

Special National Water Week 2007 Edition

celebrating water research in the Water Research Cluster
at the University of Adelaide

As the Prime Minister declares that the Murray-Darling Basin is in drought crisis, and every capital city in Australia investigates desalination as the short to mid-term alternative water source, research on smart water management and use is more than ever in demand. The Water Research Cluster continues to develop partnerships for research projects in water-related fields, and to promote knowledge of current water issues. This Newsletter particularly celebrates events associated with National Water Week 21-27 October, and the work of the Water Research Cluster and its partners, as well as summarising the context for water management.

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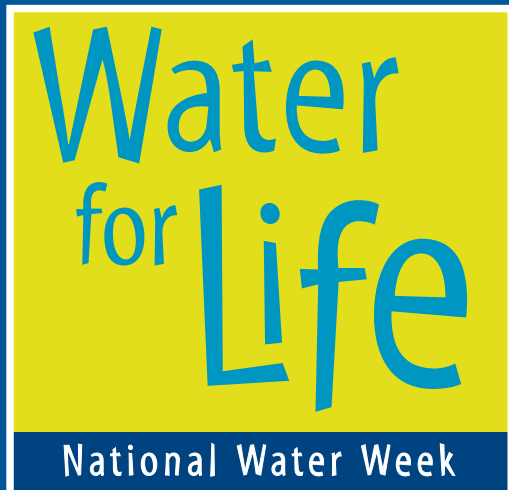
Dry wetland bed of Banrock Station Main Lagoon, with potential annual water savings of 1.15 GL (Photo: Anne Jensen)

National Water Week Activities

To celebrate National Water Week, the Water Research Cluster is hosting two special events.

Water Wednesday on 24 October will feature the Minister for the River Murray Karlene Maywald and other invited speakers addressing future water security for South Australia.

Water Pitchfest on 25 October, in conjunction with the Water Industry Alliance, will bring water-smart ideas to the attention of potential clients, with a quick 'teaser' presentation of new technologies, followed by demonstrations and information available during an informal networking session.



National Water Week 2007

Sunday 21 to Saturday 27 October

<http://www.nationalwaterweek.org.au/>

National Water Week is an annual event held every October in Australia since 1993. During National Water Week, Australians are encouraged to Protect, Conserve and Get Involved in water resource management. Now, Australia cannot sustain an ever-increasing use of water. We are reaching the limits of our available water resources. As a community we need to find solutions. As individuals, we can all help to protect and conserve our water resources.

Water Wednesday The Future for Water in South Australia

6:15pm – 7:30pm

Wednesday 24 October 2007

Napier Lecture Theatre G04
Napier Building,
North Terrace campus,
University of Adelaide

**What are the options for
South Australia in the future?**

Hon Karlene Maywald
Mr Chris Stathy
Assoc Prof David Paton
Dr Rod Oliver

Presented by Water Research Cluster

Places limited

RSVP: Fri 19 Oct

kate.reinfeld@adelaide.edu.au

Water Pitchfest Emerging Technologies in Water Management

5.30pm – 7.30pm,

Thursday 25 October 2007

Sebel Playford Hotel Ballroom,
120 North Terrace, Adelaide

**New exciting options to
manage water smarter**

- Desalination
- Filtration
- Sensors
- Leak detection

Presented by Water Industry Alliance
and Water Research Cluster

Places limited

RSVP: Fri 19 Oct Jenny Brown

admin@waterindustry.com.au

New Water Expertise

The Water Research Cluster welcomes Associate Professor Bo Jin, who recently joined the School of Earth & Environmental Sciences and will add to our existing strength in the area of water research. Bo is particularly interested in the design and implementation of chemical and biological processes in wastewater treatment, water reclamation and resource recovery and brings with him six postgraduate students. The new group is known as the Water Environment Biotechnology Laboratory (WEBL).

From Wastes to Riches: Integrated Bio/nanotech-Process for Resource Recovery and Waste Treatment

 from Assoc Prof Bo Jin

The research group Water Environment Biotechnology Laboratory (WEBL) was established at the University of South Australia in 2004 and will continue with the University of Adelaide from 2007. Associate Professor Bo Jin is the founder and director of the WEBL. The mission of the WEBL is to develop innovative and advanced bio/nano-technologies for transformation of waste streams into renewable biomaterials/energy, and for sustainable reclamation and reuse of wastewater. The WEBL is a unique national research group in a leading position for developing integrated biotechnological process for production of value-added biomaterials/energy from waste streams.

The research areas in the WEBL include:

- integrated biotechnological process for production of renewable biomaterials/energy from organic waste streams
- advanced technology for tertiary wastewater treatment
- biological, chemical and physical processes in wastewater treatment, reclamation and reuse.

The WEBL team is carrying out 8 research projects, including 5 projects funded by Discovery and Linkage Grants from the Australian Research Council:

1. An integrated biotechnological process for production of lactic acid from carbohydrate-waste streams by *Rhizopus* sp.
2. Fungal biomass protein, protein animal feed from treatment process of starch processing and winery wastewater.
3. Biological hydrogen production from biomass wastes using activated sludge microorganisms.
4. Production of biodegradable polymers using advanced biological wastewater treatment process technology.

5. Solar nano-photocatalytic disinfection and mineralization of treated wastewater from sewage treatment plant
6. Innovative nano-technological treatment process for reclaimed wastewaters
7. Biotransformation of sugar cane and winery wastes into protein-rich animal feed.
8. Fate of pathogenic micro-organisms and indicators in secondary activated sludge wastewater treatment plants.

The WEBL is equipped with high standard facilities for research and technique service in:

- Biological and chemical water and wastewater treatment
- Fermentation technology
- Organic and inorganic analysis for liquid, solids and gas
- Water and wastewater microbiology.

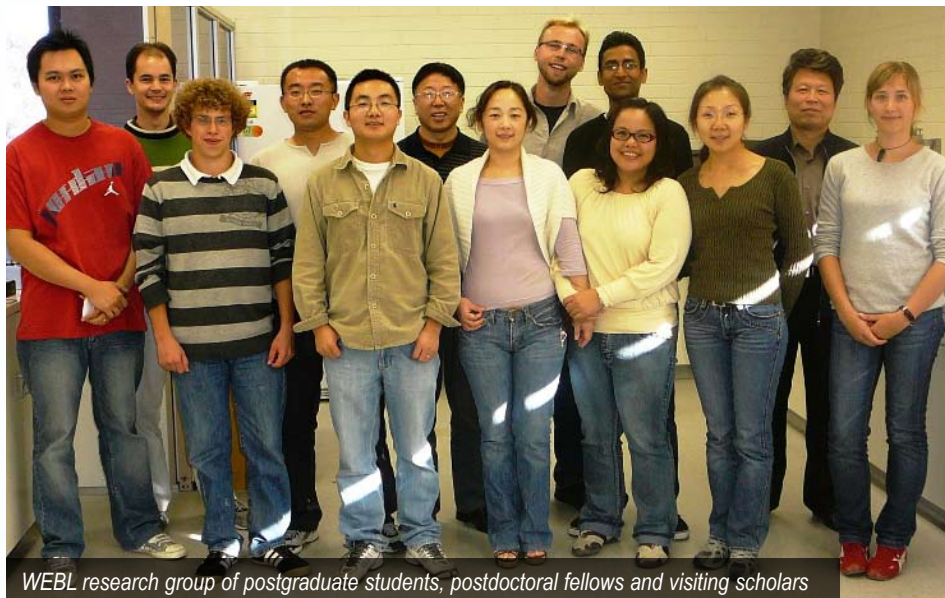
Contact: Associate Professor Bo Jin
Tel: (08) 8303 7056
email: bo.jin@adelaide.edu.au



Associate Professor Bo Jin with bioreactor



Mr Zhanying Zhang



WEBL research group of postgraduate students, postdoctoral fellows and visiting scholars

Lower Murray Landscape Futures project completed

The Lower Murray Landscape Futures project has recently completed a comprehensive, integrated and evidence-based assessment of the future landscapes that could result from achieving current targets.

The project has focussed on the Lower Murray region which includes the:

- South Australian Murray Darling Basin Natural Resource Management region
- Victorian Mallee Catchment Management Authority region
- Victorian Wimmera Catchment Management Authority region
- New South Wales Lower Murray-Darling Catchment Management Authority region.

