2016 WETLANDS RESTORATION SCIENCE FORUM, WINTON WETLANDS

Outcomes Report

WINTON WETLANDS

Outcomes Report
Wetlands Restoration Science Forum, Winton Wetlands
(Held 16th and 17st August 2016)

Contents

Prepared by:

Lance Lloyd, Winton Wetlands Committee of Management

19th December 2016

1. Introduction

The research forum was established to provide support for research on the Winton Wetlands by highlighting recent developments in wetland restoration science and, over time, assisting scientists and managers gain data for a deeper understanding of the Wetland's ecosystem functioning and its management. The Second Wetlands Restoration Science Forum was held at Winton Wetlands' Mokoan Hub on the 16th and 17th August 2016. This is a report which includes outcomes of the Forum as well as the speakers' talks and a summary of the workshop deliberations.

1.1. The Winton Wetlands Project

The Winton Wetlands project has 3 parts to it:

1. Ecological restoration - which is the focus for the Science Forum
2. Community and partnerships
3. Tourism and recreation

We are working on keeping the values of the site and restoring previous values of the site. This entails removing pests, restoration of cane grass and red gums and box trees woodlands as well as the wetlands themselves.

Our community and partnerships include Catchment Management Authorities (CMA's), Friends of Winton Wetlands (FoWW), The Country Fire Authority, local government, DELWP and Landcare Groups, locals, schools, universities and grazing lessees.

Tourism development enhances rather than compromises the site with a focus to connect people to the country. Tourism includes The Hub, bike paths, the Autumn Program (concert), flash camping, The Blood Moon Banquet and The Lunette walk (in November 2016).

1.2. Science Forum Objectives

The forum is aimed at providing support for research on the Winton Wetlands and to assist scientists and managers in gaining data for management of the site. We will use this research to gain a deeper understanding of the Wetland's ecosystem functioning as well as foster an interest in regional wetlands and their ecology, restoration and management. The 2016 event was themed around "Wetlands within Catchments" and we had keynote speakers who are undertaking management and restoration works in wetlands similar to Winton Wetlands as well as student researchers currently undertaking research on the wetlands.

We are developing a research knowledge hub to provide a regular forum for researchers to meet and to share information, equipment, facilities, and resources, and to collaborate on research as well as an online knowledge portal to access previous forum results, previous science on the site and relevant information for wetland restoration researchers and managers. Another aim is to provide a forum for the regions' managers to come together and identify shared research needs and interests.

1.3. Acknowledgements

We acknowledge the Winton Wetlands Committee of Management (WWCoM), the staff and the attendees for contributing to the success of the event. We also acknowledge the role of Professor Max Finlayson as Chair of Environmental Strategic Advisory Panel, Lee Joachim (Yorta Yorta Nations Aboriginal Corporation) and all of the speakers and workshop leaders for their contributions to the event. Thanks to Rina Cooper, Executive Assistant to the Committee of Management who recorded discussions over the two days and her notes have been used in this report.

2. Science Forum

2.1. Participants

We had over 60 people attend representing most of the major Victorian and NSW universities, DELWP, Benalla Rural City Council, research agencies, wetland and environment managers, community groups and various practitioners in wetland restoration from Victoria, NSW and ACT (see appendix 1).

2.2. Program

The program was established to meet the project aims and consisted of the following topics and speakers (see appendix 2 for copies of the presentations available).

