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STATEMENT ON THE 2011 DRAFT MURRAY-DARLING BASIN PLAN

The Draft Murray-Darling Basin Plan should be withdrawn because it does not provide the information required to make an informed decision on the future of the river system.

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Acknowledgement

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STATEMENT ON THE 2011 DRAFT MURRAY DARLING BASIN PLAN

The draft Plan released for public comment by the Murray-Darling Basin Authority on the 28 November 2011 does not provide the most basic information required to allow anybody to make an informed decision on the future management of the water resources of the Basin.

The absence of this information makes it impossible for the community, science or Parliament to understand the implications or have confidence the Plan has any prospect of delivering a healthy working river:

1. The Plan specifies a volume of water but it does not identify the volume of water required to deliver a healthy working river, as required by the Commonwealth Water Act;
2. The Plan cites river management infrastructure as the limiting factor however there is no assessment of the feasibility or cost of redesigning river management infrastructure (such as periodically flooding paddocks or raising the height of a bridge) so that a healthy working river can be delivered;
3. The Plan does not incorporate in the modelling the impact that increasing groundwater extractions by over 2,600GL will have on surface water flows, many of the groundwater systems in the Basin are linked to river systems;
4. The Plan sets long term diversion limits on the assumption that there is no risk to river health from climate change; and
5. There is no information presented on the effectiveness of the Plan to cope with long dry periods such as that experienced throughout the Basin during most of the last decade, or deliver the volumes of water required keep the Murray mouth open as a functioning (Ramsar listed) estuary and export the 2,000,000 tonnes of salt accumulating in the river system each year.

Each of the above points is examined in detail in the attachment.

As it stands, the Australian Parliament should reject this plan.

Over the past four years significant progress has been made in the understanding and modelling of the Murray-Darling Basin river system and the volumes of water required for a healthy working river system. Progress has also been made in understanding the social and economic costs resulting from changes in the use of water in the Basin.

This good work has not been capitalised on by the Murray-Darling Basin Authority to develop a comprehensive and transparent Draft Basin Plan. Instead the Murray-Darling Basin Authority ignores much of the good work and has instead produced a draft Plan that manipulates science in an attempt to engineer a pre-determined political outcome.

The Commonwealth government should stop the process, instruct the Authority to withdraw the draft Plan, abandon the proposal for a 2015 review and instead take the time necessary to include the science and social science now. The Draft Plans failings are of such significance that iterative changes will not lead to a good Plan.

The government should also suspend the current infrastructure grants and water buyback programs, and use this opportunity to establish a genuine industry reform which is aimed at delivering water reform. This must respect the knowledge and expertise of communities in those localities that are likely to experience significant impacts.

This Plan should clearly articulate the environmental outcomes that are likely to be achieved for a range of water volumes and the social and economic costs of returning this water to the river and delivering it down the river system.

Nature has been kind to us this year. Let us take advantage of our good fortune and give ourselves the time to deliver the reforms that our generation is so capable of achieving.

It is far better to delay this Plan now, than to introduce a flawed Plan to Parliament that will lead to the worst possible outcome: on-going degradation and on-going uncertainty for communities.

The Gillard government went to the Australian people in 2007 and 2010 with a promise to restore the Murray-Darling Basin to a healthy condition. They also promised evidence-based policy based on the best available science. There is ample science. What the Authority has done is stop this science being made available and has refused to subject it to transparent independent review so that people can make informed decisions.

If the Basin Plan does not deal with the fundamental bio-physical needs of the system, such as moving sufficient water down the system to restore medium-size floods, managing the Murray mouth during times of drought and discharging the salts, it will be impossible to restore the health of the Murray-Darling Basin.

The draft Plan fails these most fundamental tests, of both the intent and law under the *Commonwealth Water Act 2007*. The Plan needs to demonstrate how it will return over-allocated rivers to sustainable levels of extraction. That is a question of science - science the draft Basin Plan either ignores or refuses to publish.

Without the release of any new independently reviewed scientific information, the *Guide to the Basin Plan* released by the Authority in 2010 still represents the best publicly available science to establish what is needed to restore the Basin to health. The *Guide* made it clear that between 3,856 GL and 6,983 GL of water needs to be recovered from consumptive use to restore the Basin to health. Even the bottom end of this range is far higher than the 2,750 GL proposed reductions in surface flows, and this does not take into account any impact a proposed increase of 2,600 GL of groundwater extraction will have on these river systems, despite the *Guide* stating that groundwater systems are already over-allocated and extractions need to be reduced.

It beggars belief that a statutory Authority could justify spending over $9 billion of taxpayers money to recover 2,750 GL from the rivers (which CSIRO says won't fix the problem), and then increase the groundwater take by 2,600 GL when we know that many of the groundwater systems are linked to river systems.

With regard to the impacts of the Basin Plan on people, everyone is acutely aware that major economic reform can only be achieved if the people affected are made part of the solution. The Wentworth Group has been arguing this case for years.

The 2004 *National Water Initiative*, on which this reform is built, was founded on this very principle. It was a partnership between modernising irrigated agriculture and in doing so restore over-allocated rivers to sustainable levels of extraction. This approach achieved overwhelming support from farmers, conservationists, scientists, all state and territory governments, and all political parties, because it found an economic mechanism that delivers environmental reform in a way that also modernises irrigated agriculture.

As a result of this agreement, 18,000 irrigators across the Murray-Darling Basin were given a more secure water property right (worth an estimated $28 billion) and the right to trade that

water more freely than ever before. Taxpayers also agreed to contribute an additional $9 billion to fund water buybacks and water infrastructure efficiency. These reforms are also entirely voluntary, which means that nobody is taking water from anybody.

This package of reform represents a transfer of wealth of over $20 billion from the Australian community to irrigators. If it delivers a healthy river, it is a wonderful investment in the future of Australia. If it doesn't, it will be a scandal of generational proportions.

The reason we need Commonwealth intervention in the Murray-Darling Basin is because its rivers do not stop at state borders, and state governments have proved, over many decades, incapable of managing these river systems in the national interest.

Despite what irrigator lobbyists would have us believe, rivers don't stop at the NSW border, and people hurt by bad water management don't stop at the NSW border either.

We know from the Authority's own economic analysis that at a Basin scale, the freeing of rights to trade water and the $9 billion fund, means the net Basin wide economic impact of water reform is likely to be less than 1%, and that this is expected to be more than offset by economic growth over the transition period to 2019.

The worst case long-term scenario would see 1,600 fewer jobs across the Basin by 2019, a rate of about 200 jobs per year. This is against a background of 13,000 new jobs that are currently being created across the Basin each year. Other models suggest that there could even be a net increase in jobs because of the massive public investments in water buybacks and infrastructure.

Of course we also know that there will be greater impacts on some smaller communities that are heavily reliant on irrigated agriculture. We need to acknowledge these impacts and establish a genuine industry reform process, one that respects the local knowledge and capacity of those local communities. It is here that the Commonwealth should be directing financial support so that those communities can adjust to a future with less water.

Nobody believes the draft Plan released by the Authority is capable of delivering the reforms needed to create a healthy working Murray-Darling Basin. The current top down selection of infrastructure projects by state government agencies are proving to be grossly uneconomic, and the water buyback program, whilst far more effective, is not being undertaken in a strategic manner. It is not surprising that communities are rejecting water reform.

This is bad policy built on a flawed, 19th Century world view, that environmental reform can only be achieved at the expense of the economy. There are no winners in this old fashioned view.

