



2017-18 Annual Report



Water
Research
Australia

Our year

For more than a decade, Water Research Australia (WaterRA) has been a successful hub for collaboration and innovation on water issues.

WaterRA is tasked by our Members and stakeholders with managing research that will allow them to keep pace with change and address the industry's long-term goals and challenges. It is a responsibility we take seriously and it defines our mission.

This year, as in previous, we have worked to bring together key water research groups, regulators and industry Members to define and conduct targeted, priority research to address current and emerging issues in water. It has led to nine projects reaching completion and nine new Communities of Interest covering seven of our focus areas, creating thirty-one additional project opportunities. Together, with our extensive links to the national and international water research community, we have provided critical and timely information on emerging issues of concern – ensuring that the best possible knowledge and skills are accessible to the Australian water sector. Our Members have accessed and downloaded this vital information through our publications (Health Stream, factsheets, reports, presentations and news articles) over 141,000 times.

Over the last three years, we have looked to partner even more closely with our Members, listening to feedback and assessing emerging areas of concern to build a stronger, broader, more interconnected research agenda with greater value and services. We have capitalised on our efficiencies, expanded the expertise in our team and redesigned our services. These changes have been led by the Board and CEO, with the Risk and Audit, Human Resource, and Strategic Advisory Committees of the Board providing guidance and expert advice.

Our ability to help our Members and their customers – the greater Australian community – has clearly resonated,

with our membership base across water utilities, research organisations and providers, private sector companies, government departments and regulators growing every year – we welcomed four new Members in 2017-2018, taking our membership to 63 organisations and counting.

With more Members comes more access to more expertise in the areas of drinking water, wastewater, stormwater, and reuse – increasing our collaborative outcomes. As a result, we now have an even greater capacity to interlink the key challenges facing the water sector and design solutions across all points in the water cycle.

Increasingly, our focus is on ensuring that research engenders the innovation and business improvements that warranted the research investment in the first place. As a result, this year we have deepened our relationships with key partners, such as Water Industry Operators Association (WIOA), to broaden our reach and target the people who can put new processes and knowledge into practice.

Still, many challenges remain across the research value cycle, from problems such as ensuring water security in a changing climate, tackling ever-emerging contaminants, ensuring safe and sustainable water management so that communities thrive regardless of where they are in Australia, through to successfully implemented solutions and a future-ready workforce.

Together with our Members we are at the forefront of investigating these issues, with many exciting projects developed in 2017-2018 to address challenges as diverse as anti-microbial resistance, operator competency, and the management of carp.

Our focus on discovering solutions through collaborative research will remain, as always, unwavering, underpinning everything we do. However, 2017-2018 also saw the creation of our new Strategic Plan 2018-2021.



This plan will enable us to build on the changes we have already achieved in the collaboration and innovation space and will increase our value to the water sector, with a focus on delivering impact through distinct knowledge transfer services, and working with our Members to accelerate the adoption of research.

Our foundation initiative, which commenced in 2018, is the Value of Research project, which aims to identify the many ways and domains where the impact and value of research can be realised and quantified across the water sector. Currently, there are many organisations signing up to this project, demonstrating just how important the outcomes will be for organisations and the broader sector. Upon completion, the project will transition to a key service

which WaterRA will provide, supporting Members and the industry to fully realise the value of research across all aspects of their business, so our Members can accurately demonstrate that research is not a cost, but an investment – an investment in the future of their business, an investment in future changes, an investment in customers and an investment in the world’s most vital resource.

2017-2018 has been an exciting year for WaterRA and 2019 and beyond promises to be even better. We would like to thank our Board and Members for their belief, contributions, commitment and continued support. You make our mission possible and, together, we can ensure a bright future for the water sector through collaboration, innovation and impact.



A handwritten signature in black ink, appearing to read 'S Cox'.

Shaun Cox
Board Chair



A handwritten signature in black ink, appearing to read 'KL Rouse'.

Karen Rouse
CEO

WaterRA is dedicated to ensuring the safety, security and sustainability of our most vital resource – water. Our collaborative research efforts translate to real-world solutions for the water industry, so generations of Australians can thrive now and in the future.

Our board

Our Board is responsible for the strategic direction and oversight of WaterRA on behalf of Members. It comprises three Directors nominated by research Members, three Directors nominated by industry Members, an Independent Chairperson elected by the Members, an Independent Director appointed by the Board, and the CEO.



MR SHAUN COX | NON-EXECUTIVE INDEPENDENT CHAIR

Previously head of Melbourne Water, Shaun Cox is a highly experienced and respected member of the water sector. He has served as Director and Chair of both the Smart Water Fund and the Water Services Association of Australia (WSAA) and was on the inaugural Board of the Cooperative Research Centre for Water Sensitive Cities.



MR JAMIE HOLLAMBY | CHAIR OF RISK AND AUDIT COMMITTEE (RAAC)

A Chartered Accountant and General Manager, Business Services at SA Water (inc. research of the AWQC), Jamie has a wealth of experience in finance, governance, project and risk management. Jamie also sits on the Advisory Board of the SA Government Financing Authority.



DR STEPHEN CAPEWELL | CHAIR OF HUMAN RESOURCES COMMITTEE (HRC)

With a background in water quality and treatment, Steve is General Manager Operations Services at Water Corporation in Western Australia. Steve has broad governance experience as Chair of the Perth desalination plant alliances as well as the WA State Advisory Committee for the Purity of Water.



MR KEN MURPHY | INDEPENDENT DIRECTOR

Currently a private consultant, Ken has over 20 years' of experience as a Company Director/Chairman complemented by more than 25 years' of Chief Executive and Managing Director level experience. Ken is a past member of various Government, business, community committees and taskforces.



MS KAREN ROUSE | EXECUTIVE DIRECTOR

Karen has over 20 years' water sector experience holding senior management positions at SA Water and the CSIRO's water flagship and is the CEO of WaterRA. Karen has previously served on Board Committees for the Water Services Association of Australia and is currently on the Board of the Water Industry Alliance.



MR DAVID SHEEHAN | CHAIR OF STRATEGIC ADVISORY COMMITTEE (SAC)

General Manager Water Quality Performance and Regulation at Coliban Water, David has extensive water sector experience including a regulatory role with the Victorian Department of Health. David is former member of the National Health and Medical Research Council's Water Quality Advisory Committee.



DR MELITA STEVENS | MEMBER OF RAAC

A member of the Implementation Committee that supervised the start-up of WaterRA, Melita is an adjunct professor at RMIT and an Honorary Senior Fellow at Melbourne University. Currently Principal Scientist for Melbourne Water, Melita has been involved in water quality and research for over 20 years.



PROF RICHARD STUETZ | MEMBER OF HRC

Richard has 20 years' research experience in Australia and the UK and is the Director of the UNSW Water Research Centre. He is a member of IWA and was instrumental in the establishment of the IWA Young Water Professionals programme and its international conference series.



PROF CHRISTOPHER SAINT | DEPUTY CHAIR SAC

Chris is the Dean, Research & Innovation for the Division of Information Technology, Engineering and the Environment at the University of South Australia and is also Director of the China Australia Centre for Sustainable Urban Development (a joint initiative with Tianjin University, China).

Our team

In 2017–2018 we broadened the expertise in our team — restructuring roles to better align with our business model and bringing in new skills to help us in delivering on our goals, now and in the future. We welcomed Dr Ian Overton (Chief Research Services Officer), Michelle Pfitzner (Business Manager), Mark Andersson (Engagement and Marketing Manager) and Deepika Jaduram (Research Adoption Manager).



MS KAREN ROUSE
CHIEF EXECUTIVE OFFICER (CEO)

With over 20 years' water sector experience, Karen has been leading the team since 2016, providing direction and guidance so that we achieve for our Members.



