

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

Water features prominently in news stories, as the effect of drought deepens in the Murray-Darling Basin and unprecedented water restrictions apply in most capital cities. 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.

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Panorama of Blue Lake, Stradbroke Is. Queensland, which is the focus of a Water Research Cluster project. Photo: Ashley Natt

Australian Ecosystem Observation Network (AEON)

Professor Wayne Meyer from the University of Adelaide has been co-chairing a Steering Group with Andy Lowe (DEH and University of Adelaide) to develop a business case for a Hub of the Australian Ecosystem Observation Network (AEON) to be based around Chowilla, a major wetland complex that is part of the River Murray in South Australia, NSW and Victoria.

The consortium lead by Wayne and Andy is short-listed to attract funding from the National Collaborative Research Infrastructure Strategy (NCRIS - <http://www.ncris.dest.gov.au/>)

The primary purpose of the Chowilla Hub is to develop a national facility that enables consistent measurement and monitoring of some icon ecosystems using innovative technology. This capability will provide insights into how and why this important ecosystem is changing (Chowilla is one of six icon sites identified as high priority for management in the Murray Darling Basin), and what do these changes mean for the delivery of ecosystem services in the region?

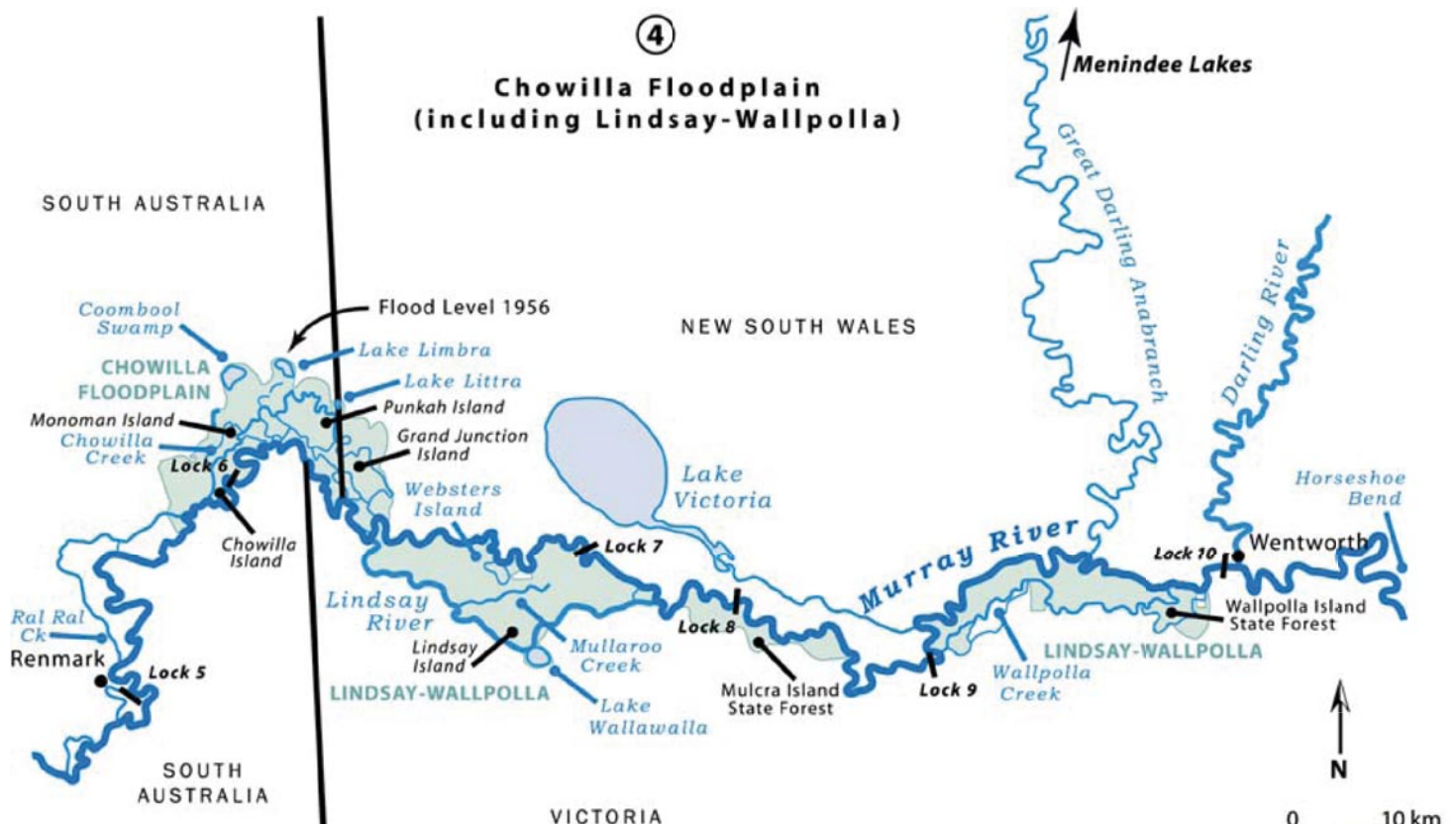
The facilities will encourage a diversity of research that has previously been impossible through a lack of quality research infrastructure. The data generated will be collected and transmitted with the latest wireless technology that will enable easy and widespread access. This will be married with greatly improved data management of historic, existing data to give more researchers greater access to critical information that can illustrate the changes going on.

The infrastructure at this site is will enable data capture on carbon, water and energy balances that is nationally relevant and also the accompanying data that is critically important for monitoring the condition of regional resources. The experience gained at the Chowilla site together with the open architecture of the data gathering capability will enable other intensively instrumented sites within the Murray Darling to join.

This proposal brings together 13 partners representing the range of research interests (Universities and CSIRO) and jurisdictional (State agencies and regional catchment management authorities) responsibilities in one of the largest collaborative research ventures attempted in southern Australia.

