NOVEMBER 2007

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Aqua Australis

NEWSLETTER OF THE HYDROLOGICAL SOCIETY OF SOUTH AUSTRALIA

THE CONTRADICTIONS OF RIVER REGULATION

CM Finlayson & M McCartney

The purpose and benefits of river regulation

Dams have been an influential part of human development for thousands of years. However, only in the last century, and increasingly in the last 50 years, have technological advances enabled the construction of large dams. In the period 1900 to 1949 less than 1,000 large dams were constructed world-wide every 10 years. Since 1950, there has been an upsurge in construction with more than 5,000 being built in a decade; the greatest proportion of these in Asia (mostly China), North America and Europe.

Definition of Large Dams

Based on criteria used by the International Committee On Large Dams, a large dam is one that fulfils at least one of the following criteria:

- higher than 15 m
- higher than 10 m but with a crest length of more than 500 m
- has more than 1 Mm^3 storage capacity
- has more than 2000 m^3s^{-1} spilling capacity
- has special foundation problems or is of unusual design

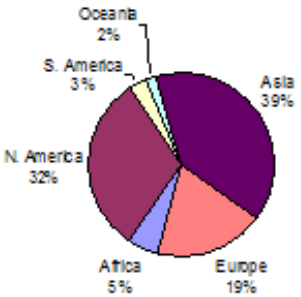
The demarcation between large and small dams is based purely on engineering criteria.

Storage reservoirs are built to impound water during times of high flow so that it can be released when flows are inadequate to meet human water requirements. The stored water may be used for public and industrial supply, irrigation and/or hydropower. Dams are also used for flood control. There is no doubt that dams have brought real benefits to many millions of people worldwide.

Today, it is estimated that more than 400,000 km^2 (0.3%) of the global land surface have been inundated by reservoirs. The aggregate storage of about 6,000 km^3 represents a seven-fold increase in the standing supply of natural river water. At the same it is estimated that dams, inter-basin transfers and water withdrawals for irrigation have fragmented 60% of the world's major rivers. Only about 23% of the total water discharge of the 139 largest river systems in North America, Europe and the former Soviet Union remains unregulated. Most remaining free flowing rivers are relatively small.

Largely as a result of increasing concerns about negative social and environmental impacts, investment in large dams declined substantially throughout the 1990s and into the early part of the 21st century. Recently there has been a re-evaluation of the role of large dams and, although the controversy remains, it is likely that investment in large dams, particularly in Africa, will soon increase. The World Bank has adopted a position in favour of major water resource projects on the basis that they support regional development, with "significant direct and indirect benefits for poor people" and that current knowledge means that negative social and environmental consequences can be successfully averted or sufficiently mitigated. As a result, the Bank is re-engaging in the development of water infrastructure and, in its current water sector strategy, has targeted a 50% increase in lending for water resource projects.

Other institutions, including the African Development Bank, the Commission for Africa and the New Partnership for Africa's Development (NEPAD) have called for increased investment in the water sector. At the African Ministerial Conference on Hydropower and Sustainable Development, held in Johannesburg in March 2006, there was general agreement on the need to accelerate the implementation of dam-building projects throughout Africa. The leaders of the G8 summit in Gleneagles, through the launch of the Infrastructure Consortium for Africa, committed a significant amount of aid assistance to infrastructure development. In addition, the European Union pledged to increase the aid volume to developing countries, with a significant part going towards infrastructure development projects, and with a special emphasis on Af-



Geographic distribution of the World's large dams

(Continued on page 2)

THE CONTRADICTIONS OF RIVER REGULATION

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rica. China is also investing significantly in infrastructure throughout Africa, including in large dams.