MS CAROLYN BELLAMY
RESEARCH CAPABILITY MANAGER

Carolyn's focus on building the future of the water industry through supporting current students has gone from strength to strength, with eight graduates in 2017-2018 and fifteen new students this year.



MS MICHELLE PFITZNER
BUSINESS MANAGER

Our newly appointed business manager, Michelle, has been developing our reporting systems and guiding the organisation's 100% success in regulatory and audit compliance.



DR KELLY HILL
RESEARCH PROGRAM
COORDINATOR

Kelly has been leading our team in bringing together collaborators from research, industry and government, and sharing our knowledge to the benefit of all of our Members.



DR IAN OVERTON
CHIEF RESEARCH SERVICES OFFICER

2017-2018 marked Ian's first year with WaterRA. Ian's wealth of knowledge and 25 years' experience has seen the realisation of even more value from the research solutions we develop for our Members.



MR MARK ANDERSSON
ENGAGEMENT AND
MARKETING MANAGER

Joining in March 2018, Mark is building upon the strength of the WaterRA community and ensuring Members are making the most of the many benefits WaterRA membership has to offer.



MS CLAIRE MCINNES
SENIOR RESEARCH MANAGER

Claire has long been known for her dedicated approach to research management. 2017-2018 has proven to be no exception – under her guidance, nine projects have been completed and realised industry impact.



MS SUSAN SPRAGG
ENGAGEMENT OFFICER

A stalwart of the team, Sue has supported the CEO and Board in delivering on our strategy while also ensuring the needs of our Member community are met at every call and every event.



MS DEEPIKA JADURAM
RESEARCH ADOPTION MANAGER

The newest member of our team, Deepika, is forging our new strategy to develop even more services which aim at the very heart of ensuring research is understood and adopted by industry.



MS ANGELA GACKLE
COMMUNICATIONS MANAGER

Angela has been keeping our Members abreast of new innovations, research and opportunities leading Water Matters and Health Stream with her technical expertise and experience.

Our thanks

We would like to give thanks to departing staff members Peter Brass and Fred Fleuren. Peter served as Chief Operating Officer (including Company Secretary, Jul 2012-Dec 2017) and Fred as Finance Manager (Oct 2008-Feb 2018), collectively providing over a decade of dedicated service to WaterRA, our mission and our Members.

Global reach local impact

Over 60 Member organisations—water utilities, research organisations as well as consulting firms and private companies—are Water Research Australia Members. In 2017-2018 we welcomed four new Member organisations to our community—Viridis (Nov 17), WaterQPlus (Jan 18), Federation University (Apr 18) and the Department of Health Queensland (May 18).



Members



Global Partners

Our Members

- Atom Consulting
- Australian Water Association
- Australian Water Quality Centre
- Barwon Region Water Corporation
- Central Gippsland Regional Water Corporation
- Central Highlands Water
- Centre for Appropriate Technology
- Charles Darwin University
- ChemCentre
- City West Water
- Coliban Region Water Corporation
- Curtin University of Technology
- Deakin University
- Department of Health - Environmental Health Northern Territory
- Department of Health & Human Services Tasmania
- Department of Health & Human Services Victoria
- Department of Health Queensland
- Edith Cowan University
- Federation University
- Flinders University
- GHD
- Goulburn Valley Regional Water Corporation
- Grampians Wimmera Mallee Water Corporation
- Griffith University
- Hunter Water Corporation
- IBL Solutions
- Lower Murray Water
- Melbourne Water
- Monash University
- Murdoch University
- National Measurement Institute
- NSW Health
- Power & Water Corporation
- Risk Edge
- RMIT University
- Seqwater
- South Australian Water Corporation
- South East Water Corporation
- Suez Water
- Swinburne University of Technology
- Tasmanian Water & Sewerage Corporation
- University of Adelaide

Reach, Impact

Over 60 national Member organisations and 12 Partners across the globe providing real solutions through collaborative research

- University of Melbourne
- University of Newcastle
- University of New South Wales
- University of Queensland
- University of South Australia
- University of Technology
- University of the Sunshine Coast
- University of Western Australia
- University of Wollongong
- Veolia Water Australia Pty Ltd
- Victoria University
- Viridis Consultants
- Wannon Region Water Corporation
- Water Corporation of WA
- Water Futures
- Water Industry Operators Association of Australia
- WaterNSW
- WaterQ Plus
- Western Region Water Corporation
- Yarra Valley Water

Our Global Partners*

- Canadian Water Network
- Chinese Academy of Science
- International Research Center On Water and Environment (C.I.R.S.E.E.)
- KWR Watercycle Research Institute
- Public Utilities Board Singapore
- STOWA Foundation for Applied Water Management Research
- TZW Water Technology Centre
- UK Water Industry Research
- Veolia Environnement Research and Innovation (VERI)
- Water Environment & Reuse Foundation
- Water Research Commission South Africa
- Water Research Foundation
- Water Services Association of Australia

* through membership of the Global Water Research Coalition

Our focus

WaterRA's research engagement is national and international, addressing urban, regional and remote water issues. The scope of our research is shaped by our Members' needs and embraces all aspects of drinking water, recycled water and wastewater.

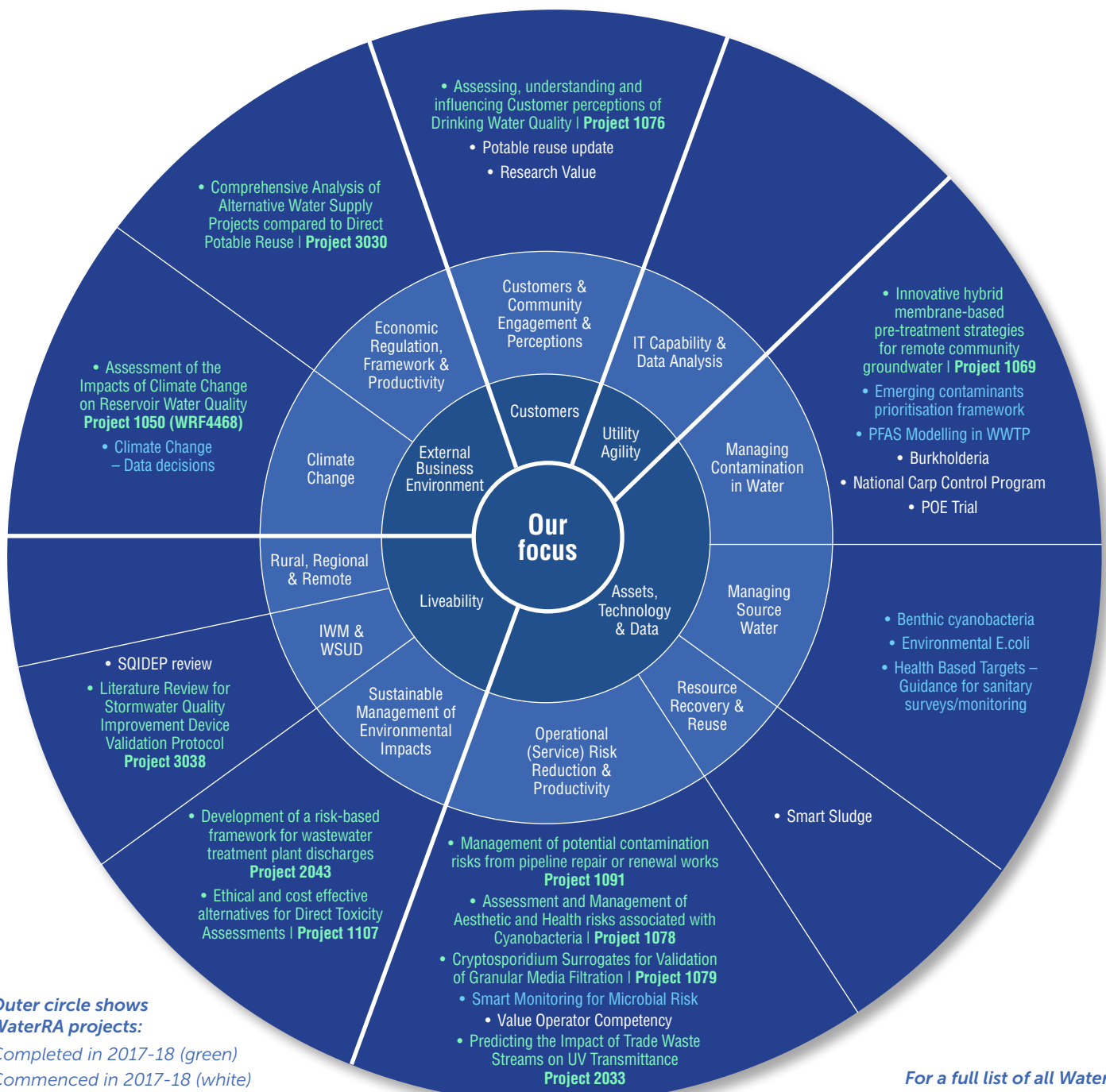
Over the past three years we have continued to work on delivering more value to more Members through restructuring our research portfolio.

