



Australian Government



# Delivering A Healthy Working Basin

About the draft  
Basin Plan

[www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)

## ACKNOWLEDGEMENT OF TRADITIONAL OWNERS

The Murray-Darling Basin Authority acknowledges and pays its respect to the Traditional Owners and their Nations of the Murray-Darling Basin. The contributions of earlier generations, including the Elders, who have fought for their rights in natural resource management are also valued and respected.

The Authority recognises and acknowledges that the Traditional Owners and their Nations in the Murray-Darling Basin have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. The Authority understands the need for recognition of Traditional Owner knowledge and cultural values in natural resource management associated with the Basin. The Authority supports the belief of the Northern Murray-Darling Basin Aboriginal Nations and the Murray Lower Darling Rivers Indigenous Nations that cultural flows will provide beneficial outcomes for Traditional Owners. Further research is required to assist in understanding and providing for cultural flows.

The approach of Traditional Owners to caring for the natural landscape, including water, can be expressed in the words of Ngarrindjeri elder Tom Trevorrow:

*... our traditional management plan was don't be greedy, don't take any more than you need and respect everything around you. That's the management plan – it's such a simple management plan, but so hard for people to carry out.<sup>1</sup>*

This traditional philosophy is widely held by Traditional Owners and respected and supported by the Murray-Darling Basin Authority.



<sup>1</sup> Tom Trevorrow (2010) Murrundi Ruwe Pangari Ringbalin, 'River country spirit ceremony: Aboriginal perspectives on river country'.

# Foreword by the Authority

This draft Basin Plan represents one more step in the ongoing journey of managing our rivers.

For decades, our governments and Basin communities have invested knowledge and money to maintain or restore the health of the rivers—rivers that are a critical source of drinking water, provide water to important environmental sites and habitats, are recreational playgrounds, and support livelihoods, cultures and contribute to the nation's economy.

We live in the driest inhabited continent in the world and the complexity of balancing a relatively small amount of water against a range of genuinely competing interests for this water should not be underestimated.

It has long been recognised that the management of the Murray–Darling Basin is not as good as it might be, and managing a basin and river system as big as the Murray–Darling does not lend itself to instant responses.

We must also accept that human settlement over the past 200 years has altered the landscapes and placed constraints in the system, which make it physically impossible to return to a natural, pristine environment.

So, this Plan is not about returning the rivers to their natural state. It's about finding the optimal balance between the environment, economies and communities... not settling for the lowest common denominator but building a framework for change to provide, for the long term, a healthy working basin.

The Plan we have developed allows seven years to 2019 to give everyone time to work together and adjust to the changes required to bring the system into balance.

We are writing this at a time when many of the interest groups are in disagreement about what is proposed.

Different state governments have different views. Typically, Victoria and New South Wales argue for minimal change while South Australia strongly argues for a larger volume of water. At times they seem to be almost diametrically opposed. Situation normal!

The conservation movement want more, farmers and irrigators want less. Scientists want more science. Again, situation normal!

Everyone has “right” on their side. For every claim there is a counter claim.

Very few people are willing to concede anything, believing that in doing so the other side will gain an advantage.

We simply can't go on managing the Murray–Darling Basin as if it were a tug-of-war. In the end, everyone pulling in opposite directions gets us all exactly nowhere.

“Situation normal” is no longer good enough.

That's why we propose to build a pathway to 2019. It's a pathway we should all be able to walk along, exploring the opportunities together, learning, adapting and adjusting.

But we have to make a start.

We have to agree to do this together.

This Plan is not an end point. It's an opportunity to start the next part of the journey which began years ago.

As former Prime Minister John Howard made clear in 2007 when he announced the \$10 billion plan to “improve water efficiency and to address over-allocation of water in rural Australia, particularly in the Murray-Darling Basin”:

*For this plan to work there must be a clear recognition by all—especially by state and territory governments—that the old way of managing the Murray–Darling Basin has reached its use-by-date.*

Of course, making the change from the “old way” of managing water to a “new way” involves courage, compromise and is not without risk.

But, they are risks worth taking. As Prime Minister Howard also stated, “the tyranny of incrementalism and the lowest common denominator must end”.

The pathway to 2019 should be supported by all.

It provides an opportunity to bring into play infrastructure and environmental works and measures to make the management of water more efficient, whether the water is being used for production or for environmental purposes.

Seven years allows ample time for the state, territory and Australian governments to review the rule books and management frameworks to make water use more efficient and effective than it currently is. The Windsor parliamentary inquiry deserves credit for putting a spotlight on this particular issue. Seven years allows local communities, properly empowered and resourced by governments to further develop their abilities to play an active role in the decisions about how their catchment is managed and how water for the environment is used.

Done properly, the pathway to 2019 will take us from the “old way” of managing to the “new way” with the least amount of impact and the best chance for a high degree of community ownership in a healthy working Basin.

Let's talk about the facts.

First, based on the hundreds of conversations and briefings we've had over the past year, there is no single number (additional volume of water required) that will satisfy all the interest groups and governments.

More importantly, there is no single number that will magically fix the health of the Murray–Darling system.

What is done with the water, how the rivers are run, how flows are controlled, historical constraints in the system, and how water is recovered all add to the complexity and make a “just add water” solution laughable.

So what do the numbers mean? Numbers, any numbers, can only be an estimate of what the best available information, including science, tells us we need to bring the system into balance. The numbers will vary over time as new information, updates in science, more efficient water management, infrastructure and water buyback are brought into play.

More recent and robust modelling has shown that key environmental objectives can be met with a lower volume than the range suggested in the Guide. The lower volume, based on the modelling, will achieve the objectives of keeping the Murray flowing to the sea nine years out of 10, to flush salt from the system and water important sites in the Basin.

Of course, the pathway is not without risks. To mitigate those risks the destination to 2019 has opportunities to monitor, evaluate and adjust. More than “just a number”, the Plan gives a real opportunity to see how the Basin is performing, and to make adjustments along the way.

It's also why we've strengthened the Plan (the draft legislative instrument) to overtly and repeatedly reinforce the need to optimise economic, social and environmental outcomes.

In many ways, the “optimisation equation” requires value decisions and judgement calls that go beyond just science, and to quote the late Professor Peter Cullen:

*Scientists commonly hold strong values about desirable outcomes, and should be welcome in the political debates as society grapples with the various issues. However, they should not expect their scientific standing gives them any special right to decide value questions for society. Their science needs to inform the debate, not replace the debate.*

In that spirit, I thank the CSIRO for giving the Authority the confidence that the science that underpins the Plan is sufficient to use as a starting point on a journey toward a healthy working basin.

By providing a starting point, Basin communities and their governments can adopt an adaptive management approach which both respects and reflects new information as it comes to hand.

The review that CSIRO has conducted over the past several months makes it clear that the work of science and research is never ending. There is always more to be done. In that context the next seven years should be a fertile place for further improvement of the scientific foundation of the Basin Plan.

And while there is more to be done, it's also important to acknowledge that much has been achieved already. Basin governments and communities have put in a great deal of effort over past decades to limit water use and recover water for the environment through caps, programs and water sharing plans.

Reflecting on this past effort, we are proposing that a volume of 2,750 GL/y is to be recovered to achieve balance in the system. But this must be viewed in the following context.

Already, almost half of that volume has been recovered through buyback and infrastructure, which means 1,468 GL/y remains to be recovered over the next seven years.

The Plan is a starting point to get us onto the pathway toward an adaptive management approach where we can continue to improve our knowledge and adjust the numbers accordingly over the next seven years. It is likely to change. And how this amount is secured will be critical to the socio-economic impacts of water-dependent communities.

There will be no compulsory acquisition of water. The Australian Government has committed to bridge the gap through water-saving infrastructure and water purchases from voluntary sellers. Based on the Authority's socio-economic analyses, recovering this volume through water purchases alone could have serious detrimental effects in communities that rely heavily on irrigated agriculture. However, if governments have an investment bias toward infrastructure and environmental works and measures that can deliver efficiency savings, the social and economic impacts can be greatly improved. Further improvements would also be made through a commitment to key projects, such as Menindee Lakes, as well as a better coordinated and more efficient management regime, as proposed by the Windsor parliamentary inquiry.

It is also important that where buybacks are used as a tool for water recovery, it needs to be made very clear where and what type of entitlements (e.g. high or low security) will be purchased. The mix of entitlements will determine which agricultural industries and communities are affected.

Equally, what is done with this recovered water, how the Commonwealth Environmental Water Holder behaves in a market context and how it manages its holdings, must also be carefully articulated and managed. The Commonwealth should publish its trading framework and forward business plan on a regular basis to achieve a higher degree of market certainty.

Another key component to achieving success is to actively involve local communities in the decision making and management processes associated with this Plan and the administration of water more generally by the Commonwealth and state water agencies.

The Authority fundamentally believes that local communities need to be engaged in managing their part of the river system. That will require the support and funding from government. There are already many good examples of localism operating in the Basin.

Localism can mean different things to different people. To the Authority, it means people working together in local communities with mutual respect, without labels, to solve common problems.

It matters less whether localism occurs through Catchment Management Authorities, Regional Development Bodies, water working groups, natural resource management boards or the many other structures that exist. What matters more is that people and communities are given the chance to have their say.

Communities, when properly resourced, are well placed to make good decisions about river management and land care. People who work the land have a well earned reputation for being excellent stewards. They have a vested interest in maintaining a healthy balance. But, often, they need backup and support.

Access to technical support and resources to improve knowledge, efficiency, productivity and resource management have been part of the agricultural policy landscape for generations. Governments have typically tried to be of assistance to those who work the land—so it should be with this Plan.

There needs to be an overt and formal commitment by the Basin governments to encourage local communities to take part in managing the Basin. Providing funds, making technical skills and support available, and devolving opportunities for water management decisions should be part of this journey.

Finally, we would like to thank all of those people who have been instrumental in helping with this important work. They are, of course, too numerous to mention, but there have been literally thousands of people who have helped along the way.

In the end, this Plan must become a Plan which can be embraced and accepted by the broader community. That will take time and it will take patience. Most of all it will require people to travel the pathway looking forwards not backwards.

At this stage, the draft Basin Plan is a discussion document. The proposals it contains are just that – proposals, and its release kicks off the start of a 20-week consultation period. Through this consultation you can help us to develop the Basin Plan, and we encourage you to contribute to the process.

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## OUR 10 KEY POINTS

### **1. Our vision is for a healthy working Basin**

Our vision is for a healthy, working Murray–Darling Basin that supports strong and vibrant communities, resilient industries, including food and fibre production, and a healthy environment.

This is why we have developed a draft Basin Plan that takes a balanced and adaptive approach to water management and hardwires in the need to optimise social, economic and environmental outcomes. It also includes check points along the way to 2019, when the Plan will be fully implemented.

### **2. The Basin Plan is the next step of the journey**

Communities and governments have been working towards balanced water use for decades. Since the Basin-wide cap on surface water use in 1995, significant work has been done to recover water for the environment through a range of government programs such as The Living Murray, state water sharing plans, Australian and state government water purchases and investment in water-saving infrastructure.

This draft Plan is our current thinking on the next step in the journey to recover water to achieve a healthy working Basin.

We are proposing that surface water use in the Basin is limited to 10,873 gigalitres per year (GL/y) on a long-term average. This represents a reduction in water use of 2,750 GL/y (compared to 2009 baseline diversions).

There has already been progress in achieving this total reduction. Accounting for contracted water recovery to date, there is 1,468 GL/y left to be recovered for the environment across the Basin by 2019.

Including all efforts since 2004, by 2019 around 3,573 GL/y of water will have been recovered for environmental use in the Murray–Darling Basin.

The Authority is also proposing a Basin-wide long-term average limit of 4,340 GL/y on groundwater use.

Communities and governments have undergone significant water reform to date. Some places have already ‘done their bit’ to achieve balance within their catchment. Others still have a way to go. Overall there remains a need to continue the effort toward ‘whole-of-basin’ health.

### **3. We have a robust starting point**

We are confident that we have a robust starting point for the journey to 2019.

We have used a model that looks at flows at 122 sites throughout the Basin (called a hydrological indicator site approach) to underpin our work. This is a more robust approach than the end-of-system flows method used previously.

The hydrological indicator sites approach has been peer-reviewed throughout its development. The most recent review was completed by a group of leading scientists, under CSIRO’s national research flagship Water for a Healthy Country. These reviews give us the confidence that we have a “sufficient basis to begin” an adaptive management process.

In the context of “learning by doing”, science will play an ongoing and central role in the management of the Murray–Darling Basin. We will be setting up an advisory group under the Water Act to oversee this future work program.

### **4. It’s more than just a volume of water**

The science confirms there is no single volume of water or number that will guarantee the health of the Murray–Darling Basin.

