



**Murray Irrigation**

**Ideas to Deliver the Murray-Darling Basin Plan  
*Submission to the Department of Climate Change,  
Energy, the Environment and Water***

**3 July 2023**

[www.murrayirrigation.com.au](http://www.murrayirrigation.com.au)  
PO BOX 528 DENILIKUIN NSW 2710 | 1300 138 265

## Table of Contents

<b>Table of Contents.....</b>	<b>1</b>
<b>1 Executive Summary .....</b>	<b>2</b>
<b>2 About Murray Irrigation Limited.....</b>	<b>3</b>
2.1 Background .....	3
2.2 Location.....	3
2.3 Water Use in the 2021/2022 Season .....	4
<b>3 Ideas for the SDLAM program.....</b>	<b>4</b>
3.1 Idea 1: Murray Reconnected Floodplains .....	4
3.2 Idea 2: Millewa Forest Regulator Upgrade .....	6
3.3 Idea 3: Werai Forest Regulator Upgrades .....	7
3.4 Idea 4: Aratula and Bullatale Creek Reconnection .....	8
3.5 Idea 5: On-Farm Wetland water delivery .....	9
3.6 Idea 6: Unregulated Flow delivery .....	10
3.7 Other ideas.....	11
<b>4 Ideas for the 450 program.....</b>	<b>11</b>
4.1 Idea 7: Murray Irrigation System Optimisation.....	11
4.2 Idea 8: Extension of Murray River Works Program.....	13
4.3 Idea 9: Lower Darling and Darling Anabranh Fish Passage Works.....	14
4.4 Other ideas.....	15
<b>5 Future climate change resilience.....</b>	<b>15</b>
<b>6 Supporting impacted communities .....</b>	<b>15</b>
<b>7 Supporting impacted Irrigation Infrastructure Operators.....</b>	<b>16</b>
<b>8 Conclusion.....</b>	<b>16</b>

## 1 Executive Summary

Murray Irrigation is Australia's largest private irrigation company delivering water to over 2,100 family owned landholdings through 2,778km of gravity fed channels and operating \$1 billion of infrastructure. The system was originally built by government in the 30's and 40's then privatised in 1995. The company is constitutionally not-for-profit. Since privatisation our average water delivery has halved.

For the food producing farmers and surrounding communities whose livelihoods depend almost entirely on viable annual allocations from the NSW general security water entitlements held in southern NSW, the overwhelming concern is the threat of further water recovery combined with the frustration of knowing that much greater environment outcomes can be achieved with water that has been recovered.

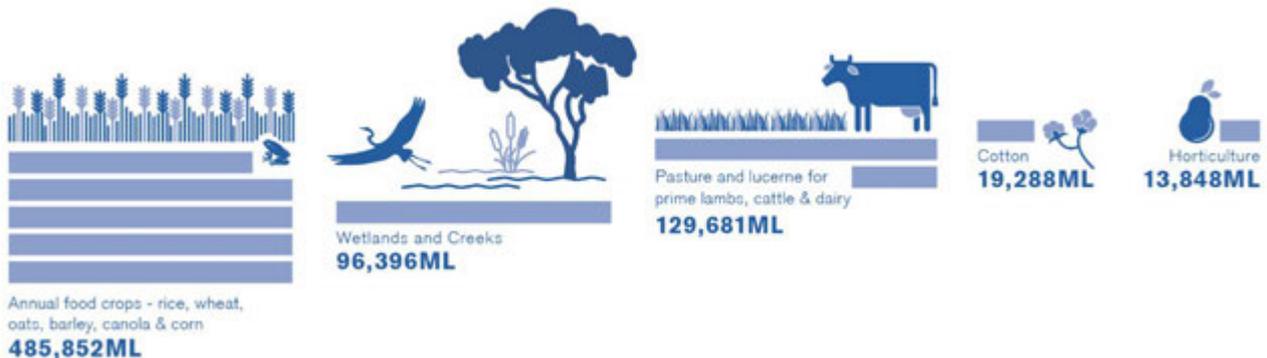
Our local communities have a strong connection to the riparian environment, understand the importance of water both for environmental purposes and consumptive use. There are a number of ideas we would welcome that should be further investigated and implemented before the known damaging effect of water recovery is considered.

