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# SAFE **WATER** SUMMIT

A safe, sustainable water supply for remote-living Indigenous Australians

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THE UNIVERSITY OF QUEENSLAND  
Mayne Medical Building, Herston  
Brisbane, Queensland, Australia  
29-30, November 2018

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AUSTRALIA

Faculty of Medicine,  
School of Public Health  
School of Clinical Medicine

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# SAFE WATER SUMMIT

A safe, sustainable water supply for remote-living Indigenous Australians

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Please help us to spread the message by including the following SAFE WATER SUMMIT hashtag in your social media posts: #safewaterUQ

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*Thursday, 29 November 2018  
ES Meyers Tiered Theatre (Room 26, Level 4)  
Mayne Medical Building*

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<i>TIME</i>	<i>TOPIC</i>	<i>PRESENTER</i>
<i>8.30 AM</i>	Guests assemble and experience Heidi Chan's eco-moodscape (repeated during intervals)	Heidi Chan
<i>8.45 AM</i>	<b>OPENING</b>	<b>Chair, Wendy Hoy</b>
	Welcome Remarks	Wendy Hoy
<i>8.50 AM</i>	Welcome to Country	Aunty Kerry Charlton
<i>9.00 AM</i>	Opening address	Bronwyn Fredericks PVC-IE
<i>9.15 AM</i>	Keynote Introductory Speech	Joshua Creamer
<i>9.30 AM</i>	Setting the scene	Charles Gilks
<i>9.40 AM</i>	Keynote address – Kupi – Drinking water and chronic disease in remote Australia, The Western Desert Kidney Health Project	Christine Jeffries-Stokes and Annette Stokes
<i>9.55 AM</i>	Morning tea	
<i>10.25 AM</i>	<b>LIVED EXPERIENCE</b>	<b>Chair, Claire Brolan</b>
	Pandanas Park's contaminated water	Patricia Riley
	We need clean water where we live, in Borroloola	Nancy McDinny and Gadrian Hoosan
	PFAS and PROS on your doorstep in Australia	Dianne Priddle
	Country not happy	May Diganbal Rosas
	What is the drink of choice in remote communities?	Megan Ferguson
	<b>IMPACTS ON HEALTH</b>	
	Kidney function in rural communities – filtering the facts	Karen Dwyer
	Unsafe water, poor health and low life expectancy in remote communities	Jay Rajapakse
	Chronic renal toxicants in drinking water, and public health provisions of the NHMRC Australian Drinking Water Guidelines	Ian Stewart
<i>12.15 PM</i>	Lunch (12.15 – 1.15 PM)	

<i>TIME</i>	<i>TOPIC</i>	<i>PRESENTER</i>	
<i>1.15 PM</i>	<b>APPROACHES, SOLUTIONS, CHALLENGES</b>	<b>Chair, Richard Banati</b>	
	The Deadly Heavy Metals Water Filter	Uriah Daisybell	
	High nitrate in remote community bore water supplies: hydrogeological and geochemical considerations	Matthew Currell	
	To Treat or Not to Treat – That is the question!	Daniel Drew	
	'Understanding context' – an oft forgotten pre-requisite for the design of appropriate drinking water solutions	Annette Davison	
	Housing for Health and Safe Water: Revisiting history to land in the present	Paul Torzillo	
	Positive re-design of drinking water delivery in the Torres Strait Islands	Chris Blake	
	Safe, Secure and Sustainable Water Services for Queensland Communities	Rob Fearon	
	Water and Wastewater services for remote communities in Western Australia	Anas Ghadouani	
	Adapting International Development sector approaches to improving water service outcomes for remote Indigenous communities	Kumi Abeysuriya	
	Unsafe regulated potable water supplies – more common than you think: Part 1	Michael Lawrence	
Unsafe regulated potable water supplies – more common than you think: Part 2	Katrin Doederer		
<i>3.15 PM</i>	Afternoon Tea		
<i>3.40 PM</i>	<b>PLANNING AND POLICY FRAMEWORKS</b>	<b>Chairs, Jay Rajapakse, Brian Hudson</b>	
	Identifying the critical 'unknown unknowns'	Geoff Harris	
	Water and the bush	Felicity Wall	
	Leveraging Australia's SDG commitments for greater accountability and action for safe water for Australia's First Peoples living in discrete locations	Claire Brolan	
	<b>ONGOING RESEARCH</b>		
	Chronic kidney disease, diabetes, and water quality in the Northern Territory	Paul Lawton	
	Chronic Kidney Disease of Unknown Aetiology (CKDu) in Sri Lanka: Advancing a hypothesis-agnostic approach	Katrina Van De Ven	
	Environmental factors impacting drinking water quality in CKDu-affected regions in Sri Lanka: an isotopic tracer approach	Chandima Nikagolla	
	<i>5.00 PM</i>	CLOSE	

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*Friday, 30 November 2018*  
*Collaborative Room (room 25, level 3), Mayne Medical Building*