How water is used, how the rivers are run, and how the Basin’s landscapes are managed all contribute to Basin health. There needs to be continued effort in natural resource management activities (such as pest and weed management and revegetating river banks and floodplains), to complement the use of environmental water.

Water use is also limited by constraints and rules. For example, in some parts of the Basin, water delivery needs to be carefully managed to avoid flooding communities. Another example is that water acquired for the environment must mimic the operational rules historically attached to the entitlement. Constraints and rules limit where and how much water can be sent through the system at any one time.

These constraints and rules can change, if governments agree and third party impacts are addressed. However, it is important to point out that under the current system, entitlement and operational constraints make it almost impossible to achieve some environmental outcomes (such as watering all of the extensive floodplain on the lower reaches of the Murray, including Hattah Lakes and the Riverland) no matter what volume of water is delivered. In that sense, what might be desirable must be tempered by reality and common sense to achieve what is possible.

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.

### **5. We’ll review progress at 2015**

There will be a mid-point review at 2015, so we can monitor and evaluate and adjust where necessary on our way to 2019.

We acknowledge that the numbers could and should change, based on new knowledge, including further science and research, community impact, local involvement and the results from environmental watering programs.

We will also be setting up an advisory committee to help determine any such changes.

This means the numbers are a starting point in a process to monitor, review and revise over the next seven years.

## **6. Any savings from a 'rules review' will see the volumes adjusted.**

As part of the 2015 review, Basin ministers have agreed to look at how existing river management arrangements (rules and practices) and environmental works and measures could improve the efficiency and effectiveness of water use. Their decision to put in place a work program to undertake this 'rules review', which was recommended by the Tony Windsor-chaired parliamentary inquiry into the Basin Plan, can be regarded as a substantial step in state-based river management.

Any savings made as a result of achieving these efficiencies will allow the numbers to change.

## **7. The northern Basin is different to the southern Basin.**

We recognise that the northern Basin is different to the southern Basin.

It has more variable climate and rainfall, it is less regulated and less developed, and water is managed in a different way. This presents both opportunities and challenges.

Very little water from the north can reach the mouth of the Murray in the south, unless nature intervenes and brings heavy rainfall and big floods (providing only 18% of flows to the Murray Mouth under natural conditions). Northern catchments, where they are connected, will only be required to make a downstream contribution to the water needs of the Barwon–Darling through to the Menindee Lakes.

Managing water in the northern Basin is quite different from the southern Basin. In particular, because of a different rules framework, fewer public storages (dams), and highly variable connectivity between catchments and tributaries to the Barwon–Darling, there is a need to consider alternative approaches to river management.

For this reason, in collaboration with the New South Wales and Queensland governments, we will initiate a Northern Basin Committee of community representatives to work with the Authority and support local and catchment-based groups to address these matters.

## **8. One size doesn't fit all.**

As the north is different from the south, we also recognise that different catchments have different levels of environmental health and communities are affected differently by change.

Therefore, the draft Basin Plan is not a 'one size fits all' approach. It allows us to be flexible and adapt, and emphasises the importance of drawing on local knowledge to better manage the different parts of the Basin.

If a catchment has already recovered its required amount of water, on-going monitoring and river management will, of course, need to continue. We see these catchments as opportunities to further develop natural resource management and 'whole-of-catchment' management opportunities.

Where more needs to be done, governments must focus their efforts on support for adjustment and inevitable change.

## **9. How water is recovered will affect social and economic impacts**

The *Water Act 2007* specifically states that the Act does not authorise compulsory acquisition of water access rights. The Australian Government has committed to 'bridge the gap' through water-saving infrastructure and water purchases. No water holder will have their entitlements reduced or compulsorily acquired as a result of the Basin Plan. However,

there is likely to be flow on impacts from water recovery in some communities, particularly those with small populations that are highly reliant on irrigation.

Where social and economic impacts are likely, appropriate responses will need to be considered. There needs to be a concentrated effort by governments to enhance the economic capacity of communities (both water and non-water related) as well as a clear demonstration of an investment bias toward water recovery that supports infrastructure, both on and off farm, as well as environmental works and measures.

There is 1,468 GL/y of water left to be recovered to meet the proposed limits on surface water use. Of this volume, it is estimated that 400 GL/y could be recovered through future investments in water-saving infrastructure, including changes to the infrastructure and operation of the Menindee Lakes. This leaves a gap of about 1,000 GL/y to be recovered through other measures.

When water purchases are used as a tool for water recovery, the type of water purchased (i.e. the mix of high and low security water entitlements), how that water is used, whether it is traded on the water market and how it is managed and incorporated into the entire system must be clearly articulated by Basin governments through clear business plans and management rules. This applies particularly to water recovery activities by the Australian Government and water management by the Commonwealth Environmental Water Holder, other environmental water holders and the Authority.

## **10. Localism is critical**

We fundamentally believe that local communities need to be engaged in the management of their part of the river system. That will require support from government.

Localism is about using local people to find localised solutions to achieve the objectives of the Basin Plan. Opportunities for local input have been built into the Plan to ensure that communities are given the chance to have their say over the next seven years and beyond in the ongoing development and implementation, including the management of environmental water.

The next opportunity for local input is during the 20-week consultation period of the draft Basin Plan.

We look forward to hearing your views.

### **Murray–Darling Basin Authority**

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The draft Basin Plan is now out for public discussion for 20 weeks, ending on 16 April 2012. If you want to have your say, look at the information in this document or find out more at [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)



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# Chapter 1 – A healthy working Basin

*healthy working river: a managed river in which the natural ecosystem has been altered by the use of water for human benefit, but in which the altered system retains its ecological integrity while continuing to support strong communities and a productive economy.*

Most of the rivers of the Murray–Darling Basin can be considered ‘working rivers’. While the flows in some rivers, like the Paroo, remain mostly natural, for the majority of rivers, water is captured, extracted or diverted to support communities, agriculture and other industries. Communities also value healthy and functioning river and floodplain ecosystems, which provide many important services. These include clean water for drinking and agricultural use, nutrient cycling between the river and floodplain, fish stock for anglers, and an environment that supports tourism, recreation and cultural values. To achieve these multiple benefits, there needs to be a balance between the water available to the environment and the water that is used by communities and industries. This is what the concept of a ‘healthy working river’ is all about. It is an idea that can be extended to groundwater aquifers, which need to be used in such a way that groundwater-dependent ecosystems are healthy, contributions from aquifers to river flows are maintained and the quantity and quality of groundwater is maintained and suitable for use.

*Fledging ibis with parents*



The Murray–Darling Basin Authority has a vision of a healthy working Basin that has:

- strong and vibrant communities with sufficient water of suitable quality for drinking and domestic use (including in times of drought), as well as water for cultural and recreational purposes
- productive and resilient industries with long-term confidence in their future, particularly for food and fibre production
- healthy and diverse ecosystems with rivers regularly connected to their creeks, billabongs and floodplains, and ultimately, the ocean.

Achieving a healthy working Basin is a complex, ongoing job that requires trade-offs and compromises between competing values. It requires:

- balancing the water needs of communities, industries and the environment
- improving infrastructure for efficient and effective use of water, including for the environment
- improving river operations to optimise water delivery to irrigators, communities and the environment
- a water market that allows water to move to its most productive use
- actively managing, trading and delivering environmental water, balancing between system-wide priorities and local needs
- integrating water management with wider natural resource management at the catchment and local scale
- governments helping communities to adjust.

The *Water Act 2007* (Cwlth) charges the Murray–Darling Basin Authority with developing a Basin Plan. The Plan will guide the management of water within the Basin and coordinate water use across the Basin's four states and one territory. Through the Basin Plan, the Authority is contributing to the vision of a healthy working Murray–Darling Basin.

However, the Basin Plan cannot address all these activities and does not operate in isolation. It relies on continuing support and action from governments and communities, and builds upon and complements reforms already undertaken.

Nor will the Basin Plan be a static document. It will evolve to best manage the Murray–Darling Basin as new knowledge

emerges, infrastructure and farm management improve, climatic conditions vary, and values and priorities change.

The Authority has released a draft Basin Plan (referred to legally as the proposed Basin Plan) for public consultation. *Delivering a healthy working Basin – About the draft Basin Plan* is one of a group of documents intended to help people understand the draft Basin Plan and the way it will contribute to improving Basin water management. This document provides a brief overview of the draft Basin Plan, including the broader context in which the Plan has been developed; the key elements of the Plan and how these have been developed; key policies related to how the Plan will be implemented, including the adaptive management process and opportunities for localism; where to go for more information on specific issues; and how communities and individuals can get involved.

Other key documents on the draft Basin Plan include:

*The proposed Basin Plan – a draft for consultation*: this is the legislative instrument and is written in legal form. When finalised, this is what will be tabled in parliament and become law.

*The Plain English Summary of the Proposed Basin Plan – including explanatory notes*: this is a detailed explanation of each of the elements of the legislative instrument.

*The draft Basin Plan – Catchment by catchment*: this is a booklet that provides a snapshot of the main elements of the Plan in each catchment.

A number of technical documents explaining different aspects of the draft Plan. These will be available from the Authority's website at [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)

For more information on broader water reform in the Basin, see:

*Delivering a healthy working Basin – Supporting communities, industry and the environment*: this provides an overview of the Australian Government's broader water reforms in the Basin to complement the implementation of the Basin Plan. Available from: [www.environment.gov.au](http://www.environment.gov.au)



## Chapter 2 – The need for reform

*“The Committee heard a clear recognition from the people we met in our travels throughout the Basin that change is needed. There was a clear acknowledgement that some water needs to be returned to sustain the environment and Basin communities. The Committee heard that a Basin Plan is an appropriate way to achieve this”*

- House of Representatives Standing Committee on Regional Australia, in *Of drought and flooding rains — Inquiry into the impact of the Guide to the Murray–Darling Basin Plan*.

The Murray–Darling Basin is one of the largest river systems in the world. It covers a million square kilometres and is larger in size than the combined area of France and Germany. It is home to more than two million people and provides drinking water for more than three million people. There are over 40 Indigenous groups in the Basin who continue to have a strong spiritual and cultural connection to its lands and waters.

The Basin is one of the most productive food and fibre regions in Australia. It represents 20% of Australia's total agricultural land area, approximately 40% of Australia's farms and gross value of agricultural production, and 65% of the total irrigated land area. Agricultural industry in the Basin provides an annual average of \$15 billion worth of produce to the national economy, of which around one third comes from irrigated agriculture. Key agricultural products in the Basin include fruit and nuts, vegetables, table and wine grapes, dairy, rice, cotton, grain, sheep and beef cattle.

The three longest rivers in Australia – the Murray, the Murrumbidgee and the Darling – all lie within the Basin. There are over 30,000 wetlands, 16 of which are recognised under the Ramsar Convention as being internationally important. The rivers, floodplains and wetlands of the Basin support many native plants and animals, many of which are threatened or not found anywhere else in the world.

The Basin's communities, agricultural production and environment are all dependent on having healthy working rivers and aquifers.

*Cattle on pasture near Echuca, Victoria*



## REDRESSING THE BALANCE

For more than a hundred years, the infrastructure and management of the Murray–Darling Basin has largely been developed to secure social and economic outcomes. Many rivers have been modified and become highly managed systems to supply drinking water to towns and cities, support agriculture, mitigate floods and droughts, and allow for navigation.

The millennium drought exposed the limits and weaknesses of how water is currently used in the Basin. There was not enough water to maintain water levels in South Australia's Lower Lakes, exposing acid sulphate soils, or to flush salt and excess nutrients out to sea. The Murray Mouth was only kept open by constant dredging. Wetlands and floodplains from the Narran Lakes and Macquarie Marshes in the north to the Lower Murrumbidgee Floodplain, Barmah–Millewa Forest and Chowilla Floodplain in the south all experienced environmental degradation. Some irrigators received no water in some years, while towns and cities experienced harsh water restrictions.

These declines in the Basin's environmental health have not been restricted to drought years. Very large floods can still occur, but small to medium floods are commonly constrained, typically by in-stream dams in the more regulated south, or captured in large on-farm storages, commonly found in the less regulated north. These smaller floods are important in ensuring that the Basin's environment is resilient and able to survive through drought years.

Rivers in the southern Basin once flowed more strongly in winter and spring; now their flows peak in summer and autumn to match the demands of irrigators. Changes to seasonal peaks can affect breeding and feeding opportunities for most of the water-dependent native animals in the Basin, while seasonality of flooding is also important for most flood-dependent vegetation.

Declines in environmental health due to water use are not uniform across the Basin – in general they are more severe in the southern Basin, where there is greater river regulation and a longer history of development, and are more visible at the lower end of rivers, often a long way downstream from extraction points.

