Innovative Water Management Award

Summary of Mr. Peter McCamish’s work
‘Integrated Water Recovery’
International Commission on Irrigation and Drainage (ICID)

WATSAVE AWARDS 2012

Category: WatSave Innovative Water Management Award

Title: Integrated water recovery provides regional growth for Northern Victoria, Australia
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Describe the innovation

The Victorian Government-owned Northern Victoria Irrigation Renewal Project (NVIRP) and Rubicon Systems Australia are delivering a world first, large-scale irrigation modernisation project in the Goulburn Murray Irrigation District (GMID), Victoria, Australia: a region that is responsible for approximately 25 per cent of the state’s agricultural production.

The project delivery model and new technology being implemented throughout the region is drawing attention from around the world as an example of how different levels of government can work together to overcome challenges such as reduced water availability, aging irrigation assets and the need to increase productivity.

With the state of Victoria heavily dependent on the GMID’s AUD $1.45 billion per year dairy and agricultural industries, the NVIRP project was initiated to improve the region’s inefficient irrigation network, capture transmission water lost to the system and share these water savings between irrigators, and the environment.

NVIRP is also an enabling project, providing a modernised irrigation system that offers improved levels of service to its customers who can leverage further on farm efficiencies and increased productivity and profitability. The 6 300 km irrigation channel network has been in operation for around 100 years and inefficiencies were compounded by record low rainfalls and long-term drought.

NVIRP is responsible for planning, designing and delivering a program of works to implement works including new irrigation technology developed by Rubicon Systems Australia, including innovative regulator gates such as FlumeGates™ and a Total Channel Control (TCC®) system. This technology is being installed throughout the extensive irrigation channel network and adjacent farms and enables unprecedented water delivery, measurement and management accuracy as well as a fully automated process to deliver water and monitor water use. The modernised system is also providing water to irrigator’s near-on-demand and at higher and consistent flow rates facilitating increased opportunities to optimise on farm water use efficiency and productivity.

Full automation of the majority of the system is also reducing the carbon footprint of the scheme as the multiple daily adjustments of regulator gates and meters associated with a manual system are largely no longer required. This reduces significantly the vehicle travel requirements over such an extensive system.

The project is being delivered with the cooperation of multiple stakeholders including three tiers of government. NVIRP is both the name of the project and the state-owned entity operated by the Victorian Government to deliver the project.

NVIRP is working closely with local governments and the local government water authority (Goulburn-Murray Water) to deliver the project on the ground to produce the water savings and is also working closely with the Australian Commonwealth Government, which has last year committed over AUD $1 billion to the project (total project value AUD $2 billion).
Capital works are predominately delivered in the winter of each year when the irrigation system is non-operational. This works program is the culmination of extensive planning and design to undertake a program of modernisation works within a three month period.

To date, NVIRP has led the installation of over 2716 Rubicon gates and major control structures, as well as the installation of 117 km of channel lining and decommissioning of over 1000 metered outlets. As well, removing largely redundant assets assists in reducing system water losses, increases operational efficiency and reduces ongoing operations and maintenance costs – increasing the overall affordability of the scheme for current and future generations of irrigators.

The program has already shown evidence (see Figure 1) of achieving water savings through the reduction of irrigation channel seepage and leakage, meter error and inefficient operation and exceeded savings targets in its first independent audit in 2009. Visitors have travelled to view the project from all over Australia and the world.

International visitors have commented on the advanced nature of the irrigation technology and how they hope to develop similar systems in their home countries. Visitors are also intrigued about the level of cooperation achieved between three tiers of government and other key stakeholders that is enabling the delivery of this very significant project – which to date is the world’s largest irrigation modernisation project.

Describe how the innovation saves water

To meet the objectives of planning, designing and delivering this two stage AUD $2 billion project successfully NVIRP is required to:

- implement water distribution and delivery efficiency improvements in generating an estimated average of 429 gigalitres (GL) of annual water savings by 2017-18 with an agreed budget of AUD $2 billion. Having achieved so far 109 gigalitres per year (long term average) to-date, the project remains on target to meet this ambitious target

- deliver an improved standard and efficiency of a water delivery services with modernised connections to a central arterial delivery system; and

- provide a catalyst for economic development and productivity within the region.

