Connections
research for a sustainable future

The Commons

Art and food combine at The Commons, which has the motto: “Give what you can, take what you need.” The Commons, in Lavington, Albury, NSW, is the shopfront for a Office of Environment and Heritage funded project which initially aimed to raise awareness of sustainability through art. Read how the project has developed and expanded in its first three months on page 8.

ILWS Flood Research

Institute researchers are studying both the positive effects of the flooding in the Murray-Darling Basin, such as waterbird breeding events and increases in native fish and frog populations and river productivity, as well as efforts to alleviate negative effects of flooding, such as hypoxic blackwater that can cause the deaths of native fish and crustaceans. The “real time” evaluations they are providing are helping to inform current decisions on use of environmental water being made by water managers. Read more on page 19.

Exposed

For the past 18 months ILWS environmental chemist Dr Julia Howitt and Dr Greg Doran from CSU’s Graham Centre have been working on a project funded by NSW Police that’s been assessing whether there is a risk to officers being exposed to licit and illicit drugs in the workplace and absorbing these chemicals through skin contact, inhalation or accidental ingestion. The field work has involved visits to police stations around the state, first-hand experience of police raids on cannabis plantations, even a flight in a police helicopter…. Read more about this exciting and unique project on page 4.
From the Director

- Professor Max Finalyson

As we head towards the end of 2016 we are renewing the membership of ILWS in line with the proposals developed through our recent reaccreditation period.

The membership renewal is initially focussed on CSU researchers and will move to our adjunct members soon after. This is an important process and after 10 years I can well imagine that we look very different from where we started. In that respect we should celebrate all our members and look forward to also welcoming our renewed membership which will comprise both past and new members.

Membership of ILWS is open to CSU’s research active researchers, who are not members of other accredited CSU research centres. There are three categories of membership: Full Member, Associate Member and Higher Degree Research (HDR) Student Member. The reaccreditation for a further 5 year period is an opportunity to re-establish our modus-operandi and embrace the existing operational environment and consolidate and extend our research impact.

Our reaccreditation came about due to the efforts of our members through their research and contribution to our new strategy, as well as through the efforts of our office staff, and all ably facilitated by Associate Professor Catherine Allan. Thank you to everyone for your contribution and to Catherine in particular.

With the reaccreditation and membership renewal as a backdrop I recently participated in a Vice-Chancellor’s Forum. While the spring sunshine burst through and warmed the environment around us we engaged in further deliberations about the future of CSU and our contributions to our communities. Out of this I came up with a number of statements that resonated with myself.

These are given below, much as individual “thought statements”, not as a coherent strategy. This reflected how they came to me throughout the Forum and will certainly provide me further thought and, if you wish, further discussion with yourself.

1. What partnerships do we have? What is unique and powerful about them? Can we embrace them and position ourselves as first in our market?
2. Can we extend our innovative and transformative ways of research training? Are our PhDs innovative and fit for purpose, for tomorrow’s world?
3. How are we rounding our skills and preparing to perform as individuals and teams in that new world?
4. What do we contribute to our communities and how do we portray that?
5. What is our product? Are we market or product focussed?
6. What aspects of what logics are we using? Will we enable technology to enhance or erode these?
7. Can we make our postgraduate students and fellows more job ready? What skills are we providing them for the world beyond our campuses?
8. What level of public good do we individually and as an institution provide? Is the balance right when we also consider the more complex world of markets and governments that envelope us?

I’m not sure if this is an eclectic collection of thoughts or the basis of our future strategy, but they were, as said, thoughts that resonated as I shared a dialogue with my colleagues in the Forum, and fed by our recent exploration of ourselves as we combined to reset ILWS for another 5 years.

Thank you and best wishes for the upcoming festivities and embracing another year in our academic institution, and with our communities.

Recent grants

External grants

TLM Stand Condition Change Assessment Methodology. (2016) Robinson, W. MDBA, $5750

Expert review of hydraulic models of locks 7,8 and 9 vertical slot fishways. (2016) Li, J. MDBA, $3600


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

Consultancies

Evidence-based scientific advice – Lasting environmental benefits of non-flow measures in the Murray Darling Basin. (2016) Baumgartner, L. Department of Agriculture & Water Resources (Fisheries & Forestry) $9090

Internal grants

For the latter part of 2016, the Institute has provided a total of $77,400 to nine members for team-based and integrated research activities/initiatives. Five Institute adjuncts have received a total of $7,120 for research activities that will contribute to the Institute’s research profile or outputs. Details at http://www.csu.edu.au/research/ilws/home/for-members/funding/internal-funds-awarded
Awards & Appointments

NSW Tall Poppy Award

Ecologist Dr Dale Nimmo whose research focus is on finding solutions to the modern extinction crisis continues to be recognised.

Earlier this year Dale was the recipient of the 2016 Wiley Next Generation Ecologist Award, an initiative aimed directly at supporting Early Career Researchers through a research and professional grant and a Plenary opportunity. Accordingly Dale will receive a $3000 grant to go towards his “Can Indigenous fire regimes restore mammal communities?” project and deliver the Next Generation Plenary at the Ecological Society of Australia conference in Freemantle, in December this year.

On Thursday, September 29, Dale was one of 13 scientists to be presented with a NSW Young Tall Poppy Award by the Australian Institute of Policy and Science (AIPS) at a ceremony at the Museum of Applied Arts and Science in Sydney. The awards are to honour up and coming scientists who combine world-class research with a passionate commitment to communicating science.

As part of the Young Tall Poppy campaign, Dale, as an award winner, will share his knowledge with school students, teachers and the broader community through workshops, seminars and public lectures.

In congratulating Dale on his most recent award, CSU Vice-Chancellor Professor Andrew Vann said: “Dale is delivering exactly on what Charles Sturt University aims to achieve through its research; finding solutions to big issues, with both local and global impacts.”

Dale was also a member of the Mallee Fire and Biodiversity Team, La Trobe University which was selected as a finalist for the NSW office of Environment and Heritage Eureka Prize for Environmental Research, 2016. Together with government agencies, private landowners and conservation organisations, the Mallee Fire and Biodiversity Team has collected one of the world’s largest datasets on fire. Their research has transformed the understanding of how fire affects biota, produced innovative new tools and significantly contributed to change in fire policy.

And in the latest news, Dale has just been awarded a three-year ARC Discovery Early Career Researcher Award of $372,000.

Dale’s research will examine the impact of Indigenous land management, particularly patch mosaic burning, on mammal communities and its potential to restore degraded ecosystems.

The project will be based in one of the few areas in the world where large-scale traditional Indigenous land management continues, the remote western deserts of Western Australia.

Appointments

Institute Director Professor Max Finlayson who was appointed to Charles Sturt University’s Academic Senate for his second term as a Professorate representative, has been elected Deputy Presiding Officer of the CSU Academic Senate for the 2016-2018 term.

The Academic Senate makes recommendations on policy and provides advice to the Vice-Chancellor and Council.

“This role provides an opportunity to have an input into the University’s decision making processes from a research position,” says Max.

With the University looking hard at its future it’s an exciting time to be part of the Senate and able to have an input from a research perspective. I see this as an important opportunity for ILWS and the wider CSU research community.”

He says his appointment as Deputy Presiding Officer, which is fully supported by Professor Mary Kelly, the Deputy Vice-Chancellor (Research, Development and Industry), further strengthens the opportunity to contribute to the strategic management of CSU and in particular to its research endeavours, and to represent the research community.

Max has also been appointed as the independent scientific member of the Lake Cowal Foundation’s Board of Directors. The Foundation is a not-for-profit Environmental Trust. One of the PhD students that Max supervises, Xioying Liu (Sha Sha) has recently submitted her thesis on a study funded by the Foundation and Max is looking at further linkages and possible research projects.

Congratulations to ILWS member Associate Professor Rosemary Black who has been appointed to the Global Sustainable Tourism Council’s (GSTC) Board of Directors.

“I am delighted to have been elected to the GSTC, a prestigious international organisation that advocates and manages global sustainable tourism standards,” says Rosy.
Completed Projects

Environmental contamination from drugs

Goran, G. & Howitt, J. NSW Police Force, $94,600

It’s all been very “hush hush.” But now that the project is finished and the results are out environmental chemist Dr Julia Howitt is free to talk about what has been an exciting and unique ILWS project.

For the past 18 months she and Dr Greg Doran from the Graham Centre have been working on a project funded by NSW Police that’s been assessing whether there is a risk to officers being exposed to licit and illicit drugs in the workplace and absorbing these chemicals through skin contact, inhalation or accidental ingestion.

There have been visits to police stations around the state, first-hand experience of police raids on cannabis plantations, even a flight in a police helicopter…

“It’s been one of the most exciting, hands-on projects I’ve ever been involved in with a very different kind of field work to what I’ve done previously,” says Julia.

The project has produced important knowledge with practical recommendations that will lessen the risks of exposure to drugs for police officers.

“What we have found is important,” says Julia. “It is knowledge that will greatly assist, not just NSW Police but, once we’ve published it, law enforcement agencies around the world that are interested in these results. It can help them to manage their workplace safety and ensure all their exhibits are appropriately handled thereby reducing the risk to their officers.”

As background to the project Julia explains that officers within the NSW Police [indeed all police officers] have a much higher occupational exposure to illicit drugs than the rest of the community.

“They are arresting people that may be carrying drugs on the street; they are raiding labs; they are raiding hydro-plantations and going out into the field, seizing cannabis crops and having to destroy them… so there were questions around what level of exposure do the officers have?,” says Julia. “Are they potentially exposed to residues in the workplace? When they seize materials these have to be stored for a period of time until they are tested and disposed of so there were questions around were there any risks in the way the drugs were stored?”

The sampling done for the project was extensive. To look at the question of surface residues in police stations, Julia and Greg swabbed counters, scales where the drugs were weighed, and places where the drugs were stored at five regional and six city police stations on three different occasions.

“We were checking if someone comes along later and puts their hand down on a surface that had drugs on it, what might they have been exposed to,” says Julia. They also took air-samples to find out what was in the air, and took urine and hair samples from more than 50 police officers at the police stations.

“The police do workplace drug testing like a lot of industries do so one of the questions was, what are the chances that someone might be exposed enough to return a positive test,” says Julia. “We did lots of urine tests but only a few hair tests as it is harder to get people to volunteer for hair tests as you need a reasonable amount of hair, about the thickness of a pencil.”

They also did a study on drug residues looking at how long they persisted on different surfaces and accompanied police when they raided four houses where cannabis was being grown inside. “We did air sampling to see what was in the air and we swabbed the hands and clothes of the officers as they brought the evidence out,” says Julia.

