Murray-Darling Basin Royal Commission
GPO Box 1445
Adelaide SA 5001

29 April 2018

Dear Commissioner Walker,

SUBMISSION TO MURRAY-DARLING BASIN ROYAL COMMISSION

Thank you for the opportunity to provide a submission to the Murray-Darling Basin Royal Commission. I strongly support this investigation into key issues of concern in order to ensure that the Murray-Darling Basin Plan is implemented effectively.

General Context

Over the past two years, I have been increasingly dismayed and concerned to discover the extent of the limitations and prescriptions imposed on the implementation process for the Basin Plan. The starting point of 2750 GL as the water recovery target was already compromised and unable to deliver all the environmental outcomes in the Plan, as indicated in MDBA documents (eg Gibbs *et al.* 2012).

Scientific advice has stated that 7600 GL is needed to return river systems from current degraded states to a healthy state. A minimum recovery target of 3800-4000 GL is needed to maintain the current degraded state of health. River ecosystems are still recovering from the major impacts of the Millenium Drought 2000-2010 and need extra water above these targets for continued recovery. Floodplain condition improved after floods in 2010-12 & again in 2016 floods but declined between these floods and is declining again in dry conditions (Jensen 2016; Jensen in prep).

The 2750 GL recovery target can only deliver 10 out of 18 flow targets for 4 Living Murray icon sites[1]. The full volume of 3200 GL with all constraints relaxed is required to deliver 17 out of 18 flow targets for these sites (Gibbs *et al.* 2012).

The implementation process contains further opportunities for compromise through reviews and adjustments, almost all on the part of the environment. We have reached a point where the worst outcome could be 2129 GL and the best could be 2579 GL, both less than the original compromised target. And further questions are being raised about whether the 2107 GL reported to be held currently by the Commonwealth Environmental Water Holder is all real available water.

The Basin Plan was intended to redress the balance to include the environment which had previously had no water rights, but powerful irrigation lobby groups and upstream communities then complained that there was too much emphasis on the environment and argued for concessions to include economic and social

[1] Barmah-Millewa, Pericoota-Gunbower, Hattah Lakes, Chowilla Floodplain

factors. As these factors had already been included in previous arrangements, this tipped the balance back towards extractive uses. As compromises continue through the implementation process, the balance is moving away from the possibility of sustainable healthy working rivers and towards rivers in continuing decline.

Current Stage of Implementation Process

For the Basin Plan to deliver the objects, purposes and desired outcomes of the Water Act and Basin Plan, in the form of the desired goal of a 'healthy working river', the implementation process needs to accelerate simultaneous delivery of all elements of the total package of supply projects, efficiency projects, complementary 'toolkit' projects and constraints projects. Action to accelerate efficiency and constraints projects and to ensure the integrity of supply projects is needed prior to approval of the current proposal to reduce the water recovery target by 605 GL.

The implementation process needs to have improved transparency and quality control, with rigorous project evaluation to ensure the integrity of individual supply projects and their claimed 'equivalent environmental outcomes'. For example, the Wentworth Group of Concerned Scientists have proposed an evaluation process with 12 criteria derived from the Basin Plan which can be applied as a minimum check on whether the 36 supply projects should proceed. The Wentworth Group have formulated a set of amendments to the Water Act which would ensure that the supply projects are implemented in a way that is consistent with the Basin Plan, the full 450 GL of water towards the 3200 GL target is achieved, and constraints projects designed to improve flow efficiencies in the river systems align with MDBA targets. These draft amendments have been forwarded to Minister Littleproud and Shadow Minister Burke as part of current negotiations around the SDL adjustments amendment and are available on request from the Wentworth Group (02 9251 3811; *information@wentworthgroup.org*).

Development of the efficiency projects to deliver 450 GL of additional water and the constraints projects to improve river flows and delivery of environmental water both need to be accelerated and similarly subject to rigorous checks on deliverability of predicted outcomes.

Timetables and penalties, eg tranche payments

- Whether an adequate process is in place to measure and report progress towards meeting the objects and purposes of the Basin Plan, with milestones and penalties for delays or failure to meet timelines and requirements of the Water Act
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- What actions can be taken to ensure compliance by Basin states with the intent of the Basin Plan, including shepherding environmental water to its targets
- What consequences should be applied to Basin states found to be subverting the intent of the Basin Plan, whether through state regulations which allow water-diverting activities, or through lack of enforcement of regulations

Access to Information

Over the past two years as a Healthy Rivers Ambassador and River Fellow, I have had access to briefings and documents relating to all of these issues. The amount of information is overwhelming and daunting for someone who has other paid work to do and is not being paid to read mountains of technical reports.