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<i>TIME</i>	<i>TOPIC</i>	<i>PRESENTER</i>
<i>8.30 AM</i>	<b>Guests assemble</b>	
<i>8.45 AM</i>	<b>NEXT STEPS: where to now for long-term action for safe water?</b>  Brainstorm of effective next steps (including advocacy, funding of research and existing resources, and selection of priorities)	<b>Chair, Nina Hall</b>
<i>10.30 AM</i>	<b>Morning Tea</b>	
<i>10.45 AM</i>	Small group development of actions and next steps, including draft proposals	Chair, Nina Hall and designated facilitators*
<i>12.50 PM</i>	Closing Remarks	Wendy Hoy
<i>1.00 PM</i>	CLOSE	

*\* Claire Brolan, Kumi Abeysuriya, Megan Ferguson, Raymond Maher*

**NOTES**

## ABSTRACTS

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### LIVED EXPERIENCE

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#### **Kupi – Drinking water and chronic disease in remote Australia, Western Desert Kidney Health Project**

**Christine Jeffries<sup>1,2</sup>, Annette Stokes<sup>1,3</sup>**

<sup>1</sup>University of Western Australia Rural Clinical School; <sup>2</sup>Western Desert Kidney Health Project; <sup>3</sup>Wongutha Birni Aboriginal Corporation, WA

The Western Desert Kidney Health project (WDKHP) was a research project conducted in five towns and five remote Aboriginal communities in the Goldfields of Western Australia. The aims of the project were to determine the prevalence of type 2 diabetes (T2DM), kidney disease and their associated risk factors in Aboriginal and Non-Aboriginal adults and children and to compare those rates with national rates

The WDKHP found higher than predicted rates of T2DM, hypertension, haematuria, aciduria and elevated ACR in Aboriginal and non-Aboriginal adults and children. There was no difference between Aboriginal and non-Aboriginal children.

Drinking water quality in the study communities often does not meet national and international safety guidelines. We have been able to outline biologically plausible pathways that might explain how poor drinking water quality and contamination might contribute to chronic disease and poor health outcomes in remote areas.

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#### **Pandanus Park's contaminated water**

**Patricia Riley**

Pandanus Park Aboriginal Corporation (PPAC), West Kimberley, WA

I am a Nyikina Mangala traditional owner and the spokesperson of Pandanus Park Community. The 2015 WA Auditor General's report found that our water is contaminated with nitrates in a major way. They say the level is alright for consumption for most but it is too high for babies under three months and pregnant women.

In 2017 the not-for-profit Yaru Foundation gave us a reverse osmosis unit and now the whole community (150 people) cart water from this one double tap unit for drinking and cooking. It is regularly sampled by Derby Shire. We shower and wash and garden with our house main tap water that the Kimberley Regional Service Providers treats with chlorine. This water smells like faeces and affects our eyes and skin. We are not healthy and the chlorine does not solve the problem. Nothing is happening. We feel fear and we don't know how much damage is being done to us. We want feedback and we want to manage our own water.

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#### **We need clean water where we live, in Borroloola**

**Nancy McDinny and Gadrian Hoosan**

Garawa and Yanyuwa Country, Borroloola, NT

In April this year we were told that our (bore) water in Garawa camp on the McArthur River is contaminated with lead and manganese and we should not drink it, and then they said it was safe and that the high lead had come from our pipes and not the mine. We think this is a "cover up", they just want the mine to keep going. People in Garawa now get drinking and cooking water from the new bore in Borroloola that has a filter. We have been here for 40,000 years, and used to fish here every day. In 2014 a monitoring group said that our fish are toxic with lead from the mine, so we stopped fishing and started worrying. Now we have to drive 100 km to fish. We've asked, but no one has had tests. We can't live with this contamination anymore. We need the water to be clean, it's our life and our children's lives. We need a person to talk to us. We don't trust anyone anymore. We are being treated like animals. Also, there is a big push for fracking for shale-gas, which might be 10 times worse than the McArthur mine. People of the all 4 language groups here and the pastoralists here are working together but are not being supported.

## PFAS and PROS on your doorstep in Australia

**Dianne Priddle**

Berwick Stud, Oakey, QLD

It is a fundamental right for all humans to have access to clean water. Oakey sits on an Alluvial Basin with the water system contaminated by PFOS and PFAS chemicals leaking from the nearby Oakey Defence Base. We live within the 26 km zone. These chemicals are both bio-persistent in that they don't break down in the environment for more than 50 years. Our cattle still drink from the contaminated zone with bores, creek and overland flow when raining. We are exposed to chemicals in this zone that have been linked to a range of health issues ranging from cancer to kidney disease. Yet our own government has downplayed these findings. We must act on the latest science the world has to offer. Local, state and federal government bodies must work together to share information and act fast, as if it was their properties suffering contamination.

