

Water for Rivers Submission to the Proposed Basin Plan

Creating the world's most efficient
natural river systems

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1.0 Executive Summary

The Water 'Efficiency' Outcomes Challenge for the Murray Darling Basin

'Water for Rivers has demonstrated that there is sufficient water for all sectors if it is managed properly.'

Governments and institutional arrangements have been focussed on absolute recovery number(s) for too long, demonstrating an alienation of regional community, through a legitimate fear of change and legitimate questions surrounding the veracity of volumes to be recovered across the Basin.

It is time for people and their community to be taken on a journey, supported by proven delivery and institutional arrangements that bring the productive sector and the environment together, through a 'real outcomes' process and not one based on absolute terms.

The Chair of the MDBA recently stated:

"We have moved away from the 'big cut on one day' scenario to what we are now doing, which is trying to manage the system using adaptive management techniques; and recognising that this [process] is more than just about a volume of water. It's about how you run the river; how you recognise its constraints and all those sort of things".

"I want to spell out how the numbers [in the draft plan] will apply between 2012 and 2019 when the numbers actually click in to place. There are a few things: the process of adaptive management; Tony Windsor's work; and the opportunity for localism. That is the chance to give people a say on how they may want to manage their section of the river in better ways than we can, based on local knowledge and information, and new knowledge over time.

Water for Rivers has the longest history of water recovery in the basin 2003 – 2012. During this period of operation it has worked with community, irrigation companies, river operators and regulators to achieve triple bottom line outcomes. Water for Rivers has exceeded its target, on time and budget, while leaving behind a legacy of more infrastructure providing more efficient water use and improved environmental outcomes. This success has been achieved without adversely impacting production of food and fibre, in fact it can be argued that productivity has increased.

What government is struggling with, is demonstrating that the Draft Plan recovery target of 2,750 GL, is a target, made up of the adaptive management approach through learning, delivered on a regional basis.

River communities want to be listened to, they want to be part of realistic solutions adapted for their river and they want to ensure that, what they know and have experienced for years, living by the river (one they respect and value highly) will in fact be taken into account to deliver better water resource management through this adaptive approach.

If as the Draft Plan states, its overall objective is:

‘River management is ongoing, and this Plan supports a forward process that is flexible and allows communities, river operators and users, and their governments to continually learn by doing. The processes of monitoring, evaluating and adjusting have been hardwired into the draft Plan.’

Then the question needs to be asked, what will this process be and what is the strategy for Basin states and their communities to join with the MDBA having the confidence that they will be provided with the ‘tools’ to ‘learn by doing’, rather than deliberating on a target in absolute terms.

In other words how do we sign on to accountability with confidence based on past actions.

During the seven-year transition period, MDBA states that it will, ‘undertake further detailed assessment of the health and water needs of the Basin’s key environmental assets. The results of this research will be considered in reviews of the Basin Plan, along with other new information about socioeconomic impacts, improved operating rules and the benefits of new infrastructure, before the SDLs come into effect.’

The challenge now is how does government put this into effect, rather than the disparate process of recovery that exists today?

The answer is, based on a river valley approach to combine river system efficiency, using world first technology, as the foundation for future river management and water delivery for the Basin.

Water for Rivers has learned by doing in developing its river valley model.

Applied properly across the Basin it will ensure that community, regions and the environment have the confidence that their collective work using these tools will deliver ‘a better Basin Plan outcome’.

The following model is presented for the MDBA’s consideration to achieving **‘Successful River Valley water efficiency, recovery & SDL credits for the Basin.**

2.0 Background

Water recovery and efficiency should be planned from a ‘total river system approach’, from headworks to on-farm/environmental asset i.e. similar in concept to the root, trunk and branch approach to tax reform. The alternative is a demonstrated discontinuous approach which leads to sub-optimal, ineffective and costly water recovery to the detriment of the irrigation sector, regions and will result in less water for the environment.

To exemplify this, the need for improved river system management is analogous to the proven benefits of delivery channel automation and on farm efficiency benefits, which have been demonstrated with the NVIRP project on northern Victoria. Similarly the Murrumbidgee Computer Aided River Management (CARM) system, which is an upgrade of river infrastructure and installation of new interactive river flow management technology, throughout the Murrumbidgee river system, would underpin ‘water system efficiency’ benefits for the Basin, enabling better environmental water delivery to the ‘right place, at the right quantity and at the right time’.

Better managed flow control in both systems achieves water efficiency benefits through less leakage and seepage, reduced transmission losses and reduced operational surplus or unaccounted for water.

