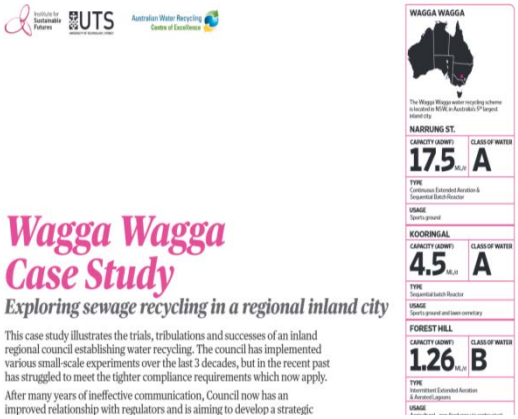
Regional Water Recycling Workshop

12 March 2014

Resilience in the Bush
AWA NSW Southern Regional Conference, Wagga Wagga

Summary Report



Prepared by the Australian Water Recycling Centre of Excellence and the Institute of Sustainable Futures, University of Technology Sydney

Introduction

The AWA Southern Regional Conference included a two hour workshop for approximately 40 participants on the topic: *How can we help get water recycling on the ground in regional NSW in the current environment.* The workshop was planned and coordinated by the Australian Water Recycled Centre of Excellence (AWRCoE) and the Institute of Sustainable Futures, University of Technology Sydney (UTS).

The workshop followed a keynote presentation by Dave Gough, chair of WateReuse Australia and Strategy Manager for Sydney Water, on the topic: *Water recycling - at the crossroads?* and Mark O'Donohue, CEO of the Australian Water Recycling Centre of Excellence, on the topic: *Innovation to expand water recycling in regional Australia.*

Andrea Turner, research director at the UTS Institute of Sustainable Futures, highlighted results from the AWRCE project: *Building Industry Capability to make Better Recycled Water Decisions.* The project website helps Australian water utilities, government agencies and private companies invest in water recycling schemes. It includes a review of eight well-known water recycling schemes - from an economic, operational, regulatory and environmental perspective – and provides lessons to guide investment. The case studies – including residential, industrial, commercial and irrigation water recycling schemes – provide in-depth learning from each scheme with respect to recycled water use, treatment options, public-private funding, regulatory frameworks, and an assessment of risks, costs and benefits. Lessons from the Wagga Recycled Water Case Study were presented to workshop.

Workshop participants held small group table discussions to identify "issues" hindering water recycling and "opportunities" or "solutions" for regional NSW using topics below. Some tables focussed on the first three topics; others on the last three topics.

1. Stakeholders – who are the players?
2. Scheme objectives – what does success look like?
3. Supply and demand – what volumes are required?
4. Treatment – what level of treatment makes sense?
5. Institutional arrangements – what approvals and contracts affect the scheme?
6. Financing – what are the financial arrangements?

Table discussions were facilitated by Mark O'Donohue (AWRCoE), Dave Gough (Sydney Water), Annalisa Contos (Atom Consulting), Andrea Turner (UTS) and Don Alcock (AWRCE).

Participants viewed the following resources:

- Wagga Wagga Case Study – Exploring sewage recycling in a regional inland city
  http://waterrecyclinginvestment.com/

- Making better recycled water investment decisions: *Shifts happen*
  http://waterrecyclinginvestment.com/

- Australian Water Recycling Centre of Excellence website
  http://www.australianwaterrecycling.com.au/

This workshop builds upon an earlier national workshop: *Overcoming barriers to water recycling in rural and regional Australia* held in Brisbane in July 2013. See Attachment 1. A webcast of four regional water recycling schemes presented at this previous workshop is available at: http://www.blueshadowgroupvideo.com/AWR/watertrends.html

Summary of Discussion

1. Successful water recycling initiatives have occurred in many rural and regional towns in recent years, mainly irrigation schemes for agriculture, ovals and parks. Councils increasingly want to learn from the experience of others - by sharing skills and knowledge including feasibility studies, economic assessments, technology processes, regulatory approvals, use of consultants and stakeholder engagement case studies. Smaller regional councils and utilities look to organisations such as the NSW Water Directorate, NSW Office of Water, Australian Water Association, and NSW Local Government Association to facilitate knowledge sharing on recycled water options and technologies.

