**Biodiversity Conservation 2015-2016**

**Program Leader - Dr Peter Spooner**

**Members** - Professor Gary Luck, Professor David Watson, Associate Professor Ian Lunt (Adjunct), Dr Melanie Massaro, Dr Dale Nimmo, Dr Jodi Price, Dr Wayne Robinson, Dr Manu Saunders, Dr Skye Wassens, Dr Maggie Watson

**Overview**

This SRA, with all members ecologists, has continued to conduct research aimed at understanding native plant and animal interactions in human modified landscapes, with a focus on agricultural and urban landscapes.

Members have expertise in vegetation and wildlife ecology; plant-animal interactions; animal behaviour; ecosystem services; conservation biology of threatened species; landscape ecology - fragmentation effects; connectivity analyses; restoration ecology and practice; environmental history; road ecology and roadside vegetation management; and biodiversity survey methods.

In 2015/16 the SRA welcomed two new members, Dr Dale Nimmo and Dr Jodi Price, who brought with them expertise that has broadened the team’s scope.

Dr Nimmo is an animal ecologist with broad interests in how ‘big’ disturbances - things like fire, drought and land clearing - influence biodiversity. His achievements in 2015/16 include securing two Hermon Slade Foundation funded projects, one on whether landscape structure can enhance the resilience of biodiversity to climatic extremes, and the other on whether Indigenous fire management can restore mammal communities. At the end of 2016 Dr Nimmo was awarded a three year ARC Discovery Early Career Researcher Award which he will use to build on the Indigenous fire management project.

Dr Nimmo was also the recipient of the 2016 Wiley Next Generation Ecologist Award; a member of a project team which won the 2016 Nancy Mills Science in Parks Award; and the winner of an Australian Institute of Policy and Science Tall Poppy Award in 2016.

Dr Price is a plant community ecologist who is broadly interested in community assembly processes and species coexistence.

A major project completed at the end of 2016 was the ARC Discovery project “Predicting the delivery of ecosystem services in agricultural landscapes” led by Professor Gary Luck with post-doc Dr Manu Saunders and PhD student Rebecca Paisley. For this study the researchers conducted some of the most comprehensive landscape-scale experiments to date on ecosystem service delivery by birds and insects across different agricultural land uses.

Another ARC Discovery project, which is being led by Queensland University of Technology and involves team members Professor David Watson and Dr Maggie Watson, is continuing with large amounts of audio data currently being analysed. A key outcome of this project was the successful application for an ARC Linkage Infrastructure, Equipment and Facilities grant which will see 350 audio recorders sited across Australia in 2017.

Professor Watson is also involved in research on facilitation cascades, and evolution and ecology of host range.

During 2015/16 a project team led by Dr Peter Spooner undertook a full floristic survey of 198 sites throughout the Murray Valley National Park in NSW, prior to an ecological thinning trial conducted by NSW National Parks. The trial aims to gauge the effectiveness of thinning River Red Gum saplings as a means of promoting biodiversity in high stem density areas. Dr Spooner is also involved in a connectivity analysis project that will help Holbrook Landcare group prioritise their on-ground works.

Dena Paris is working with Dr Massaro on this project.

In 2017, Dr Massaro starts a new project with PhD student Helenssa Mhalaou in the Northern Territory working on “The impacts of feral ungulates to ephemeral savannah waterholes and the flow-on effects on native mammals and birds.”

Dr Wayne Robinson is involved in an ongoing collaborative research project Dr Ken Green (NSW NPWS) and Dr Naomi Davis (Melbourne University) looking at the diet of alpine herbivores in the Australian mainland with five papers on mammals published to date.

Another highlight during 2015/2016 included articles by Adjunct Associate Professor Ian Lunt and Dr Manu Saunders being published in *The Best Australian Science Writing 2015*, an annual collection celebrating the finest Australian science writing of the year.

**Current Projects**

**Acoustic Observatory: a network to monitor biodiversity across Australia.** (2017-2020) ARC Linkage Infrastructure, Equipment and Facilities project ($900,000) led by Queensland University of Technology with ILWS team members Watson, D., Luck, G. & Nimmo, D.


