

出國報告（出國類別：考察）

第 13 屆國際河川研習會
(13th International Riversymposium)

服務機關：經濟部水利署中區水資源局

姓名職稱：江俊生 副工程司

派赴國家：澳洲

出國期間：99 年 10 月 11 日~14 日

報告日期：99 年 12 月 14 日

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一、研習目的

水利署中區水資源局轄管大安溪鯉魚潭水庫、大甲溪石岡壩、及濁水溪集集攔河堰等 3 水源設施及苗栗至雲林之中部地區水資源調度與管理，穩定中部各地區之供水為主要核心業務。近年各區社經發展蓬勃，公共用水需求快速增加，致水源調度吃緊，加上近年氣候變遷所造成之非旱即澇現象，包括降雨強度增強、豐枯水期降雨不均、降雨分佈型態改變、水資源調配難度增加等問題，皆增加中區水資源調度困難。為未雨綢繆並汲取相關國外調水配水與管理經驗，爰參加國際水資源管理委員會舉辦之「第 13 屆河川國際研習會」(13th International River symposium)，研討主題包括水資源管理、水資調度、生態基流量評估、旱災管理、水資源決策輔助工具等議題，實為提昇專業智能及因應氣候變遷產生水資源管理問題及推廣台灣經驗良好機會。

二、研習過程

此次於澳洲伯斯舉行之第 13 屆國際河川研習會時間為 99 年 10 月 11 日至 99 年 10 月 14 日，加上前後啓程與返程時間，出國時間共計 7 日，每日過程及研習內容如下表：

日期	過程	研習內容
10 月 9 日	啓程 (桃園→香港 →澳洲伯斯)	10/10 利用下午時間自費前往 Perth 西邊 Mundaring 蒐集「Mundaring Weir Water Supply Improvement Project」相關資料，詳附件照片及說明。
10 月 10 日		
10 月 11 日	參加第 13 屆 國際河川研 習會及技術 考察。	1.The Netherlands. Social and economic consequences of global post 2010 biodiversity policys. 2.Republic of Korea. Revival of Rivers :a new korea. 3.Providing environmental water fo unregulated systems, with emphasis on the West Australian approach. 4.The role of water markets in achieving sustainable water use. 5.Case Study:Transferring from lakes to river basin management: Drim dialog.
10 月 12 日		1. Case Study: River of the Cape, South Afica. 2. Study Tour: River Restoration Study Tour- Swan Canning River park. 3. Water planning tools.
10 月 13 日		1.Dancing with river in Deltaic Bengal:an exploration of river, land and rvier islands. 2.The Ord East Kimberley Expansion Project. 3.Moving mountaions(and rivers) in a flat landscape. 4.Impacts of climate change on rivers.
10 月 14 日		1. Moving water on a grand scale- water transfers and agriculture. 2. When rivers don’ t move-Droughts. 3. The Great River Debate- The Oceans Are Our Solution for Future Water.
10 月 15 日		返程 (澳洲伯斯→

三、心得及建議事項

(一)心得感想

首先非常感謝經濟部水利署及所屬中區水資源局之長官支持，讓本人有機會參與此次於澳洲伯斯(Perth)舉辦的第 13 屆國際河川研習會，此次研習會雖然僅有 4 天，惟超過 20 個國家及 500 位研習人員參與此次盛會。此次研習會研討的議題包括科技化水資源管理、健康河川環境、生物多樣性、河川育復及保育、氣候變遷影響與因應、以及水資源如何永續利用等，在研習過程個人也跟來自紐西蘭、荷蘭、美國、印尼、日本、韓國、中國大陸及澳洲本地等研習人員分享及交流台灣經驗。參與此次研習會後，個人認為國內的河川及水資源管理的工具方法、經驗及模式方面，與國外並無太大落差，甚至在工具應用上國內技術更有領先，惟在集水區及河川環境管理與決策人員部份，在澳洲及歐洲國家中任何的河川及集水區管理工作，在最基礎的規劃作業到方案形成、及至決策階段都會有不同專業人員參與及充份討論。反觀，國內的河川及集水區管理權責多分散於各權責機關，專業技術及相關資源較難整合及有綜合管理的成效，期待未來水、土、林相關管理權責機關納入「環境資源部」後，有更多不同專業領域人員參與河川及集水區管理工作。

另經聆聽及蒐集各國所發表之水資源與集水區管理經驗，與會研習人員多表示水資源的管理議題複雜，須考慮的層面包括環境變遷、社會接受度、財務計畫及政策等等，都是相當困難的工作挑戰。且配合科技的進步，多數與會管理單位多已發展即時監測系統及集水區管理系統等，以作管理輔助決策參考。台灣本島因同時存在降雨時空分布不均、地質脆弱、河川短、人口稠密、土地資源有限等劣因，集水區水資源管理相對不易，且極端事件發生更是頻繁，集水區由專責單位負責及引進即時與行動的全流域監控與決策系統輔助管理已為世界各國水資源與河川管理未來趨勢。

(二)建議事項

- 1.建議未來持續派人參與國際河川研習會，除可學習國外相關河川及水資源管理識能外，亦可向國際分享台灣經驗。
- 2.建議國內相關水土林之三級及四級機關，除現有專業技術人員（如土木、水土保持、水利工程及林業人員等）編制外，應優先增加包括環境保育、復育、永續安全等基層人員，並使各領域專業人員充份參與規劃、方案形成至決策過程，以兼顧各個面向，並儘可能在考量資源永續及環境安全條件形成決策。。
- 3.持續引進擴充高科技系統工具，儘可能朝即時的與行動的全流域監控與決策系統輔助管理，提昇管理效能。