As a company employing staff and supporting food production and environmental outcomes within the basin, we are well placed to play a key role in helping to shape and implement these ideas through partnerships with government.

We hope you enjoy reviewing our ideas and welcome a new era where basin communities and environment are collaborating to achieve environmental outcomes.



## 2.3 Water Use in the 2021/2022 Season



## 3 Ideas for the SDLAM program

The following section outlines ideas that could be considered as Sustainable Diversion Limit Adjustment Mechanism (SDLAM) Projects so that a greater environmental outcome is achieved from environmental water already recovered. The concept where environmental works are completed on-ground so that an environmental outcome is achieved to avoid further water recovery is a sound concept regarding SDLAM projects. Instead of SDLAM projects being limited to “notified projects” under a rigid framework, the SDLAM program should be amended to an ongoing program where SDLAM “principles” are used to continually develop and implement projects on an annual basis. This then enables improvements in scientific knowledge to be incorporated into these projects. A good example is the monitoring information resulting from environmental watering initiatives from the Commonwealth Environmental Water Holder. A number of these projects can also be shaped to represent very good value for money and to meet more timely outcomes by partnering with entities such as Murray Irrigation.

### 3.1 Idea 1: Murray Reconnected Floodplains

#### What works could happen?

We are proposing Australia’s largest targeted environmental watering program using a water supply network, the “Murray Reconnected Floodplains”. On-ground works include:

For Creeks:

- Upgrade landholder crossings to allow fish passage and delivery of environmental water.
- Upgrade fence creek crossings so they are flood tolerant or to relocate fencing to exclude stock from creeks.
- Upgrade to Murray Irrigation escapes so they can deliver targeted volumes of water identified by the environmental water manager.

For On-Farm Wetlands:

- Fencing to protect wetlands from grazing.
- Habitat enhancement works to maximise chance of threatened species recovery.
- Water supply delivery works so that water can be delivered to the wetland site.

With previous experience as the Implementation Authority for Australia's largest integrated environmental program, the Murray Land and Water Management Plans, Murray Irrigation is also well placed to be a partner implementing this program.

### What is the environmental outcome?

Connecting thousands of kilometres of ephemeral creek and river systems so that these systems are connected back to the Murray River (Figure1). Works and water delivery to rehabilitate hundreds of on-farm wetlands.

- Deliver oxygen-rich water to floodplains to prevent mass native fish deaths.
- Redistribution of native fish back into key habitat sites.
- Long term protection and enhancement of threatened species habitat.
- Subject to competing demand, capacity to deliver around 6,000ML/day.
- Delivering drought refuge water to prevent mass fish deaths.

A large number of wetlands and creeks are available for rehabilitation in our 724,000ha area of operation. Possibly 10% of our area may be considered important habitat. Some of these sites are adjacent to RAMSAR listed wetlands. A total area of up to 74,000ha could be achieved with this idea.

### Size and scale of project

A very large scale project possibly requiring total funds greater than \$150M and taking 10 years to fully implement with significant outcomes connecting creeks in the first 1 to 3 years.

### Location

Within the entire Murray Irrigation Area of Operations, with a priority on the western half of the footprint.

