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JOINT SUBMISSION

Inquiry by the House of Representatives Regional Australia Committee into “**the potential role that new environmental works and measures projects could play in partially offsetting SDL reductions under the Basin Plan, focussing particularly on prospective project proposals identified by state governments and community interests**” (item number 2).

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OVERVIEW

With the Murray-Darling Basin Plan now in final stages, there is plenty of interest in the role environmental works and measures can play in improving the efficiency and effectiveness of environmental water delivery and partially offsetting the sustainable diversion limits (SDLs) in the Plan.

In Victoria, engineering works and measures have played a key role in providing environmental water to important wetlands – pumping of water to Hattah Lakes, the use of regulators and channels in Barmah and Gunbower forests and at Lindsay Walpolla – during the recent drought. While they have made it possible to maintain drought refuges and achieve certain environmental objectives that would otherwise not have been met, they have inadvertently created the misleading impression that engineering solutions are a long-term alternative to returning the necessary volumes of real water to rivers.

This is far from the reality. On the whole, engineering works and measures are expensive, require long time-frames to deliver, provide limited returns on investment and require

extensive management and monitoring. In addition, the ecological risk associated with water delivery through works and measures has not been given due attention.

The purpose of the Murray-Darling Basin Plan is to set scientifically adequate limits on how much water can be taken out of the river system in order to give the wetlands and the rivers of the Basin a real chance at long-term recovery. While works and measures could be considered a part of the solution in specific areas with particular objectives, we caution against any broader attempt to substitute adequate water flows with infrastructure works and measures.

In this submission we have provided:

1. Key recommendations for decision-making about future environmental works and measures to achieve an environmentally, economically and socially sustainable Basin; and

2. Case studies in support of the above key recommendations, including:

- **Victorian works and measures: Highlighting ecological risks associated with current works and measures and listing some “good” proposals which can be considered in the future;**
- **A summary proposal of “good” engineering interventions for the Coorong, Lower Lakes and Murray Mouth; and**
- **A costed proposal to implement key recommendations from the Native Fish Strategy to improve river and native fish population health.**

3. Additional recommendations 5 and 6 relating to the Committee’s other terms of reference, ie “progress in water recovery...through irrigation infrastructure and water purchase” (item 1) and “the groundwater sustainable diversion limits for the Basin in the revised proposed Basin Plan” (item 3).

RECOMMENDATIONS

1: Consider works and measures as a *supplement* to water recovery and environmental flows, not a *substitute*: Environmental works and measures implemented as part of ‘The Living Murray (TLM) program have been subject to cost and time blowouts¹, and have not lived up to their early promise. They have benefitted only a fraction of the Basin’s wetlands– in the range of 0.6 per cent of all wetlands² and 5.7 per cent of Ramsar listed wetlands³.

¹ MDBA (2011). *The Living Murray Annual Implementation Report 2009 – 2010 and Audit of The Living Murray Implementation* MDBA publication number 143/11. MDBA, Canberra.

² Kingsford, R. T. *et al.* (2004). Classifying landform at broad spatial scales: the distribution and conservation of wetlands in New South Wales, Australia, *Marine and Freshwater Research*, 55(1): 17-31.

³ Pittock, J. *et al.* (2010). Changing character: *The Ramsar Convention on Wetlands and climate change in the Murray-Darling Basin, Australia*. *Environmental and Planning Law Journal*, 27(6): 401-425.

Works and measures have also required extensive management and monitoring and only a small number of candidate works and measures stands up to proper evaluation of utility and cost effectiveness. They are no substitute for actual environmental flows and should only be considered as a supplementary measure. They are not a primary means for delivering and managing environmental water and certainly not a substitute for water itself.

