The Financial Report Covers:
Water Quality Research Australia Limited
ABN 32 127 974 261
ACN 127 974 261
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250 Victoria Square, Adelaide 5000
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Fax: + 61 8 7003 2447
Email: jodieann.dawe@wqra.com.au
www.waterquality.org.au

Program Funding - Total Active Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>WQRA Funding</th>
<th>External Funding</th>
<th>In Kind Support</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking Water</td>
<td>2,208,985</td>
<td>4,501,834</td>
<td>5,172,360</td>
<td>11,883,179</td>
</tr>
<tr>
<td>Wastewater</td>
<td>1,494,413</td>
<td>12,317,366</td>
<td>13,993,560</td>
<td>27,805,339</td>
</tr>
<tr>
<td>Recycled Water</td>
<td>18,400</td>
<td>58,566</td>
<td>144,070</td>
<td>221,036</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,721,798</strong></td>
<td><strong>16,877,766</strong></td>
<td><strong>19,309,990</strong></td>
<td><strong>39,909,554</strong></td>
</tr>
</tbody>
</table>
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<td>Drinking Water</td>
<td>18</td>
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<tr>
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<td>24</td>
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<tr>
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<tr>
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<td>56</td>
</tr>
</tbody>
</table>
Chairman’s Report

This has been our first full year of operation. In this early stage of operations, in start-up mode, the WQRA Board considered it essential to provide a good strategic foundation for our future and at the same time to retain flexibility of approach together with timely approvals to ensure that we can accommodate novel ideas and approaches to water quality research. WQRA already represents the majority of water suppliers in Australia together with a substantial portion of research suppliers. We continue to seek new membership to be certain of complete cover of water quality research requirements in all states and territories. We are fortunate to have excellent relationships with other groups such as WSAA and the Urban Water Security Research Alliance (UWSRA). This has been to our benefit in the evolving research landscape related to water quality and provision in Australia.

The environment in which WQRA operates has been subject to substantial change since our inception. The establishment of Centres of Excellence for desalination, groundwater and water recycling has guaranteed that there will be overlap between our objectives and their objectives. This will require re-examination of our respective roles. Our objective is to collaborate with all working within the water quality sphere and where possible to develop joint programs which will amplify our research output and avoid duplication and redundancy of effort. The nexus between quantity of water and quality of water is extremely important in times of drought. One of our roles will be to emphasise this relationship and to provide the information sets to manage water quality.

A key component of our financial strategy has been, and will be, to seek parallel funding from Commonwealth granting agencies such as the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC). The support provided by WQRA for ARC linkage grant applications has proved popular. Those that are successful will provide a multiplier on future finite financial resources.

Internationally, our membership of the Global Water Research Coalition (GWRC) has given us great surety in understanding of the interaction between Australian research and research elsewhere in the world. It has also given us the capacity to open dialogue with others with similar issues and research aspirations.

Our ultimate objective is to fulfil the aims of our vision ‘safe water for Australians’, and to engage with all in Australia who aspire to provision of high quality research and education in water quality. We want to engage with these agencies as members in one of our three constituencies. Where membership is not possible we will maintain dialogue and co-operative interaction to ensure cohesive research development. Our two research programs, Drinking Water and Wastewater/Recycled Water are complemented by the Education program. This latter program is a platform upon which our future skill base in water research and management is predicated. Demographic projections suggest that future skill shortages would occur were such a process not in place. Our summer scholarships complement the doctoral top up program and act as the cement by which appropriate students are attracted to work in the water industry and retained by that industry in the future.

My personal thanks go to the membership, the board members, to the other organisations with which we interact and to the secretariat for their support. The secretariat led by our CEO Jodieann Dawe has worked tirelessly to support our work and should be congratulated on their successful implementation of smooth operations and good communications. All have travelled far and wide across Australia supporting you, the membership, meeting with prospective members, regulators and other relevant organisations. Their unstinting efforts have guaranteed that we move into the new financial year with bright prospects and expectations that WQRA has met and will meet our members’ needs for water quality research.

Michael R. Moore
August 2009.
Water Security continues to be a major focus for all Australians as demonstrated by the significant investment in water initiatives at both the federal and state levels. While much of the emphasis has been on water quantity, water quality can never be taken for granted. Through its members, Water Quality Research Australia is bringing together key water research groups and industry to conduct targeted, priority research to address current and emerging public health issues in water quality.

Water Quality Research Australia was officially launched in August 2008. In the start-up year, the focus has been on laying the company foundations to ensure a sustainable and efficient organisation that is able to provide value to its members and the Australian water community. The last 12 months have been a challenging but exciting time as WQRA has recruited key staff, developed and implemented the initial research portfolio and, most importantly, engaged with members and key stakeholders to determine the strategic priorities that need to be addressed both now and in the years ahead.

After thirteen successful years of operation, 2008/09 also saw the wind up of the CRC for Water Quality and Treatment (CRCWQT). The formation of WQRA marks the successful transition from a CRC model to an industry-funded company. At the completion of the CRCWQT, WQRA assumed responsibility for overseeing the completion of many remaining projects and there has been a concerted effort to complete and distribute all outstanding reports to ensure that the wealth of knowledge developed through the CRCWQT is captured and transferred to users. Over 20 reports have been completed and disseminated.

The development of the initial WQRA research portfolio has been a core objective during the year. Defining the immediate and emerging issues which are crucial research questions for the Australian water community has been a priority to ensure that members’ funds are invested judiciously. Identification of the research priorities was achieved through workshops in late 2008, which were attended by a wide cross-section of the WQRA membership. The workshops were followed by a call for project concepts and the final short list of project concepts was determined by a members voting process. Through the development of the initial research portfolio, both the engagement of members and the integrity and transparency of the selection process has been critical.

Another successful CRCWQT initiative that has been adopted and developed by WQRA is the Education Program. Building capacity and capability of young professionals in the water research area is critical as the water industry faces staff and skills shortage within the next 5 - 10 years. Targeted at budding undergraduate researchers the second successful Summer Scholarships reporting seminar was held in Melbourne, Feb 2009, with 10 students presenting on a wide range of industry related research topics. Two new PhD students have commenced under the WQRA PhD Initiative. In the coming years, WQRA aims to build the Education Program so that it continues to provide high quality, motivated and trained researchers to the water industry.

The membership is the backbone of WQRA and two-way engagement with members is critical to the success of the research programs and WQRA. Therefore a key focus has been to get to know the members and their organisational needs, as well as determine how WQRA can support members through research. Communication and engagement with members has been through many channels including meetings, newsletters, website and company visits. As a relative newcomer to the water industry, it has been a pleasure to meet with so many inspiring and dedicated people committed to ensuring both quality and quantity of water for Australians.

I would like to take this opportunity to acknowledge the enthusiasm and dedication of the WQRA directors, the members of the Board Advisory Committees, the Project Review Team and the Education Committee. Input from these members and key stakeholders provides invaluable support to WQRA in determining the research direction and ensuring the governance and integrity of WQRA operations. Lastly, I would like to recognise the staff of WQRA and their professionalism and commitment over the last year, that has helped WQRA to achieve the successes that are reflected throughout the pages that follow in this 2008-2009 Annual Report.

Jodieann Dawe
CEO
Acknowledgements

Acknowledgement of Contributions

WQRA’s progress in the past year would have been significantly more difficult without the assistance of our many collaborators within our Membership and externally. We are most grateful for their generosity and commitment, and would like to formally acknowledge their contribution.

Drinking Water Steering Committee

- Andrew Humpage (Australian Water Quality Centre)
- Peter Cox (Sydney Water)
- Amy Dysart (Power and Water Corporation)

Wastewater/Recycled Water Steering Committee

- Judy Blackbeard (Melbourne Water)
- Heather Chapman (Griffith University)

Project Review Team

- Peter Cox (Sydney Water)
- Judy Blackbeard (Melbourne Water)
- Heather Chapman (Griffith University)
- Andrew Humpage (Australian Water Quality Centre)
- Amy Dysart (Power and Water Corporation)
- Martha Sinclair (Monash University)

Education Program Committee

- Felicity Roddick (RMIT University) - Chair
- Dennis Mulcahy (University of South Australia)
- Kathryn Linge (Curtin University)
- Richard Stuetz (University of New South Wales)
- Mary Papachristos (Water Corporation WA)
- Asoka Jayaratne (Yarra Valley Water)
- Chris Saint (Australian Water Quality Centre)
- Glen Shaw (Griffith University)
- Leanne Pearson (University of New South Wales)
- Helen Salvestrin (Centre for Appropriate Technology)
Acknowledgements

Regulatory and Scientific Advisory Committees
In addition to regular consultation with Members to ensure that new and changing priorities are captured in the research portfolio, WQRA has assembled two high level Board Advisory Committees - Scientific and Regulatory - which will provide direction and advice in these two critical areas to the WQRA Board.

WQRA Board Regulatory Advisory Committee
Jan Bowman - Chair (Department of Human Services, Victoria)  
Sophie Dwyer (Queensland Health and Forensic Services)  
Vesna Cvjeticonin (National Health & Medical Research Council)  
David Cunliffe (Department of Health, SA)  
Paul Byleveld (NSW Department of Health)  
David Sheehan (Department of Human Services, Victoria)  
Xavier Schobben (NT Department Health & Families)

WQRA Board Scientific Advisory Committee
John McNeil - Chair (Monash University)  
Nancy Millis (University of Melbourne)  
Adam Lovell (WSAA)  
Don Bursill (Chair WQAC - NHMRC)  
Ian Falconer (University of Adelaide)  
Frans Schulting (GWRC, FSL Consultants)

Hosting by SA Water
WQRA would like to thank South Australian Water Corporation for their support as the WQRA host organisation. SA Water’s significant in-kind contribution includes office space in SA Water House - a 6 star green star facility, in the Adelaide CBD - state-of-the-art meeting room facilities, IT support services and access to office technology equipment. The central location in Adelaide and flexibility of the open plan structure make the building an attractive and convenient base for nearly all WQRA staff as well as visiting WQRA members.

WQRA is also grateful to Water Services Association of Australia, which provides office space and support for the Program Manager Wastewater/Recycled Water, David Halliwell, who is based in Melbourne.
About WQRA

WQRA is a not-for-profit, public company limited by guarantee, which is wholly owned and funded by its members who include Australian utilities, research organisations and government departments.

The WQRA Board is a representative Board consisting of experienced directors who are elected by the membership at the AGM, as well as an independent Chair and the CEO. The Board is chaired by Professor Michael Moore, who has recently retired as head of EnTox at the University of Queensland. The current Board represents a broad cross section of experience and expertise from within the water industry and associated research and regulatory organisations.

To provide timely and relevant advice to WQRA on emerging issues and strategic approaches to current issues, in late 2008, two Board advisory committees were established - scientific and regulatory. The members of the Advisory Committees are nationally and internationally recognised and bring a high level of expertise to WQRA and its Members.

WQRA is a national organisation which focuses on co-ordinating and managing collaborative research of national application on behalf of Australian water utilities and suppliers to enable them to address issues in drinking water quality from both traditional and new sources including reuse water, utilisation of reuse water and aspects of wastewater management. WQRA brings together key water research groups and industry members across Australia to conduct targeted, priority research. These relationships place WQRA in a unique position to rapidly address current and emerging issues in public health and water quality.

During its first full year of operation some of the highlights for WQRA were:
- Transition from CRCWQT to WQRA
- Chairman appointed in July 2008
- New logo and Brand profile chosen
- Public launch of WQRA
- WQRA accepted as member of Global Water Research Coalition
- WQRA accepted as member of Water Research Foundation (formerly AwwaRF)
- Three new WQRA members
- Workshops held and Members prioritised water research issues
- First WQRA AGM held in November 2008
- WQRA commissioned first suite of 25 research projects
- Two new WQRA PhD students selected

WQRA staff during the year 2008-09 were:
- Jodieann Dawe - Chief Executive Officer
- Susan Spragg - Executive Assistant to the CEO
- Fred Fleuren - Senior Finance Officer
- Angela Gackle - Marketing and Communication Manager
- Simon Newbold - Chief Operating Officer (Sep 08 - Feb 09)
- David Halliwell - Program Manager, Wastewater/Recycled Water
- Michele Akeroyd - Program Manager, Drinking Water
- Carolyn Bellamy - Education Program Coordinator
- Steve Papp - Publications Coordinator
- Priscilla Barry - Administrative Officer

WQRA Staff left to right: David Halliwell, Carolyn Bellamy, Priscilla Barry, Simon Newbold, Jodieann Dawe, Fred Fleuren, Susan Spragg, Steve Papp, Angela Gackle and Michele Akeroyd
About WQRA

The core aims of WQRA are to:
1. Conduct and advocate for high quality research on priority issues for the Australian Water Industry relating to public health and acceptability aspects of water
2. Adopt a risk-based approach to research to underpin the implementation and further development of relevant Australian guidelines for drinking water and recycled water.
3. Facilitate knowledge transfer and the up-take of the outcomes of the research in the industry.
4. Build capacity and capability for the industry

Members of WQRA

Three initial categories of membership were established for WQRA - General Members, Industry Members and Research Members. Industry members are classified into three bands according to their size, with corresponding differences in the level of financial contribution and voting rights for determination of research priorities. The number of Members is unlimited and additional categories of membership may be created in future if required.

At 30 June 2009 WQRA had 43 Members comprising 21 Industry, 15 Research and 7 General members. During the year WQRA gained 3 new member organisations: Victoria University, Wannon Water and Murdoch University.

Organisation - Industry
Australian Water Association Ltd
Degremont Pty Ltd
Barwon Region Water Corporation
Central Highlands Water
City West Water Ltd
Coliban Region Water Corporation
Department of Health, Victoria
Goulburn Valley Regional Water Corporation
Grampians Wimmera Mallee Water Corporation
Hunter Water Corporation
Melbourne Water Corporation
Power & Water Corporation
South East Water Limited
Sydney Catchment Authority
Sydney Water Corporation
United Water International Pty Ltd
Wannon Region Water Corporation
Water Corporation of WA
Yarra Valley Water Ltd
South Australian Water Corporation
Central Gippsland Regional Water Corporation

Organisation - Research
Australian Water Quality Centre
Centre for Appropriate Technology
Curtin University of Technology
Flinders University
Monash University
Murdoch University
RMIT University
The University of Queensland
University of Adelaide
University of NSW
University of SA
University of Wollongong, Faculty of Engineering,
University of Technology, Sydney
Victoria University
Griffith University

Organisation - General
Cradle Coast Water
Department of Water WA
Esk Water Authority
Lower Murray Urban and Rural Water Corporation
NSW Department of Health
Orica Australia Pty Ltd
NSW Water Solutions, Commerce
Transition - CRCWQT to WQRA

Transition from CRCWQT

After 13 years, the CRC for Water Quality and Treatment (CRCWQT), formed under the Commonwealth's Cooperative Research Centres Program, officially ended on 30 Oct 2008. Rather than seeking a further round of funding under the CRC Program, the Governing Boards of the CRCWQT and the Water Services Association of Australia (WSAA) worked together to establish an independent and industry funded research organisation to build on the achievements of the CRCWQT beyond 2008 - Water Quality Research Australia Limited (WQRA). The formation of WQRA marks the successful transition from a CRC model to an industry-funded company which continues to address the Australian water industry needs in water quality research through facilitating excellence and collaboration in national R&D projects.

