financial survey of mills and firewood collectors reliant on the NSW river red gum timber resource was undertaken to identify the revenue, employment and expenditure profile of the sector.

This information was adjusted for the level of reliance of each business on resource sourced from public land. This information was then used to generate a 'public land river red gum' sector that could be inserted into the regional economy input-output table and be used to estimate the direct and indirect impact of the industry. For this sector:

- The estimated annual gross revenue of the timber industry was allocated to the output row.
- Direct employment was allocated to the employment row. It was assumed that all people directly employed live in the region.
- Wages were allocated to the household income row.
- Labour on-costs were allocated to the other value-added row.
- Non-labour expenditure was initially allocated across the appropriate intermediate sectors of the regional economy.
- Intermediate sector expenditure was further allocated between local expenditure and imports based on information from the financial survey and location quotient for each relevant sector.
- Purchase prices for each sector were adjusted to basic values and margins and taxes allocated to appropriate sectors using relationships in the latest (2001–02) National Input-Output Tables.
- The difference between total revenue and total costs was allocated to the other value-added row.

The total and disaggregated annual regional impacts of the existing timber industry reliant on the NSW river red gum resource from public land (in 2009 dollars) are shown in **Table A9.5**.

It should be noted that the direct employment contribution identified in Table A9.5 is an estimate of the employment that is reliant on only that timber sourced from public land. This estimate is derived by multiplying the number of full-time equivalent (FTEs) employees of each business by the reliance on public land of that business, as reported by survey respondents. This accounts for the difference in direct jobs

Table 9.4: Aggregated Transactions Table: Regional Economy 2009 (\$'000)

	Agriculture/ Forestry/ Fisheries	Mining	Manufact- uring	Utilities	Building	Services	Total	Household Exp	O.F.D	Exports	Total
Agriculture/ Forestry / Fisheries	132,321	11	197,303	16	321	9,627	339,599	12,732	170,008	1,064,832	1,587,171
Mining	61	951	6,437	49	751	404	8,653	185	-595	44,867	53,110
Manufacturing	73,360	1,817	231,863	4,348	59,484	176,658	547,530	138,049	152,996	2,122,059	2,960,634
Utilities	20,837	427	21,057	91,142	2,829	39,586	175,878	30,922	27,669	145,029	379,498
Building	5,366	503	4,730	4,790	122,429	29,733	167,551	0	426,449	92,873	686,873
Services	139,694	3,419	400,456	14,220	58,153	741,103	1,357,045	849,415	1,075,062	1,705,463	4,986,985
TOTAL	371,639	7,128	861,846	114,565	243,967	997,111	2,596,256	1,031,303	1,851,589	5,175,123	10,654,271
Household Income	289,031	8,637	323,959	36,765	148,848	1,576,168	2,383,408	0	0	0	2,383,408
OVA	432,151	22,594	596,982	112,017	87,946	994,121	2,245,811	141,101	65,469	9,301	2,461,682
Imports	494,384	14,752	1,177,794	116,149	206,112	1,419,604	3,428,795	1,384,876	351,752	366,883	5,532,306
TOTAL	1,587,205	53,111	2,960,581	379,496	686,873	4,987,004	10,654,270	2,557,280	2,268,810	5,551,307	21,031,667
Employment	8,341	148	5,687	744	2,440	30,151	47,511				

reported in this section and the 274 direct jobs identified in Chapter 6 of this report. Chapter 6 reports the confirmed total employment in the river red gum timber industry in businesses that source timber from public land. This includes employment in those businesses that source some timber from private land.

The timber industry reliant on the river red gums sourced from NSW public land contributes the following to the regional economy:

- \$86 million in annual direct and indirect regional output or business turnover
- \$39 million in annual direct and indirect regional value-added
- \$21 million in annual household income
- 450 direct and indirect jobs.

This sector represents 1 per cent or less of the regional economy (Table A9.6).