We are proud to say that, building on the support from our Members and the wider water community, we have taken our research offerings from purely water quality to now span the breadth of water sector needs.

We have ensured alignment with partner organisations, ensuring the strategic directions of all of our Members can be supported and efficiencies are realised. This places us in a unique position with a holistic view of shared issues, linking Members to appropriate experts and identifying solutions that draw from a wide array of available research.

This approach has delivered invaluable results and placed WaterRA at the forefront of collaborative research in Australia.

The increased breadth of our research across our focus areas in 2017-2018 can be seen below:



Outer circle shows WaterRA projects:

Completed in 2017-18 (green)
 Commenced in 2017-18 (white)
 Continuing in 2017-18 (blue)

For a full list of all WaterRA projects visit waterra.com.au

Our delivery

Over the last three years we have changed the way we deliver our services, especially our projects. The initiation of projects begins with an industry need. We bring together researchers and industry Members to share information in our Communities of Interest (COI) and collaboratively define the need in a Community of Interest Problem and Opportunity Definition workshop.

This is the third year during which our COI process has driven the creation of new projects. COI-based problem definition workshops reliably provide a stimulating environment for our water sector Members to discuss their goals, business needs and challenges for the future with peers and researchers who are leaders in their fields.

We have further refined the process in 2017-2018, based on Member feedback and the addition of new technologies, to aid in collating discussion ideas and delivering session outcomes more quickly to participants.

The resulting collaborative effects have been abundant, sparking ideas, understanding, innovation and engagement. It has led to nine new Communities of Interest in 2017-2018 covering seven of our focus areas and we have been able to translate that into thirty-one additional project opportunities – eight underway, twenty-two in development, and one currently in negotiation, with the potential for even more.



Our Communities of Interest

Emerging contaminants
(2 – ABR and PFAS)

Managing Source Water
(2 – Catchments and Carp)

Regional, Rural and Remote (1)
Digital Utility (1 – Data Science)

IWM & Liveability (1 – Smart Metering)
Customers (1 – Customer preferences)

Operational (Service) Risk Reduction & Productivity (1 – Chloramination)

Our workshops

5 Tech transfer/knowledge-sharing workshops

[Projects #3019 July '17 / #1078 Oct '17 / #1066 Oct '17 / #1109 Dec '17 / #2036 Apr '18]

4 Wrap-up workshops

[Projects #1107 Sept '17 / #1078 Nov '17 / #1075 May '18 / #1076 May '18]

2 Webinars

ICE WaRM on WaterRA Research Symposium [Oct '17]

IWA Webinar on Resource Recovery & Reuse [Oct '17]

Our projects

Working across our eleven focus areas, our projects during 2017-2018 defined how far we have come in the breadth of our research and our ability to meet our Members' needs, no matter what challenge they are wanting solved.

During 2017-2018, nine research projects were completed¹, representing the culmination of effort of forty-six industry partners and twenty-one research agencies. For a cash investment of over \$530k, WaterRA leveraged more than \$2.1m in in-kind contributions, and approximately \$1.5m in funding from collaborating agencies, to create these projects for and with our Members, with a total value of \$4.2m.

2017-2018 has also seen thirty-one additional project opportunities - with eight underway, twenty-two in the development stage and one currently in negotiation. These opportunities, along with our current and completed projects,

cover nine of the eleven focus areas, transforming WaterRA from water quality research specialists into an organisation which can aid Members across all their water industry research needs, aligning with the big challenges and strategic initiatives of water utilities across the country.

We have also seen our research numbers grow, with more and more of our research partners seeing the value in our project delivery style — being able to meet with industry and really determine the needs and ways in which research can most impact organisations and provide solutions.

In the past year, our researchers have published twenty-nine journal papers and presented at thirteen conferences around the world. Papers have appeared in journals as diverse as *Emerging Infectious Diseases* to the *Official Journal of the Leisure Institute of Western Australia* and *Earth's Future*.

Our outcomes

With our growing awareness that projects need practical tools for better adoption, WaterRA delivered a range of projects for our Members that provided useful tools for water utilities. Two projects developed risk-based frameworks to assist water utilities in their operations. The 'Management of potential contamination risks from pipeline repair or renewal - #1091' delivered a control framework to improve management practices, whilst allowing utilities to be flexible in their approach. The framework is based on the latest science and knowledge of current management practices, and aligns with the Australian Drinking Water Guidelines (ADWG).

Another tool available to utilities was developed in the project 'Robust wastewater discharge assessment – a risk-based approach - #2043'. The 'WWTP discharge framework calculator' combines our current knowledge with expert judgement to allow utilities to rank the relative risks of a WWTP associated with its receiving environment. It's a simple means to prioritise WWTP performance and engage with regulators, yet is backed with the latest science.

The project tools developed for 'Development of tools for assessment and management of aesthetic and health risks associated with cyanobacteria - #1078' include a PAC dosing estimator (CRAST) and generic procedure for mid-treatment water quality monitoring. The benefits of this approach were realised during the project when unexpected taste and odour detections were originally thought to be from poor PAC treatment; instead the mid-treatment monitoring revealed the treatment process was lysing cells releasing the T&O compounds.

A joint Water Research Foundation and WaterRA project saw the development of the WaterSET tool and user guide which gives a comprehensive analysis of alternative water supply projects compared to direct potable reuse.

2017-2018 has seen our portfolio and expertise expanded significantly, and we will be working closely with all of our Members under our new strategy to develop even more resources and services to ensure research findings can be transferred and adopted for maximum impact.

Footnote:

¹ For outputs based on, or derived from WaterRA projects, including journal papers, book chapters, reports, conference presentations, fact sheets and student theses, visit waterra.com.au.

Projects completed in 2017-2018¹

Assessment of the Impacts of Climate Change on Reservoir Water Quality.

Burch M, van der Linden L, Chang C, Lin TF, Barandouzi MA, Moglen GE, Godrej NE, Little J and Brookes JD.
(joint Water Research Foundation and WaterRA Report)
Project 1050 (WRF4468)

Innovative hybrid membrane-based pretreatment strategies for remote community groundwater.

Waite TD
Project 1069

Assessing, understanding and influencing Customer perceptions of Drinking Water Quality.

Newcombe G, Newton K, Fielding KS and Roiko A.
Project 1076

Assessment and Management of Aesthetic and Health risks associated with Cyanobacteria.

Newcombe G and Newton K.
Project 1078

Cryptosporidium Surrogates for Validation of Granular Media Filtration.

Monis P, Hillis P, Rodick F and Drikas M.
Project 1079

Management of potential contamination risks from pipeline repair or renewal works.