The pair also spent three weeks with the drug squad, a week at a time,
where they went to: “Lots of interesting forested places in northern NSW.”

“The work in the forests involved the drug squad, police from the local police stations, and the police air wing so there was a helicopter associated with the project,” says Julia. “For the volunteers from the squads we did skin and clothing swabs as well as air-testing, lots of urine tests and a few hair tests. We also swabbed the vehicles they were using.”

They did this through the whole process of the raid, from the discovery of the cannabis plants through to their incineration.

“We were very happy with how people were willing to participate,” says Julia. “When we were doing the forest raids we had five to six officers on each trip who were giving urine samples every morning and then on the last afternoon so we could track their exposure through the whole week. It was a bit of an imposition but they were happy to find out whether the processes they had in place to keep them safe were adequate. All of the urine tests came back clean.”

The sampling has produced “1000s and 1000s of data points” with screening done for a suite of 23 drugs and metabolites (the breakdown product) for every surface swab. “As an example, for one regional station, we took 85 surface swabs and screened for 23 drugs so ended up with 1955 results,” says Julia. Air, hair and surface samples were analysed using instruments at the University’s laboratory in Wagga Wagga, and the urine samples went through the normal drug testing procedure NSW Police use. Some hair samples were also double-checked using the normal testing procedure.

What they discovered was, that while the majority of the swabs were clean for most drugs, everywhere they went they did have swabs with low levels of drug residues: most-commonly cocaine, methamphetamine and MDMA.

“To the point where we had to work out what was normal for a non-police station so we swabbed some counters in libraries, council offices etc. to establish a community-base line,” says Julia. “We only occasionally found MDMA in the public areas but we certainly found cocaine most everywhere.”

They found within the police stations there were some areas more likely to have contamination than others so they have made recommendations to NSW Police about special types of cleaning that may be required in different areas of the station.

“We also did a study on drug residues and how long they persisted on different types of surfaces so we have made some recommendations about the types of materials that they should consider using on counter tops and those sorts of surfaces when they are doing renovations and building new stations. Some surfaces are more porous than others so the material is more likely to persist.”

They also made recommendations on ways to ensure that the areas that are likely to be contaminated are kept to a minimum to minimise cross-contamination between different areas.

Now that the results of the research have started to be disseminated, the interest in the results of the project from organisations other than NSW Police, including from overseas, has started to grow.

“While there has been some similar testing of drug residues elsewhere, there hasn’t been anything that has measured the surface contamination and all the drug testing to work out the risk of metabolism and exposure to the same extent as our project,” says Julia. “We are quite confident in saying we have the strongest dataset on cannabis exposure and metabolism in the world because we have all the skin swabs so we know what the officers were exposed to directly and we have all those daily urine tests.”

Julia’s presentation of an overview of the results at The International Association of Forensic Toxicologists and the Society of Hair Testing Conference in Brisbane in August generated a lot of interest including a request by the European Workplace Drug Testing Society for Julia to speak at their biannual conference in Turin, Italy next May.

She and Greg are both giving keynote presentations at the NSW Police Force National Drug and Alcohol Testing Conference in Sydney, November 21 and 22, this year. Julia will talk about the cannabis raids and Greg the work in the police stations. They have also submitted one paper on the project with “at least another two to come.”

“NSW Police are very pleased with the results of this research,” says Julia. “It is very much about giving them the knowledge they wanted to see if they needed to change the way things are done.”
Current Projects - Updates

Fish Passageways

Quantifying improved fisheries productivity at fish passage rehabilitation sites in Lao PDR. Baumgartner, L., Robinson, W., McPherson, J. with Thorncraft, G. (National University of Laos), Phonekhampheng, O. (National University of Laos), Singhanouvong, D. (Living Aquatic Resources Research Centre) and Cooper, B. (UniSA) (2016-2020) ACIAR, $1,890,224

Lots of news coming out from this project. It has received more funding from its funding body, Australian Centre for International Agriculture Research (ACIAR), it was selected by ACIAR for a high-level research-for-development dialogue between the Australian and Lao governments, and the Australian Embassy erected a colourful billboard featuring the project outside its offices in Vientiane in September.

ACIAR has committed a further $95,000 to the project for the organisation and running of what is being touted as “the biggest fisheries event in the Mekong for 10 years”.

The Lower Mekong Fish Passage Conference: Applying Innovation to Secure Fisheries is being hosted by the Living Aquatic Resources Research Centre, November 14 to 17, in Vientiane, Lao PDR. Over 160 local and international delegates will attend the conference which attracted local and international delegates will attend the conference which attract-
ed an additional $80,000 from the US Government through its Department of the Interior – International Technical Assistance Program.

Project leader Dr Lee Baumgartner, who is on the conference’s organising committee, says the conference will bring together global experts in the field of riverine development, fish passage and aquatic ecosystem management to demonstrate how applied research can be used to enhance policy and decision-making across the Lower Mekong Basin.

“The conference is by invitation from the Lao government,” says Lee. “Its prime aim is to bring together government agencies, developers, researchers, local provincial and district leaders and natural resource managers in an effort to share knowledge on the successes and opportunities regarding fisheries sustainability in the region. The broad aim is to ensure economic development is furthered while maintaining, and where necessary, restoring healthy aquatic ecosystems.”

The conference includes a tour of the Pak San multi-species fishway which includes the upstream fishway and the fish friendly downstream passage gates.

The project was also selected by ACIAR to be one of the first two ACIAR projects to be highlighted in a research-for-development dialogue on October 18, in Vientiane, Laos.

“A high level meeting was organised between the Australian and Lao governments to talk about projects which are having significant success in achieving development outcomes,” says Lee.

Feedback from the Australian Embassy after the meeting was that, at the highest level of the Lao ministry there was strong interest in the two ACIAR projects, and that the government was keen to draw on the results to formulate better policies and enforcement.

Pakistan Workshop

The team of ILWS researchers (Adjunct Professor Jay Punthakey, Associate Professor Catherine Allan, Dr Michael Mitchell and Dr Richard Culas) involved in the ACIAR project Improving groundwater management to enhance agriculture and farming livelihoods in Pakistan have attended a second planning workshop this year. (Professor Max Finlayson is also part of the team but had to withdraw from attending the workshop at the last minute.)

The four-day Inception Workshop was held at the University of Agriculture, Faisalabad, Pakistan from August 29 to September 1. Catherine and Michael ensured that a lively and participatory approach was used throughout the workshop, clearly directed at achieving outputs considered foundational to the project’s successful initiation. These outputs include:

• A revised and endorsed four Year Activity Table, including confirmation by each team member of their individual roles and responsibilities
• A detailed Gantt chart timetable for all activities to be undertaken during the first year
• An action plan to further design research activities in collaboration with stakeholders through a series of Participatory Rural Appraisals in the case study regions
• Discussions to nurture and confirm a shared research purpose and methodology, and to advance the project’s strategies to engage women, youth and other stakeholders

The four-year project aims to tackle the critical issue of groundwater over-extraction in Pakistan which is threatening the livelihoods of millions.
The ILWS team will work with international and Pakistan-based partners to develop groundwater management tools and approaches aimed at enhancing the long-term future livelihoods of farming families while also reducing social and environmental impacts from groundwater over-extraction.

Securing safe water


Work on the first phase of this project between April and September this year has focused on engagement, a pilot screening for E.coli in domestic supplies and a questionnaire survey. Geographically the project is focussed in the Gulf Region of Far North Queensland (Etheridge Shire) and the Darling Basin in southern Queensland.

“One hundred and seventy five water quality samples were collected and analysed for E.coli from 152 properties across Etheridge Shire,” says the project’s interim coordinator, Adjunct Professor Peter Waterman.

The key finding was that 33% of samples contained E.coli and this pathogen was found in all sources of untreated domestic water supplies: specifically, in 49% of rainwater tanks, 61% of surface water supplies, 55% of shallow bores and 14% of deep bores.

Untreated water was being used at 78% of the properties sampled. Only 10% of the water sources were filtered either through natural river sands or using a domestic water filtering system and 12% were boiled before being used for drinking and cooking.

“These findings are of concern with respect to health risks to the households surveyed,” says Peter. “E.coli in all sources of untreated domestic water supplies could potentially be a regional development constraint, if left unmanaged. Management of the quality of water on isolated properties in rural and remote is relatively simple and public health guidelines are available.”

Phase 1 of the project has focused on:

- Initial engagement and network building with officers of State Government, officers and elected members of Local Government Authorities (LGAs), leaders of NRM groups in the NGO sector, and regional stakeholders.
- Planning, conducting and synthesising the results of the pilot water quality sampling and questionnaire survey undertaken in Etheridge Shire in the Gulf Region in May.
- Identifying sources of data and information on water quality in the project study area.
- Establishing and furthering links with potential partners for the research initiative.

Phase 2 will focus on project implementation and information consolidation to include:

- Holding stakeholder engagement workshops in Goondiwindi and Charleville involving LGAs, the QMDC and other NRM groups, the MDBA and MDA and State Government departments.
- Conducting communications and awareness activities in the LGAs where water quality screening and question surveys could be conducted in 2017.
- Exploring the feasibility of having securing adequate safe domestic water taken up as an across-jurisdictional community organisation championed and actioned initiative.
- Planning the roll-out of the water quality sampling and questionnaire surveys in Croydon in the Gulf Rivers region and Quilpie and Goondiwindi in Darling catchments region.
- Collate, evaluate and document regional water quality conditions and the results of water quality screening and questionnaire surveys.

And Phase 3 will focus on project evaluation, reporting and re-planning.

*Results and updates about the project were presented and discussed at the SEGRA Conference in Albany, WA, October 26-28 at the “Secure Safe Domestic Water Collaborator’s Forum”. The Forum was convened by Etheridge Shire Council (ESC), ILWS-CSU the SEGRA Foundation. Professor Max Finlayson, Director of ILWS, was the Facilitator and Adjunct Professor Peter Waterman the Rapporteur.

Resilience of biodiversity


Ornithologist Gary Cheers has commenced surveying 240 sites across north central Victoria for birds.

“We are hoping to see further recovery of bird communities following the end of the Millennium Drought given how much rainfall the region has experienced,” says project leader Dr Dale Nimmo.
Better Parks

Better Parks for People. Whitshed, R., Black, R., & Harvey, R. (2016-2017) FACS NSW Liveable Communities, $62,727

Good parking, toilet facilities and shade. These are the features that are “topping the list” when it comes to what older Australians want from their parks according to preliminary data from a survey and focus groups conducted in Albury for the project “Better Parks for People.”