It is vitally important that we think of water resource management for the environment in terms of water use efficiency and ecological response, using knowledge based systems ie adaptive environmental management, similar to clever real time technology delivering the irrigation sector significant efficiency gains on farm ie more with less. This approach also delivers accountability improvement in the daily ‘real time’ use of our water resources in rivers - a total valley system approach using CARM.

Since establishment in 2003, Water for Rivers has conducted numerous water recovery projects in both Victoria and New South Wales. Its predominant water recovery through infrastructure-based projects, and history of project development and learnings has led to the development of ‘world first technology’ for river system management .

To-date, Water for Rivers has recovered water through a range of projects including:

- Investing in irrigation delivery system efficiency using channel automation and channel lining as well as stock and domestic piping to recover system losses. In some cases this also included returning river and stream flows to their more natural state;
- Modifying riverside billabongs and wetland storage systems to reduce evaporative losses and return them to their ephemeral natural wetland state e.g. Lake Mokoan, Forest Creek, Coonancoocabil;
- On-farm water efficiency projects, including reconfiguring and, in some cases, amalgamation of several farms into larger more efficient and sustainable irrigation properties;
- Combining resources from other water efficiency programs to achieve more cost effective and triple-bottom-line outcomes in irrigation districts e.g. the NVIRP project; and
- Providing the opportunity to achieve long-term multiple benefits to recovery by improving operational efficiency in river management, as highlighted by the Murrumbidgee CARM Project.

3.0 River Valley system efficiency, recovery and better management – an approach for acceptable water recovery in the Basin

Based on Water for Rivers’ experience, a critical component of both the broader regional policy context and Basin Plan is **a vision and set of targeted outcomes for the social and economic wellbeing of the Basin Community, and other dependent national communities and industries.** These are lacking from current propositions.

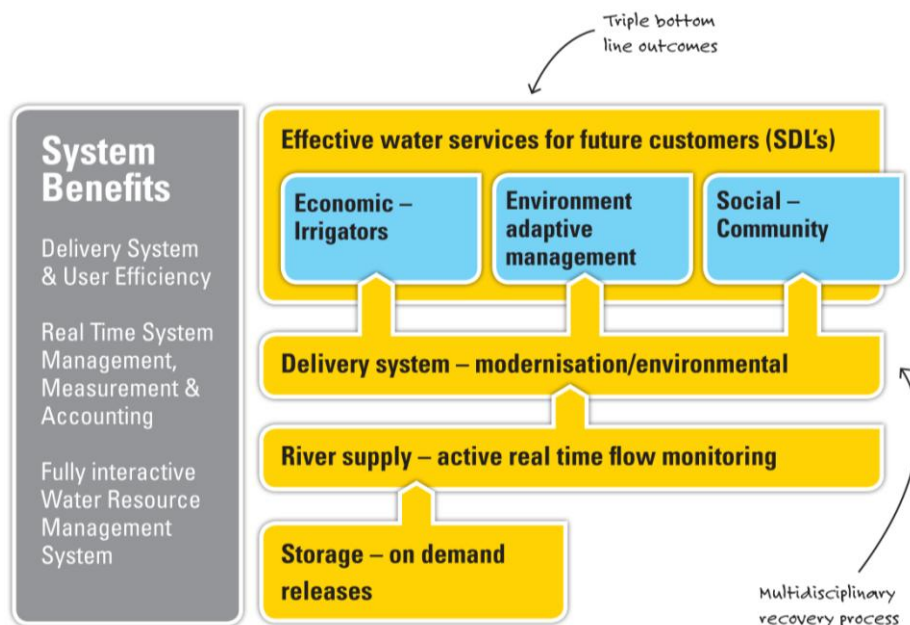
The equitable delivery of water to all consumptive users and the environment requires cost effective and efficient ‘real time’ water delivery control management; this is the only way to acceptably achieve future SDL’s as determined by the MDBA and the Australian Government.

In other words, smarter use of river water and continuous ‘real time’ river valley flow accounting with improved control will deliver better solutions and outcomes for the Basin community, as well as providing far superior environmental watering outcomes in absolute quantity/response terms, using less water.

A multidisciplinary recovery process from water storage to on-farm/environmental asset including real time water accounting, is essential for the future of our Basin river valleys.

This approach using CARM (explained in more detail in Appendix 1) is at the core of **River Valley** recovery model. The model is outlined in the following diagram.

Diagram 1 - Water for Rivers’ multi-disciplinary model for water recovery



Water for Rivers' experience is that providing community preferences and making 'trade-off (opportunity cost) decisions' through a multidisciplinary water efficiency recovery process is critical to the eventual adjustment process in the Basin – without this, the community will be significantly challenged in meeting future SDL requirements and the environment will not have the improved 'river management tools' to operate and deliver water more efficiently.