Topic	**Speaker**
Welcome to Country Short talk on the importance of wetlands (including Winton Wetlands) to the Yorta Yorta	Lee Joachim, Yorta Yorta Nations Aboriginal Corporation
Welcome from the Winton Wetlands Committee of Management and Forum Objectives	Jim Grant, CEO WWCoM*
Managing a Wetland Centre - Hunter Wetlands Centre	Dr Stuart Blanch, CEO, Hunter Wetlands Centre
Wetlands in Catchment Context – Conservation and Reserve Management	Dr Neil McCarthy, Chief Executive Officer, North East CMA
Field Inspection: Key sites and works, research and investigation programs and their results (Bus **and** Walking). A Community Science Event with Catherine Allan and other Speakers on Day 2 who will explain their research and works.	Winton Wetlands staff
Day 2 welcome and Recap of Day 1	Mr Lance Lloyd
Keynote- Learning Together (& its role in Wetland Restoration)	Dr Catherine Allan, Charles Sturt University
Cane Grass Restoration Experiment	Mr Daniel Martin, Melbourne University
Red Gum Regeneration and Recruitment	Mr Andrew White, Deakin University
Vegetation Survey Aims and Early Results	Dr Michelle Casanova, Federation University
Citizen Science - Frog Monitoring in Winton Wetlands	Ms Wendy and Mr Rod Sherlock, FoWW
Carp Control and Virus Update	Mr Lance Lloyd, Winton Wetlands
Climate Change Implications of Wetlands Management and Conservation	Stuart Blanch, Hunter Wetlands Centre
Social-Ecological modelling for wetland restoration	Dr Luisa Perez, Charles Sturt University
Keynote - Evaluating plans for wetland vegetation recovery, using a decision tool	Dr Jane Roberts, Ecological Consultant – Wetlands, Floodplains, Rivers

Topic	Speaker
Workshops: Role of re-introductions to the site to increase biodiversity? Growling Grass Frogs (Matt Looby) Magpie Geese (Stuart Blanch) Fish (Alistair Cameron) Aquatic Vegetation (Kimberley James) Benefits, Practicalities, Problems, Management	Lead Facilitator: Mr Lance Lloyd, Winton Wetlands
Summing up – Ideas from speakers and workshops	Prof Max Finlayson, Charles Sturt University

*Jim stood in for Dennis O'Brien, Chair Winton Wetlands Committee of Management, who was an apology

3. Summaries of Talks

3.1. Managing a Wetlands Centre

Dr Stuart Blanche, CEO, Hunter Wetlands Centre

The seven 'Es' of an Effective Wetland Centre

1. **Enhance** –to improve the wetlands we inherited which were degraded. The visitor centre is an old rugby club. It is a very contaminated site which historically was used as a dumping ground.
   - It has been restored with the help of volunteers.
   - There is a nursery on site.
   - There is predator proof fencing.
   - Now it is a community asset and important to people in the community who are unemployed, have mental health issues etc and they see it as a refuge.
   - It is the oldest wetlands centre in Australia and is a Ramsar site.
2. **Experience** – 4km walking, 2km of canoe trails, a good site for people with disabilities, touching things, map based interactive touch screen kiosk, café.
3. **Educate** - have an education centre and hire it out to the education department, 7,000 students per annum, curriculum based, lots of volunteers,
4. **Encourage** – enjoying the wetlands, mothers group, groups to support future endeavours, repeat customers
5. **Enable** – 3 site maintenance groups, green army, work for the dole, corporate volunteers
6. **Efficient** - cut costs which is difficult to do for community groups, we have solar panels (30-35% of our power we generate), we have an electric vehicle charge point. (innovation to attract funding)
7. **Expanding and extending**. Over 200,000 trees have been planted on our site. We are looking at Hunter Wetlands National Parks adjacent to the current site which is a former grazing area but there is the threat of mangroves invading (50 years' time) in the area so we will be revegetating with trees by direct seeding and hydro mulching through a grant received through the 20 million Trees Grant Program.

We have reintroduced magpie geese. Green and golden bell frogs were introduced by the university but they were killed off within a couple of years, freckled ducks were introduced by CSIRO in the 90's and are threatened in NSW but the population is large on this site now.

