

What's happening in water research at the University of Adelaide

Water governance is entering a new era, with a new federal Labor government bringing changes and potential new agreements for water management. Heavy rains in the eastern states have raised hopes that the drought will ease, but the challenges of managing diminishing water resources remain. 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 provides a summary of current activities by the Water Research Cluster and related news items on the context for water management.

In this issue:

- Water Research Cluster News & Activities – Environmental Flows seminar, farewells, new Facilitator
- Water Issues – Acid Sulfate Soils, Wetlands Dying
- Water News Updates – Floods and Droughts
- Water Research Cluster Postgraduate Corner – new program
- Water Research Links – Funding Opportunities, Grants
- Water Conference & Seminar Diary
- Water Organisation Links
- Water Information Links
- Who is the Water Research Cluster



Shallow waters and exposed mudbanks along Goolwa's river shores provide ideal habitat for waterbirds, while boat users struggle to launch their craft and annual yacht races have been cancelled. Photo: Anne Jensen

Thanks and Farewell



Dr Paul Dalby, energetic and effective Facilitator for the Water Research Cluster for its first three years, has moved to a new position in the Faculty of Sciences an advisor in communication, marketing and business development.

Congratulations to Paul on this exciting progression in his career, and continued good fortune with his business Infusion Consulting.

Keep in touch with Paul's activities through his website www.litfuse.com.au

Our sincere thanks from the Cluster to Paul, for his unflinching enthusiasm for water issues, and his ability to find funding and partnership opportunities.

The Water Research Cluster has been very successful in its initial three years, and with Paul's capable assistance has made the most of its opportunities to be ready for its next evolution.

Leadership Panel Departures

Three members of the Leadership Panel have moved on. Assoc Prof Peter Gell has gained a professorial position at the University of Ballarat. Dr Marcus Lane has moved to the University of Queensland.

Assoc Prof Mike Geddes has stepped down as Leader of CLLAMMecology after steering it through the first turbulent period of establishment.

Mike will still be involved in ongoing Coorong studies as a Visiting Research Fellow, while Assoc Prof Justin Brookes takes over as Leader of the project.

Thanks to Peter, Marcus and Mike for their contributions to the Water Research Cluster, and we wish them well in their new ventures.

Introducing New Cluster Facilitator

New Facilitator Anne Jensen has worked with the Water Research Cluster from its early days, editing the Newsletter since July 2005, as well as coordinating postgraduate forums, and organising events for National Water Week 2007. Her working collaborations with Paul Dalby made her a logical choice to continue Paul's work as Facilitator.

Anne brings a range of experience in water and natural resources management in government, private and research sectors. She is a Cluster postgraduate, currently finishing a PhD study with the School of Earth & Environmental Sciences, investigating optimum conditions for application of environmental flows on the River Murray. Her study is supported by Land and Water Australia, as well as the SA Murray-Darling Basin NRM Board, Renmark to Border Local Action Planning, Nature Foundation SA Inc, SARDI Women's Suffrage Centenary Bursary, and the Department of Water, Land and Biodiversity Conservation.

Anne is also a part-time environmental consultant, with clients including private landholders, community groups and environmental NGOs. Previously, Anne worked for conservation company Wetland Care Australia, managing company development, fund-raising and over 50 wetland repair projects. Prior to that appointment, Anne completed 20 years of service in natural resource management with the South Australian environment agency, including many projects dealing with water and wetland management.



Anne Jensen checking one of her seed traps for collecting river red gum seed at Twin Creeks on Chowilla Floodplain, during the watering event in late 2005. Photo: field assistant Marcus from Germany.

Water Research Cluster Environmental Flows Seminar By Paul Dalby

The Water Research Cluster hosted a Seminar on 7 December 2007 to discuss the implications of allocating water for "environmental flows". The recent drought in the Murray Darling Basin has highlighted the political and community pressures on water allocation when water becomes scarce. There has been a strong community reaction, particularly in irrigation areas, to water being allocated in a drought strictly for environmental purposes.

Dr Rod Oliver (CSIRO) presented the outcomes from a major CSIRO research project that identified the implications of different flow regimes in the Murray Darling Basin. To retain what ecologists regard as a

minimum set of ecological processes in the Murray Darling System, a further 2000 GL of water needs to be returned to the River from irrigators, over and above any existing flows. This is based on normal years, not in drought years or under a drier climate.

Prof Wayne Meyer (University of Adelaide) presented information on the economic returns and ecological costs of irrigation within the Murray Darling system. He identifies the economic and social importance of irrigation within the Murray Darling Basin, but also identified a significant volume of water that could be returned to the river from irrigation with almost zero economic impact in the region (in terms of farm profitability), if the water was taken from the least viable farms.

Conclusion: by re-allocating between 1500 and 2000 GL of water from irrigation to environmental flows, important ecological characteristics of the system could be preserved at almost no economic cost.

Step Change in Water Governance Needed Urgently

The Water Crisis in South Australia was the topic at the American Chamber of Commerce lunch on 15 February. The University of Adelaide was well-represented in the audience of over 300 people who attended the lunch. Invited speakers were Prof Mike Young of the University of Adelaide, Mr Joe Flynn of the Water Industry Alliance, and Mr Colin Pittman of Salisbury City Council. Mike Young spoke of the need to fix the fundamentals of water management, to get the pricing signals right, and to stop impeding innovative solutions. Mike described an alternative system which firstly reserved water for running the delivery system and water for the environmental health of the system, and lastly allocated water for consumers. Joe Flynn emphasised the wealth of innovative ideas available in South Australia and the potential for world-leading technologies. Colin Pittman described the world-leading recycling systems in Salisbury, where stormwater is cycled through wetlands and pumped into aquifers under pressure, before being sold for re-use within 12 months. The Salisbury Council has just announced a profit of \$3 million last year from recycled water sales.