2. Regional NSW councils and utilities need assistance in undertaking viability assessments of scheme opportunities. It was noted that new economic planning approaches, decision support tools and case study lessons are being made available through the Centre, and stakeholders supported this knowledge being delivered by workshops, webinars, training courses, staff exchanges, demonstration projects and case studies.

3. Councils and utility representatives noted increasing efforts are being made to implement the concept of integrated water cycle management and water sensitive urban design to minimise the impacts of urban development on the environment and to address water security by diversifying supply options. Recycled water from wastewater facilities, stormwater harvesting, on-site greywater systems, and aquifer recharge are increasingly being assessed as options in regional integrated water management plans, in addition to traditional potable supply options.

4. Within the current NSW regulatory framework councils believe there is scope to better coordinate regulation in regard to health, environment, economic, and local government planning for recycled water scheme proposals and upgrades. Councils and utilities find it challenging to negotiate and interpret regulation on recycled water produced by NSW Health, NSW Office of Water, IPART and the Department of Local Government. Councils and utilities support risk-based regulation, consistency in regulation, and the need to streamline the approval process.

5. Larger NSW regional councils believe they are experienced in, and have capability to regulate, low-risk recycled water schemes such as irrigation schemes for agriculture. At present, councils believe they are required to undertake more State regulatory approvals with a reuse scheme for agriculture than for a potable water supply. More guidance and resources are needed for councils to address and validate higher-risk and more advanced recycled water schemes, possibly through a single state agency.

6. Councils believe the private sector could take a greater role in co-financing, operating and managing regional water recycling schemes. Many regional councils contract consultants for feasibility assessments, stakeholder workshops, technology selection, scheme design, operation and management. With 3rd Party Access legislation, more private operators can now become involved in regional water services and recycling schemes, but some councils are unsure how this can work in practice.

7. Economic and cost incentives can be/should be offered to users of recycled water. Some councils provide recycled water free to private golf courses, farms and wineries. Agricultural uses can be the most economic due to water quality and quantity requirements. Regional councils believe that recycled water schemes with low distribution and/or treatment requirements can be developed cost-effectively, can offset and avoid wastewater costs and potable water supply costs, and can provide environmental and community benefits.

Workshop group discussions

The following is a summary of each table discussion on issues and solutions.

Andrea Turner Table - ISSUES

(1) stakeholders

- Water quality issues due to diverse end uses (agriculture, potable, washing machines (using cold water)) etc. often mean health stakeholders need to be involved which can be complicated.
- Currently seems to be a low level of awareness/understanding of recycled water by the community which needs to be changed (see solutions)
- Politics – big decisions made by politicians (cutting the tape) including identify targets but with little consideration of whether recycling makes sense in a particular context or how much it will cost. Also very little $s assistance to achieve big statement/target.

(1 and 5) institutional and stakeholders

- Some have brought in outside help to assist with stakeholders and complexities (like Wagga) but found that stakeholders, people, interpretations change over time – often feel as if starting from scratch (this is in part a manifestation of the time it takes for recycled water projects to go from planning to fruition).
- many stakeholders dealing with similar issues – maze to understand what need to do.

(2) objectives

- What is the driver for the recycled water – often different for different stakeholders, changes over time and not aligned.
- Build big now or risk losing the funding available (a YVW scheme example provided)

(3) supply – demand

- Is there demand for the product and how will seasonality affect the demand and costs for storing during low demand? If insufficient storage this can lead to risk of non compliance.
- Agricultural end uses can often be the most economic due to quality and quantity requirements.
- Need to shift away from the mentality of “build and they will come OR design in flexibility”

(4) treatment

- Need to be careful of source water quality and end uses because if they change this can cause issues (e.g. source water quality changes can cause higher salt and be detrimental to the crops)

(6) financing

- Grants are drying up so if is now more difficult than ever to afford capital and ongoing operating costs
- When users like agricultural use recycled water they often need to go through more complex hoops than if just using river or potable water. Suppliers therefore have to keep the price of recycled water down to be competitive against other sources to enable marginal cost to be used by end user for those extra compliance and reg etc. hoops and dealing with salt and nutrients. Costs and price of water often just don’t stack up.
- Due to the longer distances involved the transport/pumping of recycled water increases energy costs.