In other words, significant socio-economic impacts will eventuate based on the suggested target quantities of water required from some of the key river valleys, as outlined in the Draft Plan.

SECTION A

4.0 `Successful River Valley water efficiency, recovery & SDL credits for the Basin

The Water for Rivers' Water **River Valley** Model is a three -step process that encompasses:

1. An assessment of water efficiency, SDL credits and recovery and the delivery of benefits for the community, the economy of the region and the environment on a river valley basis;
2. The development of agreed river system community water efficiency and recovery plan(s); and
3. Implementation of each plan within the valley/river system for which it applies.

Also included is concurrent integration with key platforms of the National Water Initiative.

4.1 The model explained

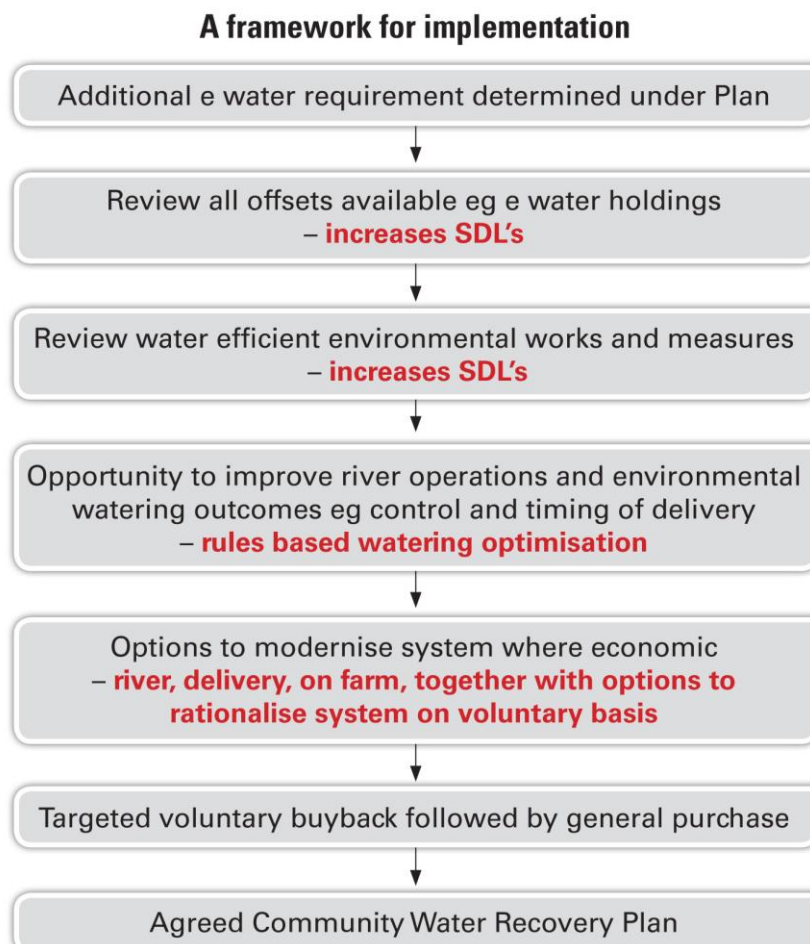
4.11 Step 1. Basin region/river system environmental water recovery

The effectiveness of the **River Valley** planning process for implementation of water efficiency and recovery projects is not in question. The process identifies and confirms all 'credits' such as state environmental water holdings, reviews possible environmental works and measures for efficient watering, and then, based on Water for River's Murrumbidgee River Project experience, investigates the opportunity to improve water delivery efficiency through real-time river operations and crediting any 'rules-based water remaining in storage' as a result of efficient river operations.

This process, or framework, allows a parallel and progressive move into modernisation and rationalisation linked to targeted water purchase as a last step to the whole multidisciplinary process.

The benefits of this planning process are numerous and deliver a 'triple-bottom-line' approach to water recovery as outlined in Diagram 2 – Basin Region/River System Environmental Water Recovery Plan.

Diagram 2 - Basin Region/River System Environmental Water Recovery Plan



4.12 Step 2 Agreed river system community water efficiency and recovery plan(s)

This planning process also assesses the opportunity cost of the efficiency measures and provides for trade-off decisions in managing river assets (delivery and environmental) as well as maintaining and growing the productive and efficient future of the irrigation sector.

It would also assist in managing concurrent structural change which is already evident in many parts of the Murray-Darling Basin.