A9.2.4 Indicative financial models of timber industry operations

A9.2.4.1 Methodology

Three models were developed to examine three timber industry operations. The financial models require a number of inputs including:

- sawlog supply to the mill by quality of log (separated into public and private supplies)
- product output mix (essentially furniture timbers, sleepers, landscape timbers and firewood and a range of by-products including sawdust, chips and sawdust which are sold to various markets)
- product recovery rates
- product prices
- mill variable and overhead costs
- labour costs and requirements
- finance costs
- payments.

Table A9.5 Annual regional economic impacts of the river red gum timber industry*

	Direct effect	Production-induced indirect effect	Consumption-induced indirect effect	Total indirect effect	Total direct and indirect effect
Output (\$'000)	47,664	27,613	10,859	38,472	86,136
Type 11A Ratio	1.00	0.58	0.23	0.81	1.81
Value-added (\$'000)	23,167	11,044	5,107	16,151	39,318
Type 11A Ratio	1.00	0.48	0.22	0.70	1.70
Income (\$'000)	10,862	6,899	3,158	10,056	20,918
Type 11A Ratio	1.00	0.64	0.29	0.93	1.93
Employment (no)	253	131	66	197	450
Type 11A Ratio	1.00	0.52	0.26	0.78	1.78

* Employment in State Forests, haulage and snagging is located in production-induced flow-ons.

Table A9.6 Relative magnitude of the river red gum timber industry

	Gross O/P (\$'000)	Value-added (\$'000)	Income (\$'000)	Employment (no.)
Direct contribution	47,664	23,167	10,862	2531
Total contribution	86,136	39,318	20,918	450
TOTAL REGION	21,079,464	4,868,258	2,394,266	47,511
% Direct contribution	0.2%	0.5%	0.5%	0.5%
% Total contribution	0.4%	0.8%	0.9%	0.9%

Note: The direct employment contribution does not include contractors or Forests NSW employees. These employees are included in the total contribution.

Model outputs include:

- sawmill gross margin (enterprise revenues less variable costs)
- sawmill cash flow over time; and
- Sawmill net income (gross margin less overhead costs and depreciation allowance).

The key parameters which can be varied to show the impact on business performance include:

- log throughput
- product recovery
- product prices.

A9.2.4.2 Model One – high-quality focus

The first model describes a mill with a focus on quota operations geared towards high-quality logs and value-adding. In general these mills have a lower reliance on sleeper and residue operations.

There is a higher investment in machinery within the mill and many of the bush operations are carried out under contract. Reliance on public lands is high with 95% of current throughput sourced publically. The following table outlines the characteristics of the mill.

A9.2.4.3 Model Two – sleepers and residue

The second model describes a mill with a higher reliance on sleeper and residue operations. Reliance on public lands is less, estimated at 54%. Some of the 46% from other sources is sourced from Western Lands Leases as well as private sources.

Table A9.8 outlines the characteristics of this type of mill.

A9.2.4.4 Model Three – residue/firewood operations

The third model describes an operation geared towards producing firewood from trees felled by quotas operations. The following table outlines the characteristics of this type of operation.

Table A9.7 Model One – financial details

Current estimates and assumptions	
Total volume of throughput (m ³)	8,500
Average annual revenue (AR)	\$4,814,625
Annual operating costs (OC)	\$3,989,295
Net revenue (NR)	\$825,330
NR/AR	17%
NR/Total volume	\$97
Estimated assets (not including valuation of licences)	\$7,250,000
Return on assets (ROA)	9%

Table A9.8 Model Two – financial details

Current estimates	
Throughput (m ³)	19,500
Average annual revenue (AR)	\$3,918,000
Annual operating costs (OC)	\$3,322,000
Net revenue (NR)	\$557,993
NR/AR	15%
NR/Total volume	\$29
Estimated assets (not including valuation of licences)	\$4,750,000
Return on assets	16%

Table A9.9 Model Three – financial details

Current estimates	
Throughput (t)	7,350
Average annual revenue (AR)	\$771,750
Annual operating costs (OC)	\$607,515
Net revenue (NR)	\$200,985
NR/AR	17%
NR/Total volume	\$17
Estimated assets (not including valuation of licences)	\$1,175,000
Return on assets	18%
Reduction to 0% ROA	220 t

**Timber survey questionnaire
(mill owners) 2009**

Arche Consulting Pty Ltd has been contracted by the NSW Natural Resources Commission to prepare a socioeconomic impact assessment to inform the Commission’s regional assessment of Riverina red gum forests.

