RESEARCH, EVENTS AND ACHIEVEMENTS 2011 | 2012
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OUR AIM

"TO UNDERTAKE INTERNATIONALLY RECOGNISED AND INTEGRATED RESEARCH IN SOCIAL AND ENVIRONMENTAL SUSTAINABILITY TO ENHANCE THE LIVELIHOODS AND LIFESTYLES OF PEOPLE IN RURAL AND REGIONAL AREAS."

OUR GOALS

· TO ENHANCE INTEGRATED RESEARCH ACTIVITY

· TO ENHANCE THE INSTITUTE’S NATIONAL AND INTERNATIONAL REPUTATION FOR QUALITY RESEARCH

· TO ESTABLISH AND MAINTAIN EFFECTIVE PARTNERSHIPS WITH STAKEHOLDERS

· TO ENGAGE WITH STAKEHOLDERS AND INFORM THE WIDER COMMUNITY ABOUT THE INSTITUTE’S RESEARCH

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Director’s Report: 
Professor Max Finlayson

The Institute for Land, Water and Society (ILWS) established, promotes and supports research within Charles Sturt University, and with the challenging aim of undertaking multi-disciplinary and integrated research to enhance the livelihoods and lifestyles of people in rural and regional areas. The Institute initially struggled to meet the full potential of being a research-minded and community-relevant institution with a focus on integrated projects. It was a hard thing to do - there is no question about that. We had a bevy of high achievers and we had a high profile in some regional and rural research areas, but we were adding something far more profound and far-reaching. We were given a new challenge, and were possibly even thrust into it before we really understood what it meant, but we did have a group of determined researchers who set out to achieve what they could. It was not simple, nor straightforward, but I’d like to thank those with the vision and the fortitude to send along this path. As much as we may have thought it was difficult there was a lot of interest and support for doing it.

We were asked to change the way in which we undertook research. Some saw opportunity, and embraced it, while others saw confusion, and sought guidance, and support solace. Others seemed almost blissfully unaware of the change in focus. The details undoubtedly differ enormously, but I don’t see this as an unusual situation for teams faced with implementing major changes in how they work. The last word is important but with a different slant - it is how we worked as individuals and within the team to achieve this goal that is important.

So, how did we work? We embraced consultation and participation and we explored a series of changing processes and challenging expectations and accountability procedures, and balanced individualised and teamwork approaches. Eventually, we developed a series of processes whereby we ended up with a set of self-forming and multi-disciplinary strategic research areas that addressed outputs as well as outcomes and impacts, and were based on teams. These were and still are directed towards the challenges faced by rural and regional communities. They are based on the skills of individuals and the benefits of teamwork within our institutional frame. And they are undetermined by the pervasive and complex opportunities for and rewards that we get from supporting sustainable communities.

The challenges in developing an integrated research agenda have been many, with some of the more intractable coming from the established reductionist and disciplinary approaches to research – in contrast the complex problems facing rural and regional people require integrated and multi-disciplinary approaches. We know there have been and will be many more challenges. We can though build on the successes that we have had and determine much about our future, and that is the space I am looking for. We will continue to laud our past successes and thank those behind them, but we all know that even more is expected from us – we have been asked to further focus our work and be more strategic and respond to various measures of success. I love it - the closer we come to our aim of undertaking integrated research the more we will be asked to become more strategic and focussed and integrated – and in doing so the closer we come to helping our local and global communities address key issues and to determine their future.

Hence, thank you to everyone who has been involved in the development of the Institute for Land, Water and Society. We appreciate the past and look forward to the future research environment and the opportunities therein.

Australia’s prosperity has been built on the use of our considerable natural resources which are intricately interconnected with our natural and cultural heritage.

At the same time our rural environment is facing issues caused by land clearing, river regulation, farming practices, industrial development, urbanisation, the introduction of non-indigenous plants and animals, and now, climate change.

Some of these problems have adversely affected our biodiversity, river health and water quality, and also threaten the sustainability of Australia’s rural, regional and remote communities.

Many of these communities are undergoing significant restructuring including changes in employment opportunities, community services and infrastructure, and demography. These issues have attracted increasing attention from the communities themselves, as well as governments and industry. Many communities are looking to themselves and their regions as well as to governments to support basic services and infrastructure with a view to chart a course for the future.

The Institute for Land, Water and Society (ILWS) has established a substantial research capacity and commitment to partnership building to support community, industry and government efforts to safeguard our biodiversity, land and water assets, and to ensure a dynamic and sustainable future for our regional communities.

The Institute is one of four accredited Centres of Research Excellence within Charles Sturt University (CSU), Australia. CSU is a national University with major campuses in Australia’s inland regional centres of Albury-Wodonga, Bathurst, Orange and Wagga Wagga. It also has campuses in Australia’s Capital City, Canberra as well as in Dubbo, Goulburn, Manly, Parramatta and Port Macquarie (NSW), and in Ontario (Canada).

The Institute is an internationally recognised provider of integrated research that contributes to enhanced social and environmental sustainability in rural and regional areas. It combines the expertise of over 200 environmental scientists, social researchers, economists, and post-graduate students to address critical sustainability issues mainly in inland Australia, and in particular the Murray Darling Basin, but also in developing countries overseas.

Since 2007 the Institute has been led by Professor Max Finlayson, a wetland ecologist recognised internationally for his expertise in wetland management. Membership comprises full members, early-developing members, post-graduate students, post-doctoral graduates and adjunct members. While most Institute members are associated with CSU there are also members based at other universities, institutions and government agencies whose specific areas of expertise and research interests enhance the Institute’s diverse research capacity. Members undertake research across a range of topics including biodiversity, climate change, energy use, natural resource management, sustainable water use, regional development, rural social issues, Indigenous business, cultural heritage, tourism, education, and communication.

ILWS key researchers are recognised internationally and nationally for their individual and team expertise in areas such as wetland management, fragmented landscapes, ecosystem services, climate change adaptation, environmental economics, land use changes, conservation management and social policy.

A significant number of the Institute’s researchers work in the field of environmental science and management. As such they have contributed to Charles Sturt University obtaining a ranking of 4 in 2012 through the Excellence in Research for Australia (ERA) initiative, being ‘above world standard’ in this field, and in the broad field of environmental science (ERA is an evaluation process whereby the research strengths of Australia’s universities are ranked based on the quality of research outputs such as the number of publications in highly regarded international journals).

The Institute’s Advisory Board, chaired by Dr John Williams, provides strategic advice to the Institute Director and to the Management Team including input to future research directions, policies, programs and emerging opportunities, as well as facilitating linkages between the Institute and the wider community.

Since 2009 the Institute’s research focus has been on a number of key Strategic Research Areas (SRA) where the Institute has the research expertise, breadth of knowledge and interest to tackle the challenges faced by rural and regional communities. These research areas are issue focused, team-based, interdisciplinary, underpinned by disciplinary excellence, and output and outcome orientated.

**ILWS Strategic Research Areas:**

- Social Research for Regional Natural Resource Management
- Sustainable Water
- Social Aspects of Climate Change Adaptation
- Sustainable Business Development in Regional Australia
- Woody Regrowth in Rural Landscapes
- Environmental Justice and Governance for Social Change
- Ecosystem Services
- Improving Rural Livelihoods and Environments in Developing Countries

Integrated research is a fundamental aspect of the mission of the Institute and is recognised by the University and the ILWS Advisory Board as a holistic and systematic approach to problem solving.

Reflecting its multidisciplinary nature, the Institute is aligned with ten different schools within the University, including Environmental Science, Humanities and Social Sciences, Community Health, Communication and Creative Industries, Agriculture and Wine Sciences, Management and Marketing, Accounting, Biomedical Sciences Schools, the Graduate School of Policing and the Murray School of Education.

The Institute is an important contributor to policy making and management decisions that contribute to ensuring a sustainable future. It has well-established partnerships with State and Federal Government departments, agencies and other tertiary institutions as well as linkages to international organisations such as UNESCO, The Nature Conservancy (USA), Ramsar Convention on Wetlands, Chilika Development Authority, USA Forest Service, Centre for International Forestry Research-Indonesia, Troepenbos International and to overseas universities including Stanford University, Gadjah Mada University, University of Lambung Mangkurat, Hohai University, Nananz University, Stockholm University, Seoul National University, Tianjin University, University of British Columbia, University of California, Berkeley, University of Edinburgh, University of The Philippines, University of Vienna, and Wageningen University.

Much of the research work undertaken by the Institute relies on financial and in-kind assistance from various funding bodies, government departments and agencies.

**Funding partners include:**

- Wetlands International-South Asia; WWF International; Australian Research Council; Department of Sustainability, Environment, Water, Population and Communities; Department of Climate Change and Energy Efficiency; AusAid; Australian Centre for International Agricultural Research; Fisheries Research & Development Corporation; Rural Industries Research & Development Corporation; Cotton Catchment Communities CRC; Australian Centre for Renewable Energy; Australian Centre for Ecological Analysis and Synthesis; National Centre for Groundwater Research & Training; National Climate Change Adaptation Research Facility; Murray Darling Basin Authority; CSIRO; Volunteer International for Development Australia; Future Farm Industries CRC; Caring For Our Country; Department of Primary Industries – NSW Fisheries; NSW Office of Environment and Heritage; Department of Primary Industries Victoria; Department of Sustainability and Environment Victoria; NSW State Water; Australian Alps Liaison Committee; Industry & Investment NSW; Murray Catchment Management Authority; Murrumbidgee Catchment Management Authority; Sydney Metro Management Catchment Authority; Lachlan Catchment Management Authority; Wakool River Association; Albury Conservation Company; Lake Cowal Foundation; Wimmera Catchment Management Authority; North East Catchment Management Authority; and various shires and councils.
During 2011-2012 the Institute further consolidated its position as a leading research provider in Australia, with projects ranging from large integrated multi-disciplinary projects to single-focus projects.

The Institute continued to be led by Director Professor Max Finlayson with Associate Directors Professor Mark Morrison in 2011 and Dr Joanne Millar in 2012.

The Institute’s Strategic Research Areas continue to represent its areas of research strength with a new SRA - Improving Rural Livelihoods and Environments in Developing Countries - established in 2011.

The emerging Sustainable Management of Wetlands in Agricultural Landscapes SRA was incorporated into the Sustainable Water SRA mid-2012 and the Innovative Perspectives on Energy SRA transformed into the Environmental Justice and Governance for Social Change SRA during 2012. Two new SRAs are expected to be established in 2013, one with a focus on biodiversity, the other on food security.

Membership

The Institute membership has remained fairly stable. In 2010 there were 231 members, with 49 full members, 52 adjuncts, 20 early developing, 5 post-doctoral fellows, and 105 post graduate students. In 2012 the total number of members increased to 278 with 46 full members, 73 adjuncts, 22 early developing, 12 post-doctoral fellows and 125 post graduate students. The Institute currently has 248 members, with 42 full members, 66 adjuncts, 22 early developing, 10 post-doctoral fellows and 108 post graduate students.

The Institute’s success in securing funding for a number of large projects was reflected in an increase in post-doctoral fellows (12) in 2012. To date this is the largest number of post-doctoral fellows the Institute has had at any one time.

There has also been an increase in the number of post-graduate students, a reflection of both an increase in CSU’s international PhD students associated with the Institute (adding to the Institute’s research diversity) and a greater number of PhD scholarships available with additional or full funding from outside the University.

The completion rate was excellent in 2011 and 2012 with 33 ILWS students awarded their Doctorate of Philosophy, Masters, or Doctorate of Business Administration. Dr Emily Sharp whose Principal Supervisor was Professor Allan Curtis, was awarded CSU’s Faculty of Science Outstanding Thesis Prize for her “Exploring community-agency trust before, during and after a wildfire” thesis.

Publication Performance

The Institute’s publication performance has also improved. It achieved 57.6 weighted publication points in 2012, an increase of 52% on its 37.8 weighted publication points in 2011. This compares with 38 weighted publication points in 2009 and 42.2 in 2010. Over the two years period, the Institute achieved a combined total of 95.4 points which represents 17.5% of CSU Research Centres’ total over the same period.

Social Media

A growing number of Institute members are taking advantage of the opportunities presented by social media and are writing regular blogs as well as “Opinion Pieces” for web-based news services such as The Conversation and ScienceAlert.

External Research Funding

Two of the Institute’s Strategic Research Areas have been particularly successful in attracting external funding.

In 2012 the Sustainable Water SRA (led by A/ Prof Robyn Watts) was able to build on previous environmental water monitoring research projects to establish collaborative partnerships with government departments and secure $1.8 million in funding from the Commonwealth Environmental Water Office (CEWO), continuing to monitor ecosystem responses to environmental watering in two important Murray Darling Basin river systems during the 2012-2013 water year.

The Social Research for Regional Natural Resource Management SRA (led by Professor Allan Curtis) has continued to be involved with the National Centre for Groundwater Research & Training, attracting almost $950,000 in funding since 2009.

In 2011 the Institute secured $1.54M in external research funding. In 2012, it attracted $1.92M, an increase of 25% on the previous year. That figure totals $3.46M or almost 24% of CSU Research Centres’ total external research funding over the 2 year period.

There has been a deliberate effort by the Institute to attract funding for larger research projects with capacity for greater level of impact at the policy and changed practice levels. This approach reflects the strategic goals of the University.

In 2011 there were over 24 new projects; in 2012, over 30 new projects.
New Projects (over $100,000):

2011


Sustaining economic growth in China. Sharma, K. Hicks, J & Bandara, Y. (2011) AusAid's Australian Leadership Awards (ALA) Fellowships Program. $158,000


2012


Developing fish friendly design criteria for small hydro facilities. Finlayson, M., Kopf, R. (2012-2014) Australian Centre for Renewable Energy through DPI NSW. $141,500


Integrating community values into regional sustainability planning: The Lower Hunter region, NSW. Raymond, C., (ILWS research fellow) & Curtis, A. (2012-2014) SEWPAC. $175,000

Identifying low risk climate change mitigation and adaptation in catchment management while avoiding unintended consequences. Finlayson, M., Pittock, J. & Lukasiewicz, A. (2012 to January 2013) NCCARF. $100,000

Other major on-going projects:


Understanding landholder responses to water reform and climate change in the Namoi Valley. Curtis, A., Sharp, E. CRC Cotton Catchment Communities/ ANU. (2011-2013). $150,000


The ecology and conservation management of the endangered Regent Parrot along the Murray River in NSW. Spooner, P., Watson, D., Luck, G, Oliver, D., (NSW OEH) & Watson, S. (2011-2012) NSW OEH. $150,000

Integrating the conservation and ecosystem-service value of Australia's catchments, Luck, G. (2009-2014) ARC Future Fellowship. $682,077

Other major projects completed in 2011/12:

Designing landscapes to deliver ecosystem services in agriculture. Luck, G. & Spooner, P. (2009-2011) ARC Discovery grant. $255,000


Climate change adaptation in the Coorong, Murray Mouth and Lakes Alexandrina and Albert. Finlayson, M., Gross C., (ANU) Pittock, J., (ANU). (2010-2011) NCCARF. $100,000

Heatwaves, population health and emergency management in Australia-a qualitative study. Led by University of Adelaide with Parton, K. (2009-2011) ARC Linkage Grant. $132,000


AWARDS


Dr Hazbo Skoko, was awarded the ‘Best Professor in Economics Award’ for excellence in leadership, education and teaching, at World Education Congress, Global Asia Award held in Dubai on Sept 25, 2011.

Dr Branka Krivokapic-Skoko received the Best Paper award at British Academy of Management 2011 (Organisational Psychology Track) conference held Sept 13 to 15. Her paper was titled ‘Academics and Breach of Psychological Contracts in the University Sector: Insights from an Australian Business School.’

In 2011 Dr Julia Howitt and Dr Alek Zander were members of the Chemistry Teaching Team from the School of Agricultural and Wine Sciences, which won the Vice-Chancellor’s Award for Teaching Excellence. The Inland Living Experience team comprising of ILWS member Dr John Rafferty from the Murray School of Education and Peter Jones from the Division of Facilities Management won the Vice-Chancellor’s Award for Excellence in Sustainability.