From 2008 to now, water savings have been mainly realised from the main trunk “backbone” works, where around 3000 km of main channel have been modernised with automatic SCADA controlled regulators, new mag meters and a small amount of channel remediation works.

The installation of the automatic gates (Appendix 1, Figure 2) on the backbone channels has significantly reduced outfall losses or end of channel escape losses (Appendix 1, Figure 3) and provided better customer service delivery. Improved metering to customers on the
backbone is allowing better management of water and reducing losses occurring at customer outlets e.g. leakage around outlets structures and unauthorised use.

In future years more savings will be realised by decommissioning about 3000 km of smaller spur channels (reducing evaporation, seepage and leakage losses) and reconnecting customers back across to the backbone channel, through alternative supply mechanisms than open channels such as using large pipes and or pumps funded by NVIRP.

Already considerable effort towards achieving the Government’s objectives for the program has been made. See Figure 1 below.

Figure 1: Stage 1 & 2 Water Recovery
How are water savings achieved

NVIRP has the target of delivering 429 GL/yr LTCE of water savings by the 2017-18 irrigation season. The majority of water savings realised to date have been associated with three activities or programmes:

- reduction in outfall losses achieved through the automation of old channel regulator structures mainly in the Central Goulburn 5-9 and Rochester irrigation areas
- replacement and rationalisation of customer service point (old meters and open outlets) on the backbone across the NVIRP Stage 1 work areas. This reduces leakage through and around outlets as well as the metering errors associated with old meter and open outlets.
- some channel remediation works to reduce channel leakage and seepage in the Central Goulburn 5-9 area.

Rationalisation or decommissioning of spurs (non-backbone) channels and the reconnection of customers to a modernised backbone outlet within the Connections Programme has begun and will continue to 2017-18. Water savings generated by the NVIRP project are in turn being independently audited in conformance with a Technical Manual which itself has established world’s best practice in terms of providing a methodology for reliably quantifying water savings as a result of specific works and measures.

NVIRP also works closely with partnering agencies such as the Goulburn Broken Catchment Management Authority to support other water savings projects such as on-farm efficiency programs which leverage off the benefits of a modernised distribution system.

Irrigation modernisation works over the ten year program will reduce system water losses and generate savings to benefit both the environment and consumptive water users. Channels with high seepage and/or leakage rates are identified through a range of techniques:

- through soil maps, sandy soils, prior streams
- aerial maps
- Goulburn-Murray Water leakage history (system operator)
- geophysics
- field walks and
- operator knowledge

Losses and savings are then verified through pondage tests. Following this identification, and in some instances plastic lining (HDPE) or clay remodelling as part of the remediation (Appendix 1, Figures 4 and 5).
Describe the scope for further expansion of the innovation

The technology to save water and the lessons learnt over the four years of the project can be transported into catchment areas and irrigation regions throughout Australia and more broadly around the world.

The Murray Darling Basin Authority under its current draft Basin Plan has indicated that there is a widely held view that we need to change the way we manage the Basin.

It is understood that infrastructure improvements to gain water savings will also enable new investment to be made in agriculture and other industries across the Basin.

As many international visitors have seen, some of the water savings strategies and modernisation works being implemented by NVIRP are appropriate and could be applied in irrigation systems across the world.

Roll of individual nominee

Peter McCamish (Chair) NVIRP

Peter has significant knowledge of the Goulburn Valley horticultural industry, as he has been part of this industry for 34 years. He is also a Director of SD Reid Holdings, a Tasmanian Australia cherry grower and exporter. As well he is a currently a Director of Water for Rivers, former Director of SPC Ardmona Limited and former member of the Shepparton Irrigation Implementation Committee and Food Bowl Modernisation Project Steering Committee.

Peter chairs the NVIRP Board of five Directors which is a skills based board. He has been a member of this Board since its inception in January 2008 and was instrumental in developing the overall concept and subsequent representations to Government to attract the necessary funds. He also played a pivotal role in the community consultation processes supporting the roll out of the project.
Appendix 1: Photo Gallery

Figure 2: Newly installed channel regulator structures

Figure 3: An example of an old outfall structure
Figure 4: Example of channel lining being undertaken as part of NVIRP modernisation works

Figure 5: Ariel view of channel lining works in progress