The environmental consequences of river regulation

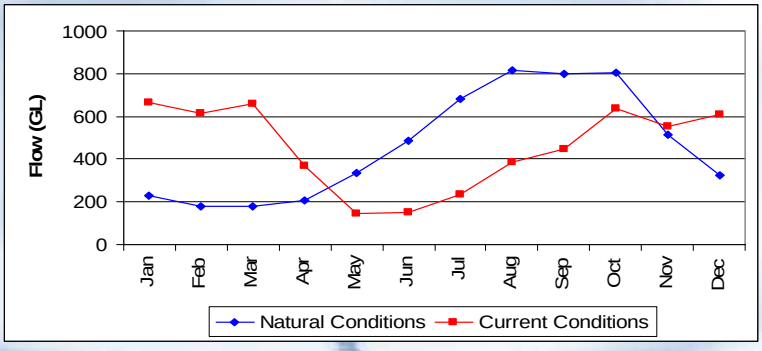
The review of the World Commission on Dams confirms that dams have brought benefits to many millions of people worldwide. However, often they have also, through disruption of riverine ecological processes, reduced the opportunities for people who depend on the natural functions, resources and attributes of river ecosystem to sustain their livelihoods. In many cases the rural communities living in the vicinity of reservoirs, or downstream of dams, gain no advantages from the water stored in the reservoir. Instead, the benefits they previously derived from ecosystem resources and functions may be undermined.

"In many cases the rural communities living in the vicinity of reservoirs, or downstream of dams, gain no advantages"

Overall dams and the environment in which they are located interrelate with a high degree of complexity, and the responses of ecosystems to dams are extremely varied, depending not only on dam structure and its operation, but also local sediment supplies, geomorphic constraints, climate and the attributes of local biota. Despite extensive research, in many cases it is impossible to predict, even with site-specific studies, what the precise impacts of a new dam will be. This is particularly true of impacts which do not occur until many decades after dam closure.

Many dams have not only altered the pattern of downstream flow (i.e. intensity, timing and frequency), but also altered the water temperature and chemistry. The reduction of flood peaks reduces the frequency, extent and duration of floodplain inundation. The reduction of channel forming flows and truncated sediment transport alters channel and floodplain morphology. These changes, and others, directly and indirectly influence a myriad of natural processes and so ultimately influence downstream biota and the ecological integrity of ecosystems, sometimes tens or even hundreds of kilometers downstream.

In many places in developing countries, rural communities living close to rivers remain highly dependent on the natural functions of floodplain ecosystems and the resources supplied by them. For such communities, the biological resources of floodplains often provide the single most important contribution to their livelihoods and welfare (e.g. through food supplies, construction materials and medicinal plants). Dams through disruption of flood-related ecological processes can disrupt the opportunities for flood dependent livelihoods thereby increasing competition for scarce resources. In many cases, dams bring benefits primarily to city people. Rural communities living downstream gain no advantages from the water stored in the reservoir. Instead, the benefits they previously derived from ecosystem services are undermined. The resultant forced changes to livelihood strategies can result in a downward spiral of increasing poverty and environmental degradation.



Comparison of pre- and post-impoundment flows in the Murray River, Australia: variation in the average monthly flow at Albury (2225 km from the mouth).

There is increasing evidence that environmental degradation driven by river regulation and interconnected agricultural development is proving detrimental to fisheries and agriculture and the wider ecosystem services that are vital for the well-being of many people. Thus, in addition to campaigners and activists, rational scientists, decision-makers, and local people are increasingly questioning if we have gone too far? Is the environmental degradation caused by river regulation about to bite back? Will our food and energy systems suffer the consequences of the environmental degradation that they have spurned? The answers to these questions can provide us with more sophisticated arguments to inform decisions about river regulation. At the same time there is a substantial human dimension with estimates that globally more than 8 million people have been "resettled" as a consequence of large dam construction.

The Millennium Ecosystem Assessment in 2005 highlighted the extent of global environmental degradation and loss of ecosystem services and proposed steps to change the way in which we do business. The Comprehensive Assessment of Water Management in Agriculture highlighted the need for further investment in water management options to ensure food supplies globally, but also called for a change in the way we did business. Both assessments recognised the socio-economic benefits derived from river regulation for irrigated agriculture and hydro-electricity; these are well established and promoted through local and global-scale examples and pronouncements by government officials, engineers, economists and agriculturalists.

THE CONTRADICTIONS OF RIVER REGULATION

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Dams, ancient and modern:
Left: TheMarib dam built in the 6th century BC (in what is now Yemen) to supply water for irrigation; right: the Three Gorges dam completed in 2004 on the Yangtze river for hydropower and flood protection.

(Continued from page 2)

The Comprehensive Assessment attempted to bring further information and rigour to some of the debates about river regulation by assessing the current status of the water for food and nature conundrum and provided scenarios for the future development of irrigated agriculture and calls for greater efficiencies for rain-fed agriculture. This leaves us with a complex scenario globally with many regional and local variants – dams have brought benefits to many people and at the same time they have brought detriment to many others. The biophysical outcomes of river regulation have a human outcome – benefits, detriment and inequities are well known. The question remains – what is the balance? And who compensates and supports the losers? Indeed, if you take the longer-term environmental detriments into account who are the losers?