In 2012 Prof Kishor Sharma received a Vice-Chancellor’s Award for Leadership Excellence and A/Prof Geoff Burrows, a Vice-Chancellor’s Award for Teaching Excellence, and was recognised in the Australian Awards for University teaching program in 2012.

DIRECTOR’S ACTIVITIES

Institute Director Prof Max Finlayson is often called upon by international and national governments, agencies and research organisations for his expertise in wetland management. A member of the Scientific and Technical Review Panel (STRP) of the Ramsar Convention on Wetlands since the early 1990s, Prof Finlayson has been appointed as an Invited Expert of the STRP for another three years, specifically for his expertise on wetlands and climate. He was also the co-ordinating lead author for the chapter on biodiversity for the United Nations Environment Program, Global Environmental Outlook 5 (UNEP GEO 5) report, published in 2012.

During 2011/2012 he:

- As part of his involvement in Ramsar, presented a keynote talk on 40 years of cooperation between Wetlands International and Ramsar at the Wetlands International Triennial council meeting and symposium in Edinburgh, UK; led discussions on climate change and wetlands at the Americas regional meeting of Ramsar in Jamaica; attended an International Blue Carbon Policy Working Group meeting in Belgium organized by IUCN and Conservation International; gave a presentation on Ramsar guidelines for wetland restoration at a New Zealand Wetland Restoration Conference; coordinated input on wetlands for a World Bank initiative on ecosystem based adaptation to climate change; gave a presentation on wetlands and climate change mitigation at the INTECOL wetland conference; attended the 11th Conference of the Parties to the Ramsar Convention on Wetlands held in Romania where he facilitated the passing of a formal resolution on wetlands and climate change; and as a Ramsar representative has spoken at community events in Australia including a Gippsland Lakes Community Forum in Bairnsdale, Victoria
- Led a seminar and training course at Chilika Lake in India on the management of wetland weed species, with a follow-up visit in 2012 to initiate a climate vulnerability and assessment training program
- Supported water birds and vegetation surveys in lakes along the Yangtze River in China
- Assessed the vulnerability of high altitude wetlands in Ladakh, India, to climate change, for a WWF International funded project
- Developed priorities and guidelines for wetland restoration at a workshop in Beijing, China, run by the Institute of Wetland Research, Chinese Academy of Forestry in 2011 with a second visit in 2012 to give lectures and training in wetland ecology and management
- Attended a scientific committee meeting of the National Wetlands Science and Technology Program in Cuiaba, Brazil
- Participated in an assessment of ecosystem services in the Jiangau-Yancheng coastal wetlands in China as part of the Asian Development Bank ‘Mainstreaming the Environment for Poverty Reduction’ project
- Joined the steering committee for the ‘High-throughput genomics approach for comprehensive biological assessment of environmental change in tundra wetlands’ project funded by Genome Canada
- Was a member of the Thirlmere Lakes Inquiry, an independent panel set up by the NSW Government to look into the condition of the lakes, which are in the Greater Blue Mountains World Heritage Area.

MEMBERSHIP OF ADVISORY PANELS AND STATUTORY BOARDS

Institute Director Prof Max Finlayson is a member of the Scientific and Technical Review Panel of the Ramsar Convention on Wetlands and head of its “Wetlands and Climate Change” theme; the IUCN Commission for Ecosystem Management; Board of Advisors of the International Crane Foundation; Wetland Education and Training (WET) panel for Sydney Olympic Park Authority; and chair of the Winton Wetlands Management Committee’s Scientific and Technical Advisory Group. He is the Past President of the Society for Wetland Scientists, Oceania.

Dr Catherine Allan is a Board Member of the Albury Conservation Company.

Dr Rosemary Black is a Ministerial appointment on the NSW National Parks & Wildlife Service, Southern Ranges Regional Advisory Committee, and is a Member of the Global Sustainable Tourism Council Education and Training Working Group; a representative of Interpretation Australia on Guiding Organisations of Australia (GOA); a Member of Ecotourism Industry Reference Group Yeppoon High School, Queensland;
and the Member of IUCN Commission on Education and Communication.

Prof Kathleen Bowmer is an international peer reviewer for the Australian Research Council and the Qatar National Research Fund, and is an Honorary Research Fellow of CSIRO Land and Water.

Dr Colin Boylan is on the Executive Board of Management of the Society for the Provision of Education and the International Advisory Panel for Centre for Excellence for Children and Adolescents with Special Needs. He was also a member of the Office of the Board of Studies for New South Wales’ Higher School Certificate Examination Committee in Senior Science.

Adjunct A/Prof Ian Gray is a Member of the Lachlan Regional Transport Committee.

Dr Jonathon Howard was on the Board of Directors for the NSW Nature Conservation Trust.

Dr Val Ingham represents CSU on the NSW-ACT PEN (Promoting Excellence Network) funded by the Office of Learning and Teaching (OLT).

Prof Gary Luck is a Council member of the Ecological Society of Australia and University representative on the Parks Victoria Research Partners Panel.

A/Prof Ian Lunt is a Member of the NSW & Victorian River Red Gum Adaptive Management Science Advisory Committee for OEH/DSE; a Member of the Victorian Northern Plains Grasslands Technical Advisory Group; a Member of the Technical Advisory Group, Coastal Woodland Adaptive Experimental Management Program, Parks Victoria; a Member of the Oolambeyan biodiversity working group, NSW National Parks & Wildlife Service; and a Member of the Scientific and Technical Advisory Group, Winton Wetlands.

Dr Melanie Massaro is the Treasurer of the Australasian Seabird Group.

Dr Joanne Millar is an Advisory Board member for Action Works Nepal (not for profit community development).

Institute adjunct Prof David Mitchell was a Board Member of the Lake Cowal Foundation and the board’s representative on the Cural Gold Project Community Environmental Monitoring and Consultative Committee; and is chair of the Environment Working Group of the Anglican Church of Australia.

Dr Digby Race was on the Board of The Norman Wettenhall Foundation.

Dr John Rafferty is the Vice President of the Australian Campuses Towards Sustainability (ACTS).

A/Prof Dirk Spennemann is a Special Advisor to the Advisory Council on Historic Preservation, Republic of the Marshall Islands and a member of the Technical Advisory Board to the Historic Preservation Office, Republic of Palau.

Dr Iain Taylor is a Board Member of the Fivebough and Tuckerbil Swamps Management Trust.

Dr Rik Thwaites is on the Indigo Shire Environmental Advisory Committee.

Dr Skye Wassens is on the River Red Gum Adaptive Management Science Advisory Committee (cross border NSW and Victoria) DECCW/DSE; a Member of the Technical Advisory Panel (TAP) BHP Billiton’s Litoria aura Compensatory Habitat Program (CHP) as part of the Hunter River Remediation project; and was an expert consultant for ‘Identifying climate change adaptation strategies to inform wetland and floodplain management along the River Murray in SA’ Murray Darling Basin NRMM Board South Australia.

A/Prof David Watson is a Councillor with Birds Australia (along with Prof Finlayson and Institute adjunct Dr Justin Watson); on the Technical Advisory Group for the Great Western Woodlands Project (jointly managed by Birdlife Australia and the Nature Conservancy); a Member of the National Threatened Bird List Committee; founding member and senior ecologist for the Slopes to Summit Partnership (regional hub of the Great Eastern Ranges Initiative); and a Member of the management committee for Wimaminda Environmental Education Centre.

A/Prof Robyn Watts is on the Environmental Water Scientific Advisory Panel for the Department of Sustainability, Environment, Water, Population and Communities.

Dr Andrea Wilson was Deputy Chair of the NSW Threatened Species Scientific Committee.

**MEMBERSHIP OF EDITORIAL BOARDS**

Institute members are members of various editorial boards, on editorial panels, section editors, associate editors, consulting editors and reviewers for journals such as the Journal of Ecotourism; Journal of Interpretation Research; Teaching Science; Education in Rural Australia; International Electronic Journal in Elementary Education; Journal of Research in Rural Education; Journal of Change Management; Journal of Management and Organization; South African Journal of Human Resource Management; Australasian Journal of Environmental Management; Rural Society; Faculty 1000 Research; ISRN Ecology; Nature Conservation Journal; International Journal of Agricultural Sustainability; Mountain Research and Development; Extension Farming Systems Journal; International Journal of Environmental, Cultural, Economic and Social Sustainability; Australian Journal of Agricultural and Resource Economics; Agricultural Systems; Crop and Pasture Science; Supply Chain Management; An International Journal; International Journal of Logistics Management; Asia Pacific Journal of Social Work and Development; International Social Work; Indian Journal of Social Work & Social Sciences; Social Development Issues; Information Resource Management Journal; Open Sociology Journal; Open Communication Journal; Campus-wide Information Systems; Disaster Advances; Environmental Management; The New Country; International Journal of Organizational Analysis; Austral Ecology; and Journal of Natural Sciences Education.

In addition, Prof Max Finlayson is Editor-in-Chief of Marine & Freshwater Research; Prof Gary Luck is Chair of the Editorial Board for Ecological Management and Restoration; Prof Kevin Parton is Editor of Australian Farm Business Management Journal and Dr Angela Ragusa is Editor-in-chief of Rural Society.
STRATEGIC RESEARCH AREAS

SUSTAINABLE WATER

Program Leader - Associate Professor Robyn Watts

Membership - Professor Max Finlayson, Dr Catherine Allan, Dr Roderick Duncan, Dr Andrew Hall, Dr Jonathon Howard, Dr Julia Howitt, Dr Paul Humphries, Dr Shelby Laird, Dr Skye Wassens, Dr Alek Zander, Prof Kathleen Bowmer, Dr Anna Lukasiewicz, Dr Nicole McCasker, Dr Susanne Watkins and Dr Mariagrazia Bellio

Over past two years this Strategic Area (formerly known as Adaptive Management of Water Policy, Planning and River Operations) has undertaken a range of research projects primarily in the Murray-Darling Basin.

The incorporation of what had been the emerging Sustainable Management of Wetlands in Agricultural Landscapes SRA into this SRA mid-2012 saw an increase in the number of Sustainable Water SRA members and also in the breadth of its research foci. Institute director Professor Max Finlayson joined this SRA, bringing with him his expertise and knowledge of wetland management in both national and international arenas.

Members of this SRA are involved in a number of significant projects, which include:

CSIRO Flagship Cluster - Ecological responses to altered flow regimes

Since 2010 members of this SRA (A/Prof Robyn Watts, Prof Max Finlayson, Dr Skye Wassens, and Dr Keller Kopf) have been involved in the $3 million multi-disciplinary national research collaboration CSIRO Flagship Cluster - Ecological responses to altered flow regimes project. The Cluster involves four sub-projects with ILWS members contributing to two sub-projects. They are:

- ‘Flow dependent ecological responses’ which is investigating the development of ecological models and innovative methods for the monitoring and assessment of ecological responses and impact to environmental water; and
- ‘Assessing aquatic habitat condition and trend,’ which is assessing the current ecological condition of aquatic habitat in the Murray-Darling Basin.

The three-year research project is being undertaken in collaboration with CSIRO’s Water for a Healthy Country Flagship, Griffith University, University of NSW, Monash University, La Trobe University and the Arthur Rylah Institute.

By improving the knowledge and tools that underpin water resource planning for aquatic ecosystems, the Cluster is developing the science that will underpin improved environmental monitoring and modelling tools for the Murray-Darling Basin and beyond.

Monitoring ecological responses to environmental watering in the Edward-Wakool river system

SRA members are undertaking a multi-disciplinary collaborative project to evaluate the ecological responses to the delivery of environmental water in the Edward-Wakool river system.

Institute researchers first began monitoring the Edward-Wakool system in the 2010/11 wetting year through a project funded by the Institute and the Murray Catchment Management Authority, which investigated natural flow pulses that triggered blackwater events and the effectiveness of environmental water in providing refuge habitats. A CSU honours student also studied frog responses to in-channel flow pulses. The following year (2011/12), with $281,678 funding from the Commonwealth Environmental Water Office (CEWO), monitoring of environmental watering was further expanded with the Institute collaborating with the Murray CMA and Monash University to study a range of ecosystem responses and indicators. This project also received in-kind support from the CSIRO Flagship Cluster - Ecological responses to Altered Flow Regimes project.

In 2012/13 the Monitoring the ecological responses of Commonwealth Environmental Water in the Edward-Wakool system project is consolidating a range of assessment methods into the one ecosystem-based monitoring program, incorporating fish movement and population assessments undertaken by NSW DPI. The project, funded by CEWO ($910,935), involves a team of 19 people led by A/Prof Robyn Watts. Project partners are DPI - NSW Fisheries, Murray CMA, Monash University, the Wakool River Association and the NSW Office of Environment and Heritage.

The knowledge from this project (and its Murrumbidgee System equivalent) is helping water managers in Australia optimize the delivery of environmental water in this system and will assist other environmental water programs in Australia and across the world.

Monitoring ecological responses to environmental watering in the Murrumbidgee System

Another multi-disciplinary collaborative project being undertaken by members of this SRA is the ‘Monitoring of ecological responses to the delivery of environmental water in the Murrumbidgee system’ project.

The project’s leader Dr Skye Wassens first started working in this system in 2000 when she began research on frogs in the semi-arid parts of NSW, including the Lowbidgee, and helped develop an emergency watering strategy in 2007 to help save the Southern Bell Frog. Since then NSW OEH has funded further research identifying the relationships between the responses of fish, waterbirds and frogs following environmental watering and natural flood events.

In 2010/11 NSW OEH funded research to monitor the responses of the Southern Bell Frog and to assess the resilience of frog communities in the mid-Murrumbidgee following long periods of drought. In 2011/12 the CEWO provided $160,473 in funding to continue and expand monitoring in response to environmental watering. Further CEWO funding ($776,222) in 2012/13 broadened the mid-Murrumbidgee project to include monitoring the response to environmental watering in the Lowbidgee wetlands, as well as the Western Lakes, and the Murrumbidgee River from below Burrinjuck and Blowering Dams to its end. Dr Wassens leads a team of about 14 people. Partners included NSW OEH, University of NSW, Murrumbidgee CMA and DPI - NSW Fisheries.

Focus Farm Wetland study

The multi-disciplinary Focus Farm Wetland Study was a joint research project with the Graham Centre for Agricultural Innovation. This project was completed in 2011. More details are available on page 12 of this report.
Climate change mitigation

Another almost completed major project, is ‘Identifying low risk climate change mitigation and adaptation in catchment management while avoiding unintended consequences’ (2012-2013) funded by the National Centre for Climate Change Adaptation Research Facility ($100,000). Principal Investigator is Professor Max Finlayson, with co-researcher Dr Jamie Pittock, from ANU, and ILWS post-doctoral research fellow Dr Anna Lukasiewicz.

This project focused on several catchments in the Murray-Darling Basin as examples for testing a more integrative climate change adaptation method designed to increase resilience and avoid maladaptation.

A ‘Climate Change Adaptation Catchment Assessment Framework’ (CCA CAF) was developed as a planning tool for regional management bodies in southern Australia to assess climate change adaptation. The framework is currently being tested and a user guide is being developed.

Developing Fish Friendly Design Criteria for Small Hydro Facilities

‘Developing Fish Friendly Design Criteria for Small Hydro Facilities’ was a new project started through this SRA in 2012. The two year project funded by the Australian Centre for Renewable Energy through DPI NSW Fisheries and Waratah Power ($141,500) is delivered by post-doc Dr Anna Navarro (who is based at the Narrandera Fisheries Centre) and ILWS researcher Wayne Robinson. The project aims to come up with a design for small hydro power stations that can be built on small existing weirs throughout the Murray-Darling Basin without adversely impacting on fish populations.

Murray-Darling Basin Futures Collaborative Research Network

As part of CSU’s involvement in the Murray-Darling Basin Futures Collaborative Research Network (MDB futures) (2012-2015) led by the University of Canberra, ILWS researchers are involved in four projects sitting under two of the CRNs four priority areas.