Water reform should be about providing a future where irrigated agriculture and a myriad of other industries are on a sustainable foundation, because our rivers are healthy. All this Plan has done is walk away from the social contract of the National Water Initiative and in doing so has given voice to extremists who are hell bent on destroying water reform for political reasons.

We are better than this.

Australia has achieved great reforms in our past and surely it is not beyond the capability of this country, with all our wealth and knowledge, to produce a plan that restores the health of our inland river systems and does this in a way that still maintains a productive economy in the Basin.

ANALYSIS OF THE 2011 DRAFT MURRAY-DARLING BASIN PLAN

A healthy working Basin needs to:

- Restore the ecological function of the rivers, floodplains and aquifers;
- Restore wetlands of national and international significance; and
- Maintain a healthy, functioning estuary.

Five fundamental pieces of environmental information are needed to build an effective Basin Plan:

1. The water regime that the best available science says is required for a healthy working river;
2. The cost and feasibility of overcoming river management infrastructure constraints so that environmental flows can be delivered downstream;
3. The impact of increased groundwater extractions on surface water flows (and *vice versa*), recognising that many groundwater systems in the Basin are directly linked to the river systems;
4. Accounting for the risk to river health from climate change when setting long-term diversion limits; and
5. The volume and frequency of flows that are required to keep the Murray mouth open during times of drought and to discharge salt from the Basin.

1. What water regime is required for a healthy river?

The environmental objectives in the 2007 Commonwealth Water Act are to protect and restore water-dependent ecosystems, ecosystem function of water dependent ecosystems and to ensure that these water dependent ecosystems are resilient to risks and threats.[1]

We support these objectives.

We also accept the scientific methodology used by the Murray-Darling Basin Authority (MDBA) for setting the specific environmental flow targets, using 122 hydrological indicator sites across the basin. We also accept that the selection of 18 key environmental asset indicator sites for detailed hydrological modelling is appropriate for determining the sustainable diversion limits.

Our fundamental objection is that none of the 2011 draft Basin Plan documents provide even the most basic information as to the volumes or timing of water that are required to give a reasonable prospect of achieving these objectives.

Does the draft Basin Plan protect Ramsar sites as required by the Water Act? We have no idea because the draft Plan does not tell us.

What we do know, from the CSIRO review, is that a 2,800 GL per year reduction does *"not achieve the majority of the hydrological targets"* that have been set in the draft Plan. It *"is thus not consistent with the currently stated environmental targets".*[2] This finding is consistent with the earlier analysis in the 2010 Guide to the Basin Plan that even with a 3,856 GL reduction there is high uncertainly that it would achieve the environmental water requirements.

In other words, we have the situation where the Murray-Darling Basin Authority presents a draft Plan for public exhibition which contains no information as to what level of environmental flows are required to achieve the very environmental targets that the Authority is recommending the government adopt, even though CSIRO has told the Authority that the 2,750 GL figure they propose will not meet them.

How can the government expect the community, science or the Parliament, to give proper consideration to a plan that its own review says cannot achieve the objectives it sets?

What we do have available is more than sufficient scientific evidence to suggest the 2,750 GL reduction grossly underestimates the environment water requirements needed to 'protect and restore water-dependent ecosystems, ecosystem function of water dependent ecosystems and ensure that these water dependent ecosystems are resilient to risks and threats'.

The 2010 *Guide to the Basin Plan*[3] released by the Authority in late 2010 sets out in detail the environmental flow needs for each of the 18 key environmental asset indicators sites.

The Guide to the Basin Plan is the best publicly available science completed to show the range of water volumes required to restore the health of the Basin. It says that between 3,856 GL and 6,983 GL of water needs to be recovered from consumptive use. There has been no new scientific breakthrough since August 2010.

By contrast, the information accompanying the draft Plan only provides colour coded approximations for the 18 key environmental asset sites. More useful information on just 4 of the sites is provided however it is selective and incomplete.

They give no reason why the 4 sites were selected and the other 14 not, nor do they provide any information on the science underpinning the other 100 or so 'hyrdrologic indicator sites'.

This is not minor scientific 'nit picking'. This is information that is fundamental to determining the appropriate sustainable diversion limits to return the Murray-Darling Basin to good health – the whole purpose of water reform.

As one example, we examine the Hattah Lakes Ramsar site in Victoria. We contrast the information provided in the 2010 Guide for the Hattah Lakes Ramsar site (Table B14.6 below), with the information provided in the draft Plan documents for the same key environmental asset site (Figure 8.1 below).

The 2010 Guide describes in detail, the volumes of flow and the duration of those flows for six components that together make up the ecosystem of this Ramsar listed 'key environmental asset':

- Semi-permanent and persistent temporary wetlands;
- Temporary wetlands;
- Fringing river red gum and red gum forest;
- River red gum woodland;
- Episodic wetlands; and
- Black box woodland.

AN EXAMPLE OF INFORMATION CONTAINED IN THE *GUIDE TO THE BASIN PLAN*, 2010 [4]

Table B14.6 Environmental water requirements: Hattah Lakes

Target	Event			Proportion of years event required to achieve target (%)		Proportion of years event occurred under modelled without-development conditions (%)	Proportion of years event occurred under modelled current arrangements (%)
	Flow required (measured at Euston)	Duration[a]	Timing	Low uncertainty	High uncertainty		
Maintain 100% of the current extent of semipermanent and persistent temporary wetlands in good condition[b]	40,000 ML/day	2 months in total (with 7-day minimum)	June to December	50	40	67	30
	50,000 ML/day	2 months in total (with 7-day minimum)		40	30	48	19
Maintain 80% of the current extent of temporary wetlands in good condition	70,000 ML/day	6 weeks in total (with 7-day minimum)		33	20	38	12
Maintain 100% of the current extent of fringing river red gum and red gum forest in good condition	85,000 ML/day	1 months in total (with 7-day minimum)	Preferably winter/ spring but timing not constrained to reflect that high flows are dependent on occurrence of heavy rainfall and will be largely unregulated events	30	20	34	10
Maintain 80% of the current extent of river red gum woodland in good condition	120,000 ML/day	2 weeks in total (with 7-day minimum)		20	14	23	8
Maintain 50% of the current extent of episodic wetlands in good condition Maintain 50% of the current extent of black box woodland in good condition	150,000 ML/day	1 week total and minimum		13	10	17	6

a Duration is expressed both as a total and minimum duration, allowing multiple smaller flow events that meet the minimum duration criteria to comprise a successful event. Minimum durations are therefore a subset of total duration and should not be read independently. MDBA analysis showed that if a minimum duration is not specified and individual events must meet the total duration criteria, the proportion of years would be significantly reduced.

b There is overlap in the inundation thresholds of all habitat types. The separation shown in the table is constructed for the purposes of determining water requirements.

From this information, when replicated for each of the 18 indicator sites in the 2010 Guide and used in conjunction with the hydrological indicator sites, it is possible to model the environmental flow needs for each of the 19 catchments across the basin, and ultimately derive an estimate of the volume and timing of water that needs to be provided.

All this information is presented in detail in the 2010 Guide, and it was from this scientific assessment that the Authority derived a range of 3,856 GL to 6,983 GL.

Contrast this information with what is presented in the draft Basin Plan documents.

The draft Plan accepts that the science described in the 2010 Guide represents appropriate ecological targets for the Hattah Lakes and the other 17 key environmental asset sites in the basin.[5]

The manner in which the Draft Plan presents success against these targets has some concerning omissions:

- Firstly, there is no detailed information on the impact of a 2,750 GL reduction target on 14 of the 18 key environmental asset sites; and
- Secondly, data for those four sites where information has been provided has been selectively used to give the impression that the draft Plan delivers a reasonable environmental outcome.