Anyone with an interest in this proposal is encouraged to contact Wayne Meyer: wayne.meyer@adelaide.edu.au Ph: 8303 8110.

The Chowilla Floodplain and Lindsay-Wallpolla Islands Icon Site Source: MDBC



Multiple Project Successes for Geographical and Environmental Studies researchers

The Water Research Cluster provided Dr Jennie Fluin, Dr Peter Gell and Dr John Tibby with financial support to develop a proposal to undertake research to better understand the habitat of the Blue Lake on Stradbroke Island in Queensland. The Department of Natural Resources and Water has funded a pilot project that will allow a reconstruction of the lake level history from Blue Lake. The project which will document the history of the lake using diatoms deposited in sediment cores as an indicator of past lake levels (see separate story in WRC Activities).

Dr Peter Gell has also been successful, along with Lance Lloyd, Peter Newall and Assoc Prof Keith Walker, in being awarded the "Riverland Ramsar Site Ecological Character Project".

Dr John Tibby is part of a successful \$200,000 application for a three year project, lead by University of Wollongong researchers that will examine the environmental history of the Macquarie Marshes wetland complex in northern NSW. The multidisciplinary project with collaborators from Macquarie University, University of NSW and the Department of Environment and Conservation (NSW) will assess the effects of climate change and irrigation abstraction on this Ramsar-listed wetland. Initial work on this project was supported by a Humanities and Social Sciences Faculty small grant in 2006.

Water Research Cluster Press Release 13 June: Don't Get Complacent About Water

'University of Adelaide scientists are calling on all South Australian residents to reduce their water use as much as possible this winter.

Professor Mike Young from the University's Water Research Cluster says that despite recent rain, there is still a serious drought facing State irrigators and water storages remain the lowest ever recorded.

"Total inflows into the River Murray are at their lowest in more than 100 years and the system is running on empty," Professor Young says.

"Without massive amounts of rainfall in the upper reaches of NSW and Victoria, and also in the Adelaide Hills over winter and spring, the situation could still get worse.

"Now is not the time to stop saving water. Minimal allocations are a disaster for the industry and for the environment."

Professor Young warns householders against becoming complacent about water use, given recent good rainfalls in Adelaide.

"Irrigators in the Riverland have been told to expect a minimal allocation in July. If these allocations cannot be increased, many families will lose whole orchards, vineyards and even their businesses. The implications are awful.

"It's essential that householders continue to save water to ensure Adelaide has a water supply next summer. Saving a bit more may mean the difference between extinction and survival for businesses, regional communities, industries and ecosystems," Professor Young says.'

Note: this release was picked up by Channel 7 evening news and several talk-back radio programs, including ABC 891 Breakfast Program.



Living Laboratories

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

The Australian and State Governments are undertaking major investments in infrastructure and policy reform in South Australia, to improve the management of water and other natural resources through programs such as The Living Murray, National Action Plan for Salinity and Water Quality and National Water Initiative. While these programs have funding for internal monitoring and evaluation of the outcomes of these programs, they also provide an outstanding opportunity to engage the research sector to:

- independently measure and benchmark the outputs and outcomes of the programs;
- monitor and learn about how to successfully implement large reform and restoration programs; and
- document and transfer research findings and lessons learned to wide audiences.

Living Laboratories aims to utilise large-scale infrastructure and policy initiatives in water and natural resource management as "living laboratories" to:

- generate and document innovations and lessons learned that can be used to better implement large-scale NRM programs;
- integrate research methodologies into implementation programs to allow more meaningful evaluation of their outcomes; and
- provide infrastructure for Australian researchers to undertake world-class research.

By allowing researchers to be active participants in the delivery of large infrastructure and policy reform initiatives, their research can be woven into the fabric of the program design, and be used to provide feedback on the program effectiveness to policy makers. It is hoped that such a model would put Australian policy makers and researchers at the leading edge of environmental-related management and research internationally.

Living Laboratories "Silent Hands, Quick Fingers, Mapping Minds" 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 "Integrated Landscape Modelling" on **Thursday 19 July 2007**. The goal of the workshop is to raise awareness about the tools and thinking necessary to integrate decision making for natural resources management.

For more information, visit the ICE WaRM website or contact Paul Dalby on 0401 122 204.

Pilby Creek on the Chowilla floodplain was dry in March 2005 but filled in late spring with an environmental allocation and spilt over its banks to water lignum shrublands on the floodplain (November 2005). (Photos: Anne Jensen).

History of groundwater dependent ecosystems, Stradbroke Island

The purpose of this project by Dr Jennie Fluin, Dr Peter Gell and Dr John Tibby (Geographical and Environmental Studies Discipline) is to better understand the habitat of the Blue Lake and other wetlands on Stradbroke Island.

There is likely to be substantial expansion of the current groundwater extraction from the island, as part of a plan to address a significant water deficit in Brisbane's domestic water supply. There are a number of potentially significant, detrimental, effects on the physical environment from this pumping. One possible effect is significant reduction in the level of Blue Lake, situated in a National Park on the island.

The Queensland Department of Natural Resources and Water (NRW) have funded a pilot project which will allow a relatively low resolution of the lake level history from Blue Lake. Given that lakes such as Blue Lake may be subject to natural, climate-driven fluctuations, NRW want to know whether such fluctuations have occurred in the past. This may mean that Blue Lake and other ecosystems have some resilience to the planned extractions.

The research team will document the history of the lake using diatoms (a type of algae) deposited in sediment cores as an indicator of past lake level. In freshwater lakes, the known habitats of diatoms are used to infer changing lake levels from changes in diatom communities. A decline in the proportion of open water species, in the simplest case, infers a decline in lake level.

