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Northern Basin Review



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Acknowledgement of the Traditional Owners of the Murray–Darling Basin

The Murray–Darling Basin Authority acknowledges and pays respect to the Traditional Owners, and their Nations, of the Murray–Darling Basin, who have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. The MDBA understands the need for recognition of Traditional Owner knowledge and cultural values in natural resource management associated with the Basin.

The approach of Traditional Owners to caring for the natural landscape, including water, can be expressed in the words of Darren Perry (Chair of the Murray Lower Darling Rivers Indigenous Nations) —

‘the environment that Aboriginal people know as Country has not been allowed to have a voice in contemporary Australia. Aboriginal First Nations have been listening to Country for many thousands of years and can speak for Country so that others can know what Country needs. Through the Murray Lower Darling Rivers Indigenous Nations and the Northern Basin Aboriginal Nations the voice of Country can be heard by all’.

This report may contain photographs or quotes by Aboriginal people who have passed away. The use of terms ‘Aboriginal’ and ‘Indigenous’ reflects usage in different communities within the Murray–Darling Basin.

Foreword from the Chair

On behalf of the Murray–Darling Basin Authority, I would like to express my heartfelt appreciation to the many individuals and groups who have taken the time to meet with myself, my colleagues, and MDBA staff over the past year. Since becoming Chair I have had the pleasure of travelling to many areas of the northern basin, and have been constantly impressed by the commitment to community, agriculture, and the natural environment I have witnessed.

Your insights have helped us to better understand the complexity of the northern basin and its people, and the decision the Authority has reached reflects many of the important points you raised during our meetings.

The Authority has decided to propose amendments to the Basin Plan, which include changes to sustainable diversion limits in the northern basin. These are described in the separate 'Northern Basin Review' report. We have also proposed a number of 'toolkit' or complementary measures to be undertaken to ensure we make the best possible use of this water.

Authority members faced a difficult task in determining if the current 390GL was still the most appropriate volume of water to achieve the outcomes of the Basin Plan. We propose to change the volume from 390 GL a year to 320 GL a year, provided the Australian, New South Wales and Queensland governments commit to implementing a number of so-called 'toolkit measures' designed to improve water management. In making a recommendation of 320 GL we feel it strikes the best balance in ensuring the health of our northern rivers while limiting the impacts on communities.

You have told us that certainty is important to you in planning for your communities. We hope this recommendation will provide that certainty, and that we can continue to work together in managing the rivers of the northern basin.

Neil Andrew

Chairman, Murray–Darling Basin Authority

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Summary

The Northern Basin Review (the Review) set out to investigate whether a water recovery target of 390GL was suitable to ensure balance across water needs in the northern basin.

The MDBA consulted extensively with northern basin communities during 2016 to understand perspectives on water management in the north and to share the findings of the work conducted for the Review. This community consultation report provides a summary of comments received from communities during this time. The concerns, comments and questions have been presented as they were conveyed to the MDBA. Where possible, we have shown how the feedback from the community has been reflected in the proposed amendment, or provided links to further information.

There were a number of key themes that arose during community meetings during 2016. These include the following:

Decision-making process

People were extremely interested in understanding how the MDBA would make a decision to amend the Basin Plan given the diversity in views and needs for consideration. There was widespread support for the triple-bottom-line decision-making process (which aims to balance water use between economic, social and environmental needs), although people were most interested in what it would mean for their community. Equity was considered critical in making a good decision. People wanted to see how different things (such as disparity between state water recovery volumes, historic extraction by upstream users, and the greater influence that is afforded to larger irrigators compared to smaller enterprises) would be considered and balanced.

Achievement of environmental outcomes

Community members want certainty that recovered water will lead to good on-ground environmental outcomes. There were concerns the outcomes described through modelling of environmental indicators cannot be achieved on the ground. Also, concerns environmental water is not sufficiently protected to allow it to arrive where and when it should within the river system.

Importance of low flows

Re-establishing low flows in the rivers was deemed critically important by most communities, particularly those in the Barwon–Darling. Low flows are needed to secure stock and domestic water supplies, maintain property boundaries, provide opportunities for fishing, and contribute to a basic sense of community well-being, particularly for Aboriginal people.

'Toolkit' measures (complementary measures)

There was strong support across the northern basin for a collection of measures in addition to water recovery that can contribute to environmental objectives while minimising negative economic and social impacts. They were described by communities as measures that either

replaced water recovery (substitution) or had the potential to enhance environmental outcomes with whatever water was recovered (enhancement). These measures included market-based mechanisms (such as temporary trade to allow water to be bought where and when it was needed), and natural resource management measures (such as addressing cold water pollution or improving fish passage).

Economic impact of water recovery

Significant concerns were expressed about the impact on employment from water recovery and the need to give suitable consideration to the communities that are experiencing impacts. People favoured the use of infrastructure efficiencies over buyback, and complementary measures over water recovery in general, as these were seen as lessening the impacts of the reform.

Aboriginal involvement

Aboriginal people want to have a role in water management and want the dependency of their culture, physical and emotional health on healthy rivers acknowledged.

Communications and engagement

The importance of communicating all aspects of the Basin Plan was broadly expressed. This included clear communication of the science and information the MDBA used to inform our work.

The MDBA has proposed an amendment to the Basin Plan that would see the environmental recovery target for the northern basin reduced from 390GL to 320GL. The MDBA proposed this amendment on the understanding that governments have committed to implement a range of associated measures to ensure the 320GL can be used as effectively as possible to achieve environmental outcomes. The responses contained in this report reflect this proposal.

Introduction

This report provides a summary of feedback and responses received during consultations throughout the northern basin in 2016. Consultation was arranged with a broad range of stakeholders to promote understanding and receive feedback and comments on the work of the Northern Basin Review (the Review).

The northern basin is very different to the southern basin. It is drier and much flatter. It receives most of its rain during summer, while the south receives most of its rain in the winter. The rainfall in the north is not only lower, but also more inconsistent than in the southern basin. This has led to different challenges in water management, with less reliance on regulation by large headwater storages and greater use of large privately constructed off-stream storages. The population in the northern basin is also much sparser, with far fewer large towns and more large farms than in the southern basin.

Sustainable diversion limits (SDLs) were set for the Basin Plan in 2012 to limit the amount of water that could be extracted, in recognition more water needs to stay in the environment to support the plants, animals and people that rely on rivers and floodplains. An initial reduction in the diversions in the northern basin was set at 390 GL. While decades of in-depth research underpinned the decision to reduce diversions in the southern basin, in finalising the Basin Plan, governments recognised there wasn't an equivalent knowledge base for the north, and there was an opportunity to do further work to improve this.

Under the Review, further research and investigations have been done on the environmental outcomes and social and economic impacts of water reform; to see if 390 GL strikes the best balance between improving environmental outcomes and lessening the impacts on towns and producers.

The Northern Basin Review is an important opportunity to make sure we are delivering on our responsibility to promote healthy rivers and productive basin communities. The views on water management from the communities of the northern basin are reflected in this report.

Consultation history

Key stakeholders have been involved in the Review since the beginning. From 2012, MDBA held many meetings and talks with irrigators, floodplain graziers, conservation groups, local government, natural resource management groups, state agencies and others. The MDBA Chair and the Parliamentary Secretary also toured regions in 2015 to engage with the broader community. Community consultation regarding the Review has also involved advice from the MDBA's formal committees and advisory groups, particularly the Northern Basin Advisory Committee and the Basin Community Committee.

Descriptions of some of the key groups involved in informing the Northern Basin Review are provided below.

The role of the Northern Basin Advisory Committee

The Northern Basin Advisory Committee (NBAC) consists of eleven members that represent a wide variety of interests across the northern basin. The Committee was formed in 2012 under Section 203 of the Water Act 2007 to provide the MDBA with advice.

Members of the Committee generally met five times per year and were chosen because of their knowledge and experience on issues relevant to the Basin Plan. NBAC have played an integral role in the work of the Review through providing ongoing feedback and advice. They have participated in several working groups established to focus on key areas of the work program including: social and economic studies, environmental science projects, hydrologic modelling, and water recovery options.

NBAC have prepared a report which outlines what they were asked to do, and their resulting advice and recommendations to the MBDA, governments and communities. Their most important recommendation is a 'toolkit' of measures they believe are necessary to complement SDLs in achieving Basin Plan objectives. This report is available on the MDBA website. Although the findings from this report are not replicated here, some similar themes were raised during community meetings and are included where relevant throughout this report.

A key concern of NBAC was while they were willing to act in the interests of the community, the MDBA should make more effort to engage directly with communities in the northern basin to confirm their views and expose any new ideas. In response to this advice, the MDBA worked closely with NBAC to plan a series of meetings to connect directly with a wide range of northern basin stakeholders.

Lower Balonne Working Group

The Lower Balonne working group was formed by the Lower Balonne Water Network to be the key consultative group in the Lower Balonne region, an important focus for the Review. The working group provided valuable feedback and advice on all areas of the work program and members were actively involved in reviewing the new environmental science work undertaken in the Lower Balonne. This included floodplain inundation and vegetation mapping, waterhole analysis and research on the Narran Lakes' waterbirds. They also provided advice on the floodplain grazing economic model and the pattern of water recovery in the Condamine–Balonne catchment.

Northern Basin Aboriginal Nations

The Northern Basin Aboriginal Nations (NBAN) were also an important group the MDBA worked with throughout the Northern Basin Review. NBAN is an independent, self-determining organisation that promotes the views and perspectives of Aboriginal people on water research, policy and management. NBAN represents 22 First Nations.

The MDBA worked with the NBAN to conduct a survey in Brewarrina, St George and Dirranbandi. Eleven Basin Nations are represented in the results, which focused on a variety of waterways including rivers, lakes and man-made water features such as weirs and the Brewarrina Fish traps.

Community consultation in 2016

A three-phase engagement process was designed to build community understanding, involve a broad range of community members and help with input to the Northern Basin Review. The phases were:

- Phase 1: meet with key community representatives including local councils, chamber of commerce representatives, local businesses, farmers, recreational fishers and environmental interest groups. Explain the Review and its status through small community meetings in northern basin towns.
- Phase 2: follow up with stakeholders from Phase 1 meetings and share findings/seek feedback on environmental, social and economic research and how this will inform decisions on whether to change current Basin Plan settings.
- Phase 3: formal public consultation following the steps laid out in the Water Act 2007.

This report outlines the key themes from Phase 1 and Phase 2 activities. A report responding to submissions made as part of the formal engagement process (Phase 3) will be published at the conclusion of that process. The formal consultation process will open on Tuesday 22 November 2016, and close on Friday 24 February 2017.

Phase 1 meetings: March – June 2016

More than 20 community meetings were held, with more than 150 community members attending the meetings at Dubbo, Lightning Ridge, Narromine, Nyngan, Walgett, Bourke, Brewarrina, Gunnedah, Tamworth, Wee Waa, Narrabri, Goondiwindi, Toowoomba, Texas, Moree, Warren, Wilcannia and Louth. Participants included irrigators, graziers, business people, Traditional Owners, council representatives and many others.

All Phase 1 community meetings were attended by the MDBA Chief Executive and another Authority member, as well as technical and engagement staff. These meetings had an open, informal format, and were designed to provide an overview of the Northern Basin Review process and allow stakeholders to raise any issues related to water management in their region, not just items specifically related to the review. For this reason, many concerns beyond the remit of MDBA were discussed in the meetings. To holistically reflect the discussions held, these issues have also been documented in the report and, where relevant, they have been considered in the context of the Review and/or passed on to other relevant bodies.

In addition, meetings with peak bodies were held in Sydney and Toowoomba.

At the conclusion of each meeting, the MDBA summarised the key points and questions heard throughout the sessions. These summaries were sent to each meeting attendee along with any additional information requested.

Phase 2 meetings: July – August 2016

Phase 2 community meetings were held in nine locations: Moree, Wee Waa, Warren, St George, Dirranbandi, Goondiwindi, Bourke, Brewarrina and Walgett. While it was not possible to run meetings in all towns visited in Phase 1, all stakeholders that participated in Phase 1 meetings were invited to attend a meeting near them.