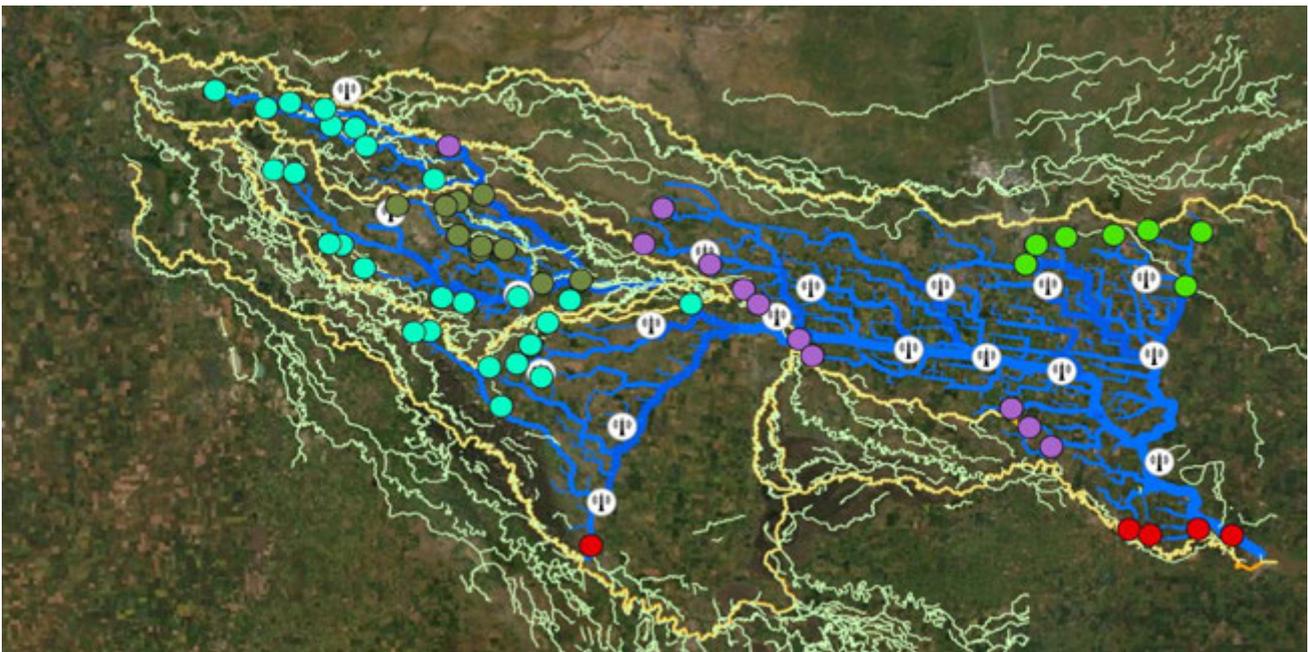


Figure 1: Location of Murray Irrigation Area of Operations along with natural escape sites and telemetry system to operate water delivery structures remotely.

## 3.2 Idea 2: Millewa Forest Regulator Upgrade

### What works could happen?

Upgrade/replace several forest regulators with modern remote controlled delivery infrastructure to enhance the existing NSW National Parks Millewa SDLAM project (Figure 2).

### What is the environmental outcome?

Improved water delivery to help maintain the ecological character of a RAMSAR site- which is the Millewa forest. Upgraded infrastructure can maximise the benefits of water management within these systems to for maximum ecological benefit. For example the retention of water in lagoons or wetlands to complete waterbird breeding events.

### Size and scale of project

Moderate scale project, estimated to take 1-3 years with possible funds of \$20M.

### Location



Figure 2: Area location of sites to upgrade for the Millewa forest

## 3.3 Idea 3: Werai Forest Regulator Upgrades

### What works could happen?

Upgrade/replace several forest regulators with modern remote controlled delivery infrastructure. Works include: Niemur offtake regulator, Moonya lagoon regulator, Tumudgery creek regulator, Reed Beds Creek regulator (Figure 3). This will compliment the NSW National Parks SDLAM project.

### What is the environmental outcome?

This forest is of high ecological interest with existing watering arrangements with environmental water holders. Improved water delivery to help maintain the ecological character of a RAMSAR site- which is the Werai forest. Achieving ecological outcomes with less water and also significant cultural benefits given the first nations significance of this forest.

### Size and scale of project

Moderate scale project, estimated to take 1-3 years with possible funds of \$15M.

### Location



Figure 3: Area location of sites to upgrade for the Werai forest

## 3.4 Idea 4: Aratula and Bullatale Creek Reconnection

### What works could happen?

Remove sediment build-up and replace crossing site with clear span bridge (Figure 4).