Under the CRNs ‘Environmental water and allocation – understanding and optimising watering requirements, biodiversity, ecosystem services and productive water uses in the Murray-Darling Basin’ theme:

- Wayne Robinson is working on the ‘Examination of the relationships between stream water flow and fish species and invertebrate taxa using hierarchical regression analyses’ project, as part of the larger ‘Using an Evidence Based Approach in the Optimization of Water Allocation Decisions’ program.
- Dr Mariagrazia Bellio, with principal investigator Prof Max Finlayson, is working on a sub-project of the larger ‘Conserving Biodiversity’ project titled ‘Analysis of Ramsar Site Information in the Murray Darling Basin’.
- ‘Wayne Robinson is working on the ‘Developing ecologically meaningful metrics to advance environmental flow ecology’ (2012) which involves A/Prof Robyn Watts.

INTERNATIONAL LINKAGES

Members of the SRA were also involved in research collaborations and projects overseas. These include A/Prof Robyn Watts, who was invited by Professor Xia, from Hohai University, Nanjing (China), as a Visiting Professor in May 2011, to assist with an aquatic monitoring and assessment research project. CSU and the Institute have a formal alliance with Hohai University. In February 2011, Chinese student Lei Yinru (Ruby) began her PhD looking at climate change and migration through a CSU/Hohai University PhD Scholarship.

In 2011, as a follow-up to a previous visit to Australia by research collaborator and colleague Dr Hubert Keckes, University of Vienna, Dr Paul Humphries spent six weeks at the University of Vienna collaborating on a project related to larval fish dispersal in the Danube and other experimental work with Dr Keckes and his students. The three year ‘Modelling dispersal patterns of fish larvae in a large river’ project has been financed by the Austrian Science Fund.

Since 2009 Dr Catherine Allan has collaborated with Professor Pier Paolo Roggero and Dr Giovanna Seddaiu from the University of Sassari, Sardinia, Italy. Their shared research focus is on systems thinking via social learning. Systems thinking is also at the centre of Dr Allan’s collaboration (paper publication and grant applications) with Professor Ray Ison and Dr Kevin Collins from the Open University UK, and recent collaboration (paper) with other researchers, including Professor Claudia Pahl-Wostl (Germany) and Jun Xia (China) from the Global Water Systems Project.

Institute Director Professor Finlayson has continued his extensive involvement with the Ramsar Convention on Wetlands and work on wetlands. More details of Professor Finlayson’s international and national activities during 2011/12 can be found on page six of this report.
MEDIA

Members of this SRA have been active in the media and on-line forums, particularly in response to the Murray Darling Basin Plan. Prof Max Finlayson, Dr Paul Humphries and Dr Skye Wassens were among more than 60 scientists who signed a joint statement issued April 13, 2012 commenting on the then draft Murray-Darling Basin Plan for lacking transparency and failing to consider climate change.

PHD STUDENTS

This SRA has a large number of PhD (and a Masters) students. They include:

Paul Amoateng: The changing spatial extent of water bodies and the implications for urban flooding - The case of Kumasi, Ghana

Carmen Amos: Frogs in the middle and lower Lachlan catchment and how biophysical factors impact their occupancy patterns

Adrian Clements: Ecological responses of aquatic vegetation communities to the water regime and water quality of inland ephemeral lakes (funding from NSW State Water and Lachlan CMA)

James Dyer: The role of movement in explaining the distribution of riverine shrimp

Jamin Forbes: Population dynamics and implications for management of a Murray cod and golden perch fishery in south-eastern Australia

Damian Kelly: Historical Aboriginal fish traps and river function

Alexandra Knight: Benefits of environmental watering for the distribution of Sloaneas’s froglet (Crinia sloanei), the Common Eastern Froglet (Crinia sigifera), and the Plains Froglet (Crinia parinsignifera prsignifera)

Stacey Kopf: Fish assemblages and instream habitat in lowland river anabranches

Xioying Liu (Sha Sha): Ecological Characterisation and Scenario Setting for Lake Cowal (funded by the Lake Cowal Foundation)

Luke Pearce: Conservation of southern pygmy perch (Nannoperca australis) (Masters)

Luisa Perez-Mujica: A system dynamics approach to assessing sustainability of tourism in wetlands

Christine Reid-Piko: Contemporary and palaeo-ecology of freshwater mussels

Steve Sass: Frog Communities of the NSW Far South Coast: Distribution, Habitat Occupancy and Climate Change

Kylie Singh: Water requirements of fresh water turtles in the Murray-Darling Basin and the responses to environmental flows

Abbie Spiers: An exploration of community perceptions about wetland health in New Zealand

Dr Sylvia Zukowski: What information is required for sustainable recreational freshwater fishery regulations in Australia? Sylvia graduated in 2012 and her thesis made a major contribution to development of new fishing regulations for the NSW Murray Crayfish recreational fishery.

ACTIVITIES

Murray-Darling Basin Seminar Series

During 2012, the Institute participated in the Murray-Darling Basin Seminar Series, a range of events which brings together managers, researchers, landholders, students and practitioners working in the Murray-Darling Basin on Basin-wide issues. The series is a collaboration between the Murray-Darling Freshwater Research Centre, La Trobe & Charles Sturt Universities, and the North East Murray CMAs with the aim of sharing information, learning from others and to provide a regular opportunity for people to meet and discuss Basin issues. The Institute hosted four seminars during the year at the Albury-Wodonga campus. The seminar series will continue in 2013.

Showcasing Success

On November 20, 2012 the Institute held a special morning tea to celebrate its success in attracting on-going funding from the Commonwealth Environmental Water Office (CEWO) for two projects to monitor and assess the ecosystem responses to environmental watering in the Edward-Wakool and Murrumbidgee river systems for the 2012-13 water year. Nearly 50 people, including representatives from CEWO and various partner agencies, attended the event.

VISITORS

During 2011/12 there were a number of visitors to the Institute as a result of SRA members’ connections. They included:

- A colleague of Prof Max Finlayson, Dr Jan Pokorny, a plant physiologist and wetland ecologist from the Czech Republic, who visited in March 2011. Dr Pokorny, co-author of the book Water for the Recovery of the Climate: A New Water Paradigm believes the critical role plants have in distributing solar energy and equalizing temperature extremes is being overlooked and under emphasised.

- In August 2011, the Institute organised and hosted a week-long visit for 14 scientists, engineers, foresters and administrators from India who visited Australia to investigate how it is addressing the uses of limited water resources. The group from Loktak in Manipur state (Loktak Development Authority) and Chilika in Orissa State (Chilika Development Authority) took part in a three day workshop at CSU’s Albury-Wodonga campus followed by a field trip to natural and artificial wetlands in the Murray-Darling Basin. The visit was under the auspices of Wetlands International-South Asia, a global non-profit organisation dedicated to the conservation of wetlands world-wide. The ‘Strengthening livelihood security and adapting to climate uncertainties in Chilika Lagoon, India’ project with researchers Dr Mariagrazia Bello and Professor Max Finlayson follows from this visit.

- Professor Cao Lei, Executive Director of the Multidisciplinary Centre for Eco-Environmental Science, University of Science and Technology of China, spent three months in Australia in 2011 as a visiting researcher, at CSU and Deakin University. She made a second visit in 2012 as a recipient of an AusAid Australian Leadership Award Fellowship. Professor Lei is involved in a major project studying waterbirds in the Yangtze floodplain, which has also involved Institute Director Professor Max Finlayson, Dr Mariagrazia Bello and Dr Daryl Nielsen from the Murray Darling Freshwater Research Centre.
CURRENT PROJECTS

Two projects as part of Murray-Darling Basin Futures CRN (2012-2015):

- Examination of the relationships between stream water flow and fish species and invertebrate taxa using hierarchical regression analyses. Robinson, W., CSU. $40,000, & CRN. $30,651
- Conserving biodiversity: Analysis of Ramsar site information in the Murray-Darling Basin. Bello, M. & Finlayson, M., CSU. $80,000

Assessment of post-flood recovery of frog populations in the Lachlan catchment. Wassens, S., & Luck, G. (2012-2013) OEH. $13,964


Investigation into the socio-ecological system of the Murray Catchment. Howard, J. (2012) Murray Catchment Management Authority. $30,000


Ecological Characterisation and Scenario Setting for Lake Cowal. Finlayson, M. (2012-2015) Lake Cowal Foundation, PhD Scholarship. $90,000


Modelling dispersal patterns of fish larvae in a large river. Project team: Hubert Keckeis (University of Vienna), Michael Tritthart, Hubert Habersack (University of Natural Resources and Life Sciences) and Paul Humphries. (2011-13) Austrian Science Fund.


COMPLETED PROJECTS


Identifying low risk climate change mitigation and adaptation in catchment management while avoiding unintended consequences. Finlayson, M. & Pittcock, J. (2012 to January 2013) NCCARF. $100,000


Identification of hydrological and habitat requirements to maintain viable Southern Bell Frog (Litoria raniformis) populations in the Lowbidgee floodplain (Phase 2). S Wassens, A Wilson. (2010-2011) Department of Environment and Climate Change. $28,867

Vulnerability assessment of the impacts of climate change and sea level rise on Sydney Olympic Park wetlands. Finlayson, M., Spiers, A., & Paul, S(Sydney Olympic Park Authority/CSU); (2011) Sydney Olympic Park Authority. $10,000

How is social justice embedded in Australian water governance institutions? ILWS PhD scholarship A. Lukaslewicz. (2008-2012)
Adaptations Options technical workshop held with the project partners. A Climate Change literature review, semi-structured interviews. The project involved a comprehensive maladaptation. That increases resilience and avoids more integrative climate change adaptation as an example for testing a method for catchments in the Murray-Darling Basin beneficial. This project focused on several change impacts and are overwhelmingly adaptations that reduce risks from climate risks, costs and benefits. A challenge Inherent in every adaptation measure are risks, costs and benefits. A challenge for decision makers is how to choose planning can better consider risks, costs and benefits to inform a choice of measures. A ‘Climate Change Adaptation Catchment: Assessment Framework’ (CCA CAF) was also developed as a planning tool for regional management bodies in southern Australia to assess climate change adaptation.

Outputs


Four reports (2012) identifying low-risk adaptation for each of the case study catchments- Goulburn broken, North East, Murray and Lachlan.

Outcomes

The CCA CAF and its associated concepts have been presented at climate change-related workshops, conferences and seminars around Australia (in Melbourne, Canberra, Sydney and Brisbane) and overseas (at a seminar organised by the International Institute for Global Health in Malaysia).

The Climate Change Adaptation Catchment Assessment Framework was developed and tested as a planning tool aimed at catchment-level NRM managers. The tool was proved helpful to CMA project officers during a review of NSW Catchment Action Plans as it allowed the incorporation of climate change adaptation considerations into management activities within the CMAs’ water programs.

The CCA CAF User Guide has been developed to offer step-by-step instructions and necessary information for managers to apply the CCA CAF within their NRM institution.

Focus farm wetland study, 2010-2011

Funding

Murrumbidgee CMA / Caring for Our Country, $257,000

Investigators/ Researchers

Dr Andrea Wilson & Dr Remi Dehaan, CSU, project managers, Dr Catherine Allan, Dr Skye Wassens, & Prof Max Finlayson, ILWS, Helen Burns, Dr Tom Nordblom and Dr Iain Hume, Graham Centre for Agricultural Innovation; Dr Daryl Nielsen,MDFFRC; Pat Murray, Vanessa Griese, field staff, & Allie Hendy & Amelia Walcott, honours students

Description

The project studied rain-filled wetlands in selected areas of the Murrumbidgee catchment that featured different climatic conditions and farming systems. A methodology was developed to assess rain-filled wetland condition and biodiversity value. Information was collected on the nutritional value of wetland vegetation for stock production, the value of rain-filled wetlands for biodiversity conservation (terrestrial and aquatic) and cost-benefits of different wetland management options. Focus groups of farmers, supported by on farm case studies, promoted interplay between scientific and practical knowledge, and provided insight into how the various wetlands are valued and managed. A variety of biophysical and social approaches were used.

Outcomes


Outcomes

A better understanding of the ecological importance of rain-filled wetlands, how they are currently valued and managed, and what information and other assistance will help farmers manage these wetlands more sustainably.
RESEARCH FOR REGIONAL NATURAL RESOURCE MANAGEMENT

Program Leader - Professor Allan Curtis

Membership Dr Rod Griffith, Dr Nicki Mazur, Dr Digby Race, Dr Michael Mitchell, Dr Emily Mendham, Dr Chris Raymond, Dr Maureen Rogers, Dr Joanne Millar, Dr Penny Davidson, Royce Sample and Simon McDonald

A major success story for this Strategic Research Area, led by Prof Curtis, would have to be its recognition for the contribution its social research is making to the National Centre for Groundwater Research & Training (NCGRT), resulting in the attraction of additional research funding.

NCGRT was established in 2009 by the Australian Research Council and the National Water Commission as a five years initiative. Charles Sturt University is one of 12 university partners in the NCGRT which also includes four Government Departments, four industry partners and CSIRO.

The SRA has been involved with NCGRT from its inception with Professor Curtis as a Principal Investigator. The CSU team is undertaking the majority of the social research component of the NCGRT’s Program 5: Integrating socio-economics, policy and decision support systems, led by Professor Tony Jakeman (ANU). Program 5 researchers also include economists and legal researchers from the University of Western Australia and CSIRO.

As NCGRT funds are committed over a five year period (2009-2014), the SRA team has been able to enter into other research partnerships and leverage on the NCGRT resources to attract additional funding and achieve complimentary research outcomes consistent with the NCGRT mission.

Over the past three years CSU researchers have gained an additional $450,000 (from the NSW Government, Cotton CRC, NCGRT) to add to $650,000 initially allocated through NCGRT. The additional funding can also be interpreted as recognition of the contribution that social science has made to the program, especially the NCGRT’s large integration projects in the Namoi catchment in northern NSW and the Willunga Basin in South Australia.

Namoi Integration Project

The Namoi integration project is part of Program 5 but includes researchers from other NCGRT programs and is a partnership between NCGRT and the Cotton CRC. The project is investigating the socio-economic and environmental impacts of water reform and climate change in the Namoi catchment.

That particular project funded one of the three post-doctoral research fellowships to have come out of the SRAs association with NCGRT. Two of those fellowships (Dr Michael Mitchell and Dr Emily Sharp) have been completed. A third post doctoral fellowship is part-funded by NCGRT (Dr Emily Mendham) and that position will continue until 2014. The association with NCGRT is also supporting the research of four CSU PhD students (Andrea Rawluk, Saideepa Kumar, Theresa Groth and Jennifer Sherry who commenced her PhD in February 2013).

Groundwater Planning

As part of his fellowship, Dr Mitchell collaborated with a post doctoral research fellow (Sondoss El Sawah) and doctoral student (Joseph Guillaume) from iCAM at ANU to employ participatory processes to engage stakeholders in the development of an integrated model to improve groundwater planning in the Willunga Basin of South Australia (which includes one of Australia’s major wine-growing regions). Dr Mitchell also led a review of international literature related to the social dimensions of groundwater management. The key findings of this research were published as a technical report and subsequently as a paper in *The Journal of Hydrology*, an A category international journal.

Resilient Landscapes and Communities

Dr Mitchell was also engaged on the innovative “Transformation for resilient landscapes and communities” project led by ILWS adjunct Dr Rod Griffith, and including internationally recognised experts in resilience thinking (Dr Brian Walker) and social learning (Dr Val Brown). This project received seed funding from NCGRT and other sources to assess the value of applying resilience thinking and social learning to enable rural, resource-dependent communities to consider and pursue transformational change options. The case study involved collaboration with the Wakool Shire Council and the Murray CMA. Experience from this project formed the basis for a large Rural Industries R&D Corporation funded project for additional research in northern Australia.