四、附件



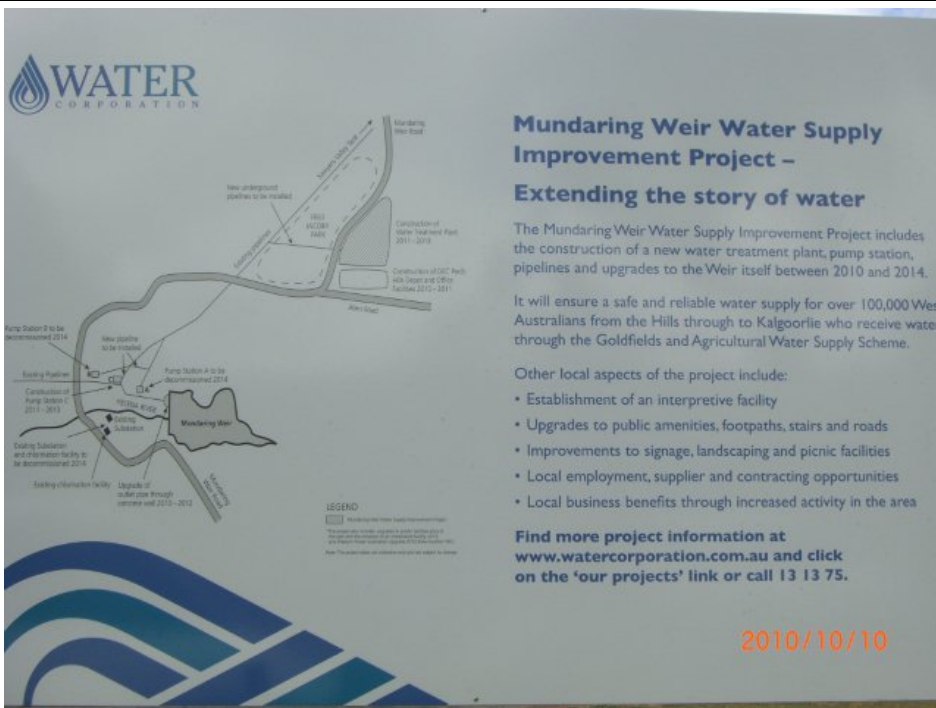
附圖 1 說明：本張照片為於 Perth city 之 Kings park 往 Swan River 拍攝。



附圖 2 說明：本張照片為當地扶輪社於 Perth city 辦理假日二手物品市集情形，並與相關志工合照。



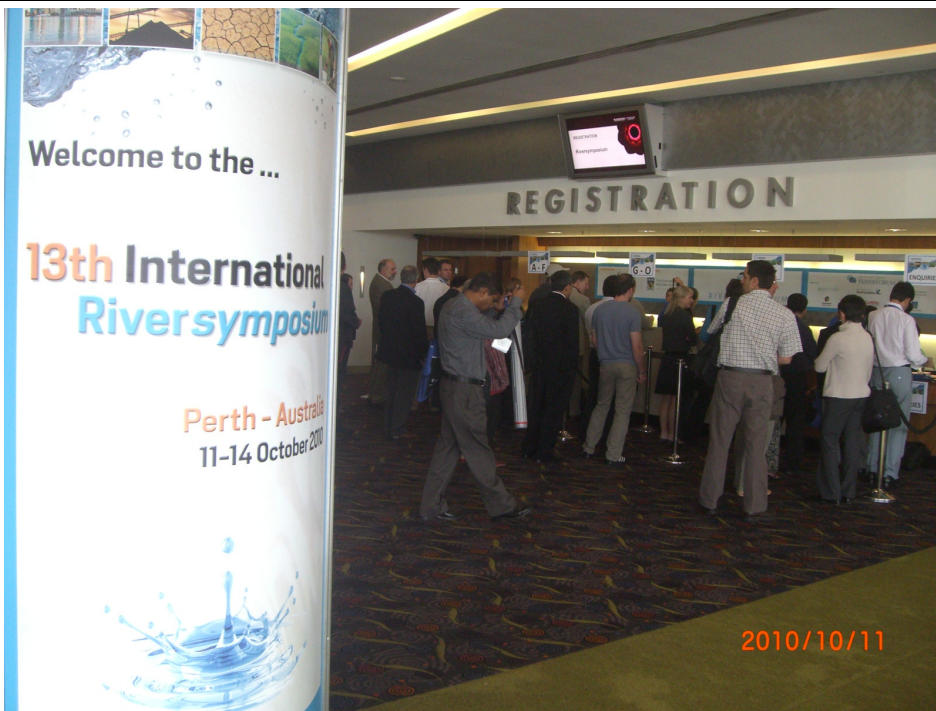
附圖 3 說明：10/10 利用公餘時間自費前往 Mundaring Weir，照片由下游往上游攔河堰方向拍攝，圖片中可見該攔河堰右側岩盤基礎良好，故興建攔河堰時並未將基礎移除後再建，對國內而言實屬特殊案例。



附圖 4 說明：位於 Mundaring Weir 旁之「Mundaring Weir Water Supply Improvement Project」告示牌。



附圖 5 說明：圖片中送水幹管負責將 Mundaring Weir 所攔蓄之水源，以加壓方式送水至 560km 外之「arid goldfields」高地使用，此加壓供水系係於 1890 年開發使用迄今。其加壓送水管輸水長度及開發年代，對國內而言亦屬特殊案例，極具參考價值。