During its tenure, the CRCWQT had a significant impact on the Australian water industry bringing together industry and researchers to address priority issues in a collaborative and constructive way. At the end of the CRCWQT over 70 Research Reports were completed, which are freely available on the WQRA website. From the translation of the research outcomes into real world industry situations, significant economic benefit has flowed to the Australian water industry members through efficiency gains in water treatment and distribution system management. As an example, an economic evaluation (2005) of CRCWQT outputs estimated that benefits from implementing CRCWQT research findings in chemical management created direct industry savings of up to $26 million per annum from the reduction in chemical use.

A major focus of the CRCWQT was a targeted program of research to underpin the provision of safe water supplies for the community. One of the key outcomes of the CRCWQT was the translation of the research outputs into the development of the Water Quality Management Framework, which was incorporated into the Australian Drinking Water Guidelines which forms the basis for the regulation of the drinking water industry.

As an integral part of the CRCWQT wind-up, a series of road-shows and workshops was undertaken to assist in the dissemination of research outcomes to industry partners and the wider water community, as well as the finalisation of CRCWQT research reports for concluded projects. Where it was not possible to complete research reports, or for projects that were still ongoing, WQRA has ensured that during 2008/09 there has been a strong focus on capturing the research knowledge developed by the CRCWQT and that completed research reports are widely distributed.

The final CRCWQT Annual report (2007-08) outlines the success of the CRCWQT and is available at http://www.waterquality.crc.org.au/publication_annualreports.htm

To ensure a smooth transition from the CRCWQT to WQRA and to minimise the hiatus in research outputs, a small number of significant projects with external funding were approved by the WQRA Board in early 2008. These projects, coupled with existing projects, which were initiated, but not completed, during the term of the CRCWQT form the basis of the current research programs in Drinking Water and Wastewater/Recycled Water. In addition, WQRA has overseen the publication of the final reports of residual CRCWQT projects.

The policy for uncompleted CRCWQT projects was to withhold 10% of funding until submission of a satisfactory final report. This process continues.

The other area where continuity was important was in the Education Program.
Final report production

When the CRCWQT ended, WQRA undertook to manage the completion of a significant number of final research reports. In the past year, 18 final CRCWQT reports and 2 Water Research Foundation (formerly AwwaRF) reports have been published - a significant number of reports compared with previous years. When all reports are completed more than 90 research reports, 9 occasional papers, 8 technical fact sheets and numerous other publications will have resulted from the 13 year lifespan of the CRC.

Underlying the production of such a large number of reports in a relatively short time has been a major coordinated effort. WQRA has relied on the goodwill of many industry and research colleagues who provided critical assessment of reports. Sincere thanks to all those who have generously given their time and intellect to help maintain a high quality in the standard of output.

The CRCWQT publications will continue to be freely available in PDF form from the WQRA website.

The CRC Reports in Table 1 were published in 2008-09 and can be downloaded from www.wqra.com.au

Table 1 CRCWQT Research Reports completed 2008-2009

<table>
<thead>
<tr>
<th>Report</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR 44:</td>
<td>Development of Low Cost Online Monitoring Package to Improve Chloramination Control (Sept 08)</td>
</tr>
<tr>
<td>RR 46:</td>
<td>A Series of Exposure Experiments - Recycled Water and Alternative Water Sources: Part B - Microbial transfer efficiency during machine clothes washing and microbial survival turfgrass experiments (Aug 08)</td>
</tr>
<tr>
<td>RR 47:</td>
<td>Investigation of the survival of Cryptosporidium in environmental waters (Oct 08)</td>
</tr>
<tr>
<td>RR 49:</td>
<td>Small water system reliability in remote Indigenous communities in the Kimberley (Apr 09)</td>
</tr>
<tr>
<td>RR 52:</td>
<td>Investigations of NDMA formation by chlorination of model compounds (Jul 08)</td>
</tr>
<tr>
<td>RR 53:</td>
<td>Study of Water Usage in Urban Areas (Aug 08)</td>
</tr>
<tr>
<td>RR 57:</td>
<td>Modelling DOC Removal by Enhanced Coagulation (Aug 08)</td>
</tr>
<tr>
<td>RR 59:</td>
<td>Artificial mixing for destratification and control of cyanobacterial growth in reservoirs (Sept 08)</td>
</tr>
<tr>
<td>RR 60:</td>
<td>Screening Assays for Water-borne Toxicants (Jul 08)</td>
</tr>
<tr>
<td>RR 61:</td>
<td>Cylindrospermopsin Mechanisms of Toxicity and Genotoxicity (Jul 08)</td>
</tr>
<tr>
<td>RR 62:</td>
<td>Causes and prevention of chlorinous off-flavours in potable water (Feb 09)</td>
</tr>
<tr>
<td>RR 63:</td>
<td>Membrane Distillation of Brine Wastes (Nov 08)</td>
</tr>
<tr>
<td>RR 64:</td>
<td>Biological filtration processes for the removal of algal metabolites (Aug 08)</td>
</tr>
<tr>
<td>RR 66:</td>
<td>Optimisation of Cylindrospermopsin Screening Assays (Jan 09)</td>
</tr>
<tr>
<td>RR 67:</td>
<td>A practical guide to reservoir management (May 09)</td>
</tr>
<tr>
<td>RR 68</td>
<td>Optimising the water treatment and disinfection train for pathogen removal (Feb 09)</td>
</tr>
<tr>
<td>RR 72:</td>
<td>Impacts of De-stratification on Reservoir NOM and its Removal by Water Treatment (Nov 08)</td>
</tr>
<tr>
<td>RR 78:</td>
<td>Risk assessment for drinking water sources (Jun 08)</td>
</tr>
</tbody>
</table>
The PhD students

At the conclusion of the CRCWQT two groups of students were still to submit their theses. One group (24 students) were in year four of their candidature and of this group six students completed in this past year.

The second group (12 students) were the final CRCWQT PhD intake in 2006, who were in year two or three of their candidature at the end of the CRCWQT. The students are listed in Table 2. The remaining stipends were transferred to the host universities, and there has been less requirement for active involvement in administration of these students.

The WQRA Education Program Coordinator has been responsible for overseeing the students’ progress as they near completion. WQRA receives a copy of the PhD thesis, which is available to our members. A high number of CRCWQT students are very close to submitting, and it is anticipated that the majority of the remaining students will submit and graduate within the next twelve months. Students have been encouraged to attend relevant conferences and submit papers for Young Water Scientist of the Year and the IWA / YWP Conference to help in the technology transfer of their research outputs to industry.

An important purpose of this networking is to enable WQRA to continue to gauge the success of the program in directing young scientists into the water industry.

### Table 2 CRCWQT PhD Students and status

<table>
<thead>
<tr>
<th>PhD Students and University</th>
<th>PhD Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CRC Students graduated in 2008-09</strong></td>
<td></td>
</tr>
<tr>
<td>Sam Brooke (Aug 1999) PhD</td>
<td>The Destruction of Cyanobacterial Toxins in Drinking Water by Ozone</td>
</tr>
<tr>
<td>AWQC and Univ SA, Water Research Foundation</td>
<td></td>
</tr>
<tr>
<td>Univ of NSW, Sydney Catchment Auth</td>
<td></td>
</tr>
<tr>
<td>Christine Kaucner (Jul 2002) M.Sc (P/T)</td>
<td>Surface Properties and Transport of Pathogens in Runoff</td>
</tr>
<tr>
<td>Univ of New South Wales</td>
<td></td>
</tr>
<tr>
<td>Joanne O’Toole (Mar 2004) PhD</td>
<td>Water Reuse and Alternative Water Sources: Attitudes, Practices, Risk Assessment and Human Health Outcomes</td>
</tr>
<tr>
<td>Monash Univ</td>
<td></td>
</tr>
<tr>
<td>Jasper Pengelly (Mar 2004) PhD,</td>
<td>Effects Induced by pH, Ionic and Osmotic Stress on PSP Toxin Production in Cyanobacteria</td>
</tr>
<tr>
<td>Univ of New South Wales</td>
<td></td>
</tr>
<tr>
<td>David Ruebhart (Oct 2003) PhD</td>
<td>Investigation, Optimisation and Validation of a Range of Bioassays Using Lower Trophic Level Organisms for the Testing of Aquatic Toxins</td>
</tr>
<tr>
<td>Griffith Univ</td>
<td></td>
</tr>
<tr>
<td><strong>CRC students submitted thesis in 2008-09</strong></td>
<td></td>
</tr>
<tr>
<td>Curtin Univ</td>
<td></td>
</tr>
<tr>
<td>Jodi Dong (Mar 2004) PhD</td>
<td>Urban Planning and Integrated Water Management: Towards an Alternative Institutional Model</td>
</tr>
<tr>
<td>Griffith Univ</td>
<td></td>
</tr>
<tr>
<td>Robert Huston (Mar 2005) PhD</td>
<td>An Assessment of Chemical Contamination of Rainwater Tanks in Urban/Industrial Areas of Australia</td>
</tr>
<tr>
<td>Griffith Univ</td>
<td></td>
</tr>
<tr>
<td><strong>CRC students commenced in years 3 &amp; 4</strong></td>
<td></td>
</tr>
<tr>
<td>David Beale (Mar 2004) PhD</td>
<td>Development of Portable Instrumentation for the Measurement of Pesticides in Water</td>
</tr>
<tr>
<td>RMIT Univ</td>
<td></td>
</tr>
<tr>
<td>Univ of Adelaide</td>
<td></td>
</tr>
<tr>
<td>Rebecca Campbell (Mar 2003) PhD</td>
<td>A Biosensor to Detect Cylindrospermopsin</td>
</tr>
<tr>
<td>AWQC and Univ SA</td>
<td></td>
</tr>
<tr>
<td>Daniel Couton (Feb 2002) PhD</td>
<td>The Structure and Chemistry of Natural Organic Matter in Groundwaters from the Gnangara Mound</td>
</tr>
<tr>
<td>Curtin Univ</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Degree</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Shengfu Fang</td>
<td>PhD</td>
</tr>
<tr>
<td>Shoshana Fogelman</td>
<td>PhD</td>
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<tr>
<td>Stacey Hamilton</td>
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<tr>
<td>Eun Kyung Lee</td>
<td>PhD</td>
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<td>Robert May</td>
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<tr>
<td>Xiaoxia Qiu</td>
<td>PhD</td>
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<tr>
<td>Meivy Ratanachaithong</td>
<td>PhD</td>
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<tr>
<td>Victoria Ross</td>
<td>PhD</td>
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<tr>
<td>Sylwia Solarska</td>
<td>PhD</td>
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<td>Ian White</td>
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<td>Grace Chan</td>
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<td>Kathy Cinque</td>
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<td>Hanna Driessen</td>
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<td>Jason Dunlop</td>
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<td>Dina Zebian</td>
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WQRA Research Programs

Background

Research undertaken by WQRA addresses key scientific and technical knowledge gaps and emerging risks, identified by WQRA members and key industry stakeholders, and supports the Australian water community by providing relevant and targeted research outcomes to support evidence-based decision making.

2008-09 has focussed on determining the research priorities for the Australian water industry, and the pathways to address these priorities, through consultation with all key stakeholder groups including water utilities, researchers and government health regulators. WQRA research projects are being specifically designed to deliver critical outputs and to develop knowledge transfer mechanisms to ensure that benefits are delivered to the membership and Australian community.

WQRA’s corporate structure was specifically designed to enable WQRA to support a wide range of research and leverage WQRA member funds through Australian federal government initiatives including the ARC Linkage Grant Program and the NHMRC Partnership Projects Initiative, as well as to partner with international organisations with both financial and in-kind funding, making WQRA a more attractive organisation with which to collaborate.

During this year the key overall achievements in the Research Programs are:

- Determination of the WQRA Research Priorities
- Shortlisting of 25 project concepts that address WQRA Research Priorities
- Formation of the Project Review Team
- Meeting with research and industry members to assist in the development of research proposals from the short-listed project concepts
- WQRA financial support approved for the first round of the NHMRC Partnerships Project Initiative - “Establishing Australian health-based targets for microbial water quality” (Monash University)
- Establishment of funding policies and processes for supporting ARC research proposals from WQRA research members and initiating the first call for funding in May 2009
- WQRA support approved for 6 ARC Linkage submissions from WQRA research members for May 2009 funding round
- Submission to the National Water Commission in response to the Biennial Assessment of Progress against NWI - 2009

Research Programs Overview

WQRA coordinates its research efforts through three programs - Drinking Water (DW), Wastewater (WW) and Recycled Water (RW). The DW Program is managed by Dr Michele Akeroyd and the WW and RW Programs are managed by Dr David Halliwell.

Industry Research Priorities

Good governance is critical to any organisation but especially so to WQRA because of its membership structure and the collaborative intent of WQRA. Transparency of operations and project selection processes are key to providing avenues for valuable input and ensuring sustained trust with Members, as well as providing direction and frameworks for staff and Board.

The process used to develop the initial research priorities and a suite of core research projects within the WQRA research portfolio is shown in Figure 1. It was designed to ensure that WQRA Members were consulted and, through a voting process, had the opportunity to determine the direction of research.
Program Workshops

In late 2008, Member organisations and other stakeholders were invited to attend two workshops to discuss and determine the current priority research issues in the respective programs. An extensive list of topics was collated and members were asked to allocate their votes according to their organisation’s priorities. When the votes were processed the list of issues was divided into three distinct groups. The first, with the majority of votes, were identified as priority one issues and the bulk of the research investment was directed to these priorities. The second group had fewer votes, but were still critical industry issues and were designated priority two issues. The third group were determined as lower priorities and were not progressed further. From these workshops the 15 top level high priority research issues were consolidated (Figure 2).