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## Country not happy

**May Diganbal Rosas**

*Dagoman Country*

I am an elder of the Katherine community and senior custodian of Dagoman Country on my mother's side. We live on this land, near the Tindal Air Force Base. In 2017 we were told that levels of PFAS from fire-extinguisher foam are high in our soil and water and have been for many years. I have to tell my grandchildren that they can't pick berries, and can't eat barramundi and turtles and prawns from the Katherine River any more. Our drinking water is now from rain water tanks and not from bore water or the river. The damage is huge.

My people have always been here, we are connected to our land and we live off our land for bush tucker. We use this sacred land for cultural purposes and rely on its resources.

I raised my concerns with the Northern Land Council. No one has come to speak to me, we are ignored. Government and Defence need to come and hear from us with respect. We will never leave this country, this will always be our home.

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## What is the drink of choice in remote communities?

**Megan Ferguson<sup>1</sup>, Julie Brimblecombe<sup>2</sup>**

<sup>1</sup>The University of Queensland, Brisbane, QLD; <sup>2</sup>Monash University, Melbourne, VIC

Nationally, plain water has been shown to contribute 48%, and sugared drinks and alcohol 28%, to the drinks consumed by Aboriginal and Torres Strait Islander peoples. Aboriginal and Torres Strait Islander leaders have raised concerns about the impact of water palatability and potability, and limited household resources on the drink choices of residents. In food stores, storeowners aim to address this by supplying large, affordable containers of water, 600 ml water for \$1.00, pricing water and diet soft drinks lower than sugar softdrinks and promoting bottled water. Further discounting water by 20% increased sales by 17.6%. Councils have been supported to create supportive environments for health, including installation of water bubblers. Gaps remain in relation to the impact of water supply on drink consumption and the potential role in preventing diet-related disease.

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### **Kidney function in rural communities – filtering the facts**

**Karen Dwyer<sup>1</sup>, Susan Brumby<sup>1,2</sup>**

<sup>1</sup>School of Medicine, Deakin University, Geelong; <sup>2</sup>National Centre for Farmer Health, Hamilton, VIC

Chronic Kidney Disease of unknown aetiology (CKDu) is a prevalent condition (17.9–21.1%) in agricultural communities in India, Sri Lanka and Central America. Young (20-50 yo) male agricultural workers are predominantly affected. Putative antecedents include agrochemical exposure, contaminated water and dehydration in addition to a higher burden of traditional risk factors for CKD. Within Victoria the prevalence of CKD is greater in agricultural communities compared to the state as a whole – for example in the Grampians and Loddon-Mallee-Murray regions the prevalence of CKD is 13.5% compared to 9.8% for the state as a whole and 5.4% and 7% for Bayside and Eastern Melbourne. Our preliminary data shows that 67% of 511 eligible persons based in agricultural communities has 1 or more known risk factor for CKD, which is double the expected rate and likely under-reported. The proposed study aims to define the burden of CKD in agricultural communities and identify novel CKD risk factors.

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### **Unsafe water, poor health and low life expectancy in remote communities**

**Jay Rajapakse<sup>1</sup>, Herath Manthrilake<sup>2</sup>, Brian Hudson<sup>1</sup>**

<sup>1</sup>Queensland University of Technology (QUT), Brisbane, QLD; <sup>2</sup>International Water Management Institute (IWMI), Sri Lanka

Drinking water supplied to remote communities comes from groundwater and/ or surface water sources. Communities in remote areas often access unsafe water for drinking. The quality of this water varies, and poses different health risks based on the nature, quantity and combinations of contaminants.

Common waterborne diseases like typhoid, cholera and gastroenteritis are well known. Chronic kidney disease of unknown causes (CKDu) is another global problem, causing suffering for patients, and posing heavy financial burdens on public health systems. Kidney function can fail for different reasons, known and unknown. There are many hypotheses about the causes of CKDu, and unsafe drinking water is prominent. Human capacity to tolerate different water qualities also varies from place to place. Therefore, standards for drinking water quality should reflect local circumstances.

Provision of safe water to remote communities through appropriate water treatment solutions could improve health and life expectancy in remote communities.

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### **Chronic renal toxicants in drinking water, and public health provisions of the NHMRC Australian Drinking Water Guidelines**

**Ian Stewart<sup>1,2</sup>, Wasa Wickramasinghe<sup>2</sup>**

<sup>1</sup>Food and Water Toxicology Consulting, Brisbane; <sup>2</sup>Queensland Alliance for Environmental Health Sciences, The University of Queensland, Brisbane, QLD

Chemical agents that can adversely affect renal health may contaminate drinking water. Nephrotoxic metals and metalloids include cadmium, lead, inorganic arsenic and uranium. Sodium is an essential element but chronic excess intake, through its contributory effects on hypertension, is likely detrimental to renal function. Maximum permissible concentrations in drinking water for Cd, As, Pb and U have been determined by NHMRC; advisory considerations are presented for Na. Several disinfection by-products, notably the trihalomethanes, are renal toxins. Organohalogenes are more likely to form in conditions of high organic load during drinking water disinfection. While the aetiology of population-level chronic renal disease is presumably multifactorial, future epidemiological investigations should assess community-level variability in drinking water quality for consideration of water-borne nephrotoxins.