附圖 6 說明：10/11 第 13 屆國際河川研習會參與人員報告情形。



附圖 7 說明：第 13 屆國際河川研習會開幕情形。



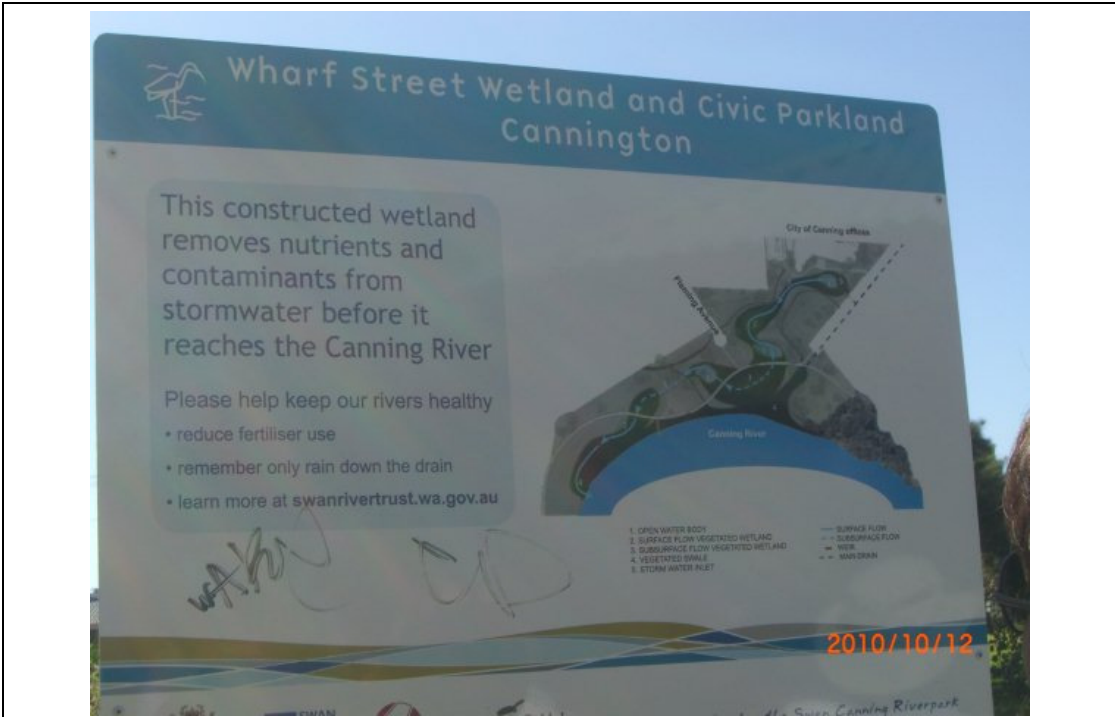
附圖 8 說明：第 13 屆國際河川研習會開幕配合上台人員撥放投影情形。



附圖 9 說明：10/12 參加 Swan River Restoration Study Tour 所見跨 Swan River 橋樑，由圖中可見其送水管與橋樑共構，與國內一般橋樑與輸水管單獨設置情形不同，此方式可減少橋墩設置數量並可提昇與環境之調和。



附圖 10 說明：10/12 參加「Swan River Restoration Study Tour」所見跨 Swan River 橋樑，圖中可見就地取材使用木材作為橋樑墩座支撐材料，經個人評估該地因河川流量及水位變動小，有其設置條件，與國內環境太不相同。



附圖 11 說明：10/12 參加「Swan River Restoration Study Tour」所參觀 Whorf Street Wetland 之現場宣導牌。



附圖 12 說明：10/12 參加「Swan River Restoration Study Tour」所參觀 Whorf Street Wetland ，相片內容為 storm river 進入 Canning River 前之溼地設置。



附圖 13 說明：研習會期間與來自印尼研習人員合照。



附圖 14 說明：研習會期間與來自中國(左一)、韓國(左二)及日本(右一) 研習人員合照。

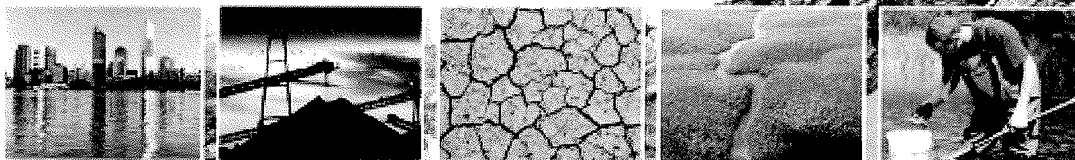


附圖 15 說明：研習會期間與當地澳洲研習人員合照。



附圖 16 說明：10/14 日水資源議題辯論與參與聆聽人員情形。

13th International Riversymposium DAILY NEWS



TUESDAY 12 OCTOBER

Biodiversity and Korea's River Restoration Project

More than 500 guests from 20 countries filled Burwood's Grand Ballroom yesterday morning at the official opening of the 13th International Riversymposium.

The Hon Dr Graham Jacobs MLA, Minister of Water and Health WA officially opened the conference after Janette Hayden's Welcome to Country, and a performance by Jonathan Walley Middar Dancers and Performers. Keynote speakers Dr Leon Braat from the Netherlands, and Korea's Dr Yoon Jung Cha then took to the stage.

Biodiversity was the key topic for Dr Leon Braat from Wageningen University & Research centre. His presentation centred on the importance of recognising the degradation of biodiversity and the necessary policy changes needed to conserve biodiversity and ensure the "sustainable satisfaction of all needs."

Dr Yoon Jung Cha introduced guests to the Four Major Rivers Restoration Project of South Korea, which aims to restore the Han, Nakdong, Geum and Yeongsan rivers to provide water security, flood control and ecosystem vitality.



Jonathan Walley Middar Dancers and Performers entertained more than 500 delegates at the official opening of the 13th International Riversymposium

TODAY'S KEY ACTIVITIES

- Study tours - River Restoration Study Tour - Swan Canning Riverpark & Endangered Fish Species Study Tour
- River Dialogue Workshop 2: The importance of storytelling to share knowledge, Astral 3 at 12.30pm
- Riverprize Gala Dinner, Grand Ballroom at 7.00pm

TODAY'S STUDY TOURS

For those who are registered for a study tour, remember they are on today! Make sure you're at the bus ready for departure for the following times –

- **10.15am** for the River Restoration Study Tour - Swan Canning Riverpark
- **12.15pm** for the Endangered Fish Species Study Tour

20 EXHIBITORS ON DISPLAY

By now, you will have walked through the trade exhibition, located in the foyer of the complex.

The trade exhibition is a great opportunity for both exhibitors and delegates to network, share knowledge and ideas as well as new technology within the water market.

Each trade booth is manned during all session breaks and we encourage you to visit each display and interact with the exhibitors.

Managing human impact on the world's lakes and rivers

The University of Western Australia's research on lakes and rivers is having a major impact at an international scale. Recently a management system developed at the University was deployed at picturesque Lake Iseo in the alpine Lombardy region of northern Italy together with researchers from Università degli Studi di Brescia.

Director of UWA's Centre for Water Research, Professor Jörg Imberger, and his colleague Assistant Professor Clelia Luisa Marti were in Italy from July 15 to 30. They used the 'Real-time Management System (RMS)', developed at the Centre, and being used at several sites around the world.

"This management system has

allowed us to overcome the tyranny of scale," Professor Imberger said. "Lake Iseo is a relatively large and deep system and cannot easily be covered with a monitoring program. RMS allows us to combine monitoring equipment; database management; three-dimensional computer simulations of the hydrodynamics and the ecology; and web technology in real-time, so that field experiments maybe embedded into numerical solutions on the 'fly'".

Professor Imberger said the objective of the field experiment was three fold - the ecological functioning of deep lakes, assessing the impact of climate change and land use on deep lakes, and the exchange of material across the ben-

thic boundary layer and its impact on lake productivity between.

The Director of UWA's Centre of Excellence in Natural Resource Management has also been working as part of an international team to assess the crisis in the world's rivers. The report of their work was recently published in the journal Nature.

The grim portrait of the world's rivers shows that nearly 80 per cent of the world's human population live in areas where river waters are highly threatened, posing a major threat to human water security and resulting in aquatic environments where thousands of species of plants and animals are at risk of extinction.