NRW are also very interested in the pursuit of an ARC Linkage agreement which would provide a continuous, high resolution assessment of the history of the lake and a number other groundwater dependent ecosystems on the island.

Dr Peter Gell and Dr John Tibby travelled to Brisbane to outline the proposed ARC Linkage project, stressing the substantial, additional, benefits that this process brings. Dr Galen Halverson, a new lecturer in Geology and Geophysics, will study the carbon and nitrogen isotope signature of the sediments to provide additional information. If successful, the grant would support the only known project of its type in Australia. It would substantially augment the high-resolution palaeo-climate record from south-east Queensland and represent only the second diatom study of European impact on Queensland wetlands.

Chinese Linkages Reports by postgraduate student Grace Chan

Third Eco Summit 2007, Beijing, China

At the third EcoSummit in China in May 2007, 1400 delegates from 70 countries participated. Thirteen keynote speakers included James Collins (USA), Gunter Pauli (Italy), Robert Costanza (USA), Rusong Wang (China), Felix Muller (Germany), Pierre Laconte (Belgium), William Mitsch (USA), Jianguo Liu (USA), Wolfgang Haber (Germany), Sven Erik Jorgensen (Denmark), John Lee (UK), Jizhong Zhou (USA) and Alan Covich (USA). The previous EcoSummit conferences were held in Denmark (August 1996) and Canada (June 2000).

The general theme of EcoSummit 2007 was "Ecological Complexity and Sustainability: Challenges and Opportunities for 21st Century Ecology". The EcoSummit aimed at integrating natural and social sciences with policy- and decision-makers to develop a better understanding of complex ecological systems and provide sustainable solutions to environmental problems. "Eco" here means a bridge between man and nature, between ecology and economy, between natural and social science, between science and society. "Summit" here means the top academic and practical level of ecological research, top urgent and important ecological issues to be discussed, and top ecological societies and ecological journals engaged.

The summit hosted 50 symposia and 20 oral sessions addressing Aquatic and Terrestrial Ecology, Ecological Economics, Ecological Engineering, Ecological Modelling, and Environmental Conservation, Management and Policy. Two symposia were chaired by members from the School of Earth and Environmental Sciences of the University of Adelaide:

- Symposium 12 - Spatial Information For Sustainable Management Of Natural Resources by Dr Bertram Ostendorf and Dr Megan Lewis; and
- Symposium 34 - Ecological Informatics For Unravelling Ecological Complexity And Determining Sustainability by Assoc Prof Friedrich Recknagel. A number of researchers and students from the University of Adelaide also presented their latest research.

Useful materials can be found on the EcoSummit's website:

<http://www.ecosummit2007.elsevier.com/authors.pdf>

Special issues of peer-reviewed Elsevier journals will publish papers from the EcoSummit.



The opening ceremony of the 3rd EcoSummit (Photo: Grace Chan)

Visit to Institute of Hydrobiology, Chinese Academy of Sciences

Wuhan, China, May 27 – June 2, 2007

The Institute of Hydrobiology of the Chinese Academy of Sciences is a prestigious scientific research organisation, which mainly studies life phenomena of aquatic organisms in correlation with their water environments. There are four research centres and over twenty research groups, providing many research opportunities for Masters and PhD students.

Grace Chan visited the research group on Algal Resource and Toxicology, led by Professor Lirong Song. Professor Song is an international expert in algal toxicity, and has links to the Ecoinformatics and Watershed Ecology Laboratory at the School of Earth and Environmental Sciences.

In 2005, Professor Song and his colleagues visited the University of Adelaide and they plan to visit again later in 2007. These academic exchanges have strengthened the newly established partnership between The University of Adelaide and The Chinese Academy of Sciences.

One objective of the visit was to understand the taste and odour problems in freshwater systems and to learn about sophisticated quantification of odorous compounds, which is potentially applicable to Australia. Samples were collected of water and soil in Xionghu Reservoir (3.5 hours from Wuhan city), which has recently experienced its first taste and odour problems in both water and fish, leading to substantial financial loss in a fish farm. Samples were brought back to the Institute and analysed by Headspace Solid Phase Micro-extraction/ Gas Chromatography-Mass Spectrometry.

Another focus of Grace's visit was to introduce the concept and application of bio-inspired computation. Two seminars on Artificial Neural Networks and Evolutionary Algorithms were given. Chinese colleagues also had the opportunity to practise modelling techniques with their own datasets.

Grace would like to thank Professor Lirong Song and his colleagues for their warm welcome and hospitality. This exchange program was made possible with the support of Assoc Prof Friedrich Recknagel, the Water Research Cluster, the School of Earth and Environmental Sciences, and the CRC for Water Quality and Treatment.



Grace Chan (second from left) and Professor Lirong Song (third from left), with colleagues and students from the Institute of Hydrobiology

Outbreak of algal bloom in Lake Taihu, China

Sources: *The Straits Times (Sunday Times)*, June 10, 2007

Chinese Government's Official Web Portal (<http://english.gov.cn/>)

There was an environmental crisis in eastern China in May 2007. Lake Taihu, the third largest freshwater lake in China, with an area of 2,250 km² and average depth of 2m, was attacked by the ever-worst blue-green algal bloom.

More than 6,000 tonnes of blue-green algae were collected from the lake. The foul-smelling lake water forced Chinese authorities to shut off the drinking water supply to over 2 million residents for days. The local residents could only live on bottled water, and the price rose from RMB\$1 to \$6.5 for 2 gallons of water.

Chinese Premier Jiabao Wen has demanded a thorough investigation of the Lake Taihu crisis. Authorities believe that the incident was partly caused by the lowest water levels in 50 years and the 20,000 factories on the lakeside. Authorities have ordered all towns around Taihu to establish sewage treatment plants and insisted that industrial factories meet new water emission standards by the end of June 2008.