The project, funded by a NSW Family and Community Service’s Liveable Communities grant, got under way in July this year. Two research assistants Drs Alexandra Knight and Dr Susanne Watkins have been engaged to work on the project which aims to enhance the well-being of older Australians by improving urban parks.

“Susanne, who is responsible for the spatial research, has been checking and classifying all the parks in Albury, so whether they are natural, sporting ground, parks or residual green space,” says project team leader Dr Rachel Whitsed.

“That’s the first step for us to be able to say how accessible and attractive parks are going to be. At the same time Alex has been mostly responsible for the survey and the focus groups.”

The survey “Have A Say”, run through project partner AlburyCity, had 121 responses. So far Rachel, Alex, and the other researchers involved in the project Associate Professor Rosemary Black and Robin Harvey (from the School of Humanities and Social Sciences) have run four focus groups with an Albury walking group, a men’s and a women’s physio group, and a mixed group. While the survey was open to people of all ages, all of the people in the focus groups were over 65 years of age.

“Specifically we wanted to find out how often people use parks, how they use them and why they use them,” says Rachel.

The preliminary themes to come out of the survey and the focus groups were that people wanted good parking, toilet facilities, shade, playgrounds to take the grandkids to, connectivity between parks, and proximity to water i.e. the Murray River.

“For example the walking group likes to meet somewhere where they can park, there are toilets, and then they will walk and some of that will be on streets and some will be on parks,” says Rachel. “It’s almost like we need human corridors as we need for wildlife.”

As part of the project the researchers will also visit selected parks to observe how people use parks. “There may be things that we haven’t picked up in the focus groups or survey that people are doing,” says Rachel.

The next step was to take the information from the focus groups and survey to work which parks have a higher “attractiveness” score and are more accessible.

“We will then work out what the population of people over the age of 65 who live near the parks is, and then start model-ling the accessibility,” says Rachel. “The result will be a spatial tool for strategic planning of urban parks for AlburyCity and other councils to use.”

Rachel describes the project as an interesting one, especially how it has captured people’s imaginations.

“Everyone you talk to has an opinion on parks and how they are used and what should be there,” she says. “Parks are relevant to everybody.”

The Commons


Researchers involved in a project which initially aimed to raise awareness of sustainability through art are “amazed” at how the project has developed and expanded in its first three months.

The project’s design builds on learnings and lessons from three previous research projects – the two Our Place projects, funded by the NSW Office of Environment and Heritage (OEH), and the Learning Communities Higher Education Participation and Partnerships Program (HEPPP) project, funded by the Commonwealth Department of Education.

“Essentially it was a new contract with the Office of Environment and Heritage to broker community engagement strategies and options on the theme of sustainable communities,” says Dr Helen Masterman-Smith. While planning had been underway for a few months prior, activities began in July this year. The other ILWS researchers involved in the project are Dr John Rafferty and Dr Marie Sheahan.

Helen says one of the key barriers to community engagement on sustainability issues identified in the Our Place projects was the lack of a community-driven space that the community could engage with on sustainability issues in ways that were flexible enough, particularly for disadvantaged communities such as
those on a low-income, culturally-diverse groups, Aged Care pensioners, the unemployed and people with disabilities.

“We wanted to see if a space was created for sustainability activities, with a social justice bent if you like, that was available to the community, when and how they wanted and that they could influence, what would that look like?” says Helen.

The researchers have partnered with the Goodlife Co-operative, a not-for-profit community organisation that evolved from the Our Place projects with a mission of protecting animals, the environment and improving the well-being of people through community and education projects.

To address the need for a community-driven space, a shopfront, “The Commons”, is being leased by the Co-op in Mate St., Lavington, Albury. It is open Monday to Fridays from 12.30pm to 5pm.

The flagship of the six activities in the brokerage is the Art of Sustainability Exhibition and competition series. It involves a different school or community group exhibiting every two to four weeks.

“There are prizes attached to each heat [exhibition], and the finalists from each heat then go into a grand final, an exhibition as part of the Sustainable Living Festival co-ordinated by Albury and Wodonga City Councils this month,” says Helen.

The exhibitions, apart from being a way of engaging young people, are exhibited at The Commons “which is within walking distance of disadvantaged neighbourhoods whose residents would rarely go or have the opportunity to get to an art gallery. It has really been pitched as a community-based art show. For a lot of the students and the community members it is the first time they have exhibited in a public space. The response from the public has been amazing.

“As part of what is in The Commons, the art exhibition gives us a trigger for conversations around sustainability, artistic endeavour etc.”

well as being an arts space, The Commons has quickly grown to be used for other purposes. It is a food distribution centre, a drop-in centre, a book exchange, a meeting place… and has a raised vegetable garden and nursery out the back.

“I’ve even done guest lectures for CSU second year Natural Resource Management students here so they can understand what happens around the kitchen table….they need to understand what happens in households if they are going to save the river,” says Dr John Rafferty.

“Some of the students have joined the Goodlife Co-op and are regular volunteers.”

Members of the Goodlife Co-operative are concerned about food waste and have partnered with Foodshare, a not-for-profit community organisation, which receives surplus food from supermarkets at its depot in Wodonga for distribution to over 100 local outlets including the CSU Students Association, local schools and welfare agencies.

“To get food relief from the traditional welfare agencies can be quite a harrowing experience for many low-income people so that food waste was not ending up in as many needy households as it could be,” explains Helen. “What the co-op members were interested in is the concept of a free store, which is something that has happened in Gippsland and elsewhere in the world. (cont next page)
“Food from organisations such as Foodshare, alongside donated home-goods, tools and various other things that the community can share, is embedded as part of that.

“The food part is as much about reducing landfill and waste, the environmental side of things which is as important as the social justice side.”

In the three months since The Commons opened its doors in July more than 10 tonnes of food has been distributed, valued at around $50,000. Between 50 and 100 people come through its doors each day. Many of these are Age Pensioners. Helen says by week eight the Co-operative had become financially self-sufficient from community donations.

Another project activity is to do with community resilience and engagement with the neighbourhhood.

“The idea was that if we have the art space, the food relief, which is a huge drawcard, and the free store, could we engage with those disadvantaged communities, which can be ‘hard-to-reach’, about some of the social, environmental and economic sustainability challenges in the community,” says Helen.

The original plan was to have weekly and monthly events.

“But ever since we’ve opened we’ve been absolutely swamped with people. We still do the monthly social night but we have ditched the weekly events because what we learnt is that people don’t like appointments. They like to be able to just come in when they are up to it and have a conversation about sustainability. One of the issues that has come up is the lack of community transport. Carpooling is on the radar.”

The co-op (which now has over 50 volunteers on its books) has set up a community work-board where community members write down anything that they think needs attention on the social, environmental and economic sustainability front. Anyone else can then come in and give it a tick (“like a low-tech Facebook like”.)

A third activity is a grant-writing workshop to be held at the end of November.

“We are trying to hold as many of the events as we can here on the premises with the intention of engaging members of disadvantaged communities as partners/stakeholders alongside professionals,” says Helen.

The idea behind the grant-writing workshop was to work on grants that would continue the partnership between CSU, the Goodlife Co-op, and potentially other players such as AlburyCity, FoodShare and others. Other activities held as part of Sustainable Living month in November included:

- A two day “People powered democracy” workshop held Nov 4 and 5 involving 22 participants. Topics covered in the workshop included citizen ‘juries’, participatory budgeting, neighbourhood organising, flat pack democracy and local community initiatives. Among the attendees at the forum, which has received $8000 internal funding from ILWS, were community members, Dr Drew Cottle from Western Sydney University and CSU scholars.
- A “People powered economy” workshop about community and social enterprise on November 18 and 19. “In addition to all this, we’ve also done a number of what we call ‘Environmental Protection Unplugged’ activities which have ranged from a presentation on the Our Place project to Rotary in Albury, a talk for the Big Ideas series put together by Parklands Albury-Wodonga and the Bhutanese Association, talks to community groups, service providers, high school students and NRM practitioners…” says Helen.
- The lease for the shop that houses “The Commons” runs until April next year but not surprisingly there are plans to move into a larger premise. “One of the things people are finding here is that it really is a practical way to reconnect with the community and have their faith in humanity restored a little bit,” says Helen. “We get all sorts of people here and some are really struggling. By coming here they are finding a sense of purpose in their lives by understanding they have a valuable place in the community. The social inclusion benefits are one of the biggest things.”

Helen, John and Marie spend 5 to 20 hours a week at The Commons and, from a research point of view, are doing what Helen describes as “auto-ethnographic research or diary of a start-up, that kind of thing.” “We three are the subjects though we do plan to do more formal interviews down the track,” she says. “A lot of people that come here are amazed at what has happened over the first three months and are very keen to be interviewed and talk of their experience.”

The team are working with fellow Institute member Dr Merrilyn Crich- ton, a sociologist at Wagga who is looking at why similar projects could be done in Wagga. Merrilyn is also putting together an Ethics Application so formal interviews can be conducted with volunteer stakeholders. “Her plan is to come down once a month and be an external observer,” says Helen.

(The money from OEH runs out at the end of the year. However the researchers have just heard that they have had success with their grant application to the NSW Environmental Trust, for a $100,000 Powering Down project, modelled on the current project and aimed at the same neighbourhood/communities but with a focus on energy efficiency and security.)
Workshops, conferences & forums

It’s been a busy few months for our researchers going by all the reports that have come in on attendance and presentations at various conferences, workshops and forums in Australia and overseas.

The following highlights some just of this activity. More under “Conferences” on page

Enjoyable, Memorable, Meaningful: Using Wildlife Interpretation to Do It All

Associate Professor Rosemary Black and Professor Betty Weller, Southern Cross University (SCU) delivered an intensive two day workshop on the “how to” of wildlife interpretation at Binna Burra Mountain Lodge in Lamington National Park just inland from the Gold Coast on September 15-16.

Thirty-three workshop participants ranging from novice wildlife tour guides to a few tour operator-guides with more than 30 years’ experience in the field attended the workshop which was organised by Ronda Green on behalf of Wildlife Tourism Australia for both members and non-members.

Most workshop participants were from the southeast Queensland and northern NSW regions including staff from wildlife attractions and facilities (O’Reilly’s Guesthouse, Currumbin Wildlife Sanctuary, Cedar Creek Estate, Bat Hospital), wildlife and ecotour operators, museums, national parks, conservation groups, and universities.

The workshop consisted of mini-lectures interspersed with individual and small group activities where participants applied what they were learning. Informed by research and practice, Rosy and Betty presented a number of principles that underpin successful interpretation.

The principles were illustrated through role-modelling, DVD examples, and several guided walks. A world café activity helped tease out ideas for applying interpretive principles to reach new and/or challenging audiences. Issues such as the use of Aboriginal stories by non-indigenous guides, and wildlife feeding on tours and at resorts, were discussed and debated.

