

SRA Report 2011 -2012



Ecosystems Services SRA

Program Leader Dr Roderick Duncan

The main achievements of this SRA, which aims to quantify and attach a value to environmental services and the ecosystems that produce these services in regional Australia, over the past two years have been:

- a workshop focussing on ecosystem services in the Murray-Darling Basin held in Canberra
- the research related to ecosystems services undertaken by Prof Gary Luck in line with his Australian Research Council (ARC) Future Fellowship, and
- the completion of one major ARC project, and near completion of a second.

Prof Gary Luck is recognised a leader in ecosystem research in this country. In 2010 he was awarded an ARC Futures fellowship to work on an over-arching project titled “Integrating Conservation and Ecosystem Service Values.” This fellowship, which finishes in March 2014, has allowed him work full-time as a researcher, publish over 20 papers and develop stronger collaborations with international colleagues through regular visits to North America and Europe. Prof Luck is a member of Ecosystem Services Partnership (ESP), a world-wide network to enhance the science and practical application of ecosystem services. In 2012 he attended an ESP annual conference in Portland, Oregon in the U.S. and was involved in a workshop on mapping and modelling ecosystem service priorities. He is a member of the ESP working group for this topic.

His ecosystems research can be categorised under four research themes which are:

- Identifying spatial priorities for protecting ecosystem services. With colleagues from the University of British Columbia (A/Prof Kai Chan), University of Queensland (Dr Carissa Klein) and now through his involvement in the ESP working group, A/Prof Luck is developing approaches that better identify spatial priorities for protecting ecosystem services. This work attempts to identify locations that are important for protecting the delivery of key services such as flood mitigation, water filtration and carbon storage.
- *Luck, G.W., Chan, K.M. & Klein, C.J. (2012) Identifying spatial priorities for protecting ecosystem services [v1; ref status: indexed, <http://f1000r.es/T0yHOY>] F1000Research 1:17 (doi: 10.3410/f1000research.1-17.v1*
- The ethics of ecosystem services . This research addresses the question “What are the ethical implications of valuing nature using ecosystem services?” In 2011, A/Prof Luck attended an

interdisciplinary workshop on the ethics of ecosystem services held in Germany, from which he was lead author for a paper on ethical considerations in on-ground applications of the ecosystem-services concept.

- *Luck, G.W., Chan, K.M.A., Eser, U., Gómez-Baggethum, E., Matzdorf, B., Norton, B. & Potschin, M.B. (2012). Ethical considerations in on-ground applications of the ecosystem services concept. BioScience 62, 1020-29.*
- Case studies of ecosystem-service provision. In collaboration with Dr Spooner and PhD students Shannon Triplett and Manu Saunders, A/Prof Luck is examining case studies of service provision in agricultural landscapes – particularly the horticultural districts of northern Victoria. As part of this, and in collaboration with Dr Sandra Lavorel from Université Joseph Fourier in France and Dr Sue McIntyre from CSIRO Ecosystem Sciences, he has developed the first framework for vertebrates that uses the functional traits of birds to predict the impact of environmental change on the delivery of ecosystem services.
- *Luck, G.W., Lavorel, S., McIntyre, S. & Lumb, K. (2012). Improving the application of vertebrate trait-based frameworks to the study of ecosystem services. J. Animal Ecol. 81, 1065-76*
- Urban Ecology. Prof Luck, who has been involved in previous research projects on urban biodiversity and human-well being, is working with a post-doc from Melbourne University on the ecological values of community gardens across Melbourne and whether or not birds and bats are providing any ecosystem services to growers.

The Institute has had two major ARC projects that were directly relevant to research on ecosystem services in this country. The first project “Designing landscapes to deliver ecosystem services to agriculture” (Luck, G. & Spooner, P.) an ARC Discovery Project worth \$225,000 finished at the end of 2011. The second, “Managing agricultural landscapes to maximise production and conservation outcomes: the case of the regent parrot,” (Spooner, P., Watson, D. & Luck, G.), an ARC Linkage project with Select Harvest and NSW Office of Environment and Heritage worth \$501,000 is due to be completed this year. This project employed two PhD students, Shannon Triplett and John O’Laughlin, and a post-doc DR Simon Watson.