Although many priorities overlapped across the Research Programs, 8 priorities were assigned to the DW Program and 7 to the WW/RW Programs. These industry-driven research issues have formed the basis of project development in the first year.
Project Selection

Project concepts were developed by WQRA Research Members, focussing on addressing the WQRA Research Priority Issues that were identified during the October and November 2008 workshops. Seventy four project concepts were considered by WQRA members. Project leaders were provided with three minutes to give an ‘Elevator Pitch’ at the 2008 AGM to provide an overview of the proposed project concept to the members present, prior to decision making. After two rounds of voting - the first at the AGM and the second at a general meeting (December 2008) - a suite of short-listed concepts was selected to be developed further into full project proposals (Table 4). Figure 3 shows the allocation of short-listed project concepts against the WQRA research priority issues.
## WQRA Research Programs

### Drinking Water - Project Title

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Lead researcher and agencies involved</th>
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<tbody>
<tr>
<td>Epidemiology of Cryptosporidium and Giardia species and genotypes in animals in drinking water catchments using molecular tools</td>
<td>Paul Monis/Una Ryan - AWQC/Murdoch Uni, SCA, Water Corp</td>
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<tr>
<td>Evaluation and validation of rapid molecular methods for the detection and identification of pathogens in water</td>
<td>Paul Monis - AWQC/Melbourne Water/ Sydney Water/Flinders Uni/SA Water</td>
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<tr>
<td>Emerging disinfection by-products: toxocology and chemistry (ARC)</td>
<td>Anna Heitz - Curtin Uni/Water Corp/AWQC</td>
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<td>N-Nitrosodimethylamine (NDMA), other nitrosamines and N DBPs in Australian drinking waters</td>
<td>Gayle Newcombe - AWQC/Curtin Uni/Monash Uni/WSAA</td>
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<tr>
<td>Nitrosamines, including NDMA, and other nitrogenous disinfection by-products in Australian drinking waters</td>
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<td>Graeme Dandy - Uni Adelaide</td>
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<tr>
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<td>TBA - Water Corp</td>
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<tr>
<td>Capacitive deionisation for high recovery and low energy desalination of brackish water supplies</td>
<td>Linda Zou - Uni SA/SA Water</td>
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### Wastewater - Project Title

<table>
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<tr>
<th>Project Title</th>
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<tr>
<td>Membrane fouling in municipal MF/RO water reclamation plants</td>
<td>Siva Sivakumar - Uni of Wollongong/Sydney Water/Water Corp/UTS</td>
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<tr>
<td>Real time integrity monitoring for RO membrane systems</td>
<td>Eddy Ostarcevic - Victoria Uni/GWM Water/Coliban Water</td>
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<td>Development of predictive tools for membrane ageing</td>
<td>Pierre Le Clech - UNSW</td>
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<tr>
<td>Treating wastewater for potable reuse: removal of chemicals of concern using advanced oxidation processes</td>
<td>Anna Heitz - CWQRC/Water Corp/EAWAG/GHD</td>
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<td>Safety of recycled water for end-users determined in a mouse in vivo multigenerational study</td>
<td>Fiona Young - Flinders Uni/Melbourne Water/Yarra Valley Water/Griffith Uni/AWQC</td>
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<tr>
<td>Exposure assessment using tracer chemicals - Stage 1</td>
<td>Martha Sinclair - Monash Uni/Water Futures</td>
</tr>
<tr>
<td>Chlorine disinfection of human pathogenic viruses in recycled waters</td>
<td>Alex Keegan - AWQC, DHS Victoria/Water Futures/Health SA/Sydney Water</td>
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Figure 3 Allocation of short listed project concepts against research priority issues

Thematic Workshops

To ensure that WQRA meets the needs of its Members and stakeholders, as well as being alert to new developments in the industry, there will be ongoing workshops as need arises to identify and prioritise current water quality research knowledge gaps. This process was used to select the 15 research issues that have driven the research agenda for the first suite of projects in WQRA’s Drinking Water, Wastewater and Recycled Water Research Programs, and the outcome is 25 new project proposals under development.

During 2008-09, in addition to the research priority workshops, a consultative workshop on lagoon/pond treatment systems was held. In the coming year several key areas for workshops have already been identified including:

- Decentralised systems
- Cryptosporidium
- E-knowledge

WQRA plans to utilise workshops as one means of engaging industry to identify water quality- and health-related research gaps and to explore WQRA’s role in addressing these gaps. Once research gaps have been identified, there may be several options for WQRA to progress ideas to full proposal development including, for example, through a Request for Funding Proposal (RFP) process or something similar.
Lagoon/Pond Treatment Systems

The ‘Lagoon/Pond Treatment Systems’ workshop was held adjacent to the May 2009 quarterly Members meeting in Coogee, NSW. A number of presentations were made by invited speakers, including a presentation of project proposals from the November 2008 call for project concepts from Howard Fallowfield, Helen Stratton and Charles Lemckert. A key goal of this workshop was to gain a better understanding of the level of interest in, and experience of, the issue among Members. This will inform and enhance the development of a full project proposal on this topic, for funding consideration by WQRA and industry more broadly. The project proposal is due in the first quarter of the 2009/10 year. Presentations and meeting notes can be viewed on the WQRA website (www.wqra.com.au).

WQRA Project Review team

The Project Review Team (PRT) is a high level technical and advisory group that provides expert evaluation of WQRA project submissions and recommendations to the CEO. The intent is to employ a transparent and rigorous due diligence process for each project proposal prior to submission to the Board seeking a funding decision. The Project Review Team was formed in January 2009, bringing together WQRA Industry and Research Members to assess each of the projects being considered for funding. The PRT has met 3 times to review project proposals, including those proposed for ARC and Water Research Foundation funding.

The Project Review Team (PRT) comprises the WQRA CEO and Program Managers, and selected Industry and Research representatives. The critical objectives of the PRT are to ensure that:

- each project addresses at least one of WQRA’s Research Priority Issues
- WQRA has a balanced Research Portfolio
- R&D is not being duplicated elsewhere
- potential for collaborative projects is identified
- projects fulfil the Project Selection Criteria

The PRT reviews the project for technical robustness and organisational capability, and the project schedule to ensure that milestones are achievable within the time and budget allocations.
Drinking Water program

The focus of the Drinking Water program has been on the development of collaborative research projects that address critical knowledge gaps in the public health aspects of drinking water quality. In 2008-09 the main areas of research development have been in chemical and microbiological contaminants in water supplies, water supply quality in rural and remote regions, optimisation of treatment processes and distribution systems, and public perceptions of water supplies.

The key achievements for the Drinking Water Program include:

- Development of a draft information package, including diagrams, maps and tables, through the project ‘Guidelines and Best Practice Documentation - Water Supply in Remote Indigenous Communities’ for review by the National Water Commission. It is anticipated that the information package developed through this project will be launched during Water Week in 2009;
- Completion of the CRCWQT report ‘Towards a Risk Management Manual for Drinking Water Catchments and Sources’ by Water Futures;
- Engagement in the National Climate Change Adaptation Network and participation in stakeholder meetings;
- The Global Water Research Coalition Project ‘International Guidance Manual for management of Toxic Cyanobacteria’ will be finalised for the GWRC Board in November 2009, followed by public release in early 2010; and
- Continued support for the four Water Research Foundation projects in the DW Program, three of these projects are nearing completion of the final research reports, while the other commenced in March 2009 to investigate ‘Alternative and Innovative Methods for Source Water Management of Algae and Cyanobacteria’ and is expected to be completed at the end of 2011.

Existing WQRA projects

There were nine projects that were either transferred from the CRCWQT or initiated by the CRCWQT and contracted by WQRA. The projects underway during 2008-09 included:

Project 1001: ‘Guidelines and Best Practice Documentation - Water Supply in Remote Indigenous Communities’
Collaborators: Centre for Appropriate Technologies
Budget: $250,000; WQRA Budget: $0
Status: Underway

The aims of the project are to develop an information package, including materials such as diagrams, maps, and tables, to assist remote, indigenous communities to prepare usable and understandable drinking water management plans, consistent with the Australian Drinking Water Guidelines. The information package is currently being trialled at four locations - one in each of New South Wales, Northern Territory, Western Australia and Queensland. The outcomes of these trials will guide the form and contents of the information package. This project is due to be finalised in October 2009.

Project 1002: ‘Towards a Risk Management Manual for Drinking Water Catchments and Sources’
Collaborators: Sydney Catchment Authority, Water Corporation, Water Futures
Budget: $5,000; WQRA Budget: $5,000
Status: Complete

The scope of work was to complete the Final Project Report for the “Towards a Risk Management Manual for Drinking Water Catchments and Sources (CRCWQT Project Number 202102)’. This project was completed in 2008/09 and the final report is available on the WQRA website.

Project 1003: ‘Evaluation of Integrated Membranes for Tastes and Odours and Algal Toxin Control’
Collaborators: AwwaRF 4016; AWQC
Budget: $553,500; Foundation Budget: $208,090 AUD; WQRA Budget: $68,051
Status: Underway

This project commenced in December 2007 and is now in the final stages of experimentation and analysis. This project will evaluate ultrafiltration (UF), nanofiltration (NF) and reverse osmosis (RO) membranes, in integrated treatment systems, for the removal of taste and odour compounds and cyanobacterial toxins. A final project report is expected in early 2010.
Collaborators: AWQC, National Cheng Kung University (Taiwan), Virginia Tech University (US), University of Adelaide, Water Corporation
Budget: $1,002,266; Foundation Budget: $138,889; WQRA Budget: $245,000
Status: Underway
This project, which commenced in March 2009, will evaluate a range of alternative and innovative techniques for control of algae and cyanobacteria that have potential for application in drinking water reservoirs. The study will consider a range of commercial products and some other techniques that are available in the US, Australia and Asia but have differing degrees of acceptance and testing within the water industry.

Project 1006: ‘Implications for enumeration, toxicity and bloom formation - Are there more toxin genes than toxic cyanobacteria’
Collaborators: Water Research Foundation (formerly AwwaRF) 4060; AWQC, United Water, University of Tennessee
Budget: $474,397; Foundation Budget: $213,263; WQRA Budget: $0
Status: Underway
This project aims to establish the relationship between cyanobacterial genes, especially toxin genes, and cells using real-time PCR, cell counts and flow cytometry. It will investigate the effect of growth on gene number, examine if the number of toxin genes affects toxin production and, examine the potential of combined data to better forecast the growth of toxic cyanobacteria in water systems. This project is now in its final stage, with the report due to the Foundation in July 2009.

Project 1007: ‘Methods for Measuring Toxins in Finished Waters’
Collaborators: Water Research Foundation (formerly AwwaRF) 4020; AWQC
Budget: $837,688; Foundation Budget $192,111; WQRA Budget $0
Status: Underway
The project has a broad scope which can be divided into four key areas:
• evaluation of potential chlorine neutralisers for efficient quenching activity and for lack of effect on biological assay systems;
• evaluation of various toxicity assay formats to identify those with adequate sensitivity and rapidity for use with finished waters;
• determination of assay sensitivity to confounding compounds in real waters;
• recommendation of a suite of assay/quencher combinations, and definition of quality control parameters ensuring their reliable use.
There were some minor relocation issues that have impacted on the progress of the project. This has delayed the draft final report until late August 2009.

Drinking Water workshop, Melbourne, October 2008
Project 1008: ‘Optimal Water Quality to Minimise Distribution System Problems’
Collaborators: AWQC, Delft University of Technology, United Water, SA Water, Grampians Wimmera Mallee Water, Water Corporation, Orica Watercare
Budget: $1,153,426; WQRA Budget $408,772
Status: Underway
After some delays with being able to establish the field trials, the field experimentation is underway. A revised project plan has been prepared for WQRA, including invoicing and reporting requirements. This project is not expected to finish until May 2011.

The aim of this project is to determine the extent of treatment necessary to minimise water quality deterioration after passage through the distribution system. This will be achieved by comparing the impact of a range of water qualities provided from four different treatment schemes on four parallel distribution test rigs, with a range of detention times. The water entering the test rigs will be chlorinated to satisfy chlorine demand but with minimal chlorine residual entering the test rigs to maximise biofilm growth.

A range of water quality parameters and analytical tools including on-line techniques will be used to monitor treated water quality and changes within the distribution systems. This will identify water quality parameters and analytical tools which are most suited for monitoring water quality within distribution systems and can be used to predict water quality deterioration.

Project 1011: ‘Health Effects of Drinking Water from Rainwater Tanks’
Collaborators: Monash University, SA Health, AWQC
Budget: $35,270; WQRA: $35,270
Status: Underway
The initial stage of this project consisted of a health study of 300 Adelaide households that were drinking rainwater. An additional stage was added onto the project where Cryptosporidium and Giardia sampling was undertaken in addition to the main study and included analysis of sediments from the rainwater tanks where people were not drinking the water. A method was developed by the AWQC to recover pathogens from the sediment to support this analysis. The results of this survey will be compiled and disseminated to WQRA members.

Collaborators: Power & Water, NZ Ministry of Health, Institute of Environmental Science and Research Ltd, Pacific Islands Applied Geoscience Commission
Budget $0; WQRA Budget $0 (all CRCWQT funds expended prior to transfer to WQRA)
Status: Underway
The water quality data management system is aimed at use in Pacific Island countries, based on the Water Information New Zealand System. It will also be provided to the WHO International Network on Small Community Water Supply Management as a tool for general use in developing countries in Asia, Africa and South America.

Drinking Water workshop, Melbourne, October 2008
The Water Quality Monitoring Database is planned in three parts. Those parts being delivered to the specification of NZAID are the core system and the enhanced system. A third part is the inclusion of chemical modules for WQRA.

The outcomes from a workshop held in October 2008 informed the additional elements that were required for the database. These elements are currently being developed and added to the database.

**CRCWQT Projects on Final Report**

WQRA has been managing the completion of CRCWQT projects that are on final report. Support is being provided, if required, to finalise all of these project reports through the Drinking Water program.

As of 30 June, 15 of the 30 Drinking Water final reports have been completed, with another six close to finalisation. The remaining nine reports will be completed by December 2009.

**Approval of new WQRA projects**

Progress has been made in developing the project proposals for the 18 short-listed DW project concepts. As of 30 June, 5 projects have been approved by Board, another 5 projects are being assessed by the Project Review Team and the remaining 9 are in progress.

The Approved WQRA projects are:

**Project 1009**: ‘Physico-chemical controls on growth, toxicity and succession of Microcystis and Anabaena species in Sydney Water supply reservoirs’

Collaborators: UNSW, Sydney Catchment Authority

Budget: $1,068,912; ARC Budget $180,000; WQRA Budget $189,000; Board Approved March 2009

Status: Contracting

This project has not commenced and is not expected to do so until July 2009. The objectives of this project are to:

- determine the key nutrient (N, P and Fe), light and temperature requirements of *Microcystis* and *Anabaena* species (including the impact of nutrient form and transformation dynamics on uptake kinetics) that typically occur in Lake Burragorang and other selected Sydney water supply reservoirs and to gain insight into the mode of nutrient acquisition by the organisms;

- assess the impact of nutrient availability and growth conditions on production of toxins by these *Microcystis* and *Anabaena* species, and relate the nutrient requirements, growth characteristics and exudate production of the *Microcystis* and *Anabaena* species to biogeochemical and physical conditions in Lake Burragorang and other Sydney water supply reservoirs.