2: Ensure that ecological risks from environmental works and measures are properly taken into account: Environmental works and measures can play a role in improving ecological outcomes for degraded wetlands in the Murray-Darling Basin, especially when water availability is low. However, the potentially harmful impacts of such infrastructure should be assessed, and only “good” projects considered for implementation in the future. Studies of existing environmental works and measures in the Coorong, Lower Lakes and Murray Mouth (CLLMM) area ⁴ by Pittock & Finlayson suggest they frequently result in disruption to ecological processes and destruction of wetland areas. The studies found reduced resilience of wetland habitats and the introduction of unanticipated risks, costs and outcomes, including community rejection, not least because they fail to address the key causes of degradation. Any further engineering works for this area must pass the key tests for a “good” program. We have included a paper containing examples of “good” programs for the CLLMM for future consideration under the case studies section.

3: Commit to a workplan for addressing ‘system constraints’ to deliver adequate volumes of environmental water: Expensive engineering works with limited environmental benefits and potentially significant downsides should not be funded in preference to measures which address ‘constraints to environmental water delivery,’ such as removing redundant weirs and purchasing easements. ‘System constraints’ are cited by the Murray-Darling Basin Authority (MDBA) as presenting physical and policy barriers to delivering environmental water and are deemed to impose an upper limit to the amount of additional water that can be delivered as part of the Basin Plan. System constraints include the risk of flooding public infrastructure, such as bridges or roads; flooding private property, such as paddocks, and the size of a dam outlet limiting how much water can be released. Despite the limitations such constraints place upon the ability to deliver environmental water and therefore environmental outcomes, there is no comprehensive feasibility study, workplan, public strategy or budget available to systematically address the constraints. The government should commission an independent review to redress this matter through quantitative and qualitative scoping on a valley-by-valley basis that feeds into a workplan and schedule for tackling the problem. Unallocated funding from the existing \$5.8 billion infrastructure budget would be an appropriate source of funding for this crucial element of Basin planning.

4: Maintain and implement the native fish strategy: Expensive engineering works with potentially significant downsides should not be funded in preference to credible and

⁴ Pittock, J., & Finlayson, C. M. (in press). Climate change adaptation in the Murray-Darling Basin: Reducing resilience of wetlands with engineering. Paper presented at the Water and Climate: Policy Implementation Challenges. Practical Responses to Climate Change National Conference, 1-3 May 2012, Canberra.

ongoing programs which have significant community support such as the MDBA Native Fish Strategy (NFS) and proposals for the construction of fish-ways in key areas. A summary proposal for the Native Fish Strategy is included in the case studies section.

5: Make full use of the water market to implement the Basin Plan and acquire the water the environment needs: Buying water from willing sellers is the most cost effective and efficient way of returning water to the river system and delivers the best outcomes for investing tax-payers' money⁵. The Commonwealth's \$3.1 billion water-buyback program has already recovered more than 1,253 billion litres of entitlement (929 billion litres long-term annual average yield) and is projected to return 1,600 billion litres of environmental water in total. However, the much larger \$5.8 billion infrastructure program has only identified 290.5 billion litres of entitlement to date (219.6 billion litres long-term annual average yield) and will only deliver 600 billion litres of water in total⁶. This is a massive difference in cost effectiveness and return for the taxpayer. A recent Monash University study of the Australian Government's buyback scheme (Dixon et al 2012)⁷ found that moderate droughts and cuts in water allocations arising from drought, and not a water-buyback scheme conducted over many years, have had significant impacts on regional economies of the Southern Murray-Darling Basin. The buy-back program should be expanded and accelerated to purchase water where priorities of the proposed Basin Plan are fulfilled until the Basin Plan is finalised and becomes the strategic driver. The purchase of real water with a much higher likelihood of delivering real benefits should be prioritised for funding over works and measures.

6: Adopt a consistent approach to groundwater assessment before setting groundwater SDLs in the Basin Plan. The Independent Expert Scientific Committee (IESC), which is tasked with assessing the cumulative impacts of large coal and gas developments on water resources, has already identified '*Basin scale modelling which would provide data to support the understanding of risks*' and '*knowledge projects and foundational science*'. It would appear pre-emptive to set sustainable diversion limits in the Basin Plan that may markedly contradict a more rigorous and robust assessment process. First, a bio-regional assessment should be completed, and the IESC should be able to advise the determination of ground-water SDLs based on this assessment.