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### **The Deadly Heavy Metals Filter**

**Uriah Daisybell, Allan Alipio**

Christian Aboriginal Parent Directed School, Coolgardie, WA

The aim of this project was to determine whether a carbon coated mussel shell, charcoal and neodymium magnets can be used to cheaply remove heavy metal ions from mining-polluted drinking water.

To coat the mussel shells with sugar, sugar is heated into a liquid form. After the sugar solidifies, the coated shell is burned to create carbon-coated mussel shells.

The bottom of the filter is covered with fine linen cloth and contains the carbonated shells, at the middle are neodymium magnets, and on top of the filter are charcoals.

Testing of the filter found that the amount of heavy metals were reduced into a level that is not harmful to humans.

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### **High nitrate in remote community bore water supplies: hydrogeological and geochemical considerations**

**Matthew Currell<sup>1</sup>, Daniel Drew<sup>2</sup>, Phil Krasnostein<sup>2</sup>, Annette Davison<sup>3</sup>, Sandor Guggidsberg<sup>1</sup>, Matthew Mullins<sup>1</sup>, Tom Pendlebury<sup>1</sup>**

<sup>1</sup>School of Engineering, RMIT University, Melbourne, VIC; <sup>2</sup>Optimos Group; <sup>3</sup>Risk Edge Pty Ltd

This paper presents findings of an honours project using simple field-based techniques to characterise drinking water supply quality at Mulga Queen and Mount Margaret, two communities in the Western Australian gold-fields with high levels of nitrate (>50mg/L as NO<sub>3</sub><sup>-</sup>) in bore water. High nitrate concentrations occur in ground water throughout Australia's arid and semi-arid regions, including many remote communities dependent on bore water for drinking supply. This may pose health risks, particularly where nitrate co-exists with elevated concentrations of heavy metals such as uranium. Previous studies have attributed elevated nitrate to high rates of biological N-fixation in the soil. However, to date there have been few studies examining the governing factors controlling nitrate levels within specific aquifer systems, or their relationship to other hydrogeological and geochemical conditions. In this work, mining and other public databases provided valuable information to better characterise hydrogeological and geochemical influences on groundwater quality.

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### **To Treat or Not to Treat – That is the question!**

**Daniel Drew<sup>1</sup>, Phil Krasnostein<sup>1</sup>, Annette Davison<sup>2</sup>**

<sup>1</sup>Optimos Group; <sup>2</sup>Risk Edge Pty Ltd

Water analysis data from remote communities in Western Australia and elsewhere reveal that groundwater sources may contain a range of dissolved species some of which are classified as unwanted contaminants.

In the case of the communities at Mulga Queen and Mt. Margaret in central Western Australia, the contaminant of most concern is nitrate (NO<sub>3</sub><sup>-</sup>) because concentrations are close to or exceed the 50mg/L lower limit in the Australian Drinking Water Guidelines (ADWG) where infants and pregnant women may be affected. Recent health studies in the region have raised questions about health issues from long-term, chronic exposure to much lower concentrations of nitrate.

To address the problem of high nitrate concentration in drinking water, a hierarchy of options exists ranging from non-treatment alternatives to the application of treatment technologies.

Various options are presented, revealing that a contextual approach is required to establish the best "Fit for Purpose" option with long-term sustainability.

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## **'Understanding context': an oft forgotten pre-requisite for design of drinking water solutions**

**Annette Davison**

Risk Edge Pty Ltd

The World Health Organization and the Australian Drinking Water Guidelines call for a catchment to consumer approach to drinking water management. This approach includes understanding the governance framework in which the water supplier operates – the stakeholders, the legal and formal requirements, the product being produced and the controls and monitoring to consistently provide 'fit for purpose' water. Water suppliers need to fully understand their operating context to holistically understand and manage risks. For each system to be supplied with drinking water, it is important to first undertake an operating context assessment to identify key stakeholders, key hazards that must be controlled, water quality guidelines that must be met and design treatment and monitoring technologies that are contextually and culturally appropriate for the community in which they will be implemented. In this presentation, I will discuss the need to 'understand context' as a pre-requisite to the 'appropriateness' of drinking water solutions.

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## **Housing for Health and Safe Water: Revisiting history to land in the present**

**Tess Lea, Paul Torzillo**

Housing for Health Incubator, University of Sydney, NSW

In the 1980s, Healthhabitat made a point of measuring water use and water contamination issues in the desert regions of Australia. This was to meet a widespread myth that, since Aboriginal people wasted or otherwise did not know how to use water, the functionality of water amenities was irrelevant. In this paper, Housing for Health Incubator collaborators Professor Paul Torzillo and Associate Professor Tess Lea provide an overview of this historical work. We bring it into the contemporary period, where water security, palatability and potability loom large as issues for health and viability, both as a legacy of over-extraction and portent of climate change pressures.