A multi-disciplinary team was marshalled across participating state government agencies, research organisations and regional bodies. The project was initiated by the Land Technologies Alliance, a joint venture between the University of Adelaide, CSIRO, DWLBC, SARDI and the Department of Primary Industries in Victoria. It was funded by the National Action Plan for Salinity and Water Quality in South Australia and Victoria, and had major in-kind support from CSIRO Water for a Healthy Country.

Key findings from the project are summarized below:

- Regional leaders and policy makers could have as much influence on landscape futures as climate change and commodity prices.
- Taking a strategic spatial targeting approach could result in up to a doubling of the efficiency of the NRM actions. This is profoundly different to not taking a strategic spatial approach which is likely to result in significant social and economic costs for the region.
- The key to efficiencies gained through the strategic targeting of specific actions in specific locations in the landscape is in capitalising on the ability of some actions to achieve multiple environmental benefits, and to minimise economic costs and/or generate economic income.
- Climate change presents both challenges and opportunities for the region. Achieving natural resource condition targets under some climate change scenarios is likely to be less costly or even economically and socially beneficial compared to futures where climate is stable at current levels.
These benefits or reduced costs may come if new industries are established and prices for carbon, biomass/biofuels are high. Additional benefits may come from the impact of a warmer, drier climate on environmental problems resulting from deep drainage and river salinity.
- Innovative approaches and economic incentives for the adoption of natural resource management actions can substantially reduce the cost of achieving regional targets, especially if climate and commodity prices remain at current levels.
- Taking a holistic, evidence-based approach to analysing future landscapes provides a constructive critique of existing regional plans and targets and broad recommendations for future policy and implementation enhancements.
- It is possible and profitable to strive for a sustainability ideal for the region. The right policy options within all futures generate substantial positive flow-on effects for the region and benefits for multiple environmental objectives.

Research Tuesdays, University of Adelaide

There's a hole in the Bucket

Tuesday 9 October 5:30 pm

Napier Building, University of Adelaide
North Terrace campus

Prof Mike Young, Professor of Water Economics and Management, School of Earth & Environmental Sciences, University of Adelaide

As one of Australia's leading water policy reformers, Mike Young will address questions about arguably Australia's most precious resource:

- Why has so much of Australia and, more particularly, South Australia run out of water?
- How many holes are there in the bucket?
- Has the bucket got smaller?
- What can science and policy analysis tell us about the problems we face?
- With what shall we fix it?
- How innovative can we be?
- Could South Australia become internationally renowned for its capacity to manage water?
- What would governments, businesses and the community have to do?

Bookings are essential and can be made via

Phone: 8303 3692

email: research.tuesdays@adelaide.edu.au

- The landscape futures analysis framework can be adapted to different regions with different natural resource management and planning issues, and with different physical and biotic, economic, and social environments.
- Even with the establishment of new industries and incentives, and the use of highly targeted approaches, public payment of farmers will probably still be required to motivate widespread natural resource management. This could be a payment for the provision of ecosystem services from multi-functional landscapes.

For more information contact:

Prof Wayne Meyer, University of Adelaide

Ph: 08 8303 8100 wayne.meyer@adelaide.edu.au

Dr Jeff Connor and Dr Brett Bryan, CSIRO Land and Water

Ph: 08 8303 8784 jeff.connor@csiro.au or brett.bryan@csiro.au

Dr Chris Pettit, Department of Primary Industries

Ph: 03 8341 2407 christopher.pettit@dpi.vic.gov.au

* podcasts of presentations on this project can be downloaded from the Living Laboratories section of the ICE WaRM website:

<http://www.icewarm.com.au>

The website will be available shortly at

<http://www.landscapefutures.com.au>

Water Research Cluster Profile: Professor Martin Williams

Martin Williams is a geomorphologist interested in landscape responses to climatic change. He has worked extensively in Australia, Africa and Asia, where he has been investigating the response of rivers like the Nile, the Murray-Darling and the Ganges to climatic fluctuations during the last thirty thousand years, including the impact of El Niño Southern Oscillation events. He is also researching the causes and consequences of and solutions to desertification in China, Africa, Central Asia and Australia. He is author of over 200 research papers (eleven in *Nature*), reviews and reports and author or editor of eleven books, including *Interactions of Desertification and Climate* (Arnold, London, 1996) and *Quaternary Environments* (Arnold, London, 1998, 2nd edition), also translated into Chinese.



Prof Martin Williams (left) and colleagues in the field (Photo: Martin Williams)



Meroitic ruins east of the Nile, Northern Sudan, dating from 2000 years ago, when the Nile valley was less arid. (Photo: Martin Williams, 2005)



Bed of former lake west of main Nile, northern Sudan. The lake was fed from overflow from the Nile during a period of exceptionally high floods 9000-7000 years ago. (Photo: Martin Williams, 2005)

His work has taken him to the heart of the Sahara and to all parts of the Nile basin, where he spent several years mapping soils along the Blue and White Nile. As a result of this early work he realised that the physical and chemical properties of the soils being developed for irrigated agriculture had little to do with present-day climatic gradients and in fact reflected the depositional history of these two great rivers. In a region where water is limited, such knowledge is vital for implementing land use policies that will not aggravate existing salinity problems.

He continues to work in this region and most recently has been advising and helping to train Sudanese land and water managers during his regular visits to the Sudan.

Of special interest is the apparent increase in the frequency of extreme rainfall events in the northeastern quadrant of Africa, in line with predictions from the latest global atmospheric circulation models discussed in the 2007 reports of the Intergovernmental Panel on Climate Change. Since both the Nile and the Murray-Darling basin show a similar response to past climatic changes, as do the rivers of central India, it will be instructive to extend the limited historical flow record of the Murray by using the thousand year flood record from the Nile.

There is also scope to obtain a relatively detailed ten thousand year record of extreme floods in the Nile, against which to view current events. The key question here is at whether we are dealing with natural variability or a step-function change to altered hydrological conditions.

Footnote: Professor Martin Williams, Foundation Professor of Environmental Studies, has just been awarded the Royal Society's highest honour, the Verco Medal, for his outstanding research on landscape evolution and climate change.

Water Research Cluster Activities

CLLAMMecology update– Key Species (Birds) Project From Research Fellow Dr Dan Rogers

The broad aim of the Key Species project within CLLAMMecology is to develop “response curves” of key flora and fauna species to environmental parameters, such that the responses of these species to in situ environmental change can be predicted. The development of such curves are especially important in the absence of environmental flows into the Coorong, which would provide a more holistic measure of these species responses.

The Coorong’s avifauna are icons for the system, providing an important avenue for community engagement. Within the Key Species project of CLLAMMecology, the Bird Ecology group aim to understand how key bird species respond to environmental change in both space and time. Unlike other biotic components of the system, birds rarely respond directly to variation in physical parameters; rather their responses tend to be indirect and relate to the response of key food species.



For example, key piscivorous species such as Australian Pelican and Fairy Tern respond to changes in the physical environment through their effect on the distribution and abundance of fish species. However, different bird groups will obviously respond differently to changes in the physical environment: shorebirds (including migratory shorebirds) are likely to respond as much to changes in the distribution of mudflats (which, in turn, are related to bathymetric profiles and water depth, the latter of which is controlled by the Coorong’s hydrology), as to the distribution of food items within these mudflats.



Part of the challenge of predicting the response of birds to environmental change comes from their relative mobility. The challenge arises from two fronts. First, mobile organisms are able to (and do) make habitat choices at scales that are broader than single ecosystems (such as the Coorong), and probably make these choices based on relative habitat quality from what’s available. For example, a decline in the abundance of a bird species on the Coorong might reflect an increase in habitat quality elsewhere within the species’ range, rather than any change in habitat quality in the Coorong (incidentally, this example is unlikely in most cases – the decline of the Coorong is well documented!).

In the short-term, this can be seen for the nomadic Banded Stilt, whose Coorong population numbered tens of thousands last January, before dropping to zero following the flooding of inland ephemeral wetlands. Second, changes in the population size of a species on the Coorong might reflect the impact of habitat modification elsewhere within the species’ range. A striking example comes from the migratory shorebirds, that overwinter on the Coorong, but breed in the northern Arctic, and travel through eastern and south-east Asia on migration. Interannual changes in Coorong population size might be as much to do with changes in the habitat quality of any (or all) of these areas, in addition to changes in the Coorong. This problem can be overcome by comparing the size of the Coorong population with global population estimates through time, but these global population estimates are not necessarily accurate, or regularly updated.