PROGRAM CHANGES

- Chris Hallett presenting in B3C from A3F
- Robin Smith presenting in B3D from D1F
- Grant Douglas replacing Laura Wendling in B3D

DELEGATES WELCOMED TO RIVERSYMPIOSIUM

More than 500 delegates nibbled on canapes, sipped champagne and enjoyed the smooth sounds of jazz at last night's Welcome Function.

The event, sponsored by the University of Western Australia (UWA)

gave Australian and international delegates the opportunity to mingle and discuss the day's events.

Pro Vice-Chancellor Research Alistar Robertson gave a short speech while a roving magician provided some light entertainment.

Thanks to our sponsors:



The Commonwealth as Water Holder

A Basin-wide approach to environmental watering

Australia's water ecosystems – rivers, wetlands, floodplains and the plants and animals they support – are vital to Australia's long term sustainability. Over-extraction and drought continue to put our rivers and wetlands under significant stress. As water availability declines due to climate change, protecting and restoring the health of these assets will be an increasing challenge.

To help address this problem, Australian Government reforms have created the position of the Commonwealth Environmental Water Holder.

The Commonwealth is holding and managing water entitlements throughout the Murray-Darling Basin. Entitlements are acquired through the Government's Water for the Future initiative and are managed for the purposes of pro-

tecting and restoring environmental assets such as wetlands and streams.

Decisions need to be made about using this held environmental water across competing environmental outcomes. To guide these decisions a long-term framework has been developed which includes a set of criteria for evaluating water use options, and input from Basin states and a scientific advisory committee.

As at September 2010, more than 273 gigalitres of environmental water had been made available for use to the rivers, wetlands and floodplains of the Murray-Darling Basin. Preliminary outcomes are positive, including improved tree health, decreasing salinity and benefits to threatened species.

However, the program is at an early stage and in the coming

years, the Commonwealth's environmental water holdings will grow substantially. This will provide an increased range of watering options and a much greater capacity to protect or restore environmental assets and improve overall ecosystem health.

You can learn more about the Commonwealth as water holder at 1.30pm today in the session on Moving Water for the Environment – Environmental flows for rivers and estuaries or by visiting the Department of Sustainability, Environment, Water, Population and Communities' trade booth in the Riversymposium exhibition area.

After *Riversymposium*, to find out more about the Australian Government's environmental watering program call 1800 218 478 or visit www.environment.gov.au/water/policy-programs/cewh/index.html

The Ongoing Search for Sustainable Water Solutions

Thiess Services is applying the latest ideas to the management of Perth's water resources, confirming the company's place at the forefront of the Australia's water services industry. By ensuring the right people are deployed and the safest, best-in-class strategies are applied with an internal culture focused on success, Thiess Services is supporting efforts to make our modern lifestyle more sustainable.

Through Swan Water, a joint venture with Water Corporation, Thiess Services assists with the effective and efficient day-to-day management of half of Perth's water services network. It is a role that is taken very seriously.

Indeed, the Thiess Group has been delivering on-the-ground water management outcomes for

several decades, beginning with the nation-building Snowy Mountains Scheme. Currently, the group is constructing Victoria's \$3.5 billion new desalination facility in conjunction with French water experts, Degremont. Upon completion in late 2011, Thiess Services will operate and maintain a facility capable of supplying 150 billion litres of drinking water each year – equal to about one third of Melbourne's annual water needs.

Thiess Services people is actively providing technical services throughout the twists and turns of the water resource journey – from waterways and wetland management to potable water harvesting, distribution and reticulation, desalination, wastewater treatment and recycling.

Nationally, Thiess Services is

a leading provider of integrated services in water, energy, environmental and infrastructure management, committed to the challenge of improving the environment and enhancing the communities in which its people live and work.

For more than 75 years, the Thiess Group has been involved in the construction of some of the nation's largest infrastructure projects, including the Sydney Harbour Tunnel, Melbourne's Eastlink project and Brisbane's current \$4.8 billion Airport Link project. A commitment to delivering great client outcomes has powered expansion throughout Australia, New Zealand, Indonesia and the Middle East. Thiess Group has annual turnover of \$6 billion and \$15.5 billion of work in hand. It is a wholly-owned subsidiary of Leighton Holdings Ltd.

Recognising our Future Water Leaders

The Future Water Leaders Award, formally Young Water Scientist Award, promotes excellence in the development of capable researchers, communicators and innovative thinkers. The award provides postgraduate students the opportunity to raise the profile of their research as well as present at an internationally recognised conference.

For 2010, we could like to congratulate our two finalists – Chris Hallett and Dominic Skinner.

Originally from the UK, Chris Hallett gained a BSc in Biology from the University of Manchester, studying among other topics, the effects of light on the health of Costa Rican tree frogs, before commencing an MSc in Marine Environmental Protection at the University of Wales, Bangor. During his MSc, Chris held

a volunteer research fellowship at CSIRO in Hobart, studying the diet and feeding ecology of two deep-sea dogfish species on Tasmanian seamounts.

Chris fell in love with Australia during his time in Tasmania, and in February 2007, began a PhD in the Centre for Fish and Fisheries Research at Murdoch University. Chris' current research centres on estuarine fish community ecology, the concept of ecological health, its monitoring and assessment, and the use of ecological indicators for aquatic ecosystem management.

Dominic Skinner is currently undertaking a PhD at the University of Adelaide in collaboration with CSIRO's Water for a Healthy Country Flagship Programme (2009-11 scholarship recipient). Dominic's research examines the effects of water level

decline on Lake Alexandrina in the Lower Murray River, focussing on the changes to sediment redistribution by wind. More broadly, his research interests include the cumulative effect of climate change and river regulation on water availability for human use and environmental flows.

Dominic completed Honours in Environmental Management at the Flinders University of South Australia and has a Bachelors degree in Science, majoring in Chemistry and Biochemistry, from the University of Adelaide. He is an avid squash player and has a keen interest in wildlife photography.

Dominic presented his research in sessions yesterday and Chris will present today in B3C. The winner will be announced in the closing plenary on Thursday. Best of luck to both finalists.

PROGRAM SUMMARY

The first day of the Riversymposium program made me feel very glad we have made the move to Perth this year, with plenty of interesting Western Australian content. The National Water Commission ran a fascinating session about providing environmental water for unregulated systems. Groundwater and regulation were also discussed in the Water in Industry feature session and will be continued in a groundwater feature session tomorrow (B2D). Leon Braat delivered a sobering story about loss of biodiversity on the globe and the complex relationship between biodiversity and ecosystem services. The need to include economics in environmental management was explored in the water markets feature session in the afternoon.