Groundwater Use

In 2011, Dr Sharp and Prof Curtis surveyed groundwater users in the Namoi catchment as part of the large integrated NCGRT/Cotton Catchment Communities CRC exploring the socio-economic and environmental impacts of changes in climate, technology and water policy. The social research focussed on understanding farmers’ beliefs and knowledge of climate change, their trust in the NSW Office of Water and their views on how water reforms have impacted future plans for their properties. Their research also explored the social acceptability of Managed Aquifer Recharge (MAR) using water from large floods. Those findings have contributed to a cross-program investigation in the opportunity for MAR in farming landscapes (see later section for a summary of the national workshop co-chaired by Professor Curtis, Professor Tony Jakeman and A/Prof Bryce Kelly UNSW). The SRA team led a large team of NCGRT researchers to develop a paper examining the opportunity for MAR in farming landscapes. That paper has now been published in the Australasian Journal of Environmental Management.

Groundwater Dependent Ecosystems

Dr Mendham’s post doctoral research has included a major contribution to the third Wimmera Catchment Social Benchmarking study (details page 15), co-supervision of two CSU PhD students supported by the NCGRT and a project examining Groundwater Dependent Ecosystems (GDE). GDE are not well understood but will need to be if Australia is to make use of groundwater resources without adverse environmental impacts. NCGRT scientists are developing new ways to define and map GDE in order to better understand their dependency on groundwater and surface water. Dr Mendham is working on the social component of this research with the North Central CMA, Goulburn Murray Water and the Department of Primary Industries (Victoria) with a view to understand stakeholder knowledge of groundwater and surface water interactions.
As well awareness of GDE and the ways GDE are currently managed on private land. Andrea Rawluk’s PhD is fully-funded by the NCGRT. She is part of the larger NCGRT effort led by Program 5 to examine the opportunity for MAR in farming landscapes. Andrea’s research is examining the social acceptability of conjunctive use of surface and groundwater, with a case study in the Ovens Valley of North East Victoria.

Environmental Water Application

Dr Wendy Merrett (ANU) is leading another NCGRT project, which examines the ways modelling can contribute to the resolution of complex issues where there is a high level of uncertainty. In this case, the focus is on the application of environmental water to wetlands in the Lachlan catchment where there is an annual allocation of over 100 GL of water for the environment. Saideepa Kumar, an ILWS PhD scholarship holder with a top-up from the NCGRT, is part of the NCGRT team working on this project. Saideepa’s PhD is focussed on the role of social research in integrated modelling attempting to identify condition targets for the application of environmental water.

Social Benchmarking

Theresa Groth’s PhD is examining the nature and role of occupational identity in multi-functional landscapes. Theresa’s research topic was identified as an important knowledge gap during the Wimmera Social Benchmarking project, a project co-funded by the NCGRT and the Wimmera CMA.

The development of long-term partnerships with Catchment Management Authorities (CMA) has been an important achievement for this SRA. Prof Curtis has pioneered the use of mail surveys to gather spatially-referenced social data to assist with the implementation and evaluation of regional NRM. To date projects have been completed in eight regions across South Eastern Australia.

In 2011 the research team was contracted to undertake the third survey in the Wimmera region ahead of the development of the next Wimmera NRM strategy. With surveys in 2002, 2007 and 2011, the team was able to assist the WCMA in evaluating the outcomes from NRM investment; provided insights into the values and long-term plans of landholders; and identified trends in social structure, including property size, absentee ownership and occupational identity. The social benchmarking methodology and research findings have been published in international journals and the approach was adopted as Best Practice by the Australian Government’s Department of Agriculture, Fisheries and Forestry.

Trust in Fire-Prone Communities

Prof Curtis and Dr Sharp (until the end of 2012) are also involved in a three-year (2010-2013) international project with social scientists from Canada and the USA focusing on trust between managers and residents in fire-prone communities. This research is part of the long-term collaboration between Prof Curtis and Professor Bruce Shindler at Oregon State University. The project: ‘Advancing knowledge about citizen-agency trust in wildland fire management: A collaborative assessment framework for Australia, Canada, and the U.S.’ is led by Prof Shindler and is the first-ever international project to be supported by the Joint Fire Sciences Program of the National Interagency Fire Centre in the U.S.

PHD STUDENTS

There are five PhD students associated with this SRA.

Theresa Groth: How does farming as an occupational identity ‘fit’ within the overall personal identity of rural landholders and is it possible to classify those landholders using a collective identity construct?

Saideepa Kumar: Establishing more acceptable and achievable environmental watering targets in a complex changing world

Andrea Rawluk: What governance arrangements will enable rural communities to implement Managed Aquifer Recharge using large flood events to both optimise the social, economic and ecological benefits of this technology and represent the needs and perspectives of stakeholders?

Katrina Sinclair: In a changing climate how will farming systems exposed to reduced water availability respond to secure a sustainable future?

Gina Lennox: Absentee ownership of rural land: Modes, trends and implications

ACTIVITIES

Book Launch

The book, Landscape Logic: Integrating Science for Landscape Management, published by CSIRO Publishing, was launched on May 2, 2012 at the North East Catchment Management Authority’s Wodonga offices by Dr John Williams. The book represents the culmination of a major multi-disciplinary research project undertaken from 2007 to 2010 by 42 researchers and environmental managers from four Australian universities (including CSU), CSIRO, three state agencies and six regional catchment management authorities.

The Landscape Logic project was funded by the Commonwealth Environmental Research Facilities Program and led by Professor Ted Lefroy, Director of the Centre for Environment, University of Tasmania. Co-editor and contributing author Prof Curtis led the project’s social science program, a key component of the project, and a team of eight ILWS researchers.

The book examines the effectiveness of environmental programs to improve our waterways, soils and natural vegetation and includes important messages for environmental managers, land managers, researchers and policy makers.

Managed Aquifer Recovery (MAR)

A Managed Aquifer Recovery (MAR)in Australia workshop was held April 26 - 27, 2012 in Canberra at the Australian National University under the NCGRT umbrella. The workshop, co-convened by Prof Curtis, Prof Jakeman, ANU and A/Prof Bryce Kelly, UNSW, was limited to 25 participants who represented the key science disciplines within NCGRT. Representatives from the Murray Darling Basin Authority, the National Water Commission, the relevant Queensland, NSW and Victorian government departments and the farming industry also attended. The workshop examined the opportunity for MAR in farming landscapes by considering where water might be sourced; the capacity to store water in aquifers; the extent and type of demand for this technology; the environmental benefits, costs and risk associated; and the socio-economic benefits and costs. Dr Andrew Stone, CEO, American Groundwater Association, was a keynote speaker at the workshop.
In Focus

The social drivers of catchment management in the Wimmera CMA, 2011-2012

Funding
NCGRT, Wimmera CMA. $72,000

Investigators/Researchers
Prof Allan Curtis, Dr Emily Mendham, Simon McDonald, Royce Sample, ILWS

Description
The 2011 social benchmarking survey was the third survey conducted by Prof Curtis in the region, following on from surveys in 2002 and 2007. The three surveys provide valuable longitudinal data that is not available for any other catchment. Rural landholders were surveyed to gather spatially-referenced data for intermediate NRM outcomes for key environmental assets. The research gathered information about landholders assessment of issues, long-term plans, enterprise mix and management practices.

Outputs

Outcomes

VISITORS
American Wildfire Researchers

Professor Bruce Shindler from Oregon State University, USA and A/Prof Eric Toman from Ohio State University have become regular visitors to the Institute. Both are interested in the human dimensions of fire management and are working on collaborative projects with Professor Allan Curtis and other Institute researchers.

As part of the Joint Fire Sciences Program project led by Prof Shindler examining trust in the fire management context, social science researchers from Canada and the US visited Australia in October 2012. The focus of the visit was a workshop at Wangaratta facilitated by Prof Shindler. Fire management practitioners provided feedback on a process and draft handbook that enables practitioners to monitor and evaluate trust between managers and residents. As a precursor to the workshop, the visitors were taken on an Institute organised tour to familiarise them with the landscape and fire management in North East Victoria. The team included Prof Shindler, Dr Christine Olsen (Oregon State University), Professor Tara McGee (University of Alberta) and Dr Bonnie McFarlane and Dr Amy Christianson (Canadian Forest Service).

A/ Prof Toman visited Albury/Wodonga, in June 2011 and again in July 2012. He is co-supervising PhD students Theresa Groth and Jenny Sherry, who will start her PhD in 2013, from the U.S.

CURRENT PROJECTS


Integrating community values into regional sustainability planning: The Lower Hunter Region, NSW. Allan Curtis and Chris Raymond (Research Fellow). Curtis, A. (2012 -2014) SEWPAC. $175,000


Predicting the response of water quality and groundwater dependent ecosystems (GDE) to climate change and land management practises: an integrated modelling approach. Curtis, A. (2012-2014) University of Canberra Collaborative Research Networks and CSU. $80,000


COMPLETED PROJECTS


SUSTAINABLE BUSINESS DEVELOPMENT IN REGIONAL AUSTRALIA

Program Leaders - Professor John Hicks and A/Prof P. K. Basu

Membership - Prof Mark Morrison, A/Prof Grant Bambery, Dr Richard Sappey, Dr Branka Krivokapic-Skoko, Dr Roderick Duncan, Dr Glen Duncan and ILWS adjunct Professor Jock Collins, University of Technology, Sydney

A highlight for this SRA in 2011 and 2012 would have to be its success in obtaining consecutive AusAid Australian Leadership Award Fellowships resulting in two groups of Chinese academics visiting Australia to study and work with members of this SRA.

The fellowships were the result of ongoing research carried out by Professor Hicks, Professor Kishor Sharma, Associate Professor Basu and Dr Richard Sappey over the last ten years on China-Australia business relations and regional issues.

Projects with China

In 2011 the $158,000 ‘Sustaining Economic Growth in China’ project, which involved Prof Sharma, Prof Hicks and Dr Yapa Bandara, provided for four Chinese scholars from Jilin University of Finance and Economics, Tianjin University and Yunnan University of Finance and Economics to spend a month at CSU’s Bathurst and Wagga campuses (CSU’s Faculty of Business has had long teaching and research relations with these universities). During their stay the Chinese visitors also received training from the Western Research Institute on Input-Output technique and data analysis, and completed research in the areas of:

- Sustainability and rationality of China’s fast export growth
- Vertical specialisation of China’s exports
- Impact on regional tourism on Chinese economic growth

In 2012 the second $136,000 (plus $27,000 from CSU) ‘Achieving balanced growth in domestic and external markets in China’ project, which involved Prof Sharma and Prof Hicks, A/Prof Basu and Dr Bandara, saw six Chinese scholars from three provinces spent six weeks in Australia. During their stay they also attended a month-long training course on the use of Input-Output techniques and other related techniques including how these can be used for policy-making purposes.

Findings from these fellowships have allowed the researchers to produce a variety of research outputs, including journal articles (published, accepted and in review) and conferences presentations, which members of the SRA have co-authored with their Chinese colleagues. These outputs include:


Indigenous Business

‘Determining the factors influencing the success of Indigenous business in urban, regional and remote areas of Australia’ ARC Linkage project was another major project delivered by this SRA during 2011/12, partnering with the Cultural and Indigenous Research Centre Australia and Indigenous Business Australia ($254,682). This project, which began in 2011 and spans three years, involves Prof Morrison, Dr Branka Krivokapic-Skoko, A/Prof Basu and Prof Jock Collins from the University of Technology, Sydney.

Immigrants in the Bush

The ‘New Immigrants in the ‘Bush’: Attraction and Retention of New Immigrants in Regional and Rural Australia’ three year project, funded by the Rural Industries Research and Development Corporation (RIRDC), with Dr Krivokapic-Skoko and Prof Collins (UTS) was completed in 2011.

Psychological Contracts in the Mining Sector

In 2011 three members of the SRA (Dr Krivokapic-skoko, A/Prof Gary O’Neill and Dr David Dowell) received a small grant from the Institute to deliver the ‘An exploratory study of the psychological contract in the mining sector: Can employee attraction, retention and outcomes be enhanced by better understanding of the written contract?’ project. In 2012 a further foray into research on the mining sector by members of this SRA (Prof Hicks, Dr Krivopic-skoko and Christopher Sherley) resulted in the ‘Friend or foe: Newcrest Mining Limited and its impact on regional development in Australia’ conference paper presented at the XII World Congress of Rural Sociology, July 29-August 4, 2012, Lisbon. Further research through the ‘Mining and corporate citizenship: Newcrest and the communities in the Central West (NSW) project is planned.

Other Projects

Other research undertaken by members of this SRA during 2011/12 included:

- Research on regional labor market comparisons, using Census data from 2001 to 2006 to look at industry specialisation and whether or not it has increased or decreased, how it has changed, if drought has had an impact, and what effect changes in industry specialisation has had on labour market outcomes. A regional labour studies research group, operating within the SRA, was formed. Members consist of Prof Hicks, Ms Dierdre Keogh, A/Prof Basu, Dr Richard Sappey, all Faculty of Business, Dr Jennifer Sappey, Faculty of Arts, A/Prof Rakesh Gupta, Griffith University and Dr Girijasankar Mallik, University of Western Sydney.


- On-going research on aged-care
services in Australia with a paper
Sappey, J. and Hicks, J. (2012) The
economic and social impact of ageing
in rural and regional Australia, presented
to the XIII World Congress of Rural
Sociology, July 29 to August 4, 2012,
Lisbon – Portugal.

As part of CSUs involvement in the Murray-
Darling Basin Futures Collaborative Research
Network (MDB futures) led by the University
of Canberra, Prof Hicks and A/Prof Basu
are involved in the three-year ‘Modelling
community adjustment to water trading in the
Murray-Darling Basin’ project. The project is
under the theme of “Drivers of change-
derstanding and integrating the economic,
social, health and environmental drivers of
change in the Murray-Darling Basin.”

A/Prof Basu, Dr Glen Duncan and Dr Pat
Bradbury are also working with the emerging
A/Prof Basu, P.K. & Bandara, Y. (2012 on-
going) CSU.

Prof Srikkanta Chatterjee from Massey
University, New Zealand visited CSU’s
Bathurst campus in September 2012 to work with Prof Hicks and Prof Sharma, A/
Prof Basu, Dr Bandara and visiting Chinese
academics on a paper, which seeks to
analyse the changing trade patterns between
Australia, on the one hand, and separately,
China and India on the other. Professor Clem Tisdell of Queensland University
also visited in September 2012 to join the
CSU staff listed above to work on a
research project which seeks to analyse the
changing culture of China and the business
implications this may have. Both projects
build on the AusAid funded project ‘Achieving
balanced growth in domestic and external
markets in China.’

VISITORS
Prof Srikkanta Chatterjee from Massey
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changing culture of China and the business
implications this may have. Both projects
build on the AusAid funded project ‘Achieving
balanced growth in domestic and external
markets in China.’

CURRENT PROJECTS
Achieving balanced growth in domestic
and external markets in China. Hicks, J.,
on-going) AusAID Australian Leadership
Award. $136,606 & CSU: $26,930

New immigrants improving productivity
in Australian agriculture. Collins, J. &
Krivokapic-Skoko, B. (2012-2015) RIRDC.
$436,932

Determining the factors influencing
the success of private and community-
owned Indigenous businesses across
remote, regional and urban Australia.
M. Morrison, D.L. Foley, J.H. Collins, B.
Krivokapic- Skoko, P.K. Basu, D.K. Brudenall,
A.M. Redman. (2011 to 2013) ARC Linkage
grant with partners Cultural and Indigenous
Research Centre Australia, Indigenous
Business Australia. $454,682

Strategies to promote community
resilience in disaster management: The
case of flooding in selected communities
in Bangladesh and Australia. Hicks,
J., Ingham , V., & Islam, R., Sappey, R.,
Mannock, I., (2010 on-going) CSU.

Evaluating Major Events in the Region.
Hicks,J., Murphy, T., Basu, P.K., Arthur, L.,
Keigh, D., & West, G. (2011on-going) ILWS.