Five experts delivered short sharp presentations on their research on interpretation in specific contexts such as whale-watching tours (Liz Hawkins, SCU), cage shark diving (Kirin Apps, SCU) and seal watching (Leah Burns, Griffith University).

“A large part of the success of the workshop was due to the openness of participants to new ways of working with visitors, and the willingness of participants to share their prior knowledge and experience, including what doesn’t work,” says Rosy. “Feedback from participants was very positive, with calls for the workshop to be delivered in other regions.”

INTECOL

Institute Director Professor Max Finlayson was a key invited plenary speaker at the 10th International Wetlands Conference (INTECOL) in Changshu, China, Sept 19-24.

The conference, which is held every four years, is the largest, most influential conference in the field of wetland science and applications. This was the second time it was held in Asia – the other being the first conference in 1980. Max gave the closing talk on the role of wetlands in meeting the UN’s UN’s Sustainable Development Goals; and contributed to two workshops, one on wetland classification, and another on the state of the world’s wetlands.

In the sidelines of the conference he led a team that is developing a flagship report for the Ramsar Convention on Wetlands on the state of the world’s wetlands.

“ A lack of comparability in wetland classification has blighted efforts to understand the extent of wetlands globally and within many countries or regions, and may also introduce complexities in assessing targets under the Sustainable Development Goals,” says Max. “The workshop on the state of the world’s wetlands was designed to identify the scientific basis for assessing the state of wetlands and the major drivers given that recent analyses have reported that 65-70% of wetland globally have been lost since 1990.”

Also present at INTECOL was PhD student Xioying Liu (Sha Sha) who gave a well-received talk about her integrated research on Lake Cowal, and Institute Adjuncts Randy Milton and Adjunct Professor Nick Davidson. Randy participated in the above mentioned workshops and the Ramsar report, and is also working with Max and Nick to complete a book on wetlands – entitled The Wetland Book – with some 463 articles.

Nick co-led a workshop on “Assessing and reporting wetland status and trends: issues and challenges”. The workshop formed part of a process initiated by the Society of Wetland Scientists’ (SWS) Ramsar Section, which Nick chairs, and which aims to improve the availability of data and information on the state of the ecological character of the world’s remaining wetlands. (cont next page)
This is recognised as a major gap in the essential knowledge-base for the Ramsar Convention on Wetlands.

A set of papers on wetland assessment issues, derived from the INTECOL workshop and earlier SWS symposia on the topic, is currently in preparation for Marine & Freshwater Research “Research Front”. Nick is visiting ILWS in November this year to work on further developing a project to improve wetland assessment information and reporting.

Society for Limnology Conference

Institute speakers at the 2016 Australian Society for Limnology Conference held in Ballarat, Sept 26-30 included:

- **Dr Julia Howitt** who presented on monitoring the blue green algal bloom in the Edward-Wakool River system earlier this year. (Julia also chaired a Invasive Species session);
- **Dr Paul Humphries** who gave a talk on a conceptual synthesis of flow-recruitment relationships for riverine fishes, and a tribute to the late Keith Walker;
- **PhD student Kendal Krause** who gave a talk on the roles of Murray cod (*Maccullochella peeli peeli*) and Gambusia (*Gambusia holbrooki*) in structuring the community composition of emerging zooplankton; and
- **Institute Adjunct Dr Joanne Ocock**, who gave a talk on monitoring frog response to wetland flows in the northern Murray Darling Basin.

International Ecosummit

Dr Peter Spooner attended the 5th International Ecosummit on Ecological Sustainability & Engineering Change August 29- September 1, held in Montpellier, France. He presented a paper on the influence of urban encroachment on the use of large Eucalyptus trees by squirrel gliders, to a session which focussed on the conservation importance of large old trees in urban landscapes.

The conference was attended by approx. 1400 delegates from 75 countries, where plenary speakers included Professors Howard Odum, Sandra Diaz, John Grime, Sandra Lavorel, and many other leading environmental scientists. The aim of the conference was to find solutions to global environmental problems, where sessions were held on a diverse array of topics such as ecological restoration, historical ecology, sustainable agriculture, and protection of biodiversity.

Peter then caught a fast train northward, to present at the 5th IENE (Infra Eco Network Europe: International Conference on Ecology and Transportation), held in Lyon, 30 August – 2nd September. He presented a paper to a session which focussed on roadside vegetation, titled “Seed dispersal by myrmecochorous ants in road verges: the influence of soil disturbances from roadworks”, co-authored by Zsofia Palfi (Phd student) and Dr Wayne Robinson. This conference was attended by over 400 people from 46 countries, with 260 papers presented on issues relating to road ecology and management.

Environmental Toxicology

Dr Julia Howitt attended the Society of Environmental Toxicology & Chemistry conference with the theme “Industry, science and environment – towards a sustainable future” in Hobart, October 4-7, where she co-chaired the poster session and snapshots, and acted as a mentor for the student mentoring program.

Second Winton Wetlands Restoration Science Forum

The Institute was well represented at Second Winton Wetlands Restoration Science Forum “Wetlands within Catchments: A landscape perspective”, August 16 to 17. Held at the Winton Wetlands, near Benalla, our speakers included:

- **Associate Professor Catherine Allan** who spoke on “learning together and its role in wetland restoration”;  
- **PhD student Luisa Perez-Mujica** who spoke on “Socio-ecological modelling for wetland restoration”; and  
- **Institute Director Professor Max Finlayson** who is chair of the Winton Wetlands Environmental Advisory Panel and who did the “wrap-up” at the end of the forum.

Other ILWS attendees included Dr Dale Nimmo, Dr Jodi Price and our Visiting Academic Professor Luiz Silva.
National Rewilding Forum

On September 7, ILWS members Professor David Watson and Dr Maggie Watson attended the National Rewilding Forum, organized by the National Parks Association of NSW in Sydney.

Forty-five people attended the forum, delegates coming from a wide range of universities, agencies and non-governmental organizations. The forum began with a keynote address by Frans Schepers from Rewilding Europe, giving a broad-brush overview of how the concept of rewilding is catalysing large-scale conservation across Europe.

Inspired by what’s possible, the delegates turned their attention to the Australian context, breaking into groups to scope common goals, identify success factors and devise strategies to overcome obstacles. John Turnbull was facilitator for the day, with groups reporting back, discussing differences of opinion, exploring common threads and mapping out generalized goals.

"Despite the breadth of the audience and the variety of perspectives expressed, a unified vision emerged and broad consensus was achieved regarding the need for a rewilding network and a set of guiding principles," says Dave. "The proceedings are fascinating reading for everyone interested in safeguarding the long-term future of Australian wildlife."


Coexistence with non-human animals in Malaysia

Associate Professor Peter Simmons was in Malaysia, September 13-22 to present at the International Communication and Media Conference in Kuala Lumpur and to further develop his (and colleague CSU researcher Dr Michael Mehmet’s) research interest on human coexistence with wildlife.

During the visit Peter gave a presentation at the International Islamic University of Malaysia called “Transparency and communication can improve wildlife welfare outcomes: A case of kangaroos”, based on recent decisions affecting kangaroos in Bathurst.

His host, the former Rector of the Islamic University Dato’ Syed Arabi Bin Syed Abdullah Idid asked for a letter about their research with international colleagues, Associate Professor Aida Nasirah Abdullah from the National Defence University of Malaysia; Associate Professor Kalthom Hussein from the International College Selangor; and Mohd Fauzi Kamarudin from the University Teknikal Malaysia Melakai.

Much of the group’s interest for this project to date has been on two common species sometimes labelled as pest: Macaque monkeys in Malaysia and kangaroos in Australia.

The team has conducted interviews in different parts of Malaysia to develop a survey that can be used in different countries, to study attitudes to living with wildlife. Interviews were conducted with officials responsible for managing and protecting wildlife, people working in non-governmental organisations, people living with monkeys, and journalists.

“The main research is yet to be done but the early indicators are that decision processes need to routinely include non-departmental people who can speak on behalf of the animals,” says Peter, whose letter advocating transparency was subsequently featured in Malaysian National Daily newspaper the New Strait Times, September 26.

Social development conference in Sri Lanka

President of the Asia Pacific Branch of the International Consortium for Social Development, Professor Manohar Pawar, (pictured below) organised an international conference on “Social Work, Social Development and Sustainable Development Goals” in collaboration with the Department of Sociology, University of Peradeniya at Oak-Ray Regency Hotel in Kandy, Sri Lanka, 29-30 September 2016. (more next page)
Over 300 people participated in the conference where nearly 80 papers were presented.

Professor Pawar, in addition to delivering welcome and valedictory addresses, conferred two ICSDAP presidential awards: Distinguished Social Development Senior Scholar award and Distinguished Social Development Practitioner award.

The conference also helped to build a social work library at University of Peradeniya towards its new social work program. Among others, the conference was partly supported by ILWS, CSU’s School of Humanities’ and Social Sciences, and Ministry of Social Empowerment and Welfare, Government of Sri Lanka.

Also at the conference was Ms Carla Hogg, a Doctorate of Social Work scholar, who presented a paper on “Unconventional tools for the new conventional family” and ILWS member Dr Troy Whitford, who, together with CSU’s Dr Henry Prunckun organised two focused workshops on ‘Socio-political research and assessment for national and international non-government organisations’.

**SEGRA**

The Institute was well-represented at the 2016 SEGRA (Sustainable Economic Growth for Regional Australia) conference held in Albany, WA, Oct 26-28.

Adjunct Professor Peter Waterman presented – Challenge 4 – “How can we get off the grid and secure 24/7 renewable solar energy for sustainable regional development”.

Professor Max Finlayson was the Facilitator, and Peter the Rapporteur for the Researchers Forum – “Secure Safe Domestic Water Collaborator’s Forum”.