At the mean time, scientists have suggested an environmentally friendly way to clean up the massive scum. A part of the 6,000 tonnes of blue-green algae have been used for scientific experiments, which turns algal cells into biofuel and organic fertilisers.

Fermentation of algal cells in a sealed container can produce sufficient methane gas to support the power needs of a local family for one to two months. When the algal cells stop fermentation and production of methane gas, they can be converted into organic fertilisers.

Water Droplets Series

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 7 asks 'What has to be got right for the people who depend upon the Basin's water and for the Basin's environment?' Governments, water users and environmental representatives are deep in discussions about proposed new legislative arrangements for the Murray Darling Basin. This droplet provides a check list, including balanced water sharing, hydrological integrity, investment security, efficient resource use, optimal storage and resolution of over-allocation.

Earlier Droplets on urban water trading, water governance, water interception, water accounting, water trading and stormwater management can be read at www.myyoung.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.myyoung.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

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 on the Water Research Cluster website <http://www.water.adelaide.edu.au>

Federal Water Plan

Debate on the Federal Water Plan continues, with concerns raised by both Victoria and the Australian Conservation Foundation that early drafts of the Bill did not mention over-allocation. There was also no commitment to return 1500 GL to the River Murray by 2014, nor mention of the promised independent environmental manager. Environment Victoria called for clear, strong environmental rights equivalent to irrigation rights.

Farmers in New South Wales and Queensland are concerned about proposed restrictions on use of bore water, maintaining that water stealing was a thing of the past. They are concerned that the draft Bill gives Minister Turnbull too much power to override the independent authority.

Prof Peter Cullen said the Plan must go ahead, and that it is critical to improve the governance of the Murray-Darling Basin, to cope with the water scarcity we now face. He said that investments in both infrastructure and buy-back of water entitlements are needed to make the system more sustainable. Prof Cullen pointed out that the principles underlying the Plan are those of the National Water Initiative, which has already been agreed to by the Prime Minister and Premiers. He said that it is possible to improve wealth for irrigation industries, even with less water for irrigation.

Sources: ABC Online, 24 May, 25 May, Sydney Morning Herald, 19 June

National grants program for water projects extended until 2013

The Federal Government's national fund for community-based water projects has been extended for a further six years. Community organisations are able to receive grants of up to \$250,000 under the program, with many local governments having already applied for grants for small-scale projects that save water, improve water recycling or boost water resources. On the day the 2007 Federal Budget was handed down, Federal Environment Minister Malcolm Turnbull announced the Community Water Grants Program would be extended until at least mid 2013. The Commonwealth will distribute a further \$200.7 million through the program by 2013. The extended program will focus upon installing water tanks, water meters and water saving fittings in community facilities. Councils have until July 4 to apply for grants under the program's current funding round. For more information about the Community Water Grants Program, including how to apply for a grant, visit <http://www.communitywatergrants.gov.au>.

Source: Enviroinfo May 17, 2007

Melbourne water strategy to be reviewed

The Victorian Government has commissioned a review of the Central Region Sustainable Water Strategy just 8 months after its release as a result of the on-going drought. The strategy, released in October last year, will be reviewed by the Victorian Water Trust, headed by Professor Peter Cullen. The Central Region Sustainable Water Strategy outlines actions to provide an additional 400,000 megalitres of water for urban, agricultural and industrial use by 2055. The Strategy will be underpinned by spending of \$1 billion through government water authorities over the next ten years.

Source: Enviroinfo May 17, 2007

Murray-Darling inflows to fall: CSIRO

Dr Bryson Bates, Climate Change Leader in CSIRO, told the 5th Australian Stream Management Conference in Albury to expect inflows for the Murray-Darling Basin to decline by 10-25% in the next 50 years. He said that water planning needs to shift from using the historical record as a basis, to using a scenario approach to explore possible different futures. Dr Bates said it is important that we start to adapt to the climate change that is already locked in, as well as aiming to cut greenhouse emissions.

Source: ABC Radio PM, 22 May, 2007
<http://www.csu.edu.au/research/ilws/publications/5asm%20proceedings.html>

Turnbull announces \$9.8 m water grants

Minister Turnbull has announced total water grants of \$9.8 million, including a grant of \$7 million to establish the Environmental Economics Research Hub, led by Prof Jeff Bennett of ANU, with UniNSW, UWA, Central Queensland University and Griffith University as partners. A total of \$2.8 million has been allocated to 7 projects from the National Water Standards Program for the use of science, data and modeling to improve water management. Additional grants of approximately \$1 million each have been made to the eWater CRC for developing a toolkit of hydrological models for water planning, and for the groundwater-surface water interaction tool project. \$850,000 has been allocated for 4 urban water projects. Details are available in the Minister's press release of 22 May.

Funding for Environmental Economics Research Hub

The Australian Government has announced funding of \$7 million through its \$100 million Commonwealth Environment Research Facilities (CERF) Program to establish an Environmental Economics Research Hub. The Environmental Economics Research Hub will develop economic models and tools for environmental policy makers in areas such as designing marine reserves; developing incentives and tools for improving water efficiency and developing policies for promoting environmental stewardship, multi-species and ecosystem management for biodiversity, and adapting to climate change. The hub will be led by Professor Jeff Bennett, Director of Graduate Studies in Environmental Management and Development at the Crawford School of Economics and Government at the Australian National University in Canberra. Other hub institutions include the University of New South Wales, the University of Western Australia, Central Queensland University and Griffith University.

Source: Enviroinfo May 31, 2007

Victorian water infrastructure plan released

The Victorian Government has announced the state's largest water infrastructure plan in 25 years, which will see the construction of a \$3.1 billion desalination plant and a \$1 billion upgrade to the Goulburn irrigation system. The second phase of the 'Our Water Our Future' strategy includes plans to build the desalination plant near Wonthaggi in the state's south-east, providing 150 billion litres a year to Melbourne and Geelong by late 2011.