<http://cweb.salisbury.sa.gov.au/manifest/servlet/page?pg=863>

State of the Lower Murray Lakes Seminar

The International Centre of Excellence in Water Resources Management (ICEWaRM) presented a seminar on the State of the Lower Murray Lakes on 21 January. The presenters were Dr Kane Aldridge of the University of Adelaide and Dr Paul Hanson from the Centre of Limnology, University of Wisconsin-Madison, who is conducting research on primary productivity in the Coorong with the support of ICEWaRM.

Kane Aldridge described a model of nutrient fluxes in the Lower Lakes, which has been developed using 1979-1996 data, including periods of high river flows and variable lake condition. The model will allow assessment of mixing effects for different inputs, which will give more accurate evaluation of potential management options, such as saline inflows. Current data indicates that the Lakes are in a transition state, with increasing dissolved organic carbon and ammonia, and the future direction of fluxes is unknown.

Paul Hanson described his research in the US on Wisconsin lakes developing models for future predictions of water quality, for example tracking dissolved oxygen in the water column, primary production and respiration in algae. During his field work in the Coorong he has found low productivity in the Southern Lagoon and high productivity in the Northern Lagoon. The shift in primary producers associated with the shift in state is affecting all trophic levels. Paul is a member of the GLEON international lake monitoring network, along with Justin Brookes of the Water Research Cluster, and this link led to Paul's current work in the Coorong.

Living Laboratories

Living Laboratories is a collaboration between the Department of Water Land and Biodiversity Conservation (DWLBC) and the International Centre of Excellence in Water Resource Management (ICEWaRM). The University of Adelaide is an active member of ICEWaRM.

Living Laboratories 'Emerging technologies in environmental monitoring' was held on 13 June 2007. The event was podcast and all Powerpoint presentations are available for download from <http://www.icewarm.com.au>. The aim of this workshop was to provide an Open Forum for the community, researchers and policy makers to present and discuss social and economic instruments and their use.

The next Living Laboratories event will be on 'Large-scale regional projects: potential living laboratories for ecological experiments' on Friday 22 February July. The 'Future of the Pike River irrigation area' will be discussed on 7 March. For more information, visit the ICE WaRM website or contact Amber Welk at awelk@icewarm.com.au

climate2030

12-PART SEMINAR SERIES



The Research Institute for
Climate Change & Sustainability

Seminar 6: Water

It is anticipated that annual average rainfall in the south-west and in parts of the south-east of Australia will decrease in coming decades. This, combined with a general drying trend over large parts of the continent due to increased temperatures and evaporation, is likely to adversely impact on our water resources.

This seminar will discuss research that is taking place to track, manage and allocate water so both society and the environment gain the greatest net benefit from the available water.



Seminar convenor is Associate Professor Justin Brookes, School of Earth and Environmental Sciences. He has been a member of the CRC for Water Quality and Treatment working in the role of Reservoir Specialist for eight years.

Seminar program

Introductions and overview

Associate Professor Justin Brookes School of Earth and Environmental Sciences, University of Adelaide

Impacts of climate change on water availability

Tim Kelly SA Water

Optimising the sustainability of water supply systems

Professor Holger Maier School of Civil, Environmental and Mining Engineering, University of Adelaide

Solutions for the future

Professor Mike Young School of Earth and Environmental Sciences, University of Adelaide

Venue and time:

5-7 pm Tuesday 8 April
Lecture Theatre G04 Napier Building
North Terrace Campus, University of Adelaide

Bookings:

Admission free but registration essential
Email: alayne.moody@adelaide.edu.au
Phone: 8303 8243

For further information visit:

www.adelaide.edu.au/climatechange/seminars

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High Cost of Losing Wetlands

New research at the University of Adelaide has quantified the commercial value of wetlands and the high economic cost of their loss. PhD graduate Dr Carmel Schmidt, supervised by Prof Christopher Findlay in the School of Economics, found the value of permanent natural wetlands for water filtration was at least \$7100 per hectare per year, and the value of constructed wetlands ranged from \$14,100 to \$28,000/ha/y. Previous estimates of the value of wetlands had been set as low as \$300/ha/y. These values highlight the lost opportunities to utilize the natural filtration functions of wetlands, instead of constructing water filtration plants.

Source: Adelaidean Vol 16 No 10 Dec 2007

Acid sulfate problem surfaces in River Murray wetlands

The problems of acid sulfate soils, well-known in coastal estuaries and wetlands of the east coast, are now appearing in the River Murray valley, particularly where wetlands have been inundated for decades by raised river levels, and are now drying out in the drought. Scientists are warning that acid sulfate soils are turning river banks and billabongs into death traps for fish and birds and hazards for humans.

Paula D'Santos, project officer for the NSW Murray Wetlands Working Group, says the alarm was raised at Bottle Bend Lagoon, upstream from Mildura, when the lagoon's pH fell from a healthy 7 to a deadly 3 after it became cut off from the river's main flow. Fish died in their thousands, the banks were lined with toxic aluminium and manganese salts and the gnarled red gums on its banks began to die.