My experience has been that the key information is well-hidden and that the reassuring language used by the MDBA and staff disguises the real impact of the details within the implementation process. The message

from the MDBA is that the Plan is not perfect but it will come out all right in the end at the point of reconciliation in 2024. And if it is not all right, there is another process to 'make good' any defaults.

Evidence Related to Areas of Particular Focus

36 Supply Measure Targets

The Sustainable Development Limits (SDL) Adjustment Package proposes a reduction of 605 GL in the water recovery target of 2750 GL, on the basis that 36 supply measures would deliver 'equivalent environmental outcomes'.

It has taken considerable investigation to uncover how this proposal has been justified as, on the face of it, it does not make sense from a scientific perspective. While the individual projects can deliver an environmental outcome, they clearly do not deliver an equivalent outcome to natural flow processes. For example, the Chowilla regulator does not replace natural overbank flows but it can fill the gaps between flows to reduce the impacts of water extraction and river regulation which have reduced the frequency of natural flood events.

Flows from the South-East into the Coorong cannot replace natural inflows from the Murray River but they can relieve drought conditions and maintain salinity levels within the hyper-saline range preferred by the salt-adapted species which live in the Southern Lagoon.

The Menindee Lakes can be managed to reduce evaporative losses but this should not be at the expense of maintaining the water regime required to sustain native fish populations or to maintain flows to the Lower Darling. New scientific information emerging in 2017 from the EWKR project indicates the major importance of the Lower Darling in supporting some part of the life cycle of all native fish in the Basin. The flow regime in the Lower Darling is critical in sustaining all native fish stocks for all Basin rivers. Any changes to the management of the Darling River and Menindee Lakes must maintain appropriate flows to sustain fish habitat in the Lower Darling River.

In the case of the SDL adjustments, the term 'equivalent environmental outcomes' has been applied in a very limited context. Two flow scenarios have been modelled, comparing the effect of the whole package of supply projects to the baseline flow of 2750 GL in the Basin Plan. Comparisons were done at the river reach scale. At this macro scale, scientific criteria have been applied to say that there is no significant difference between the two scenarios in achieving the required flows to inundate 12 identified ecological elements at prescribed frequencies. The outcomes have therefore been declared 'equivalent'. However, 2750 GL is inadequate to deliver all the desired environmental outcomes and targets in the Basin Plan, so the comparison is essentially between an insufficient flow (2750 GL) with 22% less flow, even less sufficient, and concluding that there is no significant difference between them, so the outcomes are equivalent.

The argument from the MDBA is that they have conducted the entire process as prescribed in the Basin Plan. If that is accepted, then the Basin Plan needs to be amended to ensure that the water recovery target is sufficient to deliver all the outcomes and targets in the Plan.

Recovery of 450 GL

The recovery of 450 GL of environmental water is intended to deliver enhanced environmental objectives relating to salinity levels in the Coorong and Lower Lakes, water levels in Lake Alexandrina, maintaining an open Murray mouth, exporting of 2 million tonnes of salt annually, increasing barrage flows, watering of floodplains and delivering environmental outcomes in the Southern Basin.

Progress on developing suitable projects has been exceptionally slow, with resistance from upstream states culminating in the statement from then National Water Minister Barnaby Joyce that the 450 GL could not be delivered. The report from Ernst & Young has indicated that this water could be found, although with some

caveats. It will be important to ensure sufficient investment in social support to off-set any social or economic impacts. Recent findings by Prof Lin Crase and Dr Jeff Connor have indicated that the best value ($/ML) for Basin investments is to spend half the funds on water buy-backs, and the other half on social support in communities, as opposed to engineered structures to deliver water, as proposed in some supply projects.

Water Recovery to Date

I work closely with Nature Foundation SA, providing ecological advice on delivery of environmental water supplied by the CEWO. I am very familiar with the overall operation of the CEWO and the manner in which water delivery is coordinated. I am aware that the volume of environmental water available is less than adequate to deliver fully all environmental targets, and that funding is limited to support delivery costs and essential monitoring costs.

It is therefore of extreme concern to hear evidence that the quoted holding of 2107 GL is not fully secure, due to terms and conditions on some acquisitions. It is also of very great concern to hear reports that the price paid for water for one entitlement was double the official government valuation, and that only 1/20th of an entitlement purchased on the Warrego River will flow into the Darling system. Murray-Darling Basin funding should be used in a responsible and accountable manner to achieve best possible value and outcomes.