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## **Positive re-design of drinking water delivery in the Torres Strait Islands**

**Chris Blake<sup>1</sup>, Brad Milligan<sup>1</sup>, Toni Veronese<sup>2</sup>, Greg Jackson<sup>3</sup>, Heidi Grodecki<sup>3</sup>, Nina Hall<sup>4</sup>**

<sup>1</sup>Tropical Public Health Services, Queensland Health, Cairns; <sup>2</sup>Torres Strait Island Regional Council, Torres Strait; <sup>3</sup>Queensland Health Water Unit, Brisbane; <sup>4</sup>The University of Queensland, Brisbane, Qld

The Queensland Government piloted an initiative to install water treatment technology that was 'fit-for-purpose and fit-for-place' in remote Indigenous communities on two Torres Strait Islands (Hammond and Warraber Islands). It was identified that an effective model of safe drinking water delivery for remote Indigenous communities should include five 'prerequisites for success' to ensure equitable access to safe drinking water, these include cross-agency collaboration, tailored design for each community, cultural competency by government agencies engaging in Indigenous communities, appropriate water treatment training and technology, and ongoing mentoring and support for remotely-located water operators. The program, commencing in 2016 and implemented in 10 communities, has demonstrated ongoing sustainable results and efficient use of investment, by better management of drinking water supply systems and is evidenced by zero boil water alerts (attributed to *E. coli*). This initiative has adaptive potential for other remote communities and other basic service delivery, including wastewater treatment and solid waste management.

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## Safe, Secure and Sustainable Water Services for Queensland Communities

**Rob Fearon**

Queensland Water Directorate (*qldwater*)

*qldwater* is the central advisory and advocacy body within Queensland's urban water industry representing the majority of the state's public water and sewerage service providers. *qldwater* works with members to promote safe, secure and sustainable urban water services for communities.

Queensland is one of the largest sub-national jurisdictions in the world with population spread over 370 regional supplies, 88% of which are potable and 44% that service fewer than 500 people. Water supplies developed over the past 130 years driven by co-investment by state and local state government but coordinated funding ceased abruptly in 2009 leaving small communities to manage independently.

Small councils can struggle to manage or afford their systems and have been criticised in national reviews, some of which call for corporatisation or privatisation. Seeking sustainable solutions, *qldwater* and the Local Government Association of Queensland are working with 32 councils to examine regionalisation under a program sponsored by State: the Queensland Water Regional Alliances Program.

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## Water and Wastewater services for remote communities in Western Australia.

**Anas Ghadouani**

The University of Western Australia, WA

This presentation will provide a brief overview on the key, current and historical, challenges facing the provision of adequate services for water and wastewater in remote communities of Western Australia. A report on recent development in the state of Western Australia will be provided, especially in the context of a number of new initiatives and collaborative discussions between the university and the various key agencies as well as the private sector. This water summit will provide great opportunities to initiate collaboration and share ideas on how to develop adequate and integrated solutions for the key challenges.

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## Adapting International Development sector approaches to improving water service outcomes for remote Indigenous communities

**Kumi Abeysuriya<sup>1,2</sup> (Hon), Nina Hall<sup>2</sup>**

<sup>1</sup>Institute for Sustainable Futures, Queensland University of Technology (QUT), Brisbane; <sup>2</sup>School of Public Health, The University of Queensland, Brisbane, Qld

Water service provision is generally viewed as the domain of technical experts with relevant scientific knowledge not usually available in remote communities. While Indigenous Shire Councils in Queensland are responsible for water services for larger discrete remote communities, decisions rely on recommendations from external consultants that may not be such a good option for the context of that community. Numerous studies stress the need for greater empowerment and capacity for competent decision-making by remote communities. One path to building such attributes may be through adapting community-led participatory approaches to community water safety planning designed for the international development sector. Through such approaches, stakeholders in Indigenous communities may be meaningfully involved in co-designing services consistent with their values and needs in collaboration with relevant experts, making incremental improvements to the approaches to better achieve the full range of outcomes they desire.

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## Unsafe regulated potable water supplies – more common than you think: Part 1

### Michael Lawrence

Bligh Tanner, Brisbane

Advanced Water Management Centre, The University of Queensland, Brisbane, QLD

In August 2016, a *Campylobacter* outbreak in New Zealand's Havelock North drinking water supply caused ~5000 cases of illness and four deaths. The consequent inquiry analysed compliance of New Zealand water providers with regulatory standards; 20% of the population were supplied water was not demonstrably safe.

In Queensland, a "Comparative report" compared our drinking water providers for 2015-2016. The report indicates that "rainfall events increase the difficulty in treating many water supplies" and "the subsequent treatment of the drinking water during these events is unable to adequately treat the drinking water supply to a suitable standard".