This deterioration in environmental health is likely to be exacerbated by climate change. It is predicted that climate change will see extremes in weather becoming more common, with more intense droughts and floods occurring more often. Modelling also suggests that the Basin will become hotter and drier overall, particularly in the south, which will reduce surface water availability. There is evidence that the extent of the recent millennium drought was at least partly due to human-caused climate change.<sup>1</sup>

Groundwater use has increased significantly in recent years, including since the introduction of the cap on surface water use in 1995. This use has been centred on a number of large aquifers associated with a number of the major rivers in the Basin. There are, however, large parts of the Basin where, for various reasons, groundwater use has remained relatively undeveloped.

Better water management is needed, drought or no drought.

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<sup>1</sup> CSIRO (2010) Climate variability and change in south-eastern Australia: A synthesis of findings from Phase 1 of the South Eastern Australian Climate Initiative (SEACI).

## BUILDING ON A LEGACY OF REFORM

The Basin Plan is one of the key actions aimed at achieving a balance between the water needs of communities, industry and the environment. But it is not the first or only initiative designed to achieve a healthy working Murray–Darling Basin.

Landcare groups, catchment management bodies, natural resource management groups, local environmental support groups and Indigenous groups – as well as individual landholders – are active across the Basin and have been undertaking work to improve the health of the local environment for a long time.

State governments have instituted significant reforms, both individually and collectively. South Australia stopped issuing surface water extraction licences in 1968. In 1995, Basin governments agreed to impose a cap on surface water use. In 2004, the National Water Initiative was adopted with the aim of phasing out overuse of water, reforming the water entitlement system and developing an active water market. This includes groundwater, with programs such as the joint Commonwealth and New South Wales Achieving Sustainable Groundwater Entitlement program reducing groundwater entitlements and levels of use in over-allocated aquifers. Inefficient infrastructure is continuously being upgraded or replaced.

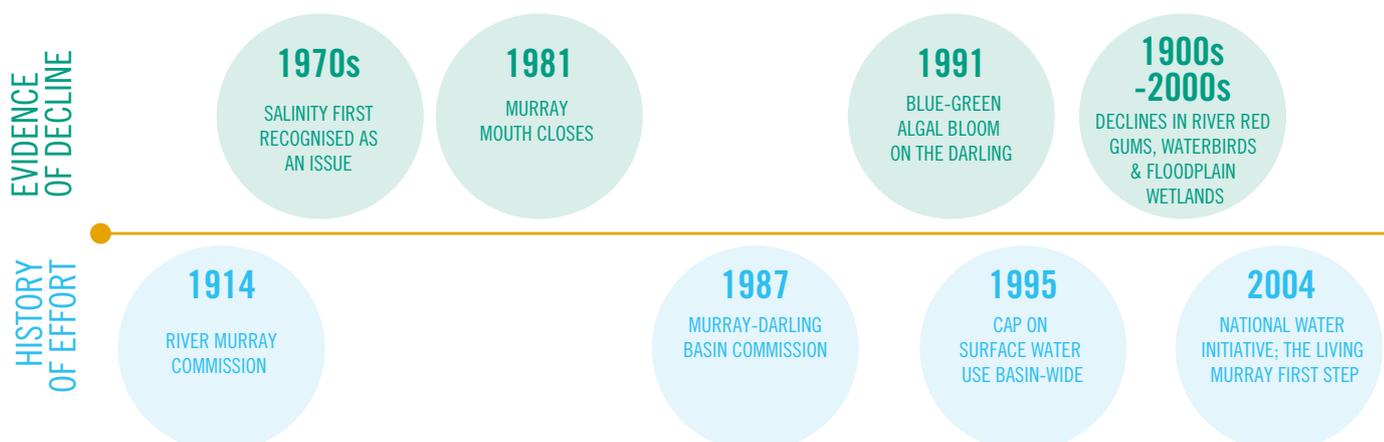
Water has been returned to the Basin environment through various programs, including The Living Murray initiative, state water sharing plans, RiverBank (New South Wales), the Northern Victoria Irrigation Renewal Project, and other state programs.

Several successful long-term large-scale programs to address specific problems are also in operation, including the Basin Salinity Management Scheme, The Native Fish Strategy and The Living Murray initiative.

Deliberate watering of many of the Basin’s environmental sites has been under way for many years, ranging from large-scale events by the Commonwealth Environmental Water Holder, The Living Murray and state governments to local farmers watering private wetlands on their farms.

The Basin Plan has been developed taking into account this historical effort and aims to build upon and complement existing reforms.

**Figure 1:** Timeline of historical efforts



### A healthy working Basin in action

Farmers in the Basin have a well earned reputation for being stewards of the land and water and have a vested interest in maintaining healthy rivers. The work of the New South Wales Murray Wetlands Working Group (MWWG) is an example of this, with local irrigators and conservation groups working together to achieve a healthy working Basin.

The MWWG has collaborated with Murray Irrigation Limited to deliver environmental water to rehabilitate and manage wetlands on private properties across the New South Wales Murray and Lower Darling region. Since 2000, the MWWG has been able to deliver, using the Murray Irrigation Limited infrastructure, 75 GL of environmental water to more than 200 wetlands across 71,000 ha.

The benefits of this water saw an increase in wetland plants (such as reeds and rushes), while black box and river red gums showed signs of new growth, flowering and some recruitment. Farmers who participated in the project endorsed the social, aesthetic and environmental benefits. Howard Jones, chair of the MWWG, stated that farmers 'could go out and see some water among the trees and the lignum; the return of birds they hadn't seen for 40 to 50 years and other life, reminding them of where everything fits into the jigsaw puzzle.'





*Charles Waterhole on the Paroo River near Wanaaring,  
New South Wales  
Arthur Mostead*



**Chapter 3 –  
Key elements of  
the draft Basin Plan**

The Basin Plan will be a high-level plan to ensure the water resources of the Murray–Darling Basin can be managed in an integrated and sustainable way to achieve a healthy working Basin. Importantly, as state governments progressively revise or renew their water resource plans leading up to 2019, these water resource plans will take on the relevant requirements of the Basin Plan.

This chapter outlines the key elements of the draft Basin Plan.

## LONG-TERM AVERAGE SUSTAINABLE DIVERSION LIMITS

One of the key actions towards achieving a healthy working Basin is the need to ensure there is balance between the water needs of communities, industries and the environment. The Basin Plan aims to do this through the establishment of new long-term average sustainable diversion limits (SDLs) that reflect an environmentally sustainable level of water use (or ‘take’). The SDLs are limits on the volumes of water that can be taken for human uses (including domestic, urban and agricultural use) and are set at both a catchment and a Basin-wide scale. The SDLs can be considered to be a new cap in that they are not designed to be met each and every year – instead they must be met as long-term averages. For some catchments, as well as at a Basin-wide scale, water must be recovered for the environment to meet the proposed SDLs.

The SDLs will commence in 2019, by which point they will be incorporated in state water resource plans. The Authority is required to monitor the performance of these plans. Prior to 2019, water use will still need to be within current permissible use under the existing cap. Chapter 4 outlines the basis on which the SDLs set out in the draft Basin Plan have been determined and, where necessary, the volumes of water to be recovered to meet the proposed SDLs.

The Authority will review the SDLs in 2015, which could see them adjusted as a result of further work being undertaken (see Chapter 5 for more information on this).

## ENVIRONMENTAL WATERING PLAN

While the sustainable diversion limits and other reforms will see more water returned to the environment, this in itself is not enough to ensure the best possible environmental outcomes. The Environmental Watering Plan (EWP) has been developed to ensure that the size, timing and nature of river flows maximises benefits for the environment.

The Environmental Watering Plan will coordinate environmental watering across the Basin. The EWP does not stipulate when and where specific sites will be watered. Instead, it establishes a framework for planning and coordination, including objectives, standards and priorities. It requires the states to develop environmental watering plans for individual rivers and their catchments. The states will collaborate with holders of environmental water, as well as local communities and Indigenous people, to prioritise environmental watering.

Importantly, the EWP builds on existing environmental watering initiatives, such as The Living Murray, and will not operate in isolation. Environmental flows will often be coordinated with water released for irrigation, community use and industry. This will maximise benefits and minimise wastage.

The EWP also incorporates two important concepts of the draft Basin Plan: adaptive management (learning from experience to continuously improve systems and processes) and localism. These concepts are explained in Chapter 5.

The EWP will be reviewed every five years.

Web-based information and case studies to support the EWP can be found at [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)

## WATER QUALITY AND SALINITY MANAGEMENT PLAN

The draft Basin Plan includes an integrated Water Quality and Salinity Management Plan that provides a Basin-wide framework of objectives for ensuring Basin water is 'fit for purpose' – that is, suitable for irrigation and recreational uses, maintaining aquatic ecosystems, and being treated for drinking water.

The Water Quality and Salinity Management Plan contains water quality objectives and water quality targets. These targets are aspirational; monitoring progress towards their achievement will identify trends that can inform actions to address the causes of water quality decline. Achieving the targets will help to maintain appropriate water quality for environmental, social, cultural and economic activities in the Basin. As states revise their water resource plans up until 2019, they will need to consider whether to include specific actions to help address risks to water quality.

## WATER TRADING RULES

The draft Basin Plan outlines water trading rules that will apply to water markets across the Basin. The rules will be consistent with the National Water Initiative guidelines for water planning and management, and incorporate advice on water trading rules from the Australian Competition and Consumer Commission. Other trading rules at a more local level may continue to exist, but they will need to be consistent with the higher level rules in the Basin Plan.

The water trading rules aim to ensure that all the Basin's water markets will function consistently, fairly, efficiently and effectively. This will help ensure that water reaches its highest value use, optimising economic, social and environmental outcomes in the Basin.

It is proposed that the water trading rules will commence from 1 July 2013 (although some rules will commence on 1 July 2014). The Authority will monitor and, where required, enforce compliance with the water trading rules.

## WATER RESOURCE PLANS

Water resource plans set out how water resources will be managed, usually for a 10-year period, for a water resource plan area. They will be developed by the Basin states for approval by the Commonwealth Water Minister. The Authority will aim to work with states to ensure that by 2019, water resource plans are in place right across the Basin and that they are consistent with the Basin-wide planning framework. In this way, water resource plans will reflect the outcome of water recovery programs and the 2015 review of sustainable diversion limits.

## MONITORING AND EVALUATION

As with the Environmental Watering Plan, the Monitoring and Evaluation Program is based on the concept of adaptive management. The program outlines a framework for measuring progress towards restoring the Murray–Darling Basin to a sustainable and healthy working state while supporting strong communities and a productive economy, and ensuring compliance with international agreements.

Results from the Monitoring and Evaluation Program will feed into any future improvements to the Basin Plan.

## OTHER ELEMENTS OF THE DRAFT BASIN PLAN

The draft Basin Plan also:

- sets out overall objectives and outcomes
- identifies management risks to Basin water resources
- sets out the volumes of water to be set aside to meet the critical human needs of the states that depend on the waters of the River Murray system – that is, New South Wales, Victoria and South Australia
- defines catchment boundaries
- includes introductory material and an overview of the Basin water resources.

## Climate change

The Basin Plan will assist in managing the effects of future climate change.

The extent of climate change impacts on water availability in the Murray–Darling Basin over the first ten years of the Basin Plan is uncertain, and therefore it is difficult to specifically address this in setting sustainable diversion limits. The draft Basin Plan has been developed using the historic climate sequence (1895–2009). This ensures both the Basin Plan and state water resource plans accommodate a range of water availability scenarios, consistent with at least the mid-range projected impact predicted to result from climate change over the life of the Basin Plan.

The reduction in water use proposed under the draft Basin Plan will provide buffering for the environment from the predicted climate change effects, while further detailed exploration of the implications of climate change continues to be carried out.

The Basin Plan and state water resource plans will be reviewed at least every 10 years, with the first review of the Basin Plan expected in 2022, allowing the latest estimates of climate change to be accommodated.

## Cultural flows

‘Cultural flows’ is a term that has developed over recent years to mean water that provides for Indigenous people’s needs. Cultural flows have been described as follows by the Murray Lower Darling Rivers Indigenous Nations and the Northern Basin Aboriginal Nations:

*Water entitlements that are legally and beneficially owned by the Indigenous nations and are of sufficient and adequate quantity and quality to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous nations. This is our inherent right<sup>4</sup>.*

In a report to the Authority on the effects of change in water availability on Indigenous people, CSIRO stated:

*Changes to the Murray–Darling Basin river systems have eroded its capacity to meet the needs of Indigenous people. Development of water resources has led to ... significant environmental degradation and subsequent loss of access and connection to water. Additionally for Indigenous people detrimental impacts on the Basin also include the loss of control over a key resource which limits their ability to manage their country holistically, exercise custodial responsibility and authority and prevent further degradation of Basin resources<sup>5</sup>.*

The draft Basin Plan requires that organisations representing the views of Traditional Owners (such as the Northern Basin Aboriginal Nations and the Murray Lower Darling Rivers Indigenous Nations) be consulted in the development of state water resource plans and annual Basin environmental watering priorities. In addition, the National Cultural Flows Planning and Research Committee, to which the Authority has committed \$1 million over four years, has started work on a research program to improve the information base on cultural uses and values (including on commercial use and needs). The outcomes of the research program will be considered and applied in any future changes to the Basin Plan. Collaborative research and further discussion with Indigenous people through existing organisations will help provide the data, analysis and capacity necessary to address various aspects of Indigenous water access more comprehensively in the future.