Spotlight Session presentations included:
- Transforming Governance Together, Moragh Mackay, PhD student
- Benchmarking Regional Entrepreneurial Ecosystems, Professor Mark Morrison
- Small Scale Farming and Settlement of Humanitarian Immigrants in Australian Agriculture, Associate Professor Dr Branka Krivokapic-Skoko
- How Do We Sustain Production Landscapes? Professor Max Finlayson
- Grassroots Conservation Actions Among Residents on Private Land in a Regional Rural-Urban Interface Landscape in NSW, Associate Professor Rosemary Black
- Rural Stories: how embracing cultural and natural heritage can enhance tourism and sustain regional communities, Dr Peter Spooner

Immersion Session presentations included:
- Systems Thinking for Regional Development, Associate Professor Catherine Allan
- Supporting Dynamic and Sustainable Socio-Environmental Systems: realities, challenges and opportunities with the Murray-Darling Basin Water Plan, Professor Max Finlayson & Moragh Mackay
- Assessing Sustainability of Planning: systems simulation and social-ecological systems, Luisa Perez Mujica, PhD student
- Building Entrepreneurial Ecosystems, Professor Mark Morrison

**Wise Water Ways Water Management Workshop**

Professor Robyn Watts, a member of the Environmental Water Scientific Advisory Panel for the Australian Government Department of Environment, was a speaker (Oct 26) at the Wise Water Ways Water Management Workshop, held in Beechworth, October 24-28. CSU was one of the sponsors of the workshop. Robyn’s presentation was on Environmental Flows and looked at water resource allocation, environmental flows importance and assessment methodology, and streamflow management.
Opinion

Challenges for freshwater fisheries management within Australia, Brazil and beyond

By Visiting Academic Professor Luiz Silva

In terms of freshwater fish diversity, Australia and Brazil are very different. Recent estimates (including native and introduced species) account for approximately 356 species in Australia, whilst Brazil has over 3,331 and a continued increasing richness as dozens of species are described every year. Therefore, from a fish biologist perspective, Brazil is considered to be a hotspot for fisheries management/conservation research, while Australia, the only ecoregion in the world (Australasian) with less than 1,000 freshwater fish species, would not be so attractive.

What would then trigger researchers’ interests from both countries to collaborate on fisheries research?

One can speculate that for Australians, the high diversity and hotspots for conservation would be the main factor driving their interest to collaborate with Brazilians. On the other hand, the uniqueness of the Australian freshwater fish fauna (high endemism) would trigger Brazilian researchers’ interests.

Despite the enormous difference in freshwater fish diversity, interestingly Australia and Brazil share the same proportion of species listed as threatened, about 10% of the total richness (37 and 311 species, respectively). Unsurprisingly, the ichthyofauna within Australia and Brazil is threatened by similar perils, such as habitat loss or alteration, modification in flow regimes, altered water quality, blockage of migratory routes and introduction of alien species.

In some ways, all threats are related to water usage and regulation for human needs, with irrigation and river damming the major activities driving the occurrence of these impacts. Nevertheless, these activities are intended to promote human welfare and, at some extent, signify economic growth and will continue to develop globally.

There is an increasingly global demand for the development of strategies which will provide for water infrastructure development in a sustainable fashion, coupling human and environmental needs. However, several challenges are constantly constraining fisheries scientists’ abilities to effectively develop these strategies:

Challenge 1 – the lack of planning for water infrastructure development often leads decision-makers to explore areas where the potential for substantial environmental impacts is higher, therefore increasing the risks for the freshwater fish fauna and reducing the likelihood to effectively develop mitigation strategies and management plans.

Challenge 2 – water infrastructure development is far faster than researchers’ capabilities of acquiring ecological knowledge to foster management plans in affected areas. For instance, as new species are described worldwide, it is not unusual for many to already be threatened, thereby increasing the difficulty to establish effective management plans.

Challenge 3 – the need for the development of highly applied research, which requires the ability to engage with interdisciplinary teams and explore different fields of expertise such as hydraulics, geology and sociology.

Considering the frequent presence of these three challenges in decision-making processes for fisheries management, a precautionary approach will often be recommended as a strategy to minimize impacts of water infrastructure, although its effectiveness is controversial.

In this scenario, a suggested route to overcome these challenges and improve fisheries management and conservation is to exchange knowledge, especially from international experts. This route can lead to short-cuts in acquiring knowledge, developing new tools to improve planning of water infrastructure development and establishing new technologies to enhance fisheries management and conservation.

In particular, the prospect of rapidly developing more efficient management strategies to mitigate impacts of water infrastructure and promote fish conservation is the current element urging the ongoing collaboration between researchers at the Institute for Land, Water and Society within Charles Sturt University, the Federal University of São João del-Rei (UFSJ) and various research centers and universities in the USA, UK, Laos, Mexico and Laos.

The development of world class interdisciplinary research and establishment of international groups able to engage with governmental agencies and stakeholders is a robust procedure that facilitates decision-making processes in order to strengthen fisheries management and conservation, leading to sustainability and best-practices for the water industry worldwide.

Adjunct News

Regional Rail

The State Government’s announcement of $5 million toward revival of the Blayney-Demondrille railway from Demondrille (near Harden) to Maimuru, a little north of Young, represents a big change in attitude by the Government according to Institute Adjunct Associate Professor Ian Gray. Ian, who has been working for the revival of regional freight rail for many years now, says while the Government is making some positive and pleasing noises in the policy direction, there is still a lot to do on the policy side. “You probably won’t see a train at Young next time you drive to Bathurst, but maybe the time after the time after?,” says Ian who is working on related analysis. “It is now over 7 years since the supporters of the railway first met and over three years since our seminar at Blayney. But nobody wants to give up.”
Picturing and re-picturing Bonegilla
ILWS Adjunct Associate Professor Bruce Pennay’s new book, Picturing and Re-Picturing Bonegilla, was launched at the Write Around the Murray Festival at the Albury Library Museum on September 7. The book is an illustrated history of the Bonegilla Migrant Reception and Training Centre, near Albury, set up for receiving and training migrants to Australia during the post World War II immigration boom.

All Energy
Institute Adjunct Barney Foran attended the Australian “All Energy 2016” conference in Melbourne, October 4-6. He reports:

A wintery October Melbourne found me dipping my toe back into Australia’s energy futures, a former numerate passion of mine seen through two decades of whole-economy modelling from a physical and science perspective.

The conference focuses mostly on renewable electricity though not exclusively, and attracts the top end of town principally the policy wonks, investors, networks, generators, retailers and of course the tech-heads. The trade show in the Exhibition Centre overwhelmed me with the never ending array of the world’s PV and battery manufacturers and of course every nerd’s favourite item, the Tesla electric car. So a few idiosyncratic perspectives:

Never let a good crisis go by
The South Australian power down had just happened, some Federal politicians had been injudicious with their comments. In response, the assembled experts obliged with full and frank broadsides on energy and climate policy. Exact causes aside, the conference to a person welcomed a good crisis which might push the transition towards cleaner electricity past the stop-start dynamics of the past decade caused mainly by policy backflips.

The extreme storm mostly caused the problem and the shutdown protected vital components from damage. Since then, the response speed of the century-old network design is seen as an additional problem where response times of network dynamics have to decrease from their current one second to something like one quarter of a second to adequately handle the wind turbine issue.

The cusp of something really big
The investment sessions were populated by eager suits leaving us listeners in no doubt that the clean energy transition was ready to roll out, if only reasonable policy harmony could be achieved. Clean energy investment portfolios have been quickly oversubscribed and to date have returned 10%. Sombre reflections on our own bank and super accounts see them giving at best 5%. However these opportunities are snapped up by the big institutions and are not available to individuals.

The ACT’s system of auctioning the supply for their 100% renewable electricity target got high accolades from the financial gnomes, and gives the 20 year certainty that helps bypass policy back-flipping at both state and federal levels. Some ‘community energy’ sessions showed good returns on shopping centre sized PV developments, but the individual investor requires deep due diligence even down to the source of the panels used.

The equity conundrum
The equity issue (or the poor need electricity too) had intense focus in many sessions. We ‘middle classers’ have our LED globes, the energy efficient fridge, the PV on the roof and are now considering battery storage to really sock it to the black-electron majors. The less well off, pensioners and renters in general, inhabit poor building stock which is cold in winter and hot in summer.

While state government energy rebates help a little, landlords most often supply the simplest and cheapest, leaving running costs accrue to those with little capacity to pay. Great ‘tips of the iceberg’ were described where new social housing projects minimised energy costs with good design for costs no more than the standard dumb build. The scale of the response required is immense, and to date, well beyond the current political discourse.

Batteries-beware
Three lessons came from the intricate battery session at the conference. The first is buy German, Japanese or American and don’t be beguiled by the chimera of the cheap deal. The second is that it is difficult to reap a dollar profit when trying to balancing the dynamics of household or business use with variable pricing and when the sun shines best. Software systems are available to do this. Depending on your feed-in-tariff it is often best to adjust your usage to use PV electricity when the sun is shining.

If you have a low tariff, then set washing machines, ovens and especially the hot water system to run during the day. A heat pump hot water run by PV panels during the day is an energy storage system, especially the hot water system to run during the day. A heat pump hot water run by PV panels during the day is an energy storage system, possibly avoiding one third of your electricity bill. Still batteries are for the techies who are preparing to invest just to avoid the bill. They despise the electricity majors and that’s simply it.

Peer-to-peer energy trading
A new language for me was the ‘internet of energy’ where our everyday energy transactions are managed though our poles and wires in the virtual and seamless way we now accept for information.
A limited cut at this being trialled in fifty households in Perth is ‘peer to peer’ energy trading that manages a mini-grid between PV and battery installed houses. A ‘trading’ meter replaces the normal one and surplus PV electrons from my house are traded with similar users. The amounts are ‘block chain’ encrypted and the system keeps an irrefutable power ledger set of accounts. Potentially these ‘disruptive systems’ could grab $50-100 million of revenue from the Western Australian electricity system, so you see why the CEOs are worried.

Partial analysis reigns
As an analyst who’d spent two decades in whole-economy energy analysis, I was appalled by the way that all analysis is now partial. A windfarm or new technology “would save the emissions equivalent of taking 200,000 cars off the road”. There seems little recognition that our rates of population growth, our GDP led growth in affluence and so on, simply replaces those same 200,000 cars.

The tech-head in me cannot but be impressed how the energy narrative has changed in even the ten years I’ve been with the Institute. More importantly the street-cred of the investment bankers at the conference said for me that it is going to start soon and accelerate quickly. The fossils currently blocking progress will continue to impede progress, but they can’t have more than a decade left in them. So a cautious and even positive message I suppose.

So what should I do at home?
The message here has hardly changed in the past decade. Five points as follows:
• Get the structure and fabric of your house right and insulate, insulate, insulate
• Progressively replace your energy machines with four and five star ones that are cost effective. Do hot water first and install time clocks to give you the ‘energy service’ when you want it
• Shift the time of major electricity use from peak to off-peak periods to reduce your dollar costs
• Change your energy using behaviours where possible and get the capacity to zone your house so you only heat or cool one attractive living area.
• If you have spare money install three kilowatts or more of PV panels. Also sign onto green electricity providers such as REDD, Momentum and PowerShop that have significant renewable electricity generators.