⁵ Productivity Commission (2010), *Market Mechanisms for Recovering Water in the Murray-Darling Basin*, Final Report, March. http://www.pc.gov.au/data/assets/pdf_file/0019/96004/water-recovery-report.pdf

⁶ SEWPAC. (2012). Water recovered under Water for the Future Initiative as at 30 April 2012 and 31 May: <http://www.environment.gov.au/water/basin-plan/pubs/mdba-waterforthe-future-mastertable.pdf> and <http://www.environment.gov.au/water/policy-programs/entitlement-purchasing/progress.html>

⁷ Dixon, P. B., Rimmer, M. T and Wittwer, G. (2012). Modelling the Australian government's buyback scheme with a dynamic multi-regional CGE model. <http://www.monash.edu.au/policy/ftp/workpaper/g-186.pdf>

CASE STUDIES:

Works and measures can play a role in improving ecological outcomes in certain areas; however care must be taken to only select projects which improve rather than risk the ecology of such areas.

A. ASSESSMENT OF VICTORIAN WORKS AND MEASURES

(1) Works and measures that allow particular environmental outcomes to be achieved using less water:

The Lindsay River regulator project proposed by DSE⁸ is a heavily quoted example of engineering works that reduce the amount of water needed to inundate some sections of the floodplain. The project has merit in allowing water delivery in dry or drought years and should be implemented. However, the use of this project to advocate for a change in the SDL needs to be treated with great caution because the regulator will enable some environmental objectives to be met at the site (for example for red gums) but not others (fish migration or ecosystem processes). It will reduce the water requirement for small floods in a prescribed area but not for the occasional large volumes of water required to maintain floodplain connectivity. The regulator project will also reduce the volume of water leaving the site and therefore reduce the amount of water available to downstream environmental assets. It is not, therefore a panacea to environmental watering needs in the Lindsay Walpolla area.

Similarly the Hattah Lakes pump station is a vital piece of infrastructure that will allow environmental water delivery and provide drought refuge habitat in dry years and fill the main lakes. However, it is never going to provide water to the upper reaches or black box areas of the floodplain: nor will it pump enough water to allow it to flow through the lake system and exit back to the River Murray. As is the case at Lindsay, the engineering solution can meet some environmental objectives but not others, and the optimal solution will be a combination of works and water.

(2) Works and measures that enhance environmental outcomes from existing river operations, dams, weirs and regulators that create barriers to fish migration throughout the Basin.

DSE has put forward a number of proposals for fishways that would greatly improve fish passage at various sites in northern Victoria and open up river reaches that are currently inaccessible. These include:

- Ovens River –Tea Garden Creek weir in the mid-Ovens is a major obstacle to fish passage and installation of a fishway there would connect 795 km of river. The Ovens River supports significant, healthy populations of Murray cod, golden perch and Murray

⁸ DSE (2010) Priority works to increase the effectiveness and efficiency of environmental water delivery in northern Victoria

crayfish, which are likely to be important at a regional scale as source populations for other locations, including Lake Mulwala and the Murray River⁹. Enhancing habitat for Ovens River based populations may provide a basis for more widespread recovery of threatened or endangered species.

- Gunbower Creek – construction of fishways at the National Channel offtake and Koondrook weir would allow fish passage throughout the 120 km length of Gunbower Creek. The Creek, which provides excellent habitat for large-bodied fish such as Murray Cod and Golden Perch, is currently isolated from the main stem of the Murray. Similarly the Gunbower lagoons are isolated from Gunbower Creek and reconnecting them would open up further migration opportunities.
- Broken River – Gowangardie weir is the last barrier to fish migration in the Broken River below Lake Nillahcootie. Construction of a fishway here would allow fish migration throughout the 285 km river system, and would consolidate the environmental benefits of decommissioning Lake Mokoan.
- Loddon River – modifying irrigation infrastructure downstream of Lanecoorie weir to allow fish passage would provide 340 km of connectivity. However higher water recovery targets are necessary than those proposed in the draft Plan to fully benefit from the proposed works.
- Campaspe River – closure of the Campaspe Irrigation District should increase environmental flows in the Campaspe. Construction of fishways at Campaspe weir and Waranga siphon would provide connectivity through the 130 km reach below Lake Eppalock.