3.2. Wetlands in Catchment Context – Conservation and Reserve Management

Dr Neil McCarthy, Chief Executive Officer, North East CMA

- Conservation world-wide is still going backwards despite individual efforts.
- IUCN international congress will discuss the current issues.
- Sydney hosted the World Parks Congress in 2014.
- Man vs nature – connecting with people on all levels.
- Post-modern IUCN values – many parks don't meet the international criteria due to being on private land.
- Landscape journey -ours is healthy parks, healthy people. There is a group rethinking parks and beyond the Healthy parks, Healthy people concept.
- Wetlands – what are they? Where water meets land – Since the 1900 64% of wetlands have been lost.
- Victorian approach - regional catchment strategy.
- Winton Wetlands needs to have adjoining farmers on side.
- Paradigm shifts – liveability, people then relate it back to the water. There is rethinking around conservation (ie London) by looking at the whole system.
- Digital disruption – could be used to our advantage.
- Why Winton? – International recognition, IUCN, Ramsar, Biosphere. It is a well-funded project compared to others in this area with high expectations. Need others to buy into it. It should be a leader or hub to include surrounding wetlands.
- Can you rethink Winton? – build relationships with Winton Raceway, create a unique experience, brolgas, scale it up.

3.3. Learning together (and its role in the wetlands)

Dr Catherine Allan, Charles Sturt University

Winton Wetlands has been through 3 phases over the last 40 years. Pre Lake Mokoan, Lake Mokoan and post decommissioning of Lake Mokoan.
It is also a complex social ecological system which are prone to systemic failures due to project and species focus. The problem with fixing the focus, crisis/command and control, competitive. How can we learn better?

Bring in a Social scientist for-

- Social acceptability
- Values Mapping
- Motivation research
- Institutional analyses
- Evaluations
- Market, spin, manipulation, coercion.

It is usually not working as the social scientists are bought in after the science has been completed but not in the framework of a system.

How can a social scientist improve the project?

By Systems framing:

- Focus on learning
- Knowledges
- Integrating
- Holistic/landscape/catchment
- Emergence
- Adaptation

Examples of Systems framing in wetlands:

Focus Farm Wetland Project in Murrumbidgee Catchment – conducted both ecological and social work at the same time so they inform each other. Focus groups ran concurrently with biophysical studies which assisted with naming of locations and discussions with landholders who also valued the environmental aspects as well as the nutrient values of the wetlands.

Potentially for Winton Wetlands:

- What are the participatory processes via Participatory Appraisal billabong catchments (Heartlands) or Systemic Inquiry into NRM governance in Victoria?
- Learning together is reframing – knowledges, issues, legitimacy
- Questions: Establish which room you will be working in – outside the normal so we can do things differently with built in processes.
  - What could learning together look like for Winton Wetlands?
  - Who might be included in a systemic inquiry?
    - Scientist could contribute better through better communication
    - Organised community groups ie CFA, Guides etc
  - What might be the starting issues for a systemic inquiry?
  - How could it start? Co creating to bring the community along as the past fishing and hunting community which were affected have not come on the journey.

3.4. Cane Grass Restoration Experiment

Mr Daniel Martin, Melbourne University

- Project objectives – included the best way to establish cane grass ie how far from the water and the best aspect (N,S,E,W)
- Cane grass was planted in plots and monitored. Due to the number of dead plants, there were two more plantings and a greenhouse trial established.
- There was more water in the plots at the high water line than expected.
- Soil chemistry tests were conducted
- Kangaroos have had an impact on one of the sites
- Monitoring will be conducted in August and September and final report due in October 2016.
- Some plots are still under water but many plants surviving and growing.