Two sessions were run at each location as follows:

- A meeting for invited stakeholders was held in the morning of each day for approximately four hours. This meeting included detailed presentations on the environmental science, socio-economic, and Aboriginal socio-cultural heritage survey work, as well as an overview of the review and decision-making process. These meetings were well attended with 10 to 38 people participating.
- An open community drop-in session was held following the morning session. These sessions were advertised and provided an opportunity for people that had not been involved in the Review to date, to receive information and ask questions. These sessions also provided an opportunity for people from the morning sessions to ask additional questions and seek more detail from the technical experts. These sessions had lower participation than the morning meetings, with a maximum of five new people attending – although they did provide a useful opportunity for participants from the morning sessions to continue their discussions.

A consistent format for all Phase 2 morning community meetings was adopted:

- **Introduction and overview:** covered the purpose of the Basin Plan, a summary of issues raised previously in that community, and an overview of the Northern Basin Review, including the water recovery scenarios and the process used by the MDBA to make a decision.
- **Connecting communities with environmental values:** presentation covered the environmental research compiled through the Review, including the achievement of environmental outcomes (by catchment) under different water recovery scenarios.
- **Connecting water in the north with Aboriginal values:** presentation described the findings from the Aboriginal socio-cultural survey conducted by the MDBA.
- **Social and economic change:** presentation covered the context of change in local communities, (including factors not affected by water reform) as well as the modelled social and economic impacts in local towns under different water recovery scenarios.
- **Wrap up and next steps:** outlined the MDBA's decision-making process and timeline for the MDBA to make a recommendation to change the current water recovery target.

Over 200 people attended the Phase 2 community meetings. Feedback forms were provided at each of these meetings, and were completed by 65 people across all meetings. The themes and key statistics from these forms are provided in Appendix A 'Formal community feedback'.

As in Phase 1, summaries of the key points and issues raised at the morning meetings were provided to participants, along with the presentations.

Other feedback

Online engagement space

MDBA launched its online engagement space at 'getinvolved.mdba.gov.au' in March 2016. Throughout 2016, the MDBA hosted conversations about the Review, and also promoted the Phase 2 community meetings through this platform. Engagement from March to September 2016 was modest, with less than 20 comments made regarding the Review or northern basin issues. Most comments came from people within the northern basin, although there were a few

comments from others. The feedback and issues raised in this forum have been included with other comments within the body of the report.

Informal feedback

In addition to the meeting summaries, additional information received from community members during 2016 has also been included in this report. Sources of information include notes from conversations MDBA staff had when setting up meetings, as well as any relevant feedback provided through email or other means during 2016. This content has also been reflected in the body of the report.

Formal amendment process

The MDBA is proposing amendments to the Basin Plan 2012. The process for amending the Basin Plan is set out in the Water Act 2007. This includes giving the public an opportunity to comment by making a submission.

The MDBA will consider what, if any, revisions should be made to the proposed amendments in response to public submissions. A final package of amendments will be presented to the Minister for Agriculture and Water Resources, who may adopt them. Amendments adopted by the Minister must be laid before Parliament for parliamentary scrutiny.

Making a submission

The MDBA is making the proposed amendments available to the public for consultation from Tuesday 22 November 2016. The period for making a submission will open on Tuesday 22 November 2016, and will close at 5.00 pm (AEST) on Friday 24 February 2017.

Online lodgement is the preferred way to lodge submissions. The online submission form is secure and is suitable for uploading sensitive and confidential material. If you lodge your submission via the MDBA's online form, you will receive an email straight away that lets you know that the MDBA has received your submission.

Online submissions can be made at: mdba.gov.au/BPamendments

You can also email your submission to: submissions@mdba.gov.au

or post a hard copy to:

Basin Plan amendment submission

Murray-Darling Basin Authority

GPO Box 2256

CANBERRA ACT 2601

Submissions lodged via email or by post should be clearly identified including the words 'Basin Plan amendment submission' in the document title, subject line or body of the submission.

If you post or email your submission you will also receive an acknowledgement, via email or letter through the post, to let you know that the MDBA has received your submission. Unlike online lodgement, this is not an automated process, so it may take longer for you to receive an acknowledgement that your submission has been received.

Publishing submissions

The MDBA must publish the submissions it receives on the proposed amendment to the Basin Plan on its website unless a person making a submission specifically asks the MDBA to treat a submission or part of their submission confidentially.

More information

To find out more about the proposed amendments to the Basin Plan, visit our website mdba.gov.au/BPamendments or email us at engagement@mdba.gov.au or phone 1800 230 067.

Key themes from community consultation

The following provides an overview of the key questions and issues raised in community consultation in 2016. The open dialogue between the MDBA and communities during the year meant other issues not directly relevant to the review were also raised, and these have also been included for completeness. The below reflects what we heard from communities without any interpretation from MDBA. Responses from MDBA (and other governments where relevant) have been included following each topic. Where issues required detailed technical explanations, references to the appropriate technical reports that address these issues have been provided.

The decision-making process

Questions and comments on the decision-making process were frequent across all regions. There was widespread support for the triple-bottom-line decision-making framework. However, people were particularly keen to understand how the MDBA would make a decision to balance the environmental, social and economic needs. There was also a sense that people were most interested in learning what flow-on effects decisions on water recovery levels could be expected to have on their town.

There were observations that the Northern Basin Review is a good process and is providing much-needed knowledge about the social and economic impacts of water reform in the Northern Basin. Providing the social and economic work was also seen as useful to help people understand what is happening in their communities, but also to help with their decision making.

People were interested to understand how the environmental, economic, social and cultural factors will be considered together when making a final decision about how much water to recover — and emphasised the importance of a transparent process. In particular, people wanted to see how different impacts and outcomes had been compared, i.e. 'pain versus gain'. It was noted by some that there must be a point at which the impacts on the towns and communities are far too great to justify the environmental gains.

A comment was also made that governments need to acknowledge the effects of reform, and to explain how they can make decisions without considering how to help those places that are most affected. People were also interested in what scope the MDBA may have for making recommendations in regard to socio-economic offsets, e.g. compensation or structural reform support. People wanted to feel empowered in the process, with questions on how communities can convince the MDBA to take less water to reduce socio-economic impacts.

There were also other questions about how the environmental evidence was to be considered, including about the uncertainty around some of the environmental indicators and how you might justify going for a higher number (415GL) given the increase in social impacts.

The importance of being forward looking in decision-making was also noted, both in terms of environmental watering and providing certainty for investment in rural communities.

Aboriginal people wanted to have more of a say and want to understand how the information and feedback they provide will be considered in the decision-making process.

It was noted that getting the best decision from the Northern Basin Review relied on bringing many different voices together. (The importance and value of getting a diverse range of people together to discuss the important issues related to the implementation of the Basin Plan was also pointed out. Also mentioned was that achieving the aspirations of the Basin Plan for the whole community depends on good discussion of a wide range of issues.)

In particular, people were keen for all players to be in the room and working together, including Qld and NSW governments and the Commonwealth Environmental Water Office, as well as making Ministers aware of the full impacts of recovering water. It was noted that there is significant importance in the NSW and Queensland governments working constructively together. It was felt that MDBA has a role in helping bring that about.

People were also confused about the various roles and responsibilities of governments in developing water policy, but were keen to see all governments working together to reach a decision (concern was expressed that it is too easy for all the government parties involved to pass on responsibility to another agency or government). People recognised that it is unrealistic to expect to find win-wins in every scenario, but most don't want to see multiple losses. Part of this is the need to acknowledge that the resource is not infinite, and there was a note that drought was an example of when balance was needed.

Getting the balance right

The importance of getting the balance right was also emphasised, with the Basin Plan considered as a big issue facing regional areas, and particularly councils. A Warren Council representative noted that if they can't get the balance right between extractive and environmental use in the Warren area, then we will struggle across the basin. They saw the Warren region as a litmus test for the wider basin, based on both the long-established industry in conjunction with the Macquarie Marshes and the long history of shared water in the region.

*'Any previous extreme views against balance have eroded and today there is more awareness of reasonable outcomes that can be achieved'.
(Warren Community member)*

An online contributor from the Blue Mountains also reflected that the importance of the lower Darling River should have been considered in the review.

Another online contributor from near Narromine noted the need for a sustainable, balanced approach – saying that rivers need to be managed for all stakeholders, and the management of environmental water needs to be transparent and sustainable for ecosystems, while productive water needs to be used to reduce the effects of drought on local communities. Again online, a contributor from Goondiwindi supported this, stating that a healthy working river provides water for people, stock, crops and industries — and maintaining the supply of quality water is in our own best interests in the long term.

Equity

Overall, equity was seen as being important — people don't want the issue to be divisive. Equity for downstream communities was a key issue, with many comments made relating to how upstream development has affected the rivers and groups such as floodplain graziers (who want to see balance restored and the socioeconomic effects on all communities considered, particularly from people around Bourke and Brewarrina). A comment was made that Broken Hill, Menindee, Wilcannia and other downstream towns should have been included in the consultation and research.

'The belief is that those upstream have pumped all the water out so by the time it reaches these parts it's hardly a trickle. This also brings out the belief that we need to establish ways of using the resource properly rather than just taking it when it's there and complaining when it's not.'
(Louth meeting)

It was stated that there needs to be consideration of the scale of impacts in relation to city and country, with a suggestion that possible job losses such as those described by MDBA would not be considered acceptable in a metropolitan area. People from Warren also felt that they had provided more water than was fair for the Macquarie system – commenting that 85% of water recovered came from the Warren Shire. Likewise, people from Wee Waa felt the water they had sold was providing additional security for Barwon–Darling irrigators.

Interstate equity was considered important with a comment that too much water has been recovered in NSW and not enough has been recovered in Queensland. Equity between users within regions was also noted, with a comment that the current system suits those that can afford the best infrastructure and who have greater purchasing power, while the medium-to-small end businesses are struggling.

It was considered important that the effect of upstream development and diversions on Bourke and downstream communities be thought through. There was a comment that diversions in and around Bourke are very small in comparison. Additionally, it was thought important that the MDBA analysis considered the consequences of the changes that have been seen at Bourke. A suggestion was made that introducing a regional institute to an area like Bourke would help advance data and information and provide more credibility to decision-making.

MDBA response

The Water Act 2007 and Basin Plan 2012 require that we set diversion limits in a way that balances economic, social and environmental outcomes. The purpose of the Northern Basin Review was to investigate whether the 390GL recovery target was the most appropriate volume of water to help achieve the necessary environmental outcomes in the basin while minimising any negative effects of water recovery on communities.

Through the Review the MDBA have listened to people and now have a better understanding of how 21 northern Basin communities respond to water recovery and its effects. What we heard, together with our detailed analysis of economies and the environment, has fed into our decision. The real social and economic effects on irrigation communities was a contributing factor as to

why we recommend that the recovery target be reduced, together with the environmental outcomes research. We considered a range of competing views in making our judgement.

We agree with your views that returning water to the environment via the Basin Plan needs to be associated with other measures. This is why our approach – based on community input – includes a recommendation that measures in addition to water recovery could help achieve river health with less water.

Our proposed amendment offers better social and economic outcomes for northern Basin irrigation communities overall compared with current Basin Plan settings. For many irrigation communities no further water needs to be recovered. But it does also mean different things for different communities. Under the reduced recovery proposal, in most of the 21 Northern Basin communities investigated the economic effects are expected to be relatively small. In many cases, the effects are much smaller than those caused by other contributing factors. However, we recognise that any local job losses has an impact on communities.

An important part of reaching this balanced proposal was consideration of the complementary or 'toolkit' measures. Returning water to the system is essential to addressing a history of over-allocation. However, we agree with the comments of some community members that a healthy and productive river system cannot solely be achieved through water recovery. The environmental science tells us that other management actions are needed to get the outcomes we want.

For more detail on the decision-making process see the Northern Basin Review Report and the Triple Bottom Line report on our website.

Environment

There were a number of different issues and suggestions raised about improving environmental outcomes. People were also interested in understanding more about the environmental research, including methods and findings. These are described below.