The combined cost of these proposals has been estimated at \$27 million and would provide value for money in increasing the benefits of environmental water recovery. Numerous other fishway and habitat improvement projects have been identified through the Native Fish Strategy and by the CMAs and await funding.

(3) Works and measures that overcome constraints on the delivery of environmental flows:

A series of River Red Gum parks have recently been declared across northern Victoria, including the Lower Goulburn National Park. Environmental watering in this park is hampered by potential flooding of adjacent private land. A combination of strategic levee positioning and purchase of private land would greatly reduce this potential (and related damage to private land that was estimated at \$40 million following floods in the area in 1993) and allow the inundation of 10,500 ha of connected floodplain in the national park. This project has a developed business case¹⁰ and a cost benefit ratio of 1.78. The estimated cost is \$30 million (2010 estimate).

⁹ Cottingham P. Gawne B. Gigney H., Koehn J., Roberts J. Stewardson M. and Vietz G. (2008). Lower Ovens Environmental Flows Project: Environmental flow recommendations. Report prepared for the North Eastern Catchment Management Authority

¹⁰ GBCMA (2001) Lower Goulburn Floodplain Rehabilitation Scheme Business Plan summary, prepared by Price Waterhouse Coopers
<http://www.gbcma.vic.gov.au/downloads/LowerGoulburn/LGFRSBusinessPlanSummaryJuly2001Final.pdf>

However to achieve the full suite of benefits from the Lower Goulburn floodplain rehabilitation scheme, it is necessary to deal with constraints in the upper Goulburn, particularly the potential flooding of private land in the area immediately downstream of Lake Eildon around Thornton. This is a more significant impediment to the delivery of environmental water than the much touted 'flooding of Shepparton'.

(4) Strategic works and measures that generate water savings:

DSE/NVIRP has proposed the construction of bypass channels around the Ramsar listed Kerang Lakes that are part of the supply system for the Torumbarry Irrigation Area in the GMID¹¹. The construction of bypass channels around First Reedy Lake, Third Reedy Lake, Little Lake Charm and Racecourse Lake would allow each lake to be operated independently, thus providing both water savings and a more natural hydrologic regime for the lakes. DSE estimates the cost at \$15 million. This is one of the few projects that provide environmental benefits AND water savings, but the cost per megalitre saved will be very high.

¹¹ http://www.nvirp.com.au/downloads/Kerang_Lakes_bypass_project_May_2012.pdf

B. BRIEFING PAPER June 2012

RECOMMENDED MEASURES TO PROTECT THE COORONG, LOWER LAKES AND MURRAY MOUTH (CLLMM) AREA OVER AND ABOVE VOLUMETRIC SUFFICIENCY UNDER THE PROPOSED BASIN PLAN

1 Pre-requisite - Sufficient water flow to:

- flush 2 million tonnes of salt and other accumulated pollutants/sediment out to sea (and any increase in future);
- keep the Murray Mouth open naturally at all times;
- maintain sufficient water level for the Lakes Alexandrina and Albert and to have the capacity to vary this water level to achieve the following outcomes:
 - salinity in the 750-1000 EC units range for Lake Alexandrina 95% of time and never over 1500 EC;
 - salinity in the 1500 - 2500 EC units range for Lake Albert 95% of the time;
 - the lakes to vary between +0.35 mAHD as an absolute lowest level with regular (at least every 3 years), short (2-4 weeks) periods of +0.9 mAHD to inundate the samphire;
 - salinity levels for the Coorong be seasonally adjusted;
 - outcome based targets for restoring key ecosystem species and indicator species that have been severely harmed in this already compromised ecosystem are established and achieved.
- underpin the health of the Coorong, its key food plants and all species that depend on this ecosystem. (The best science should underpin any options to increase local flows to the lower Coorong as there are risks to the effectiveness of this option and other environmental impacts);
- achieve all hydrological and environmental outcomes required to ensure a healthy river in its entirety including the, Lakes Alexandrina, Albert, Coorong and Murray Mouth system (with a modicum of certainty, higher limits give greater certainty) and progressively remove or manage system constraints to achieve these higher flows towards 2019. As each constraint is removed, the extra flow must go to increase the SDLs;