3.5. River Red Gum Regeneration and Recruitment

Mr Andrew White, Deakin University

- 2900 ha of River Red Gums were lost during the Mokoan Lake phase
- Environmentally they are an ecosystem engineer for soil structure and nutrient cycling
- Seedbank has changed during the lake flooding and there is virtually no seed bank available currently
- 10 sites were selected with mature trees recruitment, mature trees with no recruitment and dead trees with no growth under storey.
- A glass house trial was conducted
- In total there is approx 311 ha of active recruitment
- There is potentially 66 ha of recruitment zones
- There is a high failure rate of field germination but much higher in the glasshouse results
- There are about 20 plant species detected in the seed bank analysis
- Where to from here? It could take hundreds of years to restore the number of River Red Gums if recruitment is conducted naturally. This research has shown that the right growing conditions will encourage growth.
- It critical that reseeding is done to ensure the dead stags are grown out.
- Aerial seeding is difficult to get the right density of up to 9000 seeds per ha.
- No soil manipulation was conducted.
- There is a higher germination rate in disturbed soil when the seeds are planted in crevices or under soil.

3.6. Vegetation survey - aims and early results

Dr Michelle Casanova, Federation University

- A seed bank is a diversity of species which are dormant waiting for the right conditions to grow.
- There is overlap between seedbank and vegetation and the overlap varies.
- Vegetation is classified into various groups called Ecolgolgica Vegetation Communities (EVC's) and this has been conducted for the Winton Wetlands and some of these have potential to germinate and others don't.
- Winton wetlands has a lot of vegetation historical information from Helen Aston studies (1962) and recent studies also and ask if the seedbank has changed over time.
- Soil Samples were taken from Winton Wetlands and taken into glasshouse trial. Germination trials in dry and flooded conditions are currently under way and germination has occurred.
- This work has only just begun so there is more time required to see what other germination will occur over time.
- It is not that important that we know about each of the species but it reflects the biodiversity and resistance of the vegetation available.

3.7. Citizen Science – Frog Monitoring in Winton Wetlands

Ms Wendy and Mr Rod Sherlock, Friends of Winton Wetlands

- The Friends of Winton Wetlands has been successful in receiving a grant for a Friends, Frogs and Fishes Project.
- 12 sites were chosen for frog monitoring and soon water quality will be studied.
- There is 15 hours per day of recordings being taken.
- Monitoring and identifying the frogs is still under way.
- A good guide to identifying frog sounds is the Melbourne Water - a beginner's guide to frog identification – Healthy Waterways Water watch program.

3.8. Carp control and Virus update

Mr Lance Lloyd, Winton Wetlands

- Carp screens have been placed in two locations with plans for two more in 12 months' time.
- Controlling carp is assisting with habitat restoration.
- The carp virus will be a useful tool to remove the carp but it is not the silver bullet. It is 90% effective. Approvals will be needed at Commonwealth and State levels. It needs to be conducted with other control measures.
- The government is looking at releasing the carp virus in 2018. The fish die off may occur in mass amounts and within 48 hours of the release of the virus, so this presents some management challenges.
- There is a PhD student looking at the impact of large quantities of fish deaths to the quality of the water, nutrients release and reducing food source for native fish and birds.

3.9. Climate change implications of Wetlands Management and Conservation

Dr Stuart Blanch, CEO, Hunter Wetlands Centre

- The Hunter wetlands have been experiencing more east coast lows than in previous years.
- Rising sea levels will be an issues in years to come.
- The impact on people will be significant.
- They have conducted bench mapping this year for digital elevation models as part of Ramsar.
- With this information, what do we do with the wetlands?
- How much can we save and the cost of saving if the sea levels rise?
- Some areas of the Hunter wetlands will have issues with rising sea levels so how do we pay for it?
- There has been a draft plan prepared of the risk the sea levels rising and of the salt water inundation risk and also plans for immediate high risk areas. One option and question – does it take into account the surge?
- Vegetation community mapping has been conducted.
- We cannot protect Ramsar values over a century with areas under 1 metre.
- Soil salinity is a big issue and rising saline ground water is a huge issue.