New Zealand visitors
Institute Adjunct Associate Professor Bruce Robertson and his wife Fiona, from the University of Otago, visited Australia October 17 to 28. While here the pair, with colleague Dr Melanie Massaro, mist-netted silvereyes to take blood samples for genetic analysis for a project which has received some Institute funding. Bruce also presented a seminar on “Mitigation of fishing impacts on the New Zealand sea-lion by a sub-Antarctic trawl fishery” at the Albury-Wodonga campus on October 19.

Use of soil-crack shelters by desert-dwelling dunnarts
By ILWS Adjunct, Dr Helen Waudby
I recently co-authored a paper with Dr Sophie Petit (from the University of South Australia) on the shelter properties of cracking-clay soils during extreme desert conditions. We also examined the use of these cracks by two sympatric dasyurids, fat-tailed (Sminthopsis crassicauda) and stripe-faced (S. macroura) dunnarts.

I spent many hours gently inserting data loggers into cracks and attaching radio transmitters to recalcitrant dunnarts.

The study demonstrated that cracks play an important sheltering role in winter and summer (as we suspected).

While cracks did buffer the extreme temperatures that characterise desert environments, they also provided a consistent microclimate.

Dunnarts (and probably other small desert animals) can rely on cracks to provide a microclimate that will not show extreme peaks in temperature and humidity (compared to outside or ambient conditions). Both dunnart species used cracks as diurnal shelters almost exclusively.

In the gibber-gilgai systems of the southern Lake Eyre Basin (where my study site is located), cracks are probably critical for a range of small vertebrates (and the predators that prey on them), particularly as all other types of shelter are scarce.

Many questions remain unanswered, including questions around dunnart-crack fidelity and parasite load, the effect of crack density on predator avoidance behaviour, and how livestock affect the complex below-surface crack network.

 Fortunately my ‘field station’ is still there waiting for me, so I hope to have a crack at answering some of these questions in the future (day job and funding permitting).

If you would like a copy of the paper, Waudby, H.P. and Petit, S. (2016) Thermoregulatory value of soil-crack shelters for small vertebrates during extreme desert conditions. Integrative Zoology, please contact me.

Some individuals (dunnarts) were easier to relocate than others Pic: A. Fairlamb
Community Engagement

Conserving birds
Dr Dale Nimmo, on behalf of the Greater Eastern Ranges Slopes 2 Summit Initiative gave a presentation on the importance of riparian vegetation for the conservation of woodland birds at the Murray Local Land Services office in Albury on August 15.

Wirraminna
The Wirraminna Environmental Education Centre, at Burrumbuttock, held an Open Day on Sept 11. Taking part in the day were researchers Professor David Watson, Dr Maggie Watson and Dr Melanie Massaranto, all of whom are on the centre’s management committee. Maggie helped run some of the activities “for children of all ages”.

The audience was entertained by Melanie’s talk about her work in Antarctica, learning about the practical side of conducting fieldwork in one of the most remote locations on earth. “The dams were full to overflowing, and everyone was amazed at just how lush the gardens were,” says Dave. “The Corroboree Frogs were very accommodating—scrambling about on top of the moss bed, rather than burrowed deep down away from view.”

“Wirraminna’s Creative Catchment Kids program won the Junior Landcare Team Award for helping spread the word on natural resource management at the 2016 National Landcare Conference in September, in Melbourne.

Fish Information Session
As part of an Upper Murray Streams and Rivers Fish Information Session attended by 27 people, freshwater fish ecologist Dr Lee Baumgartner gave a presentation on “Why on earth do we want to release a virus to eradicate carp?” Other speakers were from the North East Catchment Management Authority and Fisheries Victoria. The event, held at the Towong Shire Council offices in Corryong, October 19, was organised by the Upper Murray Landcare Network.

Lord Howe Island visit
Associate Professor Rosemary Black recently returned from a visit, in October, to Lord Howe Island to promote the work of ILWS and explore potential research collaborations.

Lord Howe Island is located 600 kms directly off the coast of Port Macquarie and is about 10 km long and 1.5 km wide. Most of the island population lives in the north, while the south is dominated by forested hills rising to the highest point on the island, Mount Gower (875 m). The Lord Howe Island Group comprises 28 islands, islets and rocks including the volcanic and uninhabited Ball’s Pyramid.

The Island’s main industries are tourism and the export of Kentia Palms. There is a 400-tourist bed limit on the Island. The Lord Howe Island Group is administered by the Lord Howe Island Board. The Lord Howe Island Group is a World Heritage Site of global natural significance with numerous endemic plants and animals, a range of diverse landscapes, the world’s southernmost barrier coral reef, nesting seabirds, and rich historical and cultural heritage. The Lord Howe Island Act of 1981 established a Permanent Park Preserve (covering about 70 per cent of the island) and the surrounding waters are a Marine Park.

In recent years cats, pigs and goats and many weeds have been successfully eradicated from the Island. The Lord Howe Island Board has been, and is currently, involved in many exciting and ground breaking ecological projects some of which are controversial among some of the Island community including the proposed rat eradication program and proposed installation of wind turbines.

Rosemary met with eleven people who are based on the Island including staff members of the Lord Howe Island Board and Marine Parks, members of the tourism industry and commercial operators.

“Everyone was interested in collaborating with ILWS on a range of research projects,” says Rosemary whose trip was funded by ILWS. “They acknowledged that to date ecological research has dominated but there is a need to broaden research to include social and economic studies. They considered ILWS’s integrated, multidisciplinary approach very attractive.”

She says ecological research options include work on the Lord Howe Island Woodhen, weeds, agriculture, and the rat eradication program. Social and economic research issues worthy of exploration include tourism, sustainability and community attitudes to natural resource management. Further research options will be explored with NSW National Parks and Wildlife Service at follow up meetings.

“The new CSU campus in Port Macquarie is the closest university to the Island so both the University and ILWS are in an excellent position to work directly with potential research collaborators on the Island,” says Rosemary.

Researchers interested in working on Lord Howe Island are encouraged to contact Rosemary.

The surrounding waters of Lord Howe Island are a Marine Park. Pic. R. Black
**Feature Story**

**ILWS flood research**

*With rainfalls in September very much above average for most of the Murray-Darling Basin, and stream flows very much above average for 73% of the Basin, there has been, and in some areas there still is, widespread flooding.*

Institute researchers are undertaking projects examining different aspects of the flooding, which will contribute to a better understanding of the ecosystem effects of floods on the natural environment. Researchers are studying both positive effects of the flooding, such as large waterbird breeding events and increases in native fish and frog populations and river productivity, as well as efforts to alleviate negative effects of flooding, such as hypoxic blackwater that can cause the deaths of native fish and crustaceans.

The “real time” evaluations they are providing are helping to inform current decisions on use of environmental water being made by water managers.

The research on the ecological outcomes of flooding is additional to the Institute’s two long-term environmental flows projects in the Edward-Wakool and the Murrumbidgee River systems. For those projects, funded by the Commonwealth Environmental Water Office, two teams of Institute researchers are working in partnership with others to examine ecosystem responses to environmental water over a five year period.

**Food for fish**

The floods were the trigger for the commencement of a project focusing on Koondrook State Forest which involves ILWS researchers Professor Robyn Watts, Dr Julia Howitt, Dr Ben Wolfenden, Dr Nicole McCasker and Dr Kim Jenkins, with technical support from James Abell, Xiaoying Liu (Sha Sha), Dr Nathan Ning and Rob Cook.

“We are studying the effects of flows from the Murray River through the Koondrook-Perricoota Forest on the productivity of the Wakool River,” says Robyn. “We will evaluate the effects of factors such as flow, water temperature, dissolved carbon and nutrients on the river productivity, which will be assessed by river metabolism and the abundance and diversity of micro-invertebrates - the food for fish and other aquatic species.

“This project complements the long-term environmental flows project in the Edward-Wakool system. Results from the Koondrook Forest project study will inform our broader study of environmental flows in the Edward-Wakool system and the data from the long-term monitoring project has enabled us to interpret what is occurring in the Koondrook Forest.”

Weekly field sampling for this project began in August and will continue until the end of November. The project is jointly funded by the Forestry Corporation of NSW, ILWS, and CSU’s Faculty of Science.

“It has been a once in 20 year opportunity to study the effects of a large flood going through that forest,” says Robyn. “This research will assist future management of the Koondrook-Perricoota Forest and inform management of other riverine ecosystems elsewhere.”

**Irrigation infrastructure to create refuge during hypoxic events**

While blackwater events are a natural part of the ecology of lowland river systems, when dissolved oxygen levels fall to very low levels (a hypoxic event caused by a rapid breakdown of organic matter) fish and crustaceans can die.

As a result of the floods, there have been hypoxic blackwater events in the Edward Wakool River System with associated fish kills.

On October 24, the Commonwealth Environmental Water Holder, David Papps, announced water with high oxygen and low carbon would be redirected through the Murray Irrigation infrastructure. (more next page)
The intent is to create local refuges for fish and other aquatic fauna in the Edward and Wakool Rivers.

In his media release Mr Papps said the water would be provided on the recession of the current flood event, in a staged process, so as not to exacerbate an already difficult time for those people affected by the flooding. Management processes were in consultation with the local SES and local government.

“The decision to use environmental water for the current situation was informed by previous research undertaken by ILWS researchers who assessed the effectiveness of using irrigation canal escapes to deliver environmental water during a hypoxic blackwater event following a smaller flood in 2010,” says Professor Robyn Watts, who heads up the long-term monitoring project in the Edward-Wakool River System.

That study, funded by CSU and Murray Local Land Services, found that dissolved oxygen in the water was higher at sites downstream of irrigation escapes where the environmental water was released compared to those upstream. As a result fish communities were maintained in the river reaches immediately downstream of the escapes, whereas in other parts of the Edward-Wakool system fish deaths were extensive.

The decision to use environmental water to create refuges during the current hypoxic blackwater event was also informed by modelling undertaken by Dr Julia Howitt and Robyn in October to predict the outcomes of using irrigation water to improve oxygen levels in the river.

“Our research is being used by the Murray Dissolved Oxygen Group (a multi-agency committee) and CEWO to inform the current decisions on water releases to lessen the impacts of these hypoxic events on native fish populations,” says Robyn.

In late October, the Institute’s ILWS’s Edward-Wakool research team were commissioned by the Commonwealth Environmental Water Office (CEWO) to study the responses to its environmental watering out of the irrigation canal escapes.

(Within the irrigation canal network in this region there are sites called escapes where water from irrigation canals can be released back into the rivers. Water in the Mulwala Canal system has higher oxygen and lower carbon that in the river as it comes from Lake Mulwala, upstream of the floodplain forests that are flooded and contributing a lot of organic matter.)