Funding would be required to establish a 'River System Efficiency and Environmental Water Recovery Plan' for each river valley. Each Plan would require investigations work to ensure water

recovery is maximised from the perspective of a river valley ‘system’ approach and not the current single focussed approach currently employed.

4.13 Step 3. Implementation – The need for a ‘river valley (river system) approach’ to water recovery and reform

Water for Rivers’ experience since 2003 is that implementation of the ‘Environmental Water Recovery Plan and Framework’ outlined in Diagram 2 provides Basin Governments, the MDBA and the NWC with the means for a co-ordinated and regional partnership approach for long term planning.

There is an urgent and fundamental need to combine water recovery, infrastructure and environmental efficiency investment in the Basin.

In other words, water recovery, water efficiency and water management projects (economic and environmental) must be linked to Basin reform on a river valley basis. To do otherwise is to abrogate government responsibility to, one, deliver triple-bottom-line outcomes and, two, provide water reform that ensures a future for irrigated agriculture in the Basin.

Through a **River Valley** model government has implemented and endorsed a highly effective *on-ground project approach* to water recovery that can achieve environmental improvements and meet the needs of regional communities in an inclusive and proactive manner, thus delivering benefits (in addition to improved irrigation systems) well into the future. Water for Rivers summarises the outcomes of this process as the ‘legacy’ effect.

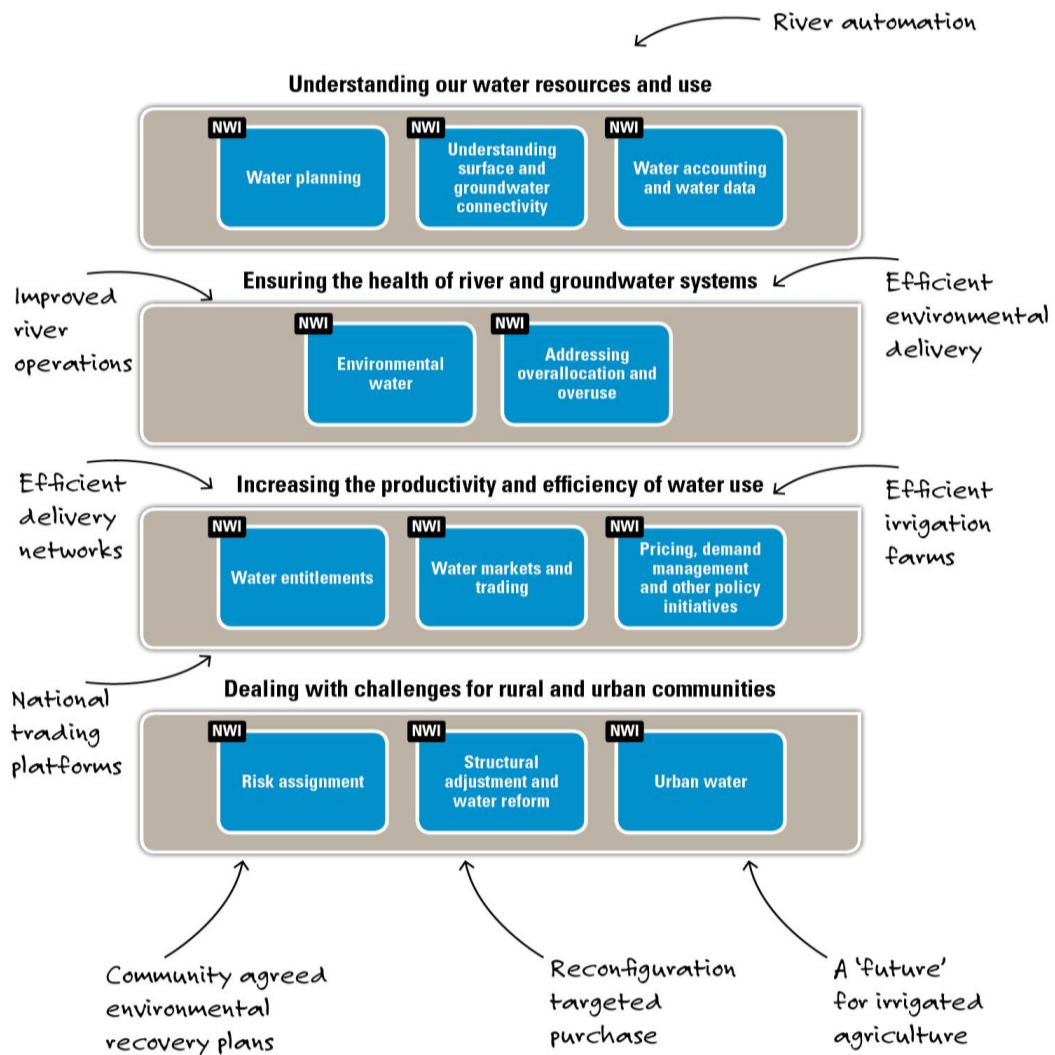
Fundamental to this assessment is the need for **a total system approach to recovery – from ‘headworks’ to ‘farm’/‘environmental site’ – for each river valley** so as to ensure cost-effective use of public funds in water recovery and to prevent any perverse economic or environmental impacts.