<sup>4</sup> Definition developed and agreed to by the Murray Lower Darling Rivers Indigenous Nations and the Northern Basin Aboriginal Nations.

<sup>5</sup> Jackson, S., Moggridge, B. and Robinson, C. 2010, Summary of the scoping study: Effects of change in water availability on Indigenous people of the Murray-Darling Basin. CSIRO: Water for a Healthy Country Flagship Report series, available from: <http://www.csiro.au/files/files/py07.pdf>







## **Chapter 4 – The proposed sustainable diversion limits**

Bridge over the Namoi river



John Baker

This chapter outlines how the long-term average sustainable diversion limits (SDLs) set out in the draft Basin Plan have been determined and the volumes of water to be recovered to meet the proposed SDLs.

## BASIN-WIDE SUSTAINABLE DIVERSION LIMITS FOR SURFACE WATER

The Authority is proposing a Basin-wide long-term average sustainable diversion limit of 10,873 gigalitres per year (GL/y) for surface water. This encompasses 3,468 GL/y in the northern Basin and 7,405 GL/y in the southern Basin.

In setting the SDL, the Authority has taken full account of previous efforts to recover water for the environment.

The baseline already takes account of around 823 GL/y on a long-term average basis that was returned to the Basin's environment before 2009. This includes water recovered through The Living Murray initiative, Water for Rivers program<sup>6</sup> and state water sharing plans.

To meet the Basin-wide SDL, a further 2,750 GL/y of water needs to be recovered (as compared to the 2009 baseline). This, plus the water recovered pre-2009, will mean that around 3,573 GL/y in total will be returned to the Basin's environment by 2019.

### Environmental water recovery to date

As at 30 September 2011, 1,068 GL/y of water has been recovered (or is contracted to be recovered) for the environment, which is not included in the 2009 baseline. This includes water recovered through the Australian Government's Water for the Future program, the New South Wales RiverBank program and stage one of the Northern Victoria Irrigation Renewal Project. The recently announced stage two of the Northern Victoria Irrigation Renewal Project Package (NVIRP 2), is estimated to see another 214 GL/y of environmental water recovered.

This leaves 1,468 GL/y to be found across the Basin by 2019.

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<sup>6</sup> Under the Water for Rivers program, around 191 GL/y of water has been recovered in the Basin for the environment. However, of this, 136 GL/y has been returned to the Snowy River, which is not included in the 2009 baseline.

**Table 1: Environmental water recovery at a glance**

Water to environment by 2009*	Extra required by the draft Basin Plan	Recovered 2009 – September 2011**	Recovery to come from NVIRP 2 Package	Remainder to be recovered by 2019
823 GL/y	2750 GL/y	– 1,068 GL/y	– 214 GL/y	= 1,468 GL/y
Total environmental water recovered by 2019 = 3,573 GL/y				

\* 959 GL/y of environmental water recovered in the Basin, of which 136 GL/y went to the Snowy River.

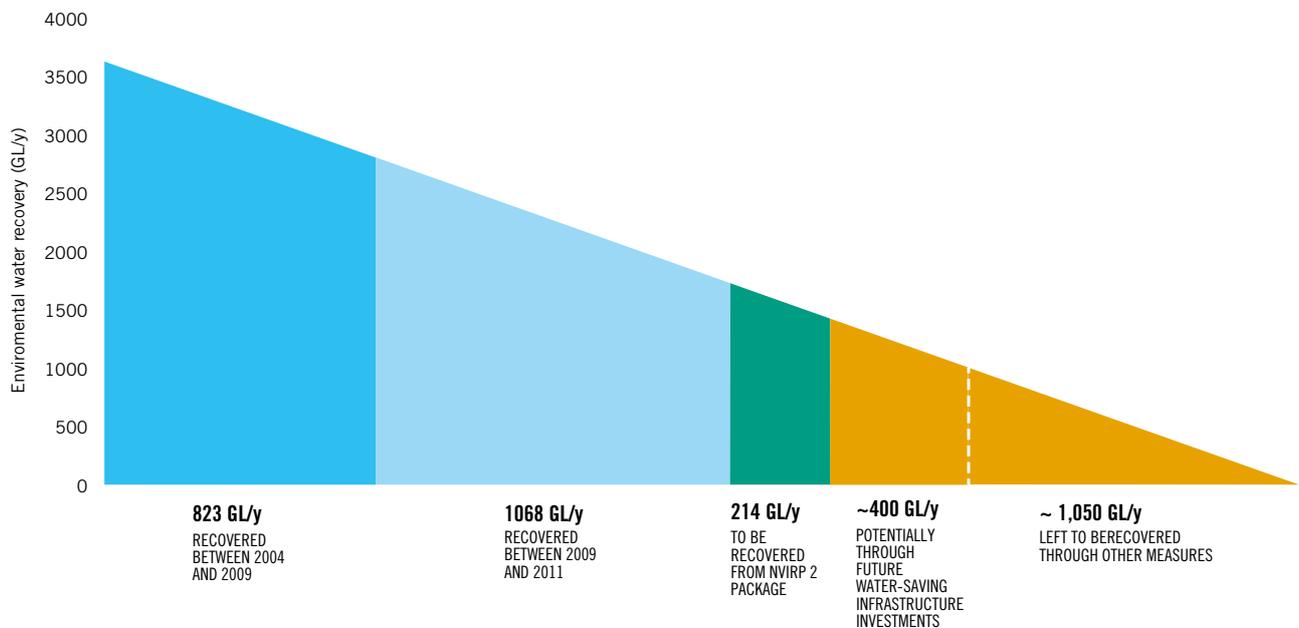
\*\*Contracted water recovery to 30 September 2011

**Future water recovery**

In addition to environmental water contracted through the Sustainable Rural Water Use and Infrastructure Program to date (including NVIRP 2), the Australian Government currently estimates that about 400 GL/y could be recovered through future investment in water-saving infrastructure (including works at the Menindee Lakes).

This would leave about 1,050 GL to be recovered Basin-wide through other measures. If this was met through water purchases alone, over the next seven years, this could be recovered at a rate of about 150 GL each year. However, the volume of water purchases could be reduced further should environmental water needs be able to be met more efficiently through changes to river operation management and rules, or through environmental works and measures.

**Figure 2: Environmental water recovered to date**



## CATCHMENT-LEVEL SUSTAINABLE DIVERSION LIMITS FOR SURFACE WATER

In setting the Basin-wide SDL, the Authority has determined not only where environmental flows are needed but also where the water should come from. The Basin Plan indicates in which rivers the amount of water extracted for irrigation and other human uses should or could be reduced.

In determining where the water required for achieving the Basin-wide SDLs is to be sourced, the Authority has focused on the following issues:

1. **the need to meet local environmental water needs.** The Basin Plan is designed to achieve sustainable water use in each catchment. Local environmental water needs have been specified for each catchment and are reflected in the catchment's SDL. Some catchments require no additional environmental water to be recovered to meet local needs.
2. **the physical ability of catchments to contribute to downstream needs.** Some rivers are only tenuously connected to the system's major waterways and are physically unable to contribute reliably to downstream flows. For example, rivers like the Paroo and Lachlan only contribute water downstream during very large floods; they are not connected to the rest of the Basin most of the time. Table 2 indicates how the Authority views the physical ability of each river to contribute to downstream flow requirements.
3. **the different characteristics of the northern Basin and the southern Basin.** The northern and southern Basin have very different characteristics. The rivers in the north typically have lower levels of water use, are less regulated and are much more variable, than those in the southern Basin. The northern Basin rivers are only connected to the southern Basin at the point where the Darling River (and its anabranch) meets the River Murray. Very significant volumes of water are taken up by the environment or evaporate along the long, slow journey downstream. The northern Basin contributes relatively little to flow requirements at the Murray Mouth — around 18% under natural conditions.
4. **the need for upstream catchments to help provide environmental water for the Barwon–Darling and River Murray.** Each upstream catchment must meet its own environmental watering needs – the water cannot be sourced elsewhere. But the system's major trunk rivers, the Barwon–Darling and the Murray, rely on significant inflows from their tributaries. Some of the additional flows required to meet the environmental needs in these two catchments will need to be sourced from upstream catchments.
5. **the need for flexibility in sourcing environmental water for the Barwon–Darling and River Murray.** The Authority has not dictated the volume of water upstream catchments must contribute to the Barwon–Darling and the Murray environmental water needs, other than to acknowledge that some catchments are physically restricted from reliably contributing to downstream flows (as explained in points 2 and 3 above). The Authority has taken this approach to provide greater flexibility in where environmental water can be recovered, to enable recovery where there is least economic cost, to allow market forces to operate and so that consideration can be given to environmental water needs and system constraints that may limit river flows.
6. **the need for environmental water to be delivered within current river operating arrangements and constraints.** There are a number of constraints which limit how water is delivered throughout the Basin. These constraints include rules which have been set to prevent flooding of private land. The Authority has set the SDLs to ensure environmental water use is within these operating arrangements and constraints.

Therefore, in the northern Basin, water will only be recovered to meet local environmental needs and those of the Barwon–Darling through to Menindee Lakes.

Given the above factors, the Authority considers that for the 2,750 GL/y of environmental water to be recovered, this should be sourced as follows:

- 2,360 GL/y from the southern Basin, of which 1,389 GL/y is to meet the local in-catchment environmental water needs, and 971 GL/y is to meet shared downstream environmental water needs for the Murray (and could be sourced from a number of southern catchments as indicated in Table 2)
- 390 GL/y from the northern Basin, of which 247 GL/y is to meet local in-catchment environmental water needs, and 143 GL/y is to meet shared downstream environmental water needs for the Barwon–Darling (and could be sourced from a number of northern catchments as indicated in Table 2).

The breakdown of the volumes of water to be recovered in each catchment is in Table 3.

**Table 2: Physical ability of Basin catchments to contribute to downstream environmental outcomes**

Northern Basin	Southern Basin
<b>Valleys that can contribute to the shared environmental water needs of the Barwon–Darling</b>	<b>Valleys that can contribute to the shared environmental water needs of the Murray</b>
Barwon–Darling	Murray
Border Rivers	Campaspe
Moonie	Eastern Mount Lofty Ranges
Namoi	Goulburn–Broken
<b>Valleys that can contribute to the shared environmental water needs of the Barwon–Darling in certain circumstances</b>	Kiewa
Condamine–Balonne*	Loddon
Macquarie–Castlereagh*	Lower Darling
Intersecting streams#	Murrumbidgee
	Ovens
<b>Valleys that do not contribute to the shared environmental water needs of the Barwon–Darling</b>	<b>Valleys that do not contribute to the shared environmental water needs of the Murray</b>
Gwydir	Lachlan
Paroo	Wimmera
Warrego	
Nebine	

\*The hydrological connectivity of the Condamine–Balonne and the Macquarie–Castlereagh to the Barwon–Darling is affected by terminal lakes and large end-of-system wetlands (for example, Narran Lakes and Macquarie Marshes); as such, recovery of water in this valley to contribute to the Barwon–Darling’s environmental water needs may only be appropriate in certain circumstances.

# The Warrego has a low connectivity with the Barwon–Darling and only contributes during periods of flood. However, there may be opportunities for water savings where the Warrego intersects with the Barwon–Darling (for example, Toorale Station), which could contribute to the Barwon–Darling’s environmental water needs. This is part of the area known as the intersecting streams.