And so, in addition to trying to predict the response of key bird species to environmental change in the Coorong, the Bird Ecology group has also made some effort trying to determine alternative response parameters, in addition to measures of abundance. Given the importance of the Coorong as a food resource for many species, this effort is focussed on the foraging performance of these species in the Coorong, and how this might respond to environmental change.



UK Perspective on River Murray Drought

It was a challenging exercise for Water Research Cluster members Mike Young and Anne Jensen to convey the complexities of the Murray-Darling Basin and the current drought to English journalist Claire Scobie and free-lance photographer Michael Amendolia. Mike and Anne were among the people contacted to contribute to the article ‘A River Ran Through It’ written by Claire for ‘The Observer Magazine’ published on 5 August in the UK.

The resulting article was an interesting mix of environment, hydrology and human perspectives. <http://observer.guardian.co.uk/magazine/story/0,,2140121.00.html>

One Degree Special Series

The Advertiser special series One Degree in August 2007 featured input from several members of the Water Research Cluster. Ten detailed supplements were published over 2 weeks.

Prof Peter Cullen of the Wentworth Group of Concerned Scientists and former Thinker-in-Residence, listed the top five things he would like to happen to protect the precious resource of water (Part 6, Precious Resource). These were:

1. Implement the National Water Initiative to measure and control water in Australia
2. Conduct research on connections between surface water and groundwater to demonstrate their links as a basis for allocation and management
3. Use water more efficiently
4. Return over-allocated systems to sustainable levels of extraction
5. Increase water planning to identify future sources of water.

Postgraduate Anne Jensen contributed an article on reducing consumption, with a particular focus on the 'virtual' water in food production (Part 6: Precious Resource). With 16,000 L to produce 1 kg of beef, eating more vegetables is healthy for the environment as well as being healthy. It is estimated that Australians waste 20% of food purchased, including the 'virtual' water used to produce it.

Prof Wayne Meyer also described the food water footprint in his article looking at sources of food and fibre (Part 9: Life Support). He calculated that for a typical daily diet of 10,776 joules of energy, 11,400 L of water is needed to produce it. While the current household and food footprint in China is 700,000 L per person/y, it is over 2 million L pp/y in the US and at a similar level for Australia.

Assoc Prof Keith Walker wrote of gathering alarm about the health of the River Murray ecosystem under increasing levels of water diversion and disruption to natural flows (Part 10: Our Future). He states that the ecological report card for the Murray is not encouraging, and that water is a pre-requisite for recovery. The decision on how much water will be returned rests with the community, and with the opportunity presented by the new Basin authority under formation.

In a supplementary section to Keith's article, Postgraduate Anne Jensen described the successful changes to the water regime at Banrock Station Lagoon, which has been dried out and returned to a more natural wetting and drying cycle. The dry bed of the lagoon has cracked and dried, aerating the soil and collecting seeds in the cracks. When the lagoon is refilled, nutrients are released from the bed, to start the food chain again.

Also in Part 10: Our Future, Assoc Prof David Paton described the rapid and startling changes in the Coorong, where the Southern Lagoon has changed state in the past decade, becoming 5-6 times saltier than the sea. Since 2005 no fish have been found, and brine shrimps have appeared for the first time. This dramatic change has eventuated as a result of several years of no inflows of fresh water from the River and the reduced tidal exchange through the restricted Murray Mouth (now only kept open by dredging). Food sources for migratory waders have almost disappeared and feeding areas are restricted by the lack of tidal movements. The Coorong is on life-support and will only survive with inflows of River Murray water bringing fresh water, nutrients and fine sediments.

Water Droplets

Prof Mike Young and Jim McColl continue to produce their series of Droplets, which are short discussion papers on water management issues. Droplets explore ideas and propositions which, if developed further, might improve water use. Ideas are explored from a fundamental perspective. They search for the building blocks and concepts that one might consider using if one was able to start without being constrained by prior decisions.

Droplet No 8 presents 'The unmentionable option: Is there a place for an across-the-board purchase?'. This Droplet examines the proposal in the National Water Plan to buy up to \$3 billion of water, which would buy 1,500GL of high security water, as recommended by scientists for halting the decline in river health. However, the largest amount of water traded in one year is less than 100 GL, so there is not sufficient water available in the current market.

The concept of across-the-board pro-rata buy-back of a proportion of water allocations is explored, with a 2-year fee-free period for irrigators to assess their options and elect either to stay in irrigation with upgraded technology, or to use their payment to move to alternative sectors. This option would give local communities an injection of funding while allowing irrigators sufficient funding to make objective choices.

Earlier Droplets on options for the new basin authority, urban water trading, water governance, water interception, water accounting, water trading and stormwater management can be read at

www.myoung.net.au

Comments are welcome.

The aim is to encourage people to think differently about water management. If you would like to subscribe to the Droplet list, send an email to droplets@adelaide.edu.au or go to the website at www.myoung.net.au

Mike Young is Professor of Water Economics and Management School of Earth & Environmental Sciences, University of Adelaide and CSIRO Water for a Healthy Country Flagship

Update on algal bloom in Lake Taihu, China

In the May Newsletter, postgraduate student Grace Chan reported on the worst-ever blue-green algal bloom on Lake Taihu, the third largest freshwater lake in China. Assoc Prof Peter Gell of the Water Research Cluster has also visited the lake recently, and supplied pictures of the bloom to demonstrate its severity.



Water hyacinth mixed with Mycrocystis algal bloom on Lake Taihu (Photo: Peter Gell)



Blue-green algae disturbed in boat wash on Lake Taihu (Photo: Peter Gell)

Water News Updates

Water issues continue to dominate news, with constant changes and political announcements, so only brief summaries are given here, and some key reports have been posted along with the Newsletters on the Water Research Cluster website <http://www.water.adelaide.edu.au>

National Plan for Water Security

Given the refusal of Victoria to sign up to the \$10 billion water plan, the Commonwealth used existing constitutional powers relating to corporation, external affairs and interstate trade to set up the new Murray-Darling Basin authority. However, the new independent, expert-based authority will not have the same level of power as originally proposed, and will be limited to setting a basin-wide environmental strategy, salinity plan and water cap. It will not get involved in river operations or seasonal allocations of water. The National Plan for Water Security for the Murray-Darling Basin was passed with bipartisan support in August 2007. The Bill includes an enhanced role for the Bureau of Meteorology in measuring and monitoring water resources. A key concession to gain passage of the Bill was a promise to the National Party that there would be no compulsory acquisition of water allocations. Victoria is still considering a challenge to the Bill in the High Court.

Wentworth Group economist Mike Young pointed out that there are not enough willing sellers in existing water markets to meet the demand to buy back \$3 billion of water to recover 1500 GL. He suggested that a more comprehensive package of options will be needed to achieve effective and efficient outcomes. Arlene Buchan of the Australian Conservation Foundation warned that compulsory buybacks may still be necessary if reform is not rapid enough.

As part of the \$10 billion plant, the Federal Government has announced \$52 million for improved knowledge and management of groundwater resources, which provide up to 30% of water resources. Emphasis will be placed on understanding links between surface water and groundwater systems.

Sources: *Enviroinfo* 26 July, 23 August, *Indaily* 19 September, *The Australian* 23 July, 6 August, *Sydney Morning Herald*, 30 July

Murray-Darling Basin Dry Inflow Contingency Planning

The impacts of the continuing drought are becoming more serious, with the situation in the Murray-Darling Basin declared critical in the latest Dry Inflow Contingency Planning Report. In response to the third edition of the Report, the Prime Minister has increased drought assistance to irrigation communities, and the Opposition has offered bipartisan support. The situation is summarized over the three contingency planning reports, including a useful list of 45 FAQs in the first report. Five principles have been adopted for contingency planning of water management in 2008-2009:

- maximum use will be made of markets
- reserves will be held for river operation and delivery, including 696 GL for dilution flows to SA
- reserves for South Australia will be stored upstream
- key decisions to be made by the Murray-Darling Basin Commission in September 2007
- carryover provisions have been widened and extended.

Victoria is currently objecting to the proposal to store 200 GL contingency reserves for South Australia. Murray-Darling Basin storages remain are only at 20% capacity, compared to the long-term average of 66%

capacity for this time of the year. Long term average inflow is 11,000 GL, but the past 6 years have averaged only 4,200 GL, with 1,211 GL in 2006-2007. The total River Murray system inflows to South Australia in 2007-2008 (excluding Snowy Releases) are expected to be about 330 GL, which is significantly below the long-term average for this time of the year of about 1,500 GL.