University of Adelaide, CSIRO and Wentworth Group scientist Mike Young sees it as a final warning to revive the Murray before it is too late. "Bottle Bend's nightmare is the first sign we are now changing the River Murray system irrevocably. Irrigators and environmentalists both need to be alarmed. This is the time to radically change the way we manage the River Murray system from top to bottom."

The acid-sulfate problem -- caused by nutrient-rich submerged sediments being exposed to air for the first time in decades -- is already rivalling salinity, over-extraction and blue-green algae as threats to the river. Senior CSIRO scientist Rob Fitzpatrick, who is leading a team looking at acid-sulfate soils, says the problem has been found in large stretches of the river in South Australia around Renmark, Blanchetown and Murray Bridge, as well as in Lakes Albert and Alexandrina.

Dr Fitzpatrick says conditions exist for acid-sulfate soils to form all along the river, but it is occurring mainly in areas that have been inundated for decades but are now slowly drying out. Sulphuric acid is produced when naturally occurring iron pyrite in the sediments -- a by-product of decaying organic matter -- reacts with oxygen. The problem can be prevented by raising water levels to re-inundate affected areas. The acidity can be counteracted by the slightly basic river water, but toxic metallic salts are also washed into the main stream.

Source: Rick Wallace, The Australian, 12 January



Paula D'Santos of the NSW Murray Wetlands Working Group tests water from the Bottle Bend wetland on the Murray floodplain, about 20km north of Mildura.

Picture: David Geraghty, The Australian 12 January

River Murray wetlands need water urgently

Wetlands along the River Murray may suffer irreversible damage within months without water, SA's environmental manager for the Murray says. There are 27 regulated or managed wetlands disconnected from the river in SA, some for more than 12 months. Now there is evidence some of these wetlands may never fully recover. If they do not receive fresh water flows soon, the species they support may be lost forever. The trees on the floodplain have not had a good drink for more than 10 years. The Coorong has been starved of fresh water flows for more than six years.

Environmental Manager Judy Goode fears time is running out for the plants and animals of the Murray-Darling system, including river red gums hundreds of years old. She says the environment is "the biggest loser" in the drought because it always comes last. Unfortunately the problem is far worse than it would otherwise be because the environment was missing out on water long before the drought took hold.

Localised watering projects at places like Chowilla have been successful, and have shown the environment can respond to small volumes of targeted water. The Government and the community have invested thousands of volunteer hours and dollars in managed wetlands to re-introduce wetting and drying cycles that mimic the natural water regime. However, with no water for the environment, dead and dying trees, salty earth and groundwater, disappearing wildlife and devastated landscapes represent a waste of taxpayers' money.

"Ultimately we have to address the situation, for the sake of a whole range of species but also for our own species, because a healthy river is essential for healthy communities," Ms Goode says.

Source: Clare Peddie, The Advertiser, 4 January

Call to Buy Back Murray water

David Paton

All River Murray water must be bought by the Federal Government and sold back to users at a higher price, if there is any hope of restoring the environment, said Assoc Prof David Paton recently. He said that the environment will never be restored under current and proposed initiatives. Any water from the Queensland floods would not be enough to help the environment, and the 500 GL target for environmental water is not likely to be reached in the foreseeable future. David Paton said that once all water has been bought back, water should be secured first for the environment, and the balance allocated for users at a higher price. Funds paid in the buyback would provide funds to allow farmers to consider their options, either to leave the industry or to continue farming.

Source: Cara Jenkin, The Advertiser, 4 February 2008

Water issues continue to dominate news, with constant changes and political announcements, so only brief summaries are given here.

Murray-Darling Basin drought continues to bite

The worst drought on record continues, with total storage levels in the Murray-Darling Basin at their lowest levels since 1940. Total storage was 1885 GL at the end of November, 75% of the previous year. Less than 1% of divertible water was available for critical environmental watering to protect endangered species and habitats. Commission chief executive Wendy Craik said the drought increased the threat of algal blooms, high salinity and increased acid sulfate leakage.

Sources: MDBC, 10 December, 2007; Greg Roberts, The Australian, 11 December 2007; the Drought Update is available at www.mdbc.gov.au

Fish in danger of becoming extinct in drought

The last remaining wetland refuge for the endangered southern purple-spotted gudgeon in the Lower Murray has dried out and 50 gudgeons from the lower reaches of the River Murray are being stored in fish tanks to prevent them dying. Scientists from the Waterfind Environment Fund are seeking farmers to volunteer to house the gudgeons in dams. They also need donations of stock or domestic water to top up water levels in wetlands. Fund chief executive Dr Mark Siebentritt said the emergency plan was the last chance to save the species before water levels fell further during summer. A Native Fish Recovery Fund is also being established to raise \$150,000 to fund a specialist breeding and return-to-the-wild program. Donations to the fund or farmer registrations can be made by calling 8211 6017 or visiting www.waterfind.org.au

Source: Cara Jenkin, The Advertiser, 21 December

Cuts to Murray cod limits

Tougher bag and minimum size limits have been imposed on fishers trying to catch Murray cod in South Australia. Fisheries Minister Rory McEwen said today the move was in response to the reduced number cod in the SA section of the Murray. Research has found that the low water levels because of the drought have made the cod more vulnerable to recreational fishers. From 2008, the daily bag limit will be one fish, and the daily boat limit will be 3 fish. The minimum legal size will be increased from 50 cm to 60 cm.