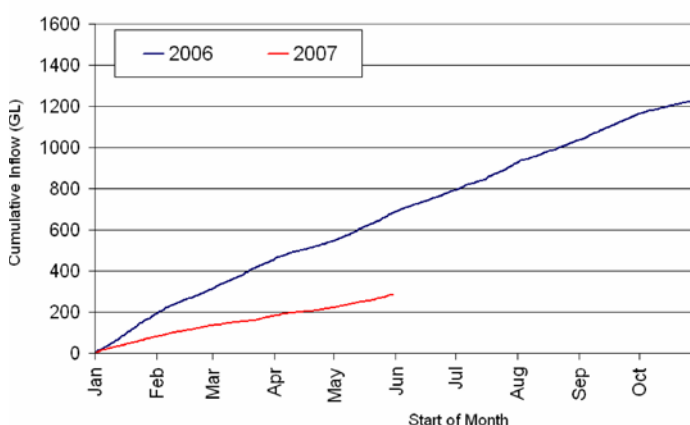
Source: Enviroinfo June 28, 2007

Limited MDB Irrigation Allocations

The Minister for the River Murray, Karlene Maywald, announced a starting allocation of 1% for South Australian irrigators from 1 July, later increasing that to 4%. This should be sufficient, with good local rainfall, for citrus, almond and avocado growers to bring in their crops, and for other orchardists to carry out maintenance spraying. The Minister also announced interim Level 5 restrictions in cities and towns, with no outside watering allowed during July. 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. The continuing record low inflows in the Murray-darling Basin are shown in the graph below.

A detailed summary of the current situation is available at <http://www.dwlbc.sa.gov.au/murray/rivercond/index.html#WaterResourcesUpdatePresentation>

A new information source has just commenced with the River Murray Water Resources Report (Issue 1: 6 July 2007) available at http://www.dwlbc.sa.gov.au/assets/files/RM_WaterResAssessRpt_Issue1_06jul07.pdf



River Murray System Cumulative Inflows 2007 to date compared to 2006 (source: MDBC)

These restrictions reflect the continuing unprecedented conditions which were never foreseen in MDBC modelling for management of supplies, based on 100 years of data. The tables below show monthly River Murray inflows to South Australia, and the date of the previous record low flow, and declining levels in Lake Alexandrina (source: referral document for Wellington Weir for EPBC assessment).

River Murray Inflows to South Australia

Month	Flow (GL)	Previous low (GL, year)
July (06)	130	154 in 1967
August (06)	120	125 in 1902-03
September (06)	112	178 in 1902
October (06)	74	139 in 1914
November (06)	55	57 in 1914
December (06)	34	97 in 1944
January (07)	30	52 in 1983
February (07)	35	56 in 2003
March (07)	48	54 in 1915
April (07)	40	68 in 1923

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

Lower Lake levels

Date	Daily Av m AHD
1/09/2006	0.849
1/10/2006	0.826
1/11/2006	0.712
1/12/2006	0.599
1/01/2007	0.476
1/02/2007	0.390
1/03/2007	0.301
28/03/2007	0.181

Lower Lakes Salinity (02/07/07)

Site	Level (mAHD)	Salinity (EC)
Lake Alexandrina	0.17	1720
Lake Albert (Meningie)	0.23	2530
Goolwa		15000

ALP to spend up on grey water use and rainwater tanks

The Federal ALP has announced it will invest \$250 million over six years through a National RainWater/GreyWater Plan that will offer a rebate of up to \$500 for 500,000 homes to help install new piping for grey water use or rainwater tanks. The Opposition Leader, Kevin Rudd said a Labor government would also set an aspirational target that by 2020 all Australian homes where suitable, would be more energy and water efficient through technologies and appliances such as rainwater tanks and grey water re-use systems. The ALP claims that National Rainwater/GreyWater Plan could recycle up to 50,000 million litres of grey water every year if all available grey water is used. The plan will be delivered in partnership with State and local authorities to ensure that local health and environmental standards are achieved.

Source: Enviroinfo June 28, 2007

EPBC Act Referrals on Proposed Temporary Weir and Lake Bonney

The proposed temporary weir at Pomanda Island downstream of Wellington has been referred to the Commonwealth Government for assessment under the Environment Protection and Biodiversity Conservation Act 1999 to determine the level of environmental assessment required. A FAQ document on the referral and a media release by the Minister for Water Security and Minister for the River Murray, Hon Karlene Maywald, are available.

http://www.dwlbc.sa.gov.au/assets/files/epbcrelease_31may07.pdf
http://www.dwlbc.sa.gov.au/assets/files/weir_epbc_faq_31may07.pdf

The proposal to isolate Lake Bonney at Barmera to reduce evaporative losses and reduce saline inflows to the mainstream has also been referred for EPBC assessment. http://www.dwlbc.sa.gov.au/assets/files/lake_bonney_faqs2_1may.pdf

Connect07 Conference

The proceedings from the Conservation Council of South Australia Connect07 Conference held in May 2007 will shortly be published on www.connect07.org.au

Presentations of interest included a sobering overview from Judith Kirk, reporting on the slow progress of returning water to the environment in the Living Murray program (see report below from Independent Audit Group). Dr Lisa Mensforth summarised the MDBC Risk Assessment program, which is identifying very significant reductions in inflows to the River Murray as a result of catchment activities such as plantations, farm dams and groundwater bores. Water Research Cluster postgraduate Anne Jensen presented a workshop entitled 'Making Conservation Choices for the River Murray', in the context of reducing water supplies and lack of water for the environment.