Report 1 April 2007:

<http://www.environment.gov.au/water/publications/mdb/pubs/dry-inflow-planning.pdf>

Report 2 May 2007

<http://www.environment.gov.au/water/publications/mdb/pubs/dry-inflow-planning-may07.pdf>

Report 3 September 2007

<http://www.environment.gov.au/water/publications/mdb/pubs/dry-inflow-planning-sep07.pdf>

Angry irrigators from Sunraysia are threatening to march on Canberra to draw attention to the drought crisis and the erosion of their water rights. They are considering class action against Governments for incompetent management of water resources.

Source: *ABC News* 18 September

Urban water utilities report card released

Every capital city except Hobart will be forced to find new sources of water, according to a new report by the Water Services Association of Australia. The annual report card, which covers all urban water utilities in the last financial year, shows inflows reduced by up to 80 per cent, especially in Melbourne and Canberra. Despite the reduced inflows, the report finds that ongoing harsh water restrictions will not be accepted by the community and the challenge is to develop reliable sources of water in capital cities in a sustainable manner. The report concludes that climate change is reducing inflows into storages and rapid population growth present significant challenges to the Australian urban water industry. The report can be viewed at <https://www.wsaa.asn.au/frameset2.html>

Source: *Enviroinfo* 23 August

Melbourne to remain on rations

Melbourne will remain on stage 3a water restrictions until the end of September, when they will again be reviewed. Melbourne's water storages are up to 34.3 per cent capacity. Melburnians have so far been spared an upgrade to tough level stage 4 water bans, despite earlier reaching the trigger-point of 29.3 per cent capacity. New 3a water bans, which include restrictions on watering gardens and sports grounds plus a ban on car washing at home, were introduced in Melbourne on April 1.

Source: *AAP: Indaily* 20 July

Water Emergency in South Australia

Prof Mike Young and three other members of the Wentworth Group of Concerned Scientists warned that South Australians need to drink recycled sewage, recycle stormwater and consume 50% less to safeguard water supplies for the future. Mike Young said all options to source water must be examined. Prof Cullen said water from rivers would become 50% less reliable. Peter Cosier said South Australian can demonstrate world's best practice in water management to promote reforms in the Murray-Darling Basin. Prof Bruce Thom promoted recycling as a reliable water source, requiring much less energy than desalination.

Source: *The Advertiser* 5 September

South Australian River Murray situation

River and lake levels are falling in South Australia as the inflows to the state are exceeded by extraction and evaporation rates, although pool levels are still being maintained at present above weirs. The level of the River below Blanchetown will fall by 0.75 m by the end of summer 2007-2008. Salinity will rise to levels significantly higher than recommended drinking standards for the pumping off-takes, and water levels will be too low and too salty for irrigation pumping around the Lower Lakes. There is a significant risk of widespread losses of permanent plantings, with associated economic losses spreading into local communities. Once permanent plantings are lost, recovery times are 3 years for grapes and 10 years for fruit trees.

Forecast flows for 2007-08 and probabilities of improvement for River Murray allocations are:

Predicted improvement for River Murray allocations				
Scenario	Predicted flows to SA by June 2008(GL)	October 2007 (%)	December 2007 (%)	February 2008 (%)
1. Worst-case conditions	815	16	16	16
2. Dry conditions	1250	16	18	20
3. Average	1370	30	32	41

Inflows in 2007 are less than half of those in 2006, with ever-reducing chances of substantial inflows before summer. The continuing record low inflows in the Murray-Darling Basin are shown at http://www.dwlbc.sa.gov.au/assets/files/RM_update14sep07.pdf

The chance of exceeding the median rainfall for the September to November period across north-eastern Victoria (where significant inflows would normally enter the River Murray) is between 40-45%. The chance of above-normal maximum temperatures is between 55% and 65% for much of the southern Murray-Darling Basin. This is worrying because if temperatures are high, evaporation rates and crop water requirements will increase. http://www.dwlbc.sa.gov.au/assets/files/RM_inflows_salinity_rainfall_charts.pdf

Allocations are currently being managed under special sharing rules, which divide the limited volumes available from storages equally between South Australia, Victoria and New South Wales. The allocations will be updated each month, as outlined in the Drought Water Allocation Policy.

Lake Alexandrina continues to fall, as evaporation exceeds inflows. Salinities are rising due to reverse leakage at the barrages. The ongoing condition of the Lower Lakes can be seen at <http://e-nrims.dwlbc.sa.gov.au/monitoring/lakes>

Infrastructure Partnerships Australia report

Water restrictions could be lifted within 5 years in all capital cities, if infrastructure priorities recommended by Infrastructure Partnerships Australia are adopted. Actions relating to water supplies include charging more for water for non-essential purposes, using private investment to expand supplies through desalination and recycling projects, and allowing trading between county and city.

Source: *The Australian* 30 July

NSW Irrigators run out of water soon

NSW irrigators on Murray-Darling Basin tributaries are expected to run out of water in 6 weeks. The current price of water is 10 times higher than one year ago.

Source: *ABC News* 25 September

Decision on temporary Wellington weir delayed

The Minister for Water Security has delayed the decision date on the building of a temporary weir below Wellington to 'enable a full environmental assessment of the structure to be completed'. As a result of the new decision date, the government's application for an exemption under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) is no longer necessary. Instead, the state government has provided a referral to the Federal Government so that the appropriate level of environmental assessment for the proposed weir can be determined.

Source: http://www.freehills.com.au/publications/publications_6931.asp#SouthAustralia

Environmental Water Allocations

Proposals for environmental water allocations are rousing angry reactions from irrigators with little or no water for their own use.

The plan by the Murray-Darling Basin Commission to purchase 20 GL towards the 500 GL First Step target attracted criticism from farmers, who are concerned that this will force up the price of water. The MDBCC said the volume was too small to have a significant effect on prices.

The Victorian Environmental Assessment Council has recommended conservation measures for 100,000 ha of Victorian river red gum forests, including purchase of 4,000 GL of water for flooding every 5 years. It is recommended that cattle grazing and logging be banned, and other impacts regulated. There has been a very negative reaction from regional communities, who see the forests as competing for water. Conservationists see the recommendations as the only way to reverse the currently high levels of stress and death in the forests. Irrigators claim that the recommendations pose the greatest threat in history to the entire irrigation industry and regional economies of the Murray and Goulburn Valleys. Comment on the VEAC recommendations has been extended to 12 October.

Sources: *ABC Rural* 17 July; *The Age* 2 September

Darling flows a mixed blessing

After about seven years of drought and nearly a year of no water flows, the Darling River is finally running again. Initial flows in the Darling River stopped 10 km upstream of Wilcannia, but further flows from the Border Rivers are following the first peak and are expected to reach the Menindee Lakes. The quality of the first flows is of concern, with high salinity levels and nutrient pollution, as residual pools are flushed out by the small flow event. Richard Kingsford from the University New South Wales says what is needed now is a good flood to flush the system. "What will happen in a river system is you get a decent flow coming through so the salinity would be incredibly diluted, but we've been through such a dry period and the salinity has built up in those residual pools left in the system," he said.

Sources: *ABC Western Plains* 17 July, *ABC News* 28 August

South Australian Irrigation Allocations update

The status of water supplies in South Australia is being reviewed on a monthly basis, as prescribed in the Drought Policy. Irrigation water allocations were increased from 4% to 13% from 2 August, but outdoor watering bans continued through into September. Rainfall continued below average for both the Mt Lofty and Murray-Darling Basin catchments. Emergency pumping of Murray water to the Mt Lofty reservoirs provided most of the 78% capacity by late August.

The SA government announced in early September that a desalination plant would be built, and the capacity of Mt Bold would be extended. Owing to recent small inflows to Mt Lofty storages, restrictions on domestic watering will be eased from 1 October, and irrigators will be increased to 16% of allocation. (However, 48% of allocation is needed just to keep permanent plantings alive, even without producing a crop).

The situation led to calls from the Australian Democrats for action to wean Adelaide off Murray water, with rebates for grey water use, and incentives for rainwater harvesting. A South Australian parliamentary enquiry will be held by the Natural Resources Committee into sustainable use of Murray-Darling Basin water, both in SA and in upstream states.