3.10. Social – ecological modelling for wetlands restoration

Dr Luisa Perez, Charles Sturt University

- The ecological modelling for wetlands restoration is looking at a complex way to solve complex environmental problems
- Luisa Perez's PhD was looking at the sustainability of the Winton Wetland's complex social ecological system via conceptual modelling. This was converted to a computer program that can be used as a prediction model.
- It provides scenarios of the project currently and helps with proposed indicators of sustainability.
- The model is now available for use on site to test various restoration scenarios.

3.11. Evaluating plans for wetland vegetation recover, using a decision tool.

Dr Jane Roberts, Ecological Consultant – Wetlands, Floodplains, Rivers

- Due for completion August/Sept 2016.
- This decision tool measures the recovery potential of wetland vegetation.
- There was a literature review conducted which compiled a landscape context of wetland recovery. It highlighted the significance of the current vegetation.
- A decision support tool was developed to evaluate the feasibility of a recovery proposal. It ensures the area under investigation is biogeographically consistent.
    - This would be to match the EVC to the landscape. This contains a number of modules that you step through.
    - It helps set achievable vegetation objectives.
    - It does not advise on monitor, triggers or alerts, consider trajectories or aim for an ecosystems process.
    - There will be a user guide produced to be available to use with the decision support tool. It will be stand alone and unambiguous, scientifically robust, logically sound, easy to use. This will require field visits, design worksheet and repetitive writing.
    - There are some test groups available that could be used to test this model.

4. Workshop Outcomes

Four workshop sessions were held to examine the role of re-introductions (re-wilding) to the site to increase biodiversity. These covered two species and two broader taxa, including:

1. Growling Grass Frogs
2. Magpie Geese
3. Fish
4. Aquatic Vegetation

Workshop participants were as to consider the Benefits, Practicalities, Problems, and Management implications of the re-introduction of these species or groups.

It was felt that re-wilding, in general, is a valid way to help manage the habitat and increase the biodiversity of Winton wetlands. It was felt the case for Growling Grass Frogs, Fish, and Aquatic Vegetation was strong, with multiple and intermeshing benefits being readily achieved, but a plan for each is required to ensure re-introductions are successful and achieve the stated objectives. The negative issues with specifically re-introducing Magpie Geese might be mean that further investigation before a plan for re-introduction of this species is prepared. The tables on the subsequent pages will be used to developed detailed plans for the re-wilding of these three preferred species or groups.

1. Growling Grass frogs – Facilitated by Matt Looby

Benefits	Practicalities/ Problems	Management

• Threatened species (nationally)
• Formerly widespread
• Iconic species (Sth Vic, NSW Riverina)
  ▪ Large
  ▪ Charismatic
• Attract investment and actions that help other species
• Enhance food web
	• Are there refuges in the landscape?
	• Source
	• Legal – translocation plan and animal welfare considerations
	• Genetics – north/south divide
	• Planning
	• Chytrid
	  ▪ Current status of wetland
	  ▪ Not bringing chytrid in
	• Salinity window – ideal release sites
	• Water quality testing
	• Vegetation structure.
		• Population monitoring
		• Community involvement
		• Interpretive material/display at centre
		• Drought
		  ▪ Refuge- dams?
		  ▪ They are highly mobile
		  ▪ Permanent springs in foothills