### What is the environmental outcome?

This will deliver “constraints level” outcomes but at a lower level and will also reduce pressure on the Barmah Millewa Reach. Improved flow regime for eastern Millewa and provide a more frequent flow into the Bullatale creek with earlier commence to flow conditions. This project has strong landholder support.

### Size and scale of project

Small scale project, estimated to take 1 year with possible funds of \$2M.

### Location



Figure 4: Location of site works for Aratula and Bullatale Creek Connection

## 3.5 Idea 5: On-Farm Wetland water delivery

### What works could happen?

Working with individual irrigators within the entire basin to use on-farm irrigation infrastructure to deliver water strategically to on-farm wetlands (Figure 5). This concept has worked well with farmers within Murray Irrigation’s footprint and can easily be adapted and extended across the entire basin on a massive scale.

### What is the environmental outcome?

The majority of wetlands within the Murray Darling Basin are on farms. Irrigators who extract water to grow food and fibre are also the most experienced and well placed to deliver environmental water to their own on-farm wetlands. A very large program can be developed to incentivise irrigators to identify and deliver water to their sites combined with initiatives to protect and enhance the sites ecology.

Very significant environmental outcomes can be achieved as delivery can be controlled, measured and timed to generate the greatest outcome. A program of this size is particularly beneficial for threatened species at on-farm wetlands where timing and duration of watering is critical. A program of this scale effectively prepares the entire basin to be “climate change ready” capitalising on the irrigation farmer’s innovation and ability to both deliver and store water to protect and enhance wetlands.

### Size and scale of project

Very large scale, many thousands of on-farm wetlands can be watered, protected and enhanced. Funds would likely exceed \$200M over a 10 year period. Likely area will exceed 200,000ha.

### Location

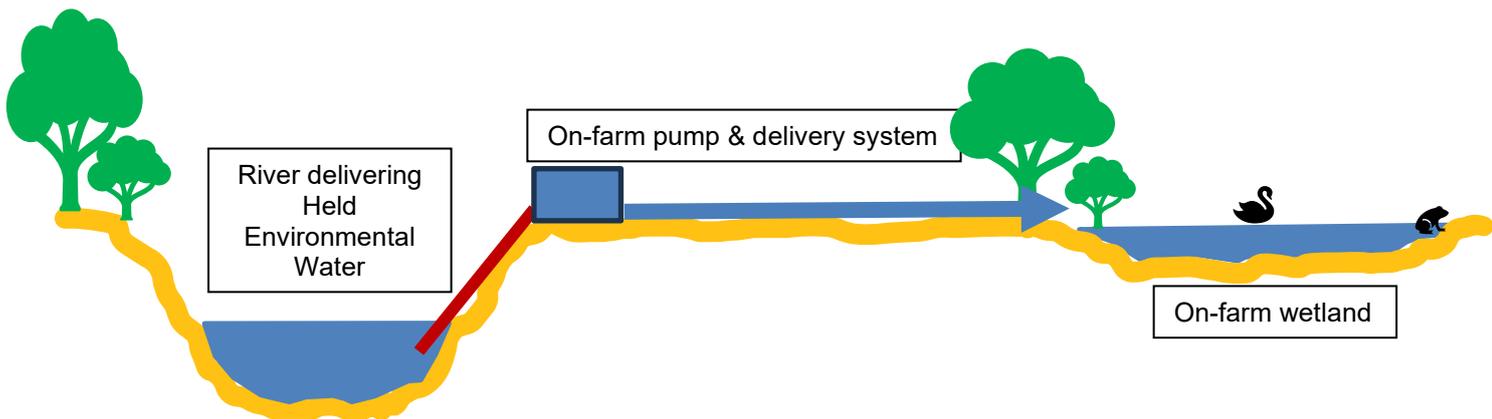


Figure 5. Outlines concept of pumping held environmental water from river systems to on-farm wetlands higher up on the floodplain. Projects can be located on farms across the entire basin where held environmental water can be strategically delivered to a wetland site.