The Liberal party proposed a 19-point plan to reduce reliance on Murray water through a desalination plant and recycling, claiming that the strategy could produce 132 GL for Adelaide each year. The Greens introduced legislation to require SA Water to set an annual water conservation target. Independent MP Nick Xenophon is preparing a bill to require investment of SA Water profits into water infrastructure and future supplies. A survey published by the Australian Conservation Foundation found 94% of South Australians surveyed supported returning 1,500 GL of water to the Murray by 2014.

Concerns are being raised about likely increases in salinity with such low flows in the River Murray, with the Minister giving reassurances that even levels up to 1,500 EC are not a health issue. These levels would, however, seriously impact on production in vines and stonefruit, with losses of \$100 million predicted if salinity at Morgan reaches 1,000 EC. South Australia has banked 225 GL of water to be used as dilution flows if salinities get too high. Prof Mike Young said the River Murray is now in the worst state it's ever been, and is screaming for help.

The proposals to block off 9 wetlands from the South Australian River Murray, including Lake Bonney, was circulated again for 10 days of further comment after two Ramsar wetlands (Nelwood Swamp and Horseshoe Lagoon) were deleted from the list.

Dredging at the Murray Mouth will continue over summer. The dredging operation commenced in October 2002 and has removed about 5 million m³ of sand at a cost of \$27 million.

Sources: [Indaily 24 July, 2, 23, 24, 30 August, 4, 5, 6, 10, 11, 18 September](#); [ABC Online 17 July](#)

An animated model of the Wellington Weir structure is available as a YouTube video on <http://stopthe weir.com/>

Warrego Water Auctions

The proposed auction of 8,000 ML of water from the Warrego River in Queensland stirred cross-border antagonism and led to intervention by the Federal Environment Minister. A recent CSIRO audit indicated significant uncertainty over future flows due to climate change effects. The Warrego River feeds floodplains in north-west New South Wales, including the Cuttaburra Creek floodplain wetlands, which support up to 80,000 waterbirds.

Queensland claims that only 11% of flows will be affected, but Prof Richard Kingsford compares this situation to the impacts of the Cubbie Station development on the Balonne River. Previously, graziers have bought up licences to keep them away from irrigators, but now graziers are selling up. A trust of farmers and environmentalists has formed to raise funds to purchase the water, to prevent its diversion out of the river for use by irrigators.

Queensland halted the auctions for 2 weeks, while the matter was under discussion, but has now announced that the sales will not go ahead, although the water is 'reserved for future use'.

Source: [Sydney Morning Herald 1, 25 September](#); [The Age 14 September](#); [The Australian 25 September](#), [ABC Rural 11 September](#)

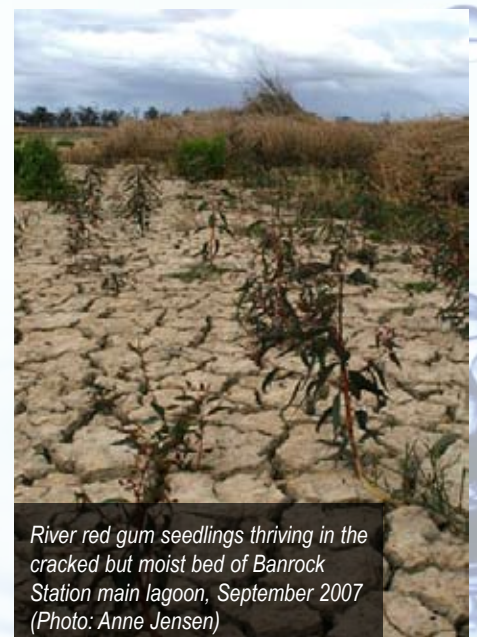
Demise of the Macquarie Marshes

A recent article by Gail Liston-Burgess in *Ecos* paints a gloomy picture of water management in the iconic Macquarie Marshes. In spite of all the investigations, plans and management agreements, as well as conservation under the international Ramsar Convention and protection as a state reserve, the Macquarie Marshes are losing their battle to survive. The worst destruction has occurred in the last 25 years, when conservation concerns were being debated. Even now, with the southern marshes dying and the northern marshes stressed, regional water users debate whether environmental allocations should be made. Blame is pointed to other groups, particularly between irrigators and graziers, while the Marshes appear to have reached a critical point, beyond which recovery is doubtful.

http://www.publish.csiro.au/?act=view_file&file_id=EC137p20.pdf

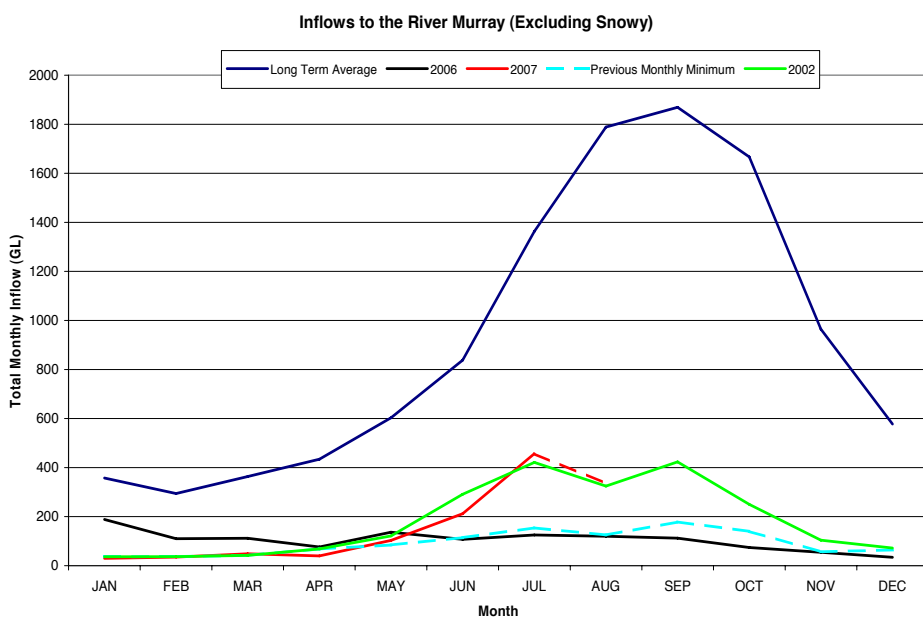
Increasing pressure by irrigation on ecosystems

A recent paper by Max Finlayson highlights the continuing irrigation demand and the negative impacts on ecosystem services which directly and indirectly underpin the livelihood and well-being of many people. The Millennium Ecosystem Assessment includes the Living Planet Index, which shows a decline of 50% in freshwater species since 1970. Max appeals for an integrated approach for managing land, water and ecosystems. He warns that ecosystem services will be lost if increased water demand is given precedence and we continue business as usual.

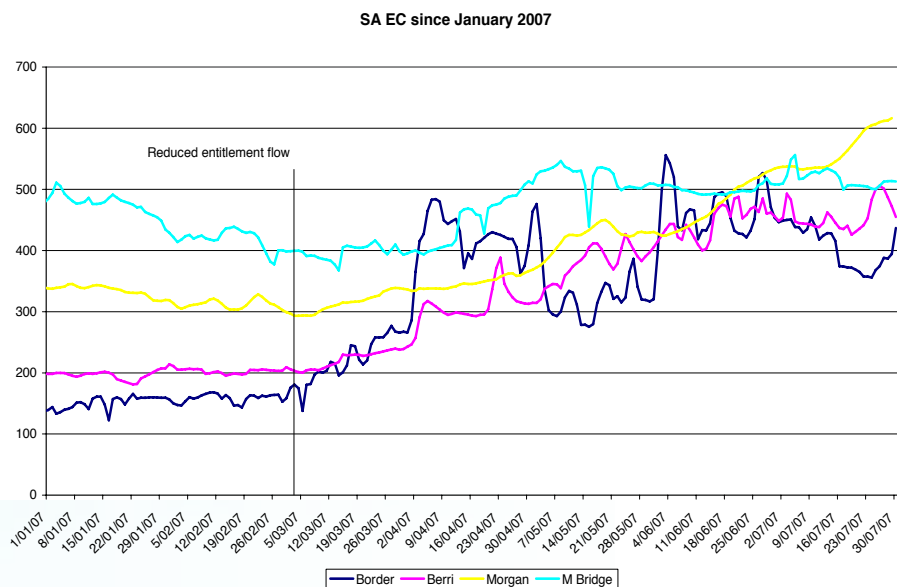


River red gum seedlings thriving in the cracked but moist bed of Banrock Station main lagoon, September 2007 (Photo: Anne Jensen)