Translated: our Government is aware of numerous councils operating unsafe drinking water supplies. Under these circumstances, I contend that a drinking-water related disease outbreak is inevitable. I will provide evidence of some of these supplies, including where "upgrades" to the system purportedly to alleviate the issues will not address the identified public health risks.

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## Unsafe regulated potable water supplies – more common than you think: Part 2

### Katrin Doederer

Advanced Water Management Centre, The University of Queensland, Brisbane, QLD

Recent salmonella outbreaks in rural Queensland could be followed in the media and clearly demonstrate the failure of providing safe water. In Queensland the performance of water utilities in the large regional centres is well understood. However, performance reporting for the small water providers is patchy and inconsistent. Reviewing water quality data available from Annual Shire Council Reports across Queensland from 2009-2017 revealed that a large proportion of *E.coli* incidences was related to a failure of the chlorination barrier. This can be caused by excessive organic loading due to rainfall events, breakdown of equipment, and lack of regular monitoring and skilled employees in regional areas. While pathogens are the major concern, rain event can also introduce additional chemical contaminants or their precursors. The evidence of the available data demonstrates a need for action to avoid a Havelock North in Queensland.

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## PLANNING AND POLICY FRAMEWORKS

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### Identifying the critical 'unknown unknowns'

#### Geoffrey Harris

Laynhapuy Homelands Aboriginal Corporation, NE Arnhem Land, NT

Laynhapuy Homelands services 25 homelands, covering ~18,000 km<sup>2</sup> in north-east Arnhem Land. Some 22 homelands source water from aquifers, and 3 from billabongs/creeks shared with wild pigs, buffaloes and crocodiles. Anecdotally, excluding surface-water supplies, there are no issues relating to taste, quality or quantity of water supplied. However, to date, there's no monitoring or awareness of community or individual house usage within each homeland, changing groundwater depth due to climatic changes (wet/dry season, 'dry' wet seasons), recharge timeframes, bore extraction impacts. Of changing water quality, including impacts of changing land use activities in recharge areas, including introduction of mining, fracking, forestry and large scale vegetation clearing.

The organisation's ability to rapidly implement and sustain appropriate monitoring, sampling or treatment has been constrained by financial considerations, limited vehicle and human resources available to do sampling, lack of internal resources with knowledge in these areas and lack of awareness of recent developments and innovations.

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## **Water and the bush**

**Felicity Wall, Josie Douglas**

Central Land Council, Alice Springs, NT

The CLC is a statutory authority supporting Aboriginal people across more than 417,000 km<sup>2</sup> of freehold Aboriginal land in the Northern Territory. Of increasing importance is the impact of inadequate housing and available water in desert communities. Issues of water quality and supply impacts on the health and wellbeing of people living in the bush. It all comes back to the water.

This presentation will bring a Central Australian perspective on water sources, impacts on infrastructure and traditional owner perspectives. By drawing on specific examples from Lake Nash (calgon water treatment), Yuelamu (water insecurity), Iwupataka (water infrastructure), Kintore (rain water tanks) and an overall commentary on the impacts of 'hard' water on infrastructure in Central Australia.

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## **Safe and secure waterways**

**Sue Jackson**

Australian Rivers Institute, Griffith University, Brisbane, Qld

Recently there has been a number of health advisories warning people not to fish or drink from rivers in the Northern Territory and Queensland. I will address the issue of access to safe water but with a focus on the food and water produced by healthy freshwater systems in towns and remote areas where Aboriginal people hunt and fish aquatic resources and rely on access to unpolluted water to maintain distinct ways of life. Results from surveys of Indigenous households in three tropical catchments will be presented: Daly River (NT), Fitzroy (WA) and Mitchell (Qld). I argue that water security research and concepts like 'critical human needs' should move beyond the normative frame of per capita/per household volumes of clean 'domesticated' water to accommodate other ways of living safely and securely on country.

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## **Leveraging Australia's SDG commitments for greater accountability and action for safe water for Australia's First Peoples living in discrete locations**

**Claire Brolan**

The University of Queensland, Brisbane, Qld

Safe, sustainable water supplies for Indigenous Australians living in discrete locations is more than a health issue: it is an intergenerational equity and justice imperative. However, rights aspects of safe water for Australia's First Peoples becomes frequently sidelined when accountability and policy complexities come into play. Tension can emerge around Commonwealth-State/Territory-local government responsibilities, partisan politics, international and multinational interests, private industry and community responsibilities, land ownership and cultural rights/entitlements. The self-determination and voices of the diverse Aboriginal and Torres Strait Islander communities at the heart of safe water supply issues are often not heard, or tokenistically engaged. Governance processes that do exist often lack meaningful and effective participatory governance mechanisms. Therefore, this presentation will consider ways Australia's commitments under the Sustainable Development Goal (SDG) agenda can be strategically leveraged to build respectful, inclusive multi-stakeholder policy and planning frameworks for safe water supplies to rural and remote Indigenous Australians moving forward.