“This project is additional to what we are already doing for the long-term environmental flows project,” says Robyn. “We are monitoring sites upstream and downstream of each escape and in the irrigation canal itself, and this experimental design will enable us to assess the outcomes of the environmental watering.”

This research contributes to adaptive management at two time scales: ILWS research can provide immediate feedback so CEWO can adjust their use of environmental water during the watering actions; the research will also contribute to longer term planning and inform management decisions in future years.

Managing flood recession in the Murrumbidgee

The Institute team leading the long-term monitoring in the Murrumbidgee River System are also involved in extra research and adaptive management with a focus on managing potential risk of hypoxic blackwater and waterbird breeding.

“Similar to what is happening in the Edward-Wakool because of the returning floodplain water, the dissolved oxygen concentrations are falling in the main stem of the Murrumbidgee at Balranald and the Redbank and Maude weirs,” says project team member Dr Ben Wolfenden.

“Continuous on-line water quality monitoring stations have picked up that the oxygen concentrations in the water have been falling over the last month [October] and are now at low levels.

“We have been working closely with government agencies to support management of flood recession with a focus on areas in the river downstream of Hay. This program combines field data collection of carbon sampling along with modelling of potential black-water risk scenarios so we can support adaptive management of environmental water within the river channel.”

Project team leader Dr Skye Wasses says the current flood event was within the envelope of the 2011/12 floods.

“Most of these areas have had a fair bit of watering,” she says. “We did have a hypoxic blackwater event in 2011/12 but then there were areas that were being watered for the first time in 20/30 years. This time there will be a fair bit of carbon and it will get hot but it’s probably not going to be as bad. But we will be keeping a close eye on it. While we haven’t found any hypoxic blackwater in the wetlands, there are some places in the river channel where oxygen levels are problematic.”
Both Ben and Skye are on the Murrumbidgee’s Technical Advisory Group on designing the hydrograph for the river indicating how, once the flood waters pass, environmental water might be used to reduce the potential risks of hypoxic blackwater that causes fish deaths.

“The water managers can’t add additional water to the current flood but they can manage the recession of the flood once it’s falling back to within normal operating range,” explains Ben.

He says management decisions have to take into account the 23 day lag time between when environmental water is released from the dam [Burrinjuck] and when it reaches to the Lowbidgee and unknowns including, with the rice season about to get underway, when and how much irrigation water will be taken out of the river via the big offtake canals.

The additional monitoring the researchers are doing builds on a return flow project Ben, Skye and Dr Kim Jenkins did in the Murrumbidgee in 2015 where they examined the impact of controlled releases of environmental water, delivered through the heavily forested North Redbank wetland complex back into the Murrumbidgee.

“There is a good role for environmental water to help protect the river ecosystem by adaptively managing the channel flows,” says Ben. “Water managers have some limited scope to do things but it’s too big for them to be able do much with environmental water but we are trying to figure out what they can and can’t do. We’ll be able to help them forecast what the consequences might be of making drastic changes to the river flow.”

**Waterbird breeding events**

Not surprisingly the flooding has been a boon for waterbird breeding events, particularly in the Lowbidgee.

“There are already well over 5000 waterbird nests in the Nimmie-Caria and that’s just in one wetland,” says Dr Skye Wassens. “There will be a lot more.”

The ILWS Murrumbidgee team in collaboration with University of NSW and the NSW Office of Environment and Heritage have just started to monitor the waterbirds using a combination of on-ground monitoring and aerial surveys using drones.

“The challenge this year is because you’ve got waterbird breeding, once those events begin they will need water coming through the system,” says Skye. “Naturally, prior to irrigation, there would have been quite a long, continuous flood but irrigation has taken the top off those flows. There will be a bit of balancing around supporting waterbird breeding and water quality issues and making sure there is enough environmental water in reserve to manage that waterbird breeding event.”

This monitoring is additional to the widespread waterbird surveys being undertaken by NSW OEH and CSU as part of the long term monitoring project.

**Fish and frog responses**

While the recent wet weather and associated flooding has restricted the number of sites that researchers monitoring wetlands in the Lowbidgee and mid-Murrumbidgee have been able to access, they were able to access the mid-Murrumbidgee wetlands in September.

There they recorded a range of different-sized golden perch, a species they don’t often find during wetland surveys, except, it seems, when there has been natural flooding as was the case during the last floods, in 2011/12. In the intervening period the wetlands were watered mostly with environmental water (a mixture of NSW state and Commonwealth environmental water.)

“We sometimes see golden perch but we are seeing larger numbers when there is widespread flooding and connectivity,” says Dr Ben Wolfenden.

Dr Skye Wassens says that it may also be an ecological response that, when given the opportunity, the fish will move onto the floodplain when they can. “High flows drive a lot of dispersal,” says Skye. “We’ve also seen quite big increases in southern bell frogs in a range of places, including in the Nimmie-Caira.”

While the researchers have found it difficult to get into some of the sites, the team deployed 12 automatic call recorders at their long term project monitoring sites in May this year for a related project, which are expected to greatly add to their data set.

“The call recorders have been out for the entire flood period recording for 5 minutes every hour and we expect that they will produce some quite interesting data,” says Skye. “Because we couldn’t physically get into our sites to do the frog surveys we potentially will utilise a fair bit of that calling data.”
Two small islands.

Robin, a small passerine restricted to patterns of the Chatham Island black robin. Their colleagues published a journal article that investigated the dispersal of endemic island species, like the Chatham Island black robin.

We found that the density of this species in the natal year forced both sexes to move, although females were more inclined to disperse and move further than males,” says Dena. “This suggests that sex-biased density-dependent dispersal may be a strategy that minimises inbreeding for endemic island species, like the Chatham Island black robin.”

Climate scientists and natural resource managers were offered a new catchment-based climate adaptation assessment tool for freshwater ecosystems, thanks to the novel work of Professor Max Finlayson and his colleagues. The ecological health of freshwater ecosystems in many parts of the world has been adversely affected by river regulation and other management actions, and climate change is now placing added pressure on these already-stressed ecosystems.

The status of food security in Cambodia was also under the spotlight this quarter, in a highly topical study authored by Dr Richard Culas and his colleague, Kimsong Tek. Their study reviewed Cambodia’s food security situation, and looked at relevant policy objectives needed to sustain the country’s food security and grain yield were assessed.

“We found that early sowing of field pea following rice gave the best results, with plants flowering three weeks earlier and yielding 1330 kg/ha more grain than after fallow,” says Julia.

“However, faba beans didn’t cope as well in soils immediately after rice and may be affected by waterlogging and soil chemistry. One major advantage was that post-rice crops had 10-fold less weed infestation than crops in the equivalent fallow treatment and, consequently, needed much less weed management.”

To read the full version of any of these articles or to see a full list of the publications for the quarter, please go to the ILWS website and/or contact the authors.

**Journal Papers**


**Publications under the microscope**

*by Dr Nathan Ning*

This quarter’s ILWS publications again covered a breadth of topics including socioeconomic policy, freshwater science, ecology, finance and forensic toxicology.

Terrestrial ecology seemed to be the flavour of the quarter, thanks to a number of contributions on this topic from Dr Dale Nimmo, Dr Peter Spooner and Zsophia Palfi and their colleagues. One of Dale’s journal publications looked at the role of invasive predators in contributing to biodiversity loss on a global scale.

The study — which was published in *Proceedings of the National Academy of Sciences of the USA*, but has since been also covered in *Science, Nature, New Scientist* and *Forbes Magazine* — incorporated a global meta-analysis of the impacts of invasive species on biodiversity, and revealed that invasive predators are involved in more than 58% of the contemporary extinctions of birds, mammals and reptiles.

“We found that cats, rodents, dogs and pigs have the greatest impacts of any invasive predators, and that endemic island faunal communities are most vulnerable to predators,” says Dale.

While on the topic of endemic island fauna, Dena Paris, Dr Andrew Hall and Dr Melanie Massaro and two of their colleagues published a journal article that investigated the dispersal patterns of the Chatham Island black robin, a small passerine restricted to two small islands.

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The Catchment Assessment Framework (CAF) allows managers to evaluate existing and potential freshwater management actions, such as riparian vegetation and habitat connectivity, for their adaptation potential in Australian catchment management. Managers will then be able to assess the advantages of these actions when considering measures to better manage climate-related risk.

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**Journal Papers**


Books

Pennay, B. (2016) Picturing and Re-picturing Bonegilla, Wodonga City Council

Book chapters


Conference presentations & proceedings


Finlayson, C. M. (2016) The role of wetlands in meeting the UN’s Sustainable Development Goals. Closing plenary talk at the 10th International Wetland Conference (INTECOL), 19-24 Sept, Changshu, China


Krause, K., Wassens, S., Wolfenden, B., & Jenkins, K. (2016) The roles of Murray cod (Maccullochella peelii peelii) and Gambusia (Gambusia holbrooki) in structuring the community composition of emerging zooplankton. Presented at the Australian Society for Limnology Conference, Sept 26-30, Ballarat

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at the 5th IENE (Infra Eco Network Europe) Conference, August 30 – September 02, Lyon, France

Spooner, P.G. (2016) The influence of urban encroachment on the use of large Eucalyptus trees by squirrel gliders. Presented at the 5th International Ecosummit on Ecological Sustainability & Engineering Change, August 29 - September 01, Montpellier, France

Reports


Influence of tourism on Niseko, Japan

Kim Nelson (above) is a PhD student in the school of Social Science and Humanities at the Wagga Wagga campus. She is in the second year of her PhD exploring tourism host perspectives of self-identity in Niseko, Japan and is under the supervision of Dr Angela Ragusa and Associate Professor Rosemary Black.

Kim lived in Japan for several years and during that time visited Niseko on numerous occasions and found that the small village had been transformed from an agricultural based community into an international ski resort through the development of ski tourism. Australian ski tourists have become particularly prominent in Niseko, with many Australians developing tourism-based businesses and holiday homes in the area. For example, during the 2009-2010 ski season, Niseko hosted 65,044 Australian tourists, increasing to 121,673 in 2014-2015, a substantial increase, given the local population is just 4685.

Despite the clear influence of tourism on the landscape of the Niseko area, little is known about how living in an environment transformed by tourism may have influenced residents in the community. This lack of knowledge prompted Kim to pursue her PhD research which will focus on understanding if and how living in a social environment transformed by tourism influences the self-identities of local guesthouse owners.

Kim will spend a month in Japan in 2017 to carry out data collection and will use narrative interviewing techniques with Japanese guesthouse owners to explore their experiences of tourism.

This research will address the lack of current knowledge of the influence of living in a social environment transformed by tourism on guesthouse owners’ self-identities and will explore how guesthouse owners’ lived experiences may affect how they manage the influence of tourism in their lives.