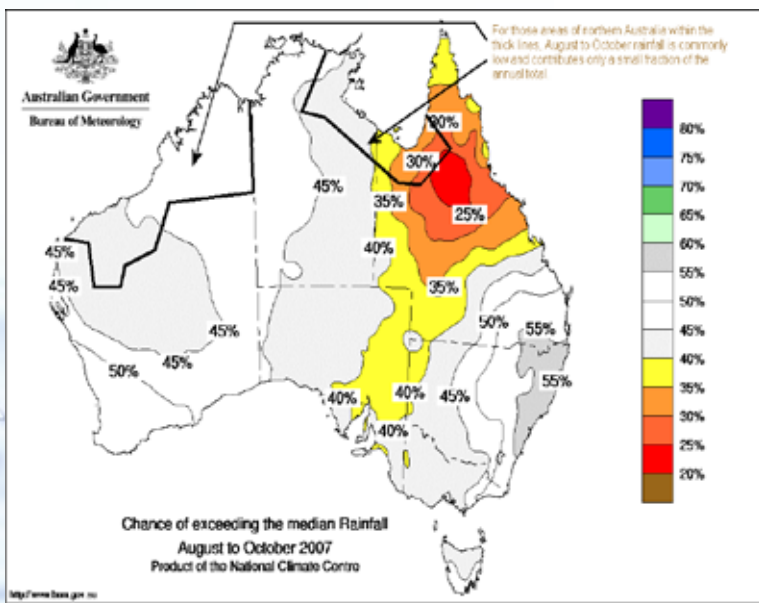
Inflows: Murray-Darling Basin currently tracking close to the 2002-03 drought year.



Salinity: As South Australia continues to receive low flows across the border, Murray salinity levels will also increase.



Rainfall: Forecasts are for below-average rain during spring right across the basin.



Next Water Research Cluster Postgraduate Forum

Field trip to Lower Lakes and Murray Mouth, plus Coorong
See the drought impacts for yourself!

Wednesday 28 November
8:00am – 5:30pm

Bus and lunch sponsored by Water Research Cluster
All Water Research Cluster postgraduates and other interested parties welcome
Bookings essential for a place on the bus!
RSVP 26 November to Paul Dalby
paul.dalby@adelaide.edu.au

Man and the Murray

*We dam it
With lock and weir
Then wonder why
It is not clear –
But thick with sludge and algae.
We concrete channels
And shore with stone –
Flooding it
When rice is sown –
Simply for selfish needs.
Altering nature
Altering flow
Leaving it
No place to go –
Other than the course we show.
It slows and drops
We wait in fear
For the mighty Murray
Has no peer –
Oh, what have we done?*

Roslyn Joy Ricci
June 2007
Water Poet of the
Water Research Cluster

Special Forum on Applying for Grants and Postdoctoral Positions

At the request of the Water Research Cluster postgraduates, a special forum was held to present advice on future opportunities for postdoctoral career development. The key presenter was Prof Graeme Hugo, who is a Champion in ARC Linkage Applications, as well as being an experienced reviewer of applications.

Graeme's very simple and direct advice was directly relevant to the postgraduate audience. He gave very useful statistics to illustrate the relative effort which should be given to different sections of applications, as well as guidance on deciding the appropriate target fund for a project.

Graeme emphasised the need for clear aims, clear methods, an accurate budget, readability of the application and clear outcomes. His presentation was very well received, and his willingness to share advice based on so much experience was very much appreciated.

Simon Brennan gave very pertinent information on the eligibility criteria for various grants and sources of important background information. He outlined the various support services available from the Research Branch for the applications process, and emphasised the need to prepare applications early so that internal review processes can identify any need for amendments before applications are submitted.

The postgraduates also very much appreciated presentations from three current postdoctoral fellows within the Water Research Cluster. Kane Aldridge, Land and Water Australia postdoctoral fellow, advised early identification of potential supervisors, and creation of opportunities by being included in team projects. He encouraged postgraduates to network, to meet authors of key papers, and to develop professional relationships.

Brian Deegan, postdoctoral fellow with the CLLAMMecology project, talked about techniques for preparing for interviewed positions, and emphasised the importance of thinking innovatively about the future potential research expansion in the position of interest.

Jennie Fluin, postdoctoral fellow with the Geographical and Environmental Studies Discipline, also talked about creating opportunities by presenting results to potential future clients. She advised of the long lead-times involved, and the low success rate on the most highly sought-after grants, such as ARC APD grants, with only 16% success. Jennie warned of the need for resilience, with many unsuccessful applications, but also talked of the advantages of the job and quality of research time, characterising the position as one 'where you are paid to think'!

The session concluded with a workshop conducted by Paul Dalby in his usual challenging style, where participants were asked to develop the outline of their personal plans for their future careers. Starting from the question 'how would you like to be introduced at an international conference in 10 years' time', postgraduates were asked to formulate targets, projects, strategies and the first draft of an action plan.

All attending agreed that it had been a very worthwhile event, with positive outputs for future application.

June Quarterly Forum: Science of Upper South East Drainage Project

The June forum looked at the integration of science into practical management in the Upper South East Drainage Project. Guest presenter Andrew Beal, Program Manager, gave an overview on how the natural resources management model has changed to become community driven and multi-disciplinary. He noted that true involvement of local people is harder work and takes longer, but is essential to get community ownership of the project. This is the largest regional landscape management project in Australia, covering 1 million hectares and involving \$82 million invested over 20 years. The current phase of the project is the most expensive and intensive, as drains are constructed and environmental needs are identified and solutions designed.

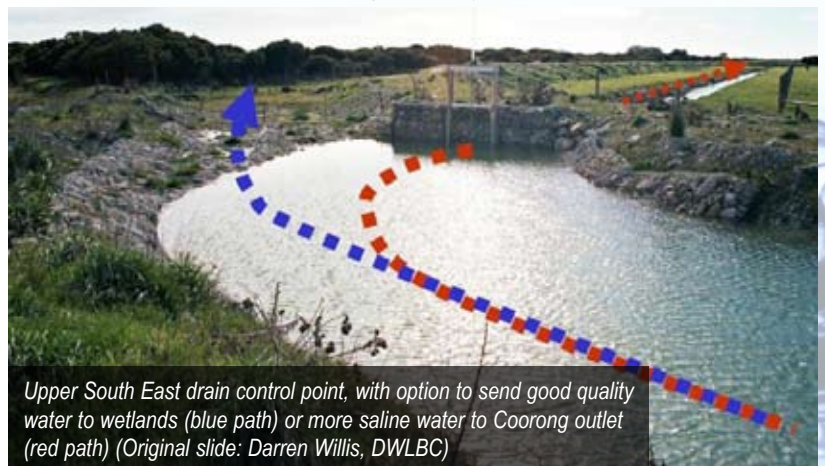
The project has required significant shifts in traditional thinking, and innovative design is now being incorporated to allow sensitivity to environmental needs. At several points in the drainage system, poorer quality water can be diverted away from wetlands, and better quality water directed into wetlands. This avoids the first salty slug of water being directed into a terminal water body. By contrast, the salinities being diverted away from wetland complexes are welcomed into the highly saline Southern Lagoon of the Coorong, if there is sufficient volume to reach there. A decision support system is being developed for optimization of water use in wetlands, with a hierarchy of wetland needs.

Landholders are able to off-set drainage levies by reserving areas with high biodiversity value through covenants on their land title. The University of Adelaide has contributed to the development of the science-based Biodiversity Off-sets Scheme evaluation system, which determines the value of land to be off-set.

A major development in the Drainage Program is the installation of a major telemetry network, which is now generating a large amount of data cheaply for application in adaptive management. Digital elevation models are used to calculate the depth and volume of water required at each wetland, to assess the volumes available in a flow event.

Postdoc Matt Gibbs is working on the decision support system, developing data on water quality, quantity and desired wetland outcomes. The DSS will apply to operation of 60 weirs in the linked drainage system and will help to develop sequences and options, both at the landscape scale and for local operations. This can be linked to DEMs to predict hydrological responses. Linked to Matt's work are two PhD projects, with Abby Goodman investigating the salt tolerance ecology of wetland plant species, and Dan Partington modelling groundwater profiles to design smart drain operation. Matt indicated that Dan's project will take into account varying groundwater levels, mixing issues, timing and hyporheic flows.