The objective of the study was to provide a social and economic assessment of the River Red Gum and woodland forests on public land within the NSW Riverina bioregion.

The information obtained through this survey is confidential and information will only be provided to the NRC in an aggregated form.

OUTLINE

The survey will cover the following areas:

- Background
- Financials, timber sources and practices
- Linkages and dependence to communities

Survey

Details	
Timber business name	
Owner	
Address	
History	
Nearest service town and area of operations	

Operations	Enterprise	Contract
Harvest and haulage (bush)		
Milling		
Manufacture		
Distribution		
Marketing and allied services		

Quotas and volumes

Annual Licence quantities (tonne or m ³)	
Timber Volumes (m ³):	
Typical focus of operations	
Private forest timber volumes	
Sawlogs	
Standard logs	
Residual logs	
Sleepers	
Firewood	
Public forest timber volumes	
Sawlogs	
Standard logs	
Residual logs	
Sleepers	
Firewood	
Private Forest Timber Source(s):	
Public Forest Timber Source(s):	
Timber security – e.g. annual quota, long term wood supply agreement etc	
Product volumes e.g. m ³ of structural timber, m ³ of flooring, decking and weatherboards, tonnes of chips, tonnes of sawdust etc.:	
Source and haulage (km) refer map	

Total Volumes

2004/05	2005/06	2006/07	2007/08	2008/09

Revenue

Average price per m ³ for each product	
Timber	
Manufactured	
Residue mill	
Residue log	
Other	
Annual Gross Revenue	
Percentage from public forest timber volumes	

Markets

Timber	
Manufactured	
Residue mill	
Residue log	
Other	
Percentage	
Change over the last 5 years	

Annual Costs – Mill	Estimate	Source/ Supplier
Sawlog Costs		
Royalty		
Harvesting costs		
Fall		
Snig		
Haul		
Total Log Costs		
Labour Costs		
Wages		
Payroll, Tax/Super & Workers Comp Insurance		
Total Labour Costs		
Other Inputs Costs		
Materials		
R&M		
Services		
Freight		
Rates		
Utilities		
Fuel		
Total		

Labour	Positions	EFT	Residential Locations	Tenure
Owner				
Management				
Office				
Field				
Mill				
Other				

Overview of workforce and employment history	
What skills are required in the operation?	
Is there a seasonal aspect to your operations?	

Assets	Description and age	Value (current valuation)
Property		
Buildings		
Machinery and Processing Equipment		
Mobile Plant		
Do you place a value on your quota?		

Has the operation made any recent investments in assets?

Other information and links to the community

Can you provide an overview of your region?

Can you describe past and key attributes of the town?

Are the health services adequate in this region?

Outline the educational facilities that exist in this region?

What other employment opportunities exist for people in this region?

Are the working conditions changed over the past decade?

How does the operation relate to other major employers in the town?

What community facilities exist as a result of this industry?

Other

Have we missed any important points?

Is there anyone in the town/region we should talk to eg Centrelink or employment agency or local development officer in the council?

Appendix 10

Harvesting and management practices on private and public land

Chapter 11 describes silviculture systems and management practices for river red gum on State Forests. A range of management restrictions on harvesting have been put in place to protect and minimise harm to environmental values. **Table A10.1** summarises and compares some of these restrictions for river red gum forests on both public and private land.

Table A10.1 Comparison between river red gum forest harvesting and management practices for environmental values on private and public land