The future

It has been argued that the era of large dam construction is over and we have learnt our lessons. However, this does not seem to be the case in parts of Africa and Asia where development needs are pressing and dam building is regaining support from national governments and international funders.

As climate variability hits our water supplies and burgeoning populations require more food and demand more water-intensive diets the quest for more dams seems to follow. Who can realistically and honestly argue about the intent, especially when the arguments against dam construction originate from wealthy western-based or funded organisations! The response from the proponents of more river regulation (not just dams but including water transfer schemes and the like) are pretty obvious; the reasons for dam construction are worthy. However, there are also many equally valid arguments against river regulation. As we face further change due to climate variability and change it seems that the arguments about river regulation will not go away. The inequities and privileges are well established.

The antagonists seem to be entrenched. The extent of ecological degradation is well documented. The pressure on our rivers is unlikely to abate. The global debate is not as simple as it once seemed – rivers whether regulated or not support many values and many people. The difficulty is in ascertaining the trade-offs that will occur when decisions about river regulation are made, noting that the modern mantra about decision making includes transparency and participatory processes. It is also necessary to recognise the influence of global processes on local decisions – many rivers cross borders; many species, some of great economic importance, migrate across borders; many nations trade across borders; economics and ecological changes operate across borders; and important decisions can be made by people in far away places.

The management of natural resources and particularly freshwater will be a key human endeavor in the 21st century. Given the large number of existing dams and those that are very likely to be built in the future, it is clear that we must live with the environmental and social consequences for many decades to come. It is now recognized that if development is to be sustainable, the effects of impoundment on ecosystems cannot be neglected. In future, minimizing the negative environmental and social effects of dams must become a prime focus of owners, operators, financial institutions and environmental managers.

About the Authors

Max Finlayson is an ecologist and Matthew McCartney a hydrologist. They both work for the International Water Management Institute, based in Sri Lanka and Ethiopia respectively. They agree on the contradictions of river regulation. They support transparency and greater participation in decision-making. They have similar opinions about big and distant institutions and ineffective governance. They enjoy rivers and nature. They agree about the folly of science for the sake of scientists. They do not agree about dams, but try asking them what it is that they do not agree about!

ESTIMATING GROUNDWATER RECHARGE & FLOW IN THE MOUNT LOFTY RANGES

Dr. Andrew Love

Management of any regional groundwater resource requires careful estimates of the magnitude of all components of the groundwater budget. Vertical recharge and discharge rates, and horizontal groundwater flow velocities are generally the most important components to be quantified. However, determining these parameters in fractured, crystalline rock aquifers, which are ubiquitous throughout the MLR, is notoriously difficult due to the limited applicability of conventional (porous media) techniques to these systems.

Several techniques are being applied to estimate groundwater recharge and flow rates in the Scott Creek catchment, including those developed for the Clare Valley FRA Project which involve environmental tracers and well-dilution tests. Characterisation of the local hydrogeology at research sites also includes the use of borehole geophysics, down-hole water quality (EC, pH, T, DO) profiling and applied tracer tests.

Vertical drainage (recharge) through various soil types
In areas of high topographic relief such as the MLR, groundwater discharge into streams may form a large component of the catchment water balance which must be considered if the resource is to be managed properly.

Conversely, many of the ephemeral creeks throughout the MLR may be a source of groundwater recharge during times of high flow. Very little is known about the importance of ephemeral and permanent surface water features in terms of the groundwater balance. In addition, there is a growing need to quantify groundwater-surface water interactions for the purpose of managing groundwater dependent ecosystems (GDEs).

Investigations of groundwater contributions to steam flow are currently being undertaken in three catchments within the MLR (Scott Creek, Tookayerta Creek and upper Marne River) that have very different geographical, climatological and hydrogeological characteristics. Selected results from a recent run-of-river sampling exercise in the Scott Creek catchment are shown below.

Stream flow rate, salinity (as EC) and 222Rn concentrations as a function of distance from the bottom of Scott Creek catchment. Significant groundwater contributions to stream flow are clearly occurring between the first and fourth sampling points at the top of the catchment, and between the last two sampling points at the bottom of the catchment.