The audience in the dams and barges session was excited by Brenton Erdmann's tale of the development of a carp trap that makes the

most of an observation that carp jump when they encounter a barrier but native fish generally don't. The trap described, situated on a dam, catches 90 tonnes of carp per year.

Dr Cha explained the Four Rivers Restoration project in Korea illustrated with a beautiful video explaining the enormity of the work planned.

The closing plenary session included an inspiring talk by Yao Yin about The Nature Conservancy's Great Rivers Partnership that emphasised the importance of scientists and communities from different nations working together to share their knowledge and experience of their river systems.

Richard Weller concluded the day's presentations with a stirring talk about future development possibilities with increasing population. The audience was treated to his wonderful graphics that made understanding the concepts immediate.

Selina Ward Program Convenor

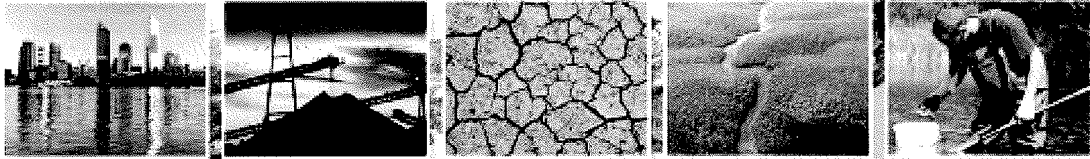
RIVER DIALOGUE WORKSHOP

The first of three River Dialogue workshops "Agents of Health – Rivers and Wetlands: Environmental Water Managers", was a great success.

Ann Hinchliffe introduced the Community of Practice for Environmental Water Managers and spoke of the five priority knowledge issues for environmental managers – managing water allocations with climate change, understanding river flow/ecological relationships, using monitoring to improve flow/allocation regimes, managing water on a whole-of-catchment scale and explaining outcomes to community.

Two case studies were presented with audience discussions highlighting the need for environmental water managers to have greater leadership and communication skills in order to take advantage of the transient opportunities of flow events. River Dialogue II, "The importance of story telling for sharing knowledge", will be held today, in Astral 3 at 12.30pm.

13th International Riversymposium **DAILY NEWS**



WEDNESDAY 13 OCTOBER

Congratulations Riverprize Winners

2010 THIESS INTERNATIONAL RIVER-PRIZE WINNER – RIVER THAMES

The Environment Agency, England, has been reviving the iconic River Thames. From being declared biologically dead in the 1950s the River Thames has made a remarkable recovery, with salmon and otters returning to the river. The Agency is working on a number of projects and initiatives with a range of partners to help the River Thames reach its ecological potential. The Environment Agency is also planning for the future. The Thames Estuary 2100 vision is a 100 year adaptable plan directing the future sustainable management of tidal flood risk in the Thames estuary.

It is this type of innovative, forward-



thinking behaviour that demonstrates the Environment Agency's commitment to protect and improve the environment, and promote sustainable development in England and Wales. International River-Foundation would like to thank the inter-

national and national Riverprize Judging Panels for their time and expertise; the Australian Government for funding the National Riverprize; and International Riversymposium for hosting the Gala Dinner.

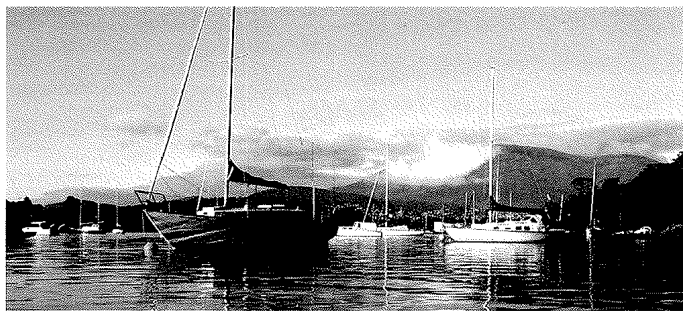
DERWENT ESTUARY WINS 2010 NATIONAL RIVERPRIZE

The Derwent Estuary, Tasmania, has been recognised for excellence in reducing water pollution, conserving habitats and species, monitoring river health and promoting greater use and enjoyment of the foreshore.

The Derwent Estuary Program is a partnership between the Tasmanian State Government, six local councils, five major industry and commercial businesses, scientists and the community to restore the Derwent estuary. Since establishment in 1999, more than \$100 million has been invested in environmental projects, and the Derwent is showing signs of recovery. During the past five

years there has been an 80 per cent reduction in organic inputs, 50 per cent reduction in heavy metals, and 30 per cent

reduction in sewage-derived nutrients in the estuary, as well as improvements in stormwater treatment.



13th International Riversymposium

THE GREAT RIVER DEBATE

Join six exciting speakers as they debate the statement: the oceans are our future solution for water. *Does desalination hold all the answers we are looking for?* Prof. Gary Jones will return to facilitate the debate and challenge you to adjudicate with the clapometer.

The two teams ... AFFIRMATIVE

Prof. Stuart Bunn is director of the Australian Rivers Institute at Griffith University. He is a member of the Scientific Steering Committee for the Global Water

System Project and a Commissioner for the National Water Commission. His research interests are in the ecology of river and wetland systems. Ms **Chloe Munro** is also a Commissioner for the National Water Commission. She is the Chair of AquaSure, the consortium building the Victorian desalination plant and a director of Hydro Tasmania. The last speaker for the positive side will be announced very soon. It is someone representing the resource industry.

NEGATIVE

Dr Roger Pulwarty is Director of the

Climate Diagnostics Centre at NOAA and University of Colorado. He's interested in climate and weather and the design of effective services to address associated risks. The **Hon Alison Xamon** is a member of Legislative Council (WA State Parliament). She is the Greens spokesperson for water and was a lawyer before entering parliament. **Dr Leon Braat** is from Wageningen UR in the Netherlands. He is interested in ecological – economics science interface and conducts international biodiversity research.

PROGRAM SUMMARY

Yesterday we heard sobering news about the future prospects and current problems with climate change and other human impacts.

Gavin Quibell shared the South African experience of a highly regarded water act that has been difficult to implement for a variety of reasons.

The challenge of successful implementation has come up many times during the program. Gavin's threat of using the vuvuzela for heckling kept the audience quiet.

Roger Pulwarty managed to amuse the audience with wit whilst covering the glum topic of climate change on a global scale.

If those challenges weren't enough,

Setiawan Wangsaatmaja described the role of managing a river previously referred to as the world's dirtiest river.