Mining and corporate citizenship:
Newcrest and the communities in the
Central West (NSW). Hicks, J., Krivopic-
skoko, B., Basu, P.K., & Sherley, C., CSU &
ILWS, (2011on-going)

Regional labour market comparisons.
Hicks, J., Basu, P.K., & Sherley, C. (2010 on-
going) CSU & ILWS.

The impact of education in China.
Hicks, J., Basu, P.K. & Sherley, C. (2011 on-going),
CSU.

Sustaining economic growth in China.
Sharma, K. Hicks, J & Bandara, Y. (2010-
2013) AusAid Australian Leadership Awards
(ALA) Fellowships Program. $158,000

COMPLETED PROJECTS
Attraction and Retention of New
Immigrants in Regional and Rural
Australia. Collins, J. & Krivokapic-Skoko,
B., RIRDC. (2008-2011), $224,000

In Focus

Attraction and Retention of New
Immigrants in Regional and Rural
Australia, 2008-2011

Funding
Rural Industries Research and Development
Corporation (RIRDC), $224,000.

Investigators/ Researchers
Professor Jock Collins, UTS and Dr Branka
Krivokapic-Skoko, ILWS

Description
Since mid 1990s regionalisation of Australian
immigration policy has become more
apparent with the introduction of a number of
initiatives encouraging new immigrants
to settle in non-metropolitan areas. This
research project provided a comprehensive
analysis of the immigrants in regional and
rural Australia. A national survey undertaken
through this project provided an overview of
the factors relating to attraction and retention
of new immigrants in regional and rural
Australia. This was the first national survey
of new immigrants living in non-metropolitan
Australia, including almost 1000 immigrants.
It explored the skills and qualifications of the
immigrants, their employment and settlement
experience and satisfaction with services.

Outputs
Collins, J., Krivokapic-Skoko, B. (2011)
Attraction and Retention of New
Immigrants in Regional and Rural Australia: Report
submitted to RIRDC.

Krivokapic-Skoko and Collins (2012)
International Immigrants Setting in Rural
Australia: ‘Rural Idyll’ or ‘Tyranny of
Distance’? 13th World Congress of Rural
Sociology, 29 July - 4 August 2012, Lisbon,
Portugal

Experience of New Immigrants Settlers
in Rural and Regional Australia. Paper
presented at: A Long Way from Home: Rural
and Regional Settlement Experiences of
Visible Migrants and Refugees. University of
Melbourne, February 10, 2012

Outcomes
The empirical findings of this project
provided the Department of Immigration
and Citizenship and other key stakeholders
with feedback on the efficacy of the migrant
pathways to regional and rural areas as
well as suggestions as to how well these
pathways were working and ways they
could be fine-tuned and improved. Other
suggestions included ways in which
government, community and industry
organisations could refine existing or
introduce new policies and procedures to
improve the attraction and retention of new
immigrants in non-metropolitan areas.
WOODY REGROWTH IN RURAL LANDSCAPES

Program Leader - Associate Professor Ian Lunt
Membership - Dr Catherine Allan, Dr Alison Matthews, Dr Peter Spooner, Dr Rik Thwaites, Dr Rachel Whitsed and Dr John Morgan, La Trobe University.

Some areas of South-East Australia are undergoing rapid demographic and land-use changes, such as reduced agricultural production and expansion of ‘lifestyle’ properties.

In some places these changes have promoted the regeneration of native woody plants across large areas. Regrowth of native trees and shrubs has triggered a diversity of responses from different sectors of the community, from ‘woody weeds’ to ‘valuable regeneration’. However the breadth of community attitudes to regrowth is poorly understood. Similarly, little research has been undertaken on the effects that regrowth has on biodiversity, ecosystem processes and ecosystem services. Woody regrowth often slips through the cracks between agricultural studies of ‘woody weeds’ and ecological and social studies of ‘natural ecosystems’.

The aim of the Woody Regrowth in Rural Landscapes SRA is to enhance environmental sustainability in regional Australia, by improving the ability to manage natural regeneration and regrowth contributing a broad range of social and environmental values.

Current research projects cover an array of social and ecological issues, including: where does regrowth occur, how does it change over time, how does regrowth affect plants, animals and soils, and how do different stakeholders view and interpret regrowth, including issues such as land use, loss of farming land, biodiversity benefits, economic and social impacts and fire risk.

The Woody Regrowth SRA includes seven staff, with expertise in vegetation and fauna ecology, social science, and GIS and remote sensing.

Most of the group’s field research is conducted by a group of enthusiastic and hard-working PhD students. Five students are currently enrolled: Erika Cross, Lisa Smallbone, Fleur Stelling, Samantha Strong and Joey Walters-Nevet. In addition, a number of Honours projects have been conducted recently by Pheona Anderson, Claire Coulson and Ben Zeeman (La Trobe University).

Research projects are being conducted in a number of regions, from southern Victoria to south-central NSW, and many are focused on a region in central Victoria, centred on Murchison, Rushworth and Heathcote, where regeneration is very widespread. Most are still underway, and outputs will begin to flow more strongly from 2014. Three ecology Honours projects were completed in 2012 and scientific papers will be published from all three projects in the near future.

The Woody Regrowth SRA is tackling a number of emerging issues, including the increasing importance of sustainability, land use planning and biodiversity conservation in eastern Australia and elsewhere. Research findings will provide a sound knowledge base for improved management of regenerating rural landscapes in Australia and elsewhere.

Completed Honours projects


Recent and forthcoming papers


PHD STUDENTS

There are five PhD students associated with this SRA. They are:

Erika Cross: Dynamics of south-eastern Australian woodlands: insights into gap-maintenance processes from dense regeneration

Lisa Smallbone: Understanding bird responses in regenerating agricultural landscapes

Fleur Stelling: Exploring how shrubby regrowth is viewed and managed in a rural landscape in Victoria, Australia

Samantha Strong: Exploring paradoxes of native vegetation management in south east Australia in the early 21st century

Joey Walters-Nevet: What role do legacy trees and soil microbes play in the process of natural regeneration?

In Focus

Understanding bird responses in regenerating agricultural landscapes, 2010-2013

Funding

CSU, ILWS

Investigators/Researchers

Lisa Smallbone (PhD candidate) Supervisors: A/Prof Ian Lunt (Principal), Dr Alison Matthews, Dr John Morgan (La Trobe University)

Description

This project investigates regenerating vegetation in a post-agricultural landscapes and how the present and future vegetation mosaic influences regional bird communities.

Does regrowth provide different resources to forest and pasture habitats? This was investigated by comparing bird composition across a range of land uses and gradients of vegetation cover, from cleared pasture, through regrowth sites of varying structure, to remnant forests.

What are the vegetation succession patterns in this changing landscape? This
was addressed by developing a state & transition model based on spatial analysis of a time series of aerial photos and modelling predictors for change in states including time, seed source and competition.

How will vegetation patterns develop in the future? This was analysed by applying a cellular automata model to predict future vegetation patterns under different rainfall and disturbance scenarios. Future vegetation patterns will influence the type of bird community supported and determine any management options required to maintain diversity.

The study has found that regrowth provides important habitat for a complementary group of high conservation value species, which is adding to regional bird species diversity.

**Outcomes**


**Description**

Why are woodlands open ecosystems with low tree densities and large gaps between trees? This question has long puzzled savannah and woodland ecologists world-wide and has been referred to as the ‘woodland question’.

In some regions disturbance events such as fire and herbivory have been shown to restrict tree regeneration in woodlands, maintaining them at densities lower than would be expected in the absence of disturbance. In water-limited ecosystems the open structure of woodlands may however be maintained by root-based competition for scarce resources between constituent trees. In south-eastern Australian dry woodlands the relative importance of disturbance and resource-limited on the structure of woodlands remains largely unknown.

Dense patches of tree regrowth that have emerged following agricultural abandonment provide a novel way of disentangling the disturbance-resource limitation question in south-eastern Australia.

By comparing the leaf area index values of remnant woodland patches and regenerated woodlands and through competition experiments, this research will provide an answer to the woodland question in a former woodland region of Central Victoria.

**Outsuts**

A research proposal, seminar and preliminary site selection has been undertaken for this project.

**Outcomes**

This project will contribute important theoretical insight into the construction and maintenance of woodland ecosystems world-wide. The results will also assist land managers in making informed decisions regarding the use of disturbance-based management in woodland ecosystems.

**Exploring how shrubby regrowth is viewed and managed in a rural landscape in Victoria, Australia, 2010-2013**

**Funding**

CSU
IMPROVING RURAL LIVELIHOODS AND ENVIRONMENTS IN DEVELOPING COUNTRIES

Program Leaders - Dr Joanne Millar and Dr Rik Thwaites

Membership - A/Prof PK Basu, Prof Kishor Sharma, Dr Rosy Black, & Prof Manohar Pawar, Dr Calvin Wang, Dr Richard Culas & Dr Peter Wynn. ILWS adjuncts involved include Dr Robert Fisher, University of Sydney; Dr Ganga Dahal, Resource Rights Institute, Bangkok; Dr Digby Race, CSIRO Alice Springs; Dr Lee Baumgartner, Department of Primary Industries - NSW Fisheries, Narrandera; Mr Horrie Poussard, International Landcare, Melbourne and Mr Patten Bridge, BridgeLogic Pty Ltd.

Rural people in developing countries are highly dependent on natural resources to provide food, shelter, income and cultural needs. However population pressures and inequitable distribution of wealth create competition for resources, land and water degradation and loss of biodiversity.

Causes of poverty and erosion of natural capital in developing countries can be geographically remoteness; war and resettlement; rapid urbanisation; unsustainable timber logging, cropping or fishing; climate change causing drought, landslides or flooding; foreign ownership and investment in resources; trade policies; poor governance and lack of education opportunities. The complexity of these issues requires interdisciplinary research to identify social, economic, environmental, agricultural and cultural factors at play, and to develop solutions.

The aim of this SRA, formally established in 2011, is to conduct collaborative, applied research with key partners to influence rural development and environmental policy and programs in developing countries.

The SRA received several grants in 2011 and 2012. Dr Joanne Millar secured $66,180 from the Australian Centre for International Agricultural Research (ACIAR) for a socio-economic study of fish harvesting project in Laos, and $64,000 from ACIAR and the University of Sydney for a socio-economic project on diversification of smallholder coastal aquaculture in Indonesia. Professor Manohar Pawar and Taewook Huh obtained a $5000 research grant from UN Research Institute for Social Development to research and write a book chapter on Korean Responses to Environmental Challenges: Origins, drivers and the impact of green growth on development. It will form part of an edited book to be published by Palgrave Macmillan.

The SRA produced 25 publications during 2011 and 2012.

PHD STUDENTS

There are 21 PhD students associated with this SRA from Nepal, Indonesia, Ghana, China, Bhutan, Pakistan, India, and Zimbabwe. They are:

- Binod Devkota: Socio-economic outcomes from community forestry in Nepal. (Graduated December 2012)
- Lukas Wibowo: Optimising the policy and institutional settings for community-based forestry in Indonesia. (Graduated December 2012)
- Michelle Smith: Linking food security and conservation. Capacity and sustainability of enclave villages within Nakai Nam Theun National Protected Area in Laos (Masters)
- Yustina Murdiningrum: The capacity of non-government organisations to be catalysts for community forestry in Indonesia
- Tri Wahyudiati: Forest Community Development: Enhancing corporate social responsibility in Indonesia’s forestry sector
- Kuenga Namgay: Transhumant agropastoralists in Bhutan. Do they have a place in the 21st century?
- Wes Ward: Communication in agricultural development in South East Asia: pathways, problems and possibilities
- Oyn Davaakhuu: Trade and Foreign Investment in the post-WTO Mongolia
- Mei Mei Meilani: Community Eco-tourism in Indonesia
- Yei Linru: Climate change and migration
- Mohan Poudel: Integrating Climate Change into Community Forestry: assessing and modelling potential livelihood implications of REDD+ in Nepal
- Popular Gentle: Equipping poor people for climate change: Can community forestry be a pro-poor adaptation strategy for rural communities in Nepal?
- Patrick Cobbina: Eco-tourism and poverty reduction in Ghana
- Naveed Aslam: Development of quality control protocols for implementation of smallholder dairy farmers
- Muhammad Shoail Turk: Development of Village-based forage seed production system for the sustainability of smallholder farmers of Pakistan
- David McGill: Breeding dairy animals in Pakistan: Modifying selection and analysis for a more profitable future
- Vijay Kuttapan: Rural to urban migration of tank irrigation communities in South India
- Karma Tenzing: Common Property Resource Management in Bhutan: improving livelihoods and governance of rangelands
- Eak Rana: Ecosystem Service Trade-offs in Forest Commons: A Case Study from Community Forests in Central Himalaya, Nepal

ACTIVITIES

In August 2011, a two day workshop was held to share information and ideas from current research and identify new integrated research areas in order to provide direction for the SRA. A total of 31 participants attended including 14 postgraduate students researching topics relevant to the SRA and 14 academic staff from Bathurst, Wagga and Albury campuses. Three adjuncts researchers also attended. Two focus areas...
In 2011 and 2012, the SRA hosted three visiting fellows: Dr Ganga Dahal, Regional Facilitator, Rights and Resources Initiative, Bangkok, Thailand, who visited in September 2012, is a member of Mohan Poudel’s PhD supervisory team.

The Implications of global environmental policies on land use and livelihoods in developing countries project is led by Dr Rik Thwaites. An initial literature review investigated the debates surrounding the global policy program to Reduce Emissions from Deforestation and Degradation (REDD+). A second literature review explored how concepts of social justice (equity, fairness, rights) relate to the REDD+ mechanism by considering key concerns and experiences of local communities engaged with REDD+. Postgraduate students involved in this project include Mohan Poudel and Eak Rana from Nepal, and Patrick Cobbinah from Ghana. Meetings have been held with ACIAR and ANU to explore potential partnerships and collaborations.

Dr Joanne Millar and A/Prof PK Basu are leading The role of rural entrepreneurship in developing countries: can it lead to sustainable development project. The study explores:

- The nature of rural entrepreneurship in developing countries;
- To what extent rural entrepreneurship contributes to long term economic and social development beyond the individual;
- To what extent rural entrepreneurship can contribute to local or regional environmental sustainability, and;
- How communities and governments can facilitate sustainable development using entrepreneurial strategies.

Two research assistants were employed in 2012 to conduct literature reviews on rural entrepreneurship in Asian and non-Asian developing countries. Scholarship options are being considered with a view to secure a suitable PhD candidate for the project.

CURRENT PROJECTS


The role of rural entrepreneurship in developing countries: can it lead to sustainable development? Millar, J. Black, R., Wynn, P. Badar, S., McGill, D. & Basu, PK. (2012-16)


Socio economic study of farmer adoption of tilapia fish production in Aceh, Indonesia. Part of Diversification of smallholder coastal aquaculture in Indonesia), Millar, J. with University of Sydney, (2012-2015) ACIAR. $64,000

COMPLETED PROJECTS


Informing productivity and profitability of small-holder shrimp aquaculture and related agribusiness in Indonesia. Collaborator with University of Sydney. Millar, J., Callinan, R. (University of Sydney), Herianto,A. (Gadjah Mada University, Indonesia) and Fachry,M. (Hasanuddin University, South Sulwesi) (2007 to 2011) ACIAR.


In Focus

Socio-economic study of fish harvesting and use at Pak Peung wetland in Laos, 2012-2015

Funding

ACIAR, $58,560

Investigators/ Researchers

Dr Joanne Millar, ILWS, Dr Lee Baumgartner, Department of Primary Industries - NSW Fisheries, Narrandera, Dr Wayne Robinson, CSU, Dr Oudom Phonekhampeng, National University of Lao, & Mr Douangkham Singhanouvong, Living Aquatic Resources Research Centre, Laos

Description

The project is part of the larger “Development of fish passage technology to increase fisheries production on floodplains in the lower Mekong and Murray-Darling River basins” project (2011 to 2015). It is investigating whether the construction of permanently-operating fishways provide quantifiable social, economic and environmental benefits to floodplain wetlands and communities. A baseline survey of fish harvesting and use by villagers was carried out in September 2011. Another survey in November 2012 explored gender differences and traditional conservation practices. The village survey will be repeated post fishway construction in 2013, 2014 and 2015 to determine any observed differences in fish migration, species abundance, and quantity or quality of fish sold and used by villagers.