Toolkit (complementary) measures

One of the key issues community members raised across most regions and at the meetings of peak bodies was the need to consider more than water recovery to improve environmental outcomes, with strong support across all northern basin communities for measures that were seen as either:

- reducing the need for recovery of water for the environment, or
- improving environmental outcomes from recovered water.

Such actions were described by communities as complementary measures — as, in general they complement water recovery, although some were proposed as substitutions for water recovery.

During Phases 1 and 2 consultations, there were various proposals for these measures, including definite actions that people felt MDBA should propose/undertake. For example, for some people there was a sense that there wasn't much point in recovering additional water unless water quality improvements could be made. A number of these measures have also been included in

advice from the Northern Basin Advisory Committee as part of a broader 'toolkit' of measures that could improve environmental outcomes — the toolkit concept was mentioned several times in community meetings.

Complementary measures were also mentioned by one online engagement forum contributor, noting that we need to remember that it's about more than just water and healthy rivers need good management that includes fishways, woody debris and fences along rivers to make the most of environmental water. It was also noted that if we want good quality water for primary productivity we must minimise uncontrolled grazing, as this would have the flow-on effect of benefiting aquatic fauna.

While noting the comments made that some measures are more appropriate in some regions than others, in general measures that communities felt the MDBA should investigate or include as part of the Northern Basin Review recommendations include:

- improved or more flexible water management practices, such as:
 - temporary trade, including the potential to purchase water from private on-farm storages
 - investment in better water management technology, such as Computer Aided River Management (CARM)
 - investment in weirs, with suggestions that additional weirs or raised weirs could help to achieve low flow targets and also help to provide refuge in dry times, as well as providing increased water reliability and flexibility in water management. (An example of the case for weirs was made at Bourke, where a number of natural rock weirs were destroyed in the Darling River downstream of Bourke to allow paddle-steamer access. The comment was also made that Boomi and Goondiwindi weir pools provide refuges during dry periods.) However, there was a comment made at Brewarrina that the weir should be removed, as it prevents the natural flow of water through the culturally significant Brewarrina fish traps.
 - Natural resource management activities including:
 - addressing cold water pollution from storages. Specific storages where cold water pollution was identified as a problem included Glenlyon and Copeton dams. Comments were made that the condition of the Macquarie River has improved significantly in response to cold water management, fishways and habitat restoration.
 - managing and/or eradicating invasive species, including carp and keeping tilapia out of the Basin. Comments were made that increasing environmental flows might just increase carp numbers unless something was done, and also that the 'system' would manage the effects of release of the carp herpes virus, as it did during a fish kill event in 2012.
 - infrastructure to improve outcomes for native fish, such as installing additional fishways on weirs and reducing fish death through installing screens on irrigation extraction points.
 - riparian zone management, including revegetation and re-snagging activities.
 - improving water quality in general — one example was given of the improvements a group of councils had achieved through working together to address aquatic weeds.

There were different ideas as to what extent any measures should be considered as substitutes for water recovery. Some community members suggested measures could be traded off for a specific gigalitre value, and there were questions as to how that substitution could be calculated, with support for an environmental equivalence test.

Toolkit measures, particularly temporary trade, were seen as the only way to meet some difficult-to-achieve outcomes, such as low flows in the Lower Balonne and Barwon–Darling.

Other stakeholders felt that any measures should provide additional benefits, and that reduction in water recovery should not be considered on this basis. A similar comment was made with regard to the NBAC toolkit, that some of these measures will only work if there is enough water in the system.

In other circumstances, people were just keen to see overall improvements in their environment and made comments about the reduced funding for natural resource management activities over time; for example, the cessation of the Native Fish Strategy and the loss of the Catchment Management Authorities in New South Wales and associated investment in natural resource management (NRM).

There was some discussion as to how toolkit measures would be funded, with people feeling the money should be found and some suggestions made that money allocated to water recovery could be better spent funding these activities. There was a specific question about selling environmental water to fund some of these activities.

There was also a comment that monitoring of environmental outcomes in the future needs to consider the effects of water recovery versus the role that complementary measures can play.

MDBA response

The MDBA has responsibility for setting sustainable limits on water use for all Murray–Darling Basin catchments. The Northern Basin Review largely focused on improving the information we use to set these limits. We examined how changes in flow might alter environmental outcomes under different water recovery scenarios. However, our research showed that there are some flow indicators that are not achieved, and analysis has demonstrated that volumetric water recovery alone (at the levels investigated) provides very little improvement towards meeting the indicators. In these circumstances other initiatives are desirable to improve outcomes. Such initiatives could be: improved delivery coordination of environmental watering; targeting water recovery by entitlement type and location; improved protection of environmental flows; and market-based mechanisms such as temporary trade and options contracts with licence holders to access key parts of flow events.

The proposed amendment to the Basin Plan is contingent on the Australian, NSW and Queensland governments implementing a number of non-volume related ‘toolkit’ water management measures to improve environmental outcomes. In making this recommendation, the MDBA acknowledges that these measures are not within our remit and cannot be implemented without commitments governments.

Protection of environmental water and compliance

There was strong support across all areas of the northern basin for protection of environmental water and people want action on this issue. In upstream areas people did not feel it was fair that

their communities had sold irrigation water just to have it pumped out downstream, while downstream communities wanted the water to reach them without being extracted enroute.

Comments were made that tax-payers' money was being used to purchase water for the public good, so it should be protected to reach the Barwon–Darling without being pumped out for irrigation. People at a meeting in Walgett commented specifically on the need for people to work together to make sure water gets to where it needs to be to ensure river health. There were also questions/concerns about how the environmental outcomes will be achieved without shepherding¹ (i.e. ensuring a parcel of water moves through river systems to achieve its purpose/benefit a user without being extracted for another purpose).

In addition, there was a comment made that irrigators tend to view all water, including purchased environmental water, as theirs and this shouldn't be the case – they felt that once the water had been purchased for the environment it was none of their (irrigators') business.

There were also some comments made that relying on the Murray–Darling Basin Cap² is not sufficient as it doesn't adequately protect water from extraction on an event-by-event basis or protect against over-use; given it is based on long-term calculations. This perspective was disputed by some, with a responding comment that protection of environmental water isn't such a problem and the current water sharing plans place a ceiling on diversions that is adequate.

There were also some comments that people may either be deliberately or accidentally breaching pumping rules.

In general, more metering, monitoring and accountability was considered important to make sure water arrives where and when it should. There was a suggestion that more accountability could be delivered through an independent panel and/or community board that would help make decisions about when water should be embargoed to allow it to flow through the system.

MDBA response

We are working with the states to build on their existing water management plans to meet the Basin Plan requirements by 30 June 2019. States are and will remain the primary entities with the mandate and capability to administer water use rules; including the licensing, monitoring and compliance programs that underpin them. As a result, actions involving potential unauthorised take are primarily a matter for state and territory governments, although the MDBA also has a regulatory role.

The MDBA recommends improvements to state water management arrangements to safeguard low flows, particularly in the Condamine–Balonne and Barwon-Darling. This needs to be worked through with state and relevant licence holders. Noting that actions involving potential unauthorised take are primarily a matter for state and territory governments, the MDBA supports all efforts of Basin states to address unauthorised take and commits to act within its mandate to contribute to those efforts.

¹ The MoU between the NSW and Australian governments on water shepherding defines it as: *delivery of a calculated volume of water that was created by the non-activation/reduced extraction at a nominated licence location to a more downstream location, after consideration of losses, where it will be made available for extraction or use for the environment.*

² Upper limit on water diversions in the Murray–Darling Basin set at 1993 levels of extraction.

MDBA modelling shows that the Cap protects against over-extraction of environmental water over the long term. The Cap does not protect environmental water on an event basis. The provision to carryover unused allocation by irrigators may result in use exceeding Cap levels following a dry period where diversions have been restricted. However, diversions will be constrained to the Cap levels in the long term. Where protection of environmental water is required on an event basis, opportunities for protecting environmental flows will need to be investigated.

Understanding the environmental science

There were many questions and comments that related to the environmental science work. The following section provides a summary of the comments that were raised. They can be grouped around three main themes: flow indicators; the work that was done/research; and achieving outcomes.

Indicators

During Phase 2 community meetings there were many questions about the environmental indicators that the MDBA uses to estimate aspects of river health in response to changes in flows.

We heard that the choice of specific flow indicators³ needs to be clearly explained, including the appropriateness of the indicators we are using, how we prioritise them, the choice of different targets and indicator sites, whether they are all equal and representative, and whether the indicators have changed as a part of the review. People wanted to know the basis for percentage figures chosen (e.g. inundation of 70% of the floodplain) as well as what this means for the environment. There were also specific questions about the in-channel indicators at Mungindi.

We were also asked if we did a model run to see what it would take to achieve the 9/9 indicators in the Barwon–Darling. We also heard discussion about why the hydrological modelling results show conflicting achievement of indicators at different recovery levels, e.g. you can achieve 1 out of 3 at 320 GL recovery, but none at 390 GL.

In some places comments were made that if only half the environmental indicators were achieved then that might mean there would be pressure for additional recovery. There were also questions about the relative value of the changes; i.e. if you only achieve one additional indicator, then is it worth the impacts on irrigators and their communities? Likewise, where all environmental indicators were being achieved across a number of scenarios (such as in the Macquarie catchment) there were questions about whether there was an over-recovery of water. Also a question around the benefit of using a particular indicator if it can only be affected by natural flow events (or 'Acts of God').

Outcomes

There were a few comments and questions that suggested that we might be trying to achieve outcomes that don't occur naturally. For example, a comment was made that anabranches around Goondiwindi haven't filled up for fifty years. Another question was asked about the length

of dry periods and in particular how long waterholes were dry pre-development, and how birds managed to breed during long dry spells. There was also a comment that development has increased base flows in the Border Rivers.

There was a question about the implications of the Northern Basin Review for Ramsar-listed⁴ wetlands (apart from the Narran Lakes).

With regard to monitoring, there was a discussion on how to reflect improvements towards indicators, reporting of non-achievements, and being clear about how long it will be before we can scientifically measure environmental outcomes. There was a related question about environmental benchmarking, and understanding what's been gained so far and how we are actually reporting on any environmental improvements achieved.

There was some uncertainty around the environmental indicators and how you might justify going for a higher number recovery of 415 GL, given the increase in social impacts, with one suggestion that environmental outcomes aren't being achieved with the recovery anyway. There were also queries about the level of confidence in the connection between the flows and ecological outcomes, like fish breeding and health of riparian vegetation.

Some other comments on outcomes and how they are balanced against the social effects of water recovery are covered in the section on 'Decision-making' below.

The science in general

People were keen to understand exactly what had been covered in the environmental science and why certain areas were included. They also asked how much work was 'new' or original.

It was asked how managed storages and weirs (Beardmore dam and the regulated stretch of the Condamine down to Cubbie weir) had been considered in the research.

In general

People wanted us to acknowledge the value of storages behind dams and weirs as drought refuges for fish.

People also worried that achievement of environmental outcomes are linked to volumes, for example, the level of confidence between flows and achieving fish breeding or good riparian vegetation.

People also wanted their local knowledge considered and valued — MDBA shouldn't just assume there is environmental damage. The point was also made that we need to link the fish, waterbird and floodplain vegetation outcomes back to the value these have for people.

MDBA response

We understand that rivers in the north are variable — naturally having times of low or no flow, as well as times of bank-full flows and floods. However, flows have also altered because of human

⁴ Ramsar Convention on Wetlands of International Importance, of which Australia is a signatory. There are 16 such in the Murray-Darling Basin; five in the northern Basin: Currawinya Lakes, Paroo River wetlands, Gwydir Wetlands, Macquarie Marshes and Narran Lakes.

use of water, sometimes meaning that important plant and animal communities do not receive water (or sufficient water) often enough or for long enough and are deteriorating. This may be because they are dependent on such flow or inundation to stimulate breeding or germination or simply recover after a long dry period. Other outcomes for a particular area might include improved native fish numbers and distribution, better opportunities for waterbird breeding and numbers, and healthier streamside and floodplain vegetation.