Source: Indaily 12 December

COAG sets up Water Working Group

Federal Water Minister Penny Wong convened the first meeting of the Council of Australian Governments (COAG) working group on climate change and water in late January. Senior State and Commonwealth officials met to progress talks on the former Howard Government's \$10 billion water plan to save the Murray Darling basin. The Premier of Victoria John Brumby, Federal Climate Change and Water Minister Penny Wong and Victorian Water Minister Tim Holding held a positive and constructive meeting on 7 February. They agreed that managing the Murray-Darling Basin with the support of all States would be in the best interests of Australia, Victoria and the other Basin States.

Sources ABC News 25 January; Indaily 20 December 2007, Media release Premier John Brumby and Minister for Climate Change and Water Senator Penny Wong, 7 February 2008

La Nina not much help to Murray-Darling catchments

Drenching rains across most of Queensland and stretching into NSW and Victoria have not helped the Murray-Darling catchment. River Murray storages are at their lowest levels on record, holding just 19% of their capacity, with more hot temperatures ahead. With Adelaide and most of South Australia taking more than 90% of their water from the Murray at present, these dam levels are critical. Growers on the NSW side of the Murray River are getting 0% allocations this year, growers on the Victorian side 33%, and in South Australia 32% (reflecting the relative security and cost of their water licences). Along the river, farmers have been choosing which vineyards and orchards to let die.

Source: Asa Wahlquist, The Australian, 22 January

Billabongs vital to riverway health: research

New research has found the iconic billabong is more important to the health of inland waterways than first thought. Scientists studying billabongs along the Moonie River near St George in Queensland say fish and other aquatic species can survive in the waterholes for up to 800 days without the need for further rain.

Source: ABC News, 2 January

South Australian water security reforms announced

The South Australian Premier, Mike Rann, has announced an Office for Water Security, with a Commissioner for Water Security. The Water Security Advisory Group and Task Force will combine to form a new Water Security Council. The Council will be headed by the Minister for Water Security, Karlene Maywald.

Mr Rann says it will develop ways to secure the state's water supplies and support national water programs, through South Australia's negotiations on the National Plan for Water Security, its commitments under the National Water Initiative and developing a comprehensive statewide water security plan that builds on and incorporates Water Proofing Adelaide," he said.

Source: Enviroinfo 14 February

Floodwaters generate feeding, breeding frenzy

After seven years of drought, the flora and fauna of inland Australia are springing into life. Floodwaters are surging downstream and lakes, swamps and marshes in western Queensland and New South Wales are now brimming with life. Hundreds of thousands of waterbirds have flocked to these lakes and floodplains. NSW NPWS has begun a massive survey of inland rivers.

"The Condamine, Balonne, Warrego and the Paroo - each has up to 1 million hectares of red gum, coolabah, or black box that will be supporting incredible waterbird activity," Professor Richard Kingsford said.

Professor Kingsford and his colleagues are recording a massive breeding event involving ibis, herons, night herons, swamp hens, coot, marsh terns, spoonbills, and a large colony of pelicans breeding on the Paroo system. Some of these birds have travelled up to 1,000 km.

"These big floods happen naturally about once every 20 years," he said. "We are hoping that the waterbirds will bounce back with big floods on these unregulated river systems," he said.

"One thing that we do know about our Australian rivers is that, when we add water, it all comes to life."

Source: David Mark, ABC News, 8 February

Water News Updates

Environmental Water Allocated for Murray-Darling

The Murray-Darling Basin Commission (MDBC) released 4.6 GL of environmental water to protect critical drought refuges and to prevent irreversible damage to the environment. This water is part of 12.8GL of environmental water carried over from last year, and will not impact on the availability of water for consumers.

Critical refuge areas Werta Wert and Twin Creeks on the Chowilla Floodplain will receive up to 2.6 GL, to provide respite for river red gums, black box and southern bell frogs, among other species stressed by many years of 'human induced' drought.

Another 2 GL will go to mitigating the risk of acidification at a number of wetlands below Blanchetown on the Murray River, caused by drying after long periods of being continuously wet. The MDBC also released 6 GL for the Wakool River and Merran Creek to protect critical fish habitat for a threatened population of Southern Pygmy Perch.

Source: MDBC, 21 January

Drought Arrangements for Murray Darling Basin Updated

Special water sharing arrangements in the Murray Darling Basin will continue into 2009 as a result of the prolonged drought, under the Murray Darling Basin contingency planning process.

Inflow for the two year period to the end of November 2007 is the lowest on record. While critical human needs are being met there is only a relatively small amount of water available for other uses, impacting on communities, production and the environment.

There is a 75% chance that there will be less water in June 2008 than in June 2007. Special water sharing arrangements are being updated, and imbalances must be paid. Any increase in the water available to South Australia can be carried over to assist in meeting critical human needs, dilution flows and associated water quality requirements in 2008-09. The arrangements will be reviewed monthly to ascertain if water quality objectives are being met (1400 EC at Murray Bridge for drinking water quality).

Further contingency measures provide 696 GL across the SA border to manage water quality and system loss requirements, and provide for critical human needs. SA will be able to hold water in upstream storages for use in 2008-09. SA Water Security Minister Karlene Maywald said the new deal would secure supplies for Adelaide and for SA country towns. Irrigators can carry over water for use in 2008-09., but allocations to irrigators would stay at just 32% of entitlements for now.