2. Improvements to the barrages

- Further infrastructure improvements for barrages more rapid operation and greater flow through at the right times.
 - Manually operated gates are not sufficient to manage the system on a daily basis in regard to tidal changes, storms and wind variation;
 - A proportion of automated gates appear to either not work or suffer from poor reliability;
 - A greater number of reliable automated gates are required in certain areas e.g. Boundary Creek;
- The barrages must be upgraded to stop salt water ingress. Leakage through concrete stop log portions of the barrage is significant particularly during periods of high tide, low levels in Lake Alexandrina and the Goolwa Channel (compounded during frequent southerly winds);
- Additional fish passages are required in certain areas of the barrages;
- A review of the operational plan of the barrages to better integrate with the environmental needs of the lakes and Coorong, to better provide variation of lake levels that best supports changeover of water and environmental outcomes. When environmental watering plans are completed, the operation of the barrages should be directed towards delivery of these plans in addition to maintaining a division between salt and fresh water;
- Stronger linkages with biodiversity experts in planning the operation of the barrages and timing of openings and closures;
- Further upgrades to prevent ingress of sea water/salt water through the barrages when Lake Alexandrina and the Goolwa Channel are at a low level.

3. Improving the water changeover into Lake Albert

- Sufficient flows (see above 1) and barrage improvement (see above 2);
- Optimise the timing of lake height variation to enhance water changeover, for example, lower lake head in advance of inflow pulses;
- Fully remove remnants of the temporary bund and return the Narrung Narrows to original bathymetry;
- Further infrastructure measures and proposed improvements should only be undertaken where detailed environmental impact assessment confirms that these measures do not cause further significant environmental harm:
 - Investigate the dredging of the Narrung Narrows to increase flows and turnover, ensuring safeguards against further environmental harm;

- Investigate the removal of the causeway that is restricting water flows through the Narrung narrows and determine if this can be achieved in a way that prevents further environmental harm from mobilising silt;
- A proposal to open lake Albert to the Coorong is not supported due to significant environmental issues.

4. Additional water from upper South East drainage schemes and South East water transfers

Current proposals to increase water flows to the southern Coorong from Upper South East drainage schemes and water transfers are not supported. The volume of water these proposals would deliver are small and are insufficient to offset a reduction of environmental flows from the Basin.

Before such an option is considered further, a detailed Environmental Impact Assessment would need to address the following matters:

- Such schemes are reliant on yet further changes to the region continuing a history of South East drainage infrastructure that significantly harmed the natural environment, surface and groundwater systems;
- The potential quantity of the water is likely to be unreliable especially during drier periods and may make little volumetric contribution towards improving salinity;
- The water quality is likely to be unsuitable for the Southern Coorong with potentially high levels of nutrients and agricultural chemical residues, risking accumulation, algal blooms and die off events when introduced to warm shallow water;
- Water transfers from within the Upper South East may result in further harm to other environmental assets;
- The ecological characteristics of the South East water are different to the Southern Coorong and could potentially import undesirable organisms.

5. Response to the Meningie Narrung Lakes Irrigators Association Five Point Plan for Lake Albert and the Coorong.

The Meningie Narrung Lakes Irrigators Association has proposed the following Five Point Plan for Lake Albert and the Coorong.

1. Remove the Narrung Ferry Causeway
2. Remove the Narrung Bund in its entirety
3. Dredge the whole of the Narrung Narrows
4. Install a pipeline at the southern end of Lake Albert to the Coorong
5. Return natural flows to the southern end of the Coorong

The Conservation Council of SA does not support point 4. The installation of a pipeline between Lake Albert and the Coorong would not improve the water quality of the Coorong for the following reasons

- The volumes of water are insufficient to flush the water in the Coorong
- Due to the low volumes, the piped water would remain stagnant, evaporate and increase the salinity of the Coorong
- Building a pipeline would damage an already fragile ecosystem
- Does not compensate or replace inadequate natural flows into Coorong, Lower Lakes and Murray Mouth.