### **Chronic kidney disease, diabetes, and water quality in the Northern Territory**

**Paul Lawton, Steve Guthridge, Alan Cass**

<sup>1</sup>Menzies School of Health Research, Charles Darwin University, Darwin, NT.

Given concerns about water quality and the burden of chronic kidney disease (CKD) and diabetes in the Northern Territory (NT), we are gathering readily available data to understand quickly the nature and scope of the problem systematically. This includes all de-identified blood and urine test data about kidney function from the NT, and all water quality testing data from the NT's single water company, from 2002 to 2018. Data will be compiled and compared for 80 individual remote NT communities. We'll see if there is any relationship between (i) exposure to various water characteristics over time (including but not limited to heavy metals, and total dissolved solids – a measure of water palatability) and either (ii) the burden or progression of measured CKD, or (iii) measures of control of blood sugar. Communities with demonstrable concerns will be the focus of in-depth consultation and further detailed research and public health responses.

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### **Chronic Kidney Disease of Unknown Aetiology (CKDu) in Sri Lanka: an hypothesis-agnostic approach**

**Richard Banati<sup>1,2,3</sup>, Katrina Van De Ven<sup>1,3,4,5</sup>, Marina Sara<sup>1,3,4,5</sup>, Timothy Boyle<sup>1,3,4,5</sup>**

<sup>1</sup>Australian Nuclear Science & Technology Organisation (ANSTO), Sydney; <sup>2</sup> Faculty of Medicine and Health, University of Sydney, Sydney, NSW; <sup>3</sup> on behalf the collaboration's three working groups: 'Medical/Physiological', 'Public Health' and 'Environment'; <sup>4</sup> in partnership with the Global Water Institute (GWI); <sup>5</sup> in collaboration with the Michael Crouch Innovation Centre (MCIC)

ANSTO has adopted a 'hypothesis-agnostic' approach to investigation of the complex issue of CKDu in Sri Lanka. This approach is underpinned by:

- Collaboration - ANSTO has convened researchers and practitioners from over 20 universities, government departments, and research agencies to form thematic groupings (medical/ physiological, environmental, and public health). To these, ANSTO offers free access to its large-scale research infrastructure and competency in isotope-based systems analytical measurements.
- Defined program of work – ANSTO is leveraging its large-scale research infrastructure and competency in isotope-based systems analytical measurements to benefit the community of researchers investigating CKDu.
- Use of novel methodologies – ANSTO, under a partnership with the GWI, recently conducted a three-day experiential innovation competition (Hackathon) aimed at mitigating dehydration, a potential contributing factor to CKDu in Sri Lanka. ANSTO is now working with the winning teams on product development to accelerate the proposed solutions for implementation in early 2019.

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## **Environmental factors impacting drinking water quality in CKDu-affected regions in Sri Lanka: an isotopic tracer approach**

**Chandima Nikagolla<sup>1</sup>, Karina Meredith<sup>2,3</sup>, Richard Banati<sup>2</sup>**

<sup>1</sup>Queensland University of Technology (QUT), Brisbane, QLD; <sup>2</sup>Australian Nuclear Science & Technology Organisation (ANSTO), Sydney; <sup>3</sup>Connected Waters Initiative Research Centre, University of New South Wales, Sydney, NSW

The chemistry of drinking water in dry climatic agricultural regions of Sri Lanka has captured many researchers attention in relation to the occurrence of Chronic Kidney Disease of Unknown Cause (CKDu) in Sri Lanka. However, studies rarely focus on the multiple environmental factors that maybe interacting and contributing to water quality in these regions.

Sixty groundwater samples were collected from endemic CKDu areas during two field visits and analysed for water chemistry and environmental isotopes. The study found that the physiochemical properties and isotopic composition of the water is highly variable highlighting that it is difficult to rely on traditional methods of water quality assessment in CKDu affected regions. Targeted site investigations considering the rainfall and the groundwater hydrology, together with understanding the fate of agrochemicals and potential contamination pathways will be useful for understanding the impact of water quality in CKDu affected regions.

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### **AND, DURING SESSION INTERVALS**

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## **Bridging the Gap: Raising Awareness of Water Health through Eco-musicology and Interdisciplinary Collaborations**