Source: Joint press release; Sydney Morning Herald 5 February, Indaily 15 January, 5 February 2008



Twin Creeks on the Chowilla Floodplain features tall river red gum forest on sandy soils and has responded well to watering in 2004, 2005 (pictured) and 2006. It will receive environmental flows from the Murray-Darling Basin Commission to maintain the positive response in tree growth, and to prevent long term environmental damage.

Photo: Anne Jensen



Werta Wert Lagoon at Chowilla will receive environmental flows to maintain benefits of two previous fillings (2005 watering seen here) and to prevent long term degradation in this valuable elongated lagoon with fringing red gum and black box riparian woodland.

Photo: Anne Jensen

Flows lift rivers and wetlands

Flooding rains in eastern Australia mean that 20,000 pairs of straw-necked ibis are nesting at the Narran Lakes near Walgett - the biggest breeding event in the Murray-Darling Basin for 8 years. Bourke's irrigators pumped from the Darling River for the first time in 2 years and at Wentworth this week, a natural flow of water down the Darling reached the Murray for the first time since 2004.

Rain has allowed release of an environmental flow of 13,000 ML from Burrendong Dam to enter the Macquarie Marshes for the first time in 2 years, providing a drink for thirsty river red gums, water couch, lignum and reed beds. Local residents say ducks and magpie geese have returned, and flooding in the Marshes has brought a large number of waterbirds to the area. Summer-growing perennial wetland plants such as water couch and large areas of reed beds at risk of dying will also greatly benefit. A further 3,000 ML of environmental water has since been allocated for the Macquarie Marshes, following more rain. Water has also been allowed down the Murrumbidgee to the Lowbidgee wetlands to protect the southern bell frog.

Professor Richard Kingsford, a wetlands expert from the University of NSW, said the outback would witness "an eruption of life" in coming months and predicted the biggest impact as the Queensland floodwaters make their way south would be on the floodplains of the Warrego and Paroo rivers in north-western NSW. The Paroo River is one of the few remaining free-flowing rivers in the Murray-Darling Basin, and supplies a wetlands system which could support a population of up to 250,000 water birds, including 14 species listed as threatened. Lake Numalla on the Paroo River filled for the first time in nearly 3 years. Queensland Natural Resources and Water Minister Craig Wallace said 760,000 ML of floodwaters had passed down the Paroo River system into NSW.

But the rains came too late for the main summer crops, cotton and rice. The cotton planting is the smallest in 30 years and the rice planting the smallest since the 1920s. Many farmers have had no allocation this summer. In the Murray Valley, the water situation "remains dire". Near Barham, farmers have been culling their dairy cows. At Wentworth, the district grape harvest is down by 25-35%.

Sources: ABC News, 25 January; Brisbane Times, 16 January; Daniel Lewis, Sydney Morning Herald, 2 February; ABC Central West NSW, 31 January; ABC News, 18 January, Warren Advocate, 24 January, ABC Rural 5 February

SA to miss out on Darling River recharge

South Australian irrigators will receive minimal benefits from Darling River flows. SA River Murray Minister, Karlene Maywald said that, under new water sharing arrangements, SA is 150 GL better off than previously. However, as a consequence of receiving more water than normal under the Murray Darling Basin agreement, SA has to pay back an accrued imbalance before any further allocations to irrigators. Water flowing into Lake Menindee (currently at 233 GL) needs to exceed 640GL for the water to be shared. Murray Darling Basin Commission CEO Wendy Craik says heavy rain and flooding of the Warrego River, in NSW's north west, would see more water make its way into the Darling upstream of Bourke, NSW, and then into Lake Menindee. "However, it won't solve the water shortage in the southern part of the basin," Dr Craik said.

Source: FarmOnline 4 February from Alisha Fogden, Stock Journal, SA, January 30, reprinted North Queensland Register

CSIRO research points to less water in Basin

The Sustainable Yields project by the CSIRO suggests there will be 20 per cent less water in some parts of the Murray Darling Basin by 2030. Since 1997, rainfall has declined by 11%, while runoff has declined by 26%. The study will be used to set new caps on water in sub-catchments. Project leader Dr Tom Hatton says demand on water is expected to rise, but there will be less water available. A member of the Wentworth Group of Concerned Scientists, Peter Cullen, said the sustainable yields studies all showed rainfall decreasing, with stream flow decreasing further, because of climate change, interception of water from farm dams, plantations and groundwater over-extraction. Competition from the cities of Canberra, Melbourne and Adelaide will also come into play. Professor Cullen said the study was an important first step in the National Water Plan. But he said "sustainable" was a misnomer. "This is the physical water yield, not what is sustainable use in terms of river health issues."

Source: ABC Rural, 24 January; The Australian, Asa Wahlquist, 25 January 2008; ABC News Online, 21 December

Water filter trial for Torrens

A \$300,000 filtration system is being tried in the Torrens Lake in Adelaide in a bid to improve water clarity. South Australia's Environment Minister Gail Gago is hopeful the filtration will control outbreaks of blue-green algae, averting the need for any future closures of the lake. The lake has been closed since last week because an algal outbreak poses a public health risk. The new water trial will last until the middle of the year.