Environmental watering must be undertaken through an ‘adaptive environmental approach’ in order to demonstrate progressive and real ecological improvements, within and across Basin river systems. In other words, all water users – namely the environment and irrigators – must be accountable and responsible in their productive use of water.

Undertaking this system approach also delivers on the NWC strategy for water reform that is based on the four platforms (see Diagram 3):

- Understanding and accounting for our water resource and use;
- Ensuring the health of river and groundwater systems;
- Increasing the productivity and efficiency of water use; and
- Dealing with challenges for rural and urban communities.

Diagram 3 - River Valley value add to NWI



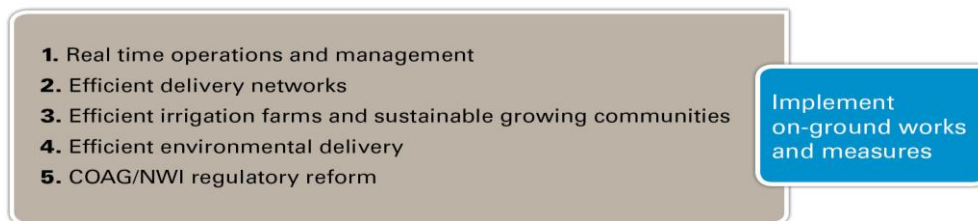
Implementation occurs in the context of five key delivery areas, as outlined in the following pages.