## 3.6 Idea 6: Unregulated Flow delivery

### What works could happen?

No additional works required. Policy change could enable unregulated flows to be used by the environmental water manager to deliver water to environmental assets using irrigation infrastructure without debit to the held environmental water account. This can be especially valuable if unregulated flows are still within bank and not high enough to reach environmental assets higher in the floodplain.

### What is the environmental outcome?

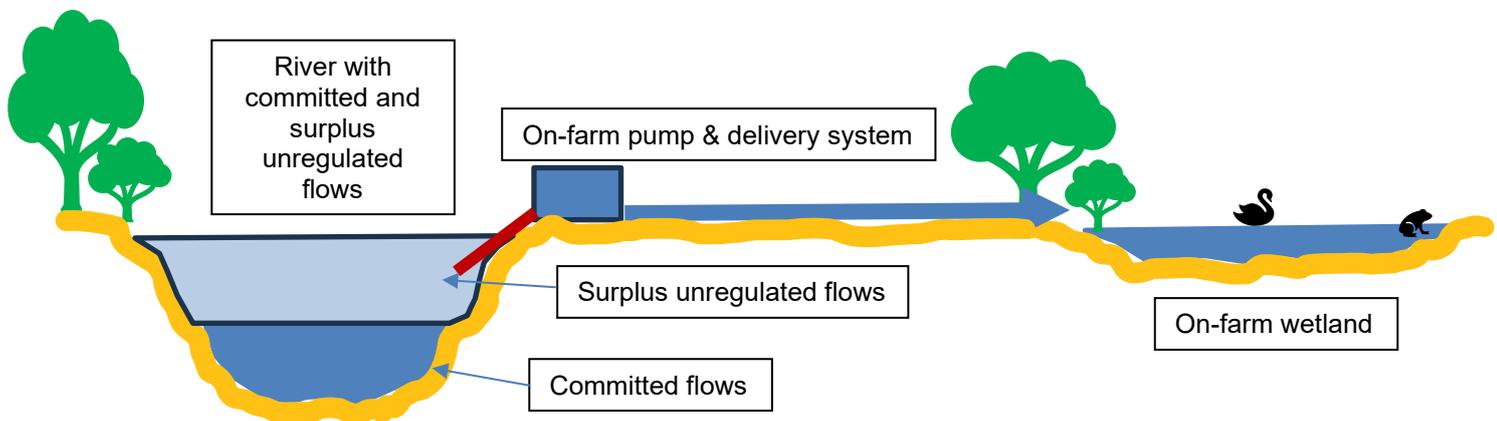
This idea compliments idea 5 and makes use of surplus unregulated flows to achieve the best environmental outcome for that water (Figure 6).

Very significant environmental outcomes can be achieved as delivery can be controlled, measured and timed to generate the greatest outcome along with potential use of large parcels of surplus water throughout entire valleys where unregulated events occur. “Top-ups” to wetland sites at a later date with Held Environmental Water can then maximise the benefit to these wetlands, especially where large breeding events of threatened species are triggered.

### Size and scale of project

Very large scale, many thousands of on-farm wetlands can be watered, protected and enhanced. Sites are the same sites identified in idea 5 and maximises the use of investment into those wetland systems.

### Location



**Figure 6. Outlines concept of pumping surplus unregulated water from river systems to on-farm wetlands higher up on the floodplain. This concept compliments idea 5 where the same assets are used to strategically deliver this surplus water.**

## 3.7 Other ideas

We understand there may be other similar opportunities throughout the basin and encourage the department to contact communities to explore those opportunities. An example includes working with other Irrigation Infrastructure Operators to strategically deliver environmental water into numerous creeks, rivers and on-farm wetlands.