**Project 1010**: ‘Characterisation and management of taste and odours from coal tar enamel lined mains’

Collaborators: RMIT, Melbourne Water, South East Water, City West Water, Yarra Valley Water

Budget: $293,540; WQRA Budget $115,000; Board Approved April 2009

Status: Contracting

Contract negotiations are underway, the project will commence once contracts are executed. This project aims to:

- identify chemicals responsible for T & O from coal tar enamel lined pipes. A desktop survey of the toxicity of these chemicals is included;

- replicate and investigate the mechanism of tainting by laboratory simulation, and to analyse any disinfection by-products; and,

- investigate methods for eliminating the T & O, and to verify that any recommended treatment does not produce any toxic by-products.

**Project 1012**: ‘Technology Transfer Officer for Water Supplies in remote Indigenous communities’

Collaborators: CAT

Budget: $110,000; WQRA Budget $110,000; Board Approved November 2009

Status: Recruiting

The Technology Transfer Officer for Water Supplies in Remote Indigenous Communities focuses on the public health aspects of water quality, in particular:

- provides a link between national and international water research and practice and Indigenous communities;

- provides a basis for coordination of research needs, practice and Indigenous knowledge between Commonwealth, state and territory agencies; and

- facilitates the sharing of knowledge and practice amongst WQRA members for small water systems.

The Technology Transfer Officer provides a direct link between the needs of Indigenous people and research related to supplying safe drinking water and treatment knowledge, as well as a link to researchers regarding knowledge gaps and emerging issues in remote locations.
Project 1018: ‘Occurrence and management of NDMA and other nitrogenous disinfection by-products in Australian drinking and recycled waters’
Collaborators: AWQC, Curtin University, Monash University
Budget: $460,741; WQRA Budget $258,331, Board Approved May 2009
Status: Contracting
This project was approved by Board at the May 2009 meeting and contracts are being developed. The purpose of this project is to:
• review the major ion composition of waters considered to be a problem with regard to scale formation. This review will be based on existing data provided by Industry members;
• review methods for measuring the extent of scale formation and possible treatment approaches; and
• provide recommendations on appropriate management actions based on the analysis of the potential extent of the scale problem and treatment options.

Based on the research outcomes, it is intended to prepare a Stage 2 project outlining a comprehensive solution to address the problem of scaling in water supplies.

Project 1019: ‘Scale formation and prevention in small water supplies reliant on groundwater’
Collaborators: UNSW, Power and Water, Water Corporation
Total Budget $215,053; WQRA Budget $80,639; Board Approved May 2009
Status: Contracting
This project was approved by Board at the May 2009 meeting and contracts are being developed. Major aims of this project are to:
• undertake a comprehensive survey to identify the levels of nitrosamines in chloraminated drinking water supplies and chlorinated recycled water in Australia;
• identify operational parameters that affect the formation of nitrosamines and recommend options to minimise formation of these DBPs;
• identify any issues with nitrosamines that may arise from blending recycled/raw waters as drinking water sources; and
• produce guidelines to assist water and recycled water treatment plants to minimise formation of nitrosamines.

Projects under assessment by the Project Review Team:
• Use of on-line surrogate parameters for rapid hazard detection and improved system performance - Chris Chow (AWQC)
• Epidemiology of Cryptosporidium and Giardia species and genotypes in animals in drinking water catchments using molecular tools - Una Ryan (Murdoch)
• Capacitive deionisation for high recovery and low energy desalination of brackish water supplies - Linda Zou (Uni SA)
• Consumer response to changing water quality associated with changing water supply systems - Adrian Fisher (Victoria University)
• Public perception of source protection and its relationship to recreation and water treatment - Rino Trollo (Water Corporation)

Projects in development as at 30 June 2009:
• Evaluation and validation of rapid molecular methods for the detection and identification of pathogens in water - Paul Monis (AWQC)
• Emerging disinfection by-products: toxicology and chemistry - Anna Heitz (Curtin Uni)
• Nitrosamines, including N-nitrosodimethylamine (NDMA), and other nitrogenous disinfection by-products in Australian drinking waters - Anna Heitz (Curtin Uni)
• Characterisation of THM formation for water quality management - Mary Drikas (AWQC)
• Implementation of biological filtration for the treatment of cyanobacterial metabolites - Gayle Newcombe, Lionel Ho, Daniel Hoefel (AWQC)
• Cyanosurvey: A national update on toxic cyanobacteria and their distribution - Andrew Humpage (AWQC)
• Optimum control of chloramine in water distribution systems - Graeme Dandy (Uni Adelaide)
• POE/POU Management and costing study - Dr Peter Sanciolo (Victoria University)
• Investigation of on-site testing methods for microbiological verification monitoring of drinking water quality - Amy Dysart (Power & Water Corp)
Projects with WQRA support for NHMRC and ARC funding:

In addition to the WQRA project concepts, the WQRA Board has also approved financial support for 3 ARC Linkage submissions and a project submitted to the new NHMRC partnership project initiative - Round 1. These projects are:

- Establishing Australian health-based targets for microbial water quality - Martha Sinclair (Monash) (NHMRC November 2008 Round)
- New methods for rapid detection of pesticides and other organic pollutants in unprotected catchments - Felicity Roddick (RMIT) (ARC May 2009 Round)
- Novel treatment methods for reduction of bromide and iodide in drinking water sources - Anna Heitz (Curtin) (ARC May 2009)
- Water, biota and air pollution - improving Australia’s capacity for assessing and managing the risks to wildlife and humans - Beate Escher (UQ - EnTox) (ARC May 2009 Round)
Wastewater/Recycled Water Programs

The Wastewater (WW) and Recycled Water (RW) Research Programs are closely aligned with industry needs, originating under the CRCWQT through a series of industry-driven and funded workshops and projects. In late 2008, under the auspices of the newly formed WQRA, a workshop was held to identify current and future priority industry issues for these programs. Key issues identified included membrane and treatment technologies, chemical contaminants, waste stream disposal and reuse, fit for purpose technologies and risk assessment. Project development has subsequently focused on these areas, in addition to completing the important work initiated under the CRCWQT.

Significant achievements in the past year were:

- The initiation of a suite of membrane technology projects, focusing on demonstrating membrane efficacy, particularly for protozoan and virus pathogen removal, with an emphasis on real time monitoring;
- Providing supporting evidence for log reduction credits for activated sludge plants;
- Developing a suite of tools (i.e. ‘environmental toolbox’) for assessment of chemical risk for human health and the environment in recycled waters and wastewaters;
- Quantifying the risk of pathogens and organic contaminants in biosolids;
- The commencement of one of Australia’s largest ARC Linkage projects investigating odour and corrosion processes in sewers, in which WQRA is a key collaborator; and
- The development of two international projects in priority areas with the Global Water Research Coalition and the Water Research Foundation.

Existing WQRA projects

There were seven projects that were either transferred from the CRCWQT or established by the CRCWQT and contracted by WQRA. The projects underway during 2008-09 included:

Project 2001: ‘Quantification of pathogen removal in activated sludge treatment’
Collaborators: Water Futures, LaTrobe University, AWQC, Smart Water Fund
Budget: $350,000; WQRA Budget: $0
Status: Underway

The objective of this project is to provide information to assist the prediction of pathogen removal performance of activated sludge plants (ASP) and to enable the effect of ‘upset’ plant conditions on pathogen removal to be integrated into treatment plant management plans. The literature review and data review on pathogen and indicator reduction by activated sludge plants, including the collation and analysis of Australian data sets have been drafted. The experimental work schedule was delayed due to difficulties in achieving steady state conditions at the pilot plant. These difficulties have now been overcome. This project will be completed in 2009/10.

Project 2002: ‘A national approach to the health risk assessment, risk communication and management of chemical hazards in recycled water’
Collaborators: Griffith University, UNSW, AWQC, Griffith University, University of Queensland, United Water, CSIRO, ACTEW, Sydney Water, Melbourne Water, National Water Commission
Budget: $2,135,000; WQRA Budget: $150,000
Status: Underway

This project aims to measure (using toxicity testing) the biological activity in purified recycled water (PRW) extracts using in vitro toxicity tests to assess the effectiveness of the treatment technologies and to inform risk assessment of recycled water for potable reuse. The project research plan has been written, the first progress report has been submitted and the literature review is complete. The outcomes of this project will be used in risk assessment and risk communication to stakeholders.

Project 2003: ‘Ecotoxicity toolbox to evaluate water quality for recycling’
Collaborators: Griffith University, Curtin University, University of Queensland, Water Corporation, Department of Water (WA)
Budget: $291,120; WQRA Budget: $0
Status: Continued through WQRA project 2005

The project aims to develop an innovative toolbox of ecotoxicity tests that can be used to characterise water that is intended for recycling or discharge.
WQRA Research Programs: Wastewater/Recycled Water Programs

into the environment. In vitro tests for estrogenicity, androgenicity, phytotoxicity, cytotoxicity and genotoxicity will be undertaken towards this aim. Due to a successful funding bid to the National Water Commission after the commencement of this project, the final stages of this project will be continued through Project 2005 (i.e. the successor to this project).

Project 2004: ‘Optimal management of corrosion and odour problems in sewer systems’
Collaborators: University of Queensland, University of Newcastle, UNSW, Curtin University, Sydney University, CH2M Hill, Gold Coast Water, Melbourne Water, Sydney Water, SEWL, SA Water, United Water, Water Corporation, Barwon Water, Hunter Water, Brisbane City Council
Budget: $19,803,612; WQRA Budget: $225,000
Status: Underway
Corrosion and odour emissions from sewer systems incur massive costs in Australia. This project will generate advanced knowledge and develop innovative technologies to support the Australian water industry in achieving efficient and cost-effective sewer management. Initiated under the former CRCWQT, this project is now in its second year and is progressing well.

Project 2005: ‘Development of ‘ecotoxicity toolbox’ to evaluate water quality for recycling’
Collaborators: Griffith University, Department of Water (WA)
Budget: $478,000; WQRA Budget: $0
Status: Underway
This project will assess the suitability of an ‘ecotoxicity toolbox’ approach to characterise water intended for recycling, using the Beenup Wastewater Treatment Plant trial as a case study. The project includes sampling of raw, primary, secondary and tertiary treated wastewater seasonally over a 12 month period. The project is on schedule.

Project 2006: ‘Membrane integrity testing for virus particle removal - Stage 1 Literature Review’
Collaborators: UNSW
Budget: $40,000; WQRA Budget: $40,000
Status: Contracting
The objective of this project is to conduct a literature review on virus particle removal by membrane based water recycling plants. The review is expected to take 4 months and the outcome will be a recommendation on future research gaps on this topic. WQRA is currently in contract negotiations with UNSW.

Project 2007: ‘Risk assessment for pathogens and organic contaminants in biosolids’
Collaborators: CSIRO, RMIT, Curtin University, Water Corporation (WA), DHS (Vic)
Budget: $460,137; WQRA Budget: $460,137
Status: Underway
The broad objective of this project is to better understand the risks of contaminants and pathogens associated with biosolids to ecosystem and human health. Specific objectives are to establish the persistence of pathogens and possible re-growth in land applied biosolids and the persistence and mobility of organic contaminants in land applied biosolids.

This project commenced under the CRCWQT and was due to finish in the 2008/09 year. However, some of the experimental work has been delayed and this project is now scheduled to conclude during 2009/10.

Wastewater/Recycled Water workshop, Melbourne, September 2008
CRCWQT Projects on Final Report

WQRA has been managing the completion of CRCWQT projects that were on final report. Support is being provided, if required, to finalise these reports through the Wastewater program. As of 30 June 2009, 4 of the 5 Wastewater final reports were completed, with a final draft received for the remaining project. Two of the final reports received during 2008/09 are awaiting final approval from external funding agencies, and the final draft report received is anticipated to be complete by August 2009.

Approval of new WQRA projects

Progress has been made in developing the project proposals for the 7 short-listed WW project concepts. As of 30 June, 2 projects have been approved by the WQRA Board. Of the remaining projects, 1 has been externally funded by the Victorian Smart Water Fund, 2 are currently under review by the PRT and 2 have yet to be fully developed by the respective research organisation. Additionally, there were 3 ARC Linkage projects submitted with WQRA support to ARC in May 2009, 1 project developed jointly with the Water Research Foundation (currently pending the Foundation’s Board approval) and one further project developed with CSIRO as an extension of a previous CRC project (666019).

The Approved WQRA projects are:

Project 2008: ‘Development of predictive tools for membrane ageing’
Collaborators: UNSW
Budget: $147,318; WQRA Budget: $120,072; Board approved March 2009
Status: Contracting
The objectives of this project are to:
• develop analytical techniques to detect indicators of incipient changes due to membrane ageing;
• conduct accelerated ageing studies for five membrane materials;
• assess the long-term ageing propensity during cyclical fouling/cleaning experiments; and
• collect industrially-aged membrane from local filtration plants to be analysed with the same analytical tools.

Project 2009: ‘Protocol for developing chemical pretreatment for high pressure membranes’
Collaborators: UNSW, Water Research Foundation
Budget: $476,239; WQRA Budget: $222,771; Board approved April 2009
Status: Project approval pending
The objectives of this project are to:
• evaluate the current methods used for dosing the chemicals in reverse osmosis and nanofiltration membrane systems;
• develop and validate a novel protocol for the evaluation of antiscalants; and
• develop and evaluate criteria to relate the decrease in operational cost of water treatment plants to the optimisation of chemical pretreatment for high-pressure membrane systems.
Project 3001: ‘Detection of cross connections in potable water distribution systems - Stage 2: Field trials of candidate detection parameters’
Collaborators: CSIRO, Melbourne Water, SEWL, YVW, CWW, Sydney Water
Budget: $125,382; WQRA Budget: $0; Board approved June 09
Status: Contracting
In dual-reticulation schemes there is always the possibility of cross-connection of recycled water into the potable system, either by faulty plumbing or backflow preventers, or even deliberately. This project aims to investigate the feasibility of a low maintenance cross-connection detection device based on robust sensors for 2 or more parameters that can reliably detect the presence of recycled water in potable water with a low level of false positives. Stage 1 proof-of-concept laboratory trials were undertaken in 2008. In Stage 2 of the project, a range of candidate parameters will be measured online in Melbourne (Hunt Club) and Sydney (Rouse Hill) to determine diurnal and weekly variations. The Report will include an analysis of these results, and the probability of detecting 10% contamination in the real world environment.