The total water purchased by the Commonwealth Government is listed by the CEWO website at 1227 GL, with the total water recovered for the Basin Plan listed as 2107 GL. Only 530 GL has been recovered since the Plan was signed in 2012, and a cap of 1500 GL on buy-backs was brought in by the Government in response to intense lobbying by irrigators. The priority for future water recovery is on engineering projects to generate water savings. No further purchases of water will be made after 30 Jun 2017 if the SDL adjustments of 605 GL are accepted.

The total holdings in entitlements of the CEWH are 2672 GL, with a long term average annual yield of 1836 GL (to end Feb 2018). The on-ground delivery figures of the CEWO indicate that significantly less water is reaching watering sites, with peak delivery in 2015-16 of 1721 GL. While less water is delivered in flood years like 2016-17, a major reason for lower use of available environmental water is the slow progress in resolving flow constraints which make delivery difficult or impossible for some target sites.

Now questions are being asked by the Australia Institute as to whether the 2107 GL of CEWH water are real and available entitlements. The call this week by Shadow Minister Burke, Senator Hanson-Young, Senator Patrick and other members of the Centre Alliance for an urgent audit of these matters is strongly supported.

Coordination of Environmental Flows

Coordinated environmental flows are being achieved by CEWO (currently subject to a separate review), but the ability to deliver desired outcomes is being limited by slow progress in relaxing constraints, issues with protecting environmental flows, and limitations on water availability from certain licences or logistical limitations in delivering environmental water to some locations.

Protection of Environmental Water

In addition, the Healthy Rivers Ambassadors group has been extremely concerned about the reports since 2016 of the impacts of water extraction in the Upper Darling. I wrote to the Prime Minister in August 2016 concerning the effect of the NSW regulations introduced just prior to signing the Basin Plan which allowed irrigators in the Upper Darling to take water with much larger diameter pipes at much lower flows and to store the water in on-farm dams for the following season, thus undermining the intent of the Basin Plan and allowing legal diversion of water purchased for environmental targets into irrigators' dams.

The Lower Darling River was dry for 500 days in 2015-16, but both the Prime Minister and Barnaby Joyce wrote back to me assuring me that they were taking care of the environmental needs of the system. I wrote to the Prime Minister again in October 2016 to urge separation of the Water and Agriculture portfolios but he wrote back to assure me that the Agriculture Minister was the most appropriate person to handle this joint responsibility. Critical fish habitats in the Lower Darling were dry for 8 months in 2015, also causing hardship for Lower Darling communities and landholders. This was a man-made drought, caused by management actions of the NSW Government in allowing excessive take from the Upper Darling.

A massive coordinated effort by the CEWO and the NSW Office of Environment & Heritage resulted in environmental water being provided to the Lower Darling in time to stimulate a massive cod breeding event in spring 2016. Without this effort and expenditure to create flows, there would have been serious losses in Basin native fish populations.

There has also been a serious lack of cooperation from the NSW government on the issue of water shepherding, to protect environmental flows being delivered to downstream targets. IN the current second flow crisis in the Lower Darling, environmental flows have been sent down the Barwon River to relieve the Lower Darling. The NSW government has issued a special order to protect the flows from irrigator take. However, the cotton industry is already claiming that this erodes their rights and are campaigning against any future protective orders.

Northern Basin Review

The key finding of the Review was to reduce the volume of water to be returned to the environment to sustain river health from 390 GL to 320 GL. The justification was that additional modelling had shown that the same environmental targets could be met, but with reduced confidence. It was argued that this reduction could be accepted, in spite of the lower certainty of meeting environmental targets. However, the modelling compared the 390 GL with 320 GL and found only small differences, but overlooked the major fact that neither option delivered more than 22 of the desired 43 environmental flow targets for the Barwon-Darling system. The evaluation also omitted any consideration of downstream impacts.

Evidence submitted to the Review by multiple interested parties indicated that the recovery target should be increased, and 415 GL was recommended as a minimum volume to meet environmental targets required by international treaties and agreements to protect wetland habitat, migratory shorebirds and biodiversity values, including the Ramsar Convention, CAMBA and JAMBA.

In addition, the Northern Basin Review assumed that all other measures in the Basin Plan, including water recovery in the Southern Basin and non-compulsory complementary ‘toolkit’ measures, will be implemented effectively and in full. This is not guaranteed and is still subject to vigorous argument by state governments. Significant pressure continues to reduce actual water recovery and to substitute complementary measures for water recovery.