**Can Indigenous land management forestall an extinction crisis?** (2017-2020) Nimmo, D. ARC Discovery Early Career Researcher Award, $372,000

**Can landscape structure enhance the resilience of biodiversity to climatic extremes? Insights from the Millennium Drought.** Nimmo, D., Bennett, A. (La Trobe Uni), Haslam, A. (La Trobe Uni) & Radford, J. (Bush Heritage Australia). (2015-2018)


Equipment Grants

Next generation tools for environmental monitoring in remote and limited access locations. Watson, D.M., Massaro, M., Luck, G., & Finlayson, M. (2015) Research Infrastructure Block Grant (RIBG), $33,583

INTERNATIONAL LINKAGES & ENGAGEMENT

Members of this SRA have well-established international linkages and partnerships with other universities, research centres or collaborative groups.

Professor Gary Luck continued collaborations with researchers at the University of British Columbia in Vancouver and other centres. They co-authored a journal article “Why protect nature? Rethinking values and the environment” which was published in the Proceedings of the National Academy of Sciences, in 2016.

Dr Peter Spooner’s participation in the Infra Eco Network of organic orchardists’ annual conference, Harcourt, NSW.

Dr Dale Nimmo, through his research on Indigenous land management, is working collaboratively with Assistant Professor Doug Bird and Professor Rebecca Bird, from Pennsylvania State University, in the U.S.

Dr Jodi Price, who has a permanent experimental site in WA as part of a global nutrient network, continues to explore global scale patterns in grassland communities with colleagues from the University of Tartu, in Estonia.

International visitors in 2015/16 were ILWS Adjunct Dr Bruce Robertson, University of Otago, New Zealand, and his wife Fiona Robertson, a Research Associate in the Robertson Conservation Genetics Laboratory, University of Otago, who were in Australia to study silveryeyes.

NATIONAL & REGIONAL ENGAGEMENT

Five members of this SRA presented at the annual Biodiversity Across the Borders: Biodiversity in rural landscapes conference, attended by 550 people, in June 2015, in Ballarat. Other conference presentations include to the Ecological Society of Australia’s Annual conferences, Ballarat; Biodiversity Dreaming Conference, Bathurst; the Species on the Move conference, Hobart; and the Network of Organic Orchards’ annual conference, Harcourt, NSW.
Dr Dale Nimmo delivered the John Paul Memorial Lecture at the Innovations in Landscape Conservation Forum in May 2016, in Wangaratta. He also gave a presentation on the importance of riparian vegetation for the conservation of woodland birds at the Murray Local Land Services offices in Albury.

Professor David Watson’s involvement with the FAUNA Alliance has continued with the Rewilding Little Desert project, in collaboration with Conservation Volunteers Australia now underway. He and Dr Maggie Watson were among the 45 people who attended the National Rewilding Forum, organized by the National Parks Association of NSW, in Sydney in 2016. Professor David Watson, together with Dr Maggie Watson, and Dr Melanie Massaro are on the Wirriminna Environmental Education Centre’s Management Committee which held an Open Day at Burrumbuttock in Sept, 2016. Dr Maggie Watson is also on the board of Petaurus Education Group Inc.

Dr Manu Saunders was one of the winners of the 2015 Outstanding Outreach Award, from the NSW Office of Environment and Heritage, and the Ecological Society of Australia. Dr Saunders, and the other award winners based in Sydney, Melbourne & Canberra, ran an ecological experiment with a local school class to collect pollinator insects on the school grounds. Dr Saunders was also very involved in a community engagement activity, a national Wild Pollinator Count which had plenty of media coverage.

The Institute, along with the NSW Government’s Environmental Trust and the Great Eastern Ranges Initiative, sponsored the Slopes to Summit (S2S) Big Tree Competition in 2015; an activity which generated plenty of media and community interest. Following this the Corowa District Landcare group produced a book Beauty, Rich and Rare, Celebrating Our Region’s Iconic Eucalypts.

Dr Wayne Robinson has run two workshops on Fraser Island, Queensland, in 2015/16, one on ants on Fraser Island, and another for the Happy Valley Bush Regeneration Project. He has also been involved in the Bittern’s in the Happy Valley Bush Regeneration Project. Researchers from this SRA have also run community wildlife trapping nights, spotlighting nights, frog wanders, and other activities for local Landcare groups.

In 2016 Professor David Watson, Dr Nimmo and Dr Alison Matthews (Adjunct) were among the 41 scientists that signed a letter sent to the NSW Premier calling for the brumby cull in the Snowy Mountains to include aerial shooting and a faster cull than originally proposed.

Also in 2016 Dr Melanie Massaro and Professor David Watson were among the 154 Australian atmospheric, marine, environmental, biological and medical scientists, including several leading climatologists, who signed an Open Letter to Australia’s Prime Minister, Hon. Malcolm Turnbull, on the climate crisis.