Points 1,2,3 and 5 are supported, where the natural flows in point 5 are interpreted to mean end of river flows through the Murray Mouth. Point 4 should not be considered, building a pipeline would provide no real benefit to the Coorong or Lower Lakes.

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C. NATIVE FISH STRATEGY FUNDING PROPOSAL: Actions proposed under each key theme for five years

1. Fish friendly infrastructure and water management

Infrastructure

(\$20 million annual investment required)

- Launch a Darling River Fish Passage Program, building on the success of the 'Sea to Hume' Fishway program.
- Update the top 20 listing of in-stream barriers to fish passage Basin-wide for priority remediation works.
- Through appropriate remediation works reduce the injuries and mortality of native caused by downstream movement through weirs.
- Reduce native fish injury and mortality caused by irrigation infrastructure
- Create, or restore, in-stream habitats with diverse and variable flow patterns in the static weir pools and anabranches of the lower Murray River.
- Review and modify operational approaches for large dams to help mitigate downstream thermal pollution.

Water Management

(\$1 million annual investment required)

- Quantify the ecological outcomes of different types of environmental watering to guide future allocation and timing decisions
- Evaluate the risks of environmental water delivery to guide future allocation and timing decisions
- Contribute native fish expertise to a cross-disciplinary advisory taskforce to maximise ecological outcomes from environmental water delivery.
- Contribute to the protection of flow parameters that underpin intermittent and unregulated systems to protect native fish

2. Connecting with communities

Demonstration Reaches

(Between \$7 million (existing) and \$18 million (expanded to all CMA regions) annual investment required)

- Strengthen the existing seven Demonstration Reaches as long-term, community-based, river rehabilitation showcase sites.
- A strategic increase in the number of demonstration reaches across the Basin to increase replication of on-ground interventions and transferability of results.

On-ground works

(\$3 million annual investment required)

- Complete the Hume to Yarrawonga re-snagging works and follow this with expansion to other priority areas of the Basin.
- Restore the Basin's only estuarine habitats in the Coorong, identifying options and undertaking feasibility trials for returning now marine and hyper-saline areas back to a diversity of brackish habitats
- Improve the understanding of the role of aquatic vegetation in supporting diverse fish communities, and support activities at priority sites for re-establishing aquatic vegetation communities.

People networks

(\$1.5 million annual investment required)

- Facilitate community and stakeholder input into rehabilitation and adaptive management of native fish habitats through continued support of jurisdictional NFS Coordinators and the Community Stakeholder Taskforce
- Develop an easily accessible Basin-wide communication network that informs, updates and reports on native fish outcomes to the broader community
- Strengthen connections, collaboration and partnerships with a broader range of key stakeholder groups.

3. Protecting the icons of the Basin

(\$0.5 million annual investment required)

- Recover the iconic Murray cod, through coordinated actions which address both conservation and sustainable recreational fishery objectives
- Develop an inventory of the locations, status and ecological linkages between key native fish habitats to inform management interventions
- Maintain a contingency fund to support emergency native fish conservation measures due to extreme events such as prolonged drought, bushfire or similar

4. Controlling alien fish species

(\$1.5 million annual investment required)

- Implement a coordinated program of Carp harvesting at existing and future fishways.
- Implement integrated Carp management at identified 'hotspots' and priority environmental watering sites.

- Complete, and commence implementation of an Alien Fish Plan for the Murray-Darling Basin that considers all 12 alien species currently found across the Basin.
- Implement strategies and early detection activities to prevent the establishment of Tilapia in the Basin.

5. Building new knowledge

(\$1.5 million annual investment required)

- Establish a state of the art 'Sea to the Hume' fish movement monitoring system
- Develop new or modified water infrastructure solutions to maximise native fish passage and minimise alien species movements
- Invest in research and monitoring to advance our knowledge and understanding of native fish management threats and emerging issues, with actions targeting all priority themes