In spite of the many submissions opposing the decrease in the water recovery target, no changes were made in the recommendations and the amendment was put to the Federal Parliament but blocked in a Senate disallowance in February 2018.

Illegal Take

- Alleged significant water thefts involving tampering with meters
- Alleged failure of state government agencies to prosecute the alleged water thefts
- Alleged failure of state government agencies to respond to multiple reports of water mismanagement, non-compliance and theft
- Refusal of the Federal Government to hold an investigation into these matters with coercive powers to access and compel key witnesses

Environmental and Ecological Health of the Murray-Darling Basin

River ecosystems still stressed due to over-extraction since the 1970s and the effects of the Millenium Drought. Extra water above the current recovery target is needed to support continued recovery from this stressed condition.

It has been found by the Goyder Institute that environmental water requirements (EWRs) for red gum and black box are not met at 2750 GL/y. The EWRs for the Chowilla and Coorong icon sites are only met at 4000 GL/y, and even 4000 GL/y is not enough for black box communities on the outer floodplains.

Water recovery targets

As far as I have been able to find, the Basin Plan does not include an obvious list of targets, in order to answer the question of whether the Basin Plan is on track to sustain healthy working rivers. I have found the following which could be described as targets:

- 4 over-arching **objectives** (protect & restore ecosystems, functions & resilience, ensure coordinated management of e-water)
- 2 **objectives** for water quality & salinity
- 2 major **objectives** for SDLs (with 7 sub-sets)
- 7 intermediate **targets** (to 30 June 2019) – no loss or degradation in flows, connectivity, assets, functions, CLLMM regime, condition & recruitment of native species
- 7 long term **targets** from 1 July 2019 require improvement in the same parameters
- 7 **targets** for 450 GL, including floodplain & habitats in Southern Basin, flows to Lower Lakes, Coorong & Murray Mouth, plus salt export target of 2 million tonnes annually
- 16 flow & biodiversity **outcomes** = environmental watering **targets**.

The intermediate targets which require no loss or degradation to 30 June 2019 are already failing, including:

- concerns about health of Coorong, algal blooms in Southern Lagoon, although recent coordinated flows to Northern Lagoon were intended to provide feeding habitat for migratory waders at a critical time -- unfortunately, almost no migratory waders visited the Coorong this summer
- individual site and reach improvement but continued decline and stress in ecosystems at wider scale, need to support regeneration post-2011 flood
- significant continued decline of waterbirds at Basin scale since 1983, in spite of significant floods in 2010-12 and limited floods in 2016
- concerns for threatened species of small native fish, with some extinctions predicted.

The environmental watering program of the CEWO is maturing well, with cross-basin coordination of flows in 2017-18 combining watering at sites in seven tributaries to produce a combined flow to reach the Murray Mouth and Coorong. This involved re-use of e-flows at multiple sites, coordination of end-system-flows and creating connectivity with floodplains. The CEWO is meeting most of the 16 environmental watering targets but is limited by physical and governance constraints, as well as the volume of water available.

Modelling Methodology

A common theme has been the limitations on the application of modelling to core management issues. The original modelling for the Basin Plan was done on 2800 GL. The modelling for the Northern Basin Review compared only 320 L and 390 GL. The modelling for the SDL adjustments used 2750 GL as the baseline, ie a volume which does not deliver all environmental outcomes. In each case, the comparisons have been between scenarios which cannot deliver the Plan outcomes. The conclusions are correct, in that there is no

significant difference between the scenarios modelled, but none of the options considered are satisfactory in terms of delivering the Basin Plan.

It is also a concern that interactive effects between projects and on downstream communities were not included. Future modelling should be undertaken on updated appropriate scenarios, with comparisons that are valid with respect to delivering expected Basin Plan outcomes. This should include modelling all possible outcomes, including 3200 GL, 2529 GL and 2179 GL scenarios to allow comparison of the 'in full' scenario with the reduced recovery volumes scenario. On the Northern Basin modelling, revision of the water recovery target should include modelling of the downstream impacts of reduced recovery volumes, and model how much water recovery would be required to deliver all environmental targets in the Basin Plan (320 GL and 390 GL both only deliver around half of environmental targets in the Basin Plan).