Instead of transparently describing what environmental outcomes will be achieved for the proposed 2,750 GL reduction, the information presented only provides a slice of the information which on its own gives the impression the volume of 2,750 GL will restore the health of the Murray-Darling Basin.

It can only be described as selective presentation of information to encourage the uninformed reader into believing a reduction of 2,750 GL will produce a healthy river, when its own science and that of CSIRO says it won't.

The draft Plan documents for the Hattah Lakes Ramsar site (one of the 4 sites where any information is provided) presents information on only four of the 6 components (Figure 8.1 below):

- Semi-permanent and persistent temporary wetlands;
- Temporary wetlands;
- Fringing river red gum and red gum forest; and the
- River red gum woodland.

INFORMATION IN THE DRAFT PLAN FOR ONLY 4 OF THE 18 KEY ENVIRONMENTAL ASSETS [6]

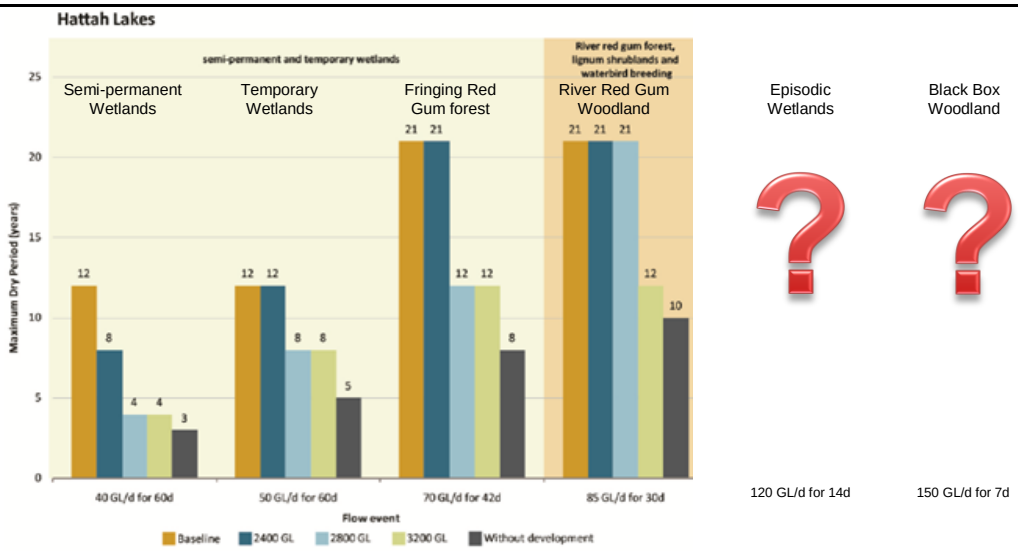


Figure 8.1: Comparison of maximum period between key flow events for Hattah Lakes under without development and baseline conditions relative to the three ESLT options assessed. Indicative environmental outcomes associated with different flow events are shown. Note: Delivery of 85 GL/d to the Hattah Lakes indicator site is currently limited by flow delivery constraints – these constraints would need to be overcome to deliver this flow. Delivery of 70 GL/d to the site would require very careful and coordinated management of water across the Murray, Goulburn and Murrumbidgee, to augment an unregulated flow event.

This information shows that there is a noticeable improvement when the reduction in extractions is increased from 2,400 GL to 2,800 GL for semi-permanent wetlands, temporary wetlands and fringing red gum forest. It also shows that a reduction in extractions of 2,800GL produces no environmental benefits for the river red gum woodlands, and that a reduction of another 400 GL (to 3,200 GL) is required if there is to be any improvement in river red gum woodland communities.

Overall however, most people when reading this information would draw the conclusion that a 2,800 GL reduction produces a significant environmental improvement.

Herein lies the red herring.

What is missing in the previous diagram is the impact a 2,800 GL reduction has on the other two components of this ecosystem: the Episodic wetlands and Black box woodlands, the periodic flooding of which is fundamental to the health of the Hattah Lake Ramsar site.

Delivering adequate environmental flows to these floodplain assets is fundamental to underpinning the long-term health of this system.

The diagram in the draft Plan hides the fact that a 2,800 GL reduction target will not deliver water onto parts of the floodplain, yet it is these floodplain wetlands and woodlands that drive the ecology of this vast inland river system.

According to the figures in the 2010 Guide, three floodplain components (the River Red Gum woodland, the Episodic wetlands and Black Box woodland) receive no environmental benefit from a 2,750 GL reduction. Two of these three are omitted from the information provided in the draft Plan, presumably because they show that they will not be maintained under the proposed flows.

These floodplain components account for 40 per cent of the total volume of water needed to maintain this Ramsar listed asset in a healthy condition.

We use this as an example to demonstrate the serious problems and highly selective use of information in the draft Basin Plan.

In other words, we have no idea what impact the 2,750 GL target has on the key environmental assets in the 4 sites where information is provided, nor do we have any information as to the level of extractions required to satisfy the stated objective of the draft Plan (and required by the Water Act), to protect and restore these water-dependent ecosystems.

Because there is no comparable information on the other 14 key environmental asset sites, or any information on the 100 or so hydrological indicator sites, it is impossible to make any evaluation whatever as to the environmental outcomes that this draft Plan will produce.

The Authority shows us the good news, and they hide the bad news. It does not explicitly outline which environmental assets can and cannot be protected or restored by the draft Plan.

The example of the Hattah lakes, where we are able to compare the Guide with the draft Plan raises strong suspicions that these other assets will not be watered sufficiently to be maintained.

The science used to establish the evidence for the 2,750 GL reduction is not only absent from the documentation, but even more disgraceful is that the science for the 2,750 GL reduction is not accorded the scientific scrutiny of transparent independent review.

It is impossible to assess the ecological outcomes from a reduction to extractions of 2,750 GL from the information in these tables. Subsequently it is impossible to assess the ecological implications for Ramsar sites, wetlands listed on the Directory of Important Wetlands of Australia as well as Commonwealth, State or Territory listed threatened species and/or ecological communities. Without the information to assess this, it is impossible to determine whether the draft Basin Plan complies with the Water Act.

There has been a significant investment of tax-payers money in the science of water management - both within the Murray-Darling Basin Authority and other institutions such as CSIRO, the e-Water CRC and the Murray-Darling Freshwater Research Centre. This scientific effort is more than sufficient to produce a high quality plan.

The Authority has either refused to take this information into account in setting the reduction targets or has chosen not to publish these results. If a commercial operation tried this sort of trick on the community in an Environmental Impact Statement it would be thrown out well before it saw the light of day.

In the absence of this critical information on the volumes of water needed to restore the health of the basin, it is impossible for the community, science or Parliament to understand its implications or have confidence it has any prospect of delivering a healthy working river.

The Australian community and our Parliamentary representatives have a right to this information and this statutory Authority has a responsibility to use this science when it develops a plan for restoring the long- term health of the Murray-Darling Basin.

2. What is the cost and feasibility of overcoming river management infrastructure constraints?

The draft Plan states that river management infrastructure constraints (such as periodically flooding a bridge or a paddock) limit the ability to provide more than 2,750 GL to environmental flows downstream, and use this to justify why more than half the environmental targets set under the draft Plan cannot be met.

"Constraints, such as dam outlet capacities and requirements not to flood private land and infrastructure, limit the ability to deliver these flows through active environmental water management.