AUDITING WATER RESOURCES IN AUSTRALIA'S 'FOOD BOWL'

Helen Beringen

The CSIRO-led Water for a Healthy Country Flagship is completing the first ever audit of current and future water availability in the Murray-Darling Basin.

The year-long, A$12 million research project is the first attempt worldwide to estimate at a basin-scale the impacts on water resources of:

- catchment development
- changing groundwater extraction
- climate variability; and
- anticipated climate change.

Led by CSIRO, the research is drawing on the expertise of national and State Government agencies as well as the Murray-Darling Basin Commission and Australia's leading industry consultants.

To be completed by early 2008, the reports for 18 different regions within the Basin will provide the most accurate assessment possible of water availability in the region.

Three reports had been released as at the start of November 2007. The first report, into the Warrego region of Queensland and New South Wales, was released in September.

The second report, detailing the water availability in the Eastern Mount Lofty Ranges near Adelaide, was released on October 18. Its 'best' estimate of the likely range of future climate outcomes was predicted to be an 18 per cent reduction in water availability for the region, while recognizing there was considerable uncertainty in the climate predictions for 2030 arising from different climate models and different global warming scenarios.

The report found that future groundwater extraction could be cause for concern in parts of the region and noted increasing groundwater salinity in the Angas Bremer Groundwater Management Unit and the Currency Creek region.

Information in the report will be used to develop a new sustainable diversion limit for the river systems in the Murray-Darling Basin., which is the key responsibility of the new Murray-Darling Basin Authority under the Water Act 2007.

The assessment is expected to be complete by February, 2008.

More information about the CSIRO Murray-Darling Basin Sustainable Yields Project is available at http://www.csiro.au/partnerships/MDBSY.html

PITCHFEST 2007

On Thursday October 25th, the Water Industry Alliance in conjunction with the Adelaide University Water Research Cluster put together the first "Water Pitchfest", a forum offering a series of 5 minute presentations on emerging technologies in water management. Summarised over this and the next page are examples of what was showcased at this event. The Publication of the following articles in the Newsletter does not mean that they have been endorsed by the HYDSOC. They are published in the interest of keeping the membership up-to-date with the development of recent commercial products in the hydrological sciences".

LitFuse is a site for the broad community of interest in better management of water and natural resources. It is a resource for groups or individuals with ideas to transmit their message to a connected community of common interest.The Fusebox on this site is a collection of ideas, blogs and podcasts on topics relating to the management of water and natural resources. Podcasts of each of the presentations given at Water Pitchfest are hosted at http://www.litfuse.com.au/fusebox/pitcfest/default.aspx

SOFTWARE FOR PROGRAMMING AN EFFECTIVE PIPE CLEANING PROGRAM

Paul Sage

Optimatics have worked with United Utilities North West to create a simple but effective pipe flushing program optimizer. The tool automates the process of deciding which pipes to flush in which order and for how long.

Discoloration of water is a common concern of water providers and is often addressed by identifying the source of the complaint and flushing the pipes responsible. Regular planned flushing of the network is more proactive and undertaken by most water authorities. Pipe flushing is one of the most effective and economical ways to reduce the risk of discoloration, and is often preferred over other methods.

This software will aid water authorities to achieve the following in regards to its pipe flushing operations:

- Efficiently plan effective pipe flushing regimes
- Minimise time and cost spent on flushing operations;
- Minimise disruption to customers;
- Accurately predict the results and effectiveness of a flushing operation;
- Accurately identify pipes which cannot be flushed effectively, for which more aggressive cleaning methods (such as pigging, air-scouring or swabbing) may be recommended.

OptiFlush provides a software environment which caters for both manual planning of pipe flushing regimes, and automated planning based on the Optimatics Genetic Algorithm optimisation engine.

