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# Aqua Australis



NEWSLETTER OF THE HYDROLOGICAL SOCIETY OF SOUTH AUSTRALIA

## WET, SALTY, MUDDY & CARBONACEOUS... Faith Cook, Delta Environmental Consulting

Although there was very little Australian data, a literature review on the carbon sequestration within South Australian tidal marshes has revealed that these habitats are likely to rate among the world's best ecosystems for sequestering carbon dioxide from the air, and storing it in long-term carbon deposits.

One unique aspect of tidal marshes is the rapid accumulation of sediment, burying organic matter almost as fast as it is produced, which significantly reduces oxidation.

High salinities within the soil inhibit decomposition of carbon into methane, reducing release of this highly effective greenhouse gas to almost nothing.

Although there are no tall trees in salt marshes, which visually demonstrate carbon

sequestration within forests, marshes are still very active producers.

Algae mats within and around the tidal marshes grow rapidly in response to favourable conditions e.g. nutrient or water availability, maximizing the amount of biomass (and therefore carbon sequestration) that occurs.

Disturbances to the system, such as sediment influxes, rapidly bury algal mats and plants alike, encouraging rapid fresh new growth.

Estimates of tidal marsh sequestration rates internationally and from Australian data suggest that sequestration within intertidal habitats could vary from 0.45 – 11.3 t C/ha/annum. The average estimate was approximately 1.9t C/ha/annum.

## NEW SOFTWARE ASSISTS RECYCLED WATER EXPERTS Environmental Management News, [www.emn.net.au](http://www.emn.net.au)

Three new software tools to assist Australia's water managers safely implement water recycling schemes have been released. The new tools will support the National Water Initiative's commitment to encourage reuse and recycling by assisting planners, operators and regulators in improving and robustly managing potential water quality risks.

Kwinana Water Reclamation Plant treats 24GL of secondary treated wastewater from the Woodman Point Wastewater Treatment Plant

Water recycling is expected to become an important option in future as it will provide a reliable and diversified water supply portfolio for Australian cities and will help to meet the pressures of drought, climate variability and population growth.

The tools will also provide additional support to recycled water supply organisations ranging from smaller scale systems such as golf courses and council operated systems watering parks and ovals through to large utility-managed dual reticulation schemes.

National Water Commission CEO Ken Matthews and Ross Young, the executive

director of the Water Services Association of Australia (WSAA), released the software tools on Tuesday. They have been developed to assist implementation of the Australian Guidelines for Water Recycling and comprise three components:

- **Requality**  
A self-assessment, continuous improvement tool for urban water recyclers;
- **AquaSafe**  
An exposure and treatment technology performance database;
- **Web based user-friendly guide**  
Explains how to use the software tools to help implement the Australian Guidelines for Water Recycling.

"The tools will help improve certainty in planning recycled water systems, provide clarity on the scientific evidence used to support recycling decisions and promote national consistency for both industry and regulators in managing critical water quality issues," said Matthews.

The development of the tools was funded under the National Water Commission's 'Raising National Water Standards Program'.

## AUSTRALIAN RAINFALL & RUNOFF UPDATE

David Kemp, Department for Transport, Energy and Infrastructure

The Australian Rainfall and Runoff (ARR) Technical Committee would like to make sure practitioners are aware that stage 1 reports for projects 4, 5, 7, 10 and 11 are now available.

The update consists of a total of 21 projects that will be undertaken in three stages, as listed below.

1. Development of intensity-frequency-duration information across Australia
2. Spatial patterns of rainfall
3. Temporal pattern of rainfall
4. Continuous rainfall sequences at a point
5. Regional flood methods
6. Loss models for catchment simulation
7. Baseflow for catchment simulation
8. Use of continuous simulation for design flow determination
9. Urban drainage system hydraulics
10. Appropriate safety criteria for people
11. Blockage of hydraulic structures
12. Selection of an approach
13. Rational Method developments
14. Large to extreme floods in urban areas
15. Two-dimensional (2D) modelling in urban areas
16. Storm patterns for use in design events
17. Channel loss models
18. Interaction of coastal processes and severe weather events
19. Selection of climate change boundary conditions
20. Risk assessment and design life
21. IT Delivery and Communication Strategies

Project 4 is related to continuous rainfall sequences at a point.

Continuous simulation of rainfall sequences is becoming an increasingly important tool in design flood estimation, as it represents arguably the most rigorous technique available to represent the joint behaviour of flood-producing extreme

rainfall events and the preceding antecedent conditions.

To inform the forthcoming revision of Australian Rainfall and Runoff (ARR), the aims of this project are to develop, test and validate the procedures for continuous simulation, as well as suggesting modifications in existing methods to account for the impact of climate change.