The targets and supporting flow regimes expressed for the indicator sites are intended to be within the scope of management within existing constraints, and where clear evidence exists defining this scope, this was taken into account when the targets and flow regimes were initially framed." (MDBA)[7]

The draft Plan does provide a list of some of those constrains, but no assessment of the feasibility and/or likely cost of using part of the infrastructure component of the Water for the Future fund to re-design the system to overcome these constraints has been carried out.

AN EXAMPLE OF DELIVERY CONSTRAINTS DESCRIBED IN THE DRAFT PLAN DOCUMENTS [8]

Table 5.1: Known flow delivery constraints in the Southern Basin

Current representation of key constraints	Impact on Site Specific Flow Indicators
Murrumbidgee System	
The NSW Water Sharing Plan places the following operational constraints on maximum flows: ○ 9,000 ML/day in the Tumut River at Oddys Bridge ○ 9,300 ML/day in the Tumut River at Tumut ○ Releases from Burrinjuck and Blowering reservoirs are limited to a combined flow of 32,000 ML/day at Gundagai (this is based on the risk of flooding Gundagai and Mundarlo Bridge) ○ 1,400 ML/day in Yanco Creek at the Offtake. To accurately reflect channel constraints and minimise the risk of flooding infrastructure a maximum flow constraint of 30,000 ML/d at Gundagai has been included in the baseline model for the Murrumbidgee system. Valve capacities as specified in the Baseline model are 27,000 ML/d for Burrinjuck Dam and 9,250 ML/d for Blowering Dam. Flows downstream of Blowering Dam are limited to 9,000 ML/d to minimise bed and bank erosion	Consistent with the baseline model orders for environmental flows from Burrinjuck and Blowering have been constrained to 30,000 ML/d at Gundagai this limits the delivery of regulated flows to the Mid Murrumbidgee Wetlands. It is likely that site specific flow indicators with thresholds greater than 25,000 – 30,000 ML/d at Narrandera will be difficult to support with only regulated releases. To achieve these thresholds, regulated releases will need to supplement unregulated tributary inflows which may limit the duration that environmental flows can be supplied for.
The Murrumbidgee River decreases in channel capacity in a downstream direction, from 35,000 ML/d at Hay to 20,000 ML/d at Maude Weir and 11,000 ML/d at Redbank Weir (Kingsford & Thomas 2004).	To reflect operation and delivery constraints and recognising that significant inundation of the Lower Murrumbidgee floodplain can be achieved using regulated diversions from Maude and Redbank Weirs, site specific flow indicators for the Lower Murrumbidgee floodplain have been based on total in-flow volumes (delivered over a period of time). Deliveries of environmental flows to the Lower Murrumbidgee Floodplain are defined in the model as a demand time series at Maude Weir. To reflect channel capacity, the demand time series has been constrained to a maximum flow of 20,000 ML/d at Maude Weir. It is envisaged that site specific flow indicators and associated frequencies can generally be achieved with a combination of regulated releases and unregulated events.

The Authority says *"There may be opportunities for works and measures to overcome delivery constraints, and provide other outcomes that improve the ability to manage these areas in the future. These actions could deliver substantial benefits to these vegetation communities, habitats and dependant species, but further cost benefit analysis and consultation with stakeholders and communities is required. With further assessment this issue may be considered as part of the 2015 review"*. [9]

This is simply an absurd proposition.

The government has made $9 billion available to restore the Basin and yet the draft Plan claims that these infrastructure constraints, some of which are relatively minor, cannot be tackled because they do not have detailed costing available.

Imagine any other government Authority or a private company asking Parliament to approve a $9 billion infrastructure plan for a freeway, a railway line, or critical gas or power infrastructure, without assessing the cost and feasibility of addressing physical constraints to its implementation. Imagine what that infrastructure would cost if they assumed, as this Authority does, that such infrastructure constrains cannot be assessed, when we know full well that many of them can.

The significance of this issue is described in the CSIRO science review of the plan: [10]

"While operational constraints preclude the meeting of some hydrologic and ecological targets, in other cases the shortfalls against targets appear to be a result of insufficient environmental water, the shortcomings in modelling environmental flow regimes in unregulated rivers or a combination of these factors. Modelling and analysis of water use reduction scenarios above the 2800 GL/yr scenario are required to more fully assess the reasons for the modelled shortfalls. The level of take represented by the 2800 GL/yr reduction scenario is not consistent with the currently stated hydrologic and ecological targets given the available evidence base."

One example of just how poorly thought out this issue is, is the 'constraint' imposed on the Murrumbidgee River's channel near Balranald: *"Due to significant evaporation and seepage to the floodplain … a flow of 9,000 Ml/d at Balranald Weir is appropriate for regulated water deliveries."* [11]

This rule has significant impacts on the ability to deliver environmental water to Ramsar sites further downstream such as the Hattah Lakes in Victoria and Chowilla floodplain in South Australia. They have built a delivery constraint into the draft Plan to stop water soaking into the floodplain, which is one of the outcomes being sought.

For the plan to succeed we must return medium and small floods to the river flood plains. If legal and infrastructure issues prevent this then the plan must address how these constraints will be removed. Restoring rivers must flood floodplains and wetlands more frequently than they do now. Purchased environmental water must therefore be able to be used to flood the floodplains.

This is not impossible, given the funding available and the backing of government. If they cannot be removed, the Plan cannot fulfil the purpose of the Act.

The proposed deferral of a decision about removing infrastructural constraints is self-defeating. By 2015, the funds that are available at present for correcting these constraints are unlikely to be still available.

The Authority should withdraw the draft Plan, abandon the proposal for a 2015 review and instead take the time to properly evaluate the extent to which existing infrastructure, land tenure and water entitlement arrangements are impeding the attainment of environmental objectives and the nature of local opportunities to make it easier to improve environmental outcomes. This can be achieved by, for example, securing easements over private land, raising bridges and improving opportunities to carry forward water from one year to the next.

In the absence of this critical information on the cost and feasibility of overcoming infrastructure constraints, it is impossible for the community, science or Parliament to understand its implications or have confidence the Plan has any prospect of delivering a healthy working river.

3. What is the impact of increased groundwater extractions on surface water flows, recognising that many groundwater systems are directly linked to the river systems?

The vast majority of groundwater and surface water of the Murray-Darling Basin is hydraulically linked. Not only will overuse of surface water affect connected aquifers, but any increase in groundwater extraction will have impacts on surface water availability.

The huge surprise is that the draft Plan proposes to increase groundwater extraction volumes across the Basin to over 4,000 GL, more than double the levels of current use identified in the 2010 Guide.

Current groundwater extractions across the Basin are 1,744 GL per annum. The 2010 Guide recommended these be reduced by over 160 GL per annum. The draft Plan does the opposite and now increases groundwater extractions to 4,340 GL. This is a net increase of 2,760 GL per annum difference between that recommended in the 2010 Guide and the draft Basin Plan.

CHANGES TO GROUNDWATER BETWEEN THE 2010 GUIDE AND THE DRAFT PLAN

Total increase in groundwater extraction from all groundwater units from the 2010 Guide to draft Basin Plan	Total decrease in groundwater extraction from all groundwater units from the 2010 Guide to draft Basin Plan
+2,765 GL	**- 5 GL**

See full details on pages 17 and 18.

No scientific reasons are given for these increases, despite the National Water Commission recommending that it should be assumed that all groundwater bodies are connected to surface water resources, unless it can be shown beyond doubt that a groundwater resource is not connected to a surface water resource[12], and a $5 million, three year CSIRO research project recommending groundwater extractions be reduced. [13]

Rather than modelling connections between the Basin's groundwater and surface water resources in those areas where allocations have been increased, the Authority simply assumes that connections are 'not significant' and ignore the increases in groundwater extractions when setting the 2,750 GL surface water reduction target.