Andrea Turner Table - SOLUTIONS

(1) stakeholders

- Talk to stakeholders + community to help them understand more about recycled water and potential issues

(2) objectives

- Allow mothballing of plants after a drought until the next time (without negative perception)

(3) supply - demand

- Need flexibility – size – staging

(6) finance

- Save STPs by reducing what going into them (divert flows beforehand) to help reduce $ investments needed
- Use assets we have (i.e. land and sun – more lagoons, solar) to reduce costs of water recycling (BUT this often leads to issues with EPA and regulators)

Table discussed knowledge solutions…….

Knowledge

- 'Shifts happen' document on UTS and Centre websites (and Wagga case study) looks really useful and relevant but how do you know about them/find them?
- Need to get the word out there about these online resources and help people "think" about their schemes
    - AWA
    - Water Directorate – board + best practice + templates
    - LG-NSW
    - IPWEA (1/4 meetings)
    - ROCs + regional alliances + associated meetings
    - Workshops to discuss such issues
- Potentially more of these kinds of resources and case study lessons
- Other knowledge transfer could be
    - metro orgs give short term placements to help regional councils learn
    - regular webinars
    - set up networks for peer learning and to share knowledge
    - stakeholders involved in projects to workshop together to identify and understand the issues for their project
- When you start schemes could use resources to
    - inform the scope of works
    - educate consultants
- Consider other trigger points to use the resources
    - In grant funding use questions as prompts/criteria to ask what you really need (demand) and to think about risks

Mark O'Donohue Table – ISSUES

(3) Variable supply and demand
- Regulatory drivers don't encourage investment in new recycled schemes and reduce demand
- Dam water is still cheaper than recycled water
- EPA recycled water regulations are different between ACT and NSW
- Cost is a major driver for potable water and pumping
- Pipe networks are expensive for greenfield development

Googong Estate in ACT – developer-led integrated water cycle management system with a dedicated water treatment and recycling plant for the township will make recycled water available for toilet flushing and garden use. This can reduce potable water consumption by 60%, and recycles half of the wastewater generated to irrigate open spaces in the town. Challenges with cross jurisdictional (ACT/ NSW) regulation of water with estate (NSW) placed within catchment of ACT storage reservoirs.

Coffs Harbour agricultural sector – provision of recycled water leading to changes in cropping structure in region, and potential increase in demands for reliable sources of recycled water (at zero/ nominal cost) resulting in pressures on local municipality meet supply needs

Mark O'Donohue Table – SOLUTIONS

- Trial different applications for different cropping approaches – reliable provision of water may lead to higher value more consistent cropping outcomes
- Need for more consistent regulatory approach to minimise time and costs across jurisdictional boundaries
- Need to find a way to move agricultural sector towards recognising value of recycled water

Don Alcock Table – ISSUES

(4) treatment
- some councils need State or Federal funding to build or upgrade treatment systems eg Tumut recycled water scheme involved $.5 million federal grant for infrastructure to pump treated recycled water from the Tumut sewerage plant to a 4 ML holding dam located on the Tumut Golf Course. Approximately 150 ML/yr recycled water is used to irrigate the golf course to replace the use of fresh water drawn from the Tumut River. Also used to irrigate sports fields. Parkes City uses recycled water golf course irrigation.

(5) institutional arrangements
- Tumut prepared the management plan and Section 60 application. Had the scheme inspected by NOW and issued Section 60 ... gaining approval was a long and painful process. Validation was required for Section 60 – you have to test/monitor the system first (lengthy 3 months/weekly tests required).

(5) institutional arrangements
- Tenix contracted by Wagga council to manage and operate two treatment facilities for recycled water. Council started Section 60 process in 2008. Had breakthrough in 2012 when a consultant came on board to facilitate stakeholder meetings. Approval process was straightforward.
- For Wagga's recycled water schemes, it was beneficial to workshop with all stakeholders, including operational and regulator, using a risk based approach.