**Table 3: Breakdown of environmental water to be recovered to meet proposed surface water sustainable diversion limits (based on contracted environmental water recovery at 30 September 2011)**

<b>NORTHERN BASIN</b>	
Catchments with no additional reductions to meet local (in-catchment) environmental water needs	Environmental water still to be recovered to meet SDLs (GL/y long-term average)*
Paroo, Warrego, Gwydir, Nebine, Moonie, Macquarie–Castlereagh	0
Catchments where further reductions are needed to meet local (in-catchment) environmental water needs	
Condamine–Balonne	95
Namoi	5
Border Rivers	8
Catchments that can contribute to the shared downstream environmental water needs of the Barwon–Darling	
Barwon–Darling, Border Rivers, Namoi, Moonie	
Catchments that can contribute to the shared downstream environmental water needs of the Barwon–Darling in certain circumstances	117
Condamine–Balonne, Macquarie–Castlereagh, Intersecting streams (including NSW Warrego)	
<b>TOTAL FOR NORTHERN BASIN</b>	<b>225</b>
<b>SOUTHERN BASIN</b>	
Catchments with no additional reductions to meet local (in-catchment) environmental water needs	Environmental water still to be recovered to meet SDLs (GL/y long-term average)*
Ovens, ACT, Kiewa, Eastern Mt Lofty Ranges, Marne Saunders, Lachlan	0
Catchments where further reductions are needed to meet local (in-catchment) environmental water needs	
Goulburn–Broken	99**
Loddon	10
Campaspe	12
Murrumbidgee	183
NSW Murray	68
Vic Murray	63**
SA Murray	22
Lower Darling	8
Wimmera–Avoca	23
Catchments that can contribute to the shared downstream environmental water needs of the Murray	
Lower Darling, Murray, Kiewa, Murrumbidgee, Campaspe, Loddon, Goulburn–Broken, Ovens, Eastern Mt Lofty Ranges	971**
<b>TOTAL FOR SOUTHERN BASIN</b>	<b>1,459**</b>

\*These volumes are estimates based on contracted water recovery as at 30 September 2011 and are subject to final verifications. Estimates are made using Long Term Diversion Limit Equivalent factors 15 November 2011 (v. 2.04) and are subject to rounding and therefore totals may be different.

\*\*These volumes do not account for potential savings through NVIRP 2 (which is expected to recover 214 GL/y).

## DEVELOPING SUSTAINABLE DIVERSION LIMITS FOR SURFACE WATER

The *Water Act 2007* requires that SDLs be set at a level that reflects an environmentally sustainable level of take (ESLT), that is, the average amount of water that can be used for agriculture, drinking and so forth, while ensuring there is enough water left to achieve a healthy river system. The ESLT reflects a balanced judgement by the Authority taking into account current environmental and hydrological science, socio-economic knowledge and system constraints that limit the flows along river channels, in order to optimise social, economic and environmental outcomes.

## UNDERPINNING SCIENCE

The method the Authority has developed to determine the environmental water needs of the Basin is known as the 'hydrological indicator site' method. A total of 122 hydrological indicator sites have been selected across the Basin (see Figure 3 for the distribution of hydrological indicator sites). Of these, 19 sites are large wetlands, which have been well studied and are known to be significantly affected by reduced flows (for example, Barmah–Millewa Forest, Macquarie Marshes, Lower Murrumbidgee Floodplain, Narran Lakes and the Coorong and Lower Lakes). The remainder are sites distributed across the system that together build up a picture of the flow requirements of the Basin's rivers and wetlands.

Environmental objectives for a variety of flows (that is, low flows, in-stream pulses or 'freshes', bank-full and overbank flows) have been determined for many of these sites, and flows were assessed at all 122 sites. Broadly, the environmental objectives focus on increasing the frequency of small to medium flooding of wetlands and the broader floodplain (in winter/spring in the southern Basin) to maintain the wetland habitats, improve the connection between the river and the floodplains, increase flows for the health of the river channel, maintain water quality, and flush salt and nutrients through the system. Figure 4 provides further details on the need for a variety of flows and connecting rivers with both the floodplain and downstream rivers.

The same hydrological models used by states for their water management and planning purposes were used by the Authority to develop and then represent flow regimes to meet the water requirements of the hydrological indicator sites. The models are realistic in that they take account of the constraints in the system

(such as channel capacity and flood risk to infrastructure) and the river operating rules that will constrain the use of environmental water (such as the capacity to call water from storages). In setting environmental water requirements, the Authority recognised the need for environmental water to be used within the current river management rules and entitlements.

The information and knowledge base used has drawn heavily on the work of state and territory governments and catchment management authorities, while the modelling used 114 years of flow data.

The Authority is committed to ensuring the knowledge base that informs its decisions is transparent, and has established a searchable online database to assist with this. Further information is available at:

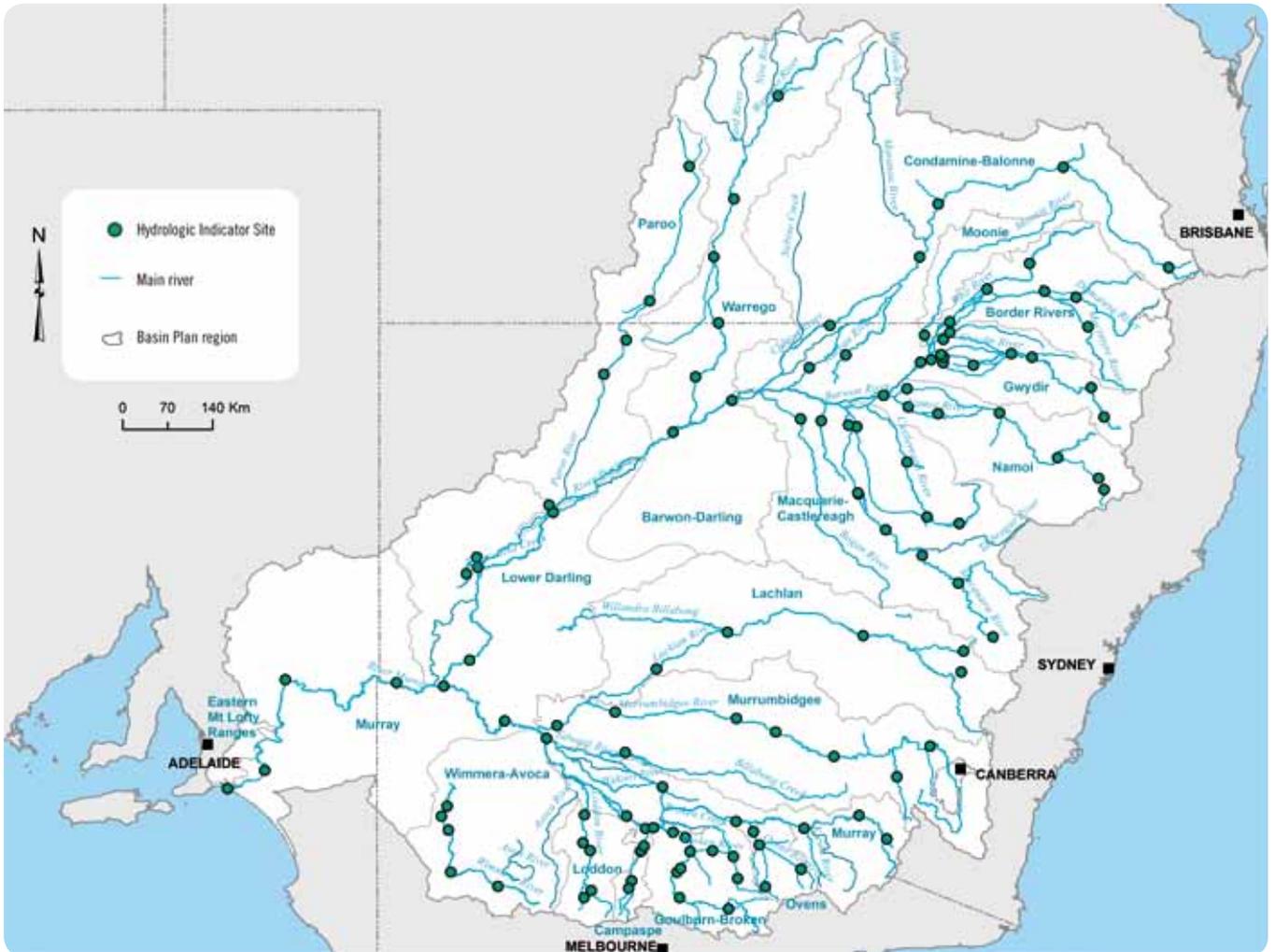
[www.mdba.gov.au/bpkid](http://www.mdba.gov.au/bpkid)

The scientific method and use of knowledge underpinning the surface water ESLT and SDLs has undergone three peer reviews. The most recent, which was led by CSIRO, was completed in November 2011.

The science reviews can be found at: [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)

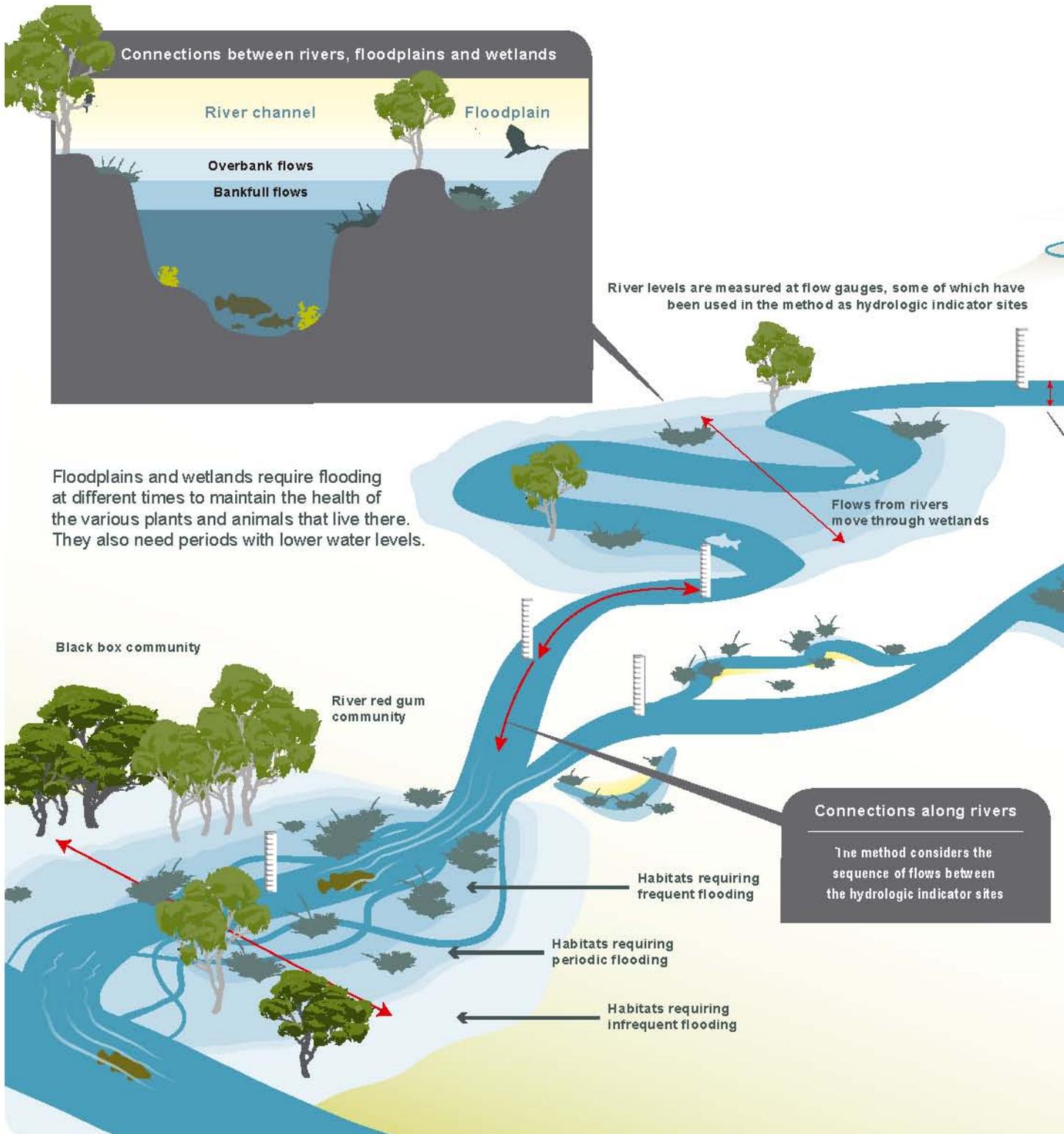
Based on these reviews, the Authority is confident there is sufficient scientific knowledge to make an informed decision, the methods used are fit for purpose and the results provide a sufficient basis for the Basin Plan, given that an adaptive management process will be in place.