Our work for many years has sought to understand these water needs for a range of species/communities in a number of places considered ecologically important, and determining minimum ‘flow regimes’ to keep them healthy – and thus how much water is needed in the river system to meet the desired outcomes. The required flow regime (including the amount of water) to meet indicators varies in catchments and for different types of plant/animal communities because of their specific needs and the local hydrology and climate. For example, river red gum communities may need to be inundated for periods of time to achieve an indicator, while a fish community may need short pulses of flow more often.

However, the northern part of the Murray–Darling Basin was less well-studied than the south, so the Review work sought to increase the knowledge base. Some examples of new work include floodplain vegetation mapping and the identification of the type and location of in-stream fish habitats along the Barwon–Darling. In addition, we used our hydrologic models to run different northern Basin water recovery scenarios. These models use flow data collected at a number of stream gauge locations as well as 114 years of climate information to correlate flows at these sites. Analysing flows over such a long period of time allows us to account for natural variability in flows and comparison at consistent sites. This modelling helped us better understand the effects of different water recovery scenarios on meeting the required ecological outcomes (based on meeting the flow indicators).

Some of the hydrological modelling results appear to show conflicting achievement of indicators at different recovery levels, in some instances showing more indicators being achieved with a smaller volume of environmental water.

In addition to different volumes, different approaches to water sharing and recovery were explored using hydrological modelling. The MDBA investigated what would happen if different types of entitlements were recovered, and in different locations. The results showed that the volume of recovery is important as additional flows in the system support long-term river health. In addition, by targeting particular entitlement types in particular locations, key environmental outcomes can be further improved, which is why you sometimes see more environmental indicators met with lower overall recovery volume. The scientific information has been reviewed by independent experts and considered fit for purpose. While there is some uncertainty, there is a level of confidence that the trends are real and that improving flows will lead to better environmental outcomes. More details on the new knowledge generated can be found in the project reports. A list of new projects and reports are available on the MDBA website.

The indicators/outcomes approach we’ve used in our environmental analysis is underpinned by extensive and peer-reviewed scientific work over many years including research, the appropriate use of indicators of ecological condition and hydrologic modelling. Detailed information on the hydrological modelling is contained in the ‘Hydrologic Modelling for the Northern Basin Review’ technical report and its summary on our website.

How we selected the environmental flow indicators in different catchments is set out in a series of reports called environmental water requirements reports. These reports outline the evidence base for our choice of different targets and indicator sites, which indicators have changed as a part of the review and why.

The proposed reduction in the water recovery target from 390GL to 320GL in the northern basin recognises that there are some areas where enough water has been recovered (such as the Macquarie system), and recommend that the local recovery targets for those areas are reduced. Likewise, there are areas where additional water recovery is still necessary to ensure acceptable environmental outcomes are achieved. Full details on the revised recovery volumes are included in the Northern Basin Review Report on the MDBA website.

Given most water recovery scenarios assume a degree of coordination of flows in the northern Basin, there were questions about the extent to which this is achievable.

There were questions about what would happen if, having chosen a particular volume:

- the environmental outcomes were not achieved in the long-term
- how the additional water recovered can be managed
- ‘how often can you get the events you want?’

Certain catchments were noted to be particularly difficult in terms of flow coordination (for example, there is no dam on the Barwon–Darling), so delivery of environmental water is difficult. People also suggested that the coordination of flow events was impractical in the Gwydir and the Macquarie.

There was a specific question about whether the 390GL fully-implemented Basin Plan scenario can be achieved by river operators, and an inference that it can't be. A person commented that the MDBA needed to acknowledge that the modelling is a planning tool, and that it relies on perfect foresight which is not possible. Similar concerns were expressed about the dampening of risk (i.e. delivery risk) in the modelling assumptions, with comments that it is unlikely water will be able to be delivered to achieve flow targets in a timely way and the knowledge gaps about this are large. Further, while modelling might be valid in terms of planning assumptions, it is not valid in terms of operation. It was noted that new technology, such as Computer Aided River Management (CARM), might be able to support improved coordination and delivery practices.

There was a comment that it is commendable that the MDBA aims to do more with less, but the reality of the northern system means that coordination is very challenging. An additional challenge was noted as understanding the decrease in yield from catchment runoff, which was considered likely to make coordinating flows even more difficult.

MDBA response

We acknowledge that coordination of flows is a challenge, and there is work to be done with operators to consider what might be practically achieved. Different delivery assumptions have been tested, and different environmental outcomes are achievable under different delivery approaches, with coordinated approach providing further improvement. More information on the assumptions in the modelling are contained in “Hydrologic Modelling for the Northern Basin Review” on our website.

The outcomes targeted under the proposed amendment do rely on the coordination of flows to achieve some outcomes. To increase confidence in the achievement of these outcomes, the MDBA has also proposed that a number of actions are undertaken to support this, including possible augmentation of bifurcation weirs in the Lower Balonne to allow low flows to be actively managed. More information on these actions can be found in the Review report on our website.

Water for the environment

There were diverse views about water for the environment. One contributor to the online engagement space from near Goondiwindi noted that the environment needs to be prioritised – ‘a healthy working river is one that is respected as the first priority and not as an aspect that comes after all other water users have taken their share’.

Those in the southern part of the northern basin system argued that there needed to be more water flowing through, with support for the 415GL recovery target in Brewarrina and the 390GL recovery target in Wilcannia. Some comments were also made at the meeting in Toowoomba that the indicators were not broad enough to cover all species. For example, macroinvertebrates are highly impacted by not having enough water, so we need to consider them as well.

There was also a specific discussion about Narran Lakes in a number of the meetings held, with people concerned that water being pumped out upstream means not enough was reaching the lakes — there was mention of water being pumped out at the Culgoa bifurcation. Aboriginal people emphasised the cultural importance of the site and others noted concern about the decline in species and threat to bird breeding events, and even our ability to meet our Ramsar obligations. There were also concerns about waterbird breeding at Narran Lake, the decline in species numbers, and about how sufficient water would be recovered to ensure that it remained an important breeding site for waterbirds. At the Walgett meeting, the Narran Lakes was noted as an important component of the system, particularly for bird breeding. There were also questions about environmental indicators, and concern they aren't being met for Narran Lakes, and questions on whether flow volume is the right measure for outcomes here.

There was support by some people in the Macquarie for water for the marshes - people rely on the water for grazing outcomes, as well as the healthy environment.

People expressed concerns about how buyback of water for the environment is being managed, in particular where it comes from, with a comment that one seller wanted to sell back water from a creek that is dry 90% of the time.

There were also concerns that sometimes too much water was being used for environmental purposes; for example, in community meetings in the Macquarie region some people felt too much water was going to the Macquarie Marshes. There were also some concerns that agricultural areas could be inundated by environmental watering, and that environmental watering might contribute to an increase in carp numbers. There was also a concern that the Gwydir wetlands were being watered during the drought, although during the meeting an Office of Environment and Heritage (NSW) representative explained that this was done purposefully to build resilience where possible.

A few comments were made in support of increased flows supporting social and economic outcomes, with comments made that the Basin Plan means more water will now flow past

Bourke, and also comments about the productive value of the water to the floodplain. It was also noted that it needs to be acknowledged that environmental water has economic value and vice versa for irrigation water.

In particular, people were keen on the value of environmental water in providing more reliability in low flows. There was a comment that it was in the interests of Bourke to get more water downstream for both irrigators and the river. In general, the values of low flows were seen as important for socio-economic reasons; so there is more information on these flows in section 'Socio-economic issues'.

Improved river health was of particular importance to the Aboriginal community, who highly value healthy rivers as vital for social and spiritual health, as well as for fishing. There were comments that flows were needed for the Brewarrina fish traps; and that this was an important site for monitoring and the Aboriginal community is keen to be involved in this. More detail on Aboriginal views and issues is presented later in this document.

Recreational fishers also noted the importance of river health for improved fishing conditions. In general people wanted to see improvements in water quality and also acknowledged that flushes through the system have a role in this. People in Walgett also acknowledged that they wanted to make sure the environment would be healthy, both now and in the future.

There were many comments relating to the use of water for the environment: how you would know when outcomes are being achieved (especially given lag times); what MDBA will do to show that flows lead to outcomes; and what actually constitutes a healthy river? Some people from Wee Waa seriously questioned why water would be purchased around their area, given most environmental watering has taken place in the Upper Namoi.

People were keen to understand how environmental outcomes (which are sometimes seen as vague) are balanced against the social effects of water recovery. This issue is covered in the section on 'Decision-making'.

MDBA response

Improving environmental outcomes in the Basin is a key objective of the Basin Plan. Water recovered either through efficiencies or purchase is being used and will continue to be used, to achieve these aims in accordance with the Basin-wide environmental watering strategy available on our website.

Hydrological modelling

The hydrological modelling has been an important component of the Northern Basin Review in showing how water recovery can influence both the environmental outcomes that are achieved and what the social and economic effects might be.

People were interested in understanding how the new modelling compares with the original modelling done while developing the Basin Plan, and some concerns were raised about the science used to produce the numbers in the Basin Plan and confusion about why certain numbers i.e. volumes, have been chosen for water recovery.

There was a specific concern around how local recovery targets were set. For example a question was raised around changes in the local recovery target in the Macquarie from 2011 to

the final Basin Plan in 2012. There were also questions about equity in the assignment of local recovery targets between catchments. (See equity section earlier in the document).

Concerns were raised about the grouping of various rivers, and how water recovery occurred across catchments. There was a specific question about why the Macquarie, Bogan and Castlereagh rivers were combined in the hydrologic model. People felt that the Macquarie has provided all the water recovery, but because the other two valleys are included in the overall assessment, the effects on the Macquarie valley are underestimated and under-stated. There was also a query about the level of use of entitlements assumed in the modelling.

A comment was made that there has been a drying trend over the past few decades, and that this should be considered in the modelling — as such a trend would take more water to wet up the system, which would have an effect on the low inflow years. People wanted the MDBA to put a relative value on this observation, as it will make a difference to how the water might be recovered, i.e. the trend could take us back to where we are now, even if a decision is made to recover more water.

Some people felt that models should only be used as planning tools; that they do not necessarily inform what is achievable on the ground. Nor are the assumptions that underpin the models fully understood. People were keen for the MDBA to share the information and help people gain confidence that the models reflect what can really happen, as well as understand the extent to which it is possible to have certainty in the results from the models.

People were also keen to understand how connectivity was considered in systems with low connectivity, such as the Gwydir wetlands.

They also noted how difficult it would be to understand how much water should be recovered for the environment due to the high degree of variability in river flows in the Northern Basin.

MDBA response

Computer-based hydrological models are used around the world to help understand, plan and manage river systems. They have been used by State and the Australian Government for more than forty years to manage the Murray–Darling Basin. These software tools allow simulations of the flow and behaviour of water along a river system. They contain more than 114 years of data, including rainfall, temperature, evaporation and the amount of water passing flow gauges along rivers. Model runs (scenario modelling) may also include the relevant agreed water sharing rules, river operating rules and even landscape information, e.g. about the floodplains, wetlands and various works constructed on the rivers. Because of this they can take account of:

- the movement of water through the river channels and associated floodplains, wetlands and anabranches
- losses and gains as water moves through the landscape
- how we manage the storage, supply and use of water for various purposes.

Environmental scientists within the MDBA used the hydrological modelling to determine whether progress towards meeting indicators of environmental health is being made — as different amounts of water represented by the SDL scenario move throughout the northern Basin. This information is then used as an input to both the environmental and socio-economic research to understand availability of water in different areas.

There have been many more model runs for the Northern Basin Review than the original modelling for the Basin Plan, giving a much better picture of what environmental outcomes are likely to be achieved. Even where indicators were not achieved, modelling allows us to understand progress towards them. In general, achievement of environmental indicators was found to depend on the quantity of recovered water as well as how and where the water is recovered and used.

The feedback from communities helped to inform and update the modelling throughout the Northern Basin Review. We agree that it is important for communities to have access to detailed information to understand the modelling. A comprehensive report on the hydrological modelling entitled 'Hydrologic Modelling for the Northern Basin Review', along with a summary report, is available on our website.