## 4 Ideas for the 450 program

The environmental outcomes of this program focus on restoring riparian systems and the Lower Lakes. This program should be amended to be “environmental outcome” focussed not “water volume” focussed, so that instead of water recovery (efficiency projects), the focus is using funds in this program to achieve environmental outcomes consistent with the principles raised earlier for the SDLAM program (supply projects) with a focus on riparian and lower lakes ecosystems. The outcomes should then be recognised as “water recovery credits” similar to the SDLAM program. State and Commonwealth Environmental Water Managers should work with communities to lead initiatives focused on these outcomes. The following ideas outline initiatives to achieve these water recovery credits.

### 4.1 Idea 7: Murray Irrigation System Optimisation

#### **What works could happen?**

Works connecting Murray Irrigation’s escape structures to ephemeral creeks and riparian systems to the Murray River. This will enable MDBA River Operations flows to reduce delivery pressure on the Barmah Millewa Reach.

#### **What is the environmental outcome?**

This concept enables MDBA River Operations water (consumptive water) to achieve an environmental outcome by being the “flow” component of water (Figure 8) flowing through creeks and rivers that then re-enter the Murray River downstream of the choke (Figure 7). The potential is very significant with up to 400,000ML/annum of consumptive water being used to achieve this environmental outcome in the Murray valley, then continuing on its journey below the Barmah Millewa reach towards south Australia. This project also improves water deliverability certainty to the lower lakes, improves water quality and assists with native fish redistribution. Subject to competing demands during delivery, Murray Irrigation escape systems have the ability to deliver up to 5,000ML/day.

#### **Size and scale of project**

Moderate scale project. Subject to options implemented in the Alluvium report, funds in the order of \$18.5M to \$42.5M could be utilised (Feasibility Study Report, Barmah Millewa feasibility Study, December 2022). Please also note that activities under Murray Irrigation’s Murray Reconnected Floodplains project will also likely upgrade similar structures identified in Option 4B of the Barmah Millewa Feasibility study. Project is a 1 to 3 year timeframe.