**Heidi Chan**

The University of Queensland, Brisbane, QLD

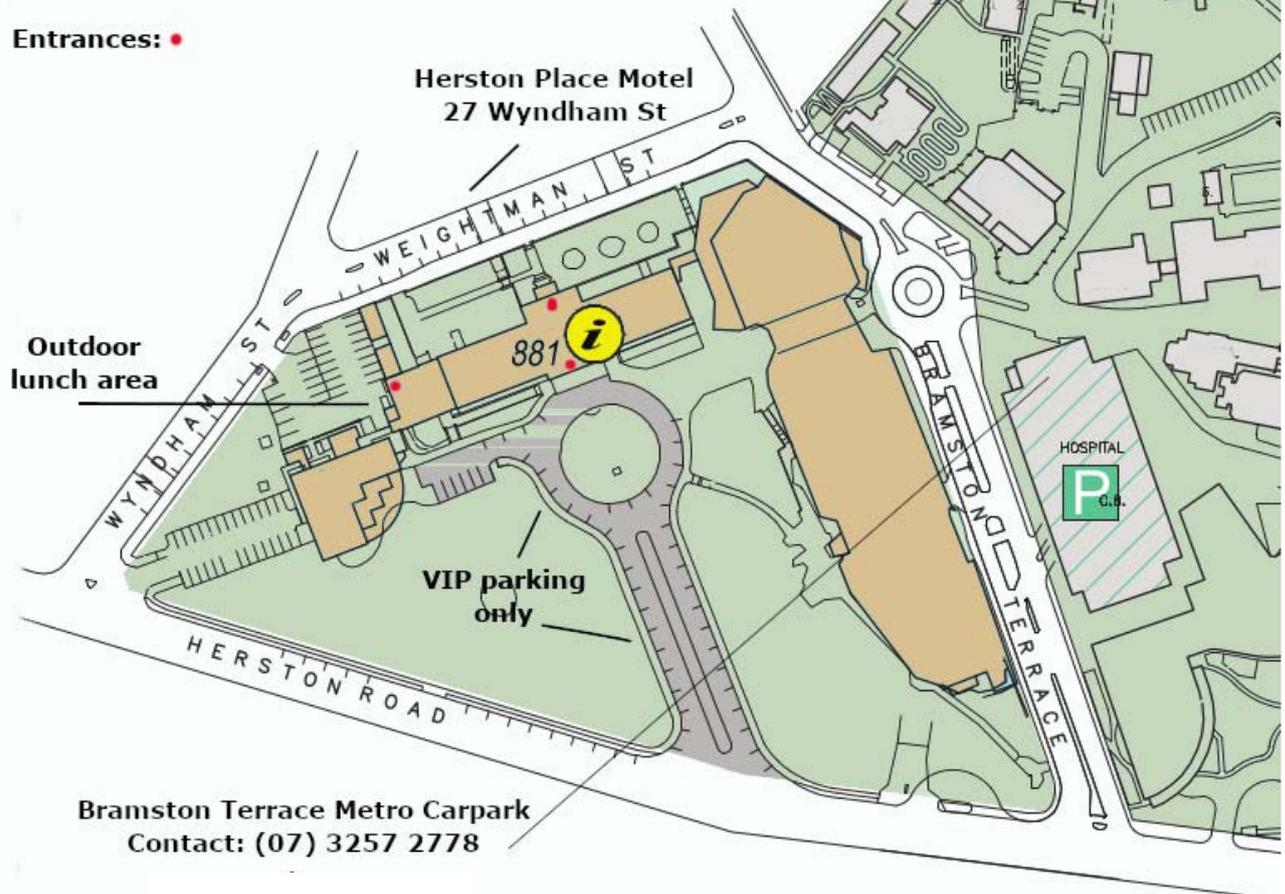
Water health is a concern, both locally and globally. To raise awareness, identify issues, transmit knowledge and seek solutions, effective communication between different stakeholders, including the public, is important. However, academic research, scientific findings, industrial knowledge and technical terminologies might be unfamiliar or unable to reach to the public. Eco-music and interdisciplinary collaborative projects can bridge the gap, and connect with a broader audience at the grassroots level. Research on music created with reference to the theoretical framework of eco-musicology has shown that eco messages can be disseminated to a wider demographic, promoting advocacy and remedial messages. Through the connection of sound/music, society/culture, and environment/nature, listeners are able to connect with their local ecologies and wider environment. Furthermore, with the application of techniques such as sonification in inter-disciplinary compositions, scientific data can be translated into aesthetic aural works, and enhance listeners' awareness and understanding of scientific concepts through affective stimulus.

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# SAFE WATER SUMMIT

## Mayne Medical Building (881)

Entrances: ●



### ADDITIONAL INFORMATION FOR VISITORS

#### FULL PARKING INFORMATION

Parking around the Herston area and the hospital complex is regulated and nearby streets is controlled. Some metered parking is available.

Transport information, maps and useful links for external and UQ attendees can be found [here](#).

Brisbane City Council Bus [Route No. 66](#) operates between UQ Lakes (St Lucia) and UQ Herston.

If you're looking to stay overnight in Brisbane, the organisers suggest seeking hotel accommodation at Spring Hill or in the CBD.

REFRESHMENTS: Morning and afternoon teas will be served in the Board Room (Room 15, Level 3).

LUNCH, on Thursday, will be served in the outdoor BBQ area at the western end of the Mayne Medical Building (entry for Level 2 and Main Reception).