OptiFlush is designed to plan successful flushing regimes that meet pre-specified flush criteria including:

- Flushing Flow Rate

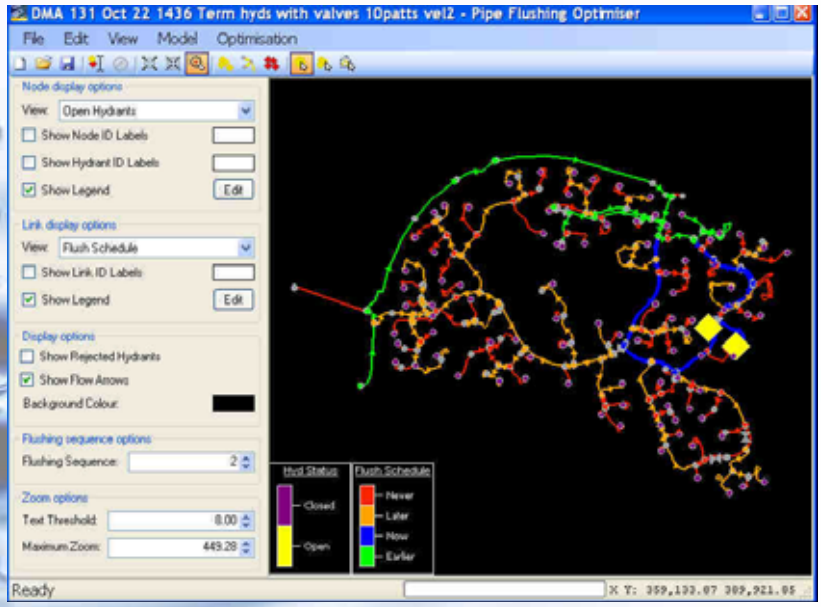
This is the flow rate required to resuspend the stable cohesive layers formed around the inner circumference of pipes, which are responsible for discoloration when larger than normal flows occur. This required flow is generally specified as some factor larger than the normal peak "conditioning" flows experienced by a pipe.

- Time to Flush

The success of a flushing operation on any combination of pipes is dependent on the duration of the flush. The required duration for a flush is generally specified as the time to pass a volume of water equivalent to the volume of the pipe(s) being flushed.

The software produces both tabular and graphic results which can be passed on to maintenance crews for action or further investigated by hand.

The technology may be delivered as a service, using Optimatics to deliver recommended flushing regimes, or as software for in-house use. In this case training can also be arranged and the tool may be customised to meet the specific needs of the client.



OptiFlush user interface showing solution layout

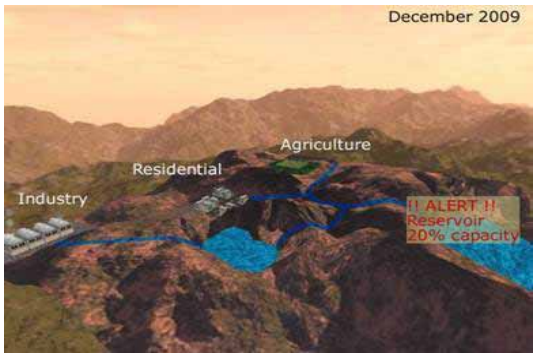
SMARTER WATER MANAGEMENT

Dr Don Perugini

As the water crisis worsens there is an increasing need for smart decisions to be made regarding appropriate water options. We need to make smarter decisions about large scale and long term water options such as infrastructure and policies. We also need to study the system as a whole rather than its individual components in isolation. Currently our water options include restrictions, desalination, pricing structure, enhancing storage, storm water and recycling.

Managing these water options is a complex task that has proven difficult. The components of a water system display complex behaviours which include economic, political, environmental and social factors. For people to comprehend such a large complex system and its behaviours is extremely difficult without appropriate support tools.

Simulation software designed by Intelligent Software Development (ISD) called SIMULAIT WATER, is based on artificial intelligence and allows modelling of complex water systems at the local, state and national levels to assess the future impact of proposed water strategies.



Screen shot of SIMULAIT WATER model

It models elements of a water system including users, suppliers and their complex behaviours. It comprises individual software components that mimic elements of a real water system in a virtual environment. This enables the testing of what-if scenarios for proposed water options, and allows decision makers to observe their expected outcomes before they are implemented in the real world.

In collaboration with Professor Mike Young from the University of Adelaide, ISD has demonstrated the effectiveness of SIMULAIT WATER by using it to model the impact on household price and water allocation of implementing an urban water trading system.

The simulation demonstrates how urban water consumers could sell their surplus water entitlements to other urban consumers who want extra water, thereby financially rewarding water conservation. The simulation allowed us to identify more effective modes of trading which were previously not considered due to the system's complexity.

Using the software, more water options and what-if scenarios can be tested leading to better informed and smarter strategic decisions.