Management practice	Private land	Public land (State Forests)
Tree retention	<p>Australian Group Selection</p> <ul style="list-style-type: none"> Sum of canopy openings must at no time exceed 20% of the net harvestable area. No prescriptions for a minimum retained basal area in between gap areas (i.e. buffer areas). <p>Single Tree Selection and thinning</p> <ul style="list-style-type: none"> Minimum retained basal area – 12 m²/ha. 	<p>Australian Group Selection</p> <ul style="list-style-type: none"> No minimum retained basal area across coup or compartment. Must not exceed 20% of compartment in a single logging event. <p>Single Tree Selection</p> <ul style="list-style-type: none"> No minimum retained basal area. <p>Thinning</p> <ul style="list-style-type: none"> Minimum retained basal area = 16–25 m²/ha. <p>General Prescription</p> <ul style="list-style-type: none"> Retain all dead standing trees with obvious hollows or large cracks and fissures suitable for occupancy by vertebrate fauna across the net harvest area (s 120 licence). Trees >100 cm diameter at breast height over bark (DBHOB) generally retained. Trees >120 cm DBHOB retained.
Canopy openings (gaps)	<p>Australian Group Selection</p> <ul style="list-style-type: none"> Maximum width of a canopy opening must not exceed twice the stand height. Minimum distance between canopy openings not be less than twice the stand height. <p>Single Tree Selection and thinning</p> <ul style="list-style-type: none"> Should aim to space trees according to the formula $\frac{1}{4}$ DBHOB (cm) x100. 	<p>Australian Group Selection (L&E Court agreement)</p> <ul style="list-style-type: none"> No greater than twice stand height, up to 60 m DBHOB. Minimum distance between gaps not less than twice height of stand. <p>Single Tree Selection</p> <ul style="list-style-type: none"> No prescriptions for a minimum retained basal area, potentially allowing clearing back to 4 habitat trees/ha (s 120). <p>Thinning</p> <ul style="list-style-type: none"> MRBA = 16–25 m²/ha (as per management plans) = maintains a relatively intact canopy cover.
Logging frequency/timing	<p>Australian Group Selection, Single Tree Selection and thinning</p> <ul style="list-style-type: none"> Harvesting operations must not occur in a previously harvested area until stocking levels meet the minimum stocked plot requirements (see regeneration below). No prescriptions to limit application of both AGS and STS across a compartment in a single logging event. 	<p>Australian Group Selection, Single Tree Selection and thinning</p> <ul style="list-style-type: none"> No prescriptions on logging frequency (i.e. return logging events) within compartments or coupes. No prescription to limit the application of both AGS and STS across a compartment in a single logging event.

Table A10.1 Comparison between river red gum forest harvesting and management practices for environmental values on private and public land continued

Management practice	Private land	Public land (State Forests)
Regeneration	<p>Australian Group Selection, Single Tree Selection and thinning</p> <ul style="list-style-type: none"> • Minimum stand stocking of 60%, within canopy openings and 70% elsewhere in the forest, must be achieved within 36 months of a regeneration event. • Regeneration event is the second period of inundation following a harvesting or thinning operation. 	<ul style="list-style-type: none"> • No prescriptions.
Riparian buffers	<ul style="list-style-type: none"> • No forestry operations in riparian exclusion zones. • Only 30% of the pre-harvest basal area can be removed in any 10-year period and the minimum basal area limit of 12 m²/ha is maintained within the riparian buffer zone. • A 5 m harvesting for any exclusion zone drainage feature with an incised channel. • Prescribed streams: 20 m exclusion, 25 m buffer. 	<ul style="list-style-type: none"> • Min. 20 m exclusion zone around and adjacent to each large permanent or semi-permanent waterbody or nominated waterway (stream, runnel, swamp and lagoon). • Modified harvesting zone (30m) around each exclusion zone
Wetland areas	<ul style="list-style-type: none"> • Forest operations must not occur in any wetland other than wetlands that comprise a river red gum broad forest type or within 20 m of any wetland, except that existing roads may be maintained. 	<ul style="list-style-type: none"> • An exclusion zone, a minimum of 20 m wide (as measured from the first line of mature trees outside the depression), must be established around and adjacent to each wetland. [Mature is defined as >30 cm DBHOB.] (s120). • A modified harvesting zone, min. 30 m wide, must be established around and adjacent to each exclusion zone, in which at least 5 habitat trees and 5 recruitment trees must be retained per hectare (s120). • Where insufficient habitat trees (H-trees) exist to achieve this level, all existing habitat trees must be retained and recruitment trees (R-trees) must be retained in sufficient numbers to ensure a level of at least 10 retained habitat/recruitment trees per hectare (s120).