WA Fisheries shared fabulous work towards preventing freshwater extinctions, including captive breeding programs for tiny endangered frogs, native fish and marron, a large WA crayfish species.

The climate change session covered WA coastal areas, land loss due to sea-level rise in the Sundarbans and innovative ideas for adaptation, and flooding and typhoons in the Philippines.

Selina Ward Program Convenor

RIVER DIALOGUES II WORKSHOP

River Dialogues II demonstrated the importance of telling stories. After an introduction to what story telling is and how it can be used in the workplace, the audience shared their stories about fish, rivers and wetlands.

Delegates are encouraged to read "River Journey II" – stories from the Riverprize winners, and if you'd like to share your story. "With conferences focussed on talking heads, the opportunity to share stories among delegates was not only interesting, but also allowing me to get to know new people with similar challenges" said one participants

For more information please visit the ARRC website at <http://australianriver-restorationcentre.com.au/>

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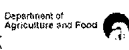
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Government of Western Australia
Department of Regional Development and Lands



Tuesday 12 October

2

Department of Water Showcases Priority Work at Riversymposium

As Western Australia's water management leader, the Department of Water is one of the sponsors of the 13th International Riversymposium.

The Riversymposium's focus will be on Western Australia and the complex issues of managing the state's rivers and catchments, while supporting population and economic development.

This important annual event (being held outside of Brisbane for the first time), provides the department with a unique opportunity to highlight and showcase its priority work which addresses these complex issues.

Case studies from across the state will be presented by department staff on Water Sensitive Cities and how we

are managing and protecting the state's water resources - including both surface water and groundwater.

Moving Perth towards becoming a water sensitive city is a priority for the department, which understands the need for providing economically viable options for water use, and taking adaptive management responses to address challenges of climate variability, to ensure that we have liveable neighbourhoods.

A water sensitive city takes into consideration the total water cycle and encourages all levels of government and industry to adopt water management and urban planning practices that will benefit the community, the economy and the environment.

Outcomes of taking this approach

include keeping our waterways and aquifers healthy.

The Department of Water aims to manage water to support Western Australia's economy, provide amenity for the community, and sustain the environment by providing three primary services to the community.

These services revolve around the interrelated services of water resource use, urban water management and services, and waterways health. They are underpinned by a range of support services, to create an outcomes-focused business model which enhances the department's role as the state's water manager.

For further information you can view our website at: www.water.wa.gov.au

Murdoch University Researches WA's Aquatic Environments

The extensive estuarine, riverine and near coastal marine environments of south-western Australia are a major source of commercial fish (fish, shellfish, crustaceans) harvested by commercial and recreational fishers. The recreational value of these environments is outstanding and is the basis of a substantial tourist industry.

As the population of Perth and surrounding cities burgeons, the challenge of managing aquatic environments and their biodiversity in a healthy condition is increasing.

Murdoch University has conducted extensive research into these environments for over 30 years and leading researchers within the Sustainable Ecosystems Research Institute continue to pioneer research necessary to underpin sustainable management of ecosystems and water in this part of Australia.

One area that has attracted much attention recently is the research undertaken by Murdoch University's Cetacean Research Unit. Key activities include cetacean population dynamics and behavior and ecosystem interactions, assessing impacts of human activity on cetacean populations, and marine mammal health in estuarine and marine environments.

Visitors to Murdoch University's booth can see outcomes of research in

the following areas:

- Health of Swan River dolphins
- Fish as indicators of ecosystem health
- Fresh-water molluscs as pollution bio-indicators
- Black bream – an important recreational fish that breeds in estuaries
- Unravelling estuarine food webs to better manage commercial and recreational fishing.

Members of Murdoch University's Centre for Fish and Fisheries Research will be on hand to discuss these and other areas of research.

TODAY'S KEY ACTIVITIES

- Visit the International Water-Centre booth today at 10am to hear about holistic solutions to global water and climate change challenges.
- Panel discussion on The Ord East Kimberley Expansion Project, Grand ballroom at 10:30am
- Catchment Challenge feature session in Astral 3 at 10:30am
- UNESCO HELP public forum on HELP in Australia, Grand ballroom at 12:00pm
- River Dialogue Workshop 3: Attracting corporate partnerships for river restoration, Astral 3 at 12:30pm

PROGRAM CHANGES

- C2B Jason Alexandra replacing Mike Taylor
- C2F Jeongkon Kim not presenting
- C4B Joe Ross not presenting
- C4F Rezaul Chowdhury not presenting

RIVER HEALTH IN CHINESE RIVERS

Join the International WaterCentre (IWC) for a drink to learn more about recent advances in river health and environmental flow assessment in Chinese Rivers.

Wednesday 13th October, Botanical Foyer at 5.30pm - 7pm

POSTER VIEWING TODAY

Don't forget that morning tea today is dedicated to posters. Poster presenters will be available at their poster boards to answer any questions you may have in relation to their work.

We'd also like to thank all the poster presenters and wish you luck for the Riversymposium Poster Award, sponsored by eWater CRC, which will be announced in the closing plenary tomorrow

Study Tours Showcase Swan Canning Riverpark and Leading Aquatic Research

Just over 100 delegates took part in the *River Restoration - Swan Canning Riverpark* and *Endangered Fish Species* study tours yesterday.

The day began at the Barrack Street Jetty for the start of the River Restoration Study Tour presented by the Swan River Trust. About 60 delegates gathered at the jetty for a Welcome to Country before boarding the Miss Sandalford boat and heading upstream on the iconic Swan

River. During the cruise delegates were presented with talks on local riverine issues and shown foreshore restoration sites, water quality improvement and intervention approaches to river management.

Following the end of the cruise at the Swan Valley, delegates travelled to Wharf Street Wetland where a constructed filtration wetland tour demonstrated effective intervention methodologies.

The Endangered Fish Species Study

Tour took delegates to the Aquaculture & Native Fish Breeding Laboratory at the University of Western Australia's Shenton Park Field Station – the largest recirculating aquatic species research system in Australia. The facility enables students and scientists to pursue leading edge aquatic science and fish reproduction research projects.

Delegates enjoyed a tour of the facility and the chance to meet staff and students to discuss current research.



About 60 delegates gathered at Barrack Street Jetty yesterday morning and enjoyed a Welcome to Country from Noongar Elder Leonard Thorne before boarding a boat for a cruise upstream.

Inaugural River Youth Forum Delegates Presented at Riversymposium

Young delegates presented their views on how to protect Perth's rivers at this year's International Riversymposium.