Source: Indaily 13 February

NSW bird breeding habitat destroyed

The federal government is referring the illegal destruction of a vital bird breeding wetland in northwest NSW to the federal public prosecutor to consider criminal and civil charges. The process of clearing 500 hectares last May bulldozed waterbird breeding habitats on Yarrol Station in the Gwydir River floodplain, near Moree. The area was home to more than 100,000 egrets, ibis, night herons and native ducks in the 1990s.

Source: Sydney Morning Herald, 7 February

Water Research Cluster Postgraduate Corner

The Water Research Cluster postgraduates have continued a program of quarterly forums since 2005, covering a range of topics from stormwater management, constructed wetlands and smart drains in the Upper South East, to palaeo-ecology of diatom communities in estuaries, wetlands and mangroves. Other discussions have included suggestions for better management of water resources, and options for future careers.

Seminars are held at the March and September forums, and field trips for the June and December forums. Meetings are on the first Wednesday of the month. Watch the newsletter and website for updates on topics.

All postgraduates are welcome, and other interested parties may be invited, provided places are booked.

www.water.adelaide.edu.au/postgraduateforum

Prizes and Awards

Congratulations to **Holger Meier** of the School of Civil, Environmental & Mining Engineering, who has now attained the status of Professor!

David Chittleborough, one of the Cluster Champions, together with **Mike McLaughlin** and their co-authors, are featured on the front cover of the Jan/Feb 2008 issue of the Soil Science Society of America Journal Their article is "Evidence for different reaction pathways for liquid and granular micronutrients in a calcareous soil." Vol 72(1), 98-110.

<http://soil.scijournals.org/content/vol72/issue1/cover.shtml>

ICEWaRM has won the Business/Higher Education Round Table's 2007 Award for Outstanding International Collaboration in Education and training for its ground-breaking professional development program with China's Yellow River Conservancy Commission (YRCC).

The **ICEWaRM** Master of Water Resources Program was launched by Minster Karlene Maywald at a special event at the Adelaide Festival Centre on 14 December. 57 students were enrolled in 2007, with strong interest for 2008. A significant section of the video-linked, multi-campus course is coordinated by Graeme Dandy, with other Water Research Cluster members Trevor Daniell and Anne Jensen among the presenters.

ICEWaRM Masters Scholarships

Scholarships for entry into the award winning Master of Water Resources Management Programme are currently available. The closing date for the current round is **22 March 2008**. Further details regarding the scholarship programme are available at <http://www.icewarm.com.au/page.php?pld=183>

2008 Australian Museum Eureka Prizes

Presented annually by the Australian Museum, the Australian Museum Eureka Prizes reward excellence in the categories of:

- Research & Innovation
- Science Leadership
- School Science
- Science Communication & Journalism
- Action Against Climate Change (School Science)
- Taxonomic Research (Research & Innovation)
- Research in support of Defence or National Security (Research & Innovation).

Entries close **2 May 2008**.

For further information on the prizes and how to enter go to australianmuseum.net.au/eureka or email eureka@austmus.gov.au

The 2007 **National Thiess Riverprize** valued at \$AUD100,000 went to the NSW Murray Wetlands Working Group for their innovative wetland rehabilitation program, which has delivered 75,000 ML of water to more than 200 wetlands covering 71,000 ha in the Murray and Murrumbidgee catchments. Much of the water has come from irrigation savings. www.mwwg.org.au

The **Thiess Riverprizes** will be awarded again in 2008 at the RiverSymposium conference in September – see www.riverfoundation.org.au

Water Research Cluster Postgraduate Forum

Engineering Angles on Water Supply and Delivery

Featuring postgraduates and staff from the School of Civil, Environmental and Mining Engineering, Margaret Murray Room, Level 4, Union Building

Wednesday 5 March 11:00am -1:30pm

includes informal lunch sponsored by Water Research Cluster. Bookings essential for catering!

RSVP 3 March to Anne Jensen email: anne.jensen@adelaide.edu.au

World Water News

Source: Melissa Barrett, former Water Research Cluster postgraduate now based in Cambridge and employed by Arthur D Little Ltd, Environmental & Management Consultants

New water strategy for England

The English Government has launched a new water strategy to help secure and maintain water supplies, reduce water pollution and tackle surface water flooding. It will help to cut water use through a combination of efficient technology, metering and tariffs, improve surface water drainage, and reduce pollution from homes, industry and farming. Current supplies are already unsustainable and this situation was exacerbated by the drought of 2004-06 in South East England.

An independent review will look at different methods of charging, including metering and tariffs. Proposals include a fairer system which offers incentives to conserve water, and metering in water-stressed areas before 2030. The review will also consider how to protect vulnerable groups, like those on low incomes.

Further information

News release <http://www.defra.gov.uk/news/2008/080207b.htm>

'Future Water' - the Government's water strategy for England <http://www.defra.gov.uk/environment/water/strategy/index.htm>

World Economic Forum Annual Meeting

23-27 January 2008, Davos, Switzerland

The World Economic Forum Annual Meeting 2008 closed with a call by business, government and civil society leaders for a new brand of collaborative and innovative leadership to address the challenges of globalization, particularly the pressing problems of conflict, terrorism, climate change and water conservation. Two sessions particularly focused on water, and many more related to water. Summaries of all discussions are available on the website.

Time is Running Out for Water. This session noted escalating demand and inadequate supply of water was leading to water stresses that posed a risk to economic growth, human rights, health, safety and national security. They noted disastrous examples such as Lake Chad in East Africa, which supports 30 million people and has shrunk to one-tenth of its original size. The links to climate change and energy were noted.