Outputs

Survey results were presented at the annual project meeting in Vientiane in January 2012. A report will be presented at the August 2013 meeting.

Outcomes

Results will enable the Lao government to decide whether or not to invest in fish passages for environmental and community benefits.
In 2011 and 2012 much of the research focused on issues that influence how society is adapting to climate change such as climate change communications, climate change policy and climate change leadership.

This SRA is made up of multi-disciplinary members (environmental economics, social science, political science, management and leadership, and communications) based in Albury-Wodonga, Bathurst, Orange and Wagga Wagga. The SRA was originally led by Prof Mark Morrison and Prof Kevin Parton until Prof Parton semi-retired in May, 2012.

Field research has now been completed for the ‘Increasing household energy efficiency’, ‘Climate change communications’ and ‘Climate change and leadership’ projects - with some papers written and accepted, others under review, and more still being written.

Household energy efficiency

The increasing household energy efficiency research project is a result of Dr Jodie Kleinschafer’s PhD on ‘Energy efficiency and residential households: Managing electricity demand’, which was funded by Country Energy (now Integral Energy) and ILWS, and which Dr Kleinschafer completed in 2010.

Information for the project was collected from nine focus groups in three different locations in NSW – Wagga Wagga, Bathurst and Port Macquarie. About 4000 Country Energy customers were then surveyed and 1100 responses obtained. Sufficient data was collected to analyse household decision making and increased efficiency and decrease electricity consumption through household types and motives segmentation.

The findings from these projects were presented to the Department of Climate Change’s Energy Efficiency Task Force and Integral Energy in 2011 and 2012. One paper has been published - Morrison, M., Kleinschafer, J. and Hicks, J. (2013) Improving Consumers’ Responsiveness To Electricity Demand Management Initiatives In Regional New South Wales: The Potential Use Of Behavioural-based Constructs For Identifying Market Segments. Australasian Journal of Regional Studies 19(2)- and several others are close to submission.

Climate change communications

The climate change communications project began in 2010 with funding from ILWS. It has involved Prof Morrison and Prof Parton, Dr Roderick Duncan and an honours student Mr Chris Sherley. After the release of the Garnaut report (2008) media campaigns run by the Australian government through 2009 did not greatly influence public support for the government’s climate change policies. This suggested a need for more targeted media campaigns.

This project examined that issue through ILWS researchers replicating a climate change segmentation study undertaken in the US. Six segments within the US population with different attitudes towards climate change had been identified, which could be used as the basis for a targeted media campaign. When the researchers replicated the US survey in Australia in December 2011 they found the segments were significantly different and their reported characteristics could be used to design targeted climate change media campaigns in Australia.

Results of the team’s work were presented at the Department of Prime Minister and Cabinet in November 2011 as well as to the Department of Climate Change in 2012 and were well received. A number of papers from this research have been submitted and are either forth-coming or under review.

Climate change leadership

As part of the climate change leadership project, led by Dr Kerry Tilbrook, a successful focus group was held in Canberra in 2011. Dr Tilbrook presented a paper at the British Academy of Management conference in July, 2011 and is currently preparing two journal articles.

Other research projects

Other research undertaken by members of this SRA during 2011 and 2012 include:

- The Lachlan drought study, led by Dr Robert Tierney, was designed to understand current drought and drought policy by examining drought events in NSW since 1900. This project is continuing with outputs so far including a book chapter in the forthcoming book Ragusa, A. (ed.) Rural Communities, a paper under review for Australian Economic History Review.

- Prof Morrison is leading a project assessing resilience in the Lachlan CMA, funded by the Lachlan Catchment Management Authority (CMA) and ILWS. A draft report, proposing to measure relative levels of resilience in terms of social, human, physical and financial capital at a sub-catchment level has now been accepted.


- The ‘Extreme weather and population health in Australia: risk assessment, prediction of health impacts and disease burden, and adaptive strategy exploration’ ARC Discovery project involving Prof Parton and other collaborators was completed in 2012. Key publications from this research include journal articles in Science of the Total Environment, and Environment International.

Members of the SRA are also developing a number of new projects, including: “Understanding the impacts of Coal Mining and CSG” (Prof Mark Morrison, Dr Gavin Mudd, Monash University); “Assisting Lower Socio-demographic Households Increase Energy Efficiency” (Prof Mark Morrison, Jodie Kleinschafer, and Felicity Small); “Unpacking Social Capital, its role in building community resilience and how to develop it” (PhD) (Prof Mark Morrison and Prof Allan Curtis) and “Developing a Statement by Church Leaders..."
PHD STUDENTS

Tim Hutchings: Modelling risky decisions in Australian farm business (Recent completion (July 2013))

Jenni Greig: Predicting the social impacts of change: Exploring a psychological approach to capturing social impact data for cost-benefit analysis

ACTIVITIES

Climate Change Policy Workshop
An ILWS workshop chaired by Prof Morrison was held in Canberra in March, 2011. More than 60 people attended and heard several prominent speakers address key questions relating to climate change. Adjunct Professor Bjorn Lomborg, an economist from Denmark’s Copenhagen Business School and Institute Director of the Copenhagen Consensus Center, headed the list of speakers, which included Canadian architect Michael Green, and economists Dr Ben McNeil (University of NSW Climate Change Centre) and ILWS’s Dr Rod Duncan. The four speakers addressed the two “What should Australian government policy be in managing climate change?” and “How should the Australian government build resilience into the economy and community given greater variability in climates?” questions. Participants included public servants from the Australian Government Department of Climate Change and Energy Efficiency, the Department of Prime Minister and Cabinet, Climate Change and Energy Efficiency, the Department of Climate Change and Energy Efficiency, the Australian Government Department of Climate Change and Energy Efficiency, and a NCARF publication Hazards Natural 16 – 18; an ILWS report; papers in New Zealand Disaster and Emergency Management Conference. Brisbane, April 15 – 18; an ILWS report; papers in Natural Hazards and a NCARF publication.

Current Projects


Understanding Drought in the Lachlan Region. Tierney, R., & Parton, K. (2010 ongoing) ILWS.

Climate Change Leadership. Tilbrook, K. (2011 ongoing)

Completed Projects


Recovery from disaster experience: its effect on perceptions of climate change risk and on adaptive behaviours to prevent, prepare, and respond to future climate contingencies. Millar, J., Boon, H., (JCU), King, D., (JCU) & Cottrell, A. (JCU) (2010-2012) Department of Climate Change and Energy Efficiency. $43,706


Consequences of water buy backs on rural communities, J. Howard (Dec 2009- Dec 2011) CSU.

Implementing a social marketing energy saving program across student residences. Black, R., Davidson, P., Kelly, J., Bell, B. & Wiltsher, J. (2010-2011) CSU sustainability grant.


In Focus

Recovery from disaster experience: its effect on perceptions of climate change risk and on adaptive behaviours to prevent, prepare, and respond to future climate contingencies, 2010-2012

Funding

Department of Climate Change and Energy Efficiency. $43,706

Investigators/Researchers

Dr Joanne Millar, ILWS, Dr Helen Boon, JCU.
Dr David King, JCU & Dr Alison Cottrell, JCU

Description

This project investigated how individuals prepared, responded and recovered from natural disaster events in Australia. The aim was to draw conclusions on adaptation and resilience to natural disasters, and perceptions of climate change. Qualitative interviews and focus groups were held in 2010 across four sites that had experienced disasters in the previous decade; Beechworth (bushfires), Innisfail (cyclone Larry), Ingham (floods) and Bendigo (drought). A quantitative survey of 1,008 households followed in 2011 using Structural Equation Modelling to analyse the results.

Results showed that resilience is both an individual trait and a process. The strongest direct predictor of resilience was adaptability and a sense of place. Indirect influences, mediated via adaptability, were: financial capacity, family and neighbour support, communications and climate change knowledge. Community demographic data supported the hypothesis that individuals remaining in the community were resilient. The researchers concluded that the four communities surveyed were resilient to disaster.

The relationship between climate change views and disaster experience is complex and needs further exploration in rural and regional Australia.

Outputs

These include conference papers to the International Symposium for Society and Resource Management, Edmonton, Canada. 17-21 June 2012 and the Australian & New Zealand Disaster and Emergency Management Conference. Brisbane, April 15 – 18; an ILWS report; papers in Natural Hazards and a NCARF publication.

Outcomes

Recommendations have been made to emergency managers in Queensland and Victoria, and policy makers in the DECC.

on Climate Change Action’ (Prof Mark Morrison, Prof Kevin Parton and Dr Rod Duncan).

Professor Ulrich Nissen delivered interesting messages on accounting for energy costs to Institute members, and business and industry representatives during his visit to the Albury-Wodonga campus in August 2011. Professor Nissen is a Professor of Management Accounting and Business Orientated Energy Management at the University of Applied Science, Giessen, Germany.
Environmental Justice and Governance for Social Change

Program Leader - Dr Helen Masterman-Smith and A/Prof Vaughan Higgins

Membership- Dr John Rafferty, Dr Andrea Crampton, Dr Merrilyn Crichton, Dr Jillian Dunphy, A/Prof Ian Gray, Dr Jonathon Howard, Dr Shelby Laird, Dr Anna Lukasiewicz, Prof Jennifer McKinnon, Dr Michael Mitchell, Dr Susan Mlcek, Prof Mark Morrison, Prof Manohar Pawar, Dr Angela Ragusa, Dr Felicity Small, (all ILWS) and Dr Oliver Villar (CSU)

A number of staff changes during 2011 and 2012 saw a change of aim for the former Innovative Perspectives on Energy and Climate Change SRA to transform mid 2012 into the Environmental Justice and Governance for Social Change SRA.

The aim of the new SRA is to advance policy, community and scholarly understandings about the social dimensions of environmental sustainability, with a focus on questions of justice and governance. The environmental justice and governance fields are considered embryonic in Australia, with research currently quite patchy, although well-developed internationally.

It is widely acknowledged that action is needed to address the numerous and growing threats to the environment and hence the natural resource base on which all life, including human society, depends. Despite this recognition, many social barriers still exist at the political, economic, cultural and institutional levels. These barriers influence action on environmental sustainability at all levels of society from the individual to neighbourhoods, nations and global communities. Environmental justice and governance are central axes of debate and contention about how to best to overcome these barriers. The SRA engages in these debates, specifically how best to build ecologically sustainable societies in socially just manners.

Current and future activities

The SRA is focusing its current and future activities on:

- Exploring the social drivers and consequences of environmental initiatives and actions, from the local to the global levels;
- Investigating and critically assessing the social dynamics and policy approaches underpinning environmental justice and equity issues; and
- Improving understanding of the diverse histories, cultures and knowledges through which social groups understand, manage and interact with the environment.

The former emphasis of the SRA on transport and energy issues has been retained with the addition of new research areas including biodiversity, conservation, climate change, rural/urban nexus, food and water security, agriculture, housing, work, and social, community, education and health services.

The transformation of the SRA has also resulted in an increase in member numbers from 8 to 18, from a variety of disciplines and with a diverse range of research interests.

PHD STUDENTS

Michelle Olivier: The advantages of localisation as a strategy for sustainability and global carbon reduction

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

Joanne Edney: Wreck divers, cultural background and the management of underwater cultural heritage in the Asia-Pacific Region

ACTIVITIES

Symposium and Launch

The new SRA was officially launched with a symposium around the theme of “Strategies for building environmentally sustainable and socially just communities” at CSUs National Wine and Grape Industry Training Centre in Wagga Wagga on November 8, 2012.

The symposium was attended by over 30 participants including a diverse range of CSU researchers and external visitors. One of Australia’s leading environmental sociologists, Professor Stewart Lockie from ANU, was a keynote speaker. The keynote address was followed by two panel discussions on:

- Strategies for building environmentally sustainable and socially just communities: political and equity dimensions; and
- Strategies for building environmentally sustainable and socially just communities: cultural and knowledge dimensions.

Practical outcomes from the symposium were recorded in a Special Issue of the journal Rural Society Vol. 22 Issue 3 -2013 (co-edited by Dr Helen Masterman-Smith and Dr. John Rafferty), with articles from Dr Michael Mitchell and Dr Jonathon Howard who also presented at the symposium.

CURRENT PROJECTS

Sustainable farming in Australia: Market instruments for improved land management. Higgins, V. (chief investigator), Cocklin, C., (James Cook University) & Potter, C. (Imperial College London). (2010-2013) ARC Discovery Project. $193,979


Building capacity to respond to climate change at a local level. Howard, J. (2012-2013) DECC, scholarship top-up, $15,000


Environmental worldviews of teachers in Australia. Rafferty, J. (2012-13) CSU.


Transportation decisions and behaviours of students and staff at the Albury-Wodonga campus of Charles Sturt University. Laird, S. & Black, R. (2012-2013) CSU. $1900


**COMPLETED PROJECTS**


What are the factors affecting the ability of agriculture to attract and retain young people? Gray, I. (2011) DPI, Victoria. $14,000


In Focus

What are the factors affecting the ability of agriculture to attract and retain young people?, 2011

**Funding**

Department of Primary Industries, Victoria, $14,000

**Investigators/ Researchers**

Adjunct A/ Prof Ian Gray,

**Description**

In 2011 the Victorian Department of Primary Industries commissioned a research literature review in order to address the terms of reference of a Parliamentary Inquiry into the Capacity of the Farming Sector to Attract and Retain Young Farmers and Respond to an Ageing Workforce.

The most important features of farm population change were found to be:

(1) Low and declining entry rates for young farmers driving the ageing process in association with changing exit rates among older farmers and

(2) Farm population ageing varying among industries and places.

The ageing process is being further complicated by trends in farming, in many situations moving away from productivism towards amenity purposes and a secondary contribution to household incomes.

The study concluded that a successful government intervention aimed at improving the attractiveness of farming to young people is constrained by the structural adjustment process at the economic level, and the culture of family farming with its continuing, though declining and perennially problematic, process of succession.

The attractiveness of farming is also related to the attractiveness of rural living more generally.

Overarching these issues is the process of change towards small farms, retained for amenity value in some areas, and the rise of agribusiness, which alongside a more traditional farm management pathway, may be providing alternatives to farming careers.

The research literature indicates a wide range of factors associated with the popularity of farming careers and hence potentially affecting the likely success of related policies and programs.

**Outputs**

Gray, I. (2011) What are the factors affecting the ability of agriculture to attract and retain young people? Review of research literature prepared for the Department of Primary Industries Victoria.

**Outcomes**

Adjunct A/ Prof Gray briefed the leader of the Rural and Regional Committee of the Victorian Parliament and addressed a seminar in the Department of Primary Industries in Melbourne.
ECOSYSTEMS SERVICES

Program Leader - Dr Roderick Duncan

Membership- Prof Max Finlayson, Prof Gary Luck, Prof Mark Morrison, Dr Julia Howitt, and Manu Saunders (all ILWS).

This SRA aims to quantify and attach a value to environmental services and the ecosystems that produce these services in regional Australia.

In 2011 and 2012 the SRA’s main achievements were the delivery of a workshop focusing on ecosystem services in the Murray-Darling Basin; ecosystems services related research conducted by Prof Gary Luck through his Australian Research Council (ARC) Future Fellowship; the completion of the ‘Designing landscapes to deliver ecosystem services to agriculture’ ARC Discovery project; and near completion of the ‘Managing agricultural landscapes to maximise production and conservation outcomes: the case of the Regent Parrot’ ARC Linkage project.