Social and economic factors

How communities were affected by the water reform process was a major topic of conversation during all meetings. In general there was support for the social and economic research. People appreciated the new work as it showed the real effects of water recovery and other drivers of change on towns throughout the Northern Basin. The following provides an overview of the key topics of discussion.

Social and economic research data and context

Community members were most interested in understanding how the outcomes of the Northern Basin Review may influence their community, with communities emphasising the need to minimise impacts on the health and viability of their towns. Communities noted the link between landholders' productivity and how this is reflected in the community during both prosperous and difficult times.

People said that it was good to see the research confirming some of what communities have been saying for a number of years in regards to the changes they are experiencing. They also commented that the economic decline (i.e. job numbers) suggested through the research in some towns as a result of the Basin Plan reform can contribute to informing the approach on further water recovery. The work was seen as useful evidence to make representations to governments for assistance to help communities adjust. People also commented on a sense of validation that their experiences of pain as a result of the reform had been borne out in the results of the work.

There was also a lot of interest in understanding what data had been used for the social and economic studies. People wanted to know when it was collected and how it reflected changes in the climate, environment and social settings faced by communities. There was also a question about the 2016 Census data and if the results will be incorporated into the analysis.

It was noted at one meeting that a significant period of the data collection was during Australia's drought period. It was felt by some that this may not be representative of the general health of a community, although it might offer some insight in comparing how a community responds under wet and dry conditions.

There were questions about tipping points, i.e. to what extent are communities able to adapt to change? There was also a comment that the social and economic model could be helpful for the community to think about their future.

The relationship between water recovery and any beneficial social and economic effects was identified as a key area of interest. Additionally, the impacts of the various recovery scenarios were queried; particularly what would happen if nothing were to be changed in terms of water recovery. Information on the changes in production, as well as area planted according to different water recovery scenarios was raised as another area of interest.

The underlying assumptions and limitations of the socio-economic models generated interest at a number of meetings. It was suggested that there needs to be context placed around the social and economic modelling numbers — such as what's going on in a town versus what's going on with the farming community in the area. The information should also be explained within the context of what is happening to rural communities on a national level. This included how any changes to farming have been taken into account.

Additionally, there were several questions about what the assumptions are in the socio-economic modelling regarding what water has been recovered and how this influences the outcomes or scenarios.

MDBA response

The data used for the social and economic work was based on the Australian Census data collected in 2001, 2006 and 2011. Given the timing of the 2016 Census, the updated data was not able to be included within the Review.

The MDBA has decided to propose amendments to the Basin Plan which include changes to sustainable diversion limits in the northern basin. In making this decision we deemed that current recovery levels (278GL) would not deliver sufficient environmental outcomes. In making a recommendation to revise down the 390GL target to 320 GL, we feel it strikes the best balance in ensuring the health of our northern rivers while limiting the impacts on communities. The full rationale for the decision is provided in the Northern Basin Review report on our website

Community profiles that provide statistical information on the population, employment, socioeconomic advantage, agricultural production and water availability for each community, as well as local perspectives on their history, business environment and current state are provided on our website.

Social and economic impacts of water recovery

There was a strong sense in many irrigation communities that there had been too much water recovered and that the reform had a strong negative impact on towns. People in these regions wanted buybacks halted, and wanted to understand how they could influence the MDBA to reduce the recovery to current water recovery levels. Some people also called for environmental water to be returned to irrigators.

There was a perception that the MDBA needs to better explain what the social and economic effects of the Basin Plan are on regional communities. It was observed that many of the newer people in towns don't have the same level of understanding about how big these impacts might be on their businesses. There is also concern held by some communities that smaller irrigators

may not be able to continue in the current climate, and that the money received through buybacks is not a good solution, because it sometimes ends with people leaving towns and causing flow on-effects — they want to keep people in their communities.

The effect of water recovery on jobs was a key theme, possibly because the MDBA presented information on jobs decline as an indicator of economic impact during Phase 2 community meetings. Employment was also mentioned by a contributor to the online engagement space from St. George, with concern that businesses will downsize and jobs will be lost if the current water recovery volume was achieved.

People wanted to understand what factors were influencing structural changes within a community; for example, how do communities respond to technology changes that affect employment? Understanding the influences that play a role in restructuring communities was seen as a critical component of addressing how to deal with change. Communities expressed interest in the role of seasonal variation in employment and what can be attributed to technological changes, mechanisation and on farm efficiency programs.

Concern was expressed, particularly by the Wee Waa community, about the volume of water recovered from the area; with serious concerns about the social and economic effects on businesses and the town. These are not the first reductions in water use experienced by Wee Waa or the Namoi catchment so there is angst regarding the ongoing pressures placed on the communities. Views expressed indicated an interest in understanding why the jobs impact is only rated as modest given the belief that Wee Waa has a high reliance on irrigation.

There was significant apprehension regarding the impact of water recovery and associated changes affecting the ability to get young people into work. It was noted that there has been a substantial decrease in the number of traineeships and apprenticeships across many rural towns. Essentially, landholders have wanted to employ people but they can't afford to take the risk when they don't have the confidence in the water supply and things like embargoes can happen unexpectedly.

A number of communities expressed concern about the economic survival of small towns. It was suggested that we should wait and see what the effects have been at the current level of water recovery; and in addition the drought should have given some indication of what will happen to towns in terms of recovering from water recovery. It was felt that the community compositions are changing in agricultural regions – cotton chippers are no longer needed and some specialised skills have left – but people need to be more skilled to operate new machinery and diversify with changes. Factors beyond water management are also reducing the employment opportunities in the regions, for example, the mechanisation of cotton farming. There was a sense that, to some extent, people need to be able to adapt and be resilient.

There was a question around how the MDBA will document the actual community effects. This stemmed from concern about the context rather than the numbers. There was comment that scale is important. This arose from discussions about whether the impacts felt by communities would be commensurate with the level of water recovery they experience. This was expressed as concern for how smaller towns, including those around Goondiwindi, would be able to cope and that the feeling that consideration needs to be given as to whether individual towns can absorb impacts. It was felt that the manner in which the water is recovered is very important to this subject.

MDBA response

Conversations with local people have informed the economic modelling which expanded upon the regional-level work that was done in the development of the Basin Plan. The MDBA focused on 21 communities to understand how places with differing degrees of dependence on irrigation have changed over time. We looked at how changes in water availability affected the area of irrigation and the flow-on effect on community employment, both in agriculture and other types of jobs such as retail, transport and government services.

This work was the most detailed work ever undertaken to assess the effects of water recovery on communities, and gave the MDBA a detailed picture of what was happening in communities as a result of the reform process versus other factors.

It is true that the effects of water recovery are generally greater for smaller economies that are highly irrigation-dependent, compared to those which are larger and more diverse. For Warren and Collarenebri, the recovery of water occurred some time ago. The effects are large and are continuing to impact those communities, even though no more water recovery is anticipated for these communities.

The Basin Plan amendment proposal offers better social and economic outcomes for irrigation communities compared with current Basin Plan settings. For many irrigation communities, no further water needs to be recovered.

Communities told us that other things would help the health of the river. The use of toolkit measures, instead of relying solely on water recovery, will keep further impacts to a minimum.

There will still be some effects, especially in the Condamine–Balonne. We need more water to remain in the system for crucial environmental outcomes, to sustain the river into the future. In recognition of impacts, especially in Dirranbandi and St George, the MDBA is advocating for support to help communities adjust.

The MDBA has produced materials to describe what happens in communities. These include community profiles that provide statistical information on the town and local perspectives on their history, business environment and current state. These are available on the MDBA website mdba.gov.au/BPamendments.

Support for affected communities

A theme common to the majority of meetings was what scope the MDBA may have for making recommendations to address negative social and economic effects that were indicated by the research, i.e. what form of help will be available to communities?

Structural adjustment was discussed as an important way to help communities recover from water buybacks. However, there was a feeling that historically, structural adjustment and associated funding has not been fairly managed. Comments reflected that previous Federal funding has been focussed on the southern basin.

There was a strong view, particularly from local councils and regional economic development groups, that the towns suffering from substantial water recovery should be compensated for their losses. It was felt that structural adjustment is needed to help remaining businesses diversify and also to get new businesses to slow the rate of potential job losses.

The MDBA was urged to make some urgent representation to government, show the impact on individual communities, and point out that it has not been addressed. Achieving balance in regards to helping affected communities adjust is considered to be of high importance.

MDBA response

The proposed reduction of the northern basin water recovery target was heavily influenced by the modelled socio-economic effects on communities if the full 390GL was recovered. However, we recognise that some communities have already been severely affected, and that further water recovery in some regions means increased social and economic impacts on those towns. For these reasons, a recommendation accompanying the proposed amendment is that an appropriate structural adjustment package be developed to support affected communities, particularly St George and Dirranbandi which are forecast to experience ongoing impacts as water recovery continues.

Water recovery methods

The method of water recovery is important to communities across the basin. Opinion expressed by community members was that recovery to date has had enough of an impact; and it is preferable to start looking at alternative options to achieve environmental outcomes that reduce the effects felt by communities.

Some people disagreed with the way we had considered infrastructure projects in the economic modelling. Some argued that even without government investment, businesses would have improved their efficiency and that the infrastructure gains lead to a reduction in opportunity for irrigation business to expand through innovation in the future.

There was also a query about what would happen if all remaining water that was needed to achieve recovery targets was recovered through infrastructure rather than buyback. There was a strong feeling that as NSW has been involved in water reform for a considerable period of time, they have felt the effects and seen the impacts throughout their towns. It was felt it is important to demonstrate the impacts that have already occurred in NSW valleys in comparison to Queensland – there were comments about the ‘heavy lifting’ that had already been done by NSW.

In the majority of meetings people said that infrastructure is a better way of saving water when compared to buybacks. Stemming from this, it was felt that money should be further invested in developing infrastructure rather than pursuing buybacks. Doing so would also enable environmental water managers to be able to use environmental water as efficiently as possible; for example, by pumping water into wetlands and then getting it back into the river. In the Macquarie it was asked, ‘what can the community really do to raise the profile of local projects in terms of water saving or infrastructure projects?’

Communities are concerned with the buyback of irrigation entitlements, particularly when water is bought from large-scale operators that are not local. There is also concern that small-scale irrigators may not be able to continue in the current economic climate; whereas larger irrigators may have more capacity to adapt.

MDBA response

Water recovery targets were designed to be met by a combination of purchase and infrastructure improvements. People are able to voluntarily sell their entitlements to the Federal Government.

Infrastructure funding is currently prioritised over buyback, as infrastructure improvement allows some water to remain in communities which lessens the impact of the recovery.

The benefits of more water for the environment and community

Increases in water availability will not just benefit the environment. There was recognition that more water may provide some better social and economic outcomes. Keeping water in the rivers was described as important to businesses that rely on the irrigation industry.

Water in the rivers provides financial savings for some communities too. It was noted that the cost of treating town water increases if the river keeps experiencing low flows of short duration. This was explained as being due to poor water quality and was also seen as a potential impact on some businesses. For example, when water quality is poor, salt content goes up and things aren't very good for citrus growing. The system needs enough flushes of water to improve water quality. As part of this, councils should be asked to show how their water treatment costs vary with the flow conditions. These comments reflected community views, particularly at meetings lower in the system.

This theme was also noted by a user from Goondiwindi via the online forum. That is, rivers give people the opportunity for many economic, social and recreational activities. From the income and jobs in irrigation farming, right through to the quiet pleasure of sitting on the riverbank and watching the birds, towns and farms on rivers have a lot to offer.

A contributor to the online engagement forum from the southern basin also commented that the environment, communities and industry are connected (in the north), so we need to make sure the way we use the river does not affect them.

MDBA response

The Basin Plan recognises that past arrangements wouldn't provide communities and industries with a healthy river they can rely on into the future. The proposed amendment aims to ensure we can maintain the health of our northern rivers for the benefit of all communities, while minimising the negative effects of reform.

The role of low flows

The role of and need for low flows in rivers was a frequently discussed topic, particularly in downstream towns. It was identified that low flows in the river are very important to graziers and others living on the floodplain and these flows need to be protected. As such, the social and economic research needs to take into account the effects on everyone along the river. There was discussion around the risks of making any changes to what the Basin Plan set out to do and how this may affect the floodplain community. If the changes are too significant, there was a belief the MDBA is essentially underwriting the irrigators and not caring about the floodplain grazing community and others that rely on water.