Ultimately, the simulation aims to help address the water crisis effectively through better management of water resources and reduced infrastructure costs

For more information contact Dr Don Perugini on (08) 8343 8455, email info@intelligentsoftware.com.au, or visit www.intelligentsoftware.com.au.

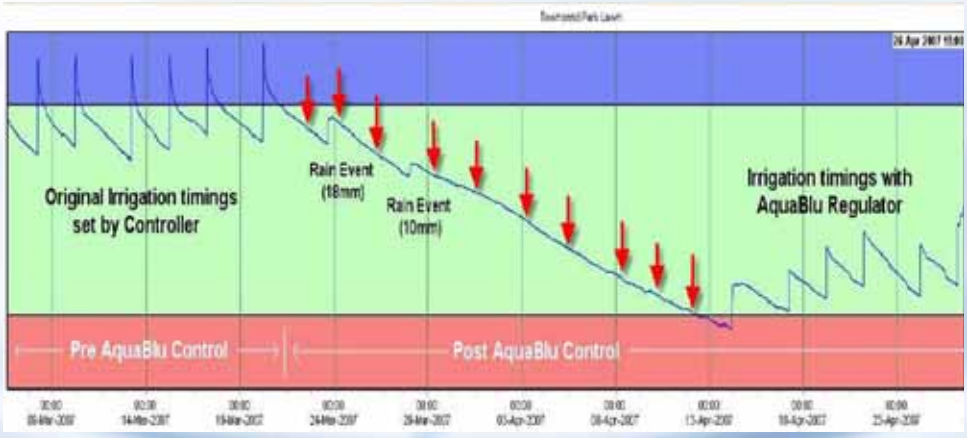
AQUA BLUE IRRIGATION

Peter Moller

The AquaBlu Sensor, desgined by Agrilink, is a capacitance (or FDR) type soil moisture sensor. This system interrupts irrigation when soil moisture exceeds the threshold set by the user. The total run times and cycle and soak times programmed into the clock controller must be calculated by the user.

AquaBlu devices tracked soil moisture levels at the Townsend House (Adelaide, South Australia), with the following results:

- Irrigations were prevented over extended periods in response to rainfall events while the soil moisture was still adequate for viable plant and turf growth—70% reduction in irrigation events.
- Annual water usage for the irrigated area reduced by 73%
- An financial saving of up to $70,000 p.a. for an irrigated area of 2ha.



Graph displaying measured soil moisture. AquaBlu interruptions indicated by red arrows