Crawford N and Contos A.
Project 1091

Ethical and cost effective alternatives for Direct Toxicity Assessments.

Van d Merwe JP and Leusch FDL.
Project 1107

Predicting the Impact of Trade Waste Streams on UV Transmittance.

Zhang X, Fan L and Roddick F.
Project 2033

Development of a risk-based framework for wastewater treatment plant discharges.

Kildea T, van de Merwe J and Leusch F.
Project 2043

Comprehensive Analysis of Alternative Water Supply Projects compared to Direct Potable Reuse.

Stanford BD, Ishii SKL, Johns G, Hadjikakou M, Khan S and Widmann TO. (joint Water Research Foundation and WaterRA Report)
Project 3030 (WRF4761)

Literature Review for Stormwater Quality Improvement Device Validation Protocol.

Toifl M, O'Halloran, Palombo E and Imteaz M.
Project 3038

The Value of Research

"Research is inherently valuable but hard to value"

This statement is at the heart of the challenge water businesses face – how to quantify the value of their research efforts and maximise the return across their business.

In 2018 WaterRA launched one of its most exciting and popular projects, the Value of Research, which seeks to identify the many ways and domains where the impact and value of research can be realised across the water sector.

The project will produce a guidance manual and accompanying tools and training programs in the utility and commercial sectors. The guidance manual will not only provide utilities with a standardised way to measure the value of the research that they are currently undertaking, but also demonstrate how to assess the likely value of future research opportunities.

The guide will present a simple framework, geared specifically toward utilities, enabling them to extract maximum value from their investments in research.

WaterRA, with guidance from its Members, has commenced scoping this project, with a large amount of interest already generated in the sector. To ensure the absolute best guidance, tools and training are developed we are looking to engage with even more interested organisations that would benefit from determining the value of their research.

A project prospectus is currently available detailing the project scope, outcomes and deliverables.¹

Sharing our knowledge



141,000
document
downloads

Health Stream
Factsheets | Reports
Presentations
Articles

Project reports

9 new
project reports
generated in
2017-18

Workshops and events



9 Community of
Interest workshops

4 Wrap-up
workshops

5 Tech transfer/knowledge-
sharing workshops

2 Webinars



7 new factsheets in 2017-18
to take our factsheet library up to 39



Water Matters

Our **monthly e-news** continued
to deliver vital information

1600+
web subscribers

109
topics

A wide range of valuable resources and activities have been developed as part of Water Research Australia's commitment to sharing our knowledge to support the understanding and application of our work. These resources include Water Matters, our monthly e-news, and Health Stream, our quarterly report on water-related health research and emerging issues, project reports, factsheets, reference materials and much more.



Global reach...

WaterRA papers downloaded across the world in...

USA, Canada, Mexico, Brazil, UK, France, Spain, the Netherlands, Germany, Austria, Italy, Hungary, Poland, Ukraine, Bulgaria, Russian Federation, Finland, Sweden, Norway, Turkey, Iran, Pakistan, India, UAE, Egypt, Algeria, Nigeria, Uganda, South Africa, China, South Korea, Japan, Vietnam, Thailand, Malaysia, Indonesia, and Australia!

Health Stream

Our quarterly magazine looking at water quality issues was delivered four times in 2017-2018 - editions #86-#89. Our Health Stream catalogue reached over 1800 people and proved to be invaluable to subscribers and Members with total downloads in the last three years exceeding 18,000



Four editions in 2017-2018

reached over **1800** people

18,000+
total downloads in
the last three years



"You may have heard from us at..."

WaterRA presented at five major water industry events

Water in the Bush [Oct '17]

International Water Association YWP Conference [Feb '18]

Smart Water Summit [March '18]

OzWater [May '18]

Water Industry Operators Association Logan [June '18]



Member meetings

2 Member-only meetings were held (Adelaide, AGM in Darwin) with national representation across our membership

Research Symposium

Our 2017 Symposium was a massive hit

102
attendees

26
presenters

24
topics



"You may have also seen us at..."

Queensland Water Directorate Forum [Sept '17]

Water Industry Operators Association Conference [Sept '17]

Waterlution's Global Water Innovation Lab Australia [May '18]

AWA Specialist networks: Catchment Management, Recycled Water, Industry, Education, and Regional, Rural, and Remote Stormwater SA

Industry Advisory Committee for the Australian Research Council

Our education program

For many years, WaterRA's Education Program has oriented excellent young (and not-so-young) students toward the water industry.

In 2017-2018 our program generated over \$300,000 of industry support, enabling industry to tackle research questions through some of the brightest minds. Their support granted fifteen new students the opportunity to undertake outstanding, tailored research for the sector, develop broad professional networks and create opportunities for collaboration. Eight projects were completed in 2017-2018, with twenty-five still in progress across six focus areas: customers and community engagement and perceptions, managing contamination in water, managing source water, resource recovery and reuse, operational risk reduction and productivity, and IWM and WSUD.

Our students have presented in various formats at a host of national and international conferences, including The Gordon

Research Conference (Boston), IWA 15th Leading Edge Conference (Nanjing), European Geosciences Union General Assembly (Vienna), International Conference on Environmental Modelling and Software (Colorado) and the Water Quality Technology Conference (Portland).

They have also been recognised for their achievements, with Matthew Kube, Sarah Aucote, Stephanie Wallace-Polley, Charndee Chahal and Sonya Kozak all receiving awards and commendations for their work.

These opportunities would not have been possible without the valuable support of our student sponsors, participating Universities and tireless mentors, who are all working with us to build capability within the sector now and in the future.

In 2017-2018 our education program has gone from strength to strength and we wish to thank our Education Committee for their hard work in ensuring our program is of the highest calibre.



Supporting students throughout their career

"Receiving a WaterRA scholarship has been pivotal in shaping my career as a water professional. The unique networking and mentorship opportunities offered by WaterRA provide great benefit. As a WaterRA student, I regularly met Australian water industry professionals who have influenced my professional development. After completing my PhD, it was through the networks I developed with WaterRA Members that I was able to secure my first permanent role as a water professional. Since then I have led work into investigating pesticide risk in catchments, the impacts of bushfires and more recently into emerging contaminants including PFAS. In 2016, I decided to invest in my development as a water professional and began my Masters. To complete the Final Project component of my Masters I have relocated to Lisbon, Portugal. WaterRA has continued to support me as I undertake my Final Project abroad."

— Emma Plant | WaterRA PhD Graduate – now Technical Advisor of Source Protection at Water Corporation

Guiding the next generation

“The benefits WaterRA provides for the mentor, mentee and the broader industry/organisation are significant. As a mentor I was able to help guide the development of a young, enthusiastic and intelligent individual. The satisfaction of watching them learn and grow is immense. The professional benefits I experienced by becoming a mentor were immense. It provided me exposure to the quality of talent that is emerging from our universities and it helped to keep me in touch with leading-edge research.”