It was also identified that when the river is dry, landholders lose their boundaries (as the river acts as a boundary fence), so there are multiple benefits to keeping water in the river, even at low flows.

For downstream communities there was a very strong feeling that upstream diversions have played a big role in the problems faced in their regions. Establishing a way to protect resources from over-use and misuse is a goal that will support these communities. It was suggested that upstream irrigators have too much opportunity to take water, and that it is critical that a balance is restored.

It was also noted that there were impacts from insufficient flows and of low water quality on fishing. This has both recreational importance and cultural importance for Aboriginal people who rely on their ability to fish in their part of the river.

The issue of riparian rights was critically important to people around Louth. Here the emphasis was again the issue of upstream take. The belief is that those upstream (particularly irrigators) have pumped all the water out (and seem to get a greater share) so by the time it reaches those downstream of Bourke the river is barely at a trickle. There was a comment that we need to establish ways of using the resource properly rather than just taking it when it's there and complaining when it's not. The issue of reliability was a big concern in this region. The guarantee of water supply and a constant flow in the river is important, along with the influence of 'upriver' factors.

In some downstream communities, a water recovery target of 415GL was preferred as this should allow more water to reach the end of the system. As indicated above, some people identified upstream development as having had a big impact on towns, communities and stock and domestic water users. It is felt that this cost has not been recognised.

A specific plea was made to change the total volume set aside in the Lower Balonne for environment, stock and domestic flows, so as to achieve flows through to the end of the system. The currently daily pass flow of 730 ML/day is not adequate.

MDBA response

As part of the social and economic assessment, the MDBA undertook a study on the effects of the different water recovery scenarios on floodplain graziers. A report on this study, entitled 'Lower Balonne Floodplain Grazing Model Report' is available on our website. This study assessed the social and economic benefits that floodplain watering events have on local agricultural production in the area and, in turn, benefits to the rural community that relies on it.

Upstream development has changed flows in the Lower Balonne; in particular affecting the overbank flows that inundate the floodplain and the more regular small flows to people at the end of the system. This has affected the ability of graziers to stock cattle. Future water recovery in the Condamine-Balonne is expected to provide some downstream economic benefits to the floodplain graziers and communities such as Goodooga and Brewarrina. This recovery will result in more frequent inundation of the mid and outer floodplain, increasing pasture production and stock holding capacity. The targeting of overland flow licenses in particular locations also influences outcomes for graziers and provides indirect benefits.

Aboriginal views and issues

The views of Aboriginal people that participated in the consultation have been included as an integral component of the collective community voice throughout the report. However, there were some issues and points that Aboriginal people sought to make specifically about the participation

of Aboriginal people in water management, as well as comments made in response to presentations on the Aboriginal cultural survey work during Phase 2 meetings. These comments are reflected below.

Aboriginal participation in water management

It was recognised that while many of the issues raised by Aboriginal people also affect community members in general, there are a number of issues specific to the Aboriginal population that need to be considered in the decision-making process.

It was felt the Aboriginal survey work demonstrates the importance of engaging with all stakeholders across the Basin. Throughout the various community meetings we held, we sought clarification about whether the survey was designed to provide cultural license to Aboriginal people.

Many Aboriginal participants were interested in how the MDBA would consider early results of the Aboriginal cultural survey work in the decision-making process.

There was also a question about whether environmental water use is synonymous with Aboriginal goals. There was a comment that we should be cautious about framing the debate as a contest for water between Aboriginal people and irrigators. It was stated that Aboriginal leaders did not see it that way, and that they understood the realities of contemporary water entitlements and were looking at realistic options.

In Wilcannia it was suggested that there needs to be stronger recognition of Indigenous entitlement throughout the process, as there is already entitlement recognition for all other parties (e.g. irrigators) involved. In terms of policy issues, there was also concern about how NSW will fulfil legislative requirements (which relates to Indigenous values and uses of water).

People thought NBAN had an important role, although there was some concern that they could be used as just 'another tick in the box' for policy makers.

On the discussion of the involvement of Aboriginal people in water management, it was stated that the collection of information is an essential part of water management and that the information and new knowledge needs to be brought back to communities. There was a question about whether there had been a specific assessment of any enhancement of Aboriginal values against the different recovery scenarios. Aboriginal people also wanted to understand the social and economic implications of the different recovery options, and have access to results and reports from any scientific work being done in the Northern Basin Review, as well as any other relevant work to understand water flows and impacts of water decisions on their communities.

Traditional Owners and Elders have typically held the knowledge for their communities and therefore whatever other knowledge is gathered should come back to the nations so they can keep their information to help secure their futures. Sentiments were expressed that this process is about giving to each other and sharing with each other, not just for Aboriginal people but for all people. It highlights the absolute need to work together, not as separate groups, but as joint forces with interests in keeping our rivers and cultures alive.

Traditional Owners wish to build the capacity of Aboriginal people to participate in water resource planning. Building capacity is vital to their engagement with and protection of Country. Aboriginal

participants wanted to understand how they could be supported to participate more and have a voice alongside landholders and other stakeholders, including the very well-resourced irrigators. NBAN representatives also commented that there are good relationships with some landholders and good outcomes from collaboration between the Aboriginal people and landholders in terms of accessing land – ‘we all need to work together on this stuff’.

It was also made clear that Aboriginal people aspire to more than jobs in agriculture, they want to have a role in managing the water. This is important both economically and culturally and there is a desire for this to be reflected in the decision-making process.

Some comments emphasised the fact that different people view the health of the rivers differently; and while Aboriginal people may value different aspects of the landscape, all perspectives are equally valid.

MDBA response

The intention of the Aboriginal survey was to better understand how Aboriginal people as a whole view environmental water, and to further understand the relationship between environmental outcomes and cultural outcomes.

During consultations, NBAN representatives described the importance of the work as 'the science of how Aboriginal people interact with water', and that people have been immensely dedicated to this work. The MDBA has a strong interest in continuing this work.

Through discussion and work with the Northern Basin Aboriginal Nations, the MDBA identified and recommends to governments a number of measures that could address some of the serious concerns of Aboriginal people and acknowledge their connection to Country and the rivers.

- ensuring Aboriginal access to waterways
- replacing or refurbishing weir pools at certain locations, such as Wilcannia and Cunnamulla
- continuing to improve the capacity of Aboriginal people to engage in water planning and decision-making in order to factor in their social and cultural imperatives.

Aboriginal social and economic outcomes

Specific socio-economic impacts of water policy decisions were also discussed in a number of meetings. This included a comment that the Aboriginal community are among the most disadvantaged people in the Basin. This prompted further interest in how to include Aboriginal outcomes in water management objectives. It was stated that through achieving some better environmental outcomes in conjunction with some shared Aboriginal beneficial outcomes, there will be opportunity to reflect improved socio-economic conditions in towns.

People mentioned a number of negative cultural and social effects of poor river health on Aboriginal people; for example, it was mentioned in Bourke that there appeared to be a correlation between higher rates of crime and an unhealthy river.

There was interest in exploring cultural flows that might include some economic opportunities as well. It was also mentioned that there is a need for some assistance in enabling people to better understand what opportunities there are and it was felt that it would be good for people to know what is actually on the table and what the limitations are in regards to Northern Basin Review

outcomes. Also that there needs to be a proper framework for Aboriginal inclusion and information needs to be more readily available.

MDBA response

The purpose of the socio-cultural work was to investigate six socio-cultural factors that are important to Aboriginal people — physical, social, financial, natural, human and cultural. The method used was a standard technique for work of this nature and is considered fit-for-purpose. The Aboriginal socio-cultural report 'Our water, our life - An Aboriginal study in the Northern Basin' is available on our website.

As outlined in this report, there is a correlation between environmental outcomes and socio-cultural outcomes for Aboriginal people. However, ultimately the interests are different, and need to be considered separately (see below).

MDBA has also done some work on social and economic implications of the water recovery. This work provides baseline reading about socio-economic water-related interests in the basin that affect people identifying with an Aboriginal background. The report 'A survey of Aboriginal water interests' is available on our website.

Cultural connection to water

Giving cultural values and cultural law sufficient consideration was a recurring theme at meetings. Discussions reflected that management of environmental flows should be sensitive to cultural values. There was a concern that current management and legislation ignore cultural law. In Aboriginal cultural law, water must be allowed to pass downstream to the next users. There was a perception that bureaucratic mismanagement of the river has led to Aboriginal law being ignored.

A discussion noted that current management arrangements include a range of indicators for environmental health and there are a multitude of studies conducted on water quality, fish breeding and for other environmental issues, but in general the cultural health of a system is neglected. People felt that if researchers can establish a method of determining when a certain fish species is in danger or when water quality levels are unsafe, it must be possible to understand when cultural sites are at risk. Inserting cultural triggers into state watering plans was seen as a significant step towards appreciating and understanding the threat that small river flows place on cultural sites.

People emphasised that there is a strong connection between cultural values and societal impacts. The Brewarrina fish traps are an example of the decline of a cultural site. Meeting participants expressed that they were very concerned about the water not going through to the fish traps and also that the fishway isn't properly monitored. Additionally, as a result of modern management intervention, namely the Brewarrina weir, the fish traps have been impacted. They are currently overgrown with river weeds that have become more prevalent since the completion of the weir and the adjacent fishway. The fish traps play an important role in the Aboriginal culture of the area — they are an example of a cultural site which, if more Aboriginal consultation was sought, could have resulted in a more harmonious outcome for the cultural site and river health.

During community consultation in Wilcannia, strong concern was raised about the state of the river. Seeing the river run dry (climatic conditions aside) was seen as a failure of water policy. It was strongly stated that Aboriginal culture is connected to the river. There are sites of significance, cultural value and stories that rely on water being in the river. If there is no flow, then Aboriginal people lose their stories and their connection to that part of the river. 'It is about the river, not just the water; it's about the fish, the flowers, plants and spirit. It is important that spirit is taken into account along with the science. This applies to all people, not just for Aboriginal people.'

People felt there is a need to understand and document the requirement for cultural flows on a seasonal basis to try and meet a number of needs — such as bird-breeding, watering of important vegetation and to allow sharing of knowledge. It was suggested that timing some events during school holidays so Aboriginal children can be involved would be a beneficial way of encouraging knowledge sharing and development.

MDBA response

MDBA works closely with Aboriginal representative groups in all the work we do. We actively work to promote understanding of the Aboriginal community's unique, spiritual connection to Country. Through the Northern Basin Review we conducted additional research into Aboriginal socio-cultural heritage to assist with this.

Aboriginal access issues

While not directly related to the Northern Basin review, access to cultural sites on waterways was raised as extremely important to Aboriginal communities at a number of meetings. A common discussion during meetings highlighted that the lack of access to the river for Aboriginal people is a widespread problem. As more travelling stock reserves and Crown Lands are leased out or sold to farmers, Aboriginal people are losing access to their traditional lands and sites.

At a meeting in St George it was noted that in some cases Aboriginal people have owned land, but felt that their ability to take full advantage of this has been affected through reductions in government funding, which has led to the land being sold. This was identified as often the reason for Aboriginal people giving up their access.

MDBA response

The MDBA noted that access to cultural sites is central to Aboriginal identity. MDBA does not have jurisdiction over land access arrangements. We have passed on the feedback received to our state government colleagues who have responsibility in this area.

Monitoring and evaluation

There was widespread support for broad, on-going monitoring of environmental outcomes. People are worried that there is not a well-coordinated monitoring program that goes beyond flow monitoring, and wanted investment so that the science improves. Improved monitoring was also seen as important in understanding the accuracy of models and for customising models in the future for different locations. One comment was made that good monitoring will ensure we know

to what extent flow contributed to environmental outcomes and the effect of other non-flow actions, e.g. control of alien species.

Metering, monitoring and accountability for water users was also seen as important in making sure water arrives where it should to improve compliance.