SECTION B

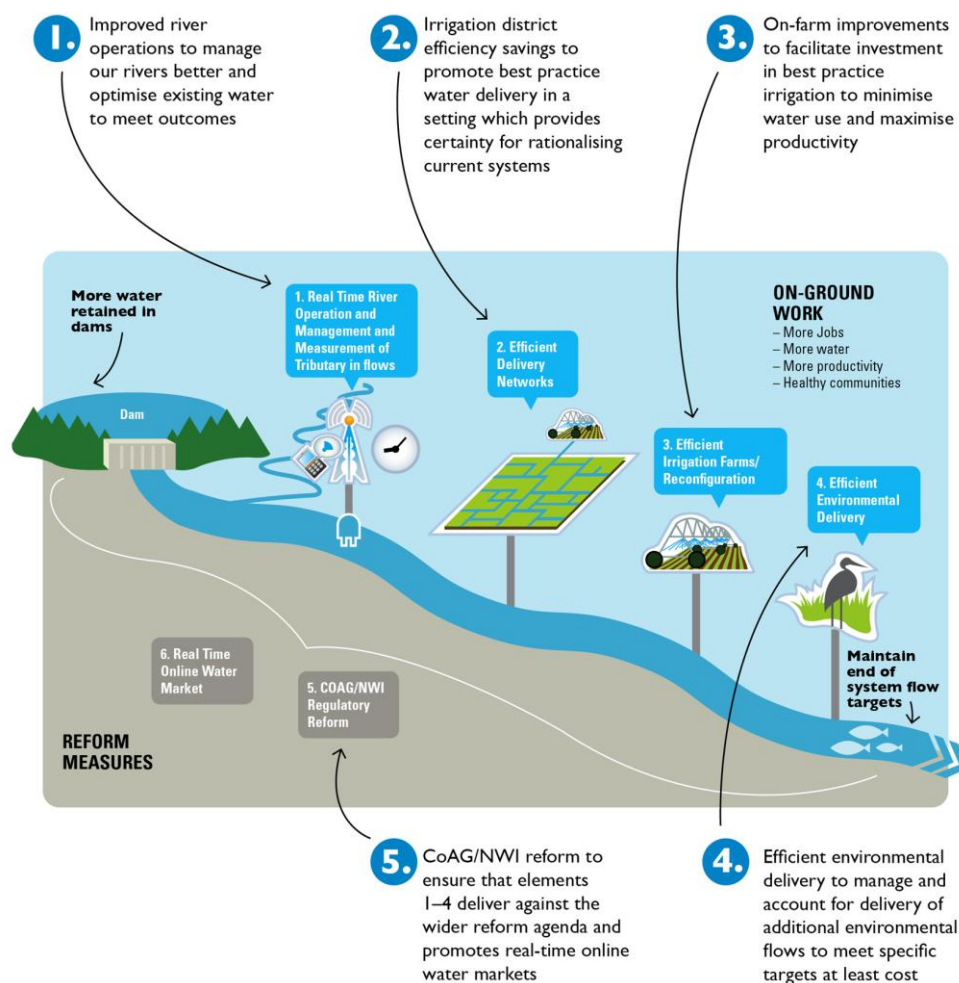
5.0 Delivery areas

There are five key areas fundamental to delivery of successful outcomes for each river system/valley.

Implementation of valley (river system) water recovery



Each is interlinked with the other and, in unison, they provide a regional partnership approach and targeted environmental outcomes. These key areas can be delivered individually, however delivered collectively they provide far superior and exponential regional benefits/outcomes (see the following diagram for visual representation).



5.1 Delivery Area 1: COMPUTER AIDED RIVER MANAGEMENT (CARM)

This allows river operators to make better estimates of required releases and leads to reduced operational surplus. Water saved can then be utilised by either the environment or consumptive users. It can also be converted to adaptive environmental water entitlements (SDL credits) and issued to the Commonwealth for environment use.

While reducing operational surpluses does not produce a true water saving, *it allows the recovered water to be utilised more effectively for the environment in any one year by targeting the release of the water for defined environmental flow events, delivering the same benefit as a purchased entitlement.*

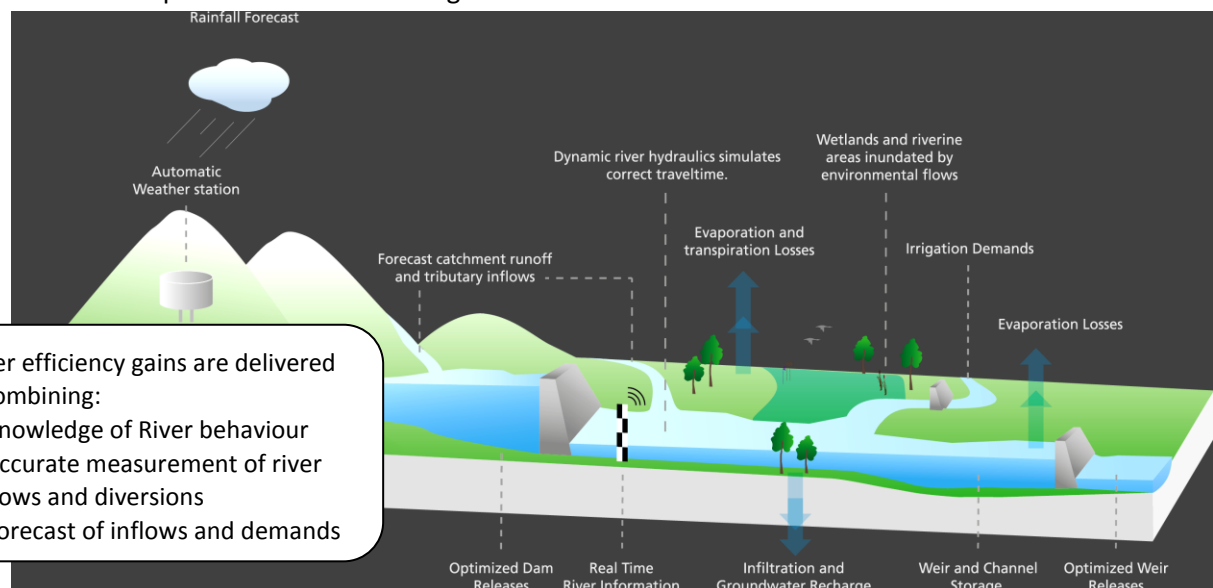
CARM combines engineering hydraulics-based solutions with modern simulation and optimisation models to manage rivers with a high level of efficiency and reliability. Hydraulics is an exact science that predicts flows and levels in rivers to a very high accuracy. Consequently, the CARM system can make precision releases from dams to accurately meet all water demands in the river and wetland systems.

This provides the river operator with the information necessary to improve reliability of water delivery to the environment and to irrigators with less water released from dams.

It also enables accurately timed planned releases of held water to 'piggy back' and meet downstream tributary inflow events, therefore reducing the volume of environmental storage release. In addition future 'over bank' flows and extent will be able to be more accurately managed providing greater confidence and less third party flood impacts.