As a part of the current revision of the ARR, Project 5 Regional Flood Methods for Australia focuses on the development, testing and recommendation of new regional flood estimation methods for Australia by incorporating latest data and techniques.

The progress report presents the initial outcome of Project 5 (Stage 1) covering data preparation and exploratory data analyses.

ARR Update Project 7 aims to develop a method for estimating baseflow contribution to different sized flood events across Australia.

The progress report summarises the work undertaken as a part of Phase 1 of the overall project. It focuses on the physical processes of groundwater-surface water interaction, theoretical approaches to baseflow separation, and the testing of these methods to various case study catchments across Australia.

The aim of these case studies is to develop a suitable approach for more wide scale application. The safety of people on floodways or flooded streets is of major concern in urban stormwater design and floodplain management. Human activity in floodways is inevitable with much development already in flood prone areas.

The safety of people can be compromised when exposed to flows which exceed their ability to remain standing and/or traverse a waterway.

The current Australian Rainfall and Runoff (ARR) guidelines (I.E.Aust,

1987) stipulate that "to prevent pedestrians being swept along streets and other drainage paths during major storm events, the product of velocities (V) and depths (D) in streets and major flow paths generally should not exceed  $D.V = 0.4 \text{ m}^2/\text{s}$ ".

The progress report for Project 10 reviews and discusses previous experimental investigations of human stability as well as empirical expressions and safety guidelines derived from these studies.

The entire dataset of relevant experimental results is re-analysed and tolerable flow conditions to ensure human safety and safe working conditions are produced.

These are presented as a set of guideline values together with discussion on the limitations of their validity and other factors which may adversely affect stability.

Blockage in drainage systems can cause significant problems in some situations, increasing water levels, inundating neighbouring properties, overtopping roads or railways, damaging infrastructure and increasing maintenance costs.

Considering the importance of the problem, blockage has not been well studied and is not well documented in existing design guides such as Australian Rainfall & Runoff.

Blockage can be caused by a wide range of materials in waterways, with the issues and consequences varying depending on individual circumstances.

Blockage is an issue for structures in both rural and urban catchments, though conditions and consequences may be different for these two catchment types. Management of blockage needs to consider a number of issues, including causes, impacts, assessment and analysis methods and maintenance approaches.

The progress report for Project 11

### AUSTRALIAN RAINFALL & RUNOFF UPDATE

David Kemp, Department for Transport, Energy and Infrastructure

provides the Stage 1 deliverable for the Engineers Australia project to develop guidelines for assessment and analysis of blockage and provides preliminary findings of the project.

Following acceptance of this report and further consultation and review, the Stage 2 report will be prepared to provide design guidance and recommendations for the assessment, analysis and management of blockage for drainage systems throughout Australia.

Reports can be downloaded from [www.arr.org.au](http://www.arr.org.au). The Technical Committee is interested in industry comments on these reports, which can be sent to [arr\\_admin@arr.org.au](mailto:arr_admin@arr.org.au).

To date over 90 practitioners from all states have made significant contributions to the ARR revision. The Technical Committee would like to reiterate its invitation for individuals and organisations to get involved in projects and the whole ARR revision process.

Individuals or representatives of organisations who are interested should contact the ARR revision team at [arr\\_admin@arr.org.au](mailto:arr_admin@arr.org.au) or contact individual members of the Technical Committee or project leaders directly (this information is available on the website).

The Technical Committee have also established an email list where you will get email notification when new project reports are uploaded to the website or when events are on. Simply email [arr\\_admin@arr.org.au](mailto:arr_admin@arr.org.au) to join.

### INNOVATIVE RESEARCH TO HARNESS CITY STORMWATER

The State Government will invest more than \$1 million in a research program that aims to better use stormwater to help secure and diversify South Australia's water supplies.

Minister for Water Paul Caica said

Cities as Water Supply Catchments is a national research program that aims to deliver a fundamental change in the way urban communities manage their stormwater.

"This groundbreaking research aims to create a national blue print to better manage stormwater in urban areas," he said. "South Australia is already a leader in stormwater harvesting and while we have made good progress in recent times, we know there are challenges ahead to ensure we can maximise the productive use of stormwater. "Cities as Water Supply Catchments will ensure stormwater is increasingly recognised as an asset and managed in a way that adds value, not cost, to urban communities.

Greater Adelaide."

The \$20 million project is part funded by the National Water Commission and is being undertaken by researchers from Monash, Queensland, and Melbourne universities and global design firm AECOM.

Commissioner for Water Security Robyn McLeod, South Australia's representative on the project, said the research will help maximise the capture and reuse of stormwater. "The program aims to develop more efficient approaches to urban water demand management and supply and planning, including Water Sensitive Urban Design," she said.