Abby Goodman presented details of her project, which is evaluating salinity effects on native aquatic macrophytes, and looking at the effect of water regime on community composition. She has identified 4000 mg/L as the salinity level where freshwater plants disappear. Her project will seek information on triggers and thresholds for salinity tolerance, and the cumulative effect of drying. She will also assess the effect of the first flush of higher salinity water in flood events.



Upper South East drain control point, with option to send good quality water to wetlands (blue path) or more saline water to Coorong outlet (red path) (Original slide: Darren Willis, DWLBC)

Water funding package announced

A \$12 million funding package from the Federal Government will be used to improve flood water management, irrigation efficiency in the cotton industry, and groundwater monitoring and management. The main focus of the funding is \$8.8 million from the Water Smart Australia Program to improve water metering and measurement of flood water in the Condamine-Balonne region in Queensland. The project will see telemetry fitted to stream gauging stations and individual meters on water harvesters to provide real time data on water usage on a catchment wide basis. The related data processing and a web based system to publish the data will also be developed. The project will also receive \$17.8 million from the Queensland Government and \$4.5 million from water users. The remaining \$3.2 million will fund another four projects in New South Wales from the Australian Government's Raising National Water Standards Program.

Source: [Enviroinfo](#) 6 September

Aquatic balance sheet to go under microscope

Water accounting development is one of the eight areas of major water reform identified under the National Water Initiative, with the aim of ensuring that adequate measurement, monitoring and reporting systems are in place in all jurisdictions, to support public and investor confidence in the amount of water being traded, extracted for consumptive use, and recovered and managed for environmental and other public benefit outcomes.

The Water Accounting Development Committee (WADC) was established in February to develop standards for Australian water authorities and for other organisations with a keen interest in water issues. Water accounting will enable sound economic and environmental assessments of decisions, such as whether to build a dam or to fund consumer purchases of tanks. Given the importance of water to economic, social and environmental debate during a period of severe drought - and at a time of heightened awareness of climate change and in an election year - the politics of water accounting will be vigorous. There will be consequences for each and every one of us.

The Age, July 26, 2007, Jayne Godfrey

National Recycling Guidelines Developed

The development of national recycling guidelines is well underway, with comments on Phase 2 closed on 21 September. These guidelines deal with managing health and environmental risks in relation to augmentation of drinking water supplies.

River Health Projects Funded

Funding of \$16 million has been granted for 7 projects relating to river health, including \$3.076 million for environmental flow management under the Raising National Water Standards program. This includes environmental flow guidelines for the Murray-Darling Basin, and more accurate assessments of environmentally sustainable levels of extraction.

More details of National Water Commission activities are available from their website <http://www.nwc.gov.au/> and from their newsletter *Distilled*.

Wentworth Scholarship Awarded

Congratulations to Greg Lyle of the School of Earth and Environmental Sciences, who is the only South Australian recipient of 17 inaugural Wentworth Group Scholarships. His research topic is 'the innovative application of spatial information to improve environmental and economic outcomes in Australia's grain growing regions'.

The scholarships are awarded annually as part of the Science Leaders Program, to enhance the ability of students, scientists and economists to engage in public policy on the future of our land, water and marine resources.

Internships in South Africa's National Park's with Global Vision International

In partnership with the South African National Parks board, Global Vision International is offering internship placements at parks throughout South Africa for 6 months or one year. The internships offer participants the chance to work alongside conservation and environmental education professionals and play a part in the long term conservation of South Africa's most famous parks.

GVI is particularly interested in recruiting students from the fields of environmental sciences, zoology, biology and other such related degree courses.

Internships start in January and July of each year and last for the duration of 6 months or one year. Further details are outlined on the relevant webpage at <http://www.gvi.co.uk/pages/projectDetail.asp?expedition=25>

Email: Erica@gviaustralia.com
www.gviaustralia.com

International WaterCentre Master of Integrated Water Management Program

The course commencing in 2008 is a joint venture of four of Australia's leading universities – The University of Queensland, Griffith University, Monash University and The University of Western Australia. IWC graduates are granted qualifications by all four universities. The Masters program will be conducted over three Semesters and initially hosted by The University of Queensland in Brisbane, but involve expert practitioners from all four university partners and others active in the water field.

The Masters teaches both technical and social/managerial aspects of water management through problem-based learning approaches. It enables students to specialise in water supply and sanitation, catchment and aquatic ecosystem health, water governance or community development. The IWC courses specialise in the management of water in developing countries.

For more information on application procedures, scholarships and funding sources, visit www.watercentre.org/education/masters

Source: [Enviroinfo](#) 12 July

Conference Reports

Global change and river-floodplain ecosystems

The 3rd International Symposium on Riverine Landscapes (TISORL) was held 27 August-1 September, 2007 in Queensland. This dynamic meeting included international experts in river ecology, human population dynamics, hydrology and water use, climate, and bio-assessment who were invited to discuss the implications of global-scale changes for river-floodplain ecosystems and to identify future research directions. The global perspective was emphasized in plenary sessions, including the Global Water System Project (www.gwsp.org), the Millennium Ecosystem Assessment reports (<http://www.millenniumassessment.org/en/index.aspx>), and the global database on large dams and their effect on river flows (Nilsson, C et al 2005). It was remarked that this meeting had the greatest linking of river hydrologists with climate change specialists seen to date.

Alternative Futures Analysis was shown to be an effective tool for community decision-making about land and water use. A particularly successful example is the Willamette Basin project in Oregon, presented by Prof Stan Gregory, which has used digital flyover scenarios to work with community stakeholders in selecting more environmentally-friendly future management options. A similar approach at Blackberry Creek near Chicago led to more environmentally-sensitive, sustainable urban designs for new subdivisions.

<http://es.epa.gov/ncer/events/calendar/2007/sep26/willamette.pdf>

http://www.cdfinc.com/CDF_Resources/BBC%20-%20Executive%20Summary%20Report.pdf

Nilsson, C., Reidy, C.A., Dynesius, M., & Revenga, C. (2005) *Fragmentation and Flow Regulation of the World's Large River Systems*. *Science*, 308, 405-408.

It is anticipated that four papers will be produced as a result of cross-cutting workshops held as part of the symposium, on the following topics (senior authors indicated):

- Protection of aquatic biodiversity David Dudgeon and Jane Hughes)
- Connectivity and river-floodplain-coastal subsidies Bob Naiman & Michael Douglas)
- Flow-ecology relationships (Angela Arthington & LeRoy Poff)
- Indicators and assessment (Charlie Vorosmarty & Caroline Sullivan).

All plenary papers are now available on the conference website under Plenary Sessions <http://www.griffith.edu.au/conference/tisorl2007/>

Connect07 Conference

The Conservation Council of South Australia Connect07 Conference proceedings are now available on www.connect07.org.au

2nd International Salinity Forum

Salinity, Water and Society – Global issues, local action

Adelaide Convention Centre, Adelaide, 31 March – 3 April 2008

For further information visit the forum website www.internationalsalinityforum.org 'Water Down Under 2008'

The 'Water Down Under 2008' Conference will be held in Adelaide, South Australia, from 15-17 April 2008, co-hosted by ICE WaRM and Engineers Australia. All professionals with an interest in Hydrology, Water Resources and the Environment are invited to attend.

Professor Graeme Dandy of the Water Research Cluster is Organising Committee Chair. Partners include ICE WaRM, Engineers Australia, SA Water, The University of Adelaide, the University of South Australia, Flinders University, Adelaide City Council, Tonkin Consulting and the Bureau of Meteorology. For further information, please visit the conference website:

www.waterdownunder2008.com

National Water Week Seminar Turning stormwater into drinking water: Innovation in urban water management

Monday, October 22, 2007, 4pm-5pm
Auditorium, Plant Research Centre, Hartley Grove, Waite Campus, Urrbrae

Science and innovation play a crucial role in ensuring secure water supplies for our cities. In this National Water Week seminar, several speakers will discuss how innovation is being used to meet this challenge, including two case studies where stormwater has been used for drinking, historically in Mount Gambier and more recently, a project under development at Salisbury.

- Introduction by John Radcliffe, National Water Commissioner: an overview on water security for cities and role of recycling and groundwater.
- Joanne Vanderzalm, CSIRO – 120 year case study; Mount Gambier storm water management for Blue Lake water quality protection
- Colin Pitman, Director, City Projects, City of Salisbury - Overview of ASTR project at Salisbury, SA : stormwater to drinking water
- Declan Page, CSIRO – Hazard analysis and critical control points plan for ASTR
- Peter Dillon, CSIRO – innovations in governance of aquifer storage and recovery: developing guidelines for environmental and health protection and water allocations

Water tastings of "Recharge", water bottled for the Prime Minister's Science, Engineering and Innovation Council. Recharge is reedbed-filtered stormwater from an urban Adelaide catchment bottled after 12 months storage in an initially brackish limestone aquifer 180 metres below ground.