Project 3002: ‘Exposure assessment using tracer chemicals - Stage 1’
Collaborators: Monash University, RMIT University
Budget: $24,244; WQRA Budget: $18,400; Board approved June 09
Status: Contracting
This project will determine whether it is feasible to measure actual water ingestion by spiking the water with a non-toxic chemical and measuring the amount of the chemical subsequently excreted in urine. Cyanuric acid is widely used in outdoor swimming pools to ‘stabilise’ chlorine by protecting it from UV degradation. When ingested, this compound is not metabolised but is 100% excreted in the urine within 24 hours. Measurement of cyanuric acid in urine has been successfully used to estimate water ingestion during swimming.

Projects under assessment by the Project Review Team:
- Safety of recycled water for end users determined by a mouse in vivo multigenerational study - Fiona Young (Flinders University)
- Treating wastewater for potable reuse: removal of chemicals of concern using advanced oxidation processes - Anna Heitz (Curtin University)

Projects in development as at 30 June 2009:
- Real time integrity monitoring for RO membrane systems - Eddy Ostarcevic (Victoria University)
- Membrane fouling in municipal MF/RO water reclamation plants - M. Sivakumar (University of Wollongong)

Projects with WQRA support for ARC funding:
In addition to the project concepts, there has also been approval of WQRA funding support for three ARC Linkage proposals. These projects are:
- Optimisation of nutrient removal, membrane fouling and excess sludge dewatering in hybrid coagulation/submerged membrane bioreactor (SMBR) treatment of wastewaters - David Waite (UNSW) (ARC May 2009 round)
- Enhancing the performance of reverse osmosis desalination membranes by understanding the mechanisms of degradation and wear - Stephen Gray (Victoria University) (ARC May 2009 round)
- Investigation of endocrine disruption in Australian aquatic environments - Frederic Leusch (Griffith University) (ARC May 2009 round)
**Education Program**

The purpose of the Education Program is to build capability and capacity for the water industry by providing support to tertiary students at research member organisations and encouraging students to pursue a career in the water industry. The CRCWQT provided excellent outcomes to the research members in building research capability and the WQRA Education Program incorporates the successful components of the CRCWQT program.

At the end of the CRCWQT, 90% of the 68 PhD students that had graduated went on to find employment in a water industry related field. Many previous students work in our Member and stakeholder organisations. WQRA’s Education Program recognises this contribution to industry skilling and professional development. The program supports WQRA’s research focus by ensuring student projects are closely aligned with priority issues and selecting high quality students.

Furthermore, the Program provides a mechanism by which WQRA can leverage the in-kind expertise of a wide range of research providers for the relatively small investment of postgraduate scholarships and consumables/minor equipment.

A new WQRA Education Committee was established and held its first meeting in Melbourne on 15 August 2008. Committee members are:

- Felicity Roddick (RMIT) Chair
- Jodieann Dawe (CEO, WQRA)
- Chris Saint, (AWQC)
- Dennis Mulcahy (UniSA)
- Asoka Jayaratne (YVW)
- Richard Stuetz (UNSW)
- Leanne Pearson (UNSW)
- Glen Shaw (Griffith Uni)
- Kathryn Linge (Curtin Uni)
- Carolyn Bellamy (Ed Prog Co-ordinator)
- Mary Papachristos (Water Corporation WA)

**PhD Scholarship Program**

WQRA PhD Scholarships are awarded to students with excellent research potential undertaking a higher degree by research. WQRA provides students with the opportunity to enhance their research skills and professional development to a point that makes them a valuable and employable asset to the water industry.

In the past year two new students were awarded WQRA PhD scholarships. Clara Loi and Arron Lethorn will be supervised at Curtin University.

WQRA also took over responsibility for three PhD students appointed to the Wastewater Program that was run in parallel to the CRCWQT. These students are now officially part of WQRA. Table 6 shows the current WQRA students and their projects.

**Nancy Millis Scholarship**

WQRA has established a premier scholarship to honour the remarkable contribution made to science and the water industry by former CRCWQT Chair, Emeritus Professor Nancy Millis AC MBE. This scholarship will be offered annually and awarded to an outstanding student.

The Nancy Millis Scholarship package consists of:

- $10,000 pa stipend (up to 3.5 years)
- $15,000 operating allowance (duration of project)
- $10,000 additional support for international conference, professional development and leadership mentoring, Ozwater Conference attendance, AWA student membership and legal advice.
### WQRA Programs - Education

<table>
<thead>
<tr>
<th>STUDENTS</th>
<th>LOCATION</th>
<th>PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heather BROWN</td>
<td>Dept of Environmental Sciences, University of Technology Sydney</td>
<td>Assessment of the Endocrine Disrupting Effects of Sewage Contaminated Waters on the Aquatic Biota and Identification of the Causative Compounds</td>
</tr>
<tr>
<td>(Feb 2006) PhD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kate LANGDON</td>
<td>Dept of Earth and Environmental Sciences, University of Adelaide</td>
<td>Selected Organic Contaminants in Biosolids</td>
</tr>
<tr>
<td>(Jun 2006) PhD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arron LETHORN</td>
<td>Curtin Water Quality Research Centre, Curtin University of Technology</td>
<td>Emerging Disinfection By-Products and Their Precursors in Drinking Water</td>
</tr>
<tr>
<td>(Mar 2009) PhD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clara LOI</td>
<td>Curtin Water Quality Research Centre, Curtin University of Technology</td>
<td>Treating Wastewater for Potable Reuse: Removal of Chemicals of Concern using Advanced Oxidation Processes</td>
</tr>
<tr>
<td>(Mar 2009) PhD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karen SCHWARZ</td>
<td>Muresk Institute, Curtin University</td>
<td>The Fate of Human Enteric Pathogens following the Land Application of Biosolids</td>
</tr>
<tr>
<td>(Jun 2006) PhD</td>
<td></td>
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</tr>
</tbody>
</table>

Table 6 WQRA PhD Students

Technical tour following 2009 Summer Scholarship Student Reporting Seminar, February, Melbourne
Summer Scholarship Initiative

In 2008-09 WQRA hosted its second round of Summer Scholarship students. This initiative gives undergraduate students an opportunity to undertake a ten week project, over the summer university break, in an area of relevance to the water industry.

For the students it provides a taste of R&D in an industry-relevant project and also the opportunity to develop advanced skills in presenting to audiences and report writing. For WQRA industry members the Summer Scholarship initiative provides the opportunity to meet a group of high calibre students who have been exposed to the water industry.

In this year’s Summer Scholarship initiative ten students from various academic backgrounds undertook investigations in a diverse range of projects - see Table 7.

The students gave presentations on the outcomes of their research to WQRA Members and others at the summer scholarship reporting seminar in Melbourne on February 17th. Judging the presentations were Emeritus Professor Nancy Millis (former Chair of the CRC for Water Quality and Treatment), Dr Kathryn Linge from Curtin University and Jodieann Dawe, the CEO of WQRA.

Prizes were awarded to three outstanding students - Tom O’Rielly, Jane-Louise Lampard and Dylan Irvine.

- Tom’s project, investigating industry water recovery using membranes and waste heat, was conducted under the supervision of Associate Professor Mikel Duke (Victoria University) and Nigel Corby from City West Water.
- Jane-Louise Lampard’s project focussed on reviewing contaminants in recycled water identified as being of concern to the water industry and general public. Her supervisors were Associate Professor Heather Chapman and Dr Fred Leusch at Griffith University.
- Dylan Irvine’s project investigated the potential of using modified zeolite to prevent biological clogging of artificial recharge structures. He was supervised by Dr Huade Guan, Dr John Hutson and Professor Craig Simmons at Flinders University.

2009 Summer Scholarship Students
External Grants

A joint Victoria University/WQRA project - Investigations of techniques for maximising the utilisation of harvested rain water using a digital ecosystem - was awarded $14,746 from Victoria University’s Collaborative Research Grants Scheme.

Harvesting rainwater can reduce the need for fresh water, as well as minimising stormwater outflows. A household that uses only harvested rain water for its gardens can save 60 to 120 kL of water per year. These savings will be enhanced if the rainwater is used judiciously inside the house as well.

This project aims to investigate techniques for developing a digital ecosystem to maximise the utilisation of the available tank water, by considering factors such as current water level in the tank, predicted rainfall, soil moisture, and water usage of various appliances.

This study will build on the WQRA Summer Research Scholarship project conducted by Jack Toke and supervised by Associate Professor Nalin Sharda.

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Table: 2008-09 Summer Scholarship Students and their projects

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Student and Location</th>
<th>Supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of Contaminants of Concern in Wastewater Treatment Processes</td>
<td>Yasmine van Leur UNSW</td>
<td>Dr Heather Coleman, Dr Stuart Khan, Assoc Prof Richard Stuetz (UNSW)</td>
</tr>
<tr>
<td>Modelling a Digital Ecosystem for Maximising the Utilisation of Harvested Rainwater</td>
<td>Jack Toke Victoria Uni</td>
<td>A/Prof Nalin Sharda (Vic Uni)</td>
</tr>
<tr>
<td>Demonstration of Industry Water Recovery using Membranes and Waste Heat</td>
<td>Tom Reilly Victoria Uni</td>
<td>A/Prof Mikel Duke (Vic Uni, Nigel Corby (City West Water)</td>
</tr>
<tr>
<td>Pesticide Residuals within a Drinking Water Catchment</td>
<td>Andrew Dinh RMIT</td>
<td>Dr Nichola Porter (RMIT)</td>
</tr>
<tr>
<td>On the Regulation of Cyanobacterial Alkaloid Toxins in Drinking Water Supplies</td>
<td>Ivan Wong UNSW</td>
<td>Prof Brett Neilan (UNSW)</td>
</tr>
<tr>
<td>Managing Water Demand in Remote Aboriginal Communities for Improved Livelihoods</td>
<td>Bonnie Marshall CAT Alice Springs</td>
<td>Helen Salvestri, James Newman (CAT)</td>
</tr>
<tr>
<td>Use of Mouse Embryonic Stem Cells and Sheep Reproductive Cells to Detect Endocrine Disrupting Compounds (EDC) Bioactivity in Environmental Water Samples</td>
<td>Allan Bond Flinders Medical Centre, SA</td>
<td>Dr Fiona Young, Dr Ken Lang (Flinders Uni)</td>
</tr>
<tr>
<td>Contaminants of Concern in Recycled Water - Alternate Sources of Exposure</td>
<td>Jane-Louise Lampard Smart Water Research Facility Griffith Uni</td>
<td>A/Prof Heather Chapman, Dr Frederic Leusch (Griffith)</td>
</tr>
<tr>
<td>Using Modified Zeolite to Prevent Biological Clogging of Artificial Recharge Structures</td>
<td>Dylan Irvine Flinders Uni</td>
<td>Dr Huade Guan, Dr John Hutson, Prof Craig Simmons (Flinders Uni)</td>
</tr>
<tr>
<td>Relating Fluorescence and Size Fractionation for Water Analysis</td>
<td>Yi Zhu UNSW</td>
<td>Dr Rita Henderson, Dr Stuart Khan, Assoc Prof Richard Stuetz (UNSW)</td>
</tr>
</tbody>
</table>
Student Prizes and Awards

Former CRCWQT student Kylie Catterall was the winner of the Young Water Scientist of the Year Award for 2008. Kylie received the award at the Riversymposium (2008) conference in Brisbane for her PhD work on development of a rapid microbial-based toxicity assay system for detection of wastewater treatment problems.

PhD student Shoshana Fogelman received an award in the Information and Communication Technology category of the Queensland Smart Women - Smart State Awards 2008. Her research project involved the development of a range of on-line water quality monitoring sensors which are able to automatically adjust to environmental conditions.

CRCWQT student Sam Brooke, who completed his PhD in February 2009, was shortlisted for Young Water Scientist of the Year 2009. The winner of this award is announced in September each year at the Riversymposium in Brisbane. Sam’s PhD project was on the destruction of cyanobacterial toxins with oxidants used in drinking water treatment.

PhD student Dawn White won a $1000 Travel Grant to attend the Australian Organic Geochemistry Conference from TiGER (The Institute for Geoscience Research), Curtin University (http://tiger.curtin.edu.au) and won ‘New Demonstrator Award’ for outstanding performance and dedication to laboratory Teaching, 1st Semester 2008, Department of Applied Chemistry, Curtin University. Dawn was also selected to be part of Scitech Outreach/Premiers Women in Science Programme -Presenter on regional tour (Kununurra) together with WA Chief Scientist Lyn Beasley 28-30th April 2009.

Kate Langdon received a special commendation in the student presentation prize awarded at the 5th Society of Environmental Toxicology and Chemistry (SETAC) World Congress in Sydney 2008.

Dina Zebian was awarded ‘Best Paper’ presented at the Australian Water Association Regional Conference, Barossa Valley, South Australia, Australia, 2008.

Wai sum Chan received an ‘International Society for the Study of Harmful Algae Travel Award’ to the 13th International Conference on Harmful Algae 2008.

National and International Conferences


Kate Langdon gave an oral presentation on “Aquatic Hazard Assessment for Pharmaceuticals, Personal Care Products and Estrogenic Compounds from Biosolids Amended Land” Langdon, KL, Warne, MSTJ & Kookana, R at the Biosolids Specialty Conference IV, Adelaide, June 11-12 2008. Kate also gave the same oral presentation at the 5th SETAC World Congress, Sydney, August 3-7 2008.

Dina Zebian gave an oral presentation on “CYN-FULL SPERM?” at The Flinders Research Centre for Coastal and Catchment Environment & Flinders Bioknowledge Postgraduate Research Conference in Adelaide, Australia and on “Blooming Problems In Water, And Possible Effects On Future Baby Booms” at the Australian Water Association Regional Conference in the Barossa Valley, South Australia.
Wai sum Chan gave a presentation on the “Lake Physical Factors Contributed to Spatial Variability of Phytoplankton in Myponga Reservoir” at the 13th International Conference on Harmful Algae 2008.

Ross Kleinschmidt was Guest speaker and gave a presentation at Entox (University of Queensland) Seminar Series on “Radionuclides in Urban Wastewater Treatment”.


Jason Dunlop presented the paper “Effect of Spatial Variation on the Salinity Tolerance of Macroinvertebrates in Eastern Australia: Implications for Ecosystem Protection Trigger Values” at the 5th SETAC World Congress, 3 - 7 August 2008, Sydney Convention and Exhibition Centre, Sydney Australia.