Wetland Health in New Zealand

ILWS PhD student Abbie Spiers recently submitted her PhD thesis on ‘An exploration of community perceptions about wetland health in New Zealand.’

The study collected qualitative and quantitative data from over 60 wetland managers in NZ through semi-structured interviews, an electronic survey, and analysis of relevant media. Wetland managers’ perceptions were explored concerning wetland health, wetland management role/s, key wetland-related challenges, barriers, successes and personal journeys. Thematic outcomes of the study indicate that wetland managers derive a range of monetary and non-monetary benefits from wetland ecosystems and perceive them to be key settings for health and well-being, including in relation to personal ‘sense of place’, whakapapa and connection to nature.

The study data also demonstrate the complexity of the wetland manager’s role and the versatility and persistence required of the diverse individuals involved in wetland management and restoration throughout NZ.

(more next page)
In addition, study participants’ responses and relevant literature indicate that political will to implement real change in wetland management is currently lacking in NZ. This is out of step with the will of wetland managers, as shown by the study results, and the environmental concerns and values of the NZ public.

This study shows that effective action to improve wetlands and water bodies as settings for human health and wellbeing will have the support of wetland managers and many New Zealanders.

Study participants consider that decision makers must more actively address the link between land use change and water quality, and overcome the inconsistencies and ineffectiveness that currently exist in wetland-related policy and legislative mechanisms in order to halt wetland loss and degradation.

This may be achieved through improved resourcing and the development of more effective legislative and regulatory frameworks, to be implemented consistently in all regions and to support sustainable, integrated and innovative action at landscape-scale to protect, manage and restore wetlands and water bodies.

These are not NZ-specific issues and cross-sectoral, integrated responses to wetland degradation are urgently required worldwide; such efforts should be adopted along the lines of the wise use principles and technical guidelines adopted by the Parties to the Convention on Wetlands.

**PhD News**

Congratulations to ILWS PhD student **Dena Paris** who has had her her first paper accepted, now published on-line. The paper, which has come out of her Honours work, is based on a study of Chatham Island black robins, New Zealand.


In September ILWS PhD student **Liz Znidersic** presented a seminar on “Tales of rails, a journey in detection methodologies: Tasman Island, Australia to the marshes of South Carolina” at Clemson University’s Baruch Institute of Coastal Ecology and Forest Science, in South Carolina, USA. She spoke about her use of audio and camera trapping to understand the biology of rails in Tasmania, the Cocos Keeling Islands (Indian Ocean) and in South Carolina.

She also gave an oral presentation on “Camera traps as an effective monitoring tool for low detectability species-A rail tale” and was co-author with Christy Hand (SCDNR) of a poster “Investigating vocalization patterns of the eastern Black Rail in South Carolina” at the Waterbird Society’s 40th Annual Conference and General Meeting in New Bern, North Carolina, September 20-23.

Welcome to two new international PhD students, **Londari Yamarak**, whose topic is “Impacts of Mining on Poverty in Papua New Guinea” and **Bharat Poudel**, whose topic is “Identification of Criteria for Sustainable Operation of Distributed Electricity Generation in Remote Areas of Nepal.”

Professor Kevin Parton is the principal supervisor for both students who are on-campus and based at Bathurst.

ILWS PhD student **Jenny Wood’s** PhD on the community spirit sown by North Wagga residents in the face of flooding was the basis for a story in the *Daily Advertiser*, Oct 16 [link](http://www.dailyadvertiser.com.au/story/4228387/spirit-key-to-recovery/)

Congratulations to PhD student **Wes Ward (above right)** whose PhD on “Exploring communication within international agricultural research teams” has been accepted and who will be graduating with a number of other ILWS PhD students in December.

**Wes** is now investigating further opportunities to verify these findings.

PhD students **Luisa Perez Mujica** and **Paul Amoateng** have secured Writing Up Awards from for 2016.
Research Activities

Measuring Radon and greenhouse gas emissions

An interesting collaborative research project is currently underway on the Wagga campus exploring methods to more accurately measure agricultural greenhouse gas emissions.

The current project is revisiting some of the goals of a former CSIRO project, OASIS, conducted in 1994 and 1995, which sought to characterise the diurnal surface energy and water balances as well as greenhouse gas emissions at the paddock scale.

Results from this study are helping bridge the gap in scales between experimental observations and the grid resolution of numerical models.

“Researchers from the University of Wollongong and Australian Nuclear Science and Technology Organisation (ANSTO) had been looking for an opportunity to test a novel radon-based technique to better quantify landscape-scale emissions of greenhouse gases (e.g. carbon dioxide, methane and nitrous oxide) from agricultural environments, particularly at night when the atmosphere can become very stable and poorly mixed,” says the Institute’s Dr Julia Howitt, an environmental chemist based at Wagga.

Julia explains that Radon emissions from the soil are relatively constant provided the soil is not water-logged. (Radon is a gas that is slowly emitted from the ground as a result of the natural radioactive decay of trace amounts of primordial uranium in all rocks and soil.)

For the current pilot project between University of Wollongong, ANSTO and CSU, the researchers are measuring radon gas emissions as well as the greenhouse gases- carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) at the same site used more than 20 years ago.

“The idea is that by measuring all of these gases consistently over a period of time as well as wind speed, wind direction, turbulence, temperature and humidity, we will be able to get a much more accurate measure of greenhouse gas emissions, especially at night,” says Julia.

Equipment being used to take the measurements, which began in August this year and will continue until December, include CSU’s portable greenhouse gas analyser purchased through a Research Infrastructure Block Grant (RIGB), a 10 metre “flux tower” installed by ANSTO, radon detectors from ANSTO, and another more advanced greenhouse analyser from the University of Wollongong.

“Because we have all of these instruments we can measure at different levels on the tower i.e. 2 and 10 metres above the soil,” says Julia. A third year CSU student Danyon Reardon, a Bachelor of Science analytical chemistry major, is assisting with the project.

“We will be comparing the data we get with that collected 20 years ago, but because we are using much more advanced instrumentation, and have added atmospheric radon measurements to our “toolkit”, we are not just revisiting the old project but are testing ways of more accurately measuring greenhouse gas emissions,” says Julia.

“By comparing CSU’s portable greenhouse gas analyser with the University of Wollongong’s, we’ve already worked out that we need to apply a correction to our observations since the level of humidity influences the readings. By doing the cross-instrument comparison we’ve ensured that future work with these instruments will be more accurate.”

The information this research is providing is important in helping to understand greenhouse gases in general and, in future, could help to optimise the application and use of fertilisers that also contribute to these emissions.”It is important to be able to measure and understand the emissions from different types of soil and in the future tie them with different land management practices,” says Julia. “In the future we’d be hoping to look at wetland management and how water management and wetlands might influence carbon cycling. There are lots of applications in the future.”

*David Griffith from the University of Wollongong will give a presentation on this collaboration titled “Radon tracer flux measurements of CO2, N2O and CH4 at Wagga Wagga: OASIS revisited?” at the Atmospheric Composition & Chemistry Observations and Modelling Conference & Cape Grim Annual Science Meeting, November 16-18, at Stanley, Tasmania.}
Research in the Philippines

Professor Kevin Parton was in the Philippines at the end of August undertaking field work as part of a five year ACIAR project Action-ready climate knowledge to improve disaster risk management for smallholder farmers in the Philippines.

The $1.8M project is led by the South Australian Research and Development Institute (SARDI) with CSU a collaborating institution along with Philippine Atomospheric, Geophysical and Astronomical Services Administration, Philippines; University of the Philippines at Los Banos, Philippines; Department of Agriculture, Philippines, and Philippine Institute for Development Studies, Philippines.

Harvesting of cabbages in the Bonguet region

EnviroHealth Research

ILWS members Dr Ana Horta and Dr Rachel Whitsed, under the SRA Spatial Research in Environment, Agriculture and Health, have set up a partnership with Dr Herbert Jelinek, a biomedical researcher in Agriculture and Health, have set up a partnership with Dr Herbert Jelinek, a biomedical researcher in the Philippines. The EnviroHealth Research Project aims to map and analyse spatial patterns of health and disease and environmental (both natural and built environment) factors, to discover spatial relationships between prevalence of health issues and diseases with environmental patterns.

“Our pilot study will investigate spatial patterns of medical conditions such as diabetes, hypertension and obesity in Albury-Wodonga,” says Rachel.

“This will lead to improved understanding of patterns and drivers of health and disease in Albury-Wodonga, and opportunities for better targeted health interventions, resulting in improved population health and wellbeing.

Director’s Activities & Engagement

Another busy few months for the Institute Director, Professor Max Finlayson. Some recent activities not already mentioned in this newsletter include:

August 2: Attended the Vice-Chancellor’s Forum in Wagga where future scenarios for CSU were reviewed. Also in attendance were other ILWS members including Associate Professor Ben Wilson and Professor Mark Morrison.

August 9-11: Was in Canberra working with researchers from CSU’s Centre for Applied Philosophy and Public Ethics (CAPPE) on a water and justice paper.

August 23: Attended his last meeting as a member of CSU’s Research Advisory Committee (a sub-committee of the Academic Senate chaired by the DVC (RDI) Professor Mary Kelly) after being on that committee for four years.

September 5: Met with Regional Development Australia (RDA) - Murray and others in Albury to discuss common research.

September 7 – 9: Revisited Kakadu National Park as part of a team assessing the health of mangroves. The team re-visited transect sites, originally surveyed 15 to 20 years ago, to look at the decline and death of mangroves. Data was collected using aircraft, helicopters and drones.


In the News

Plenty of member engagement with the media over the last few months. Full details are in our “In the News” web pages. Highlights include articles written by Institute members in The Conversation such as

- Invasive predators are eating the world’s animals to extinction - and the worst is close to home
- Neonicotinoids linked to wild bee and butterfly declines in Europe and US
- Reimagining NSW: how a happy, healthy regional and rural citizenry helps us all

Three Institute members are among the 41 scientists that have signed an open letter sent to the NSW Premier Mike Baird on August 19 calling for the proposal to rapidly reduce Kosciuszko brumby numbers to include aerial shooting and be completed in a quarter of the proposed time.

Signatories to the letter, ‘Australian Ecologists’ Letter to the NSW Premier in support of feral horse control’ from CSU include members Professor David Watson, Dr Dale Nimmo and Dr Alison Matthews. The letter generated plenty of media interest.

There have also been plenty of CSU Media Releases featuring our members and their research with good uptake by media. Releases

And a report on Australian Farming Families: Succession and Inheritance, the result of a research collaboration between business advisory firm Chapman Eastway and Professor Adam Steen and Professor John Hick, has had extensive media coverage.