UPCOMING EVENTS

CGS Groundwater Short Courses Aust & NZ

Centre for Groundwater Studies

Ph: +61 8 8201 5632 **Fax**: +61 8 8201 5635 **Email**: cgs@groundwater.com.au

Web: www.groundwater.com.au

Endorsed by: National Groundwater Committee

Course Name / Course Presenters	When & Where	Fees AU$ (+ GST)
6th ASR National Workshop: *Management of Aquifer Recharge, Storage and Treatment* **Peter Dillon** *CSIRO,* **Mike Dudding** and **Steven Parsons** *SKM,* **Paul Pavelic**, **Joanne Vanderzalm** and **Declan Page** *CSIRO Land and Water*, **Colin Pitman** *City of Salisbury* and **Nabil Gerges** *NZG*	Mon 21 – Wed 23 **April** 2008 **Melbourne** **VIC**	1500
17th Getting To Know Groundwater and Surfacewater **Tony Laws** *WA Dept of Water***, Phil Commander** *WA Dept of Env,* **Steve Appleyard** *WA Dept of Water*	Wed 7 – Fri 9 **May** 2008 **Perth** **WA**	860
Managed Aquifer Recharge Workshop: *WA Premier's Water Foundation*	Dates TBA **July** 2008 **WA**	TBA
35th Australian Groundwater School **Tony Laws** *WA Dept of Water***, Phil Commander** *WA Dept of Env,* **Steve Appleyard** *WA Dept of Water*	Mon 14 – Fri 18 **July** 2008 **Perth** **WA**	1630
9th Australian Groundwater Modelling School: *Concepts; Application GMS; PEST* *Noel Merrick UTS-NCGM*, ***John Doherty*** *WNC*, *Jeff Davis EMS-I-USA*	Tues 5 - Fri 8 **Aug** 2008 T **Melbourne** **VIC**	1950
10th Australian Groundwater Modelling School: *Concepts; Application GMS; PEST* *Noel Merrick UTS-NCGM*, ***John*** *Doherty WNC*, *Jeff Davis EMS-I-USA*	Tues 12 - Fri 15 **Aug** 2008 **Perth** **WA**	1950
6th Soil and Groundwater Pollution: *Characterisation, Remediation and Risk Management* **Bernie Kueper** *Queen's Uni Canada***, David Reynolds** *UWA***, David Thomas** *Golder Associates*	Mon 25 – Fri 29 **Aug** 2008 **Perth** **WA**	2290
7th Soil and Groundwater Pollution: *Characterisation, Remediation and Risk Management* **Bernie Kueper** *Queen's Uni Canada***, David Reynolds** *UWA***, David Thomas** *Golder Associates*	Mon 1 – Fri 5 **Sept** 2008 **Sydney** **NSW**	2290
1st Surfacewater-Groundwater Interactions Workshop: *Introduction to Modelling Approaches* **Ian Jolly** *eWATER,* **David Rasssam** *eWATER,* **Peter Cook** *CSIRO***, Adrian Werner** *Flinders Uni,* **Rick Evans** *SKM,* **Bryce Kelly** *UNSW-WRL*, **Glen Walker** *CSIRO;*	Wed 24 – Fri 26 **Sept** 2008 **Sydney** **NSW**	1700
3rd New Zealand Getting to Know Groundwater & Surfacewater **Paul White** *GNS-NZ*, **Neil Power** *DWLBC-Sth Aust,* **Howard Williams** *Environment Canterbury,* **Graham Fenwick** *NIWA,* **Mike Scarsbrook** *NIWA,* **Chris Daughney** *GNS***, Gil Zemansky** *GNS,* **David Scott** *Environment Canterbury*	Wed 15 – Fri 17 **Oct** 2008 **Christchurch** **NZ**	860
36th Australian Groundwater School **Colin Hazel, Robert Ellis** DNR&W QLD**, Bruce Pearce** DNR&W QLD**, Gerard McMahon** DNR&W QLD**, Richard Cresswell** CSIRO QLD.	Mon 3 – Fri 7 **Nov** 2008 **Brisbane** **QLD**	1630
2nd Geochemical & Reactive Transport Modelling: *Mainly PHREEQC; with MT3DMS; PHT3D* **Tony Appelo** *ITC Netherlands,* **Vincent Post** *ITC Netherlands*	Mon 24 - Fri 28 **Nov** 2008 **Brisbane** **QLD**	2500

All professionals involved in water resource policy, planning and management are invited to attend

water information

Data ⌒ Information ⌒ Insight

Industry Seminar

Thursday 6 December 2007
3.00pm - 5.00pm
Australia Asia Water Centre
SA Water House
Level 4
77 Grenfell St
Adelaide

Presenters

Mr Rob Freeman, Chief Executive, Department of Water, Land and Biodiversity Conservation
The importance of water information to national water reform

Dr Rob Vertessy, Deputy Director (Water), Bureau of Meteorology
The Bureau of Meteorology's new role and responsibilities as set out under the new Commonwealth Water Act 2007

Dr Fraser McLeod, Executive Director, Natural Resources Management, Department of Water, Land and Biodiversity Conservation
The contribution of improved water information to the management of water resources in South Australia

The seminar will be chaired by
Mr Andrew Watson, SA Regional Director, Bureau of Meteorology.

To assist us with catering, please RSVP to a.safich@bom.gov.au

AWA Australian Water Association

AWA Young Water Professionals — The next wave in water

VEOLIA WATER

The SA AWA YWP invites all water professionals to the

End of Year Function and Technical Presentation

at the

Australia Asia Water Centre
Level 4, SA Water House, Grenfell St
on
Friday 23rd November, 2007
5:15pm – 6:30pm

Drinks and finger food provided

Presentation title:
Desalination Technology and the Ashkelon Case Study
Keith Craig, Technical Director, Veolia Water Australia

RSVP to Mike Dixon mike.dixon@sawater.com.au or 8259 0369
by Friday 16th November, 2007

The Organising Committee of

water down under 2008

invites all professionals with an interest in hydrology, water resources and the environment to join colleagues in

ADELAIDE, SOUTH AUSTRALIA 15-17 APRIL 2008.

Pre-Conference workshops are scheduled for 14 April and a number of post-Conference field trips 18 April. Early bird registrations need to be received by 31st December.
http://www.waterdownunder2008.com/welcome.htm.