Nicole Thornton gave an oral presentation on progress in her PhD at the WQRA Members’ Meeting in May 2009.

Heather Brown gave an oral presentation on progress in her PhD at the WQRA Members’ Meeting in May 2009.

Somprasong Laingam submitted a Poster presentation at the Society of Environmental Toxicology and Chemistry (SETAC) World Congress, Sydney in August 2008.

Shelly Rodrigo attended the 18th International Epidemiology Association World Congress of Epidemiology, Porto Alegre, Brazil, September 2008 and the Epidemiological Research and New Directions, September 20 - 21, Porto Alegre, Brazil.


As WQRA establishes its niche in the Australian water industry, the primary communication goal is to promote activities by ensuring that member organisations receive information about, and evidence of the value and benefits of their investment in, WQRA and to provide a forum for Members to network and share research ideas and outcomes.

Marketing of WQRA is an activity that involves staff, members and others with an interest in the success and growth of WQRA’s business. The WQRA brand is established by how the Company is presented internally and externally, and is affected by all interactions, communications and activities undertaken. The perception of the WQRA Brand relies on the professionalism of activities and the relationships developed among stakeholders. As a still relatively new organisation WQRA has worked hard over the past year to establish credibility and ensure that the outcomes it achieves for its Members are of high quality. WQRA communication and marketing has been geared to build this understanding of value to Members and sense of community.

Resulting in an online seminar on March 10th coordinated by Melbourne Water.

In 2008-09, following the appointment of staff to most senior positions, the highest priority for WQRA was to determine Water Industry research priorities and call for research proposals. Two workshops were held in each of the Program areas (see WQRA Programs) and stakeholders discussed a large number of research topics with the aim of narrowing the final portfolio of issues.

Given the diversity and broad interest base of WQRA Member organisations, an important part of WQRA’s role is to build links and encourage collaborations between Members and also with external agencies with complementary and converging interests.

It is understood that our water industry member organisations have been facing some major challenges. The extent to which WQRA can meet member goals and expectations will be determined by the ability to build a strong community that is willing to work cooperatively for common benefit. The CEO and Program Managers have implemented a schedule of visiting Member organisations in each State, meeting key staff and where possible becoming familiar with operations in regional areas.

Member Meetings

WQRA Members meetings provide an opportunity for Members and invited guests to learn about the wider industry issues and be updated on company issues and the progress of WQRA’s research and education programs. In 2008-09 a format was established that assists in providing transparency of operations to Members and achieves high quality reporting as well as offering representatives from the Australian water community the opportunity to network and share research ideas in a friendly and collaborative environment.

Given that WQRA’s membership has a national base across all regions of Australia, the quarterly Members Meetings are held in different geographical locations throughout the year to encourage attendance of the staff of local Member organisations. During 2008-09 year, four general Members Meetings (Adelaide, Aug08; Teleconference, Dec 08; Melbourne, Feb 09 and Sydney, May09) and the first WQRA AGM (Adelaide, Nov09) were held. In the coming year Members meetings are scheduled for Brisbane, Perth, Sydney and Adelaide but will be supplemented by local node meetings, which focus more on state-based and local issues.

Launch of WQRA

A media release was issued in August 2008, announcing the official launch of WQRA. Approximately 70 invited guests, including many Member representatives, attended the launch, held at Ayers House in Adelaide on August 7th 2008. Guests heard short speeches by WQRA’s CEO Jodieann Dawe and Chairman of the Board Professor Michael Moore, the National Water Commission’s CEO Ken Matthews and the chair of NHMRC - Water Quality and Health Committee, Professor Don Bursill.

Interactions with WQRA Members

WQRA played a support role, following the Victorian bushfires in February 2009, in calling for relevant expertise and knowledge regarding the potential impacts of the fires on water quality and catchment issues. The WQRA community responded generously,
WQRA’s first Annual General Meeting was on the 26 - 27 November 2008 at the Sebel Playford Hotel, Adelaide. Prior to the AGM, Member representatives heard short presentations on 74 concepts for research project proposals. The voting by Members that followed determined the direction and composition of WQRA’s first suite of research projects. At the AGM those present received an update on the company’s achievements for the year.

Directly following the 2008 AGM was a teleconference General Members meeting, where a second round of project concept voting assisted in consolidating the final shortlisted research project concepts. In addition, the WQRA Membership ratified the appointment of the incumbent Board directors - John McNeil (Monash University), Anne Howe (SA Water Corporation) and Dharma Dharmabalan (Coliban Water) - to fill the three existing director vacancies.

The 15-16 February 2009 Members Meeting was held in Melbourne, and an integral part of this meeting was the 2008/09 Summer Scholarship Student reporting seminar. The Members meeting was followed a period of extensive and destructive bushfires in Victoria, which, understandably, impacted upon the number of Victorian Member representatives who were able to attend. Despite this the reporting seminar was of excellent standard, and we were delighted to have Emeritus Professor Nancy Millis to be one of the judges.

The final General Members Meeting was held in Sydney on 28 - 29 May 2009. Invited key speakers – Richard Davis (National Water Commission), Ross Young (Water Services Association Australia), Paul Byleveld (NSW Department of Health) and Peter Dennis (Hunter Water) – gave presentations on local and national water-related issues. Presentations were also given on research projects recently approved by the WQRA Board, progress in two local PhD projects and updates on WQRA Program news.

**Members Surveys**

To ensure that WQRA is providing value to Members a series of engaging questionnaires were prepared to determine satisfaction with the format for Members meetings, topics for potential future workshops and ways in which the WQRA Education Program could provide more support to Member organisations to help address the expected skills shortages in coming years. This information has provided WQRA with valuable insight into the requirements of the members and their organisations as WQRA moves forward into its second operating year.

**Member Visits**

A major visit campaign was undertaken in the second half of 2008/09 with the CEO and Program Managers scheduling face-to-face visits with the Member Representatives and in some cases Member CEOs. The object of these visits was to:

- strengthen the relationship with Member Organisations;
- introduce the newly appointed Program Managers;
- form productive relationships with the Member Representatives and core staff;
- showcase what WQRA was aiming to achieve; and
- determine how WQRA could best support each Member.
Marketing and Communication

The following is a summary of visits to Members and other organisations over the year by one or more of the Program Managers and/or the CEO.

**July 2008**
- Monash University
- Melbourne Water Corporation
- Water Services Association Australia
- Sydney Water Corporation

**August 2008**
- Adelaide University
- Griffith University

**September 2008**
- University of South Australia
- Australian Water Association

**October 2008**
- Griffith University
- LaTrobe University
- University of Adelaide
- RMIT University
- University of NSW
- University of Technology Sydney
- Sydney Water Corporation
- City West Water Ltd
- Water Services Association Australia
- Melbourne Water Corporation
- Water Futures
- University of Technology Sydney

**November 2008**
- South East Water Ltd
- University of Adelaide
- Australian Water Quality Centre

**January 2009**
- RMIT University
- Water Services Association Australia
- Sydney Water Corporation
- University of NSW
- Sydney Catchment Authority

**February 2009**
- WA Department of Water
- Water Corporation of WA
- Curtin University
- Queensland University
- Griffith University
- Water Services Association Australia
- Yarra Valley Water Ltd
- Melbourne University
- RMIT University
- Power and Water Corporation
- Centre for Appropriate Technology
- Victoria University
- Orica Australia

**March 2009**
- Australian Water Association
- Murdoch University
- Curtin University
- Griffith University
- NSW Department of Commerce
- University of Technology Sydney
- Hunter Water Corporation
- NSW Department of Health
- Esk Water
- Cradle Coast Water
- Department of Environment Tasmania
- National Measurement Institute
- Brisbane City Council
- Department of Health Queensland
- Water Secure
- Gold Coast Water

**April 2009**
- Water Futures
- Victoria University
- RMIT University
- Flinders University

Northern Territory Member visit - tour of Bathurst Island water supply system, February 2009
May 2009
Orica Australia
RMIT University
Australian Water Quality Centre

June 2009
South East Water Ltd
Australian Water Quality Centre
University of Adelaide

Conference attendance

Ozwater’09 (March 2009)
WQRA had a significant presence at the OzWater’09 Annual Conference, with a number of delegates and a booth at the Trade Exhibition in Melbourne from March 16-18. The WQRA booth proved a convenient meeting place for Members and friends during breaks, and provided an excellent networking opportunity. Approximately 100 additional newsletter subscribers were gained from inviting visitors to leave their business card.

It was pleasing to note that representatives of a number of WQRA Member were awarded prizes at Ozwater’09. WQRA Board member Anne Howe received the Nancy Mills Award, Kerry Schott CEO of Sydney Water received the Chris Davis Award and Jim Morran from AWQC received the Michael Flynn Award. Tom O’Rielly, the Summer Student judged to have given the best presentation in February was invited by WQRA to attend the Ozwater’09 conference and dinner.

IWA World Water Congress 2008 (September 2008)
The IWA World Water Congress and Exhibition is a high profile international forum held every two years, and was hosted in Vienna, Austria in September 2008. The Congress brought together several thousand delegates. The Chair of the Board, Professor Michael Moore and CEO, Ms. Jodieann Dawe both attended on behalf of WQRA. A key feature of this Congress was the presentation stream hosted by Global Water Research Coalition, of which WQRA is a member, which showcased the current GWRC research portfolio.

Singapore International Water Week and Water Conference, Trade Show and IWA Leading Edge Technologies Conference (June 2009)
After success in 2008, this year marked the second time that SIWW was convened. The WQRA CEO, Jodieann Dawe was invited to participate on the SIWW Program Committee and to Chair the Convention Session on Emerging Microorganisms of Concern - Cyanobacteria in the Water and Health conference theme.

In order to attract high quality international delegates and to leverage off the synergy of the two conferences, the 2009 IWA Leading Edge Technology conference was held concurrently. The WQRA CEO and WQRA Research Program Managers attended both conferences on behalf of WQRA and took advantage of the networking opportunities to consolidate projects with both Australian and international collaborators.

WQRA booth at Ozwater’09 March, Melbourne
Ecoforum Conference (April 2009)

Wastewater and Recycled Water Programs Manager David Halliwell attended the recycled water stream at this meeting in Sydney. The EcoForum Conference had a dedicated Water Stream for the 3 days of the conference. There was considerable emphasis in a plenary presentation as well as the water stream regarding the importance of social science, and in particular the language used by the water industry, with regards to water conservation and water reuse, particularly IPR.

4th Annual Water Symposium

Drinking Water Program Manager Michele Akeroyd attended this meeting, held in Sydney in February 2009, with a focus on sustainability of water supplies and national water reform. Sessions covered sustainable water management, recycled water and management of public health risks, emerging issues in water quality, integrated water cycle management and fit for purpose and water trading. Key note speakers included Ken Matthews (NWC), Rob Freeman (MDBA) and Tally Palmer (UTS). The symposium was well attended by representatives spanning state and federal government, water utilities, regulators, researchers and consultants.

Node Meetings

The WQRA CEO and Program Managers have initiated a series of node meetings in each state to which all Member representatives, project leaders and other stakeholders are invited. The meetings provide an opportunity to share information among WQRA members, provide a local meeting point for WQRA members who may not all be able to attend national quarterly Member meetings, communicate local and state-based research issues to other WQRA members, and to provide a local communication forum for exchange of information.

The first WQRA Node meeting was held at RMIT University in Melbourne in April 2008 and was organised on behalf of WQRA by Prof Felicity Roddick (RMIT). The meeting was attended by twelve Victorian member representatives.

The second Node meeting was also held in Victoria, in April 2009. Twelve Member organisations were represented and matters discussed included planned and potential workshops, WQRA projects and processes for seeking ARC support. Member representatives had the opportunity to update those present on issues relating to their organisation or region.

Member Research Forums

WQRA is keen to gain a better understanding of Member operating environments, and has accepted a number of invitations to attend R&D planning days or present to stakeholder groups.

WQRA was invited to attend the Grampians Wimmera Mallee Water Research Forum on May 11th 2009. Wastewater and Recycled Water Programs Manager David Halliwell and Drinking Water Program Manager Michele Akeroyd attended and provided a presentation and an overview of WQRA.

WQRA was invited to attend the SA Water Research Development and Innovation Workshop on May 13th and 14th 2009. Wastewater and Recycled Water Programs Manager David Halliwell, Drinking Water Program Manager Michele Akeroyd, and Marketing and Communications Manager Angela Gackle attended.
Newsletters

WQRA produces two regular newsletters - ‘WQRA News’ and ‘Health Stream’.

WQRA News is circulated once a month to a list of more than 500 subscribers, many of whom are employed by Member organisations, but also includes people who have an interest in water quality research. This newsletter aims to provide regular brief updates on forthcoming events, short reports on activities and programs and newsworthy items of interest to the readership.

Health Stream is a quarterly newsletter that has a circulation of more than 2500 people in 66 countries. It has been produced on behalf of WQRA by Martha Sinclair at Monash University since 1996, and provides topical information about water-related issues in health research. Sources of articles include general news and science literature. Featured subjects in the past year were the findings from an investigation of the Cryptosporidium outbreak in the UK in 2008, the ‘boil water’ alert in Far North Queensland and bushfires and drinking water. Issues 51-54 were produced and distributed in the past year.

On April 28th, the American Water Works Association publication Streamlines addressed concerns in the US about the influenza pandemic, and had a link to an article in Health Stream issue 40 on avian influenza which also gave general information about ‘flu viruses and water supplies.

Circulation for the print version of Health Stream is more than 2500 copies, with readers in 66 countries. A further 1800-plus readers are registered for email notification of new issues.

Publications

WQRA has produced two new information brochures designed to provide some background about the organisation and the benefits of becoming a Member. These can be downloaded from the WQRA website: www.wqra.com.au.

The AWA Journal ‘Water’ published lengthy articles about WQRA in successive issues (Vol 36, numbers 1 & 2 February and March 2009) prior to Ozwater’09, outlining the successful transition of WQRA from the CRC model.

A new, quarterly members-only update is also planned for the coming year.
National and International Alliances

Australian Collaborations

The political and socioeconomic landscape of the water industry has changed dramatically in recent years, with new specialised research centres established in many universities, and some states, and new Centres of Excellence with a water focus. WQRA recognises the importance of understanding the existing matrix of water organisations and that strategic linkages with the more relevant among these organisations is beneficial to WQRA and its members.

During the year, the focus has been on developing strong networks and productive relationships with organisations outside the WQRA membership. This includes:
- Water Services Association of Australia (National)
- United Water Security Research Alliance (Qld)
- Australian Research Council (National)
- National Health and Medical Research Council (National)
- CSIRO (National)
- National Water Commission (National)
- South East Queensland Councils

International Collaborations

International alliance and research collaborations are a key component to the success of WQRA and the dissemination of overseas research findings to the Australian Water Industry. There are several significant organisations that WQRA has formed relationships with and will continue to work diligently to sustain these relationships.