Other Issues to consider

- Potential conflicts of interest between the Water and Agriculture portfolios, with the Minister who sets annual diversion limits for the Basin also representing the biggest group of water users
- Consideration of relative roles & responsibilities of MDBA, Federal Water Minister, state governments – particularly who is responsible for compliance and enforcement of penalties to ensure effective implementation of the Basin Plan, including after 1 July 2019
- Reinstatement of independent review, eg reinstate National Water Commission
- Better social support to facilitate change in communities as water and irrigation activities reduce
- Climate change does not get factored in until 2022 10 year review.

Conclusion

The Murray-Darling Basin Plan will only be as good as its implementation. This must include action to:

- return enough real water to support life cycles & processes
- ensure delivery of 450 GL
- ensure genuinely equivalent environmental outcomes if 605 GL reduction passed
- protect delivery of environmental flows
- ensure all-state compliance
- control water theft
- monitor and report progress clearly and in real time.

We need a healthy working Plan to deliver healthy working rivers throughout the Basin.

References

Gibbs MS, Higham JS, Bloss C, Bald M, Maxwell S, Steggles T, Montazeri M, Quin R and Souter N (2012). *Science Review of MDBA Modelling of Relaxing Constraints for Basin Plan Scenarios*, DEWNR Technical Note 2012/01, Department of Environment, Water and Natural Resources, Adelaide

Jensen, AE (2016). Delivery of Environmental Water by *Water For Nature* Program in the South Australian River Murray Valley 2013-16. Nature Foundation SA, Adelaide.

Jensen, AE (in prep). Monitoring report on delivery of environmental water to *Water For Nature* sites in the South Australian River Murray Valley 2016-18.

Attachments

Figures 1-5 provide supporting information on the operation of environmental watering and the overall decline of Basin environmental health

I am happy to provide more details or explanation if required and to attend a hearing.