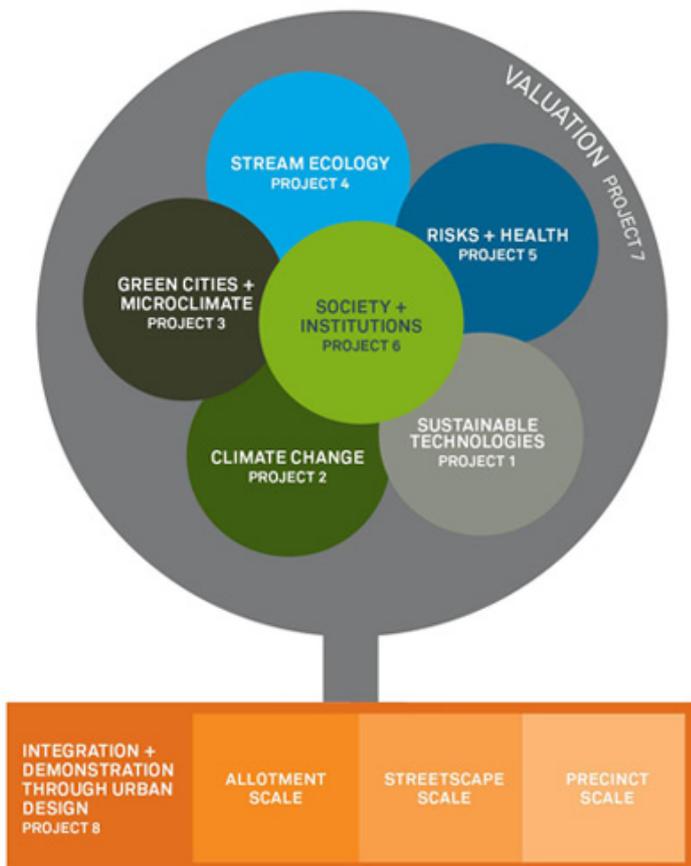
"Water Sensitive Urban Design involves designing the urban landscape in ways that make use of all the potential sources of water rather than relying on mains water."

Several potential sites have been nominated as demonstration sites for the project, including the Bowden Urban Village development on the former Clipsal site and the Lochiel Park Green Village development under construction at Campbelltown.

"The program will support South Australia's Water for Good plan and the 30 Year Plan for

For more information about the Cities as Water Supply Catchments research program visit [www.wsud.org/cities-as-water-supply-catchments/](http://www.wsud.org/cities-as-water-supply-catchments/)

The 8 WSUD project modules for the Research Program



## UPCOMING EVENTS



**World Water Congress  
and Exhibition**  
<http://www.iwa2010montreal.org/>



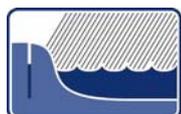
**Montréal**  
19–24 September 2010

Water is the lifeblood of the world and never more so than in Montréal, Canada, where 4,500 water professionals will gather in September 2010 for the International Water Association (IWA) World Water Congress and Exhibition (WWCE). The key topics to be discussed at this event are:

- the science and application of water management
- water, climate and energy
- cities of the future
- managing utilities and their assets
- securing new and traditional water resources for the future
- water, ecosystems and catchments
- water and health.

The IWA WWCE is a high-profile biennial event previously held in Vienna, Beijing, Marrakech, Melbourne, Berlin and Paris. In 2010, the IWA is partnering with the Canadian Water and Wastewater Association (CWWA) and the Canadian Association on Water Quality (CAWQ) to hold the event in Montréal.

The IWA is a global network of 10,000 individual and 400 corporate water professionals in 130 countries. IWA members span the continuum between research and practice and cover all facets of the water cycle, from the science and management of drinking water, wastewater and stormwater to the conservation of water resources throughout the world.



## Hydrological Society of South Australia Inc.

Presents

### Management of the Disposal of Formation Water Associated with the Production of Crude Oil

**Thursday, 5 Aug 2010**  
**Charles Hawker Conference Centre**  
**Waite Road, Urrbrae**

5.30pm – Nibbles and Drinks,  
Meet the Speaker  
6.30pm – Presentation begins

Nick Dunstan's role with Beach Energy is environmental compliance and stakeholder liaison. Nick will be presenting on initiatives for re-use of formation water produced by the process of deep reservoir crude oil extraction.