Representatives of Macquarie River Food and Fibre mentioned that the irrigation efficiency program in one of the off-river schemes (Narromine) did not result in the expected water savings. There was a comment that an audit of the effectiveness of some of the Commonwealth government projects in the north should be undertaken.

People were also keen to have a role in monitoring their local environment. Citizen science was flagged as one way to involve local people in local data, but other general comments were made about the need to use local people to understand the health of their local environment. It was seen as important to understand the communities, the issues, the history and the people. Aboriginal people felt that monitoring flows, for example those through the Brewarrina fish traps, could help to empower Elders.

Though most monitoring comments related to the environment, there was one comment that it will also be important to have ongoing social and economic studies as the plan rolls out.

There was also a question about meeting our environmental targets.

MDBA response

The MDBA has ongoing programs that monitor vegetation, waterbirds and fish across the Basin and also utilises data from the state-managed hydrometric network to monitor flows and water quality. The Basin-scale vegetation monitoring project builds on a vegetation condition assessment run through The Living Murray program since 2007. Satellite imagery from Geoscience Australia is used to monitor not just vegetation, but also the presence of water in waterholes, wetlands and low-lying floodplains. All these programs have historical data, with the oldest gauging stations still operating in the Basin being more than a century old.

The annual waterbird and fish monitoring projects are not designed for Basin Plan purposes, but are compatible with monitoring programs with a minimum of 10 years of historic data. The satellite imagery used for vegetation and water observations has a 30-year archive and imagery is captured every fortnight. This monitoring program will provide a well-informed picture of past, current and future conditions in the Basin. A map of our monitoring sites and other data sets can be found on our website..

Results on the effectiveness of the Basin Plan are published each year in a Basin Plan annual report and can also be sourced from our website. This report tracks the progress of the Basin Plan and associated water reforms.

In addition, the Commonwealth Environmental Water Office also monitors environmental outcomes, particularly in its long-term intervention program.

Water policy

Historical water policy decisions

Many participants mentioned fatigue and disillusionment with water policy – noting there has been continual change. While there was some hope the Basin Plan might end the uncertainty, there was scepticism about this and questions about what happens when the water resource plans are completed in 2019.

There is a clear desire from stakeholders to address perceived imbalances of the impacts of water reform policy across the states. Participants expressed the view that the impacts have been disproportionate and that any amendments to policy need to take this into consideration. There was concern noted at multiple meetings that, even prior to the Basin Plan, NSW has been through a lot of adjustment of water sharing arrangements for the environment, whereas QLD hasn't. It was stated there is a need for rebalancing of this so that when any future changes begin there won't be disproportionate or misrepresentative impacts.

The long history of water reform has created substantial change and it was commented that this has been forced on the irrigation industry, with the following decisions mentioned during the Goondiwindi Phase 1 community meeting as key issues:

- The 1989 decision to cease further development.
- The 1995 Cap decision.
- The changes due to the Queensland water resource plans and resource operations plans, and the NSW water sharing plans —which irrigators were not compensated for.
- The change to the pumping trigger for water harvesting (from a much lower trigger to the current trigger of 10,000ML over two days). This decision has greatly influenced how long people can pump for, from about 20 days down to eight days.

It was reflected that there is difficulty in understanding the exact role of all the various legislation and associated documents that govern the Basin, including the role of the Basin-wide environmental watering strategy once the Northern Basin Review is complete – this needs to be clarified. The way things are going has led to people becoming disillusioned by water management by state and federal governments and has created the belief that water will become a state election issue. The process of entitlements being worked out has been long and painful to landholders and has not been clear. This is part of the greater conversation about how water is managed.

An online contributor from Goondiwindi also noted adverse impacts of development — commenting that floodplain development in the past decade has not taken into account traditional flow patterns and that some developments have levelled not only tree lines, but also water holes, as if they never existed.

During meetings downstream of Bourke there was strong sentiment that water management is failing the users. At the time of the consultations, places like Wilcannia were on Level 1 water restrictions and there has already been two dry rivers in the last year. It is felt this is a result of the system being guided by politics. There were calls for the use of infrastructure to help the lower end of the system; however, overall it was suggested that when it comes to the Darling,

decision-makers aren't able to see the entire problem as they are too engrossed in individual issues. It was suggested that if NSW wants more water for the region then the Darling needs to be used for storing water on it.

There was confusion around the purpose of the embargo put in place last year by the NSW government, with people frustrated that water usually used for production was leaving the valley. This was echoed by concerns about how NSW managed the moratorium they placed and then lifted during last year, with Bourke being placed on restrictions soon after it was lifted. It was felt there is a need for more accountability through an independent panel or community board when decisions are being made on whether or not water should be embargoed to allow it to flow through the system and not be pumped for irrigation.

Around Narrabri and Moree, there was interest in understanding where the extra recovery amounts will come from. There is a desire to have the NSW Government help remove some uncertainty. There are concerns that trigger heights for supplementary pumping may be lifted, so people aren't necessarily giving water back visibly but there is still loss. For some irrigators on the Barwon there was no compensation for water they lost on the river back in the earlier days of recovery.

People also mentioned concern about past policy that allows water to be traded separately to land; for example, at Gunnedah people were worried about water going downstream to grow cotton. People would rather diversify into horticulture in the region to get more jobs, but it's hard to get the water back once this happens. It is also very difficult to compete with mining in the same market, as water has gone up by \$1,000/ML. People felt it would be really good to get more horticulture in the area as they believed it has a much higher value than things like cotton, and is much better for employment.

Two online comments from stakeholders outside the northern basin also focussed on water policy issues in the north, noting the risks from a lack of compliance in water extraction and a need for state government regulation to protect environmental flows.

MDBA response

The Basin Plan was introduced in 2012 in recognition that historical policy decisions had led to over-extraction of water from rivers and a decline in ecological health. Since then, much work has been done to further research and develop policy that supports a healthy river system, including the Basin-wide environmental watering strategy which aims to bring about enduring environmental change through strategic use of the water set aside for environmental health.

The decision to amend the water recovery levels in the Northern Basin Review was not taken lightly, and involved complex analysis, and weighing up of the options. Continuing water recovery will have an impact on communities, and the amount of water we are aiming to recover still leaves some environmental assets at risk. However, in weighing up all the evidence the MDBA is proposing an amendment that will safeguard the environment of the northern basin and the communities that rely on it in the long-term.

Barwon–Darling Water Sharing Plan/Water access licenses

A range of views were heard on the Barwon–Darling Water Sharing Plan, including that the current arrangements for the A, B and C class licenses don't make sense and that they are no

longer used as intended. It was noted that low flows are critically important and that there is no way to ensure people's rights are adequately protected. Another comment was that this is a deeply divisive issue within communities and to help with this, A Class water should be better protected.

There was a strong desire to get further information on how the various classes of licenses work and what conversion factor is used. Some regions, in particular downstream communities, identified their main issue as irrigation pumping heights. There is a widespread belief that as a result of the current arrangements, there has been inequitable use of water on the Barwon-Darling. It was commented that changes to conditions of use made by the NSW Government to A Class irrigation licenses has led to a reduction in low flows downstream of Bourke; although there was some difference in opinion as to how big an impact this has had on river flows. Previously, pumping sizes went from 150mm to no limit. Statements suggested that it must go back to 150 mm as these A Class licenses were meant to sustain the small communities and are no longer doing so. To add to the frustration it was felt that these changes were made with no consultation. The downstream communities are not happy with this process and the outcomes.

The changes to conditions of use for A Class irrigation licenses means that licences can be traded and used in a completely different way, for example, using large pumps to divert into storages rather than to directly irrigate small crops. It is alleged that small irrigators with A class licences involved in production of commodities (such as grapes, citrus and lucerne) have been affected due to a lack of access to sufficient good quality water. Part of the problem is that people are trying to push the limits of use with A class licenses by trying to irrigate areas greater than the license was intended for. It was felt that the larger scale irrigators are buying A class licences and taking the small flows.

General concern was raised that there is: a lack of information about the Barwon-Darling system in the Barwon-Darling water sharing plan; conversions of C to B class licenses; and inter-valley transfers. These haven't been modelled in the Basin Plan and there is a feeling that the system is going backward with a lack of a clear plan for the protection of environmental water.

A recurrent theme from downstream river users is low river flows and frustration was expressed regarding the current pumping rules. It was conveyed that it doesn't make sense for upstream users to be able to pump water and also carry over, when the river height is low downstream.

There was a sense that while people did not agree with the changes to pumping thresholds, they feel that the changes might contribute to making water supply more reliable. Some people felt that protection of environmental water isn't a problem as feared because the current Water Sharing Plan places a ceiling on diversions. Barwon-Darling water users do not get more long term water from these extra flows in the systems.

A major concern was the fact there is not enough environmental water coming down to the Narran Lakes. The Culgoa bifurcation means it disappears in the A Class licences where people pump it out. It is described as a real problem that people can just pump it out on low flows. A motion was put to the Western Council at Lightning Ridge to reduce the pump sizes back to the previous size of 150mm. All the A Class licenses have been acquired by the big operators making it difficult for smaller operators. It was noted that even when Bourke is on water restrictions, people still have full storages.

People wanted to understand whether or not changes had been incorporated into the modelling for the Northern Basin Review. This issue was of great concern, as people felt that water had been lost from the region and pumped out upstream, but that this would not be reflected in the modelling.

There are also examples of irrigators that still have licenses they no longer use for themselves and would like to be able to sell or trade the carryover. However, they are reluctant to sell licenses outside of the region and some might even prefer to sell them to the government to be used for environmental and other community benefits. There are many examples of small A class licenses that have been sold to new or large operators.

The issue of sleeper licenses was raised at a number of meetings. In some instances it was suggested that something should be done about the sleeper licenses to ensure there isn't a future drain on the system. Some people were concerned that last year the Northern Basin Advisory Committee advised there should be a buyback on the Barwon–Darling, although it was explained by another meeting participant that this was based on a request from landholders in that area seeking to sell their sleeper licenses.

MDBA response

MDBA has noted the concern of the community over changes to the Water Sharing Plan for the Barwon–Darling; however, NSW has jurisdiction on this plan.

The MDBA has actively considered this issue as part of the Northern Basin Review. As was noted under the section of 'Protection of environmental water' the proposed amendment does contain a recommendation that changes be made to state water resource plan rules to ensure protection of low flows (particularly in the Condamine–Balonne and Barwon–Darling). We have committed to work through issues with state governments and relevant license holders.

Communications and engagement

Communications

People sought information about the Northern Basin Review, particularly hydrology modelling, water recovery progress and outlook, Aboriginal survey work, environmental science and the socio-economic work.

Some comments were made that MDBA was slow to respond to issues and sometimes failed to follow up at all. The MDBA also needs to provide information in a timeframe that allows stakeholders to consider the information.

People also emphasised the importance of communication in ensuring a transparent process and some suggested that Councils could help.

MDBA response

This report attempts to address some criticism through documenting concerns and attempting to respond to the many questions and claims made.

How we engage

The consultation highlighted the need for us to continue to talk to a range of stakeholders in the northern basin. There were differing views about how to do this. Some people felt that invitees to the meetings in Phases 1 and 2 were a useful representative network; while others felt that the MDBA should be looking to engage with existing representative groups, such as through customer services committees, regional organisation of councils and environmental watering advisory groups.

The importance of communicating the Basin Plan more broadly was stressed, especially in cooperation with local government organisations. The importance of strong relationships with fishery managers, recreational fishers, schools, local landholders and other river users was also stressed.

Landholders were also seen as knowledgeable as many have lived in their area for a long time and can help us to understand local impacts and conditions. People also appreciate it when MDBA staff visit the rivers and talk to local people. In addition, MDBA would benefit from getting out and about and actually standing on the banks of the rivers to understand more at the ground level.

There was also a comment that we should have had more meetings in the lower part of the northern Basin to include more of the Darling River and dependent towns (Broken Hill, Menindee, and Wilcannia were mentioned specifically).

There were opposing views about the size of meetings — some comments were made about getting more community representatives to meetings and advertising more broadly, but there were also requests for smaller meetings as others were uncomfortable expressing their views in large groups. Overall, there was support for the MDBA to ensure as many people as possible understand the issues across the northern basin.