The True Value of Water. This session considered the need to balance equity and efficiency. The issue of pricing was considered, and the need to encourage efficient practices. Major problems are foreseen in China and India. Links between water and energy were again noted.

For the list of session summaries, see http://www.weforum.org/en/knowledge/Events/2008/index.htm?ssUserText=&fragment12_NextRow=51

Renewing water resources management in South Africa – changing role, form and context for science

Seminar by Dr Mark Dent, University of KwaZulu, Natal, South Africa

Wed 27 Feb 2008, 3:30pm afternoon tea

Seminar at 4pm, Charles Hawker Conference Centre, Waite Campus, (entrance through Gate 3, Waite Road, Urrbrae)

Australia and South Africa have many lessons to learn and many to offer each other in our endeavours to implement integrated water resources management (IWRM). The people of both countries are on a learning journey through largely uncharted territory and the challenges are daunting. One of the first lessons to become evident in both countries is that integrated water resources management cannot be based on dis-integrated science.”

Dr Dent's visit is sponsored by ICE WaRM

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

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 http://www.cppantanal.org.br/intecol/eng/submission_form.php

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

Email: 8thintecol@cppantanal.org.br

Water for a Healthy Country: CLLAMMecology Research Cluster Seminar by Professor Gene Likens

SARDI Aquatic Sciences Lecture Theatre, 2 Hamra Avenue, West Beach, 5 March 2008, 4.30pm (followed by light refreshments)

Prof Likens is a distinguished senior scientist from the Institute of Ecosystem Studies, New York, USA

Protecting ecosystem services in a world currently undergoing large-scale and rapid change depends on ethical standards of human behaviour. How do we accomplish this goal in the Twenty-First Century? Issues and problems related to concepts, such as ecosystem services, ecosystem health, and sustainability, will be related to ecosystem science and policy decisions. Examples will be given of the critical role of ecosystem science in monitoring, studying and evaluating environmental change, from studies of the Hubbard Brook Experimental Forest and aquatic ecosystems in the White Mountains of New Hampshire, USA.

Saving The Last Drop – Water Scarcity & The Law

The Environmental Defenders Office (SA) Inc in association with the Centre for Environmental Management and Compliance (CEMAC) at the University of South Australia presents a one day seminar

Thursday 13 March 2008, 8.30am - 5pm
University of South Australia, Bradley Forum, City West Campus

Register via www.edosaconference.org.au

Topics will include:

- Aquifer recharge: practical experience and legal aspects
- Water sensitive urban design
- National water reuse guidelines
- Water reuse – rainwater, greywater and sewer mining
- Desalination – the answer for Adelaide?
- Legal aspects of major water supply projects
- The Federal Water Act
- Water pricing and trading
- A sustainable water industry for SA.

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

Presentation on Lower Murray Landscape Futures project

11am Friday 4 April, Forum Lecture Theatre, Level 5, Architecture Building, School of Architecture, Landscape Architecture & Urban Design.

Any interested students and staff are welcome to take this opportunity to hear in more detail about the project and its outcomes.

Dr Brett Bryan from the CSIRO will talk to students in the Landscape Architecture Program about the completed Lower Murray Landscape Futures project. The talk will focus on the Dryland component of the Lower Murray Landscape Futures project, which is a large-scale investigation into integrated regional planning and landscape futures analysis. It focuses on issues such as agricultural production including food, fibre and bioenergy production; soil erosion; loss of terrestrial biodiversity; rising water tables and dryland salinisation. The presentation will provide an overview of the development and application of such a methodology to the complex spatial problem of natural resources management planning in the Lower Murray region of southern Australia. With the right policies it may be possible for regional communities and landscapes to adapt to changing climates and realise an alternative sustainable future in the dryland agricultural areas of the Lower Murray without substantial social and economic cost. A brochure describing the project can be downloaded here <http://www.landscapefutures.com.au/publications.html>

11th International Riversymposium: A Future of Extremes

1-4 September 2008 in Brisbane

For more info go to www.riversymposium.com

The Symposium 2008 will celebrate the 10th anniversary of the Theiss Riverprize.

Implementing Environmental Water Allocations

February 2009 in Port Elizabeth, South Africa

Water Research Commission and Dept of Water Affairs & Forestry, South Africa, under the auspices of World Conservation Union (IUCN) & the International Association of Hydrological Sciences (IAHS)

Further details available from website: www.wrc.org.za

Download Call for Papers and Expression of Interest form from the conference website:

<http://ewa.innercirclestudios.co.za/downloads.html>

Deadline for submission of abstracts - 30 June 2008

Water Droplet Series

Prof Mike Young and Jim McColl continue to produce their series of Droplets, which are short discussion papers on water management issues.

Droplet No 10 asks *'Pricing your water: Is there a smart way to do it?'* This droplet looks at the best way to charge for and ration household water use. It concludes that current pricing systems, which are trying to meet too many objectives, are not in fact equitable. The options for economic efficiency when water is scarce and when it is plentiful are considered, and the paper concludes with 8 recommendations for improvements to water pricing systems which would better meet objectives of equity, efficiency and sustainability.

Earlier Droplets on speeding up the reform process, across-the-board purchase of water, options for new legislative arrangements, urban water trading, water governance, water interception, water accounting, water trading and stormwater management can be read on the website below.