Yours sincerely,

Dr Anne Jensen
Healthy Rivers Ambassador
River Fellow 2017

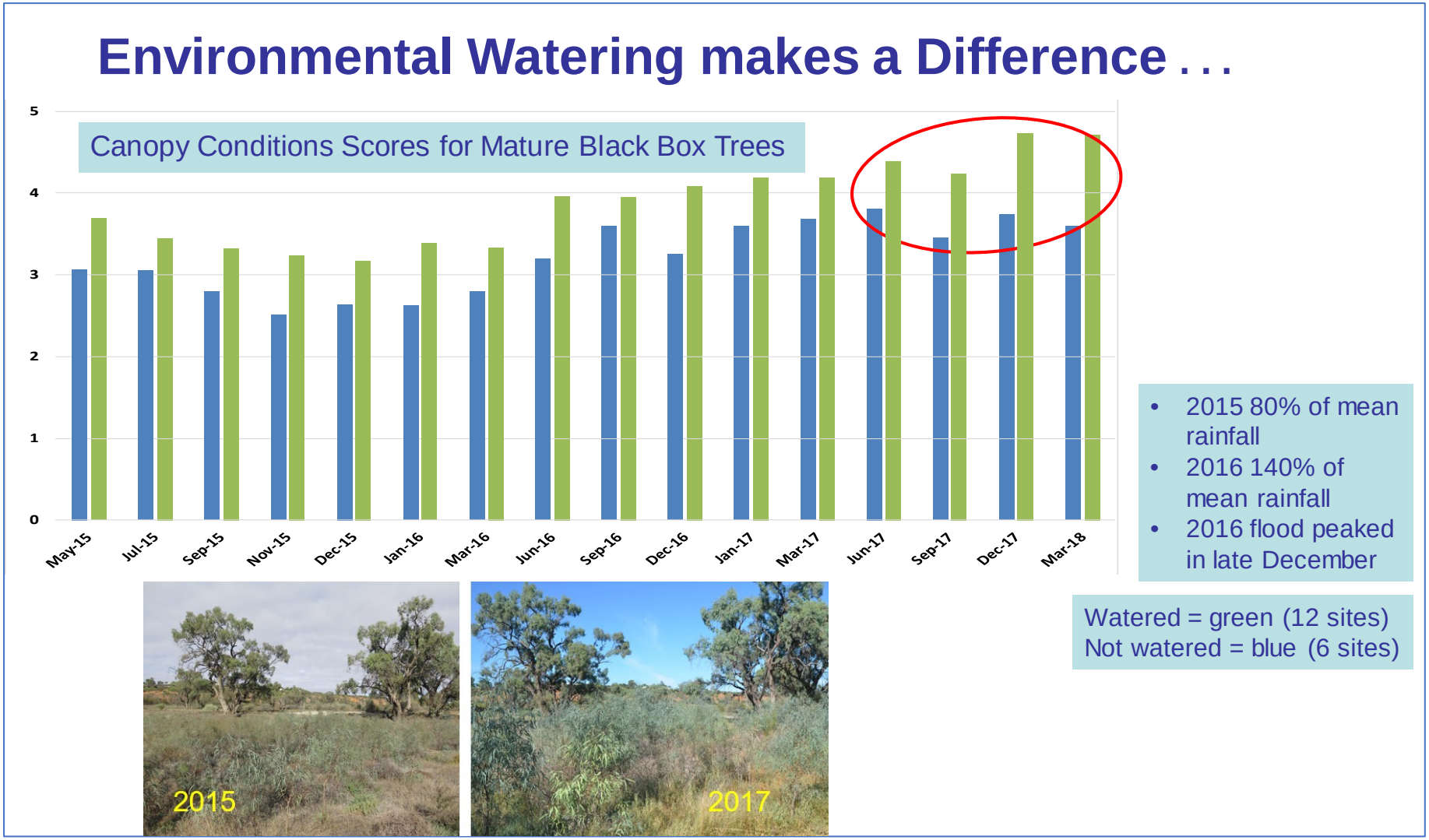


Figure 1 *Environmental watering at sites with stressed mature black box has produced a significant improvement in condition (watered trees, green series), compared to the baseline condition of non-watered trees (blue series). All trees benefited from above average rains in winter and spring 2016 and the flood which peaked in December 2016, but the baseline condition has deteriorated in dry conditions since the 2016 flood. The watered trees have continued to improve (red circle).*

Figure 2 Germinants from the 2011 flood at a site on the Murray Valley floodplain in the SA Riverland have received environmental watering 2013-15, then were flooded again in 2016. The photos show vigorous growth from 2013 (left) to 2017 (right), with heights increasing from ~ 2m to ~ 4 m. If they survive to maturity, these saplings have the potential to replace hundreds of dead mature gums 2-500 years old that died in the Millenium Drought. The site is protected by a Salinity Interception Scheme, reducing the risk of salinity affecting future survival of the trees as they grow.