We know of no publicly available peer reviewed science that would justify this decision. Science has not been provided nor has it been subject to transparent independent scientific scrutiny.

Over 760 GL of this 2,760 GL increase is in groundwater extractions from aquifers that the Authority's own 2010 Guide said needed to be either reduced, capped or capped with a trade offset:

- Aquifers needing a reduction in diversion limits or levels of extraction have had diversion increased by almost 190 GL in the draft Basin Plan;
- Aquifers needing to be capped at current diversion limits or levels of extraction have had diversions increased by over 200 GL in the draft Basin Plan; and
- Aquifers needing to be capped at current use with a trade offset if extractions were increased have been increased by over 370 GL.

These additional groundwater allocations are in aquifer systems that are considered to be highly connected to surface water[14], yet it is our understanding that not even these increases in extractions were integrated into the surface water modelling to assess the effects they would have on the already struggling surface water ecosystems.

The lack of justification for such large changes to groundwater extraction levels raises serious concerns about the groundwater extraction levels in the draft Basin Plan and the decision to not include an analysis of groundwater reductions in the surface water model.

Implications of not linking surface and groundwater

The Lachlan catchment in NSW is an example of the implications of these changes and the likely impact they will have on the long-term health of the basin.

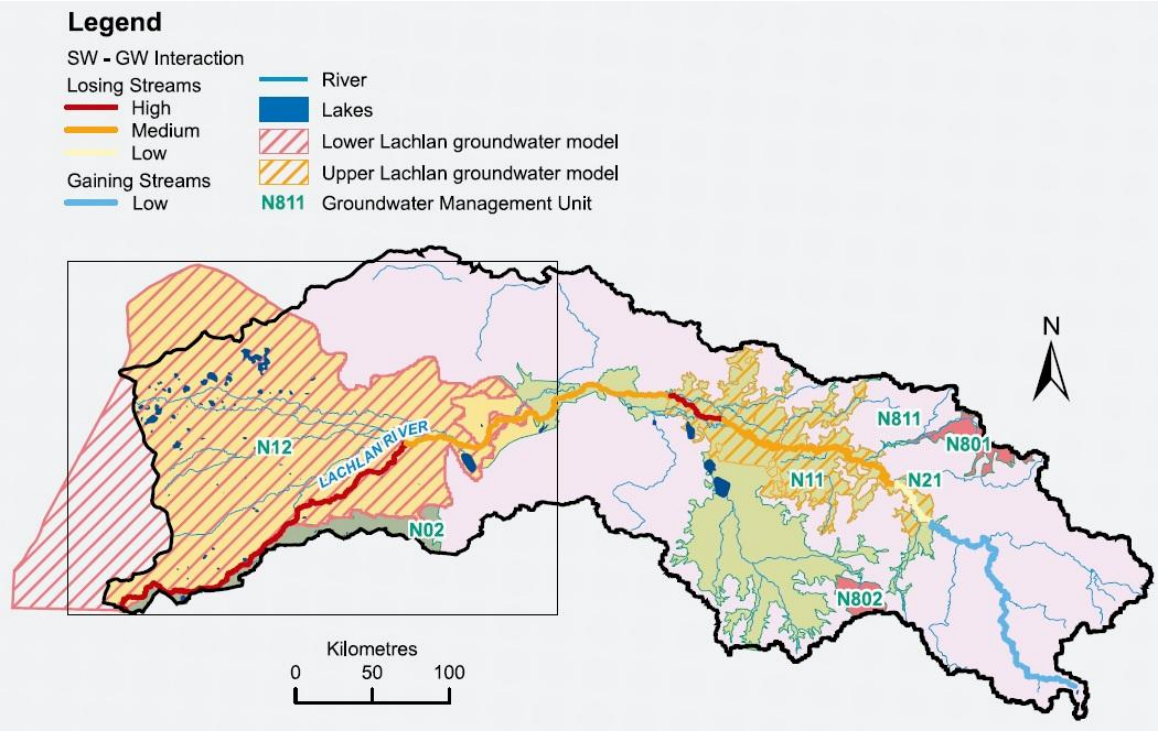
The 2010 Guide proposed reducing the current diversion limit for the Lachlan Alluviums of 185 GL to 128 GL (a reduction of 57 GL).

Prior to the Guide the Commonwealth has been assisting the NSW Government to reduce extractions in these and other groundwater systems under the Achieving Sustainable Entitlements Program because they are widely recognised to be overused. Yet the draft Plan proposes to increase extraction levels by 26 GL per annum. The draft Basin Plan modelling of surface water does not take into account what impact this 26 GL increase, nor the 83 GL increase in groundwater sustainable diversion limits between the 2010 Guide and the draft Plan, might have on the 48 GL surface water limit.

You can only use the water once. If you take the groundwater from these aquifers you will lose surface water, because there is a high level of connectivity between the alluvial aquifers and the river as shown in the figure below.

The lack of analysis of the connectivity and the impacts on Sustainable Diversion Limits (SDLs) in the draft Basin Plan make it impossible to assess the appropriateness of both the groundwater and surface water SDLs presented in the plan.

CONNECTIVITY OF GROUNDWATER SYSTEMS IN THE LACHLAN CATCHMENT, NSW [15]



The 2008 CSIRO report put these levels of extraction in context: [16]

On the Lower Lachlan Alluvium: "*Under the current climate… extraction cannot be maintained at the interim LTAEL* (long-term average extraction limit)... *Average extraction (94 GL/year for the modelled area) is about 71 per cent of the 'effective recharge' (recharge without lateral inflow). Effective recharge only exceeds extraction 44 per cent of the time. This is a high level of development which will reduce groundwater levels by up to 10 m in some parts of the lower aquifer requiring responses from both groundwater users and groundwater managers in order to reduce extraction in areas of falling water tables. As the area of lowered water table grows, additional recharge is likely to be induced from the Lachlan River, but the timeframe for this to occur is likely to be extremely long."*

On the Upper Lachlan Alluvium: "*Under the current climate, the long-term average extraction limit (61 Gl/year for the modelled area) is about 117 per cent of the current total groundwater recharge. Recharge exceeds extraction only 8 per cent of the time. This is a very high level of development which will reduce groundwater levels by up to 20m in some parts of the lower aquifer requiring responses from both groundwater users and groundwater managers in order to reduce extraction in areas of falling water tables. As the area of lowered water table grows, additional recharge is likely to be induced from the Lachlan River, but the timeframe for this to occur is likely to be extremely long."*

This evidence raises serious questions with regard to the MDBA's choice of sustainable diversion limits and the long-term sustainability of these limits.

Unassigned groundwater

Much of the remaining groundwater increases in the draft Basin Plan (in the order of 2000 GL) are in what is described as 'unassigned groundwater areas', and again there is no analysis of the impacts and sustainability of these increases in the draft Basin Plan.

An example is in the Gunnedah-Oxley Basin, where the draft Basin Plan recommends increasing the level of extraction from 0 GL to 300 GL per year. There is no evidence presented in any draft Plan document to demonstrate that this new level of extraction is sustainable.

What we do know is that in 2010 the NSW Office of Water released the *Gunnedah-Oxley basin MDB Groundwater Source Report Card*[17] assessed the risks of an extraction volume of 371 GL per year. The following risks were identified:

- High overall risk to aquifer from groundwater extraction;
- High risk to groundwater dependent ecosystems from declining groundwater levels ; and
- High risk of increasing frequency and duration of low flows in rivers.