– David Halliwell | Director, Regional and Rural Futures and Director, Research Partnerships at Deakin University



Individual success

2017 SA AWA Student Water Prize – Sarah Aucote
[Flinders University/SA Water sponsored]

2017 SA AWA High Commendation – Charndee Chahal
[Flinders University/Melbourne Water sponsored]

2017 School of Medicine 3 Minute Thesis Competition (non-clinical)
Winner – Sonya Kozak
[Griffith University/Healthy Land & Water and Seqwater sponsored]

2017 ProSPER.Net Young Researchers’ School Three Minute Thesis
Competition (Japan) 2nd place – Sonya Kozak

2018 Nancy Millis Memorial PhD Award – Matthew Kube
[RMIT/SE Water sponsored]

2018 Michael R Moore Memorial Honours Award
– Stephanie Wallace-Polley
[RMIT/WaterRA sponsored]

2018 National AWA Student Water Prize – Sarah Aucote
[Flinders University/SA Water sponsored]



Our thanks

The WaterRA Education Program would like to acknowledge its supporters:

Our Student Sponsors



Our Research Partners

- Curtin University
- Flinders University
- Griffith University
- RMIT
- Swinburne University
- University of Adelaide
- University of Melbourne
- University of Newcastle
- University of NSW
- University of Queensland
- University of South Australia
- University of the Sunshine Coast
- Victoria University

Our Education Committee

- Dr Rita Henderson [UNSW] Chair (Maternity leave)
- Prof Felicity Roddick [RMIT] (Interim Chair)
- Dr Kathryn Linge [Curtin University] (Maternity leave)
- Dr Sally McArthur [Swinburne University] (Interim)
- Mr Peter McCafferty [ChemCentre]
- Prof Dennis Mulcahy [UniSA]
- Mr Asoka Jayaratne [Yarra Valley Water]
- Dr Louise McKenzie [Hunter Water]
- Dr Paul Monis [SA Water]
- Mr Glen Rowlands [TasWater]

Our Mentors

- | | |
|--------------------------------------|-------------------------------------|
| Suzanne Froschio [SA Health] | Jason Barnett [TasWater] |
| Daniel Hoefel [SA Water] | Neil Crossing [AllWater] |
| David Halliwell [Deakin University] | Michael Storey [Sydney Water] |
| Annette Davison [Risk Edge Pty Ltd] | Tony Priestley [Consultant] |
| Joanne O'Toole [Monash University] | Stephanie Rinck-Pfeiffer [GWRC] |
| Cheryl Lim [NMI] | Peter McCafferty [ChemCentre] |
| Cameron Veale [Seqwater] | Leon van der Linden [SA Water] |
| Colin Long [Mak Water] | Tanja Stefanovic [Beyond Paradigms] |
| Daniel Deere [Water Futures Pty Ltd] | Alice Antony [UNSW] |
| Shaun Cox [Inxure Strategy Group] | Paul Byleveld [NSW Health] |



Our Members and Partners are the driving force of WaterRA.

We would like to express our deep thanks and appreciation to all of our Member organisations and Partners for their ongoing support, assistance, expertise and contributions.

Financials

Corporate Information

The Board of Directors of Water Research Australia Limited has pleasure in presenting this report for the financial year ended 30 June 2018 to the Members of Water Research Australia.

The Board

The Board of Water Research Australia is a representative board comprising 9 Directors:

- An independent non-executive Chair elected by Members
- Three non-executive Directors nominated by Industry Members and elected by Members
- Three non-executive Directors nominated by Research Members and elected by Members
- An independent non-executive Director appointed by the Board
- The CEO is an executive Director

The Chair and Independent Director are paid positions appointed for terms of three and two years respectively, while other non-executive Directors serve terms of two years in a voluntary capacity.

The Chair, Mr Shaun Cox was appointed on 22nd October 2014, following a resolution of the Members at the 2014 Annual General Meeting and was reappointed at the 2017 AGM. The Independent Director, Mr Ken Murphy was appointed following a resolution by the Board in August 2016 and commenced at the 2016 Annual General Meeting. At the April Non-Executive Directors meeting the Board resolved to reappoint Mr Ken Murphy for a further 2 year term ending at the 2020 AGM.

WaterRA Committees

The Strategic Advisory Committee has no formal decision making powers but provide expert, balanced and timely advice to the Board and management on a wide range of urban, regional and remote water issues that have strategic implications for Water Research Australia research programs and activities.

The Board also has two Sub-committees – the Risk & Audit Committee and Human Resources Committee – that provide an important assurance that key areas (Finance, Human Resources and Risk Management) of the Board's duties will be rigorously discharged. The Risk & Audit Committee incumbent Independent Member was reappointed by the Board for a two year term ending July 2020.

In addition to these advisory and sub-committees of the Board, two management committees – the Project Review Team and the Education Committee – provide advice and support to the CEO and staff and make recommendations to the Board on specific research program issues.

Directors

The names and details of the company's Directors in office during the financial year are as outlined on the following page. All Directors were in office for the entire year unless otherwise stated.

Short biographies for Directors can be found on pages 20-21. More detailed biographies for Directors' can be found on the Water Research Australia website www.waterra.com.au

During the 2017/18 financial year the Board met on six occasions for Board meetings and six occasions for Non-Executive Director meetings either face-to-face or via teleconference.

In addition Directors also met on four occasions for the Board Sub-committees either face-to-face or via teleconference.

Name	Date of Appointment	Term End or Retirement Date	Board Meetings			Non-Executive			Board Sub-committee	
			A	B	C	D	E	F	RAAC	HR
Mr Michael Burch	16 Jan 2017	18 Aug 2017	1	1	0	1	1	0	1	n/a
Dr Stephen Capewell	25 Oct 2013	2019 AGM	6	6	0	6	6	0	n/a	4
Mr Shaun Cox	22 Oct 2014	2020 AGM	6	6	0	6	6	0	n/a	n/a
Prof Stephen Gray	28 Oct 2011	12 Oct 2017	3	3	0	3	3	0	1	n/a
Mr James Hollamby	12 Oct 2017	2019 AGM	3	3	0	3	3	0	3	n/a
Mr Ken Murphy	10 Oct 2016	2020 AGM	6	6	0	6	6	0	n/a	4
Ms Karen Rouse	21 Nov 2016	21 Nov 2019	6	6	0	n/a	n/a	n/a	n/a	n/a
Prof Christopher Saint	12 Oct 2017	2019 AGM	3	3	0	3	3	0	n/a	n/a
Mr David Sheehan	22 Oct 2014	2018 AGM	6	6	0	6	6	0	n/a	n/a
Dr Melita Stevens	26 Oct 2010	2018 AGM	6	5	1	6	5	1	4	n/a
Prof Richard Stuetz	23 Oct 2015	2019 AGM	6	6	0	6	6	0	n/a	4

A Number of meetings held during the time the Director held office during the year

B Number of meetings attended

C Number of apologies registered

D Non-executive meetings held

E Non-executive meetings attended

F Number of apologies registered

Directors Report

Details of directors' qualifications, experience and special responsibilities

Name	Qualifications/ Professional Memberships	Position and Organisation	Special Responsibilities
Mr Michael Burch	BSc (Hons)	Manager Research, SA Water Corporation	RAAC Committee (Board sub-committee until 18 August 2017)
Dr Stephen Capewell	BSc (Hons) , M Eng & Tech Man, PhD (Chem Eng), GAICD, AWA, IDA, IWA	General Manager, Operations Services, Water Corporation	Chair:HR Committee (Board sub-committee)
Mr Shaun Cox	BEng (Civil), Adj Prof (U of Q), FAICD, FIE (Aust), CPEng, FAIM	Director, Inxure Strategy Group	Independent Chair: WaterRA Board
Prof Stephen Gray	BE (Chem Eng) , PhD (Chem Eng), AWA, IWA, ACS	Director, Institute of Sustainability, and Innovation, Victoria University	Chair: Risk & Audit Committee (Board sub-committee until 12 October 2017)
Mr James Hollamby	CA, GAICD	General Mgr, Business Services SA Water Corporation/AWQC	Chair: Risk & Audit Committee (Board sub-committee from 12 October 2017)
Mr Ken Murphy	Dip Comp Director, Dip Bus Mgmt, Dip HR Mgmt FAIM, CAHRI, FAICD, SIA	Principal, Ken Murphy Consulting	Independent Director HR Committee (Board sub-committee)
Ms Karen Rouse	BSc (Geology-Hons), M Env Studies, MAICD	CEO Water Research Australia	
Prof Christopher Saint	BSc(Hons), PhD	Dean: Research and Innovation, University of SA	Deputy Chair : Strategic Advisory Committee
Mr David Sheehan	MSc, DipMgmt, GAICD, NHMRC, AWA	General Manager, Water Quality Performance & Regulation, Coliban Region Water Corporation	Chair: Strategic Advisory Committee
Dr Melita Stevens	PhD, BAppSc, DipMicro, GAICD, Adjunct Prof (RMIT), Senior Fellow (Melbourne), AWA	Principal Scientist, Melbourne Water Corporation	Risk & Audit Committee (Board sub-committee)
Prof Richard Stuetz	BSc, MAppSc, PhD (Environmental Biotechnology)	Professor, School of Civil and Environmental Engineering, UNSW Australia	HR Committee (Board sub-committee)

Company Secretary

Mr Peter Brass was the Company Secretary until 20 December 2017. Ms Karen Rouse has been the Company Secretary from 21 December 2017.