(5) institutional arrangements
- low risk, small scale treatment systems can be/should be designed and operated by councils. EPA needs to know treated water discharge of nutrients in rivers
- there is no 'one best way' to operate or approve recycling schemes. These schemes need to managed and approved on a risk basis (environment, public health and economic risks)

(4) water charges
- councils don't charge for treated recycled water use by private companies (e.g. truck wash down facility, private golf courses, bananas farms, lucerne farms, etc)

(6) financing
- large recycled water schemes mostly government funded by councils, state govt, plus small grants, eg R&D funding (three CSIRO projects at Wagga). Public funds have dried up to support some regional schemes.

Don Alcock table - SOLUTIONS

(5) institutional arrangements – can use consultants/experts (eg GHD) to facilitate Section 60 applications to get players together
- Solutions – NSW Water Directorate facilitate training to small councils
- Learn from others/councils – get in touch with operators, access business cases
- Share Section 60 applications

(5) institutional arrangements - share case studies with others. Councils are good at doing this. New AWRCE-UTS online resources will be useful. Riverina Council interested in learning from others to review their recycled water opportunities.

(6) financing – get private sector involved early. With 3rd party access legislation, more private operators can now become involved in regional water services and recycling schemes.

David Gough Table - ISSUES

Treatment

- Reactive versus pro-active culture
- Self contained reuse on an industrial site (tree)
- New treatment plant, proposed use in sale yards (helminths)?
  * extra disinfection? Chlorine? UV?
- Assessment process. Is it worth the outcome? Are we over-treating water?
- Need upgradeable packageable technology trains because regs/uses change
- Industrial processes can be more difficult (closed loop) e.g. power, state, petrochemical

Institutional arrangements

- Technical competence to maintain/operate to meet licence conditions
- Operators can follow a procedure but when things go wrong….
- Some really expert people but challenge to get it down to operator level
- SCADA ? can let you contact experts but experts need to be available
- Lack of ?? size/scale

Financing

- Affording technology and on-going operational costs

David Gough Table – SOLUTIONS

- Flood vs spray irrigation (lower risks)
- Drip irrigation schemes effective for irrigation
- Opportunity to leverage “communication” technology better

Annalisa Contos Table - ISSUES

(1) stakeholders
- nitrogen in receiving water vs energy to recycle
- need to sign agreements to reuse
- agricultural use any open space is not consistent (drought)
- remove nutrients > increase costs for some RW users
- triggers to meet current guidelines
- energy/water nexus – gravity potable vs energy recycling

(2) scheme objectives
- recycling to manage PRPs
- reuses vs environment flow
- community amenity “drought proof” parks and gardens
- long history with many regional schemes

(3) supply – demand
- drought increases demand
- irrigating for “profit” vs max reuse
- open space demand is variable
- residential demand is more constant

Annalisa Contos Table - SOLUTIONS

(1) stakeholders
- return flow – how is this recognised as a +ve (& what are the approval mechanisms)
- communicating to the community
- costs benefit analysis
- DSS tool
- +ve & -ve benefits
- sensitivity analysis (e.g. power)
- water sources (potable vs recycled costs)
- drought proof
- soil structure
- water energy nexus

- Regulatory structure – increase cost (P reuse on land)

(2) objectives
- Needs analysis > treatment process
- Identification of genuine need

(3) Supply-demand
- Vision for assets in 50 years (potable reuse)
- Optimise the reticulation night watering vs day demand

Attachment 1.

Removing the barriers for water recycling in regional and remote Australia – workshop summary

Over forty participants convened for the half day workshop *Removing the barriers for water recycling in regional and remote Australia* held as part of the Asia Pacific Water Recycling conference in Brisbane on the 1 July 2013. Organised and sponsored by the Australian Centre for Water Recycling Excellence, Australian Water Association, and Queensland and NSW Water Directorates, the workshop explored issues and challenges faced by regional Australia. The workshop opened with four case studies on regional water recycling schemes:

- Dave Brooker from Mackay Regional Council on recycling for the Mackay sugar cane industry
- Kylie Evans from Tamworth Regional Council on the Tamworth sewerage augmentation - an agricultural reuse scheme
- John Radcliffe of CSIRO on a sewer mining scheme for parkland irrigation in Port Augusta
- Rachael Miller from the Water Corporation on a recycled water standpipe for irrigation and dust suppression at Karratha

A webcast of the four regional water recycling scheme case studies are available at: http://www.blueshadowgroupvideo.com/AWR/watertrends.html
A panel discussion followed before participants broke into groups to brainstorm the drivers and challenges in regional recycling at their tables. The outcomes of the discussion are summarised in Table 1 below with the most common themes listed first.