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

National Water Commission News

Major Water Interception Report Released

The National Water Commission has released a new report on the challenges facing governments in managing water interception activities.

Surface and groundwater flows are intercepted by land use activities that include farm dams, re-forestation, overland flow and groundwater extraction. The National Water Initiative (NWI) explicitly recognises the reductions in water availability that result from interception activities.

This Waterlines report [Approaches to, and challenges of managing interception \(PDF 4MB\)](#) highlights the need for a harmonised approach to water interception across all Australian jurisdictions. 'As this report shows, there are deficiencies in the models, tools, data and information to quantify the impact of interception at the catchment level, and this must be redressed urgently,' said Commission Chairman Ken Matthews. 'In particular, there is a need for commonly agreed definitions of 'sustainable levels of extraction' and 'over-allocation'. The Commission believes that first priority should be given to the three major forms of interception: farm dams, afforestation and groundwater extraction.

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)
- Justin Brookes (Environmental Biology)
- Mike Young (Environmental Biology)
- 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

Anne Jensen

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 Anne Jensen on 0407 170 706 or anne.jensen@adelaide.edu.au

Water Information Links

Useful information on water-related topics:

Australian Water Resources Assessment 2000

Surface water and groundwater - availability and quality

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

Water Resources Observation Network

<http://wron.net.au/teasers.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. Issue No 4 was released in November 2007. If you wish to receive a copy, contact Julie Francis at julianne.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

Wetlands Update is a new e-newsletter of the Department of the Environment, Water, Heritage and the Arts (DEWHA). This information service is provided to the broader wetlands community of Australia with regular updates on the Australian Government's wetlands activities and initiatives. Issue 1 January 2008 is now available and Wetlands Update will be published at 3 monthly intervals.

Contact wetlandsupdate-bounces@erin.gov.au

International Riverfoundation website is www.riverfoundation.org.au The aim is to develop a content rich Internet portal that becomes a practical online resource for river management and restoration. RiverConnect Online will be issued 8 times a year in addition to the quarterly RiverConnect paper newsletter.

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 anne.jensen@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 Anne Jensen.

Water Facts

Water required to produce commodities

Although the agricultural sector consumes more of water allocations, the amount of water required to produce agricultural commodities is generally less than the water consumed in the production of industrial goods (see table).

Product	Quantity	Equivalent water L
Sheet A4 paper	80/m ²	10
Glass of beer	250 mL	75
Glass of wine	125 mL	120
Glass of milk	200 mL	200
Cup of coffee	125 mL	140
Glass of orange juice	200 mL	170
Cup of tea	250 mL	35
Bag of chips	200 g	185
Slice of bread	30 g	40
Egg	40 g	135
Potato	100 g	25
Tomato	70 g	13
Apple	100 g	70
Hamburger	150 g	2400
Cotton T-shirt	500 g	4100
Pair of shoes	1	8000

Source: <http://www.lennotech.com/water-food-agriculture.htm>

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>

The South Australian Water Industry Alliance, consists of over 190 organisations in water-related businesses in South Australia, delivering water solutions to global markets. Visit www.waterindustry.com.au

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.

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.

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

Water Research Links – Funding Opportunities

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

George Alexander Foundation

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

Closing Dates: 27 March, 30 June, 6 October 2008

Areas of interest: Environment & Conservation -- projects to develop partnerships with communities, government and the private sector to prevent irreversible damage to the environment and to encourage the maintenance of biodiversity

Ian Potter Foundation

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

Closing Date: 27 March 2008

Areas of interest: include Environment & Conservation, Science – innovative, cross-discipline projects encouraged.

Australia-China Council General Funding Grants

The Australia-China Council invites individuals and organisations to submit applications for funding to support projects that are designed to strengthen and enhance the relationship between Australia and China and that project a positive image of Australia in China. Final submissions are due 28 March and must have matching Chinese partners.

<http://www.dfat.gov.au/acc/guidelines.html#app>

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

National Geographic Research Grants

The National Geographic Society awards grants for scientific field research and exploration through its Committee for Research and Exploration.

All proposed projects must have both a geographical dimension and relevance to other scientific fields and be of broad scientific interest.

The committee is emphasizing multidisciplinary projects that address environmental issues (e.g., loss of biodiversity and habitat, effects of human-population pressures).

This grant program does not pay educational tuition, nor does it offer scholarships or fellowships of any kind.

While grant amounts vary greatly, most range from U.S. \$15,000 to \$20,000. Committee grants tend to act as seed money and are given for one year's research.

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

U.S. Army Research Office proposals for Basic and Scientific Research

The U.S. Army Research Office (ARO) solicits proposals for basic and scientific research in mechanical sciences, environmental sciences, mathematical and computer sciences, electronics, computational and information sciences, physics, chemistry, life sciences, and materials science.

This is an apply-any-time grant, runs until 2011.

<http://www.grants.gov/search/search.do?oppld=11441&mode=VIEW>

21st Century Collaborative Activity Awards - Complex Systems

The James S McDonnell Foundation offers Collaborative Activity Awards to initiate interdisciplinary discussions on problems or issues, to help launch interdisciplinary research networks, or to fund communities of researchers/practitioners dedicated to developing new methods, tools, and applications of basic research to applied problems. There are no deadlines for this funding opportunity.

<http://www.jsmf.org/apply/collaborative/index.htm>

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.

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