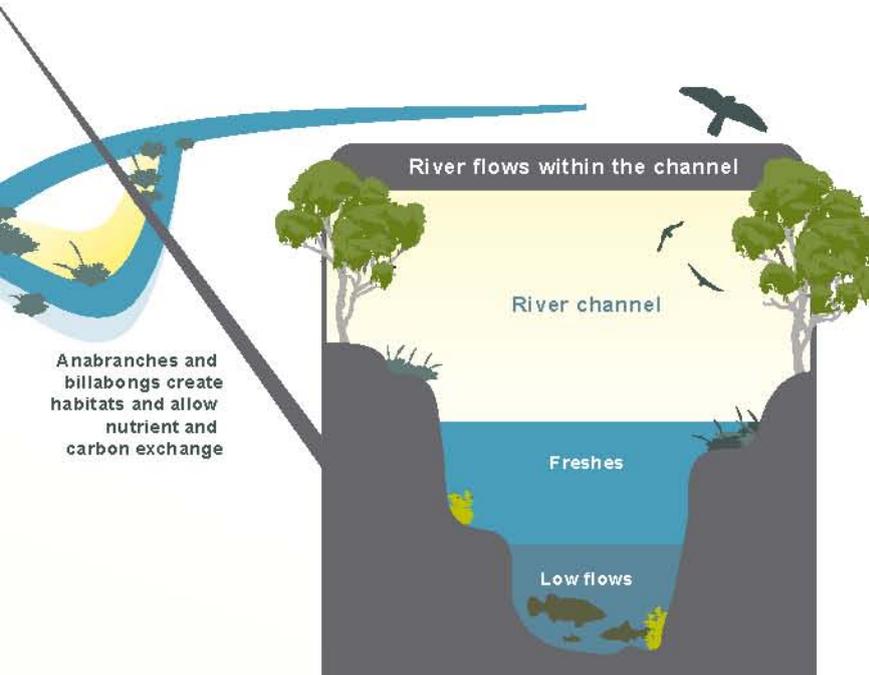
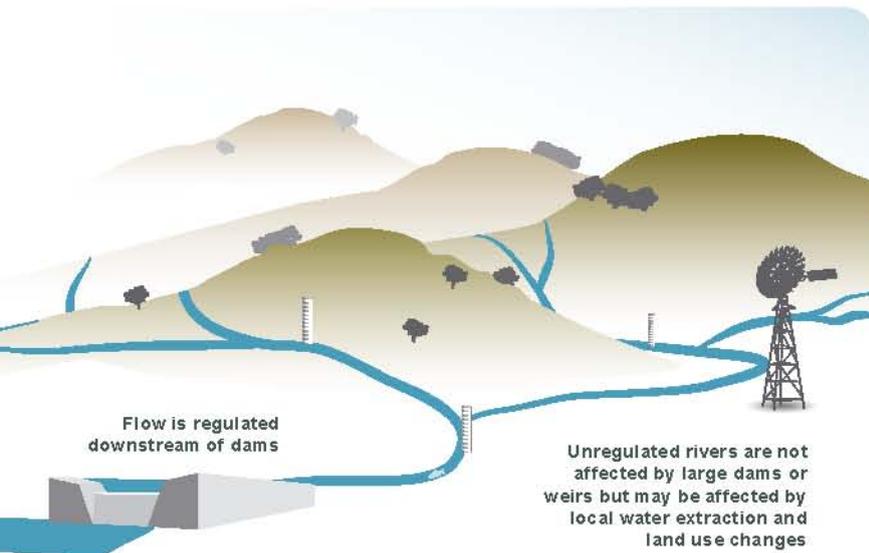
Figure 3: Hydrological indicator sites





**Figure 4:** Science and the draft Basin Plan





Different river flows such as freshes and low flows provide cues for migration as well as transport of nutrients, salt, carbon and sediment, and refuge for plants and animals in dry times.

A fresh is a pulse of water which travels down the river and is usually caused by intensive rainfall.

The rivers in the Murray–Darling Basin are more than just paths for water — they provide connections to floodplains and wetlands; they transport nutrients, carbon, salt and sediments; and they create habitats for native plants and animals. Because river flows vary over days, seasons and years, the habitats and ecosystems that rivers support vary, with some needing water periodically and some needing water all the time. The plants and animals that depend on these systems have adapted and evolved to the different river levels and seasonal conditions. The health of these water-dependent ecosystems is related to the timing and amount of river flows, as well as the duration between wet and dry times.

Figure 4 shows how flows vary within a catchment, both within the river itself and between the river and the floodplain and wetlands.

Different habitats need different periods of inundation — for example, river red gum communities need more frequent inundation than black box communities, which is why river red gums are often found closer to the river than black box gums.

In determining environmental water requirements for the Basin Plan, the Authority has chosen a number of locations within rivers, floodplains and wetlands across the Basin. At these locations, known as hydrologic indicator sites, environmental water requirements have been determined by assessing the needs of the local ecology, as well as the water needed to provide the many functions that are necessary for healthy ecosystems both locally and downstream. In working out these environmental water requirements the Authority has taken account of the infrastructure that exists in the rivers, such as dams and weirs, as well as the risk of flooding to towns and properties along the river.

## UNDERPINNING SOCIAL AND ECONOMIC ANALYSIS

The Authority has undertaken extensive analysis of the social and economic effect of reductions in water use, including examining existing research and commissioning further studies. This analysis was undertaken at a national, regional, sectoral and local level.

The analysis shows that the effects of the Plan will differ across the Basin and will present both challenges and opportunities for Basin communities. The Authority recognises some communities are likely to face more significant change as a result of the Plan. These communities are more vulnerable because they will be exposed to relatively larger reductions in water, are more reliant on irrigation, or have relatively less capacity to adapt to change – for example, if they are already experiencing difficulties due to recent economic and demographic trends, or climatic consequences.

Communities likely to be most affected by the draft Basin Plan are the irrigation-dependent regions in the Lower Balonne, Murrumbidgee, Murray and Goulburn–Broken.

The precise location and magnitude of the local effects of the Plan will be influenced by a range of factors. How water is recovered for the environment will be important, including the extent to which water is recovered through investment in water-saving infrastructure or changes to river operations, and the volume, entitlement type and pace of recovery through water purchases. There are also a multitude of external factors that will have a significant influence, including commodity prices, exchange rates, climate and a host of other factors, including confidence effects. Many of these factors cannot be forecast with any precision.

Importantly, failure to achieve sustainable water use will have negative social and economic impacts.

A synthesis report summarising the findings of the social and economic studies commissioned by the Authority is available at: [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)

## DETERMINING THE ENVIRONMENTALLY SUSTAINABLE LEVEL OF TAKE — STRIKING A BALANCE

The Authority considered various lines of evidence in determining the environmentally sustainable level of take (ESLT). After some exploratory work, the Authority decided to adopt the lower end of the water reduction range of 3,000–4,000 GL set out in the 2010 *Guide to proposed Basin Plan* for careful examination. This was due to the potential costs for irrigation dependent communities (particularly the social costs). This was further decreased to 2,800 GL/y (on the basis of further consideration of the required scale of change in the northern Basin) and was then comprehensively analysed using the above hydrological indicator site method.

In summary, the Authority, based on a range of considerations, initiated a comprehensive analysis of the environmental outcomes associated with a reduction of 2800 GL/y. It is an approach where an informed choice was made about a possible final ESLT and then comprehensively analysed.

Detailed modelling of the 2,800 GL/y reduction scenario for the comprehensive set of environmental water requirements showed that most of the water flow targets are met, including flows to the ocean and salinity targets for the Coorong. An important exception is the extensive floodplain at the lower end of the Murray, downstream of Euston Weir. Along the lower Murray, many of the smaller flood events can be reinstated and the very large natural flooding events will still occur. However, channel constraints along the river, such as those in place to avoid flooding private land, prevent larger flows from targeted environmental water being delivered and could see only part of the floodplain inundated.

Further, a sensitivity analysis was performed whereby the overall reduction was varied up and down by 400 GL in the southern connected Basin (i.e., Basin-wide reductions of 2,400 GL/y and 3,200 GL/y were examined).

Barwon River, Brewarrina NSW at the town weir. Rocks placed in the river that are used to trap fish by the local indigenous people.



Arthur Mostead

This analysis found:

- for a Basin-wide reduction in water use of 2,400 GL/y, the environmental outcomes were also reduced. Salinity targets for the Coorong are not met, and there is reduced ability to deliver flows to wetlands and low-level floodplains on the Murray below Euston, particularly during drought conditions.
- for a Basin-wide reduction in water use of 3,200 GL/y, there are only minor environmental improvements as compared to the 2,800 GL/y, due to system constraints. Specifically there is little improvement in the environmental outcomes for the lower Murray floodplain downstream of Euston due to constraints. Significant improvement in environmental outcomes at these sites cannot be achieved without infrastructure engineering works to get around the physical constraints and floodplain development and infrastructure. There are also much higher social and economic impacts associated with any increased reduction.

Based on this analysis and further detailed in-catchment modelling and assessment of the northern river system (particularly in the Condamine–Balonne), the Authority is proposing an ESLT that represents a reduction in water use of 2,750 GL/y (in reference to the 2009 baseline). In overall terms, this was determined as being enough water to achieve the environmental objectives identified by the Authority and thus being an environmentally sustainable level of take. This decision was a judgment of the Authority informed by the environmental science, social and economic impacts analysis and the variance between the options investigated.

A suite of products outlining the environmental water requirements for hydrological indicator sites, the methodology for determining the ESLT and details of the expected environmental outcomes under the draft Basin Plan will be available on the Authority website.

Importantly, there is a need to continue to invest in and improve our scientific and social and economic understanding of the Basin. For this reason, the Authority is developing a future research program, which will include the establishment an independent advisory committee to oversee the program.

Further information about the above is available at [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)

## MINIMISING SOCIAL AND ECONOMIC COSTS

The Authority is also proposing to minimise negative social and economic outcomes, through a number of ways.

The Authority is providing **communities with time to adjust**. The SDLs do not begin until 2019. This means communities across the whole Basin will have seven years to adjust to the new balance of how water is shared between the environment and other water users, providing a more gradual transition.

There will also be **flexibility in where environmental water can be recovered**. By not mandating the contribution of each catchment to the downstream environmental water needs of the Murray and Barwon–Darling, this enables environmental water recovery activities to be undertaken where there is least economic cost, allows market forces to operate and allows consideration of environmental water needs and physical and operation constraints. As part of the 2015 SDL review, the Authority will consider whether there is an overall benefit in apportioning this downstream component to particular catchments or groups of catchments.

As noted above, how water is recovered for the environment is a key factor in the extent of social and economic effects. As such, the Authority is promoting a variety of **options for meeting environmental water need that minimise social and economic effects and maximise environmental outcomes**. The Australian Government is recovering water through investment in water-saving irrigation infrastructure and a slow and measured water purchase program. In addition, there will be the opportunity to identify changes to current river operations and management as well as investment in environmental works and measures, which could see either an improvement in the environmental outcomes achieved with the same volume of water, or the same environmental outcomes achieved for a lower volume of water. Further detail on these options is in Chapter 5. Importantly, in recovering environmental water, there **will be no compulsory acquisition of water entitlements**.

Finally, there will be the opportunity for **community input into environmental water recovery activities**, which will ensure that local knowledge, including social and economic considerations, is factored into the process.

There are a number of broader water reforms being undertaken by the Australian Government that will also reduce negative social and economic effects from the implementation of the Basin Plan (see Chapter 6).

## SUSTAINABLE DIVERSION LIMITS FOR GROUNDWATER

The Basin Plan incorporates groundwater in the overall management of water in the Murray–Darling Basin. There is a growing recognition that surface and groundwater systems are connected, and that what affects one may affect the other.

SDLs have been determined for groundwater resources across the Basin to ensure that groundwater-dependent ecosystems are protected and that Basin resources are not depleted or polluted. The proposed Basin-wide groundwater sustainable diversion limit is 4,340 GL/y.

For the majority of the Basin, the Authority is proposing limits that align with existing state government arrangements, including reduction programs where they exist. This includes the Australian Capital Territory Plan limit, the Achieving Sustainable Groundwater Entitlements program in New South Wales, South Australian natural resource management regulations, and local groundwater management rules in Victoria and Queensland.

Reductions are proposed for two areas in the Basin: the Victorian Riverine Sedimentary Plain (a reduction in entitlements to 127 GL/y) and the Queensland Upper Condamine Alluvium (a reduction in extractions from 81.4 GL/y to 46.0 GL/y in the Upper Condamine Alluvium Central, and 45.5 GL/y to 40.5 GL/y in the Upper Condamine Alluvium Tributaries). These reductions are described in detail in the groundwater section of the *Draft Basin Plan – Catchment by catchment* (available from [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)).

There are aquifers across the Basin where the Authority is proposing limits that would allow for some increase in extraction, should such increases be provided for by state arrangements. Generally, these are aquifers that are currently not developed; are deep groundwater systems with low or no connection with surface water; and are highly saline, with restricted commercial application. Such groundwater is known as unassigned water and the Authority believes that by bringing them into account and setting a limit on extraction, these unassigned resources can be better and more transparently managed and regulated.

For aquifers where the SDL represents an increase in groundwater use, the Authority has been conservative in its estimates. Assessments have been based on rates of recharge and assessments of the risk to groundwater-dependent ecosystems, river flows and the productive

base. Generally the proposed levels of use represent a small percentage of the groundwater recharge rate.

The proposed SDLs will limit total groundwater extraction across the whole Basin to a volume of approximately 0.1% of the total groundwater resource.