2. Aquatic vegetation – Facilitated by Dr Kimberley James

Benefits	Practicalities	Problems	Management

• Reduce erosion
• Fish nursery
• Bird habitat
• Conservation sign
• Water quality
• Visual amenity
• Representativeness
• Trial sites (1962 list)
• Biodiversity in own right
• Improving ecosystems
  ▪ Stability/resilience
  ▪ Research interest
  ▪ Community engagement
  ▪ Co- learning
  ▪ Partnerships
• Growling grass frogs/magpie geese/fish
	• Determining goals/ Working within abiotic constraints
	• Seasonal hydrology
	• Soil capability
	  ▪ Land classes
	  ▪ Workforce resources funding
	• Biotic- grazing, weeds, complementary management activities, accessibility
	• Species source(s) - local?
	• How to introduce different species
	  ▪ Seed
	  ▪ Asexual propagules
	  ▪ Tube stock
	  ▪ Knowledge gaps
		• Climate change
		• Weeds, rabbits, foxes, insect attack, carp, kangaroos, sheep, cattle, unseasonal weather
		• Funding
		• Stakeholder support
		• Trade offs
		• Propagule supply
		• Red tape constraints
		• Bush fire management
		• Knowledge gaps
		• Access to experienced people
		• Capacity building in staff
		• Staff retention
		• Super abundant monoculture
		• Competitor control
		• Proposal/support
			• Staying with purpose and objective
			• Adaptive management
			  ▪ Monitoring
			  ▪ Reporting
			  ▪ Re-evaluate
			• Back up planting supply
			• Localised land management (weeding, spraying, burning, planting, direct seeding)
			• Tell community
			• Staff feedback
			• Community feedback
			• Co-ordination and co-operation
			• Research

3. Fish – Facilitated by Alistair Cameron

Cod/Golden Perch

Benefits	Practicalities	Problems	Management
• Social • Bring back disgruntled community • Get more carp out	• Can get fish for stocking • Cod breeding	• Sustainability • Habitat availability • Water level variability • Carp	• Add snags • Add vegetation • Promote smaller species e.g. pygmy perch, *G. rostratus*, rainbow fish and macro invertebrates • Replace carp with natives • Catch and return • Monitoring • Remove carp

Smaller natives/threatened species

Pygmy perch, *G. rostratus*, Trout cod, Rainbow fish, Hardyhead, Smelt, and Gudgeon species

Benefits	Practicalities	Problems	Management
• Refuge for threatened species • Increased ecological value of wetlands • Maintain ecological structure • Bottom up not top down • Educational (can be caught with dip nets) and learning about diversity and trophic levels	• Obtaining fish (native fish – correct genetic strains, can be difficult)	• Not enough initial habitat and become prey • Competition with, and habitat modification from, carp	• Add snags • Promote vegetation • Remove carp • Alter sediment profile – physically - add gravel or with vegetation • Install small mesh nets to separate areas • Monitoring – sampling effort v diversity

4. Magpie Geese – Stuart Blanch

Introduction

1. Unclear if magpie geese were at Winton Wetlands but likely (if only vagrants) – check with Field Naturalists Club of Victoria (for example, recently they have been sighted at Moodies Swamp)
2. If magpie geese were present, what made them extinct? Shooting? Drainage?
3. What negative impacts would magpie geese have been re-introduced?
    a. Crop destruction, control needs, destroy fruit orchards, chew up ovals, very noisy
4. Vector for diseases and viruses
5. Resident populations or vagrants? Serendip, Hunter Wetlands Centre, Bool lagoon (SA) Gwydir, Macquarie Marshes, Clarence, Tidbinbilla (ACT), Kyabram Fauna Park, therefore magpie geese can and do live in temperate south east Australian wetlands.

Benefits	Practicalities and problems	Management
• Ecosystem engineers that might introduce good physical disturbance –e.g. vegetation • Predators eat them (birds and eggs) -raptors, people, indigenous communities, goannas, pythons, red belly black snakes. • Iconic species	• Who would do it? Field and game • Eutrophication – they excrete large amounts • Eat lots of vegetation • Only breed on water • Predator proof soft release cage • Need approval • Disease risk analysis and quarantine • Genetic inbreeding	• Monitor and research • Acclimatise them • Learn from other re introduction/captive breeding • Are magpie geese smart enough? Too dumb? • Need skills/expertise – partner with people and organisations eg Healesville, Serendip, BCA • Supplemental feeding • Could be shot by hunters

5. Summary from Professor Max Finlayson

Prof Max Finlayson, Chair Environmental Strategy Advisory Panel, and Director, Institute for Land, Water & Society, Charles Sturt University, Albury

Here are a number of key issues and messages that I derived from the Forum, based on the presentations and discussions, including the dialogue and chat in the breaks between sessions. It is not a summary of all the formal presentations – you have already all heard them.