ARC Futures Fellowship

Professor Gary Luck is a recognised leader in ecosystem research in Australia. In 2010 he was awarded an ARC Futures fellowship to work on the ‘Integrating Conservation and Ecosystem Service Values’ project. This fellowship, which finishes in March 2014, has seen him become a full-time researcher, publishing over 20 papers and developing stronger collaborations with international colleagues through regular visits to North America and Europe. Prof Luck is a member of Ecosystem Services Partnership (ESP), a worldwide network designed to enhance the science and practical application of ecosystem services. In 2012 he attended an ESP annual conference in Portland, Oregon, U.S. and was involved in a workshop aimed at mapping and modelling ecosystem service priorities. He is a member of the ESP working group for this topic.

His ecosystems research can be organised under four research themes including:

* 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, 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.

* The ethics of ecosystem services: This research addresses the ‘What are the ethical implications of valuing nature using ecosystem services?’ question. In 2011, Prof Luck attended an interdisciplinary workshop on the ethics of ecosystem services in Germany, resulting in a lead author paper in BioScience on ethical considerations in on-ground applications of the ecosystem-services concept.

* Case studies of ecosystem-service provision: In collaboration with Dr Spooner and PhD students Shannon Triplett and Manu Saunders, Prof Luck is examining case studies of service provision in agricultural landscapes – particularly the horticultural districts of Northern Victoria. As part of this work, 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.

* Urban Ecology: Prof Luck, who has been involved in previous research projects on urban biodiversity and human-well being, is working with Caragh Threlfall, 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.

ARC projects

The Institute was able to secure two major ARC projects with direct relevance to ecosystem services research in Australia. The ‘Designing landscapes to deliver ecosystem services to agriculture’ ARC Discovery project (Luck, G. & Spooner, P.) ($255,000) finished at the end of 2011. Details can be found on the next page.

The ‘Managing agricultural landscapes to maximise production and conservation outcomes: the case of the regent parrot’ ARC Linkage project (Spooner, P., Watson, D. & Luck, G.) with Select Harvest and NSW Office of Environment and Heritage ($397,892) is due to be completed in 2013. This project employed two PhD students, Shannon Triplett and John O’Laughlin, and post-doc Dr Simon Watson. The researchers were able to identify how almond plantations contribute to native species conservation in North-Western Victoria, in particular the threatened Regent Parrot; to quantify the costs and benefits of bird use in almond orchards; and to develop management approaches that maximise conservation gains while minimising impacts on production.

Ecosystems and wetlands

Institute director, Prof Max Finlayson, a wetland ecologist, is also heavily involved in ecosystem services research, with ongoing publication in the field, in particular in reference to the importance of addressing ecosystem services when looking at maintaining or restoring the ecological character of wetlands. Key publications in 2011 included a chapter on managing aquatic ecosystems in Peter Wilderter (ed) Treatise on Water Science, Vol.1. pp 35-59 Oxford: Academic Press, and a United Nations Environment Programme, Nairobi & International Water Management Institute publication Ecosystems for food and water security.

Other research projects

2011 saw the completion of the ‘Benchmarking values and attitudes to Conservation in the Great Eastern Ranges’ led by Prof Morrison with collaborators from Sunshine University, University of Technology Sydney and University of Tasmania, and funded by NSW DECCW and Hawkesbury Nepean CMA. The researchers were able to identify different types of lifestyle segments leading to changed communication practices within the Hawkesbury Nepean CMA.

Dr Roderick Duncan and Prof Morrison are currently delivering ‘The Value of River Health
to the Residential Community of the Georges and Cook River Catchments’ project, which will see the appointment of PhD candidate Buyani Thomy in 2013. His research will be on valuing the benefits of improved river health. The project has attracted $138,800 in funding from the Sydney CMA, Canterbury and Fairfield Councils, and CSIRO Flagship Post-graduate Top Up Scholarship Program.

PHD STUDENTS

PhD students associated with this SRA:
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 (start in 2013)

ACTIVITIES

Ecosystems services in the Murray-Darling Basin

Forty people attended an ecosystems services workshop in the Murray-Darling Basin in Canberra, August 24 and 25, 2011. The workshop, organised by Prof Morrison and Prof 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. Professor Robert Johnston, Clarke University, Massachusetts and A/Prof Dolf de Groot, Wageningen University, The Netherlands, were the two key presenters. The workshop examined the experiences of several overseas countries in the use and valuation of ecosystems services and highlighted some of the challenges faced by practitioners valuing ecosystems services in Australia. The importance of economists, ecologists and sociologists working together to help refine and improve methods for identifying and valuing ecosystems services emerged as a major theme from the workshop which was held at a time when the Murray Darling Basin Authority was assessing the likely socio-economic impacts on local communities of the Murray Darling Basin plan’s sustainable diversion limits options.

The workshop lead to researchers in CSIRO and CSU (Prof Morrison and Dr Hatton MacDonald) contributing to the ‘Multiple Benefits of the MDBA Basin Plan’ project, which included an outline of some ecosystems services benefits to Basin communities. The project report and resulting paper are cited in the Regulatory Impact Statement that was tabled in parliament. The South Australian government has also used these research findings in their response to the MDB water sharing plan.

CURRENT PROJECTS

integrating the conservation and ecosystem-service value in Australia’s catchments. Luck,G. (2010-2014) ARC Future Fellowship. $682,077


COMPLETED PROJECTS


Designing landscapes to deliver ecosystem services to agriculture. Luck, G., & Spooner. (2009-2012) ARC Discovery Grant. $255,000.


In Focus

Designing landscapes to deliver ecosystem services to agriculture, 2009-2012

Funding

ARC Discovery grant, $255,000

Investigators/Researchers

Prof Gary Luck, Dr Peter Spooner

Description

This project addressed the National Priority of Sustainable Use of Biodiversity by employing a pioneering management framework that identified situations where agriculture can gain maximum benefit from nature’s services. It was the first study to develop a methodological framework to examine the consequences of environmental change for the provision of ecosystem services via animal species traits. It was also the first study to present a systematic approach to trait selection that addressed the interrelationships amongst scale of the environmental change, area of ecosystem service provision, and the most appropriate traits for analysis. The researchers used birds as a case study, linking the environmental change related to loss of tree cover with the ecosystem service of invertebrate pest regulation in apple orchards. They found that as tree cover around orchards increased so did the abundance and foraging rate of bird species that pursue invertebrates in flight. This may help reduce the abundance of certain pests on apples.

Outputs

Include:

Outcomes

The model developed 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 the protection of native species by recognising their contribution to agriculture.
Members of the Institute undertake a variety of research projects which add to the work delivered through the ILWS Strategic Research Areas.

Many of these projects focus on topics related to biodiversity conservation but also include projects on conservation agriculture, pest animal management, ethics, and leadership. Some of these projects are classified as consultancies. A selection below:

**CURRENT PROJECTS**


**Starling management and street tree selection for Macquarie Street.** Luck, G (2012-14) Dubbo City Council. **$80,000**


**New ethical approaches to responsible research & innovation.** Spence, E., Ragusa, A., Weckert, J., Brey, P., Hartz Soraker, J. & van Wynsberghé, A. (2012) CSU Global Alliance Grant. A collaboration between researchers at CSU and the University of Twente, The Netherlands. **$22,000**

**Floristic surveys in River Red Gum Forests** Schultz, N. (2012) OEH. **$57,046** (Consultancy)


**Demographic change and inland Australia: Exploring the motives, experiences and impact of tree-changers** Ragusa, A.T. (2007-on-going) ILWS


**Mungabareena Reserve Wiradjuri reconciliation project** Yalmambirra (2005 on-going) Natural Heritage Trust.

**The role of decision support tools in farm decision making.** Parton, K.A., & Long, B.. (2008-2013) GRDC. **$60,000**

**COMPLETED PROJECTS**

**Improved domestic profitability and export competitiveness of selected fruit value chains in the Southern Philippines.** Mullen, J. (2008-2012), ACIAR and NSW Department of Primary Industries (DPI).

**Understanding the effects of complex pollutant exposure on the growth and development of soft tissues and shell structure of molluscs.** Howitt, J. (2009 - 2011) CSU, Deakin University.

**Peer supervision for counselling professionals in rural areas.** Bailey R.I., Bell, K., & Pawar, M. (2011) CSU. **$4000**

**Controlling exotic annuals in degraded Box Gum woodland understoreys in south-east Australia, 2008-2013**

**Funding**

NSW Environment Trust Research Program, CRC Future Farm Industries, OEH, Murray CMA, Livestock Health and Pest Authority, CSU. Total funding **$227,791** plus in-kind contributions

**Investigators/Researchers**

Ian Cole, OEH, PhD candidate. Supervisors A/Prof Ian Lunt, ILWS & Dr Suzanne Prober, CSIRO Ecosystem Sciences

**Description**

Restoration goals in relation to degraded communities / environments often involve controlling exotic annuals, re-establishing original native dominants and returning historic ecological function, yet the lack of practical, cost-effective treatments often hinders progress.

This experiment was conducted over 4 years in Austrostipa understoreys of two grassy Box Gum woodlands. It compared the effects of carbon addition, spring burning, spring grazing and combinations on soil nutrients, exotic annual plants, the existing native grass sward and the establishment of four other native grasses. The control of exotic annuals by the Austrostipa sward was also explored.

**Outputs**

ABC TV science show Catalyst on 7th July 2011 ran a segment titled “Sweet Solution for Woodlands”.

Five presentations to land management agencies and community groups, two field days and four broadly distributed extension leaflets were also completed.

Four presentations to the scientific community and a PhD thesis were completed. Additional scientific papers are to be finalised in early 2013.

**Outcomes**

This project has increased our understanding of the factors that control exotic annuals in Box-Gum woodlands. This knowledge has direct application in formal reserves and across the broader landscape.
During 2011 and 2012, events run and/or supported by the Institute were primarily focussed around its Strategic Research Areas (details in individual SRA reports).

The institute was also involved in additional events including book launches, workshops and exhibitions. These events included:

**Mistletoes of Southern Australian Book Launch**

A/Prof David Watson’s first book Mistletoes of Southern Australia, published by CSIRO Publishing was launched at Domain House, adjacent to Melbourne’s Royal Botanic Gardens, February 25, 2011. The book is a comprehensive guide to half of Australia’s 91 known mistletoe species. It contains over 100 color photographs (mostly taken by A/Prof Watson) and 51 watercolour illustrations by artist Robyn Hulley. The book documents the first thorough investigation of mistletoes in Australia and is the first ‘field guide’ to mistletoes world-wide. It provides an up-to-date summary of the biology, ecology and management of mistletoes in Australia.

Around 100 people attended the launch which also included an exhibition of 25 of the book’s illustrations and art work by Rebecca Mayo, a mixed media artist and print-maker whose work features mistletoes. The book was launched by CEO of Birds Australia, Dr Graeme Hamilton. The launch was followed later in 2011 by the ‘Mistletoe Menance’ exhibition of Ms Hulley and Ms Mayo’s work at the Albury Library Museum, December 10, 2011 to February 12, 2012.

**Publishing with Impact Workshop**

A two day "Publishing with Impact" workshop, attended by ILWS PhD students and post-doctoral fellows, was held at the Albury-Wodonga campus, on June 14 and 15, 2012. Presented by Dr Camilla Myers from CSIRO Publishing, the workshop covered understanding the science publishing culture and why it is important to publish; the skills required to write well-structured and easy-to-read scientific articles; how the editorial decision-making and peer-review process works; and the protocols and ethics of scientific publication.

**Food Security in Australia**

A one-day ‘Food Security in Australia’ forum was held at the Albury-Wodonga CSU Campus on October 30, 2012, to coincide with the launch of the Food Security in Australia: Challenges and Prospects for the Future book, edited by Quentin Farmar-Bowers, of Deakin University and ILWS researchers Dr Joanne Millar and A/Prof Vaughan Higgins. The book, published by Springer Ltd., evolved from an Agri-food Network Conference in 2010 and is the first of its kind to deal with food security from an Australian perspective.

The forum was attended by 60 people including local and state government representatives, health service providers, educators from the TAFE sector, Landcare representatives, landholders and interested community members. Events of the day included a keynote address by Institute Advisory Board member Cathy McGowan AO, MP, well known rural consultant in agriculture and rural development, and a live broadcast by the ABC Country Hour (Victoria) with Libby Price. Presentations were given by guest speakers from CSIRO, University of Melbourne, University of Tasmania, Charles Sturt University and the Albury Wodonga Regional Food Security Network.

The afternoon discussions focused on education and engagement in food literacy; and strategies for using the political agenda on food security to promote further research and action.

**Sustainable Tourism & the Millennium Development Goals**

A special morning tea, attended by 37 ILWS members and guests, was held on December 4, 2012 at the Albury-Wodonga campus to congratulate Dr Rosemary Black on the Sustainable Tourism & the Millennium Development Goals: Effecting Positive Change book she co-edited, published by Jones & Bartlett Learning, Massachusetts, USA.

The book, which was co-edited with Dr Kelly Bricker (University of Utah) and Dr Stuart Cottrell (Colorado State University), examines how sustainable tourism could achieve some of the Millennium Development Goals set at the United Nations’ Millennium Summit in 2000.
EXHIBITIONS AND VISITORS

CULTURAL HERITAGE EXHIBITIONS

A/Prof Dirk Spennemann, an archaeologist specialising in cultural heritage management, is also a keen photographer who uses photographic exhibitions as a way of engaging the community in his research in Australia and overseas. Exhibitions in 2011 and 2012 included:

Pacific Reminders
This exhibition featured many of sites in the Pacific region – from Australia in the South to the Aleutian Islands of Alaska in the North – which played key roles in the War with Japan between 1941 and 1945. The exhibition was also featured at the Exhibition Space of the Shrine of Remembrance, Melbourne, December 3, 2011 to January 15, 2012.

Marianas Wide
This exhibition, held in the NMI Museum of History and Culture, Garapan, Saipan, CNMI from June 13 - August 18, 2012, captured a fleeting moment of Marianas history - a two-week period in early August 2011. The photographs of people going about their daily lives reveal the diversity and complexity of the Marianas Islands and provide a historic ‘snap-shot’ of life in the Islands in the early years of the twenty-first century.

Kiska: A World War II Battlefield Landscape
This display was part of the “When Over There Was Here” exhibition at the Alaska State Museum, Juneau, Alaska, September 7 to October 13, 2012.

VISITORS

The Institute hosted a number of international visitors during 2011/2012. These visits are an ideal way of exchanging knowledge, learning more about the issues faced in other countries and sharing the latest research findings. Visitors associated with an SRA are mentioned previously in this report whilst others included:

Dr Hem Sagar Baral, a wildlife ecologist from Nepal, was based at the Albury-Wodonga campus for five weeks in August, 2011. Dr Baral gave a number of lectures on the wildlife in the Himalayas and Nepal and also took the opportunity to study some of Australia’s wildlife. Dr Baral has established Himalayan Nature, a non-profit international conservation research institute in 2000.

As part of a two month tour of Australia, U.S. mistletoe expert Professor Robert Mathiasen caught up with Institute’s fellow mistletoe expert A/Prof David Watson and to present a seminar on wildfire and its effect on dwarf mistletoe at the Albury-Wodonga campus in March 2012. Prof Mathiasen is a forest pathologist from Northern Arizona University, Flagstaff, Arizona.

Professor Steve Vanderheiden, a Professorial Fellow with CSU’s Centre for Applied Philosophy and Public Ethics, and an Associate Professor of Political Science and Environmental Studies, University of Colorado, spends over four months per year in Australia, based at CSU in Canberra. Prof Vanderheiden who is interested in the governance arrangements of environmental systems, presented a seminar on “Human Rights and Food Security” to Institute members at the Albury-Wodonga campus, in July 2012.
The Institute’s many postgraduate students and their various research projects considerably enhance and contribute to the research undertaken by the Institute. Students’ principal supervisors are generally members of the Institute whilst co-supervisors, often Adjunct Institute members, may be from other universities, natural resource management agencies, industry, government and non-government organisations, and/or other research institutions.

In 2010 the Institute welcomed a total of 105 post graduate students, which increased to 125 in 2012, 30 more than in 2009 and 2010. This increase was mostly attributed to CSU’s international PhD students, many of whom are associated with the Institute, as well as a greater number of PhD scholarships being available with additional or full funding from outside the University.