To-date the MDBA has not recognised the benefits that will accrue from improved river operations. This is fundamental to accountability of Basin water use, real time water accounting and monitoring of flows/use across all river systems in the future.

What is Computer Aided River Management?



This delivery area requires the concurrent roll out of associated meters to all river diverters aligned with the introduction of the National metering standards, similar to the Murrumbidgee CARM project. This would enable the full benefits of CARM to be realised for all Basin rivers with improved services.

5.2 Delivery Area 2: EFFICIENT ENVIRONMENTAL DELIVERY

In each river system there is the opportunity to deliver environmental water to icon river and environmental assets (the 18 hydrological indicator sites) more efficiently and so, off-set SDL requirements using CARM.

The Commonwealth has committed a further \$10 million towards the cost of investigating environmental works and measures projects, comprising \$6 million for sixteen state government proposals and \$4 million for a state-led process to assist the development of community-based proposals.

These studies should be linked to river valley system efficiencies to maximise river efficiency and system benefits, including concurrent land management requirements, for example the Macquarie Marshes.

5.3 Delivery Area 3: EFFICIENT DELIVERY NETWORKS

This includes both system rationalisation and concurrent modernisation of the main backbone delivery systems (including connections) as was the case with the Victorian NVIRP Project

Funding should be provided based on an 'efficiency dividend' basis for permanent water recovery and transfer to the Commonwealth environmental water holder. In other words, rather than a project-by-project basis, a whole-of-system modernisation approach is required. This includes system rationalisation and targeted purchase.

Included in this delivery area is the potential for significant transmission savings through projects such as the Forest Creek Project by Water for Rivers where streams and creeks that are run all year to supply Stock & Domestic (S&D) supplies can be returned to their ephemeral state with alternative supply via a piped water system.

This includes the need for valley co-ordinated S&D schemes to return ephemeral creeks back to their more natural state.

5.4 Delivery Area 4: EFFICIENT IRRIGATION FARMS/RECONFIGURATION

The fourth key component of the River Valley package is to encourage irrigators to initiate on-farm reconfiguration and efficiency infrastructure projects that embody innovative best irrigation practice to reduce water usage and enhance productivity and resilience in the face of climate change.

The success of this element depends on the modernisation of irrigation system delivery and the provision of CARM services for river diverters. Irrigators need to receive high levels of service, with consistent high volume flows on-demand before they will invest in best practice water use on-farm.

There are significant cost, service and water resource management inefficiencies at present from not aligning metering and on-farm programs utilising the opportunity for real time technology.

5.5 Delivery Area 5: COAG/LMI LEGISLATIVE AND REGULATORY REFORM

It has been Water for Rivers' experience (and observation) with water recovery that, too often, water recovery projects proceed with a focus on the water savings per se but without the associated and critical COAG/NWI reform.

To ensure this reform continues proactively and at a regional scale, affected communities need to be given clear information about the future reform direction, buy-back plans, environmental objectives, infrastructure investment plans and risk assignment arrangements.

This key delivery area is essential to delivering the previous four successfully and must be associated with state-based regulatory reform to ensure future compliance and delivery.

Examples of regulatory changes should include:

- Adoption of the 'water order debiting' requirement on the Lachlan to southern river systems or allowing for real time temporary transfer of released diversions allocations that have been ordered but not used;
- Consideration of trade back limitations in reconfigured areas based on effective 'delivery share' constraints;
- Review of Basic Landowner Rights requirements in NSW;
- River system carry over rules which improves allocation management and use, as well as increases spill opportunities/frequency
- Market mechanisms to encourage trade close to source

SECTION C

6.0 River Valley Water Efficiency and Recovery Maximises Future Water Resource Management Benefits for Basin Plan

This section confirms that the River Valley approach could deliver major water recovery efficiencies (SDL credits) and savings across the valleys of the Basin. The proved model can provide a trusted Valley delivery model based on robust business planning tools to ensure that outcomes are achieved through cost effective approaches to maximise river and system efficiencies.