During the Riversymposium, an inaugural Swan Canning Riverpark Youth Forum developed by the Swan River Trust saw approximately 85 students from Years 5-10 in the Swan Canning Catchment gather to discuss and workshop critical challenges faced by the rivers and explore ideas for new solutions.

Two Youth Ambassadors from the River Youth Forum presented their

recommendations to the International Riversymposium delegates during this morning's plenary session.

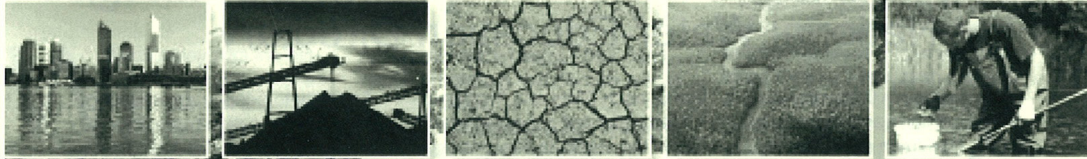
The Youth Forum included river science presentations provided by local experts with a focus on community river values and how students could help protect the rivers for the future, networking with like-minded individuals and schools.

Swan River Trust Program Coordinator Angela Petrow said the event increased students' understanding of river science and focused their attention on river values.

"This event recognises the vital role the next generation play in protecting our iconic Perth rivers and setting a good example to other young people around the world," Mrs Petrow said.

"To present their findings at the International Riversymposium allows these students to be the voice of young people and share their views with international experts, a rare and exciting opportunity." A formal report will be produced after the River Youth Forum for consideration by the Swan River Trust and reported to Western Australia's Environment Minister Donna Faragher.

13th International Riversymposium **DAILY NEWS**



THURSDAY 14 OCTOBER

The Value of Rivers 14th International Riversymposium in 2011

The 14th International Riversymposium, 26-29 September 2011, will explore the multiple reasons that rivers are valuable – the economics and ecoservices, the cultural and spiritual values, use of rivers in industry, the environmental values of wild rivers and keeping environmental flows

adequate. We will have a wetland focus including the value of healthy wetlands (and rivers) to human health. Maintaining these valuable assets requires good governance and institutional arrangements so we will run this theme along with peace and conflict around rivers, restoration of rivers, collection of data from

waterways and of course keeping the community involved.

We will be running alongside the 50th Australian Society for Limnology Conference and look forward to welcoming you all back to Brisbane. The full list of proposed themes will be available on our website in late November.

Today's debate – are you ready to clap?

Arguments have been formed and strategies decided on both sides of the debating panel, ready to tackle the controversial topic – Oceans are our source for future water. Each

debate speaker will get the chance to state their case for their side and Professor Gary Jones, CEO of eWater CRC, will facilitate questions from each team and from you, the

audience. To decide the winner of the debate, you will be asked to clap for your side – the side with the loudest applause will then win this year's debate.

UNESCO Hydrology for Environment Life and Policy (HELP) Program

The UNESCO Hydrology for Environment Life and Policy (HELP) program is an integrated water resource management initiative from the UNESCO International Hydrology Program. It has an extensive international network which is able to provide experience on collaborative water management approaches for water law, policy experts, water resource managers and water scientists.

A public forum on HELP activities globally – with a focus on Australian HELP catchments – was held to introduce the program to the Riversymposium delegates and seek feedback regarding the program.

Key messages included opportunities for sharing experiences was critical to the success of the program. This has been achieved through twinning programs, exchanges and, more recently, computer and online based

'knowledge platforms'.

New water experts from all fields are welcome and encouraged to join the network and participate in the UNESCO HELP activities in Australia and globally.

For more information please contact Jeff Camkin, UNESCO HELP Australian Coordinator, jeff.camkin@gmail.com.

University of Queensland Researchers Develop First National Water-Education Directory

Australia's first water-education resource website has been developed by researchers from The University of Queensland (UQ) to increase water and sustainability awareness.

A wide range of materials, including more than 700 online resources were provided by private and public Australian organisations, as well as government departments. This collection now offers a single point of access for teachers and students from pre-school through to secondary school.

Funded through the Australian Government's \$12.9 billion water reform initiative, Water for the Future, and hosted by the Department of the Environment, Water, Heritage and the Arts, the website is designed to support the curricu-

lum of each State and Territory.

With water not generally specified in the curricula, key concepts and themes were used to connect the online water resources to required learning objectives, according to project leader Will Kershaw from the Working Group for Cleaner Production (WGCP), in the Faculty of Science at UQ.

"Our brief was to make it easy for all Australian pre-school, primary and secondary teachers to access online water education resources from across Australia and incorporate these into their lesson plans," said Mr Kershaw.

"We created a website on which the materials can be linked by key themes and concepts to the learning objectives for any curriculum, school level and subject. This has given teachers the freedom and

flexibility to adapt a growing body of water-education resources to meet their specific needs," he said.

Mr Kershaw and his colleagues at the WGCP collaborated with UQ researchers from the School of Education and the Centre for Biological Information Technology to source and identify the best resources, review the curricula and develop the website.

Working with UQ's main commercialisation company, UniQuest, the group was chosen over 19 other tender applicants for the government project.

Working closely with the former Department of the Environment, Water, Heritage and the Arts, the website was successfully launched on 1 February 2010. The website can be viewed at www.environment.gov.au/wet

GOOD LUCK TO OUR FUTURE WATER LEADERS AWARD FINALISTS!

Once again we would like to wish Chris Hallett and Dominic Skinner good luck for the today's announcement of the winner of the Future Water Leaders Award. Chloe Munro, National Water Commissioner will have the pleasure of making the announcement in the closing plenary.

Thanks to our sponsors:



Thursday 14 October

Program Summary

Wednesday was the biggest day in the program. The National and International Riverprize winners started our day by sharing their excitement and great achievements.

Both showed extraordinary results against challenging high pollutant loads. Kuntala Lahiri Dutt gave a beautiful presentation on the charlands in lower Bengal where populations live on marginal land in the Damodar River delta region that does not officially exist. Their land can disappear rapidly during monsoon flows and there is great conflict over land as it becomes available. She stressed the importance of understanding the lives of such populations in order to really understand the ecosystems and manage them.

Two very articulate girls representing the Youth Forum which ran the last two days, impressed us with their recommendations from the forum.

The feature session on transbound-

ary rivers took us across four continents to contrast and discuss issues across borders.

There were two fabulous sessions on the Swan Canning Rivers research and innovation program and their complex management program that involves community across many levels.