Both letters resulted in considerable media engagement for the researchers concerned. Other media engagement activities for team members include:

- regular articles for The Conversation, on topics such as:
  - single-crop framing is leaving wildlife with no room to turn
  - moving common wildlife into unoccupied patches of habitat well before their populations begin to decline
  - Great barrier reef bleaching is just one symptom of ecosytem collapse across Australia
  - Grammipans struggling with drought and deluge
  - Invasive predators are eating the world’s animals to extinction – and the worst is close to home
  - Why labelling wild animals as pests or friends is holding farming back
  - Birds, bees and bugs: your garden is an ecosystem, and it needs looking after
  - articles in the magazines Ensia on the dangers of separating science and environment, and Wildlife Australia on valuing nature, and lost in a floral desert
  - in response to requests from media for commentary on ecological subjects such as bats, domestic cats, feral cats, brumby culling, European honey bees, startling removal, changes to biodiversity laws, effects of wet weather and floods on native animals and plants, how to preserve century old trees, and swooping magpies

- a story on ABC’s Catalyst program on a national network of acoustic recorders
- interviews for print, TV, radio and on-line, as an outcome of CSU Media Releases on new journal articles or new projects on topics such as brush turkeys, importance of tree cover for species’ resilience, mistletoe, Aboriginal fire management, and how cities can cope with increasing population sizes while keeping their wildlife

In 2015 and 2016 three PhD students associated with this SRA graduated.

Dr Alexandra Knight: The case for Sloane's Froglet: Generating ecological knowledge with the intent to benefit biodiversity

Dr Buddi Poudel: The effects of pastoralism on the behaviour of the Himalayan marmot (Marmota himalayana) in high altitude rangelands in Nepal

Dr Eas Rana: REDD+ and ecosystem services trade-offs and synergies in community forests of central Himalaya, Nepal

On-going students are:

Clare Lawrence: Life history and behavioural responses to nest predation in Australian and New Zealand songbirds: can naive birds adapt to exotic predators?

Zsofia (Sophie) Patyi: The role of novel human disturbances on ant-plant interactions in roadside environments

Dena Paris: Foraging behaviours, habitat use and density related reproductive performance and dispersal in the endangered Chatham Island black robin

Rebecca Peisley: Cost-benefit trade-offs of bird activity in agroecosystems (submitted)

Cecile Van der Burgh: Connectivity conservation management in practise (submitted)

Liz Znidersic: The detectability of cryptic birds (Lewin’s rail and other rail species) to assist with conservation/management options
KEY PUBLICATIONS


In Focus

Floristic monitoring for ecological thinning trial in River Red Gum forests (2015-2016)

In an attempt to improve the declining health of river red gum forests, NSW National Parks is trialling ecological thinning in 400ha of the Murray Valley National Park (NSW).

The trial aims to gauge the effectiveness of ecological thinning of River Red Gum saplings as a way of promoting biodiversity in high stem density areas.

Given ongoing river regulation and the likelihood of future droughts resulting from climate change, the NSW Office of Environment and Heritage (OEH) Science Division has composed an experimental design and monitoring plan that seeks to determine whether reducing tree density leads to improved health and biodiversity.

Reduced density is likely to mean more access to water, more mature hollow bearing trees which provide habitat and other valuable resources, and more wood debris for native Australian animals and plants. It’s also expected to prevent further decline in the condition of the red gum canopy.

As a part of this plan Charles Sturt University undertook a full floristic survey of 198 plots throughout the national park to ascertain the condition of the vegetation prior to ecological thinning, in a collaborative project with NSW NPWS and UNSW.

Under the direction of project leader Dr Peter Spooner, ecologists Ms Erika Cross, Dr Alison Matthews, Ms Shona Arber and Mr Gavin Thomas conducted the fieldwork from November 2015 to February 2016. Amphibromus fultans, a grass species listed as Vulnerable on both the NSW and Commonwealth legislation, was recorded in a number of plots and believed to be an indication that environmental watering events may have improved habitat conditions.

As the conservation program progresses, the river red gums will be closely monitored to determine how ecological thinning is affecting the forest and the availability of key habitat features in high stem density stands.

There is potential for CSU for further collaboration and assistance with on-going monitoring of the park following the thinning trial.

Outputs

A report from the floristic survey has been submitted to NSW OEH.

Outcomes

The floristic survey has provided important base-line data for the ecological thinning trial which will advise and inform future management actions in the park.