The Living Murray program under threat

The Living Murray program appears to be under threat, with many of the objectives set under the original timeframe of June 2009 unlikely to be met due to the lack of water availability. The Review of the Living Murray Implementation 2005/06 by the Independent Audit Group has revealed that, as of June 2006, no water had been recovered for The Living Murray program, and that the volume listed on the eligible measures register is 240 gigalitres (GL) leaving a residual target of 260 GL. The IAG has warned that it will be unlikely that the targets are met by June 2009 that unless many of the water recovery measures enabled in clause 23 of the IAG are rapidly progressed, including market-based measures. This may mean less emphasis on progressing small scale infrastructure measures in some jurisdictions. The report concludes that if any further delays are experienced in implementing water recovery measures, with a focus on infrastructure projects, there could be substantial delays. However, if water was recovered through the market, the time, investment and volumetric targets could be exceeded. The CSIRO has advised the IAG that there will likely be a reduction of between 2500-5000 gigalitres of water in the next 20 years, making the task of achieving the environmental objectives for the icon sites difficult. The six icon sites are the Barmah-Millewa Forest, Gunbower Koondrook-Perricoota, Hattah Lakes, Chowilla Floodplain (including Lindsay-Wallpolla), Murray Mouth, Coorong and Lower Lakes, and the River Murray Channel.

Source: *Enviroinfo* May 31, 2007

Water stolen from struggling Macquarie Marshes

Water released as part of an environmental flow for the Macquarie Marshes has been siphoned off for private use through diversion channels into several irrigation dams. The Macquarie Marshes are an internationally recognised wetland in central western NSW, considered one of Australia's most important breeding sites for waterbirds. But the drought has taken its toll on the region, and the birds have not bred for seven years. Now, new evidence reveals some landholders are actually stealing some of the water dedicated to keep the marshes alive. Prof Richard Kingsford from the University of New South Wales says this incident of water theft is another blow to the already struggling wetland. "Clearly this was supposed to be an environmental allocation for the Macquarie Marshes and therefore designed primarily for environmental purposes," he said. "The Macquarie Marshes are the worst they've ever been. We're seeing large areas of red gum dying, waterbirds have all but deserted the main part of the Macquarie Marshes, and the other problem is that normally they would breed there every two years - now we're into our seventh year without a major breeding event. It's a severe state of degradation in the Macquarie Marshes." Source: *ABC Online* Monday, 25 June 2007

Water Footprint

Did you know it takes 140 L of water to make a cup of coffee? And 16,000L to produce a kilogram of beef?? (Some articles give figures of 55,000L or even 100,000L per kg of feedlot beef!) It might make you think about your food choices a little more carefully. The emerging new phrase is 'food miles' (or km), measuring how far food is transported from source to consumer. Check out the Water Footprint site to see the water footprint of various countries at <http://www.waterfootprint.org>

At the 5th Australian Stream Management Conference, Dr Ian Rutherford gave a provocative talk entitled 'City People Eat Rivers', based on the amount of water used indirectly by consumers. For every litre of water consumed directly with food, 9 litres are used in its production. Average direct water use in Melbourne is 936 litres/day, but water consumed through food is 9,276 litres/day. This 'virtual' water links city consumers with the amount of water removed from rural streams and rivers. Urban consumers can dramatically reduce consumption of virtual water by reducing food waste (national food waste is estimated at 20%), selecting comparable products or substituting food types that use less water, and eating less red meat and more vegetables. A vegetarian diet uses 10 times less water than an animal product based diet.

<http://www.csu.edu.au/research/ilws/publications/5asm%20proceedings.html>

Grim future for Murray: academic

The River Murray is facing a grim future, an Adelaide academic says. Anne Jensen, from the University of Adelaide's ecology and evolutionary biology discipline, says the river is getting less than 20 per cent of the water it needs. "Since 2001 our scientists have been saying that the river needs a minimum of 1500 gigalitres returned to it from the Murray catchment each year," Jensen said. "We need enough water to keep the river and floodplain in balance, to prevent algal blooms and salt accumulation." "A zero allocation for the environment is just as devastating as for irrigators, with a decline in quality for all water users."

She said most red gum trees along the River Murray, and many animal and plant species, won't survive without more water delivered back to the system. — AAP

Source: *Indaily* 29 June, 2007

New home buyers looking for water

The ongoing drought has created a new property trend, with homeowners moving in search of water. Property investment advisor Terry Ryder said the "sea change" and "tree change" phenomena are being followed by "oasis change", as water availability became a major influence on property buying patterns. "The ongoing drought, the subsequent introduction of water restrictions and the increased cost of water use has already propelled the issue up the list of buyers' priorities," Ryder said. He listed the top "oasis hotspots", chosen for their high rainfall or secure water supplies from dam or groundwater stores: Townsville, in north Queensland; Perth; Maleny, in south-east Queensland; Dubbo, in central NSW; and Hobart. — AAP

Source: *Indaily* 21 May

Gwydir wetlands flattened by illegal land clearing

In one of the worst illegal land clearing incidents in Australian history, 750 hectares of the Gwydir wetlands in north-western NSW has been flattened. It's a vital habitat for native water birds and environmentalists fear it will take decades for the wetlands to recover. Agencies are investigating, and fines up to \$1 million may be imposed. Source: *ABC Lateline* 21 May

Learning Project Management Skills

At the June forum, the Water Research Cluster postgraduates enjoyed a lively presentation from our own Paul Dalby on his experiences with project management. Paul drew from his considerable experience to map out activity sequences and to warn of common pitfalls. In particular, the project should aim to achieve its purpose, even if not all outputs and outcomes are achieved. Paul explained 'project logic' and pointed out that many projects fail to achieve their purpose because the activities do not match the desired outcomes. He gave examples of how to manage time and budgets, and how to estimate costs for project bids.