Capacity building for people in the Aboriginal community was seen as important to help Aboriginal people to participate more fully in water management and planning processes. There was a suggestion that we needed to be willing to go to the Aboriginal people more to get them to participate; for example, to football games and governmental inter-agency meetings (in Queensland). It was suggested that we incorporate Aboriginal needs for employment and industry early on in water management planning processes.

There was also a comment that the MDBA needs to consult more at the beginning of processes, with a sense from some people in Wee Waa that there had not been adequate opportunities to be involved and informed about river management.

Continuity in representation by the MDBA was also mentioned as an issue — it was thought that there are often different people coming from the MDBA.

*‘Different people come, we fill out questionnaires etc. but we never hear anything again. The last lot came out about a year ago, someone with a PhD came out on MDBA’s behalf but those involved didn’t hear anything back after that.’
Community member, Bourke.*

People also feel they are talking to us but are not being heard by the various government representatives. There is concern that the MDBA will not listen and also not come back.

MDBA response

We often receive feedback on how to engage better with communities, and we are constantly enhancing our engagement approach to meet the needs of the people we meet. We have attempted to address the feedback by returning several times during the year and we have invited all participants to attend the information session on the outcomes of the Review.

Consent to store contact details has been sought from participants during consultation. This should enable easier contact and follow-up with communities in the future.

All participants that provided their contact details were emailed a summary of the meetings they attended, and have received updates on information as it became available.

The feedback provided by communities during the consultation process has been valuable and helped us to formulate our recommendation and plan further work. We welcome ongoing feedback on how we can work productively with people in the northern basin.

Weather and climate

There was some discussion around the role of climate change and how it will be considered in the Basin Plan at some meetings. The long term dry conditions and the serious impacts of these events cause concern for many communities.

Some people felt that all the water is getting used higher up when there are flows. They contended that flows are not making it through the system as regularly as they used to and this cannot be attributed to weather.

MDBA response

An MDBA report on the hydrological modelling, undertaken in preparation for the Basin Plan, advises that modelling of the water recovery scenarios does not provide a forecast of what might happen under a future climatic regime. However, it broadly shows the impacts of various scenarios over the range of historic (more than 100 years of data) climatic conditions.

The average impact on water availability due to projected climate change is less than the natural climate variability to be experienced during the life of the Basin Plan. The additional water for the environment provided by the Basin Plan will provide buffering for ecosystems from in the effect on water availability due to climate change. However, under the Basin Plan, state water management plans will need to demonstrate that they can accommodate a wide range of climate and water availability scenarios.

More information on MDBA's approach to climate change can be found on the MDBA website.

Next steps

This report has outlined and summarised feedback received during Phase 1 and 2 community consultations and we have noted how this has been reflected in the proposed amendment as well as providing a brief response to the issues raised.

The process will move into a Basin Plan amendment phase. This will involve a new phase of public consultation as we explain the outcomes of the Review.

There are three ways to participate:

- face-to-face town visits
- organised intake of public submissions
- providing information through a range of channels (see below).

Additionally, there are three desired outcomes of the process:

- Basin Plan stakeholders (governments, industry, community organisations and individuals) consider they are acknowledged, valued and informed.
- Stakeholders are aware of the Basin Plan amendments and understand why they are being proposed by the MDBA.
- Basin communities are aware of and understand the opportunities to make formal submissions to contribute to the outcome of the Review.

Channels

Any interested people or groups can register their interest in being kept informed about future opportunities to participate in our work by contacting the MDBA either by email engagement@mdba.gov.au or phone 1800 230 067.

Alternatively, people will be invited to submit online submissions during the Basin Plan amendment phase. This can be done by visiting mdba.gov.au/BPamendments

Appendix A – Feedback forms from community meetings

A short feedback form was provided to each participant for input at each of the nine community-based meetings. A copy of this form is below.

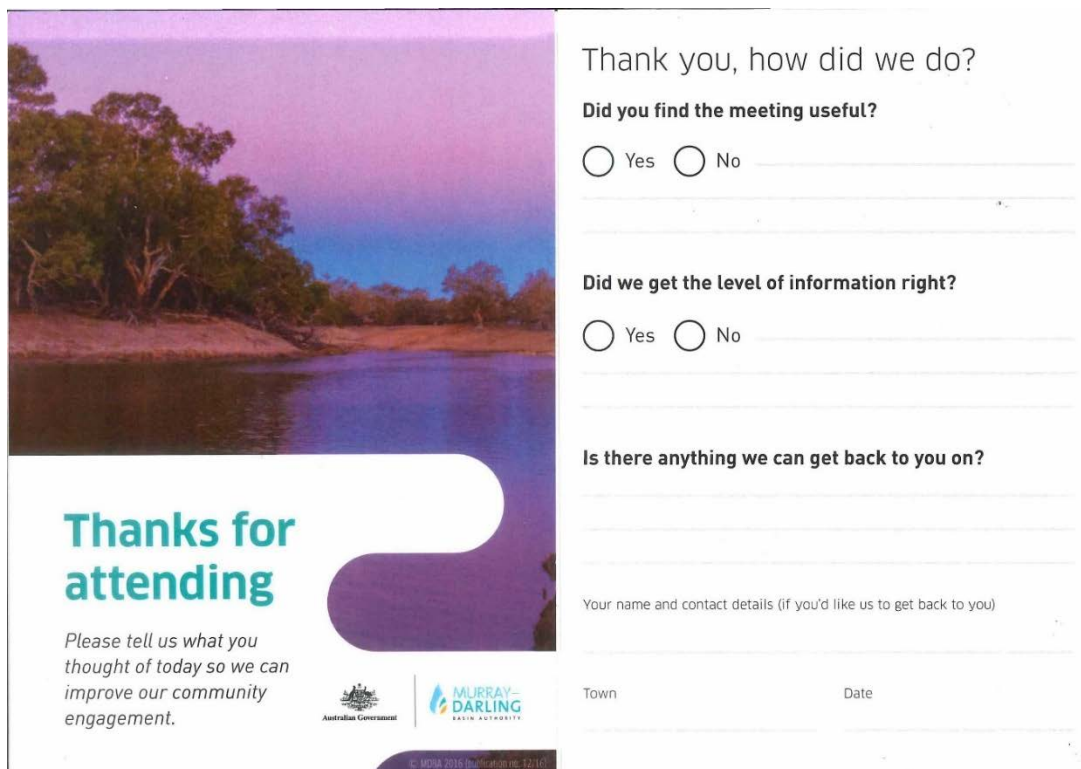


Figure 1: Double-sided feedback card provided at Phase 2 community meetings

Responses

Across all meetings 65 feedback forms were received. In response to the question – ‘Did you find the meeting useful?’ 92% of respondents answered ‘Yes’ [Figure 2].

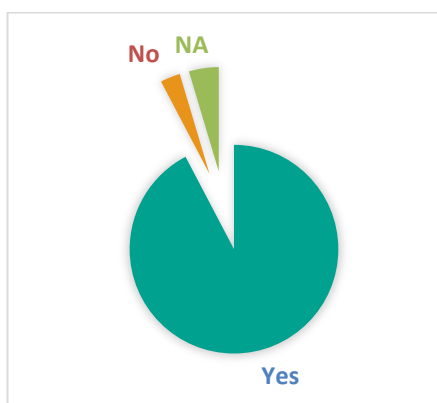


Figure 2 Responses to the question ‘Did you find the meeting useful?’

In response to the question, 'Did we get the level of information right?' 73% of people answered 'Yes', [Figure 3].

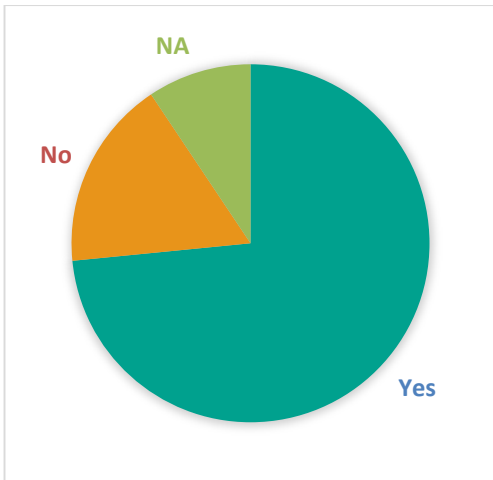


Figure 3 Responses to the question 'Did we get the level of information right?'

Twenty-eight of the sixty-five people that responded also made comments. In regard to the question 'Is there anything we can get back to you on?' The feedback is reflected in Figure 4.

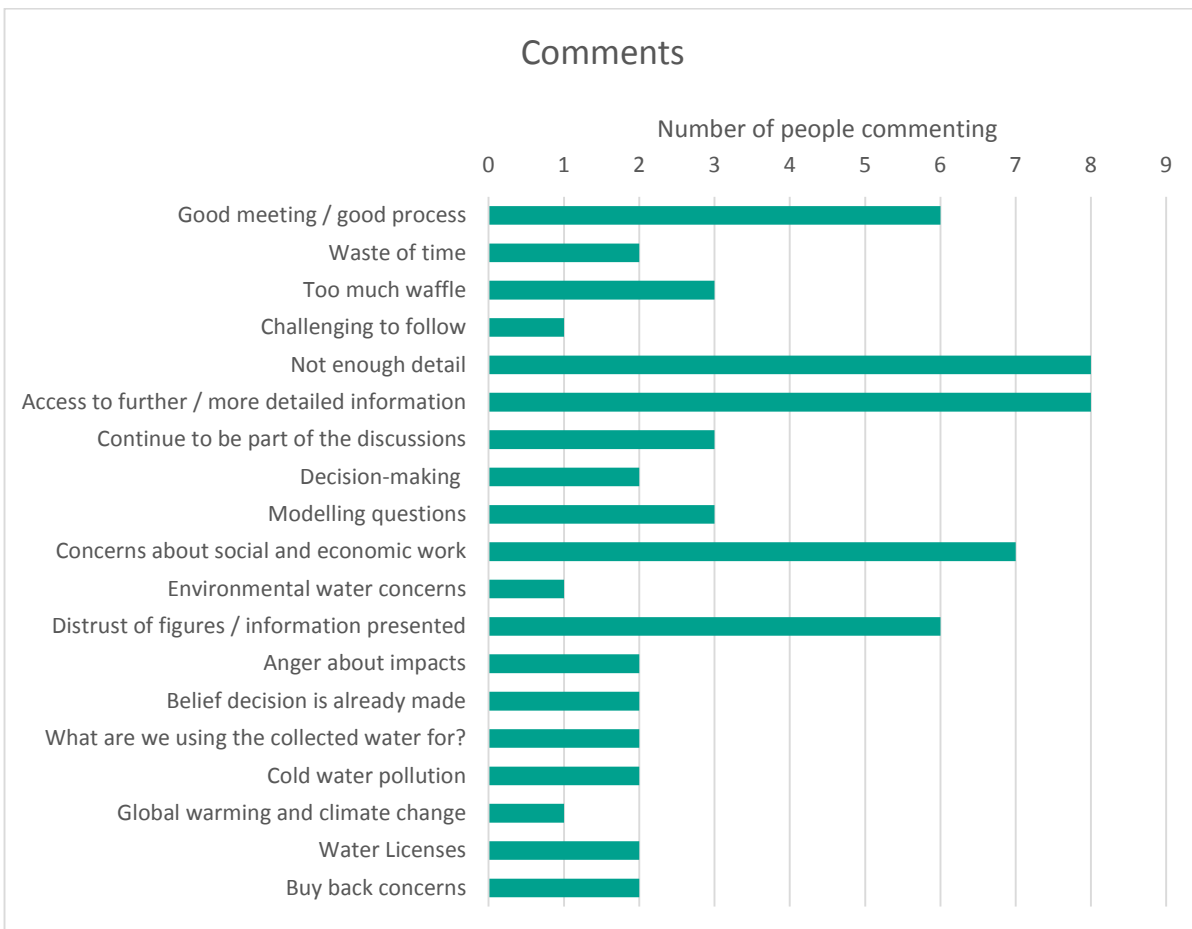


Figure 4 Comments made in community feedback forms