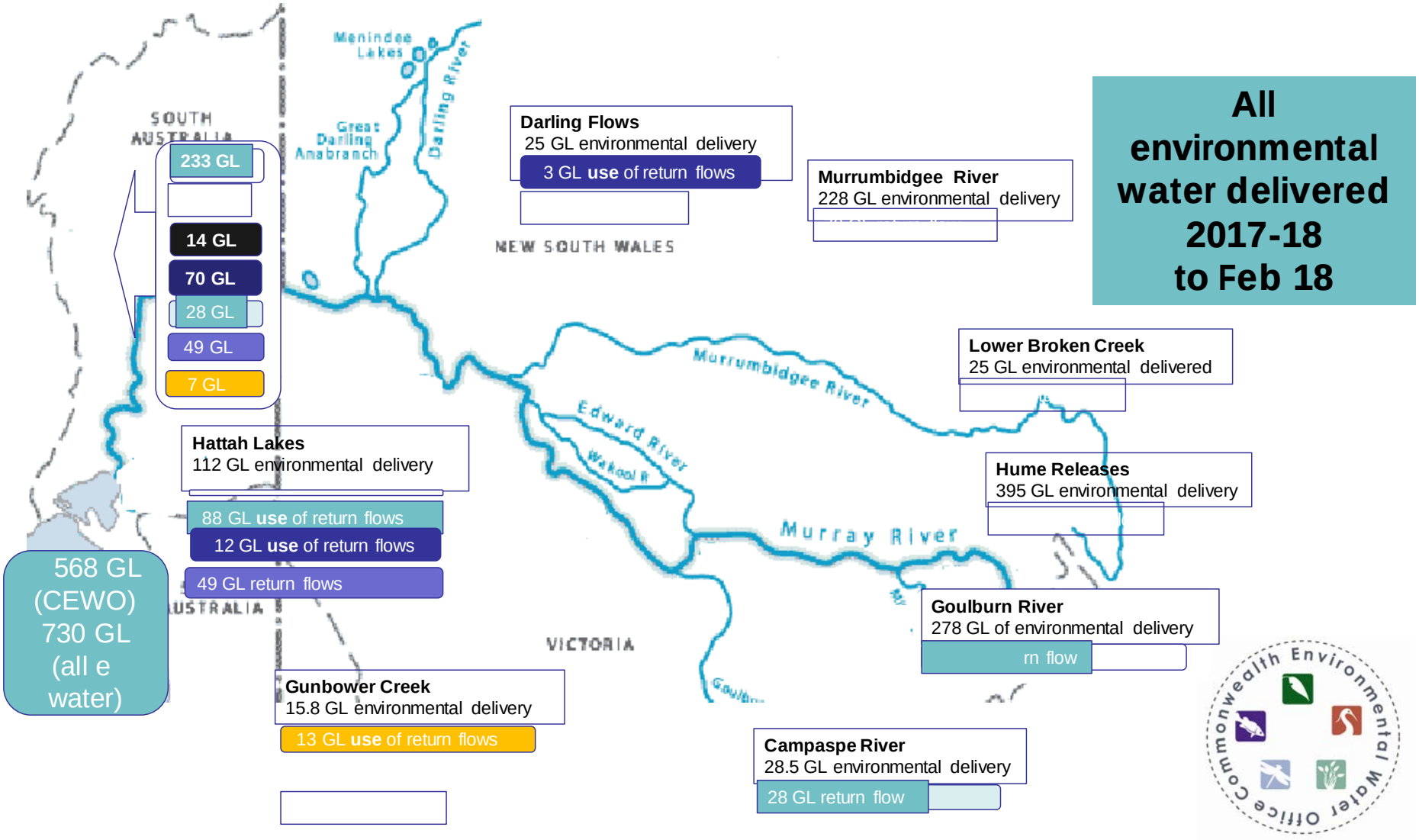


Figure 1 *Coordinated CEWO flows across seven catchments, with re-use of flows as the water progressed downstream, resulting in 730 GL delivered to the SA border to sustain further projects all the way to the Murray Mouth and Coorong. (Source: CEWO, Canberra)*