## Location

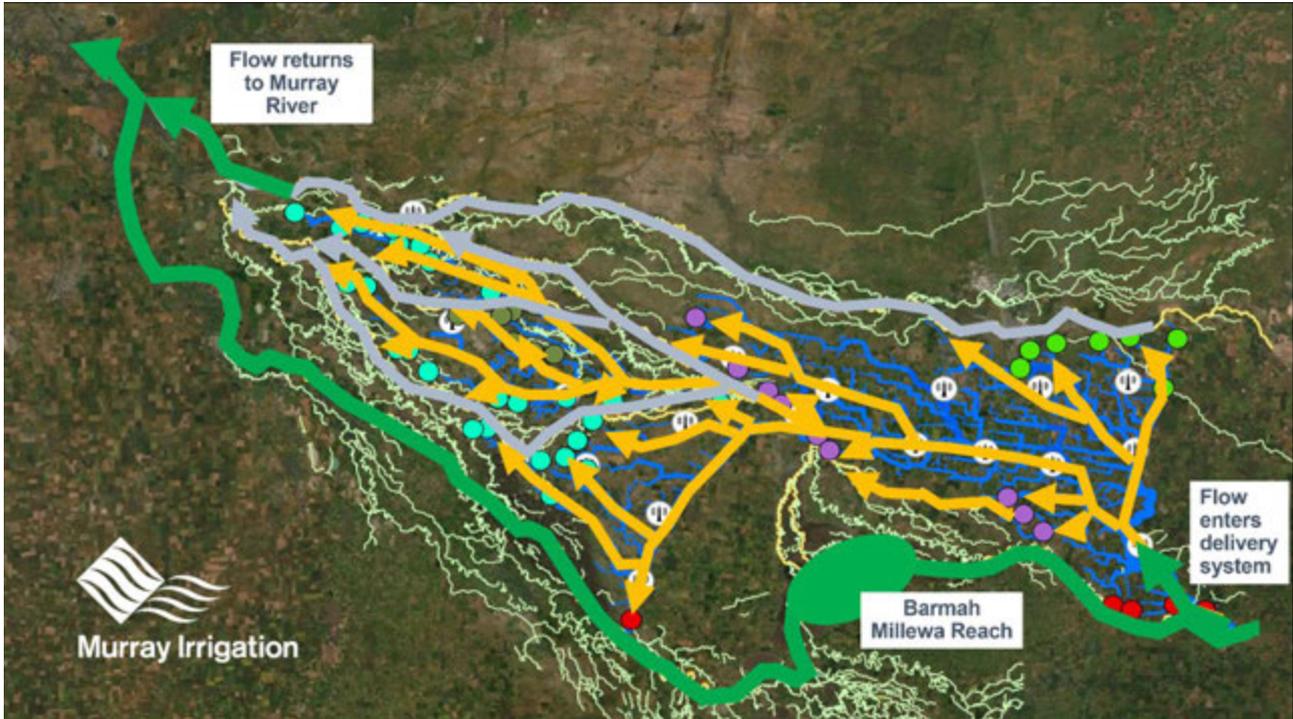


Figure 7. Location of Murray Irrigation Area of Operations outlining key entry points of riparian systems reducing pressure on the Barmah-Millewa Reach.

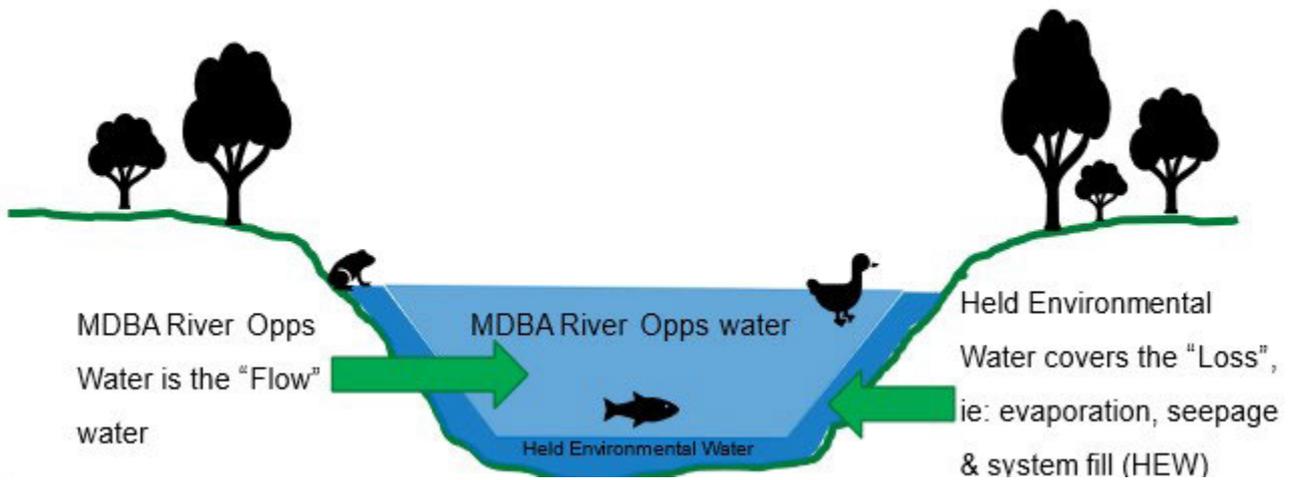


Figure 8. Diagram outlining how MDBA river operations water can be used as the "flow" water while Held Environmental Water covers the loss component. Both work together to achieve an environmental outcome in an ephemeral creek system.



## 4.3 Idea 9: Lower Darling and Darling Anabranh Fish Passage Works

### What works could happen?

Support and fund the Better Baaka program, this includes:

**Lower Darling:** Removing barriers to fish passage, installing fishways in Lake Wetheral outlet, weir 32, Pooncarie and Burtundy weir (Figure 10).

**Darling anabranh:** remove barriers to fish passage, packers crossing and dam 183.

### What is the environmental outcome?

Improve pathway for fish migration from the Menindee lakes storages to the Murray river.