Table A10.1 Comparison between river red gum forest harvesting and management practices for environmental values on private and public land continued

Management practice	Private land	Public land (State Forests)
Habitat trees (hollow-bearing and recruitment trees)	<ul style="list-style-type: none"> • H-trees should be evenly distributed throughout the area of harvesting operations and within the net logging area. Preference should be given to trees with well-developed spreading crowns and minimal butt damage. • Retained H-trees should represent the range of species in mature and late mature growth stages. • Dead standing trees cannot be counted as hollow-bearing trees (HBTs). • A recruitment tree (R-tree) preference must be given to trees from the next cohort to that of retained HBTs. • 5 HBTs/ha, within 20–50 m of any permanent watercourse, water bodies or major wetlands, must be retained. • 2 HBTs/ha in all other areas must be retained. • One recruitment tree from the next cohort must be retained for every HBT retained. • Where the total number of HBTs is less than 10 trees/ha within 20–50m of any permanent watercourse, water bodies or major wetlands, or 4 trees/ha less than elsewhere, additional recruitment trees must be retained to bring the total number of trees retained up to 10 and 4/ha, respectively. • Additional recruitment trees above the number kept for the HBTs can be kept within the riparian buffer zone. • Clumps of HBTs must be retained in river red gum broad forests where they constitute rookeries for water bird species such as herons, cormorants, spoonbills and egrets. • All HBTs are retained in riparian exclusion and buffer zones. 	<ul style="list-style-type: none"> • Across the net harvest area (except where more stringent s 120 conditions apply), a min. of 2 H-trees and 2 R-trees/ha must be retained. Where there are insufficient numbers of H-trees to achieve this level, all existing H-trees must be retained and R-trees must be retained in sufficient number to ensure at least 4 retained H- and R-trees/ha. • A modified harvesting zone, – min. 30 m wide around and adjacent to each exclusion zone, with 5-H trees and 5 R-trees/ha, must be retained (being 50 m for riparian zones). Where insufficient H-trees exist to achieve this level, all existing H-trees must be retained and R-trees must be retained to ensure a level of at least 10 retained H- and R-trees/ha. • Regeneration openings must be sited to avoid the selected H-trees and R- trees.
Pre-harvest survey	<ul style="list-style-type: none"> • Not required. • Threatened Species records search completed by DECCW. 	<ul style="list-style-type: none"> • Threatened species record search of the DECCW Atlas and Forests NSW Biodata records. • Pre-harvest surveys are only required for koalas, regent and superb parrots. • Threatened species search done during tree mark up and ongoing monitoring. • Pre-harvest surveys are only required for koalas, regent and superb parrots. • Buffer and exclusion zones implemented if found. • Not applicable to all Forest Management Areas.

Table A10.1 Comparison between river red gum forest harvesting and management practices for environmental values on private and public land continued

Management practice	Private land	Public land (State Forests)
Superb and regent parrot	<ul style="list-style-type: none"> No prescriptions. 	<ul style="list-style-type: none"> Includes prescriptions H-trees Across the entire net harvest area, a minimum of two trees carrying mistletoe, where present, must be retained per hectare. Retained H- and R-trees may be counted toward this prescription. Net harvest area and the area within 100 m of the boundary of the net harvest area must be surveyed during the breeding season prior to logging for evidence of nest trees. A person suitably experienced in the identification of such features must undertake the surveys. An exclusion zone of a minimum of 100 m radius must be established around each nest tree, whether presently active or not.
Coarse woody debris	<ul style="list-style-type: none"> No prescriptions. 	<ul style="list-style-type: none"> Across the net harvest area, sufficient on-ground residue from the current operation must be retained to resemble that in the photo standards (photo showing minimum density and nature of CWD after harvesting). (s120) Harvesting must minimise disturbance to logging debris and naturally fallen woody debris existing prior to the current operation. (s120)
Source(s)	<ul style="list-style-type: none"> DECC (2007) 	<ul style="list-style-type: none"> FNSW, (2000); FNSW, (1999); FNSW (2008c); DEC,(2004); L&EC (2007); DLWC, (1993)

Notes

Notes