These organisations include:
- Global Water Research Coalition
- Water Research Foundation
- WERF
- KWR (Netherlands)
- PUB (Singapore)

Global Water Research Coalition

As a Board Member of GWRC, WQRA CEO Jodieann Dawe attended two meetings of the GWRC - Karlsruhe, Germany (October 2008) and London, UK (April 2009). The GWRC Technical and Board meetings provide excellent opportunities for WQRA to form linkages and networks with key international agencies, to help provide a global context for the development of WQRA research priorities and projects. The GWRC forum also provides the opportunity for collaborative project development.

Following, discussions at previous GWRC Board meetings, WQRA and KWR provided a joint presentation on the project entitled “Tools for analysing androgen, thyroid and glucocorticoid activity in environmental waters”. There was significant interest in this project from CIRSEE, KWR, TZW, Water Research Foundation, WERF, WRC, WQRA and EPA. WQRA has been appointed as the lead agency, with Heather Chapman and Fred Leusch from Griffith University as the key researchers. The project scope and participants will be finalised in the first half of 2009-10.

GWRC Board of Directors, London, April 2009
National and International Alliances

Memberships and Committees

WQRA supports other research and industry organisations through membership or participation on committees.

Membership

- WQRA is a Platinum member of the Australian Water Association under a reciprocal membership agreement.
- In March 2009 WQRA became a Silver Corporate member of WaterAid.
- The official launch of the Membrane Society of Australasia (or MSA) was held in Melbourne on the 5th May 2009. WQRA is a corporate member of the society, with membrane technologies ranking as the highest priority issue in the wastewater and recycled water research programs.

Committees

- In January 2009 the CEO of WQRA was invited to serve as an inaugural member of the Curtin Water Quality Research Centre.
- In March 2009 an invitation was received for the CEO to join the advisory committee of the SA Water Centre for Water Management and Reuse. The University of South Australia and South Australian Water Corporation are partners in this Centre, established in 2004 as a joint venture to build capability in water and waste water treatment, water reuse, total water cycle management, water sensitive urban design, environmental biotechnology, water utilisation from the River Murray and the provision of water services for rural and desert communities.
- The Program Manager Wastewater/Recycled Water sits on the Industry Advisory Committee for the Institute for Sustainability and Innovation (Victoria University).
- The Program Manager Wastewater/Recycled Water sits on the RMIT Environmental Science Degree Program Advisory Committee. This group meets every 6 months to discuss the curriculum for this degree, industry placement and input.
- The Program Manager Wastewater/Recycled Water is also the Victorian representative on the National Committee for the Environmental Nutrients Collaborative Trial (ENCT), which runs an annual laboratory proficiency trial program, led by Queensland Health and Forensic Services (Coopers Plains).

WQRA is pleased to be aligned with organisations that share the goal of improving water quality and security.
WATER QUALITY RESEARCH AUSTRALIA LIMITED

A.C.N.  127 974 261

FINANCIAL REPORT

FOR THE YEAR ENDED 30 JUNE 2009

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**CORPORATE INFORMATION**

<table>
<thead>
<tr>
<th><strong>Trading Name</strong></th>
<th>Water Quality Research Australia Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACN</strong></td>
<td>127 974 261</td>
</tr>
<tr>
<td><strong>ABN</strong></td>
<td>32 127 974 261</td>
</tr>
<tr>
<td><strong>Company Type</strong></td>
<td>Australian Public Company, Limited By Guarantee</td>
</tr>
<tr>
<td><strong>Directors</strong></td>
<td>J. Bowman</td>
</tr>
<tr>
<td></td>
<td>K. Cadee</td>
</tr>
<tr>
<td></td>
<td>C. Davis</td>
</tr>
<tr>
<td></td>
<td>J. Dawe (CEO)</td>
</tr>
<tr>
<td></td>
<td>D. Dharmabalan</td>
</tr>
<tr>
<td></td>
<td>J. Howard</td>
</tr>
<tr>
<td></td>
<td>A. Howe</td>
</tr>
<tr>
<td></td>
<td>J. Mc Neil</td>
</tr>
<tr>
<td></td>
<td>M. Moore (Chair)</td>
</tr>
<tr>
<td><strong>Company Secretary</strong></td>
<td>Jodieann Dawe</td>
</tr>
<tr>
<td><strong>Registered Office and</strong></td>
<td>250 Victoria Square</td>
</tr>
<tr>
<td><strong>Principal Place of Business</strong></td>
<td>Adelaide, South Australia, 5000</td>
</tr>
<tr>
<td><strong>Auditors</strong></td>
<td>PKF Adelaide, (ABN 95 060 658 273)</td>
</tr>
<tr>
<td></td>
<td>Level 2, 139 Frome Street</td>
</tr>
<tr>
<td></td>
<td>Adelaide, South Australia, 5000</td>
</tr>
</tbody>
</table>
The Board of Directors of Water Quality Research Australia Limited has pleasure in presenting this report for the financial year ended 30 June 2009 to the members of WQRA.

The Board
The Board of Water Quality Research Australia is composed of 9 directors, with the CEO as the only executive director. The Board is a representative board comprising of four directors representing the WQRA industry members and three directors representing the WQRA research members. Directors are appointed for a two year term.

The Chairman of the Board, Professor Michael Moore was appointed 11 July 2008, following a resolution of the members at a General Meeting.

During 2008 the Board established a Regulatory Advisory Board Committee (chaired by Ms. Jan Bowman) and a Scientific Advisory Board Committee (chaired by Prof John McNeil) to assist and advise the Board and Management in developing, conducting and evaluating the research program of WQRA. In addition, to the two Advisory Board Committees, two Management Committees - the Project Review Team and the Education Committee - were established to provide support to the CEO and staff and make recommendations to the Board on specific program issues.

Directors
The names and details of the company’s directors in office during the financial year are as follows. All directors were in office for the entire year unless otherwise stated. During 2008/09 the Board met on eleven occasions, either in person or via teleconference.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date of Appointment</th>
<th>Board - Teleconference</th>
<th>Board - In Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms Jan Bowman</td>
<td>03/12/2007</td>
<td>7 7 4 3 1</td>
<td></td>
</tr>
<tr>
<td>Mr Keith Cadee</td>
<td>06/11/2007</td>
<td>7 7 4 4 -</td>
<td></td>
</tr>
<tr>
<td>Adj Prof Chris Davis</td>
<td>03/12/2007</td>
<td>7 7 4 4 -</td>
<td></td>
</tr>
<tr>
<td>Ms Jodieann Dawe</td>
<td>17/06/2008</td>
<td>7 7 4 4 -</td>
<td></td>
</tr>
<tr>
<td>Dr Dharma Dharmabalan</td>
<td>26/03/2008</td>
<td>7 7 4 4 -</td>
<td></td>
</tr>
<tr>
<td>Dr John Howard</td>
<td>06/11/2007</td>
<td>7 6 1 4 4 -</td>
<td></td>
</tr>
<tr>
<td>Ms Anne Howe</td>
<td>03/12/2007</td>
<td>7 4 3 4 2 2</td>
<td></td>
</tr>
<tr>
<td>Prof Michael Moore</td>
<td>11/07/2008</td>
<td>7 6 1 4 4 -</td>
<td></td>
</tr>
<tr>
<td>Prof John McNeil</td>
<td>03/12/2007</td>
<td>7 6 1 4 4 -</td>
<td></td>
</tr>
</tbody>
</table>

A. Number of meetings held during the time the director held office during the year
B. Number of meetings attended
C. Number of meetings apologies registered

Details of directors' qualifications, experience and special responsibilities can be found on page

Company Secretary
Ms. Jodieann Dawe has been the company secretary since June 2008.

Principal Activities
The company’s principal activities during the year were:

- Co-ordinating and managing high quality research on priority issues in water quality on behalf of the members of WQRA and the Australian Water Community
- Facilitating knowledge transfer and uptake of outcomes of R&D into industry through workshops and members meetings
**DIRECTORS’ REPORT (cont.)**

Details of directors’ qualifications, experience and special responsibilities

<table>
<thead>
<tr>
<th>Name</th>
<th>Qualification</th>
<th>Member Organisation/Position Held</th>
<th>Special Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms Jan Bowman</td>
<td>B Sc, M App Sc (Applied Toxicology), AAICD</td>
<td>Department of Health Victoria, Assistant Director, Environmental Health, Public Health Group</td>
<td>Chair of Regulatory Advisory Board Committee</td>
</tr>
<tr>
<td>Mr Keith Cadee</td>
<td>B Eng(Civil), M Eng (Environmental), MIE(Aust), GAICD</td>
<td>Water Corporation, General Manager of the Water Technologies Division</td>
<td></td>
</tr>
<tr>
<td>Adj Prof Chris Davis</td>
<td>B Sc Eng (Civil), M Eng (Civil), MBA</td>
<td>University of Technology Sydney, Sustainability Business Development Manager</td>
<td></td>
</tr>
<tr>
<td>Ms Jodieann Dawe</td>
<td>B Sc (Hons), M App Sc (Colloid Chemistry), MBA, Grad Dip Corp Law GAICD, AFAIM, MBA, CChem, CMPGr</td>
<td></td>
<td>WQRA CEO; Company Secretary</td>
</tr>
<tr>
<td>Dr Dharma Dharmabalan</td>
<td>D Tech, Dip, H.Delft, M Eng (Environ, Grad Dip (Comp), B Sc Eng (Hons) (Civil))</td>
<td>Coliban Regional Water Corporation, General Manager - Planning and Infrastructure</td>
<td></td>
</tr>
<tr>
<td>Dr John Howard</td>
<td>BSc (Hons), PhD (Freshwater Chemistry), FAICD</td>
<td>SA Water Corporation, Head of Water Quality and Environment</td>
<td></td>
</tr>
<tr>
<td>Ms Anne Howe</td>
<td></td>
<td>SA Water Corporation, Chief Executive</td>
<td></td>
</tr>
<tr>
<td>Prof Michael R Moore</td>
<td>B Sc, PhD (Medicine), D Sc (Biochemistry)</td>
<td></td>
<td>Independent Chair of WQRA Board</td>
</tr>
<tr>
<td>Prof John Mc Neil</td>
<td>MBBS, M Sc, PhD, FRACP, FAFPHM</td>
<td>Monash University, Head of Department Head, Preventive Medicine Unit</td>
<td>Chair of Scientific Advisory Board Committee</td>
</tr>
</tbody>
</table>

WQRA Board from left: Adj Prof Chris Davis, Dr Dharma Dharmabalan, Dr John Howard, Prof Michael Moore, Ms Anne Howe, Mr Keith Cadee and Ms Jodieann Dawe, Absent: Prof John McNeil and Ms Jan Bowman
Operating Results for the Period
The company’s trading result for the year ended 30 June 2009 was a surplus of $3,286,553. The company is a not-for-profit entity and is exempt from income tax.

A detailed review of operations can be found in the 2009 WQRA Annual Report which accompanies this financial report.

Dividends
No dividends were paid during the reporting period. The company is limited by guarantee and its constitution precludes the payment of dividends.

Share Options
The company has not granted options to any persons to have shares issued to them. The company is limited by guarantee and its constitution precludes the payment of dividends.

Significant Changes in State of Affairs
In the opinion of the directors there were no significant changes in the state of affairs of the company that occurred during the financial year under review not otherwise disclosed in this report.

After Balance Date Events
There has not arisen in the interval between the end of the financial year and the date of this financial report any item, transaction or event of a material and unusual nature that in the opinion of the directors is likely to substantially affect the operations of the company, the results of those operation, or the company’s state of affairs in future financial years.

Environmental Regulations
The company is not particularly exposed to any environmental regulation. The directors have not received notification nor are they aware of any breaches of environmental laws by the company.

Future Developments and Results
There are no significant changes in the state of affairs that are expected in the future which will affect the results and therefore require disclosure.

Indemnification and Insurance of Directors and Officers
Since the end of the previous financial year, the company has paid an insurance premium in respect of a director’s and officer’s liability insurance contract for current and former directors and officers against all liabilities and expenses arising as a result of work performed in their respective capacities, to the extent permitted by law.

Auditors Independence
The auditors independence declaration which forms part of the Directors reports for the financial year ended 30 June 2009 has been received and can be found following this report.

Signed in accordance with a resolution of the Directors.

Michael Moore (Chair)

Jodieann Dawe (Director)

Date: 21st September 2009
DIRECTORS' DECLARATION

The directors of the company declare that:

In the opinion of the directors of Water Quality Research Australia Limited:

1. the financial statements and notes of the Company are in accordance with the Corporations Act 2001 including:
   i) presenting a fair and true view of the company’s financial position as at 30th June 2009 and its performance for the year ended 30 June 2009,
   ii) complying with the accounting policies described in Note 2 to the financial statements;

2. there are reasonable grounds to believe that the Company will be able to pay its debts as and when they become due and payable.