Details and registration link at:

www.csiro.au/events/StormwaterSeminar

Inquiries to Helen Beringen at

helen.beringen@csiro.au

How do you value an eco system service?

Tuesday, 30 October, 2007, 2pm-4pm
SARDI Auditorium, Waite Campus, Urrbrae

Economic value of wetlands filtration service

For more information: Carmel Schmidt
schmidt.carmel@saugov.sa.gov.au

6th International IAHS Groundwater Quality Conference GQ07 Securing Groundwater Quality in Urban and Industrial Environments

Fremantle, Western Australia, 2-7
December 2007

This will be the first time a GQ conference has been held outside of Europe and North America. Previous GQ conferences were held in Tallinn (Estonia) in 1993, Prague (Czech Republic) in 1995, Tübingen (Germany) in 1998, Sheffield (United Kingdom) in 2001 and Waterloo (Canada) in 2004. Further details are available from the conference website.

<http://www.clw.csiro.au/conferences/GQ07/>

Australian Society of Limnology and NZ Freshwater Sciences Society

'Water: An Inconvenient Truth'

3-7 December 2007, Queenstown, New
Zealand

Preliminary info -- [http://www.es.govt.nz/
events/wit/prelim_info.pdf](http://www.es.govt.nz/events/wit/prelim_info.pdf)

Deadline for abstract submissions:
30 September 2007

Updates: <http://limsoc.rsnz.org/>

8th INTECOL International Wetlands Conference 'Big Wetlands, Big Concerns' 20-25 July 2008

Cuiaba, Pantanal, Brazil

40 Symposium topics are sorted into 5
groups:

- Geographical and geomorphological aspects
- Biogeochemical aspects
- Ecosystem services and biodiversity
- Management threats and conservation
- Tools for analysis and management.

Workshops and abstracts can be submitted to 8thintecol@cppantanal.org.br

More information is available at the conference website <http://www.cppantanal.org.br/intecol>

The deadlines for submission:
Abstracts 1 May 2008.
Workshops 1 June 2008

Who is the Water Cluster?

www.water.adelaide.edu.au

University Research Clusters build relationships between thematic, cross-disciplinary interested groupings of researchers. The Water Research Cluster coordinates water research across the University of Adelaide. The Water Research Cluster has a strong culture of collaboration and support of teams, and has a particular focus on supporting early career researchers.

The Water Research Cluster has specific strengths in the following fields of research:

- Integrated Catchment Management
- Managing Water in Arid Areas
- Managing Wetlands and Rivers
- Sustainable Irrigation
- Wastewater Treatment and Management
- Water Management in Urban Areas.

Leadership Panel

A Panel of academics from across the disciplines and schools of the University provide strategic direction and management of the Cluster. The current members of the Leadership Panel are:

- Graeme Dandy (Civil and Environmental Engineering) - Champion
- David Chittleborough (Geology and Geophysics) - Champion
- Angus Simpson (Civil and Environmental Engineering)
- Marcus Lane (Geography)
- David Jones (Architecture)
- Peng Bi (Health)
- David Lewis (Chemical Engineering)
- Mike Geddes (Environmental Biology)
- Justin Brookes (Environmental Biology)
- Mike Young (Environmental Biology)
- Peter Gell (Geography and Environmental Studies)
- Don McMaster (Research Branch).

Advisory Board

- Dr John Radcliffe (Chair)
National Water Commissioner and Chair, Centre for Natural Resource Management
- Mr John Johnson
Managing Director, SA Murray-Darling Basin Integrated Natural Resources Management Board
- Mr Fraser McLeod (delegate for CEO Rob Freeman)
Director, Knowledge and Information, Dept of Water, Land & Biodiversity Conservation
- Mr Tony Smith, Board Member, Water Industry Alliance
- Mr John Ringham, Chief Operations Officer, SA Water
- Dr Rod Oliver, CSIRO Land & Water
- Mr Tony Lines, Business Development Manager, United Water

Cluster Coordinator

Dr Paul Dalby

For more information relevant to water science and management, visit the Cluster website <http://www.water.adelaide.edu.au>

If you would like to advertise or send material for the Newsletter of the University of Adelaide Water Research Cluster, please contact Paul Dalby on 0401 122 204 or paul.dalby@adelaide.edu.au

Water Information Links

Useful information on water-related topics can be found in the electronic sources listed below.

Australian Water Resources Assessment 2000

Surface water and groundwater - availability and quality

http://audit.ea.gov.au/ANRA/water/docs/national/Water_Content.html

EnviroInfo Newsletter

EnviroInfo is a fortnightly eNewsletter for professionals in the natural resources and environment management fields. You can obtain a subscription by sending an email to info@envirocentre.com.au with the words 'Subscribe EnviroInfo' in the subject line.

Land and Water News is Australia's only independent, comprehensive digest of news and developments in the natural resource management sector. Further information is available at <http://halledit.com.au/publications/lawn.htm>

CLLAMMecology Newsletter is circulated electronically. If you wish to receive a copy, contact Julie Francis at julie.francis@adelaide.edu.au

Distilled is the newsletter of the National Water Commission. To subscribe, go to <http://www.nwc.gov.au/> and follow the links.

EcoVoice environmental newspaper is available online at www.ecovoice.com.au

News Splash

News Splash is a regular information email from the **Water Research Cluster** with a series of short articles of a few lines with links to further information. To register, send an email to paul.dalby@adelaide.edu.au with the words Register News Splash in the subject heading. To Unsubscribe, enter the words "Unsubscribe News Splash" in the subject heading. Send any submissions for News Splash to Paul Dalby at paul.dalby@adelaide.edu.au

Water Research Links – Funding Opportunities

Watch for new funding opportunities on the Research Branch website <http://www.adelaide.edu.au/rb/funding/ops.html>

The comprehensive Grant Opportunities page on the Research Branch website provides access to all ARC and NHMRC opportunities as well as the rural and natural resources R&D corporations. In addition, you can also access the myriad of other funding opportunities. Applications should be submitted to the Research Branch before the sponsor's closing date (1 week for Australian funds and 2 weeks for international funds). Visit <http://www.adelaide.edu.au/rb/funding/> for instructions on submitting applications.

Macquarie Bank Foundation Grants

The Macquarie Bank Foundation's funding criteria are flexible and open. The Foundation welcomes applications for funding from a diverse range of initiatives that are working in innovative ways to provide long term benefits to the community. Each application is assessed on its individual merit. Funding is focused on the core areas of education, health care and research, welfare, the environment and the arts. Internal Closing Date: accepted through year (approx 6 months turnaround for applications)

http://www.macquarie.com.au/au/about_macquarie/macquarie_in_the_community.htm

Grants for Field Research -- Earthwatch

Closing Date: Ongoing

Purpose: To create an opportunity for public involvement in significant research that addresses scientific, environmental and policy problems and issues.

Website: <http://www.earthwatch.org/research/index.html>

Contact Details: Mr Jason Alexandra, Director, Earthwatch Australia

Email: JAlexandra@earthwatch.org.au

Telephone: (03) 9682 6828

Water Organisation Links

The **International Centre of Excellence in Water Resources Management** produces the *ICE WaRM eNewsletter*. You can subscribe at <http://www.icewarm.com.au/mailman/listinfo/eneews>

Land & Water Australia

Land & Water Australia provide significant sources of water-related research information and funding for projects. Their website is www.rivers.gov.au with access to many publications.

Australian Water Association

AWA has a national coordinating committee under way now, to help in the areas of professional development, training and tertiary education for water. Visit <http://www.awa.asn.au/> and view the calendar and weekly newsletter there.

eWater Cooperative Research Centre

The eWater CRC is a joint venture between 47 water, catchment and research organizations. For more information see www.ewatercrc.com.au

The Water Research Cluster newsletter is published once every two months. The latest version is uploaded to the Water Research Cluster website (<http://water.adelaide.edu.au>). To receive a copy of the newsletter in printed form, send an email to paul.dalby@adelaide.edu.au with the words Subscribe Newsletter in the Subject heading.

To receive a notification that the newsletter has been uploaded to the website, write the words Subscribe e-Newsletter in the Subject heading.