### Size and scale of project

Very large scale, extensive lengths of fish passage restored to the Lower Darling and the Darling Anabranh systems. Funds could exceed \$70M over a 10 year period.

### Location



Figure 10. Location of fish passage works for the Lower darling and Darling Anabranh systems

### 4.4 Other ideas

We understand there may be other similar opportunities throughout the basin to achieve principles under the 450 program and encourage the department to contact communities to investigate further.

Examples include:

1. **Lower Lakes Augmentation Works** – improve the ecology of the lower lakes, improve mulloway fish populations, whilst reducing evaporation losses of freshwater.
2. **Desalination Plant Utilisation**- use of underutilised desalination plants with cheap renewable energy to offset water extracted from the Murray-Darling Basin and use that water for environmental outcomes.
3. **Coorong South East Flows** - explore further opportunities to enable more freshwater to drain into the Coorong from the south east drainage system.
4. **River Work Program**- extend the activities outlined in ideas 8 and 9 throughout other river systems in the Basin.

## 5 Future climate change resilience

Many of the proposed works will also mean preparing the environment to better manage future risks of climate change. These proposed on-ground works also means excellent control and management of water to maximise environmental outcomes. This same infrastructure can manage future variability of water over a range of scenarios that may eventuate. A good example is the 2022/2023 flood event where Murray Irrigation's water supply infrastructure delivered around 180,000ML of oxygen-rich water into the surrounding hypoxic blackwater floodplain saving large numbers of native fish from perishing. In periods of drought, this same water supply system can very efficiently deliver targeted environmental water directly to refuge pools within these systems, keeping native fish alive until the drought breaks. This and many more examples will manifest with well designed on-ground environmental works.

The result of completing these works effectively means most of our environmental assets within the Basin are "climate change ready" with a number of other multiplier benefits occurring which are not addressed by water recovery alone.

## 6 Supporting impacted communities

Water recovery from communities that depend on water for its surrounding farmers to grow food and fibre means very significant economic losses resulting in losing jobs, services and erosion of the social fabric for all members within the local community.

With the clever use of both Held Environmental water, surplus unregulated water and a multiuse approach to consumptive water, we are confident that not only can the environmental outcomes of the basin plan be achieved, but well exceeded. Funds from the SDLAM and 450 program can achieve this.

Further water recovery polarises impacted communities against the environment and generates long lasting resentment amongst the very people that are the most important to develop working partnerships with to achieve environmental outcomes.

Adjusting these programs to focus on environmental outcomes instead of water recovery would represent an exciting new era where strong collaboration would occur across all sectors including irrigation farmers, local communities, first nations peoples, universities, governments at all levels and environmental water managers. The Basin Plan would then be something to celebrate by all communities across the basin.

### **7 Supporting impacted Irrigation Infrastructure Operators**

Since privatisation in 1995, Murray Irrigation has observed its water delivery halve from an average of 1,200GL in the 1990's to an average of 600GL in the last years. Yet the company still needs to maintain its \$1B of infrastructure.

Water recovery along with other water policy changes has presented very significant challenges for the company, its irrigation farmers and dependant industries. We have worked hard to adapt and modernise our systems by being an implementation authority for the Murray Land and Water Management Plans, an active participant in the On-Farm Irrigation Efficiency program and modernised our supply system in the Private Irrigation Infrastructure Operators program.

As a company we would welcome assistance from the government to help adjust from the previous impacts of water recovery.

### **8 Conclusion**

Murray Irrigation would like to congratulate the Department of Climate Change, Energy, the Environment and Water on its initiative of seeking ideas from a range of stakeholders. With the careful consideration of these and many other ideas, we welcome a future without the threat of further water recovery, and entering a new era focussing on environmental outcomes with Basin Plan communities and the environment working together in close collaboration.

We are very well placed to be a key partner to achieve very significant and large scale environmental outcomes whilst also helping to secure downstream water security. We are also very interested in integrating these initiatives to support first nations people in our region.

Being an active participant of environmental watering initiatives since the early 2000's has given us confidence that our proposed ideas can work and we look to progressing further.