We started with Lee Joachim and the idea of connections and storylines about the past and the future. And local people being involved and helping to set the agenda. It was an obvious message to myself, but equally obviously we need to pay more attention to such connections.

Stuart Blanch then stepped up and took us for a journey across the Hunter wetland centre and the role of and benefits to volunteers, including the wider social outcomes, as well as the education and funding issues, and a lot more. He then almost shattered all the inspirational comments and ideas he presented by taking us on another journey into the perils of climate change and sea level rise and how the Hunter wetland people will need to adapt, or, as I said at the time, even to consider abandoning parts of their much loved estate. I sincerely hope not, and I am sure they will fight to avoid this, but it does raise the spectre of what global change can mean for local effort.

Neil McCarthy then took us for yet another journey – one that was challenging us to rethink our notion of national parks and conservation, and going further than aphorisms or metaphors about healthy parks and healthy people. One of my thoughts was, yes, I agree with all that, but it is not new. Take the Ramsar Convention on Wetlands, as an example, it was in its evolution in the 1960s about people and wetlands and not just about listing Ramsar wetlands under biodiversity criteria as a flagship exercise. Maybe, just maybe, we can look backwards in order to look forward and not reinvent the wheel as we already have it.

The field trip came and went, and it was wonderful. What a great time and what a great idea to take us into the wetland, as happened last year as well. I raise this as often we surely must appear to be armchair wetlanders with screen-focussed eyes. The view from the hill from Doug Bain's property was sublime. We could, as a group and as an individual, see the lake, the wetland, or whatever we want to call it. As I was thanking our host I could not also avoid the other image – the dead trees. These are real and there may not be many realistic options from getting away from them, and they do now provide habitat for a valuable assemblage of animals and plants, but the image ……how do we sell an image dominated by dead trees to an audience less enamoured with the whole system than we are? It's a challenge and its part of our wetland renewal.

We then moved onto the topic of learning together which is almost the antithesis of much of my education. And with this the value of using multiple knowledges and bringing local people in particular along on the same journey, or even more so, creating the same journey. These points take us back to the connections and visions that we had started with. But, and this is a real issue, the audience is pretty small when compared to the community of stakeholders that connect with the landscape in which the wetlands sit. Granted we were at a science forum and not a community forum as we often call them. But if we take learning together and multiple knowledges to heart then we should not be sheltering behind the name of our forum – we know this and I am sure all of us look forward to extending the outreach that we are trying to generate share and receive.

Next we were back into some of the science. This is my paddock and despite all the heart-felt sentiment I have for other things we need to do, I do love to listen to a bit of science. Daniel Martin and Andrew

White started this by describing the vegetation experiments they were doing. Nice projects and such information is needed. But the thought that struck me was that in different ways they both commented on how their university requirements did not quite fit with the research needs. These constraints are real when they are doing it get a degree. We recognise that, but do we also too often allow the system to drive what we need to do to understand the world around the system? Or even, to influence what we need to know to support the system itself? As heretical as that may sound from an academic I think we may have stumbled onto something important that does not always work the right way.

Michelle Casanova continued with the science and being a botanist (at least, having been a botanist) I just loved her plant and seedbank work. Then she came up with the absolutely beautiful scientific concepts of i) a patch scientific regime, and ii) potentially useful data. I'll leave the first, but the second really grabbed my attention. Once we get the data, and that can be hard enough, we actually need to use it to make it useful and answer the question and ask the next question. We need to manage and we need to manage now, and we need data and information to manage, and yet getting data and information takes time and money. So when we get make sure we use it well – part of that means making sure we ask the right questions, and in this case I am sure she had.