This declaration is made in accordance with a resolution of the Board of Directors:

On Behalf of the Water Quality Research Australia Limited Board

Director

Director

Dated this 21st day of September 2009
# Financial Report

## INCOME STATEMENT
FOR THE YEAR ENDED 30 JUNE 2009

<table>
<thead>
<tr>
<th>Note</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
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<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2(h, i, j, k)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6,254,517</td>
<td>299,217</td>
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<tr>
<td><strong>EXPENDITURE</strong></td>
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<tr>
<td>Research programs</td>
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<tr>
<td>Education program</td>
<td>101,849</td>
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<tr>
<td>Marketing and communications</td>
<td>61,254</td>
<td>12,301</td>
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<tr>
<td>Operating expenses</td>
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<td>38,535</td>
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<tr>
<td>Depreciation</td>
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<tr>
<td>Employee benefits</td>
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<td>22,909</td>
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<tr>
<td>Chairman remuneration</td>
<td>26,846</td>
<td>1,232</td>
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<tr>
<td>Formation &amp; preliminary expenses</td>
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<td>96,158</td>
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<td></td>
<td>2,968,064</td>
<td>171,135</td>
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<tr>
<td><strong>SURPLUS BEFORE INCOME TAX</strong></td>
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<td><strong>INCOME TAX EXPENSE</strong></td>
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</tr>
<tr>
<td></td>
<td>2(d)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>SURPLUS FOR THE YEAR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,286,453</td>
<td>128,082</td>
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The accompanying notes form part of these financial statements.
## BALANCE SHEET
FOR THE YEAR ENDED 30 JUNE 2009

<table>
<thead>
<tr>
<th>Note</th>
<th>2009</th>
<th>2008</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>$</td>
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### CURRENT ASSETS

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<tr>
<th>Description</th>
<th>2009</th>
<th>2008</th>
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</thead>
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<tr>
<td>Cash and cash equivalents</td>
<td>5,997,572</td>
<td>2,687,496</td>
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<tr>
<td>Debtors</td>
<td>269,695</td>
<td>195,800</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>23,120</td>
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<tr>
<td>GST receivable</td>
<td>98,405</td>
<td>-</td>
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<tr>
<td><strong>TOTAL CURRENT ASSETS</strong></td>
<td><strong>6,388,792</strong></td>
<td><strong>2,883,296</strong></td>
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### NON-CURRENT ASSETS

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<thead>
<tr>
<th>Description</th>
<th>2009</th>
<th>2008</th>
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<tbody>
<tr>
<td>Investment-Carbon Regen Pty Ltd</td>
<td>100</td>
<td>-</td>
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<tr>
<td>Plant and equipment at cost</td>
<td>2,412</td>
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<tr>
<td>Accumulated depreciation</td>
<td>(108)</td>
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<tr>
<td><strong>TOTAL NON-CURRENT ASSETS</strong></td>
<td><strong>2,404</strong></td>
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### TOTAL ASSETS

<table>
<thead>
<tr>
<th>Description</th>
<th>2009</th>
<th>2008</th>
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<tr>
<td></td>
<td><strong>6,391,196</strong></td>
<td><strong>2,883,296</strong></td>
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### CURRENT LIABILITIES

<table>
<thead>
<tr>
<th>Description</th>
<th>2009</th>
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</thead>
<tbody>
<tr>
<td>Trade creditors</td>
<td>802,967</td>
<td>36,135</td>
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<tr>
<td>GST payable</td>
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<tr>
<td>Income in advance</td>
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<td>2,621,454</td>
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<tr>
<td>Provision for annual leave</td>
<td>23,393</td>
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<td><strong>TOTAL CURRENT LIABILITIES</strong></td>
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### TOTAL LIABILITIES

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<td><strong>2,755,214</strong></td>
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### NET ASSETS

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<tr>
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<th>2009</th>
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<tbody>
<tr>
<td></td>
<td><strong>3,414,535</strong></td>
<td><strong>128,082</strong></td>
</tr>
</tbody>
</table>

### EQUITY

<table>
<thead>
<tr>
<th>Description</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained earnings</td>
<td>3,414,535</td>
<td>128,082</td>
</tr>
<tr>
<td><strong>TOTAL EQUITY</strong></td>
<td><strong>3,414,535</strong></td>
<td><strong>128,082</strong></td>
</tr>
</tbody>
</table>

The accompanying notes form part of these financial statements.
## CASH FLOW STATEMENT
FOR THE YEAR ENDED 30 JUNE 2009

<table>
<thead>
<tr>
<th>Note</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td><strong>Cash Flows from Operating Activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receipts from participants and other contributors</td>
<td>5,319,222</td>
<td>2,788,279</td>
</tr>
<tr>
<td>Interest received</td>
<td>194,217</td>
<td>34,217</td>
</tr>
<tr>
<td>Payments to suppliers and others</td>
<td>(2,200,951)</td>
<td>(135,000)</td>
</tr>
<tr>
<td><strong>Net cash provided by operating activities</strong></td>
<td>3,312,488</td>
<td>2,687,496</td>
</tr>
<tr>
<td><strong>Cash Flows from Investing Activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additions to plant and equipment</td>
<td>(2,412)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Net cash provided by (used in) investing activities</strong></td>
<td>(2,412)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Net increase in cash held</strong></td>
<td>3,310,076</td>
<td>2,687,496</td>
</tr>
<tr>
<td>Cash at the beginning of the year</td>
<td>2,687,496</td>
<td>-</td>
</tr>
<tr>
<td><strong>Cash at the end of the year</strong></td>
<td>5,997,572</td>
<td>2,687,496</td>
</tr>
</tbody>
</table>

The accompanying notes form part of these financial statements.
NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30 JUNE 2009

1 CORPORATE INFORMATION

The financial report of Water Quality Research Australia Limited (WQRA or ‘the Company’) for the year ended 30 June 2009 was authorised for issue in accordance with a resolution of the directors on 21 September 2009.

The company is a public company limited by guarantee registered in Australia. Its registered office and principal place of business are situated at: 3rd Floor, 250 Victoria Square, Adelaide, SA, 5000.

The nature of the operation and principal activities of WQRA are outlined in the Director’s report and the 2009 WQRA Annual Report.

2 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

(a) Basis of Accounting
This financial report is a special purpose financial report which has been prepared in accordance with the requirements of the Corporations Act 2001 and Australian Accounting Standards. The directors have determined that the company is not a reporting entity and that the report is for use by directors and members of the company.

The financial report has been prepared in accordance with the requirements of the following Australian Accounting Standards:

- AASB 101: Presentation of Financial Statements
- AASB 107: Cash Flow Statements
- AASB 110: Events after the Balance Sheet Date
- AASB 1031: Materiality

No other Australian Accounting Standards, Accounting Interpretations or other authoritative pronouncements of the Australian Accounting Standards Board have been applied.

The financial report has been prepared on an accrual basis, using the historic cost convention, and does not take into account changing money values or, except where specifically stated, current valuations of non-current assets.

The financial report is presented in Australian dollars.

The comparatives for 2008 are for the period from 12 October 2007 (date of incorporation) to 30 June 2008.

(b) Terminology
AASB 101 uses terminology that is suitable for profit-oriented entities, including public sector business entities. In applying this standard, descriptions used for particular line items in the financial statements have been amended to reflect the not-for-profit activities of the Company.

(c) Going Concern
The financial statements have been prepared on a going concern basis, as the directors have reasonable grounds to believe that the company will have such financial support from its members as may be required for normal operations.

(d) Income Tax
No income tax is payable by the Company as it is a tax exempt body under the Income Tax Assessment Act 1936, as amended.
NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30 JUNE 2009 (cont.)

(e) Goods and Services Tax (GST)
Revenue, expenses and assets are recognised net of the GST amount except:
- Where GST incurred on the purchase of goods and services is not recoverable from the Australian Tax Office. In this instance the GST is recognised as part of the cost of the expense item.
- Receivables and payables are stated with the amount of GST included
The net amount of GST recoverable from, or payable to, the Australian Tax Office is included as an item in the Balance Sheet

(f) Income in Advance
Income in advance consists of funds which have been received or invoiced but income recognition has been deferred to future years. Income in advance includes future year (2009/10) Membership Subscriptions and funding received by the Company for research projects that have project milestones that have not yet been met or the expenditure to which they related has not yet been incurred.

(g) Employee Benefits
Provision has been made for employee benefits that have accumulated as a result of the employees rendering services for each reporting period. These benefits include salaries, annual leave and other employee benefits. Leave liabilities that are expected to be settled within the next 12 month period are measured at their nominal amounts based on current remuneration rates.

(h) Initial Company Set-Up Contributions
Initial funding received from contributors for company formation costs and other start up costs of the Company was recognised as revenue for the reporting period ended 30 June 2008 and is reported in the Income Statement.

(i) Membership Subscriptions
Members Subscriptions received by the Company are recognised in the period to which they relate. This figure includes the recognition of Member Subscriptions received by the Company prior to June 30, 2008, which were included in the Company’s current liabilities in the 2008 financial statements, for future research activities that had not yet been undertaken.

(j) Research Project External Revenue
External revenue relating to specific research projects is recognised as revenue to the extent that the expenditure the revenue relates to has been incurred.

(k) Transferred Monies from CRCWQT
Monies transferred from the Co-operative Research Centre for Water Quality and Treatment and the adjunct Wastewater Program, consisted of unallocated funds that were not related to any previously contracted research projects or activities. These unallocated funds were recognised as revenue for the reporting period when the funds were transferred.

3 REVENUE

<table>
<thead>
<tr>
<th>Note</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Company Set-up Contributions</td>
<td>$ (2h)</td>
<td>$ 265,000</td>
</tr>
<tr>
<td>Membership Subscriptions</td>
<td>$ (2i)</td>
<td>$ 3,730,228</td>
</tr>
<tr>
<td>Research Project External Revenue</td>
<td>$ (2j)</td>
<td>$ 1,614,142</td>
</tr>
<tr>
<td>Interest Received</td>
<td>$ 194,217</td>
<td>$ 34217</td>
</tr>
<tr>
<td>Income from Research Publications</td>
<td>$ 5,168</td>
<td>-</td>
</tr>
<tr>
<td>Transferred Monies from CRCWQT</td>
<td>$ (2k)</td>
<td>$ 710,762</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$ 6,254,517</td>
<td>$ 299,217</td>
</tr>
</tbody>
</table>
NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30 JUNE 2009 (cont.)

4 CASH & CASH EQUIVALENTS

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash at Bank</td>
<td>5,997,372</td>
<td>2,687,496</td>
</tr>
<tr>
<td>Cash on hand</td>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>5,997,572</td>
<td>2,687,496</td>
</tr>
</tbody>
</table>

5 STATEMENT OF CHANGES IN EQUITY

<table>
<thead>
<tr>
<th></th>
<th>Retained Earnings</th>
<th>Total Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at 12 October 2007</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Surplus for the year ended 30 June 2008</td>
<td>128,082</td>
<td>128,082</td>
</tr>
<tr>
<td>Balance at 30 June 2008</td>
<td>128,082</td>
<td>128,082</td>
</tr>
<tr>
<td>Surplus for the year ended 30 June 2009</td>
<td>3,286,453</td>
<td>3,286,453</td>
</tr>
</tbody>
</table>

6 CASH FLOW STATEMENT

Surplus for the year is reconciled to net cash provided by operating activities as follows:

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surplus after income tax</td>
<td>3,286,453</td>
<td>128,082</td>
</tr>
<tr>
<td>Add: Depreciation</td>
<td>108</td>
<td>-</td>
</tr>
<tr>
<td>(Increase)/Decrease in:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receivables</td>
<td>(73,895)</td>
<td>(195,800)</td>
</tr>
<tr>
<td>Other debtors</td>
<td>(137,887)</td>
<td>-</td>
</tr>
<tr>
<td>Prepayments</td>
<td>(23,120)</td>
<td>-</td>
</tr>
<tr>
<td>Increase/(Decrease) in:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creditors and other payables</td>
<td>708,589</td>
<td>133,760</td>
</tr>
<tr>
<td>Provisions</td>
<td>23,393</td>
<td>-</td>
</tr>
<tr>
<td>Income in Advance</td>
<td>(471,153)</td>
<td>2,621,454</td>
</tr>
<tr>
<td>Net cash provided by operating activities</td>
<td>3,312,488</td>
<td>2,687,496</td>
</tr>
</tbody>
</table>
7 REMUNERATION OF AUDITORS

PKF are the appointed, independent auditors of WQRA, as determined by the Members at the 2008 Annual General Meeting.

The auditors' remuneration for services provided to WQRA for the year ended 30 June 2009 was as follows:

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>For auditing services</td>
<td>9,740</td>
<td>-</td>
</tr>
<tr>
<td>For other services</td>
<td>8,398</td>
<td>1,000</td>
</tr>
<tr>
<td>Total</td>
<td>18,138</td>
<td>1,000</td>
</tr>
</tbody>
</table>
Auditor’s independence declaration

To the Directors of Water Quality Research Australia Ltd

As lead auditor for the audit of Water Quality Research Australia Ltd for the year ended 30 June 2009, I declare that, to the best of my knowledge and belief, there have been:

(a) no contraventions of the auditor independence requirements of the Corporations Act 2001 in relation to the audit; and

(b) no contraventions of any applicable code of professional conduct in relation to the audit.

PKF
Chartered Accountants

I J Pauller
Partner

INDEPENDENT AUDITOR’S REPORT
TO THE MEMBERS OF WATER QUALITY RESEARCH AUSTRALIA LTD


We have audited the accompanying financial report, being a special purpose financial report, of Water Quality Research Australia Ltd, which comprises the balance sheet as at 30 June 2009, the income statement, cash flow statement and statement of changes in equity for the year ended 30 June 2009, a summary of significant accounting policies, other explanatory notes and the directors’ declaration.


The directors of the company are responsible for the preparation and fair presentation of the financial report and have determined that the accounting policies described in Note 1 to the financial statements which form part of the financial report are appropriate to meet the financial reporting requirements of the Corporations Act 2001 and are appropriate to meet the needs of the members. The directors’ responsibility also includes designing, implementing and maintaining internal control relevant to the preparation and fair presentation of the financial report that is free from material misstatement, whether due to fraud or error, selecting and applying appropriate accounting policies and making accounting estimates that are reasonable in the circumstances.

Auditor’s Responsibility

Our responsibility is to express an opinion on the financial report based on our audit. No opinion is expressed as to whether the accounting policies used, as described in Note 1, are appropriate to meet the needs of the members. We conducted our audit in accordance with Australian Auditing Standards. Those Auditing Standards require that we comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial report is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial report. The procedures selected depend on the auditor’s judgment, including the assessment of the risks of material misstatement of the financial report, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity’s preparation and fair presentation of the financial report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity’s internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the director, as well as evaluating the overall presentation of the financial report.

The financial report has been prepared for distribution to members for the purpose of fulfilling the director’s responsibility for financial reporting under the Corporations Act 2001. We disclaim any assumption of responsibility for any reliance on this report or on the financial report to which it relates to any person other than the members, or for any purpose other than that for which it was prepared.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.
INDEPENDENT AUDITOR’S REPORT
TO THE MEMBERS OF WATER QUALITY RESEARCH AUSTRALIA LTD

(continued)

Independence

In conducting our audit, we have complied with the independence requirements of the Corporations Act 2001.

Auditor’s Opinion

In our opinion, the financial report of Water Quality Research Australia Ltd is in accordance with the Corporations Act 2001, including:

(a) giving a true and fair view of the company’s financial position as at 30 June 2009 and of its performance for the year ended 30 June 2009 in accordance with the accounting policies described in Note 1; and

(b) complying with Australian Accounting Standards to the extent described in Note 1, and the Corporations Regulations 2001.

PKF
Chartered Accountants

I J Painter
Partner

Adelaide September 2009.
The Financial Report Covers:
Water Quality Research Australia Limited
ABN 32 127 974 261
ACN 127 974 261
Registered Trading Address:
Level 3, SA Water House,
250 Victoria Square, Adelaide 5000
GPO Box 1751, Adelaide SA 5001
Telephone: +61 8 7424 2447
Fax: + 61 8 7003 2447
Email: jodieann.dawe@wqra.com.au
www.waterquality.org.au