No analysis is provided to outline how these risks are to be managed with the extraction of 300GL.

Changing Baselines

In addition to the increase in groundwater extractions there are a number of cases where the baseline diversion limit appears to have been adjusted from the 2010 Guide, again without any scientific evidence to justify these decisions.

The Authority defines Baseline Diversion Limits as *"the best estimates of the Murray-Darling Basin Authority (MDBA) for current usage levels".*[18] For the Goulburn-Murray: Riverine Sedimentary Plan (shallow; Shepparton Formation) the draft Basin Plan sets the baseline diversion limits (from which all sustainable diversion limit calculations are based) at 244 GL per

year and the sustainable diversion limit at 244 GL per year. This gives the impression there is no change in extraction in this groundwater unit.

The 2010 Guide however, described the current use for the same groundwater unit at 83 GL per year, 161 GL less than the draft Basin Plan. They have doubled the "current use" volumes between the Guide and the draft Basin Plan with no justification. How can "current use" volumes, which are licensed allocations not modeled estimates, change so significantly?

If this adjustment to increase baselines is tallied across all groundwater units there is an upward adjustment in total baselines of over 600 GL across the Basin. In contrast, there are only a handful of instances where the baseline has decreased from the 2010 Guide to the draft Basin Plan, the total decrease across the Basin is less than 20 GL.

The draft Plan appears to be placing the Authority in the situation of promoting overuse of groundwater, or at least permitting extractions in the absence of knowledge about their environmental and sustainability consequences. This is the problem that the Authority was established to correct, rather than to promote.

In the absence of this critical information on the impact of groundwater extractions on river health and how such dramatic changes in baselines can be justified, it is impossible for the community, science or Parliament to understand its implications or have confidence it has any prospect of delivering a healthy working river.

CHANGES TO GROUNDWATER BETWEEN THE 2010 GUIDE AND THE DRAFT PLAN

Red = increase in extractions; green = decrease in extractions

Groundwater resource unit	Change from Guide to draft Plan (GL)	Groundwater resource unit	Change from Guide to draft Plan (GL)	Groundwater resource unit	Change from Guide to draft Plan (GL)
Australian Capital Territory (Groundwater) (GS56)	2.9	Lower Darling Alluvium (GS28) *	0.4	Manilla Alluvium (GS35) *	1.5
Goulburn-Murray: Goulburn–Broken Highlands (GS8a)	26	Billabong Creek Alluvium (GS13) *	5.5	Peel Valley Alluvium (GS45)	2
Goulburn-Murray: Loddon–Campaspe Highlands (GS8b)	7.4	Lower Murray Alluvium (shallow; Shepparton Formation) (GS32)	41.9	Upper Namoi Alluvium (GS51)	28.4
Goulburn-Murray: Murray Highlands (GS8c)	1	Lower Murray Alluvium (deep; Renmark Group and Calivil Formation) (GS32)	5.1	Upper Namoi Tributary Alluvium (GS52) *	1.6
Goulburn-Murray: Ovens Highlands (GS8d)	1.5	Upper Murray Alluvium (GS50) *	3.1	Lower Gwydir Alluvium (GS29)	0.6
Goulburn-Murray: Ovens–Kiewa Sedimentary Plain (GS8e)	15.8	Oaklands Basin (GS71)	2.5	Upper Gwydir Alluvium (GS47) *	0.1
Goulburn-Murray: Victorian Riverine Sedimentary Plain (shallow; Shepparton Formation) (GS8f)	160.8	Lake George Alluvium (GS26) *	0.6	Eastern Porous Rock: Macquarie–Castlereagh (GS17) *	8.2
Goulburn-Murray: Victorian Riverine Sedimentary Plain (deep; Calivil and Renmark Formations) (GS8f)	37.4	Lower Murrumbidgee Alluvium (shallow; Shepparton Formation) (GS33)	10.3	Eastern Porous Rock: Namoi–Gwydir (GS18) *	5.2
Wimmera-Mallee: West Wimmera (Loxton Parilla Sands) (GS9a)	22.1	Lower Murrumbidgee Alluvium (deep; Calivil Formation and Renmark Group) (GS33)	10.3	Gunnedah-Oxley Basin (GS70)	300
Wimmera-Mallee: West Wimmera (Murray Group Limestone) (GS9a)	23.6	Mid-Murrumbidgee Alluvium (GS36) *	4.1	Inverell Basalt (GS19) *	1.25
Wimmera-Mallee: West Wimmera (Tertiary Confined Sands) (GS9a)	3.2	Belubula Alluvium (GS12) *	1	Liverpool Ranges Basalt (GS27) *	0.5
Wimmera-Mallee: Wimmera–Avoca Highlands (GS9b)	2.8	Lower Lachlan Alluvium (GS30)	52.2	New England Fold Belt: Border Rivers(GS41) *	11.9
Wimmera-Mallee: Wimmera–Mallee Border Zone (Loxton Parilla Sands) (GS9c)	9.37	Upper Lachlan Alluvium (GS48)*	31.1	New England Fold Belt: Gwydir (GS42) *	18.1

Wimmera-Mallee: Wimmera–Mallee Border Zone (Murray Group Limestone) (GS9c)	3.2	Adelaide Fold Belt (GS10) *	2.25	New England Fold Belt: Namoi (GS43) *	23.8
Wimmera-Mallee: Wimmera–Mallee Border Zone (Tertiary Confined Sand Aquifer) (GS9c)	3.2	Kanmantoo Fold Belt (GS20) *	20.3	Warrumbungle Basalt (GS53) *	0.1
Wimmera-Mallee: Wimmera–Mallee Sedimentary Plain (GS9d)	235.6	Lachlan Fold Belt: Lachlan (GS21) *	100.5	NSW Border Rivers Alluvium (GS38) *	1.79
Mallee (Pliocene Sands) (GS3)	36.4	Lachlan Fold Belt: Macquarie–Castlereagh (GS22) *	41.6	NSW Border Rivers Tributary Alluvium (GS39) *	1.23
Mallee (Murray Group Limestone) (GS3)	36.4	Lachlan Fold Belt: Murray (GS23) *	26.8	Queensland Border Rivers Alluvium (GS58)	0
Mallee (Renmark Group) (GS3)	36.4	Lachlan Fold Belt: Murrumbidgee (GS24) *	102.5	Queensland Border Rivers Fractured Rock (GS59)	4.2
Peake–Roby–Sherlock (unconfined) (GS5)	0.4	Lachlan Fold Belt: Western (GS25) *	218.6	Sediments above the Great Artesian Basin: Border Rivers (GS60)	28.6
Peake–Roby–Sherlock (confined) (GS5)	0.4	Orange Basalt (GS44) *	3.8	Sediments above the Great Artesian Basin: Moonie (GS62)	64.4
SA Murray (GS6)	126	Young Granite (GS55) *	2.8	St George Alluvium: Moonie (GS65)	0.9
SA Murray Salt Interception Schemes (GS7)	17.5	Bell Valley Alluvium (GS11) *	0	Condamine Fractured Rock (GS57)	0
Angas Bremer (Quaternary Sediments) (GS1)	2.4	Castlereagh Alluvium (GS14) *	0.2	Sediments above the Great Artesian Basin: Condamine–Balonne (GS61)	35.3
Angas Bremer (Murray Group Limestone) (GS1)	2.4	Collaburragundry–Talbragar Alluvium (GS15) *	1	St George Alluvium: Condamine–Balonne (shallow) (GS64)	52.1
Eastern Mount Lofty Ranges (GS2)	29.2	Cudgegong Alluvium (GS16) *	0.9	St George Alluvium: Condamine–Balonne (deep) (GS64)	5.1
Marne Saunders (Fractured Rock) (GS4)	0.1	Lower Macquarie Alluvium (GS31)	28.8	Upper Condamine Basalts (GS68)	17.9
Marne Saunders (Murray Group Limestone) (GS4)	0.1	Upper Macquarie Alluvium (GS49) *	4.3	Upper Condamine Alluvium (Central Condamine Alluvium) (GS67a)	4.9
Marne Saunders (Renmark Group) (GS4)	0.1	NSW Sediments above the Great Artesian Basin (GS40) *	79	Upper Condamine Alluvium (Tributaries) (GS67b)	4.9
Western Porous Rock (GS54) *	196.6	NSW Alluvium above the Great Artesian Basin (GS37) *	21.3	Sediments above the Great Artesian Basin: Warrego–Paroo–Nebine (GS63)	196
Upper Darling Alluvium (GS46) *	4.7	Lower Namoi Alluvium (GS34)	13.3	St George Alluvium: Warrego–Paroo–Nebine (GS66)	48.8
				Warrego Alluvium (GS69)	19.1