Paul emphasised particularly the importance of communication with partners, clients and interested stakeholders at critical times along the project pathway. In larger projects, this could require a separate communication plan. Other topics covered included risk management, tracking progress, team management and avoiding surprises for clients. There was lively interest from the audience which represented several disciplines, and participants learned important skills in preparation for life beyond their postgraduate days.

Thanks to Paul for a well-prepared and entertaining presentation. The group agreed that a special postgraduate session in addition to the normal program of forums will be organised in the next two months on applying for grants and post-doctoral positions.

www.water.adelaide.edu.au/postgraduateforum

Next Water Research Cluster Postgraduate Forum

Science of Upper South East Drainage Project
Adelaide University Staff Club

Wednesday 5 September
11:00am – 1:30pm

includes informal lunch sponsored by Water Research Cluster.
All Water Research Cluster postgraduates and other interested parties welcome.

Bookings essential for catering!
RSVP 1 September to Paul Dalby
– paul.dalby@adelaide.edu.au

Go8 DAAD German Exchange Scheme

Research collaboration between Australia and Germany will be enhanced through a new researcher exchange scheme between the Group of Eight and the German Academic Service (DAAD). The DAAD is Germany's national agency for the support of international academic cooperation. With a budget of over 250 million euros (\$AUD410 million), it is one of the world's largest and most respected organisations in its field.

Under the Go8 Australia Germany Joint Research Cooperation Scheme the Go8 and the DAAD have each agreed to provide \$AUD200,000 a year from 2008 to 2010 to meet the travel and living costs of researchers who spend time at collaborating institutions in Australia or Germany.

Further details including application and selection procedures are now available at: <http://www.adelaide.edu.au/rb/funding/ausgerman.html>

All University of Adelaide applications are to be submitted to the Go8-DAAD Contact Officer at the Research Branch, Dr Don McMaster. One signed application and one electronic copy is to be submitted to Don McMaster by COB 31 August 2007.

Please register (by email) your intention to submit an application with Don or contact him at the Research Branch on x33347 if you need assistance.

Inaugural ARIAS - Adelaide Research & Innovation Impact Awards

More than \$35,000 prize money is up for grabs over the next three months for the most innovative University of Adelaide researchers.

Adelaide Research & Innovation Pty Ltd (ARI) is offering four separate awards to the University's researchers and affiliates who can demonstrate successful commercial partnerships with industry and projects that are making an impact on the community, the State and around the world. Staff members of the University of Adelaide (full-time and part-time), including affiliated titleholders who are pursuing research activities through ARI, are eligible to enter the awards.

Visit <http://www.adelaide.edu.au/aripl> for more information and a copy of the application form.

Applications close Friday 28 September 2007.

Unsung Hero of South Australian Science

Australian Science Communicators (SA) and National Science Week will present this Award at the launch of National Science Week in SA on 15 August. Nominees may be people or groups whose work has not been specifically in science communication, but they should demonstrably have shown a respect for science promotion or communication.

Nominations close at 5pm on Friday 20 July 2007 and should be sent to: Ms Rona Sakko, CSIRO Science Education Centre, EDC, Milner Street, HINDMARSH SA 5007
Fax: 8241 5373 E-mail: rona.sakko@csiro.au

ICEWaRM Masters Scholarship Round for 2008

ICE WaRM has released their next round of scholarships, for February 2008 intake into the award winning Master of Water Resources Management Programme.

Further information regarding the scholarship programme is available in the International Liaison section (Under Programmes) at www.icewarm.com.au

Endeavour Awards

Applications for DEST's 2008 Endeavour Awards have a closing date of 31 July. The awards fund Australian undergraduate and postgraduate students to study for a period overseas, and overseas applicants to spend some time studying in Australia. The awards include student exchanges, research fellowships and executive awards. The University is keen to receive a sizeable number of these awards, so academic staff should encourage students to apply.

Details can be accessed at http://www.endeavour.dest.gov.au/summary_endeavour_awards/default.html

The General Sir John Monash Awards 2008

Applications for the General Sir John Monash Awards for 2008 are due by 5 pm on Friday, 31 August 2007. Annually, up to eight Awards may be awarded to outstanding Australian graduates to enable them to undertake postgraduate study abroad at the world's best Universities, appropriate to their field of study. The Awards are not limited by age, gender, and academic field of study, country or university, subject to the university being considered to be amongst the global leaders in the chosen field of study. Further information about the scholarship, and the application form, may be obtained from:

<http://www.monashawards.org>

National Water Commission News

The National Water Commission released the Level 2 Report of Australian Water resources 2005 on 4 July. This milestone report provides a snapshot of Australia's water resources to provide a baseline for the National Water Initiative reform process. It delivers a detailed assessment of Water Availability, Water Use and River and Wetland Health.

Key Water Use Statistics

Consumptive use of water in the economy	18,767 GL
Agriculture	12,191 GL (65%)
Household	2,108 GL (11%)
Water Supply industry	2,083 GL (11%)
Other industries (including electricity and gas)	1,330 GL (7%)
Manufacturing	589 GL (3%)
Mining	413 GL (2%)
Proportion of agricultural water use for irrigation	91% (11,033 GL)
Water consumption by households	103 kL/capita

The full report and many other items are available on the National Water Commission website, including the special edition of their newsletter marking the release of the Level 2 report http://www.nwc.gov.au/publications/newsletter/nwc_newsletter_AWR2005_special_edition.html

Buying a Rainwater Tank?

The National Water Commission has released a paper on the cost effectiveness of rainwater tanks for households. Their effectiveness depends directly on their whole-of-life cost and how much water can be drawn from them over time. The report highlights that water from rainwater tanks can be used solely for outdoor garden use or can also be used in the home, and that a tank's yield is determined by both the volume and timing of run-off into the tank and the volume and timing of usage. As well as reducing their annual water bill, benefits to householders include offsetting the effects of water restrictions on their lifestyle, amenity and property values; improving the taste of water in areas of poor water quality; and helping to play a part in addressing water scarcity. This is the first in a series Waterlines papers on key water issues to be released by the National Water Commission.