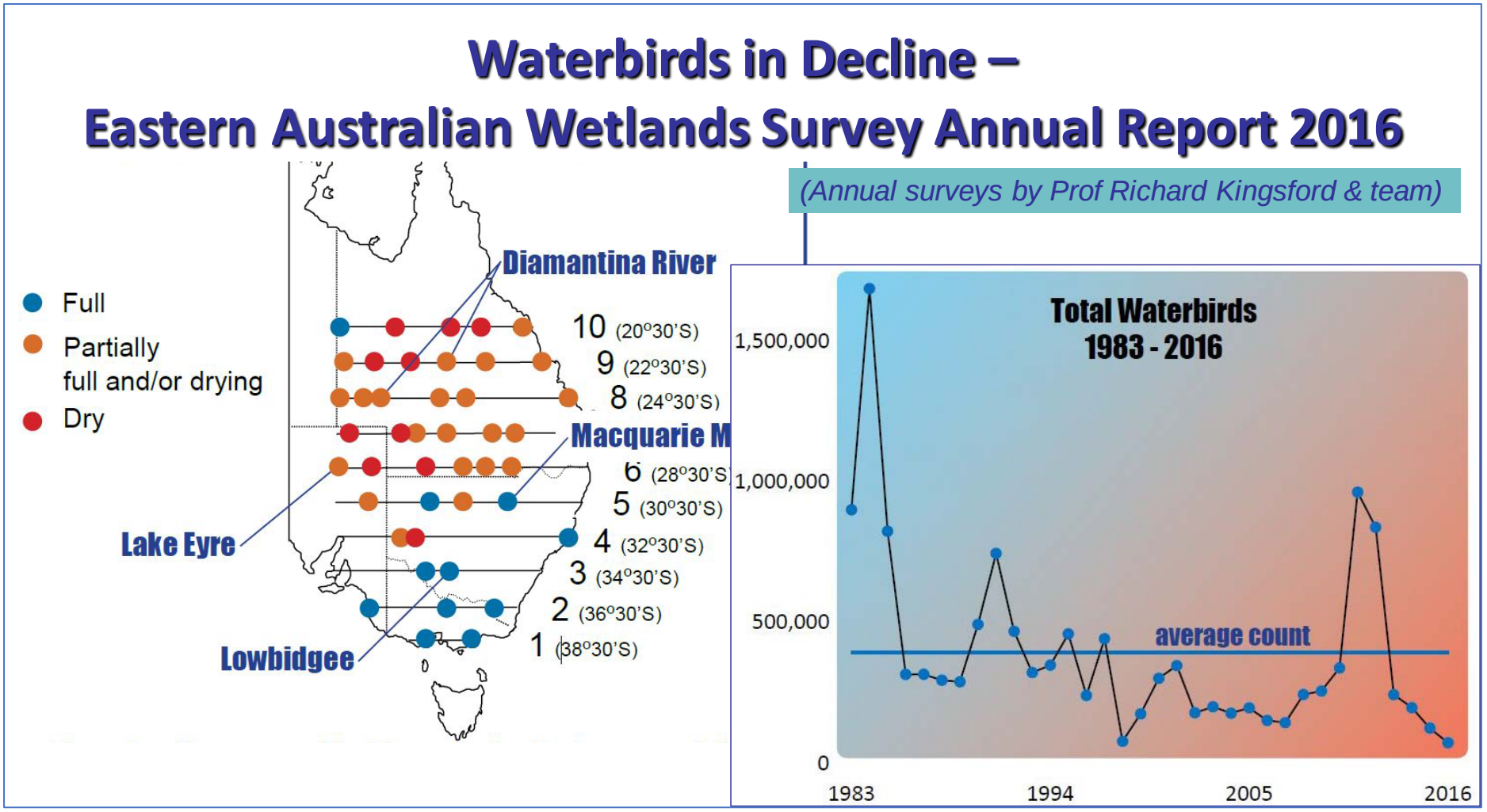
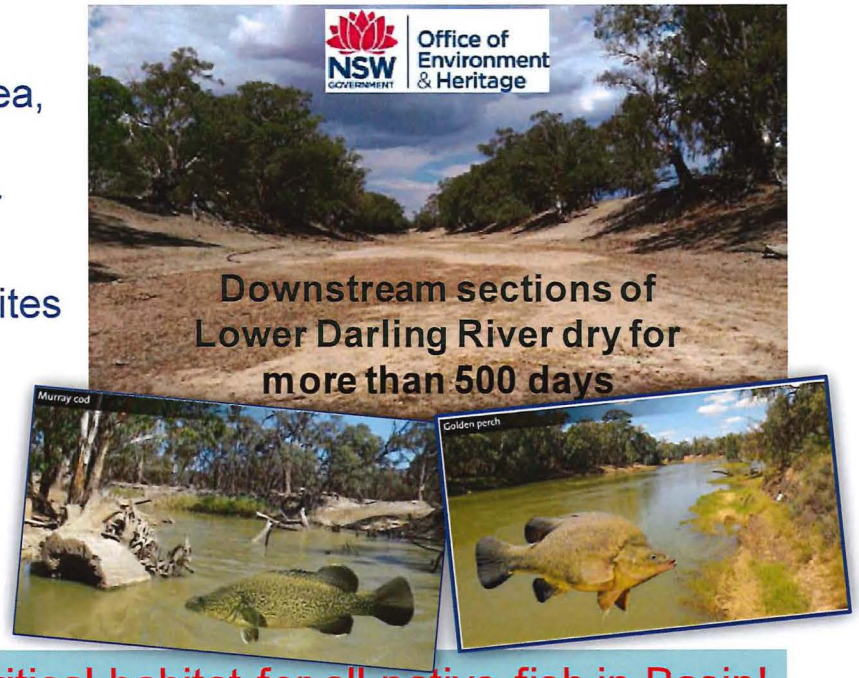


Figure 1 *Waterbird populations are showing serious continuing decline, in spite of floods in 2010-2012. Data from 2017 shows only a slight recovery from the short 2016 flood, with total numbers still only 200,000 (Porter et al., 2016, 2017)*

Lower Darling Flows Essential for Native Fish

- lack of flows 2014 -16 threatened loss of lower Darling River fish populations in key nursery area, especially callop
- environmental flows transferred from other river valleys to create low flows in spring 2016, then increased to create food sources and nursery sites for larvae, best cod breeding event in 20 years!
- rain-fed river flows continued to allow fish to grow and migrate
- environmental flows saved key nursery area and Darling fish populations able to migrate to other Basin rivers



New science 2017 that Lower Darling is critical habitat for all native fish in Basin!

STOP PRESS April 2018: Lower Darling running dry again!!

BREAKING NEWS 16 April: 23.8 GL in e-flows on way down Barwon River, NSW special order to protect e-flows en route to Lower Darling!

Figure 1 *Summary of emerging science indicating the critical importance of the Lower Darling River for all native fish species in the Basin (Source: Paul D'Santos, NSW OEH & Dr John Koehn, Arthur Rylah Institute; presentations to International Rivers Symposium, Sept 2017)*