### **Mining**

The Authority does not have responsibility for determining what Basin water resources are used for, whether for urban, agricultural, mining or other uses. This is the responsibility of state governments. As such, the Basin Plan is focused on setting a sustainable level of water use – not determining how this water is used.

In relation to mining activities, state governments are responsible for approval and regulation. Water use by mining, including coal seam gas mining, will need to be within the limits specified by the Basin Plan. This includes any leakage of groundwater resources that is caused by mining activities.

To the extent that coal seam gas projects seek to dispose of groundwater in surface water systems, states will be responsible for ensuring this is done consistently with the Basin Plan, including in respect of the Water Quality and Salinity Management Plan, and ensuring flows are consistent with environmental watering plans.

The Authority will be responsible for monitoring and ensuring compliance with the Basin Plan and state water resource plans.

### **Great Artesian Basin**

The Great Artesian Basin (GAB) is one of the largest underground water reservoirs in the world. It lies under 22% of Australia, occupying an area of more than 1.7 million km<sup>2</sup> beneath Queensland, New South Wales, South Australia and the Northern Territory. While there is interaction between the GAB and other water resources in the Murray–Darling Basin, the majority of the GAB lies outside the Murray–Darling Basin. The GAB is managed separately through the state water resource plans. Under the *Water Act 2007*, the GAB is explicitly excluded as a Basin water resource for the purposes of the Basin Plan.

## **DEVELOPING SUSTAINABLE DIVERSION LIMITS FOR GROUNDWATER**

The Authority has used multiple lines of evidence to assess the effects that groundwater extraction is expected to have on environmental sites and functions that depend on groundwater, and the ability of groundwater systems to function as productive resources into the future.

Eleven groundwater models were used to determine the groundwater environmentally sustainable level of take (ESLT). These models were developed or modified in the CSIRO Sustainable Yields Project and covered 73% of the Basin's 2007–08 extraction volume. Before being used for the draft Basin Plan, the models were upgraded to include the most recent available data. Each model was independently peer reviewed.

Where no groundwater models were available, a method known as the recharge risk assessment method was applied. This risk-based assessment method was developed for the Authority and was used to determine the proportion of recharge that could be taken without compromising the ESLT characteristics. The higher the risk there is to compromising these needs, the lower the percentage of recharge that can be extracted for consumption.

The estimated ESLT for each of the groundwater systems across the Basin was considered in conjunction with Authority policies to determine the proposed SDLs for groundwater. These policies were developed by the Authority in consultation with state groundwater experts and covered issues such as existing programs under way to reduce groundwater extraction, existing water resource plans, unassigned groundwater, deep groundwater, non-renewable groundwater resources and additional information provided by the states.

More information on these policies and how they were applied to determine the proposed SDLs for groundwater is outlined in the report *Groundwater baseline diversion limits and sustainable diversion limits* (available from [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)).



**Chapter 5 –  
Adaptive management,  
localism and the 2015  
review of sustainable  
diversion limits**

The proposed SDLs are an important starting point for the Basin Plan process. However, they are not the end of the debate. The Authority is committed to an adaptive management approach to all aspects of the Basin Plan, and has specifically included in the draft Basin Plan a requirement that the SDLs must be reviewed in 2015. This chapter explains how this will work.

## ADAPTIVE MANAGEMENT AND LOCALISM

Two of the key principles for the development, implementation and revision of the Basin Plan are the need for adaptive management and the need for localism.

Adaptive management is essentially the idea of learning from doing. It begins by applying existing knowledge, from different sources, to management. Management is adaptive when decision makers acknowledge uncertainty, continually monitor social, ecological and economic information, and include this information in future management actions.

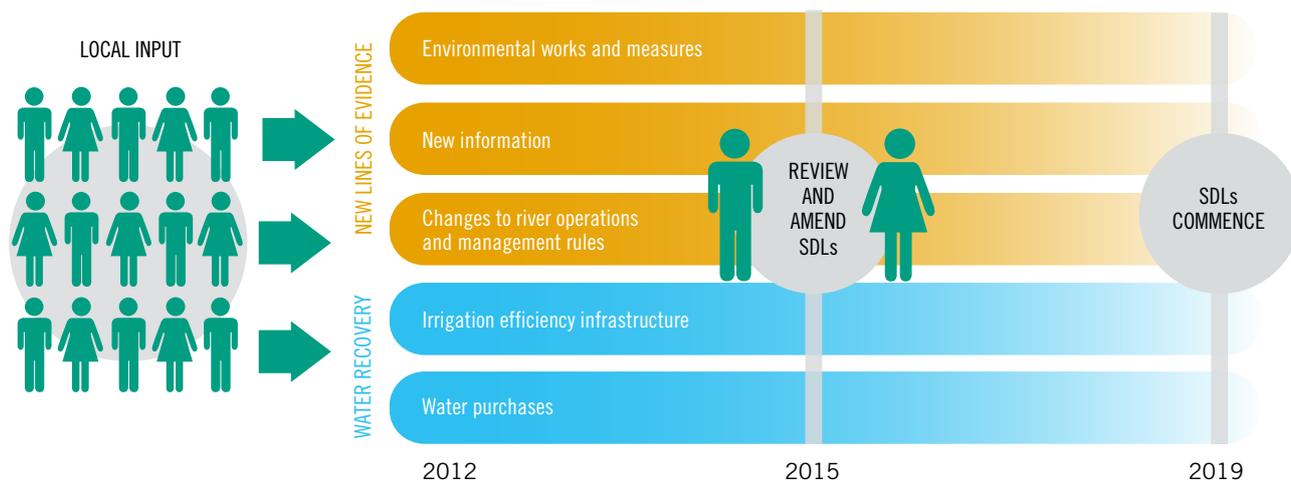
Adaptive management means the Basin Plan will change and evolve over time to incorporate new knowledge, improved hydrological modelling, prevailing weather and climate conditions, previous outcomes, changing priorities and the requirements of different parts of the Basin.

Adaptive management also builds flexibility into planning. There are operational decisions that cannot be made in advance or on a Basin-wide level. They must be made in real time and at a local level. For example, in the case of environmental water use, heavy localised rainfall may provide managers with the opportunity at short notice to flood a river red gum forest using a minimal amount of additional water.

The success of the Basin Plan and associated water reforms is dependent on local involvement. Localism in water management is about governments partnering with (and using and improving the capacity of) local and regional communities to manage water and other natural resources in an integrated way. Localism includes involving communities in developing and implementing reforms so that they have ownership of decisions and actions. It also allows local knowledge and solutions to be drawn on to meet local needs, while recognising those that fit within Basin and catchment scale strategies and actions.

Only by incorporating localism into adaptive management can managers deliver the best outcomes.

**Figure 5:** An Adaptive Plan



**Figure 5:** When the Basin Plan commences in 2012, there will be seven years before the sustainable diversion limits (SDLs) commence in 2019. The SDLs will be reviewed in 2015 (and possibly amended) based on new lines of evidence. Environmental water will be recovered through investment in water-saving irrigation infrastructure and a steady and measured water purchase program over the period to 2019. Local communities will have the opportunity to provide input into all these activities.

## NEW LINES OF EVIDENCE

The Authority has developed the SDLs presented in the draft Basin Plan based on the current understanding of the Basin's environmental water needs and hydrology, and the social and economic effects of changes to water use. The Authority has had to assume that existing infrastructure, such as dams, weirs and levees, will continue to be in place and operate as they currently do. It has had to assume that existing river operational rules and water allocation decisions will continue into the future. However, if changes are made to current infrastructure, river management and operations, or if there is new information in relation to environmental water needs, hydrology, and the social and economic effects of the SDLs, it is logical that the SDLs should reflect these changes.

The draft Basin Plan (under sections 6.06 and 6.07) specifically requires that SDLs be reviewed in 2015 and any proposals to revise SDLs are registered on the Authority's website. Amended SDLs would be included in the Basin Plan through an amendment to the Plan by 2017. Because the Australian Government has committed to a steady and measured approach to water recovery, there will be sufficient time for these changes to be factored into the water recovery strategy from 2015 to 2019.

Between now and 2015, the Authority will be working with partner governments and the community to:

- identify new infrastructure that can improve the effectiveness and efficiency of both irrigation and environmental water use or improve environmental outcomes
- bring forward new knowledge and information, either from community input, new modelling or scientific or socio-economic research; or from the results of the monitoring and evaluation of environmental water use
- review and potentially change current river operation and management rules to improve the efficiency and effectiveness of water delivery to both the environment and other users, in a way that respects property rights.

In 2015, the SDLs will be reviewed based on these new lines of evidence and consideration of any proposals that serve to advance the objectives of the Basin Plan, including optimising economic, social and environmental outcomes. If there is case to do so, the Authority will bring forward an amendment to the Basin Plan no later than 2017. This will involve a public consultation process.

Other components of the Basin Plan are required to be reviewed every five years, including the Environmental Watering Plan and the Water Quality and Salinity Management Plan. The Basin Plan must be reviewed at least every 10 years.

## OPPORTUNITIES TO RETHINK RIVER OPERATIONS AND MANAGEMENT

The first recommendation of the parliamentary inquiry into the Basin Plan, led by Tony Windsor (the Windsor Inquiry), was to “identify all regulations and agreements in place that inhibit the efficient management of water in the Murray–Darling Basin and, where appropriate, work with the states to remove these regulations.”<sup>7</sup> The Authority agrees that this is an important aspect of water management in the Basin that has the potential for major impacts on the implementation of the Basin Plan. The Authority has begun some preliminary investigations into what could be done in this area.

The Basin’s existing river management settings and infrastructure have been built primarily to deliver water for agriculture, industry and human consumption and are very efficient at delivering water for those needs. But delivering environmental flows with tools designed for consumptive use patterns is quite challenging. There is now an opportunity to optimise river management to also care for the environment, as well as consumptive users. A win-win outcome for the environment and irrigated agriculture can be achieved by building flexibility into the rules governing river management and constructing appropriate infrastructure.

Based on submissions to the *Guide to the proposed Basin Plan* and to the Windsor Inquiry, making these changes could allow the Basin Plan to achieve improved environmental outcomes or potentially achieve the same outcomes with less water – perhaps in the order of hundreds of gigalitres less.

If Basin states can work together with the Authority to make these changes to river management, the Authority will adjust the SDLs to reflect these changes.

Opportunities for improving operational efficiency and/or improving environmental outcomes have already been identified, and could include:

- changes to the operational rules for Menindee Lakes and Weir 32 on the lower Darling, which could reduce evaporative losses, and improve delivery of environmental water.

- changes to the operation of the barrages and the Coorong, Lower Lakes and Murray Mouth, which could improve the local environmental outcomes
- environmental works and measures that achieve either more efficient environmental water use at a local level or improve the environmental outcomes that can be achieved with available water, such as works undertaken through The Living Murray initiative
- in the largely unregulated systems of the northern Basin, there are opportunities for achieving the same environmental outcomes with less water through a strategic approach to water recovery (e.g. product mix, location and targeting particular flow thresholds).

Many of these changes are outside the scope of the Basin Plan and the Authority cannot make these changes alone. Basin states and the Australian Government will need to work together with the Authority to make the necessary changes to state water management arrangements and river operations practices.

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<sup>7</sup> House of Representatives Standing Committee on Regional Australia, 2011, *Of drought and flooding rains – Inquiry into the impact of the Guide to the Murray–Darling Basin Plan*, Commonwealth of Australia.

### **Changing river operations to save water – The Menindee Lakes**

The Menindee Lakes are a series of freshwater lakes on the Darling River. The lakes were originally a series of natural depressions that filled during floods, but with the building of dams, weirs, levees, canals and regulators to catch and retain floodwaters, the lakes have been developed into water storages for Broken Hill, the Lower Darling and the lower Murray.

The lakes are an important breeding and refuge site for waterbirds, with a level of diversity equal to that of Kakadu. The lakes are also an important part of the Aboriginal cultural landscape, and management of the lakes affects cultural beliefs and traditional values.

The current management of these lakes can see up to 420 GL of water lost each year through evaporation. Also, these arrangements have contributed to the degradation of the wetlands due to either too much or too little flooding.

There have been a number of studies to look at alternative ways to operate the lakes that may be more appropriate to meet both environmental and human water needs (such as Broken Hill's drinking water needs). Changes to how the lakes are managed and investment in infrastructure have the potential to save significant volumes of water for the southern Basin, with recent studies finding that between 31 GL and 174 GL of water could be saved in the lower Darling.<sup>8</sup>

### **Changing river operations to improve environmental outcomes – The Coorong, Lower Lakes and Murray Mouth**

The Coorong, Lower Lakes and Murray Mouth (collectively referred to as the CLLAMM) are located at the downstream end of the River Murray. The region is an internationally important wetland and is ranked as one of the top six waterbird breeding sites in Australia. It is also an important breeding and feeding ground for a variety of fish, turtles, frogs and other animals.