From the first project a model has been developed which will greatly enhance the flow of services from nature to agriculture by linking land-use options with service availability. This will improve economic returns to local communities and agricultural industries, and promote protection of native species by recognising their contribution to agriculture.

For the second project, the researchers have now identified how almond plantations contribute to native species conservation in north-western Victoria, particularly the conservation of the threatened Regent Parrot, quantified the costs and benefits of bird use of almond orchards, and developed management approaches that maximise conservation gains while minimising impacts on production

Institute director, Prof Max Finlayson, a wetland ecologist, also does a lot of research related to ecosystem services and continues to publish in this field, in particular in reference to the importance of addressing ecosystem services when looking at maintaining or restoring the ecological character of wetlands. During 2011 and 2012 these publications included:

- Finlayson, C.M. (2011) Managing Aquatic Ecosystems. In: Peter Wilderer (ed) Treatise on Water Science, Vol.1. pp 35-59 Oxford: Academic Press
- Boelee, E. (ed)., Atapattu, S., Baron, J., Bindraban, P., Bunting, S.W., Coates, D., Descheemaeker, K., Eriyagama, N., Finlayson, M., Gordon, L., Khaka, E., Lloyd, G.J., Molden, D., Muthuri, C., Nguyen-Khoa, S., Peden, D., Pert, P., Sinclair, F., Solowey, E., Stanford, L., Stentiford, D., Thiombiano, L. (2011). Ecosystems for food and water security. United Nations Environment Programme, Nairobi & International Water Management Institute, Colombo. 248 pp.
- Boelee, E. (ed); Atapattu, S., Baron, J., Bindraban, P., Bunting, S.W., Coates, D., Descheemaeker, K., Eriyagama, N., Finlayson, M., Gordon, L., Khaka, E., Lloyd, G.J., Molden, D., Muthuri, C., Nguyen-Khoa, S., Peden, D., Pert, P., Sinclair, F., Solowey, E., Stanford, L., Stentiford, D., Thiombiano, L. (2011) Ecosystems for food and water security – synthesis report. United Nations Environment Programme, Nairobi & International Water Management Institute, Colombo. 26 pp.
- Horwitz, P., Finlayson, C.M., (2011), Wetlands as settings for human health: Incorporating ecosystem services and health impact assessment into water resource management. *BioScience*, 61(9), 678-688, USA, DOI: 10.1525/bio.2011.61.9.6.

2011 also saw the completion of a project funded by NSW DECCW and Hawkesbury Nepean CMA “Benchmarking values and attitudes to Conservation in the Great Eastern Ranges” led by Prof Mark Morrison with collaborators from Sunshine University, University of Technology Sydney and University of Tasmania. An outcome of that project was the identification of different types of lifestyle segments which has led to changed communication practices at the Hawkesbury Nepean CMA.

A new project involving Dr Roderick Duncan and Prof Mark Morrison on evaluating river health for urban communities along the Cook and George River in Sydney has also got underway with the appointment of PhD candidate Buyani Thomy in 2013. Buyani is doing his PhD on “Valuing the Benefits of Improved River Health” as part of the three year project titled “The Value of River Health to the Residential Community of the Georges and Cook River Catchments.” This project has attracted \$138,800 in funding from the Sydney CMA, Canterbury and Fairfield Councils, and CSIRO. While there has been a lot of research work done on rivers in rural and remote areas, little has been done in urban areas, where most of Australia’s population live. This project will help address this imbalance and also provide valuable information for analysts and policy makers in urban areas.

Members

Members of this SRA are: Dr Roderick Duncan, Prof Max Finlayson, Prof Gary Luck, Prof Mark Morrison, Dr Julia Howitt, and Manu Saunders.

PhD Students

PhD students associated with this SRA were:

Manu Saunders: Pollinator insects and ecosystem function in commercial almond orchards

Shannon Triplett: The costs and benefits of birds in almond orchards in Victoria, Australia

John McLaughlin: Conservation ecology of the Regent Parrot in an agricultural landscape

Eak Rana: Assessment of eco-system services benefits in forest management in Nepal

Ashlea Hunter: Investigating the link between social and ecological benefits of urban green space

Buyani Thomy: Valuing the Benefits of Improved River Health

Activities

Ecosystems services in the Murray-Darling Basin

Forty people attended a workshop which focused on ecosystems services in the Murray-Darling Basin in Canberra, August 24 and 25, 2011.