Principal Activities

Water Research Australia's principal activities during 2018 were:

- Co-ordinating and managing high quality research on priority issues in water on behalf of the Members of Water Research Australia and the Australian Water Community
- Facilitating knowledge transfer and uptake of outcomes of R&D into industry through workshops and Members meetings
- Providing scientific evidence to underpin decision-making
- Build national water industry capability through the education program
- Promote the importance on the national agenda of safe water to the Australian Community by engaging with key decisions makers within government and industry

Operating Results for the Period

The company's trading result for the year ended 30 June 2018 was a deficit of **(\$48,893)** [2017 deficit of **\$166,367**].

The surplus/(deficit) for Water Research Australia as a whole can be considered as having two components:

- **PART A** - A deficit of **(\$239,416)** for the 2017/2018 year from revenue and expenditure acquitting commitments to research projects [2017 deficit of **(\$299,400)**] from cash reserves.
- **PART B** - A surplus of **\$190,523** for the 2017/2018 year from the remainder of the Income Statement not related to acquitting commitments to research project expenditure [2017 surplus of **\$133,033**].

The overall deficit is a reflection of research projects utilising the cash committed to them.

The company is a not-for-profit entity, registered as a charity and is exempt from income tax.

Cash & Project Commitments

At 30th June 2018 the Company had cash at hand of \$3,078,718 [2017 \$3,154,962]. At the same date Water Research Australia commitments to research projects plus external project funding held or received by Water Research Australia was \$293,555 [2017 \$449,522].

The cash commitments will be acquitted over the term of the research projects, with each project averaging a span of two to three years.

The Water Research Australia Board closely monitors its commitments to research projects relative to cash and working capital to assure that Water Research Australia's cash commitments to projects can be covered in full from the point of Board approval.

Members Liability on Winding Up

Each Member of the Company undertakes to contribute to the Company's property an amount as may be required not exceeding one hundred dollars if the Company is wound up while it is a Member or within one (1) year after ceasing to be a Member, for payment of the Company's debts and liabilities contracted before it ceased to be a Member and of the costs, charges and expenses of winding up and for an adjustment of the rights of contributories amongst themselves.

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 of 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

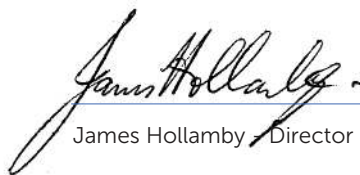
Since the end of the previous financial year, the company has paid an insurance premium of \$7,777 in respect of a directors and officers liability insurance contract for current and former directors and officers against all liabilities and expenses arising as a result of work performed in their respective 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 2018 has been received and can be found following this report.

Signed in accordance with a resolution of the Directors.

Shaun Cox - Director



James Hollamby - Director

28 August 2018

Auditor's Independence Declaration



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AUSTRALIA

DECLARATION OF INDEPENDENCE UNDER SECTION 60-40 OF THE AUSTRALIAN CHARITIES AND NOT-FOR-PROFITS COMMISSION ACT 2012

BY PAUL GOSNOLD

TO THE DIRECTORS OF WATER RESEARCH AUSTRALIA LIMITED

As lead auditor for the audit of Water Research Australia Limited for the year ended 30 June 2018, I declare that, to the best of my knowledge and belief, there have been:

1. No contraventions of the auditor independence requirements of the *Australian Charities and Not-for-profits Commission Act 2012* in relation to the audit; and
2. No contraventions of any applicable code of professional conduct in relation to the audit.

A handwritten signature in blue ink that reads 'Paul Gosnold'. The signature is written in a cursive style with a large initial 'P'.

Paul Gosnold
Director

BDO Audit (SA) Pty Ltd

Adelaide, 28 August 2018

Statement Of Financial Position

As At 30 June 2018

	2018	2017
	\$	\$
ASSETS		
Current assets		
Cash and cash equivalents	3,078,718	1,977,977
Trade and other receivables	432,806	232,748
Financial assets	-	1,176,985
Prepayments	67,904	80,638
Total current assets	3,579,427	3,468,349
Non-current assets		
Intangible asset - software	2,040	2,720
Total non-current assets	2,040	2,720
Total assets	3,581,467	3,471,069
LIABILITIES		
Current liabilities		
Trade and other payables	268,846	337,321
Revenue received in advance	2,170,759	1,943,518
Total current liabilities	2,439,605	2,280,839
Non-current liabilities		
LSL Provision Long Term	9,759	9,234
Total non-current liabilities	9,759	9,234
Total liabilities	2,449,364	2,290,072
Net assets	1,132,103	1,180,996
EQUITY		
Retained earnings	882,103	930,996
Operating Reserves	250,000	250,000
Total equity	1,132,103	1,180,996

The full financial statement is available upon request

Statement Of Profit Or Loss And Other Comprehensive Income

For The Period Ended 30 June 2018

	2018	2017
	\$	\$
REVENUE		
Revenue from continuing operations	2,837,378	2,222,969
Other income	9,919	16,969
EXPENDITURE		
Research program project expenses	(799,903)	(430,931)
Education program expenses	(374,039)	(356,337)
Marketing and communications	(128,839)	(167,303)
Operating expenses	(405,168)	(394,288)
Depreciation and amortisation expense	(680)	(14,522)
Employee benefits	(1,141,560)	(999,924)
Chairman & Ind Director remuneration	(46,000)	(43,000)
Surplus/(Deficit for the year)	(48,893)	(166,367)

The full financial statement is available upon request

Directors' Declaration

WATER RESEARCH AUSTRALIA LIMITED

A.B.N. 32 127 974 261

DIRECTORS DECLARATION

(SHORT DISCLOSURE)

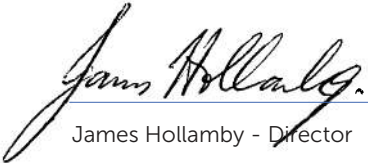
The directors of the company declare that:

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

1. the Statement of Profit or Loss and Other Comprehensive Income and Statement of Financial Position as extracted from the full Financial Report of the Company are drawn up so as to present fairly the results of the operations of the Company for the financial year ended 30 June 2018 and the state of affairs of the Company as at 30th June 2018.
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 Board of Water Research Australia Limited



James Hollamby - Director



Shaun Cox - Director

Dated this 28th day of August 2018

Independent Auditor's Report



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INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF WATER RESEARCH AUSTRALIA LIMITED

Report on the Financial Summary

The accompanying financial summary of Water Research Australia Limited comprises the statement of financial position as at 30 June 2018 and the statement of profit or loss and other comprehensive income for the year then ended, derived from the audited financial report of Water Research Australia Limited for the year ended 30 June 2018. The financial summary does not contain all the disclosures required by the Australian Accounting Standards and accordingly, reading the financial summary is not a substitute for reading the audited financial report.