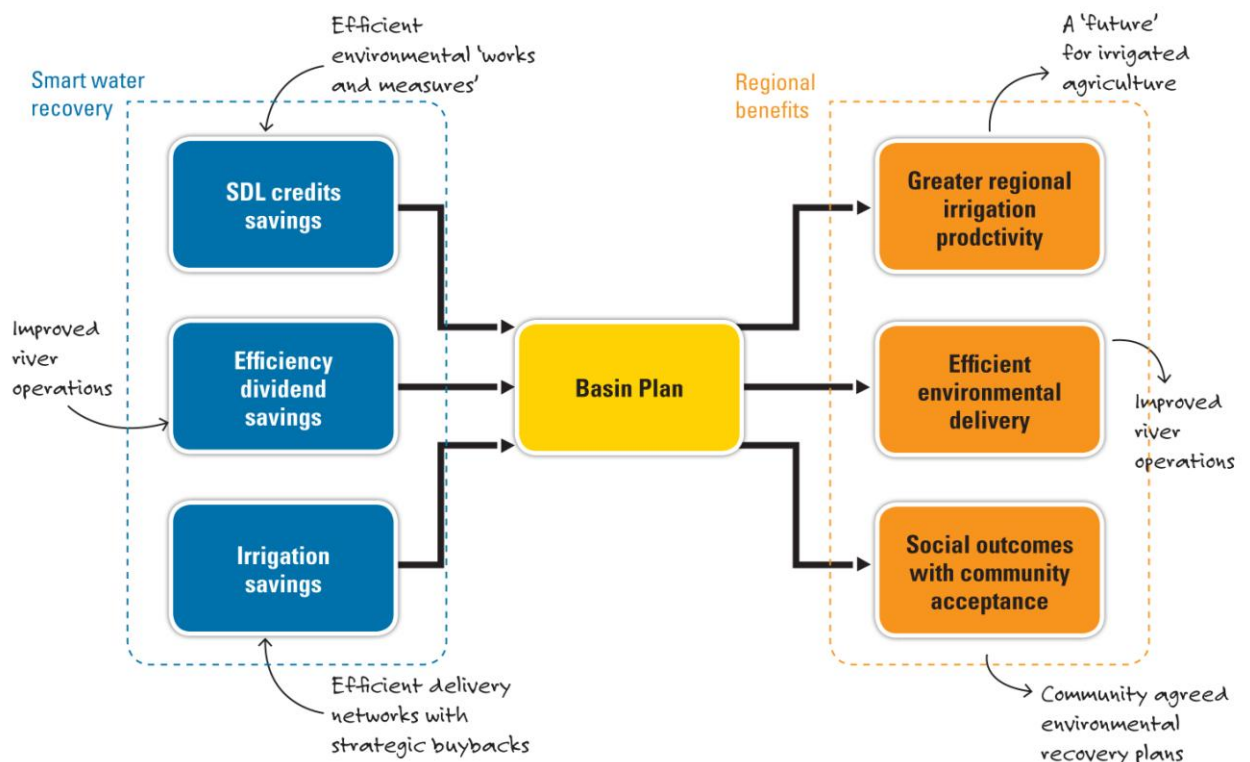
This approach generates three different forms of water efficiency benefits compounded to maximise regional benefits.

Irrigation savings: savings from investment in best practice network delivery and on-farm water use. This investment reduces water losses while enhancing levels of production. These savings can be converted directly into environmental entitlements for use in achieving watering requirements.

Efficiency dividend: savings from enhanced river operations. This investment generates additional volumes in the dam to deliver environmental flows in the right volumes, at the right time, in the right place. However, the volumes need to continue to be delivered to maintain overall end of river flows.

SDL credits: savings from implementing efficient environmental watering works and measures. Investment in these works reduces the volume of the flows needed to achieve the watering requirements of nominated icon sites. That reduces the scale of the reductions needed in setting the proposed sustainable diversion limits and so enhances local socio-economic outcomes.

Cost effective river valley water recovery delivers regional benefits



7.0 Conclusion

To meet future Basin environmental needs using an adaptive management approach prior to the final SDL's being introduced in 2019, requires a smart river system valley approach to water use efficiency.

To-date the MDBA has not recognised the benefits that will accrue from improved river operations. This is fundamental to accountability of Basin water use, real time water accounting and monitoring of flows and use across all river systems in the future.

It also enables a measurable/response management approach to seeking an 'outcomes approach' to future river water management.

This requires valley communities together with the environment to be provided with the necessary 'tools and technology' to improve river system and water delivery management.

A combination of infrastructure works, as well as smart delivery technology and environmental works and measures will delivery far superior river efficiency benefits (SDLcredits) to communities in the Basin than the current recovery approach.

Providing community with the challenge to improve system efficiencies is a far more superior and empowering outcome than the current default approach of providing just held water for the environment by 'bridging the gap'.

SDL credits and efficiency opportunities should be maximised to avoid any future reduction in the consumptive pool.

In the future the environmental water holder will require a number of different water products to reflect the future adaptive environmental approach required to support annual ecological targets.

The MDBA and government(s) now face the challenge to put this into effect, rather than the disparate process of recovery that exists today.