In the Ord River session an interesting panel of users from different sectors was utilised. They discussed the plans, potential and challenges for the area.

A common theme across the environmental flows session was the need to plan for uncertainty in a changing world.

Don't miss the six exciting sessions today and of course the exciting debate in the closing session.

Selina Ward Program Convenor

WesTrac Helping to Create a Sustainable Future

At WesTrac we are working to create a sustainable future for all communities and to reduce our environmental footprint by making these practices part of our core business. We are doing this by changing our own actions and also by helping our partners conduct their business in a more sustainable way. Together with our customers and other industry leaders, we promote safety and the efficient use of energy and materials resources in our sector. For our customers, this means providing them with the best products and technologies available, enabling them to work effectively and reduce their environmental impact. We supply them with a cradle-to-grave equipment management solution; so that

they get the most out of the equipment they buy from us and make sure that at the end of its life it's recycled or disposed of appropriately. Within our own business we look for daily sustainable practices such as reducing energy consumption, recycling waste at our facilities and promoting environmentally friendly methods. WesTrac is committed to the continuous improvement of company policies and to the performance of all our machinery in order to support our goals of increased business sustainability and responsible environmental behaviour. We partner with organisations such as the International Riverfoundation to help encourage conservation and to accelerate action for sustainable evolution worldwide.

RIVER DIALOGUE WORKSHOP

River Dialogue III was an interactive workshop in which delegates shared stories of corporate partnerships funding restoration projects. A diverse audience of catchment groups, NGOs and community groups shared experiences – from project funding taking up to five years of relationship building to organisations choosing not to approach corporates because of resource investment needed.

Some other keys messages from the workshop included: chasing the corporate dollar requires time and expertise; a clear, mutually beneficial purpose and sometimes a commitment to tailoring your product to meet the needs of the sponsor. There were also examples of organisations establishing a commercial business to provide more income.

It was evident that catchment management groups need skills in relationship building, marketing and proposal writing, and environmental managers will need to become more innovative and savvy to attract the corporate dollar.

PROGRAM CHANGES

D1B Terry Korodaj replacing Michael Wilson with a new presentation titled "Lots of solutions everywhere but why don't people change?"

D1C Jeff Camkin presenting on behalf of Susana Neto

D1E Will Shenton not presenting

D1E Wei Liu presenting his paper titled "Biological index application in river health assessment in Guijiang river."

D1F Robin Smith already presented in session B3D on Tuesday

The Daily News was produced by Newspaper Editor Jasmin Walker

A Very Big Thank You to All Involved

The International WaterForum would like to say a big thank you to all who made the 13th International Riversymposium a success.

Thank you to our keynote speakers Dr Leon Braat, Dr Yoon Jung Cha, W/ Prof Richard Weller, Dr Roger Pulwarty and Dr Kuntala Lahiri-Dutt for sharing their expertise with us as well as the case study representatives, Dr Setiawan Wangsaatmaja, Dr Yao Yin and Gavin Quibell who travelled great distances to be here.

We are very grateful to all our sponsors, without whose support this event would not be possible. Our appreciation goes to all who chaired a session as well as to the many

feature session coordinators.

Thank you to Dr Selina Ward, who convened the diverse and exciting program along with the diverse Program Committee.

Thank you to the event management team, Lynette Maxwell, Carla Mathisen and Jessica Stonier whose year round work and tireless efforts on site result in the smooth running of the conference.

Also to our student volunteers from Central Tafe in Perth who have been a great help running around in blue, as well as Tegan Baker and Michael Tyler for their help before the conference.

Wendy and Andrew Flanagan have done a wonderful job running the AV

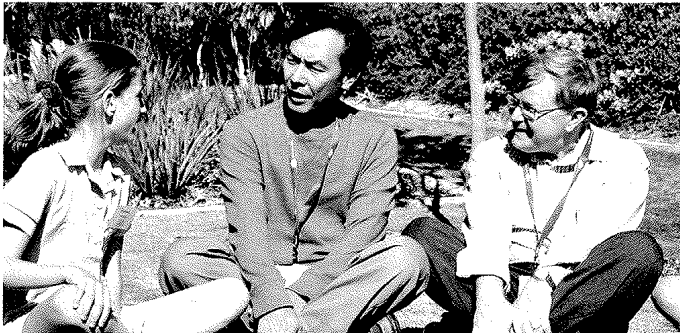
and technical aspects of the event.

Thank you to the WaterForum Management Committee in particular chair Barry Ball and Mark Pascoe, CEO of the International WaterCentre, our managing agent.

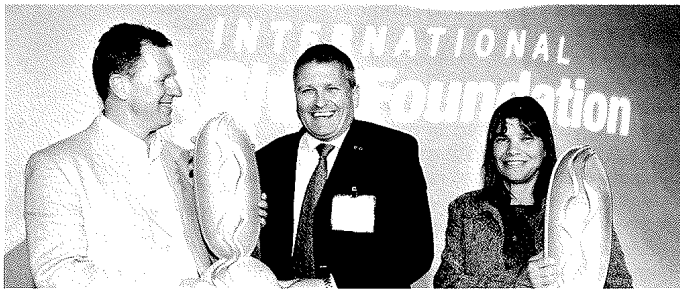
A big thank you to the Perth Reference Group who helped with our transition to Perth for 2010 as well as the four WA universities for their support at the start of the process.

Finally, a big thank you to all presenters and delegates who have made the 13th International Riversymposium the internationally recognised river and water management conference that it has become. We look forward to seeing you in Brisbane, 26-29 September 2011!

Some Highlights So Far...



Dr Yao Yin (centre) and Greg Claydon chat to a student at the Swan Canning Riverpark Youth Forum developed by the Swan River Trust.



Riverprize winners River Thames (left) and Derwent Estuary (right) receive their awards at Tuesday night's Riverprize Gala Dinner.

YOUR COMMENTS...

Akira wada, CTI Engineering Co. LTD, Japan

"I have been to many conferences around the world but this Riversymposium is the most well-organised and perfectly prepared I've been too...I very much liked the river restoration and community environment topics. Community environment is a new topic for us in Japan so it has been very good seeing what Australia is doing with this. I really liked the session on the importance of storytelling to share knowledge and I think we could use this in Japan."

Matt Hardy, eWater

"The Riversymposium has been great for us because it's given us a chance to sit down with people from Australia and overseas and show them what we do. This interaction is much more effective than a phone call or email."

Keren Raiter, WA Dept of Water

"It's great to see groups and stakeholders coming together and seeing what they do with catchments...It's been a great conference."