Water resource development throughout the Basin, has led to changes to the environment of the CLLAMM. This was particularly evident during the millennium drought, which saw catastrophic changes to the environment, including issues caused by acid sulphate soils and salinity.

There are five barrages that separate Lake Alexandria from the Coorong and were built to maintain a freshwater weir pool to Lock 1. It is often argued that the barrages should be removed to allow sea water to flow into the Lower Lakes and return them to some natural or pre-European condition. The weight of evidence suggests that prior to the development of water resources in the Basin the lakes would have been mainly freshwater lakes, with salt water occasionally entering the lakes from the sea during periods of low flows from upstream.

Unless there was a significant reduction in upstream water usage, removing the barrages would not return the environment to a 'natural state', but would instead lead to salt accumulating in the lakes and advancing up the River Murray to Lock 1, affecting drinking water supplies. It would be increasingly difficult to flush this salt out, and could see the lakes become saltier than the sea.

Removal of the barrages would also not reduce the need for freshwater flows into the lakes, which flush salt from the entire system and also provide base flows for water delivery and environmental benefits along the entire river.

However, there are opportunities to change the management and infrastructure of the CLLAMM to improve the local environment. The Australian and South Australian governments have funded network of drinking water and irrigation pipelines, which means towns and irrigators previously reliant on the Lower Lakes for water can now get their water further upstream from the River Murray. This means there is more flexibility to manage the salt and water levels of the lakes for the benefit of the environment. The Upper South East Drainage Scheme will also see water redirected to the Coorong. Further work to automate a number of barrage gates would enable more flexible barrage operating procedures.

For more information on the barrages and the CLLAMM, see [www.mdba.gov.au/draft-basin-plan](http://www.mdba.gov.au/draft-basin-plan)

8 Podger and Close, 2010, Revised Darling Water Savings Options, Report to the Department of the Environment Water Heritage and the Arts, July 2010; Podger, G.M. (2011). Darling Water Savings: Options for Environmental Filling, No Impacts, Version 2, CSIRO: Water for a Healthy Country National Research Flagship, CSIRO, Australia.

### Changing river operations to improve environmental water delivery – Weir 32

Delivery of water from the Lower Darling is constrained by an operating rule that limits the maximum flow at Weir 32 to meet Murray and Lower Darling demands to the channel capacity of 9,300 ML/d. This rule is intended to prevent water entering the Great Darling Anabranch and to avoid evaporation and seepage to the environment in the delivery of flows for consumptive use. This is because this is treated as a loss under current arrangements for the purposes of the delivery of consumptive water.

However, evaporation and seepage to the environment is not necessarily a negative when delivering large environmental flows. The operating practice limiting flows to 9,300 ML/d could be ignored for environmental flows, allowing much higher releases. Managing water in this way would push water out of the channel onto the floodplain, so some water would benefit the local environment through seepage and evaporation on the floodplain.

At flows of 12,000 ML/d or more, some would also flow to the Great Darling Anabranch. For a large-scale environmental watering event, however, this is not necessarily a problem, particularly as there is a requirement to provide environmental flows to the Great Darling Anabranch anyway.

In addition to the benefits to the local environment, increasing the flow height in this way would allow more water to be delivered to the Murray for watering of downstream sites, provided that water could be protected from reregulation to consumptive use when it reaches the Murray.

Importantly these changes in operating practice can be done in such a way as to avoid material third-party impacts.

## OPPORTUNITIES FOR LOCALISM

Local input has already proved valuable in developing the draft Basin Plan. Input has been provided through the Basin Community Committee; workshops and meetings with industry leaders, local governments, peak representative and stakeholder groups and numerous individuals; the Tony Windsor-led parliamentary inquiry into the Basin Plan; and the 3,000 or so pieces of written feedback from stakeholders on the *Guide to the proposed Basin Plan*.

Communities will have the chance to further contribute to the development of the Basin Plan during the 20-week public consultation period on the draft Basin Plan. The consultation period will include a range of engagement activities in the Basin communities, as well as a formal submissions process (see Chapter 7 for more details).

Under the draft Basin Plan, there are many opportunities for local communities to have input into the implementation of the Plan. There are specific requirements to consult with local communities in the development long-term environmental watering plans and Basin-wide annual environmental watering priorities. Communities can provide input into the 2015 review of SDLs (section 6.07 of the legislative instrument), which could include proposals for environmental works and measures, changes to river operations or information about environmental water needs or the social and economic effects of the Basin Plan.

In order to facilitate this local involvement, the establishment or strengthening of existing local organisations will be important. As an example of the Authority's commitment to this, the Authority will collaborate with the New South Wales and Queensland governments to initiate a Northern Basin Advisory Committee. The committee will consist of Queensland and New South Wales community representatives who will work with and support local and catchment based groups in implementing the Basin Plan, and ensuring the unique needs of the northern Basin are addressed.

## PROCESS FOR REVIEWING PROPOSALS AND NEW INFORMATION FOR THE 2015 REVIEW

Throughout the period to 2015, the Authority will assess any proposals brought forward for their ability to lead to changes to both surface water and groundwater SDLs. These assessments are likely to be complex, because it is necessary to look at proposals not only for their site-specific benefits but also for their implications for environmental outcomes and water users both upstream and downstream.

The Authority will develop with Basin governments a set of guidelines and criteria to consider proposals that could lead to changes in SDLs. This will include the information required of proponents and any necessary consultation processes.

This is not a process to approve or veto proposals. State and territory governments retain responsibility for managing individual rivers. The Authority will work with stakeholders to assess the likely effects of their proposals on river flows and therefore on SDLs.

If the Authority is satisfied that particular projects could allow a change to SDLs to be made, this will be recorded on the SDL register that the draft Basin Plan requires be established. By including such projects on this register, the Authority is committing to recommending the SDL changes associated with the projects in an amendment process – including public consultation – that must be completed by 2017.

In this way, the SDL that takes effect from 2019 will be based on the latest information and assessment using an adaptive management approach.

The Authority will be consulting with communities and partner governments on how this process should run. As a starting point, the Authority will establish an independent Adjustment Advisory Committee to review the proposals and provide advice to the Authority (under section 203 of the *Water Act 2007*).

Cotton between Dalby and Cecil Plains on the Darling Downs. Arthur Mostead







**Chapter 6 –  
Achieving a healthy  
working Basin:  
Broader reforms**

As identified in Chapter 1, the Basin Plan alone cannot address all the activities required to achieve a healthy working Basin. Basin governments and communities will also need to play an important role. In particular, Basin governments need to:

- articulate a clear and transparent process to water recovery and the management of environmental water holdings
- explore approaches that can either reduce the need to recover environmental water and/or improve environmental outcomes from the available water (such as through changes to river operations)
- look to align the implementation of the Basin Plan with natural resource management policies and programs
- assist communities to adjust to changes.

## AUSTRALIAN GOVERNMENT'S WATER FOR THE FUTURE

The Australian Government's Water for the Future program invests in water-saving infrastructure and water purchases, and explores options for works and measures to achieve more efficient or more effective outcomes for the environment.

The Authority believes these programs will also play an essential role to help reduce social and economic impacts on communities by providing local employment opportunities, helping farmers to continue to become more water efficient, and recovering water for the environment, which will contribute to meeting the proposed SDLs.

As of 30 September 2011, 75 GL/y contracted water recovery has been achieved through investment in water-saving infrastructure. A further 214 GL/y will be returned through the Australian and Victorian governments' investment in stage two of the Northern Victoria Irrigation Renewal Project. The Australian Government currently estimates a further 400 GL/y could be recovered through investment in water-saving infrastructure (including works at the Menindee Lakes).

The government's water purchases are also an important part of the mix of options to recover water for the environment. They help irrigators who wish to sell part or all of their water at a reasonable price in order to retire debt, invest in farm upgrades, diversify their operations or exit irrigation altogether. They ensure farmers who want to continue irrigating will not have their entitlements or the reliability of these entitlements reduced.

However, if farmers sell all their water and stop irrigating, it can have flow-on effects for communities and industries that support and rely on irrigation farming. There are also concerns that it may reduce the efficiency of delivering water and increase the maintenance costs and fees for entitlement holders who remain (often referred to as the 'Swiss cheese effect').

The Authority believes that as much water as is sensible should be recovered through investment in water-saving infrastructure or through other mechanisms, which minimise any negative social and economic costs. This is reflected in the Australian Government's commitment that water purchases will be used to bridge any remaining gap, once savings through other means have been taken into account. The water will be purchased in a slow and measured manner that does not distort market operations and does not lead to water being 'over-recovered' in any catchment.

The Australian Government has made the commitment that no individual will have their entitlements compulsorily reduced or acquired or have their reliability affected. This means no one will have to sell their water unless they want to.

## COMMONWEALTH ENVIRONMENTAL WATER HOLDER

The Commonwealth Environmental Water Holder (CEWH) manages all water entitlements recovered through *Water for the Future*. Decisions on how this water is used will be in line with the Basin Plan's Environmental Watering Plan. The Australian Government is increasingly engaging local communities to get input on where Commonwealth environmental water is used and how it is delivered, and to monitor the outcome.

One area where the government is currently seeking community input is on how best to allow for trading of water held by the CEWH when this water is not required for the environment. The CEWH will be the largest water holder in the Basin, and as such, how these entitlements are managed has the potential to affect social and economic outcomes. This will include determining the mix of water entitlements held, where these are held and the trading of these entitlements and their allocations to consumptive users. The CEWH has released a discussion paper to gain community input on this issue.

For more information on the Commonwealth Environmental Water Holder, see [www.environment.gov.au/ewater/index.html](http://www.environment.gov.au/ewater/index.html)

## TRANSITIONAL SUPPORT

The Australian Government has advised it will continue to assess the need for adjustment assistance measures to support the most vulnerable communities as the Basin Plan is being finalised and the scale and location of adjustment pressures becomes clearer. Any measures will build on the government's over \$9 billion commitment to help communities adjust to a future with less water and will be designed in close engagement with affected communities.

## NATURAL RESOURCE MANAGEMENT

The Authority recognises that achieving a healthy working Basin requires a broader focus than just water management. To maximise the benefits from environmental water use, other activities are needed to address the range of health problems facing the Basin. Governments, agencies, communities and individuals have been contributing land, money and time to natural resource management for a long time. It is important that this continue with support from a range of Basin-wide programs such as the Native Fish Strategy and the Basin Salinity Management Strategy, and local community efforts such as fencing rivers to keep out stock, removing weeds, controlling pest animals and planting native trees.

### **Integrated approaches to natural resource management actions are essential in maximising the benefits of recovered environmental water**

#### *Campaspe*

The Loddon Stressed River project run by the North Central Catchment Management Authority aims to complement the delivery of environmental flows for the Loddon River downstream of the Cairn Curran and Tullaroop reservoirs. In operation since 2003, the project has worked with local landholders to fence over 330 km of river to keep out stock, revegetate 705 ha of the riverside with native plants, remove 160 ha of riverside willows, treat 20 ha of the invasive weed Tamarix, improve 4 km of fish habitat through re-snagging, install 12 erosion control structures to reduce sedimentation and upgrade four regulating structures to improve delivery of environmental flows. The project has adapted to recent flood events and has tailored work on recovery efforts including debris removal and reinstatement of riparian fencing. The project has also grown to incorporate the Dja Dja Wurrung natural resource management work crew and is embarking on a joint macroinvertebrate monitoring program with the North Central Waterwatch program.





# **Chapter 7 – Next steps**

The release of the draft Basin Plan marks the beginning of a formal 20-week consultation period. The Authority will hold local meetings and discussions throughout the Basin where people can comment on the draft Plan.

People can also provide written comments online, by email or by post. All submissions will be posted on the Authority's website (except where submitters request confidentiality) and will then be compiled into a public report. This input will be used to revise and improve the draft Basin Plan.

The Plan will then be submitted to the Legislative and Governance Forum on the Murray–Darling Basin for their comments, when further revisions may be made. Following this the Plan will be presented to the relevant Australian Government minister for their final agreement. At this point, the Plan will be tabled in the federal parliament and become law.

The draft Basin Plan and its explanatory notes can be found on the Authority's website, along with more information on the 20-week consultation period, information on technical issues, fact sheets on common areas of interest, and responses to frequently asked questions. The website also explains how you can have a say.

You can contact the Authority using the details below. If you do not have access to the internet, your local library or local industry body should be able to help.

Website: [www.mdba.gov.au](http://www.mdba.gov.au)  
 Phone: 1800 230 067  
 Email: [engagement@mdba.gov.au](mailto:engagement@mdba.gov.au)  
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**Figure 6:** What's next for the draft Basin Plan



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