The workshop, organised by Professors Mark Morrison and Max Finlayson (ILWS) and Drs Neville Crossman and Darla Hatton MacDonald (CSIRO and Institute adjunct) was funded by CSIRO, ILWS, State Water Corporation (NSW) and the MDBA. The two key presenters were Professor Robert Johnston, Clarke University, Massachusetts and Associate Professor Dolf de Groot, Wageningen University, The Netherlands. The workshop involved a series of presentations which examined the experiences of several overseas countries in the use and valuation of ecosystems services and highlighted some of the challenges of valuing ecosystems services in Australia.

A major theme of the presentations and two roundtable discussions was the importance of economists, ecologists and sociologists working together to help refine and improve methods for identifying and valuing ecosystems services. The two-day workshop was held at a time when Australia's Murray Darling Basin Authority was assessing the likely social and economic impacts on local communities of options for its sustainable diversion limits for the Basin. Several staff from the MDBA attended the workshop and Tony Webster, the Authority's General Manager Social Economic Analysis, spoke about this assessment process.

After the workshop researchers in CSIRO and CSU then completed a project entitled 'Multiple Benefits of the MDBA Basin Plan', which included an outline of some ecosystems services benefits to Basin

communities. The final report, with Prof Morrison and Dr Hatton MacDonald contributing to Chapter 6 on Economic Benefits, is

- CSIRO (2012) [Assessment of the ecological and economic benefits of environmental water in the Murray–Darling Basin](#). CSIRO Water for a Healthy Country National Research Flagship, Australia.

The project report and the paper

- Hatton MacDonald, D., M. Morrison, J. Rose and K. Boyle, 2011. Valuing a multistate river: the case of the River Murray. *Australian Journal of Agricultural and Resource Economics* 55(3): 374-392.

are cited in the Regulatory Impact Statement that was tabled in parliament. As well, the SA government used these in their response to the MDB water sharing plan.

Current Projects

Integrating conservation and ecosystem service values in Australia’s catchments. ARC Future Fellowship. Prof Gary Luck. (2010-2014)

Managing agricultural landscapes to maximise production and conservation outcomes: the case of the Regent Parrot, Dr Peter Spooner, A/Prof David Watson & Prof Gary Luck, ARC Linkage grant project with Select Harvest and NSW Office of Environment and Heritage, 501,000 (2008-2012)

The value of river health to the residential community of the Georges and Cook River Catchments, Dr Rod Duncan, Prof Mark Morrison and Buyani Thomy (PhD candidate). Sydney CMA, Canterbury and Fairfield Councils, and CSIRO, \$238,000 (2013-2016)

Completed Projects

Multiple Benefits of the Murray Darling Basin Authority Basin Plan, CSIRO and CSU (Prof Mark Morrison), MDBA, (2011)

Designing Landscapes to Deliver Ecosystem Services to Agriculture. A/ Prof Gary Luck and Dr Peter Spooner. ARC Discovery Grant, \$255,000. (2009-2012)

Benchmarking values and attitudes to conservation in the Southern Highlands Link of the Great Eastern Ranges Initiative. Morrison, M., McCulloch, R., Greig, J., Waller, D. & Lockwood, M. Environmental Trust Grant, NSW Department of Environment, Climate Change and Water. (2009-2011)
[PDF Summary Report](#)

The provision of the Ramsar Site Management Planning Guidelines Module of the ‘National Guidelines for Ramsar Wetlands—Implementing the Ramsar Convention in Australia’. Department of Environment, Water Heritage and the Arts. Max Finlayson and George Lukacs (James Cook University). (2008)

Understanding Landholder Constraints to the Uptake of Marketing Based Instruments. Land and Water Australia, Central West CMA, Northern Rivers CMA, Queensland Government. Mark Morrison. (2006-2008)