Directors' Responsibility for the Financial Report

The directors of the company are responsible for the preparation and fair presentation of the financial summary in accordance with Australian Accounting Standards, and for such internal control as the directors determines is necessary to enable the preparation and fair presentation of the financial summary that is free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the financial summary based on our audit procedures which were conducted in accordance with Auditing Standard ASA 810 Engagements to Report on Summary Financial Statements. We conducted an independent audit of the full financial report of Water Research Australia Limited for the year ended 30 June 2018. Our audit report on the full financial report was signed on 31 August 2018, and was not subject to any modification. The 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 evidence about the amounts and disclosures in the financial summary. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial summary, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation of the financial summary 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. Our procedures in respect of the financial summary included testing that the information in the financial summary is consistent with the full financial report, and examination on a test basis, of evidence supporting the amounts, discussion and analysis, and other disclosure which was not directly derived from the full financial report. These procedures have been undertaken to form an opinion whether, in all material respects, the financial summary is presented fairly.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial summary derived from the audited financial report of Water Research Australia Limited as of 30 June 2018 is consistent, in all material respects with the audited financial report in accordance with Australian Accounting Standards.

BDO Audit (SA) Pty Ltd

Paul Gosnold
Director

Adelaide, 31 August 2018

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Publications and Presentations 2017-18

Publications and Presentations 2017-18

Journal Papers

Carter RAA and Joll CA (2017) Occurrence and formation of disinfection by-products in the swimming pool environment: A critical review. *Journal of Environmental Sciences* 58, 19-50.

Carter RAA (2017) Sharing the Pool with Disinfection By-Products. *Aquatic Recreation Australia - Official Journal of the Leisure Institute of Western Australia (LIWA)* 1, 26-27.

Chan M, Hu Y, Chen H, Podkolzin A, Zaytseva E, Komano J, Sakon N, Poovorawan Y, Vongpunsawad S, Thanusuwannasak T et al (2017) Global Spread of Norovirus GII.17 Kawasaki 308, 2014-2016. *Emerging Infectious Diseases*, 1350-1354.

Enosi Tuipulotu D, Netzler NE, Lun JH, Mackenzie JM and White PA (2018) TLR7 agonists display potent antiviral effects against norovirus infection via innate stimulation. *Antimicrobial Agents and Chemotherapy* 65(5).

Farno E, Coventry K, Slatter P and Eshtiaghi N (2018) Role of regression analysis and variation of rheological data in calculation of pressure drop for sludge pipelines. *Water Research* 137, 1-8.

Gaget V, Humpage AR, Huang Q, Monis P and Brookes JD (2017b) Benthic cyanobacteria: A source of cylindrospermopsin and microcystin in Australian drinking water reservoirs. *Water Research* 124, 454-464.

Gaget V, Keulen A, Lau M, Monis P and Brookes JD (2017c) DNA extraction from benthic Cyanobacteria: comparative assessment and optimization. *Journal of Applied Microbiology* 122(1), 294-304.

Gaget V, Lau M, Sendall B, Froschio S and Humpage AR (2017d) Cyanotoxins: Which detection technique for an optimum risk assessment? *Water Research* 118, 227-238.

Gruchlik Y, Linge K and Joll C (2018) Removal of organic micropollutants in waste stabilisation ponds: A review. *Journal of Environmental Management* 206, 202-214.

How ZT, Kristiana I, Busetti F, Linge KL and Joll CA (2017) Organic chloramines in chlorine-based disinfected water systems: A critical review. *Journal of Environmental Sciences*, 58, 2-18.

John N, Koehler AV, Ansell BRE, Baker L, Crosbie ND and Jex AR (2018) An improved method for PCR-based detection and routine monitoring of geosmin-producing cyanobacterial blooms. *Water Research* 136, 34-40.

Jones B, Flint J, Collins J, White P, Lun JH and Durrheim D (2018) Gastroenteritis outbreak at a health function caused by an emerging recombinant strain of Norovirus GII.P16/GII.4 Sydney 2012 Australia. *Epidemiology and Infection* 146(8), 970-971.

Kube M, Jefferson B, Fan L and Roddick F (2018) The impact of wastewater characteristics, algal species selection and immobilisation on simultaneous nitrogen and phosphorus removal. *Algal Research* 31, 478-488.

Lun JH, Hewitt J, Sitabkhan A, Eden J-S, Enosi Tuipulotu D, Netzler NE, Morrell L, Merif J, Jones R, Huang B, Warrilow D, Ressler K-A, Ferson MJ, Dwyer DE, Kok J, Rawlinson WD, Deere D, Crosbie ND and White PA (2018) Emerging recombinant noroviruses identified by clinical and waste water screening. *Emerging Microbes & Infections* 7(1),50.



McPhail C, Maier HR, Kwakkel JH, Giuliani M, Castelletti A and Westra S (2018) Robustness Metrics: How Are They Calculated, When Should They Be Used and Why Do They Give Different Results? *Earth's Future* 6(2), 169-191.

Netzler NE, Enosi Tuipulotu D, Eltahla AA, Lun JH, Ferla S, Brancale A, Urakova N, Frese M, Strive T, Mackenzie JM and White PA (2017) Broad-spectrum non-nucleoside inhibitors for caliciviruses. *Antiviral Research* 146, 65-75.

Rajaeian B, Allard S, Joll C and Heitz A (2018) Effect of preconditioning on silver leaching and bromide removal properties of silver-impregnated activated carbon (SIAC). *Water Research* 138, 152-159.

Thwaites BJ, van den Akker B, Reeve P, Short MD, Dinesh N, Alvarez-Gaitan JP and Stuetz R (2017) Ecology and performance of aerobic granular sludge treating high-saline municipal wastewater. *Water Science and Technology* 77(4), 1107-1114.

Wang Y, Roddick FA and Fan L (2017) Direct and indirect photolysis of seven micropollutants in secondary effluent from a wastewater lagoon. *Chemosphere* 185, 297-308.

Zahedi A, Durmic Z, Gofton AW, Kueh S, Austen J, Lawson M, Callahan L, Jardine J and Ryan U (2017a) *Cryptosporidium homai* n. sp. (Apicomplexa: Cryptosporidiales) from the guinea pig (*Cavia porcellus*). *Veterinary Parasitology* 245, 92-101.

Zahedi A, Field D and Ryan U (2017b) Molecular typing of *Giardia duodenalis* in humans in Queensland - first report of Assemblage E. *Parasitology* 144(9), 1154-1161.

Zahedi A, Gofton A, Greay Telleasha L, Monis P, Oskam C, Ball A, Bath A, Watkinson A, Robertson I and Ryan Una M (2018a) Profiling the diversity of *Cryptosporidium* species and genotypes in wastewater treatment plants in Australia using next generation sequencing. *Science of the Total Environment* (In Press).

Zahedi A, Gofton AW, Jian F, Papparini A, Oskam C, Ball A, Robertson I and Ryan U (2017c) Next Generation Sequencing uncovers within-host differences in the genetic diversity of *Cryptosporidium* gp60 subtypes. *International Journal for Parasitology* 47(10-11), 601-607.

Zahedi A, Lee Gary KC, Greay Telleasha L, Walsh Audra L, Blignaut David JC and Ryan Una M (2018b) First report of *Cryptosporidium parvum* in a dromedary camel calf from Western Australia. *Acta Parasitologica* 63(2), 422.

Zahedi A, Monis P, Gofton AW, Oskam CL, Ball A, Bath A, Bartkow M, Robertson I and Ryan U (2018c) *Cryptosporidium* species and subtypes in animals inhabiting drinking water catchments in three states across Australia. *Water Research* 134, 327-340.

Publications and Presentations 2017-18

Conference Papers/Presentations

Bertone E, Sahin O, Richards R and Roiko A (2017) Quantifying the impacts of extreme events on potable water quality: A participatory systems modelling approach. 12th Conference on Sustainable Development of Energy, Water and Environment Systems, Dubrovnik, Croatia, 4-8 October 2017.