Recycled drinking water discussion paper released

A Waterlines discussion paper on the possible introduction of recycled water as drinking water has been released for public comment. The report clearly states that it is essential that all water supply options are considered in order to find the most effective combination to secure water for cities, and concludes that risk associated with recycled water for drinking is "manageable." The report, prepared for the National Water Commission by GHD Pty Ltd, encourages the consideration of recycled water for drinking as one option for communities to augment their water supplies and to enhance their water security.
Source: [Enviroinfo June 28, 2007](#)

Aquatic Ecosystem Advisory Group update

The Aquatic Ecosystems Advisory Group brings together a diverse group of aquatic ecology experts and is chaired by Prof Peter Cullen. It is considering a range of current environmental water reform issues, including:

- development of a community of practice for environmental water managers as a knowledge management tool
- ecological constraints to water trading and the impacts of water trading on the environment, in particular, the tension between the security of flows required for the market versus the variability required for the ecological health of rivers and wetlands
- Bayesian belief networks, and how they can be used for in the context of environmental flow modeling.

Australia's groundwater – how best to manage?

Commissioner Dr John Radcliffe has summarised the priorities for groundwater management and key priority investment areas for the National Water Commission. These include:

- Interconnection of groundwater and surface water systems
- Water planning and groundwater management
- Developing and applying monitoring methods and tools that could provide early warning of the risks of groundwater quality decline
- Developing yield estimation methods for expressing sustainable groundwater yield
- Developing and applying techniques for the assessment of appropriate locations for aquifer storage.

Scheme allows donations to Murray projects

People can now donate water and money for environmental projects along the River Murray. The concept for the system was announced three years ago, but has only now become available online. The chief executive of the Waterfind Environment Fund, Dr Mark Siebentritt, says it has taken a long time to develop a system capable of dealing with water trading rules. Dr Siebentritt says it allows people to choose a specific project or donate to the general fund. "Basically what we can do is take donations of water and they can be for a range of projects or the water can be donated directly to Water Find Environment Fund and we can work out which projects we believe are the priorities," he said. "Alternatively, though, money can be donated and that can then be used to purchase water or for infrastructure."
Source: [ABC News online 21 May](#)



This lignum bush on the Chowilla floodplain is dormant and brown while conserving energy during dry times, but comes to life with green leaves and dense blossom within a few weeks of good rains or floods. (Photos: Anne Jensen)

Conference and Seminar Diary

(sources include EnviroInfo Newsletter)

10th International Riversymposium & Environmental Flows Conference

3-6 September, 2007, Brisbane

The Riversymposium aims to make a difference to the declining state of rivers and waterways. The 10th International Riversymposium & Environmental Flows Conference will provide a valuable opportunity for delegates to gain exposure across a broader range of river management topics than in previous years.

For more information:

<http://www.riversymposium.com/>

2nd International Salinity Forum

Salinity, Water and Society – Global issues, local action

Adelaide Convention Centre, Adelaide
31 March – 3 April 2008

Objectives of the Forum:

- Exchange cutting edge knowledge about the science, policies and management practices relating to salinity, and particularly its associated water and human dimensions;
- Cement and enhance the international network of scientific, engineering, policy and community interests associated with salinity;
- Provide a forum for translating scientific knowledge about salinity into sound policy, management and on-ground actions to secure long-term food production, protect land, water and vegetation resources and enhance quality of life globally.

For further information visit the forum website www.internationalsalinityforum.org

3rd International Symposium on Riverine Landscapes (TISORL)

Global change and river-floodplain ecosystems

27 August-1 September, 2007
South Stradbroke Island, Queensland

Experts in river ecology, human population dynamics, hydrology and water use, climate, and bio-assessment are invited to discuss the implications of global-scale changes for river-floodplain ecosystems and to identify future research directions. For more information visit www.rivers.edu.au

'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, with proposed conference themes including:

- Climate, Rainfall and Surface Variability
- Groundwater Systems
- Hydrological Modelling, Data and Forecasting
- Water Management and Sustainability
- National and International Water Issues and Case Studies.

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

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

Deadline for abstract submissions: 1 September 2007

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

6th International IAHS Groundwater Quality Conference

GQ07 Securing Groundwater Quality in Urban and Industrial Environments

Fremantle, Western Australia, 2–7 December 2007

Abstracts are invited on any subject related to the theme of securing groundwater quality in urban and industrial environments or any of the sub-themes listed on the conference website. Both oral and poster presentations are welcomed – posters will be keenly promoted at the conference. Further details are available from the conference website. <http://www.clw.csiro.au/conferences/GQ07/>

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:

- **Prof Graeme Dandy** (Civil and Environmental Engineering) - Champion
- **Assoc Prof David Chittleborough** (Geology and Geophysics) - Champion
- **Prof Angus Simpson** (Civil and Environmental Engineering)
- **Assoc Prof Marcus Lane** (Geography)
- **Dr David Jones** (Architecture)
- **Dr Peng Bi** (Health)
- **Dr David Lewis** (Chemical Engineering)
- **Assoc Prof Mike Geddes** (Environmental Biology)
- **Assoc Prof Justin Brookes** (Environmental Biology)
- **Prof Mike Young** (Environmental Biology)
- **Dr Peter Gell** (Geography and Environmental Studies)
- **Dr 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>

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>. For further information, please call 03 8534 5017.

CLLAMMecology Newsletter No 3 has just been released. 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

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.

Dr Paul Dalby, Facilitator, Water Research Cluster 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/opps.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 Date: 1 October 2007

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: 1 October 2007

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

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/enews>

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.

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