Land and Water

CSIRO

Venue: CSIRO Land and Water Seminar Room, Waite Road, Urrbrae.

Wednesday November 14
Streamflow generation in upland impermeable catchments: is there a need to think deeper?
Paul Shand

Wednesday December 12
Biofiltration of urban stormwater
Declan Page and Steve Wakelin

http://www.clw.csiro.au/division/adelaide/seminars/index.html

Water Industry Master Classes

Water Infrastructure

Contract Management, Alliance, PPP Frameworks

28-29 November 2007

1 O'Connell Street
Sydney

http://www.awa.asn.au/Content/NavigationMenu2/Education/NationalInterestEvents/bNov06bMasterClassWaterInfrastructure/default.htm

CONTACT HYDSOC

http://www.hydsoc.org

PO Box 6136, Halifax Street
ADELAIDE SA 5000

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MEDIA WATCH

Funding flows under $10 billion National Plan for Water Security

Irrigation water providers across Australia are invited to apply for funding to assist them to develop modernisation plans for the irrigation distribution systems within their district.
http://www.malcolmturnbull.com.au/Pages/Article.aspx?ID=97370

Water restrictions to stay for November

Minister for Water Security Karlene Maywald says current domestic water restrictions will continue into November as drought conditions worsen in the Murray-Darling Basin and Adelaide Hills.
http://www.ministers.sa.gov.au/news.php?id=2370

Bleak outlook for Irrigation Allocations

South Australian River Murray irrigation allocations for 2007-08 will remain at 16 percent as below-average rainfall continues to result in extremely low inflows into the Murray-Darling Basin.
http://www.sawater.com.au/SAWater/WhatsNew/NewsRoom/

Costello calls for widespread desalination

Federal Treasurer Peter Costello says desalination should be used to boost water supplies in all capital cities, with him listing the water crisis as his top priority.
http://www.abc.net.au/water/stories/s2039517.htm

Desal plant for Price?

Yorke Region Development Board's Peter Stockings has recently talked with Cheetham Salt about the possibility of placing a desalination plant—a backup water supply for a proposed Port Clinton housing development—at its Price works.
http://www.ypct.com.au/index.php?option=com_content&task=view&id=1521&Itemid=41

Farmland misses out on La Nina rains

It's normally associated with copious rainfall, but this time around, La Nina has failed to deliver.
http://www.abc.net.au/news/stories/2007/11/01/2078742.htm

Scientists Discover New Way To Make Water

Scientists have discovered a new way to make water. Not only can they make water from unlikely starting materials, such as alcohols, their work could also lead to better catalysts and less expensive fuel cells.
http://www.sciencedaily.com/releases/2007/10/071031125457.htm

Saving Fish: New Method Tests Sewage For Dissolved Phosphorous

A new method for measuring certain forms of phosphorus - the nutrient often responsible for algae blooms that devastate fish populations in lakes - has identified a major but previously overlooked source of the phosphorus that may heavily contribute to water quality problems, researchers from Australia and the United Kingdom are reporting.
http://www.sciencedaily.com/releases/2007/10/071029111047.htm

Climate Change Likely To Help With Groundwater Recharge

Elevated levels of carbon dioxide (CO_2) in the Earth's atmosphere could seriously impact air, weather and vegetation. Now a scientist with the Agricultural Research Service (ARS) is taking a closer look at what could happen underground.
http://www.sciencedaily.com/releases/2007/10/071006091012.htm

Note From the Chair

Nominations are now invited from all members to stand for election to the Committee of the Hydrological Society of SA Inc. for the 2007/08 financial year.

The current Committee would like to encourage members to please consider taking an active role in HYDSOC, adding your expertise to HYDSOC's future activities. The duties of the Committee are not onerous and simply require enthusiasm.

Nominations must be received by the Secretary prior to 15th November, as indicated on the form. In addition, we have booked a venue for this year's AGM, which will be held on Thursday December 13th. We have planned an evening meeting combined with dinner at a local venue, and it will be necessary to know the number of members (and partners) who are likely to attend. The speaker will be Barry Brook with a Q and A session on Climate Change along with a presentation from our Ian Laing Prize winner, Cameron Wood. It would be greatly appreciated if you could indicate by reply email as soon as possible if you think you will be attending the AGM. This request is simply to assist planning at this stage - the formal AGM notice will be issued at a later date.