4. Accounting for the risk to river health from climate change when setting long-term diversion limits.

The draft Plan does not take into account the risks of reductions in environmental flows and the likely adverse impacts of climate change on river health when it set the 2,750 GL recovery figure.

This is quite extraordinary. The CSIRO Sustainable Yields project was commissioned by the government to provide the basic information on the Basin. It was specifically asked to assess the effects of climate change on water availability. We know that the CSIRO modelling suggests that climate change is likely to result in significant reductions in rainfall and runoff in south-eastern Australia over the next 20 years. Yet the draft plan ignores these effects even though it is intended to guide water use in the basin over much of the same time period.

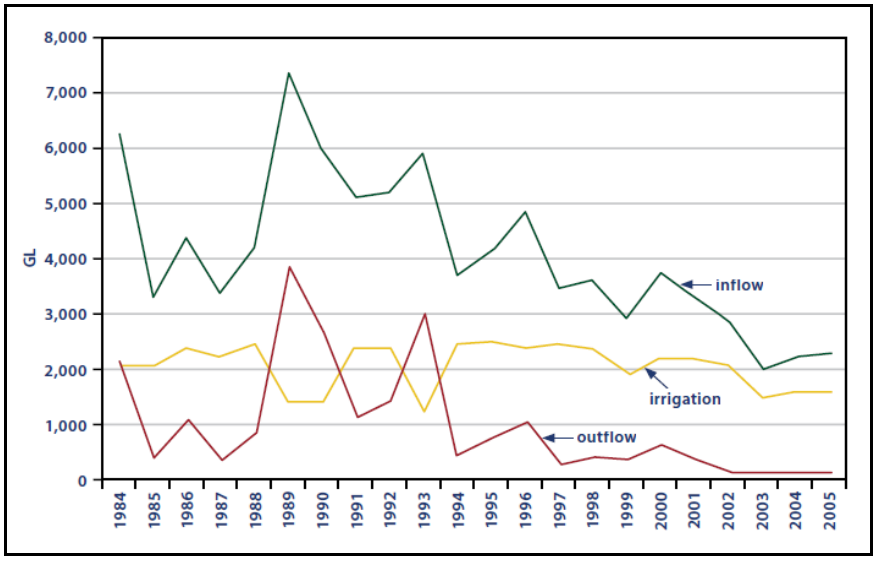
Only one month ago the Australian Parliament passed legislation to introduce an emissions trading scheme as a primary policy response to Australia's contribution to reducing global greenhouse gas emissions. Yet we now have another arm of that same government putting forward a draft Plan for the sustainable future of the Murray-Darling Basin, choosing not to take into account the impacts of climate change in its decision making.

The Murray-Darling Basin Plan must prepare our rivers and the industries which depend on them for the future against the spectre of climate change. The current draft does not.

The reason given by the Authority is that climate risk is already shared amongst users in existing water sharing plans. However, as CSIRO point out *"most existing water sharing plans significantly protect entitlement holders from the impacts of future climate change, and shift the majority of the impact to non-entitlement water, especially during extended dry periods. As the majority (70-80 per cent) of environmental water is non-entitlement water (and will remain so under the Basin Plan) this policy represents a significant risk to the environment during extended dry periods, especially should these be more severe than in the past as a result of future climate change."* [19]

We have seen how these existing rules impact on the environment when southern weather systems return to a drier cycle.[20] The figure below shows the levels of inflows, outflows and water used for irrigation for the Murrumbidgee River. Between 1994 and 2005, the outflows from this river to the Murray have been negligible, while at the same time, irrigation use has remained above 1,500 GL.

MURRUMBIDGEE RIVER: INFLOW, OUTFLOW, AND WATER USED FOR IRRIGATION, 1984-2005 [21]



CSIRO have modelled climate change projections for the Murray-Darling Basin.[22] Its median scenario predicts a decline in mean annual runoff across the basin between now and 2030 (the period this Basin plan is to have statutory effect) of between -14% for high global warming, -10% for medium global warming, and -5% for low global warming.

CLIMATE CHANGE PROJECTIONS FOR RUNOFF IN THE MURRAY-DARLING BASIN, 2030 [23]

Table 4.7 Percentage change in mean annual run-off in the Murray region[a] under different potential levels of global warming

Global climate model	High global warming	Medium global warming	Low global warming
Second wettest global climate model	+7% ('wet extreme' climate scenario)	+4%	+2%
Median global climate model	–14%	–10% ('median' climate scenario)	–5%
Second driest global climate model	–37% ('dry extreme' climate scenario)	–26%	–12%

a The region is as used in the CSIRO Murray–Darling Basin Sustainable Yields Project.

By not factoring this information into its modelling, a reduction in runoff of 10% across the basin (the medium global warming estimate), would effectively wipe out all the gains from the 2,750 GL reduction proposed by the draft Plan.

In the absence of this critical information on the risks of climate change, it is impossible for the community, science or Parliament to understand its implications or have confidence it has any prospect of delivering a healthy working river.

The draft plan should be withdrawn until it incorporates the risk of climate change when setting long-tern sustainable diversion limits to restore the health of the water resources of the Murray-Darling Basin, and puts forward a mechanism to be used to ensure that the rules surrounding the management of rules based water cannot be used to undermine the plans objectives.

5. What is the volume and frequency of flows that are required to keep the Murray mouth open during times of drought and to discharge salt from the Basin?

Rivers die from the bottom up. Every mistake made upstream magnifies the impact on the river system downstream.