Callingham T, Roddick FA, Fan L and Ooi D (2018) The TBL of Taste and Odour (poster presentation). AWA Ozwater '18, Brisbane, Qld, Australia. 8-10 May 2018.

Carter RAA (2017) Understanding the Chemistry of Swimming Pool Water Quality to Minimise Chemical Health Risks. Final Candidacy Talk. Chemistry Departmental Seminar Series, Perth, Curtin University, 2017.

Chow C, Mussared A, Fabris R, Do P, Liu J, Li J, Saint C, Le Clech P, Lim C, Pelekani C and Zappia L (2018) Online Water Quality Monitoring and Instruments - The Voice of Experience (platform paper). AWA OzWater'18, Brisbane, Qld, Australia, 8-10 May 2018

Gaget V (2018) Benthic cyanobacteria in Australia: diversity, seasonal patterns and secondary metabolite production. (Oral presentation). 9th Australian Algal Workshop, Mackay, Qld, Australia, June 2018.

Gray, S (2018) Novel fluorescent biopolymer nanoparticles for UF membrane challenge testing (keynote presentation). 1st International Conference on Bioinspired Materials and Membranes (IBMM2018) Melbourne, Victoria, Australia, 23-27 January 2018.

Kube M, Fan L and Roddick FA (2018) Immobilisation of algae for wastewater treatment and resource recovery (oral presentation). 2018 AWA/IWA Young Water Professionals Conference, Melbourne, 22-24 February 2018.

Lun JH, Sitabkhan A, Eden J-S, Enosi Tuipulotu D, Netzler NE, Morrell L, Jones R, Ressler K-A, Ferson MJ, Dwyer DE, Kok J, Rawlinson WD, Deere D, Crosbie N and White PA (2017) Comprehensive Molecular Epidemiological Study of Norovirus with Multiple Sample Types. 9th Australasian Virology Society Scientific Meeting, Glenelg, South Australia 5-8 December, 2017.

Nihemaiti M, Miklos DB, Hübner U, Linden KG, Drewes JE and Croué J-P (2018) Degradation of Micropollutants in Wastewater Effluent by UV/H₂O₂ and UV/PDS (oral presentation). IWA 15th Leading Edge Conference on Water and Wastewater Technologies, Nanjing, China, 27-31 May 2018.

Nihemaiti M, Permala RR and Croué J-P (2017) Degradation of Ciprofloxacin in PMS/CuFe₂O₄ System: Effect of PMS and Natural Organic Matter (oral presentation). IWA 10th Micropol and Ecohazard Conference, Vienna, Austria, 17-20 September 2017.

Wang Y, Roddick FA and Fan L (2018a) A modified QWASI model for predicting fate and transport of micropollutants in a wastewater lagoon (poster presentation). AWA/IWA Young Water Professionals Conference, Melbourne, Victoria, Australia, 22-24 February 2018.

Wang Y, Roddick FA, Khan S and Fan L (2018) A modified QWASI model for predicting fate and transport of micropollutants in a wastewater lagoon (oral presentation). AWA Ozwater '18, Brisbane, Qld, Australia, 8-10 May 2018.

Yan GJ, Lun JH, Enosi Tuipulotu D, Morrell L and White PA (2017) Emergence of norovirus recombinant strain GII.P16/GII.4 Sydney 2012 New South Wales. Australian Society of Microbiology, Molecular Microbiology Meeting 2018, Sydney, NSW, Australia, 11-12 April 2018.

Presentations at WaterRA events

WaterRA Members Meeting February 2018

Bradford-Hartke Z (2018) Implementing drinking water risk management in New South Wales. **NSW Health Water Unit** (Oral Presentation). WaterRA Members Meeting February 2018

Hoefel D, (2018) Water service challenges and opportunities in Regional & Remote SA. **SA Water** (Oral Presentation). WaterRA Members Meeting February 2018

Simpson A, (2018) Opportunities for Smart Water Network Technologies. **University of Adelaide** (Oral Presentation). WaterRA Members Meeting February 2018

Cooper L, (2018) Cooperative Research Centre for Remote Australia and Ninti One. **Ninti One: CRC Remote Economic Participation** (Oral Presentation). WaterRA Members Meeting February 2018

Owens L, (2018) Implications of Recent Developments in Electricity for Regional/Remote/Isolated Communities' Water Supply (Oral Presentation). WaterRA Members Meeting February 2018

Chahal C, (2018) Do particles in wastewater protect pathogens from disinfection? **SA Water and Flinders University** (Oral Presentation). WaterRA Members Meeting February 2018

Gonzalez A, (2018) An investigation of algal flocs: tailoring floc properties for enhanced separation. **University of New South Wales** (Oral Presentation). WaterRA Members Meeting February 2018

Wang Y, (2018) Improving modelling and prediction of the fate and removal of micropollutants during wastewater treatment. **RMIT University** (Oral Presentation). WaterRA Members Meeting February 2018

Workman D, (2018) Delineating the reach of recycled wastewater in estuarine systems. **University of Newcastle** (Oral Presentation). WaterRA Members Meeting February 2018

Aucote S, (2018) Smart monitoring for microbial risk assessment. **Flinders University** (Oral Presentation). WaterRA Members Meeting February 2018

Wallace-Polley S, (2018) Uptake of PFAS from Soil to Plants. **RMIT University** (Oral Presentation). WaterRA Members Meeting February 2018

Kube M, (2018) Harnessing immobilised algae for wastewater treatment. **RMIT University** (Oral Presentation). WaterRA Members Meeting February 2018

WaterRA AGM October 2017

Kinsela A, (2017) UNSW's Solar Driven CDI Technology for Desalting Brackish Waters. **University of New South Wales** (Oral Presentation). WaterRA Members Meeting October 2017

Woodworth J, (2017) PFAS. **GHD** (Oral Presentation). WaterRA Members Meeting October 2017

Kaesti M, (2017) The occurrence of iron bacteria, biofilms and opportunistic pathogens in remote water supplies. **Menzies School of Health Research** (Oral Presentation). WaterRA Members Meeting October 2017

Currie B, (2017) Burkholderia pseudomallei and other Pathogens of Health Concerns. **Menzies School of Health Research** (Oral Presentation). WaterRA Members Meeting October 2017

Gray S, (2017) Water Grid Issues: A potential solution for addressing water. **Victoria University** (Oral Presentation). WaterRA Members Meeting October 2017

De Hayr R & Johnston L, (2017) National Industry Guidelines for Water Quality Metadata. **Queensland Department of Science and Bureau of Meteorology** (Oral Presentation). WaterRA Members Meeting October 2017

Presentations at WaterRA events

WaterRA Research Symposium July 2017

Kerr F, (2017) Dancing with complexity: the neuroscience of collaboration for wicked problems. **University of Adelaide** (Oral Presentation). WaterRA Research Symposium July 2017

Linge K, (2017) Alternate water use options for rural and regional wastewater. **Curtin Water Quality Research Centre** (Oral Presentation). WaterRA Research Symposium July 2017

Roddick F, (2017) An assessment methodology for screening wastewater streams causing reduction of UV Treatment. **RMIT University** (Oral Presentation). WaterRA Research Symposium July 2017

Newcombe G[1], (2017) Management of treatment sludge impacted by cyanobacteria. **SA Water** (Oral Presentation). WaterRA Research Symposium July 2017

Newcombe G[2], (2017) Assessing, understanding and influencing customer perceptions of water quality. **SA Water** (Oral Presentation). WaterRA Research Symposium July 2017

Kildea T, (2017) Development of a risk based framework for wastewater treatment plant discharges. **SA Water** (Oral Presentation). WaterRA Research Symposium July 2017

Van der Linden L, (2017) Comprehensive assessment of the impact of climate change on reservoir water quality. **SA Water** (Oral Presentation). WaterRA Research Symposium July 2017

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