Table 1. Drivers for regional water recycling

Driver	Comment
Water supply	Water supply was a driver listed by all groups, sometimes more than once. Issues included: • lack of available water due to drought • security of supply • high demand • access and • availability. Some groups commented about the need for source diversity and alternative sources as demand and / or population increases. Water demand for irrigation was also mentioned.
Legislation and regulations	Legislation and regulations was a driver also listed by all groups, sometimes more than once. Groups comments included environmental compliance and regulations, conservation regulations e.g. BASIX in NSW. Some groups also commented about government incentives in the form of subsidies being offered.
Financial	Finance was a driver also listed by all groups. Comments included: • price of water • the cost of alternative supplies and • cost reductions and operational savings with recycled water. Two groups noted recycled water schemes allowed the deferment of capital expenditure.
Protection of water and environment	Several groups talked about the need to protect potable water sources and environmentally listed water sources. The need to protect the environment was noted by two groups.
Community	Three groups saw the community as drivers of recycled water schemes, including the need due to public perceptions of conservation aims.
Use of 'excess' water	Several groups talked about the need to do something 'constructive' with wastewater and in situations where there may be too much water

Driver	Comment
Other drivers	Other identified drivers were: • The impetus reached to continue and improve a recycled water scheme once established. • The existing availability of a buffer storage. • Nutrient trading. • Suitable technology for schemes already existing.

Having identified the drivers for regional recycling schemes participants were asked to brainstorm the top challenges facing for regional water recycling in Australia. The results summarised in the Table 2 below and listed in order of frequency listed by groups.

Table 2. Challenges in regional recycling

Challenge	Comment
Cost	Issues related to costs and pricing were overwhelmingly seen as the biggest challenge for regional recycling in Australia. Many groups talked about costs and access to or lack of funding. Costs specific to providing reticulation, producing documentation for applications to government, and to paying for electricity were mentioned. The question of schemes being financially viable was discussed including customer's willingness to pay, and the issue of pricing recycled water appropriately. The potential problem of high costs for regional areas due to the need for increased sampling was also listed.
Skills and training	This was also an area discussed by all groups. There was much concern on the existence, sourcing and training of skilled staff, particularly in regional and remote areas, knowledge gaps and having continuity of skills in plants.
Water quality	There was varied discussion on issues around the salt and nutrient content of recycled water, and the ability to produce water that was fit for purpose. The need for a balance between environmental and public health and the possibility of effects on the environment were also mentioned.
Demand variability	There was much dialogue on the variability of source water due to various factors and being able to deal with this in the scheme, including water storage facilities. The issue of intense rainfall affecting schemes was also raised, as was the quality and quantity of inflow, particularly in small plants.
Regulations	Most groups conversed about regulations, including there being too many regulators and differences between regulations in different states and authorities. It was seen there was a lack of proper regulation and inspections, and that regulators were inflexible.
Technology	Several groups saw the availability of technical resources and support as a challenge.
Community	Three groups cited this area, including whether the community would accept the use of recycled water. Community perception was mentioned stating that there was a need for public education in order for people to have confidence in the technology.
Other challenges	Other challenges noted by the groups were: • Finding the right end users and having control of end use. • Increasing population. • The need for common language e.g. fit for purpose.

Emerging Needs

Participants identified priority emerging needs for regional water recycling in Australia:

- The need for a national training and competency scheme and operator expertise
- Improved understanding of critical control point management including ongoing monitoring requirements, definition of targets, technology limitations (for example remote sensing).
- Maintenance of public acceptance (education); publicity of successful schemes.
- Unification of regulatory frameworks to ensure schemes are economic and suitable for purpose.
- Development of regulatory framework for return flows to the environment (effluent as a environmental flow)
- Continuing technical improvements to deliver ongoing cost reductions
- Improved understanding of environment and health end points including environmental toxicology; helminths and salt.