Head to  
[www.hydsoc.org](http://www.hydsoc.org)  
for more information

## Australia - New Zealand Climate Forum 2010

**Southern Hemisphere Climate:  
features · findings · futures**  
**13 to 15 October 2010**  
**Hobart, Hotel Grand Chancellor**

The guiding theme for the **Australia - New Zealand Climate Forum 2010** is *Southern Hemisphere Climate: features · findings · futures*. The motto is *Southern Exposure*, with particular focus on the role of Antarctica and the Southern Ocean in the climate of Australia and New Zealand. The themes are:

- **The living planet** - Southern Hemisphere Climate: ecology
- **Impacts on humanity** - Southern Hemisphere Climate: the human habitat
- **Observing** - Southern Hemisphere Climate: observations and data
- **Linkages** - Southern Hemisphere Climate: high/low latitude interaction
- **Changes** - Southern Hemisphere Climate: changes in the past, present and future

<http://www.bom.gov.au/events/anzcf2010/>



<http://www.hydsoc.org>

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There are currently vacancies for two committee members

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## MEDIA WATCH

### Delivering Improved Water Security for South Australians

South Australian councils will save almost 3 billion litres of water each year – about 1200 Olympic-sized swimming pools – by rolling out nine water-saving projects  
<http://www.climatechange.gov.au/-/media/Files/minister/wong/2010/media-releases/june/mr20100610.ashx>

### Experts Name the Top 19 Solutions to the Global Freshwater Crisis

The 19 best solutions to the global freshwater crisis captured by a GlobeScan and SustainAbility poll of more than 1200 leading international experts in 80 countries.  
<http://www.circleofblue.org/waternews/2010/world/experts-name-the-top-19-solutions-to-the-global-freshwater-crisis/>

### The Sermilik fjord in Greenland: a chilling view of a warming world

The wall of ice that rises behind Sermilik fjord stretches for 1,500 miles (2,400km) from north to south and smothers 80% of this country. It has been frozen for 3m years. Now it is melting, far faster than the climate models predicted and far more decisively than any political action to combat our changing climate. If the Greenland ice sheet disappeared sea levels around the world would rise by seven metres, as 10% of the world's fresh water is currently frozen here.  
<http://www.guardian.co.uk/environment/2009/sep/01/sermilik-fjord-greenland-global-warming>

### Proposal to make water infrastructure charge rules and undertake public consultation

The Minister for Climate Change, Energy Efficiency and Water proposes to make water infrastructure charge rules (rules) under subsection 92(1) of the Water Act 2007. Submissions are invited on the rules the Minister proposes to make. Submissions should be made no later than 10 September 2010.  
<http://www.environment.gov.au/water/australia/water-act/infrastructure-charge-rules.html>

### Antarctic ice provides clues to long-term drought in southern Australia

In a study published Sunday 7th February 2010 in the international journal Nature Geoscience Australian researchers detail a link between Antarctic snowfall and drought in southwest Western Australia.  
[http://www.acecrc.org.au/drawpage.cgi?pid=news&aid=797726&sid=news\\_media](http://www.acecrc.org.au/drawpage.cgi?pid=news&aid=797726&sid=news_media)

### Demand for water set to soar

Demand for water in Australia could increase by 1.5 trillion litres over the next 50 years, a new report forecasts.

<http://www.smh.com.au/environment/water-issues/demand-for-water-set-to-soar-20100715-10c1z.html>

### More consultation for Basin Water infrastructure charge rules

A further consultation period will give stakeholders the opportunity to comment on the new water infrastructure charge rules proposed for the Murray Darling Basin.

<http://www.climatechange.gov.au/minister/wong/2010/media-releases/July/mr20100714.aspx>

### Changeover to a new computer forecasting model

The Bureau is phasing out its computer forecasting model (GASP, LAPS) on 30 July 2010, and introducing a new forecasting model called ACCESS. Some bookmarks will cease to work and should be updated.

<http://www.bom.gov.au/weather-services/about/service-changes/modelchangeover.shtml>

### BP stops oil leak in Gulf of Mexico for first time since April

Engineers have stopped oil flowing freely into the Gulf of Mexico for the first time in almost three months - but stress tests over the next 48 hours will determine whether the new cap on the deep-sea well will hold.

<http://www.guardian.co.uk/environment/2010/jul/16/bp-oil-spill-leak-stopped>

### Deep thinking on the world's oceans

The world's deep ocean researchers – scientists whose field of interest extends into the uncertain world below about 2000 metres – met in Hobart recently to discuss deep ocean changes, their causes and their implications.

<http://www.csiro.au/news/Deep-thinking-on-the-worlds-oceans.html>

### 70 Percent of Himalayan Glaciers Gone by Next Century, Studies Say

While the Intergovernmental Panel on Climate Change predicted wrongly that the Himalayan glaciers would be gone by 2035, photographic and scientific evidence shows that the melting third pole is still devastating the region.

<http://www.circleofblue.org/waternews/2010/world/70-percent-of-himalayan-glaciers-gone-by-next-century-studies-say/>