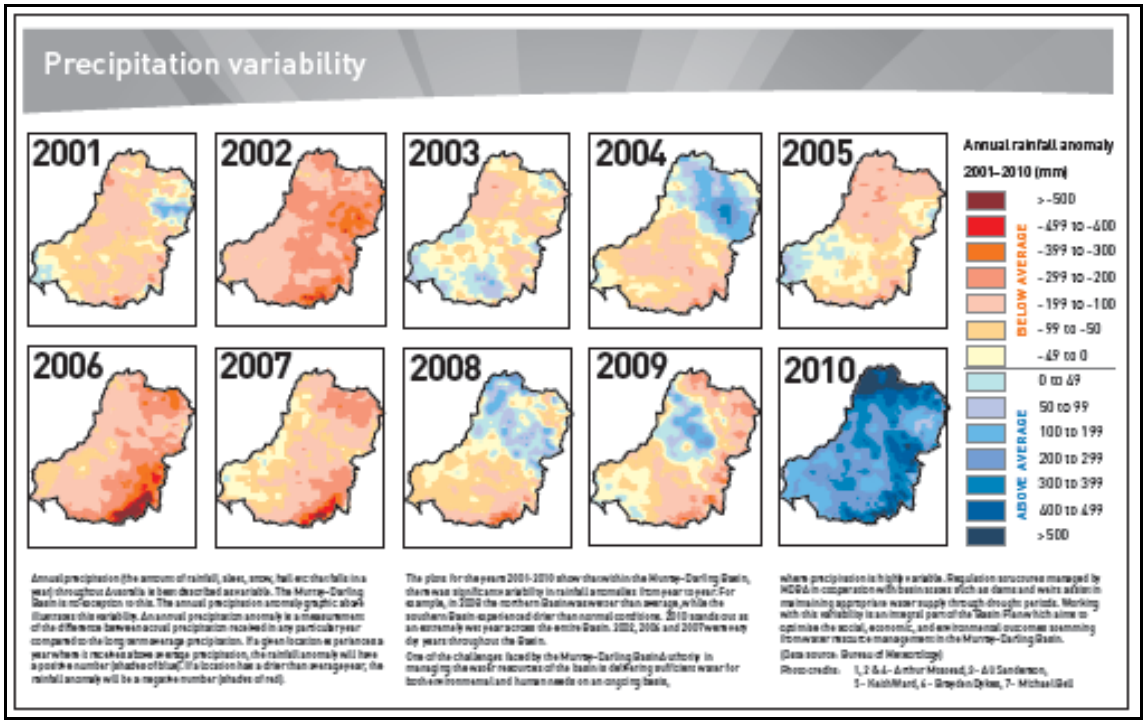
The environmental objectives in the Water Act are to protect and restore water-dependent ecosystems, ecosystem function of water dependent ecosystems and ensure that these water dependent ecosystems are resilient to risks and threats.

A fundamental test of the success of the Basin Plan is whether it will restore and maintain a healthy, functioning Murray mouth (Coorong and Lower Lakes) estuary.

The draft Basin Plan asserts that 2,750 GL will deliver an open Murray Mouth 9 years in 10.

On face value this would appear to satisfy these requirements. But this does not mean that the return of 2,750 GL from consumptive use would have resulted in the Murray mouth remaining open 9 years in the drought of the last decade. It is a statistical description of probability.

PRECIPITATION VARIABILITY IN THE MURRAY-DARLING BASIN 2001 TO 2010 [24]



There are however two issues here.

Firstly, there is no information in the documentation accompanying the draft Plan that describes how a recovery of 2,750 GL will achieve the 89% target or that achieving this target will restore and maintain the Murray mouth estuary in a healthy condition.

What the Authority does say: [25]

> Although useful as a coarse indicator of Murray Mouth opening status it is important to note that in reality maintaining an open Murray Mouth has inherent complexity in both definition and predicting potential future status due to the various factors that influence mouth opening in addition to barrage flows e.g. tidal regime, coastal sedimentary processes, sea level rise, management intervention via dredging etc. Some degree of caution is therefore required when interpreting results estimating the frequency/duration of Murray Mouth opening. However the relative frequency of opening under the different options provides an indication of the percentage of years which may still need some dredging to facilitate an open Murray Mouth.

Secondly, there is no evidence that even if this target was met by the 2,750 GL reduction that this action will satisfy the environmental objects of the Act to **protect and restore** (our emphasis) this water-dependent ecosystem.

What we do know is that the draft Plan does not even seek to satisfy this test. It simply states that an open mouth 89% of the time will '**improve** environmental outcomes'. The Authority seems to have redefined the objectives away from those specified in the Water Act.

The draft Plan notes *"Modifications to the flow regime of the River Murray have resulted in a significant change in the ecological character of the region since its listing as a Ramsar wetland in 1985".*[26] This Ramsar listing imposes obligations on Australia, under the *Environmental Protection and Biodiversity Conservation Act 1999*, to maintain the ecological characteristics that makes it of international importance under the Ramsar convention.

As we saw in the recent 2002-2010 drought, the Coorong and Lower Lakes endured severe degradation with water levels dropping below sea level, extreme hyper-salinisation of the South Lagoon, where salinity was more than 4 times that of seawater, and dramatic changes in water chemistry.

The introduction of the barrages in the 1940s had the impact of reducing the tidal prism of water in the Coorong and Lower Lakes by over 90%. This tidal prism was key to maintaining a functioning, open estuary.

The barrages, coupled with substantially reduced environmental flows down the Murray, particularly since the 1980s when the mouth first closed, have resulted in a substantial build-up of marine sandbanks, choking the entrance and developing a flood tidal delta.

An open river mouth relies on a dynamic balance between the ocean's energy and tides against the energy of the river flows coming downstream. Currently these are grossly out of balance. We now have hydrological conditions that are delivering a net import of sand that can only be balanced by higher levels of environmental flows down the Murray at regular frequencies.

To keep the mouth open the balance must be restored, particularly with respect to the movement of sand.

The morphological state of the mouth has a major controlling effect on the conveyance through the mouth of both tidal flows and barrage release flows and, as such, is a major control on the water level regime through the Coorong.[27] As we saw in the most recent drought, if the mouth is closed for any significant period, it caused major environmental damage to Lake Albert, the chemistry of Lake Alexandria becomes toxic, and the ecosystems that support the Coorong and the fishing and tourism industries that rely on a healthy estuary deteriorate.

If we are to return the Ramsar listed, Murray mouth estuary to a healthy condition, we will need a Basin Plan that delivers sufficient volumes of flows to the Lower Lakes at frequencies that will enable the mouth to remain open during drought conditions.

We need to know what this base volume and frequency is and the draft Plan does not tell us that information.

We do not know what this is. The Authority has used a good hydrological model, but this model is unable to deal with the sand that is now blocking the flood/tidal delta.

What we do know is that since 1970, over 5,000 GL of water has been withdrawn from the river system for consumptive use. We also know that the Murray mouth closed in 1981 for the first time in recorded history[28] and would have closed again in 2002 and remained closed, except for a small channel dug by a dredge, until the floods of 2011.

No estuarine ecosystem can sustain that level of damage and maintain its ecological function.

An open mouth is also critical to removing salt from the system. The draft Basin Plan sets the salt load target of discharging a minimum of 2 million tonnes of salt from the River Murray System to the Southern Ocean each water accounting period. The 2011 Goyder Institute report[29] found that: *"MDBA's salt load export target of a minimum of 2 million tonnes/year through the barrages on a ten year rolling average basis (i.e. 20 million tonnes in any ten year period) is not met except during persisting wet conditions under the baseline scenario or any of the three Guide scenarios."*

The three scenarios examined were returning 3,000 GL per year, 3,500 GL per year and 4,000 GL per year. These are all above 2,750 GL. The draft Basin Plan has no discussion of how 2,750 GL will achieve the salt load target or by how much 2,750 GL will fail to meet this target. Without this information it is impossible to determine how rapidly salt will accumulate in the system and what this will do to water quality for drinking, the environment and production.

In the absence of this critical information on the minimum flow needs of the Murray mouth (Ramsar listed) estuary and the export of salt, it is impossible for the community, science or Parliament to understand its implications or have confidence it has any prospect of delivering a healthy working river.

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