Then we had the Kermit session so well presented by Ms Wendy and Mr Rod Sherlock, Friends of Winton Wetlands. I use this phrase as so many people just love the frog thing. It more than resonates, it grabs them, and it sells with communities. And in this case we had the technology to record the frog voices in the field and then we can identify them with 'audio libraries'. It's just fantastic. And we can keep doing it, as long as we have support, and the enthusiasm that frogs engender.

Luisa Perez then continued the systemic enquiry and modelling ideas introduced by Catherine Allan when considering complex systems. These ideas seem to me about ensuring we do the obvious that we often don't do, especially in the history of NRM and conservation alike. Maybe I exaggerate a little, but understanding the systems and their components and keeping in mind that people are in there as well does seem all very obvious. But don't be beguiled into a sense of complacency, it is not easy – we the people are not all that easy to deal with. And doing it in a systemic way so that we can make sense of it and enable the connections and the storylines and sharing of different knowledges and engaging our volunteers and scientists are all part of it. We went through another journey this time and it was fast and based on conceptual models that were corroborated by feedback from local people. That is actually novel and it would be great to see it become routine.

Jane Roberts continued on the connections – connecting pathways she called it. The thought I had about the work they were doing came when she mentioned feasibility. I did go off on a tangent with this about what information do we need to manage? What are the management targets or goals? Can we reach them? Will we know unless we monitor, and make use of the information derived from the data? Is it all feasible?

And keeping in mind that we are dealing with complex systems, and we need to keep it simple, and may not know what will really happen at any point in time unless we do the monitoring, and have our communities on board. These points I like and again they are not new, but I think we at least do get that they are important. This forum has shown us that.

And that is it from me. I need to hand over for the official closing and vote of gratitude to all participants, but let me also thank you all for participating, not just attending. I enjoy these events and I hope you do and that you will come back again, and bring your connections and stories with you. Thank you

6. Appendix 1: Attendees

Name	Organisation
Adrian Martins	
Adrian Twitt	
Alan Monger	
Ash Hurd	
Damien Crute	
Daryl Snowdon	
Gayle Partridge	
Jayson Pratt	
Jodi Price	
John Bye	
Kristie Crute	
Larissa Montgomery	
Maggie Hollins	
Matthew Smith	
Rene Martens	
Robbie Alexander	
Robert Chatfield	
Scott Draper	
Stephen Routledge	
Susan Campbell	
Alistair Cameron	Alistair Cameron Environmental
Robert Baird	Biosis
Dr Catherine Allen	Charles Sturt University
Daniel Svozil	
Dr Dale Nimmo	
Dr Lee Baumgartner	
Dr Luisa Perez	
Max Finlayson	
Prof Luiz Silva	
Andrew White	Deakin University
Dr Kimberley James	
Daniel Pendavingh	DELWP
Geoff Sutter	
Jane Roots	
Sue Berwick	
Birgita Hansen	Federation University
Dr Jessica Reeves	
Dr Michelle Graymore	
Dr Michelle Casanova	
Geoff Barrow	Friends of Winton Wetlands
Matt Looby	
Rod Sherlock	
Wendy Sherlock	
Keith Ward	GBCMA
Tim Barlow	
John Pettigrew	Goulburn Murray Water
Dr Stuart Blanch	Hunter Wetlands Centre Australia

Name	Organisation
Joe Pera	JP Scientific
Dr Jane Roberts	JR Consulting
Dr Ben Gawne	MDFRC
Dr Michael Shackleton	
Dr Paul McInerney	
Daniel Martin	Melbourne University
Lisa Brassington	Mornington Peninsula Shire
Jane Young	NECMA
Dr Neil McCarthy	
Alison Ballard	Winton Wetlands Committee of Management
Dave Malone	
Jim Grant	
Julie Flack	
Lance Lloyd	
Rina Cooper	
Dr Rob Carolane	
Sue Lebish	
Tammy Atkins	
Lee Joachim	Yorta Yorta Nations Aboriginal Corporation

7. Appendix 2: Speakers' Presentations