Countries represented in the Institute international student group include Indonesia, Nepal, Bhutan, Poland, the U.S., Mexico, Ghana, Zimbabwe, Mongolia, Hungary, China and India.

The Institute also offers two Government funded PhD scholarships each year which are allocated to students whose principal supervisors have an active research profile within the institute and whose PhD research is aligned with the Institute’s Strategic Research Areas.

In 2011 and 2012, 22 post-graduate students successfully completed their PhDs, including three who had received an ILWS PhD scholarship - Dr Sylvia Zukowski, Dr Maggie Watson and Dr Anna Lukasiewicz.

2011 ILWS scholarship recipient-Abbie Spiers

Institute of the Supervising Scientists (ERISS) in the Northern Territory where she managed Biological Monitoring programs in Kakadu National Park; coordinated a global review of wetland resources; conducted a project on historical land use in Kakadu; and organised workshops and study tours for wetland managers, including Abbie’s PhD research explores community perceptions of wetland health in NZ. Her project, which sits under the Institute’s Sustainable Water SRA, integrates ecological science with social science. It will provide information about what is meant by the term ‘healthy wetland’; how wetland managers’ perceptions converge/differ; the words being used to describe wetland health; management activities currently being undertaken in NZ; and what managers think is needed to better manage NZ wetlands in the future.

These research findings will help wetland managers and decision makers to better understand the perceptions of this sector of the community, potentially improving communication about wetland health and management outcomes.

2012 ILWS scholarship recipient-SaiDeePa Kumar

In 2008 she began her Masters of Environment at Melbourne University, during which, as a recipient of the Prime Minister’s Australia Asia Endeavor Award in 2011, she undertook research on the conjunctive use of surface water and ground water in arid canal irrigated areas with a case study in India.

Deepa began her PhD with the Institute in April 2012. Through her research, she hopes to identify guiding principles and ways to address the challenges of establishing achievable and socially acceptable environmental watering targets under complex uncertain conditions. She is also examining the role of integrated models and social research in the decision making process around environmental water.

Her research will focus on two catchments (Lachlan in NSW and Campaspe in Vic) as case studies. Subsequently, a feasibility study will be undertaken in one of the catchments to identify and address some of the practical challenges involved in the application of the guiding principles.

Her research is part of a National Centre for Groundwater Research and Training (NCGRT) project, specifically examining the impact of environmental water to wetlands in the Lachlan catchment where there is an annual allocation of over 100 GL of water to the environment.

The project fits under the Social Research for Regional NRM, and Sustainable Water SRA.
Dr Nicole Bruce, A bird’s eyeweight: development of a remote sensing approach to monitoring semi-arid grasslands for biodiversity conservation. (Principal supervisor A/Prof Ian Lunt)

Dr Andrew Carter, Improving Red Fox (Vulpes Vulpes) management for Bush Stone-Curlew (Burhinus Grallarius) conservation in South Eastern Australia. (Principal supervisor Prof Gary Luck)

Dr Janet Cohn, How are the dynamics of woodland dominants influenced by climate and disturbances in South Eastern Australia. (Principal supervisor A/Prof Ian Lunt)

Dr Chris Harrington, Community as an on-going concept in multi-scale Natural Resource Governance: Cohesive actor chaotic subject - a study at the Living Murray. (Principal supervisor Dr Peter Spooner)

Dr Nicole McCasker, Of life and death in lowland rivers: Investigating mortality during the early life stages of Murray-Darling fishes. (Principal supervisor Dr Paul Humphries)

Dr Emily Mendham, Changes in rural property ownership: Challenges and opportunities for Natural Resource Management. (Principal supervisor Prof Allan Curtis)

Dr Eloise Seymour, Community values for wetlands, forests and a river reach: A study of assigned values to inform regional Natural Resource Management decision making. (Principal supervisor Prof Allan Curtis)

Dr Emily Sharp, Exploring community-agency trust before, during and after a wildfire. (Principal supervisor Dr Rik Thwaites)

Dr Alison Skinner, An investigation into the effects of understorey modification on woodland eucalypt recruitment. (Principal supervisor A/Prof Ian Lunt)

Dr Karen Bell, The experiences and support needs of non-metropolitan women who have used assisted reproduction clinics. (Principal supervisor Prof Margaret Alston (Monash University))

Dr Jennifer McKinnon, Social Work and eco-feminism in Australia: An exploration of the nexus between the personal and the political. (Principal supervisor Prof Manohar Pawar)

Dr Charles Tant, Social isolation in older Australians and the Home and Community Care program. (Principal supervisor Dr Wendy Bowles)

Dr Keller Kopf, Age, growth, and reproductive dynamics of striped marlin, (Tetrapturus audax) in the southwest Pacific Ocean. (Principal supervisor Prof Peter Davey)

Dr Dianne McGrath, Social accounting: A reporting model incorporating stakeholder dialogue in the credit union sector. (Principal supervisor Prof Reg (Martin) Mathews)

Dr Lionel Bopage, Trade liberalisation and structural change in the Australian motor vehicle industry. (Principal supervisor Prof Kishor Sharma)

Dr Royce Sample, (Masters) The influence of regional experience on environmental policy in Victoria. (Principal supervisor Prof Allan Curtis)

Dr Jodie Kleinschafer, Energy efficiency and household decision making: Managing residential electricity. (Principal supervisor Prof Mark Morrison)

Dr Felicity Small, Imagination, social interactions and the consumer decision process. (Principal supervisor Prof Mark Morrison)

Dr Kylie Eklom, Vegetation structure & food resources in drought affected semi-natural grasslands: Implications for the nationally vulnerable Plains-wanderer (Pedionomus torquatus). (Principal supervisor Prof Gary Luck)

Dr Harry Sakulis, Konsevason na Diploma na insaiat long Papua New Guinea - An Evaluation of Integrated Conservation and Development Projects in PNG. (Principal supervisor Dr Jim Birkhead)

Dr Maggie Watson, Effects of parasites on the Crested Tern (Thalasseus Bergii). (Principal supervisor A/Prof Shane Raidal)

Dr Sonia Graham, Social relations and natural resource management: The significance of trust and power to solving a collective weed management problem. (Principal supervisor A/Prof Ian Gray)

Dr Penny Cooke, The social construction of informal adult learning in community-based natural resource management groups. (Principal supervisor Dr Brian Hemmings)

Dr Catherine Car, Millipede communities in south-eastern Australia: systematics, biogeography and short range endemism. (Principal supervisor Prof Nick Klomp)

Dr Binod Devkota, Socio-economic outcomes of community forestry in Nepal: Lessons from three diverse rural communities. (Principal supervisor Dr Digby Race)

Dr Gili Earl, Applying a statutory duty of care to improve biodiversity outcomes at a regional scale. (Principal supervisor Prof Allan Curtis)

Dr Anna Lukasiewicz, Lost in translation: Where is the Social Justice in Australian water reform? (Principal supervisor Prof Kathleen Bowmer)

Dr Wendy Minato, Exploring the influence of social norms on the management of native vegetation on private land. (Principal supervisor Prof Allan Curtis)

Dr Lukas Wibowo, Exploring the policy dimensions of community-based forestry in Indonesia. (Principal supervisor Dr Digby Race)

Dr Sylvia Zukowski, Impacts of fishing regulations on the sustainability of Murray Crayfish (Euastacus armatus), NSW: social and biological perspectives. (Principal supervisor A/Prof Robyn Watts)

Dr Saeed Sabri-Matanag, (DBA), Impact of a learning culture on organisational change. (Principal supervisor Dr Glen Duncan)

Dr Janelle Levesque, Benefit finding in parental cancer: types and predictors of benefits and their influence on depression and well-being. (Principal supervisor Dr Darryl Maybery)
During 2011 and 2012 Institute members have continued to produce numerous journal articles for publication in a wide range of leading academic journals, book chapters, books and technical reports. A fuller publication list can be found on the Institute’s web site.

JOURNAL ARTICLES - HIGHLIGHTS


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


BOOK CHAPTERS-HIGHLIGHTS


BOOKS - HIGHLIGHTS


ILWS REPORTS 20011/12

62. Allan, C. Roadside Landholder engagement Program


64. Race, D., Curtis, A., & McDonald, S. Landscape Scale Conservation of Threatened Grassy Woodlands in the Greater Murray Goulburn catchment


67. Sharp, E., Curtis, A. Groundwater management in the Namoi: a social perspective

68. Curtis, A., Mendham, E. The social drivers of natural resource management in the Wimmera region

*Copies of these reports can be sourced from the Institute.
The Institute’s Advisory Board provides the Institute with strategic advice and support, reflects the diversity of the research disciplines in ILWS and is representative of our key stakeholders.

Each Board Member is a leader in his/her field with a commitment to supporting ILWS to achieve its aim of being an internationally recognised provider of research in social and environmental sustainability.

In 2011/12 the Advisory Board members were Dr Denis Saunders AM (Chair), Dr Wendy Crack AM, Ms Victoria Keighney, Mr Ken Matthews AO, Ms Cathy McGowan AO, Ms Samantha Edmonds, Dr Shayne Williams and Anna Lukasiewicz. Towards the end of 2012 a new Advisory Board was appointed. It held its first meeting in March 2013.

The new Board is chaired by Professor John Williams. Executive officer to the group is ILWS Business Manager Ms Nikki Scott.

Members are:

**Prof John Williams:**

ILWS Adjunct Professor; director John Williams Scientific Services Ltd.

Prof Williams’ life work has been in the study of hydrology and the use of water in the landscape and farming, including land salinity. He is a member of the Wentworth Group of Concerned Scientists which is creating a rational debate on Australia’s water resources. He was Chief of the Division of Land and Water, CSIRO when he retired in 2004 having served earlier at the CSIRO laboratories at Townsville in Queensland where, among other things, he studied the Great Artesian Basin and the transport of water from the Great Divide Range to the outback of Queensland and New South Wales. He has also served as Chief Scientist and Chair of the New South Wales Department of Natural Resources’ Science and Information Board; and was a Commissioner with the NSW Natural Resources Commission.

**Ms Cathy McGowan AO, MP:**

Federal Member for Indi, ILWS Adjunct Research Associate; rural communities and agribusiness consultant.

Ms McGowan has been a member of the ILWS Advisory Board since its inception. She is the principal of Cathrine McGowan Consulting, which specialises in building capacity in individuals and communities in rural Australia and overseas. Cathy has a Masters degree in Applied Science - Agriculture and Rural Development. She has worked in the area of women in agriculture for over 20 years and regularly provides policy advice. In 2000 her work with the dairy industry was acknowledged with the Australasian Pacific Extension Network award for “Excellence in Extension”. She is the past President of the national organisation, Australian Women in Agriculture. She has also worked with farming women in PNG and Ireland.

**Ms Samantha Edmonds:**

ILWS Adjunct Research Fellow; water policy advisor

Professor Bowmer has qualifications in agricultural science and chemistry and is a fellow of the Australian Institute of Company Directors. She has been employed by CSIRO (Deputy Chief CSIRO Water Resources, and Business Director CSIRO Land and Water); Charles Sturt University (Deputy Vice Chancellor); Griffith University (Adjunct Professor and team member of the national water planning project); State Water Corporation (non-executive board member); and the Australian Research Council (chair of the earth sciences panel). She also chaired the Murrumbidgee River Management Committee. Honours include the Australian Museum Pol Eureka Prize for Environmental Science.

**Ms Lorne Butt:**

Director, Company Secretary, Institute for Sustainable Leadership Ltd; Ecological Sustainability Coordinator, Western Institute, TAFE NSW.

Ms Butt is completing her Doctor of Philosophy in Management at Macquarie University’s Graduate School of Management (MGSM), and is researching the key factors impacting upon sustainability programs in universities in the Sydney basin and regions. She holds a Bachelor of Science in Environmental Biology and Bachelor of Science (Honours) in Biological and Biomedical Sciences from the University of Technology, Sydney, specialising in urban landscape ecology. She has worked in the public, private and higher education sectors for over 12 years across the areas of corporate governance, strategic planning, project management, quality management and audit, risk management, sustainability, international education, and occupational health and safety.

**Prof Kathleen Bowmer:**

ILWS Adjunct Research Fellow, water policy advisor

**Prof Paul Ryan:**

Natural Resource Management advisor

Mr Ryan is the principal of Interface NRM, an environmental consultancy that specialises in resilience thinking, strategic planning, adaptive governance and management. He works with federal, state, regional agencies and local communities to incorporate resilience concepts into natural resource management and planning. An ecologist, Paul has previously worked with CSIRO and the Resilience Alliance, coordinating ecological and multi-disciplinary research, and for state agencies and the Goulburn Broken Catchment Authority in Victoria where he was involved in the development and implementation of regional catchment strategies, programs and incentive schemes.

**Barbara Hull:**

Chief Executive Officer, Regional Development Australia—Murray

As Chief Executive Officer of Regional Development Australia Murray, Ms Hull is actively focused on strategic planning, project delivery, community engagement and economic development initiatives. She has extensive operational experience demonstrated by virtue of the range of agribusiness, environmental and infrastructure projects successfully delivered throughout the Murray Region.

**Dr David Godden:**

Adjunct Professor, Faculty of Business, CSU & Honorary Associate, Faculty of Agriculture, University of Sydney.

Professor Godden has a background in economics policy research of natural resource use, including agriculture. From 1990-2002 he was a senior lecturer with Sydney University. He then managed an economics policy unit in the NSW Government 2002-2011. His current research interests include ecosystem services and modelling air pollution abatement.

**Ms Lorne Butt:**

Director, Company Secretary, Institute for Sustainable Leadership Ltd; Ecological Sustainability Coordinator, Western Institute, TAFE NSW.

Ms Butt is completing her Doctor of Philosophy in Management at Macquarie University’s Graduate School of Management (MGSM), and is researching the key factors impacting upon sustainability programs in universities in the Sydney basin and regions. She holds a Bachelor of Science in Environmental Biology and Bachelor of Science (Honours) in Biological and Biomedical Sciences from the University of Technology, Sydney, specialising in urban landscape ecology. She has worked in the public, private and higher education sectors for over 12 years across the areas of corporate governance, strategic planning, project management, quality management and audit, risk management, sustainability, international education, and occupational health and safety.

**Prof Kathleen Bowmer:**

ILWS Adjunct Research Fellow, water policy advisor

Professor Bowmer has qualifications in agricultural science and chemistry and is a fellow of the Australian Institute of Company Directors. She has been employed by CSIRO (Deputy Chief CSIRO Water Resources, and Business Director CSIRO Land and Water); Charles Sturt University (Deputy Vice-Chancellor); Griffith University (Adjunct Professor and team member of the national water planning project); State Water Corporation (non-executive board member); and the Australian Research Council (chair of the earth sciences panel). She also chaired the Murrumbidgee River Management Committee. Honours include the Australian Museum Pol Eureka Prize for Environmental Science.

**Ms Lorne Butt:**

Director, Company Secretary, Institute for Sustainable Leadership Ltd; Ecological Sustainability Coordinator, Western Institute, TAFE NSW.

Ms Butt is completing her Doctor of Philosophy in Management at Macquarie University’s Graduate School of Management (MGSM), and is researching the key factors impacting upon sustainability programs in universities in the Sydney basin and regions. She holds a Bachelor of Science in Environmental Biology and Bachelor of Science (Honours) in Biological and Biomedical Sciences from the University of Technology, Sydney, specialising in urban landscape ecology. She has worked in the public, private and higher education sectors for over 12 years across the areas of corporate governance, strategic planning, project management, quality management and audit, risk management, sustainability, international education, and occupational health and safety.

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**Dr David Godden:**

Adjunct Professor, Faculty of Business, CSU & Honorary Associate, Faculty of Agriculture, University of Sydney.

Professor Godden has a background in economics policy research of natural resource use, including agriculture. From 1990-2002 he was a senior lecturer with Sydney University. He then managed an economics policy unit in the NSW Government 2002-2011. His current research interests include ecosystem services and modelling air pollution abatement.

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