Saving the Murray's Lower Lakes & Coorong

Minority Report

The Australian Greens & Senator Nick Xenophon

Introduction – a 'wicked' problem

1.1 Australia currently faces one of its most complex and difficult social, economic and environmental crises ever. The Murray Darling Basin is regarded as the food-bowl of the nation, and there are many basin communities which have come to depend upon water extraction for their industries and their town supplies. The basin's ecosystems are also highly threatened (including 17 Ramsar wetlands of international significance[1]) and 80% of its wetlands have already been lost as a consequence of over-allocation.

1.2 At the same time we also face a major threat in the short-term to the survival of one of our national icons – the Coorong and Lower Lakes. We face the very real possibility that acidification could lead to irreversible damage to these precious ecosystems, with serious knock-on impacts for the communities and industries of the lower Murray.

1.3 In both cases the causes of the problems are the same – a combination of the way we have mismanaged limited resources within the basin, the consequences of a severe and extended drought, and the impacts of a warming and drying climate.

1.4 This is truly a 'wicked' problem2 – it involves a series of complex and inter-related systems which are only partially understood, where difficult decisions need to be made based on incomplete and conflicting data. It also crosses a number of jurisdictional boundaries and governance grey areas, and brings together a range of different stakeholders with intersecting and competing interests.

1.5 Our leading scientists are warning that we need to significantly reduce water use within the Murray Darling Basin to ensure that our use is sustainable during future drought cycles in the face of a significant reduction in likely levels of run-off as a result of climate change. Dr Tom Hatton, Director of CSIRO's Water for a Healthy Country Flagship, indicated in evidence that the relationship between rainfall and runoff has changed dramatically and that combined with a shift in seasonality we

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1 Dr Bill Phillips, *Committee Hansard*, 9 September 2008, p. 105.

2 The term 'wicked problem' is used as a mathematician would use it— defining an issue highly resistant to resolution. This terminology was proposed by urban planners H. W. J. Rittel and M. M. Webber in 1973. See also *Tackling Wicked Problems: A Public Policy Perspective, Australian Public Service Commission*, http://www.apsc.gov.au/publications07/wickedproblems.pdf

could expect to see significantly less runoff in the future – probably in the order of 50%.3 Professor Mike Young suggested that the decline in runoff was at least 30% and possibly 40-50%.4 As a result the Wentworth Group is advocating a 42-53% cut in consumptive use will be necessary in order for the basin to remain viable, that more of the money set aside in the National Water Plan needs to be allocated to water buy-back and a separate structural readjustment fund needs to be put in place.5

1.6 Given the devastating and irreversible threat faced by the Coorong and Lower Lakes, the scale of the social, environmental and economic challenge in the Murray Darling Basin as presented in the evidence to this Inquiry, and the amount of Commonwealth investment tied up in Water for the Future ($12.9 billion) the majority report is particularly disappointing. The Australian Greens and Senator Nick Xenophon disagree with the majority report on the following points:

- We do not agree that there is not enough water available to address the environmental needs of the Coorong and Lower Lakes systems.
- We also believe the timeframe of the IGA is unduly indulgent (given the urgency of the crisis) and needs to be significantly shortened.
- We note with concern that many wetlands within the Basin are in extremely poor health, including the Macquarie Marshes, the Narran Lakes, the Lower Gwydir and the Fivebough – Tuckerbil Swamps.
- We do not believe the flooding of the Lower Lakes with salt water is an option. We also note with concern approval for such a plan was given by the Federal Environment Minister without appropriate risk assessment having been conducted.
- We believe, given current rains, between 30-60 gigalitres of fresh water will be needed to keep Lake Alexandrina and Lake Albert functioning until September next year.
- We also argue the Victorian Government's proposed North-South Pipeline, which will extract 75 gigalitres from the Goulburn for domestic use in Melbourne, should not proceed.

1.7 We note that the majority report dodges the difficult question of how we make tough decisions about prioritising water use during times of scarcity by simply concluding that water isn't available. This does not fit with the evidence presented to the Committee or that discussed within the majority report, which indicates that there is water available within the system. These volumes of water are under high demand

3 Dr Tom Hatton, CSIRO, *Committee Hansard*, 9 September 2008, pp 12-13. When questioned Dr Hatton indicated that the decline was of the order of 50%, but offered to provide exact numbers on notice.

4 Prof. Mike Young, UA, *Committee Hansard*, 10 September 2008, p. 13.

5 Wentworth Group *Submission 71*, also *Committee Hansard*, 19 September 2008, pp 19-21.

for competing uses in a situation where there is not enough to go around and where industries, communities and the environment are hurting.

1.8 From our point of view a more honest appraisal of the dire situation facing water users within the basin (including threatened environments) would have given greater consideration to weighing up the relative risks to different communities, environments and industries of limited access to water and looked to how small changes spread across users might ameliorate the risk of the irreversible loss of different industries, communities or environments.

1.9 In this context, the scope and timeframe of the IGA also needs to be revised and the role of the Commonwealth redefined. These issues will be addressed in the second part of this Inquiry which deals with the longer-term whole-of-basin issues.

A tricky balancing act

1.10 We face and must balance both serious short term threats of irreversible change to ecosystems of international significance whose loss would have serious knock-on effects – against the uncertain long-term system-wide threats to the communities and environments of the entire basin in a drying and highly variable climate.

1.11 It is clear that we need an emergency response to head off irreversible changes to the Coorong and Lower Lakes. However, this response must be in the context of a bigger picture solution to underwrite the sustainability and security of the communities and the environments of the whole of the Murray Darling Basin. We need to balance our management of this short-term emergency with the requirements of sustainable whole-of-basin management in the longer term. We do not want either one to be at the expense of the other.

1.12 We appreciate that this is an extraordinarily difficult thing to do – particularly when we are in a situation where we do not have all of the information, where the future of our climate and the availability of water is both uncertain and likely to be highly variable, and where there are so many people dependent on the basin.

1.13 The need for an emergency response to tackle a very pressing threat to the Coorong and Lower Lakes has been advocated for a number of months. This has been done in circumstances where the South Australian Government, the Murray Darling Basin Ministerial Council and the Commonwealth had been alerted to the deteriorating circumstances within the lower Murray for a long time, and have more recently received reports of an impending crisis on which they had failed to act in an appropriate and timely manner. It took the leaking of this information to the public and a concerted community campaign to put this issue onto the national agenda and mobilise support for a Senate Inquiry.

1.14 Well before the emergence of this particular crisis The Australian Greens have been drawing attention to the wider sustainability problems of our use of water,[6] of the future of agriculture in a changing climate,[7] and of the threats to the limited resources of the Murray Darling Basin system in particular.[8]

Healthy communities rely on a healthy river

1.15 We have been long-term advocates for the need for a whole-of-basin approach to managing and sharing the resources of the basin. On this basis we wholeheartedly support the views of basin communities that we need to develop and maintain healthy communities on the basis of a healthy river. As the Murray Darling Basin Association said:

> The Murray Darling Association influence stretches across the entire Murray-Darling Basin landscape and beyond, into coastal cities. It has seen through its history of 64 years the benefits that the carefully managed resources of water, land and air can do to assist in the growth and development of this great continent. We all know that water is the essence of life, not just for human inhabitants but for the entire ecological fabric of our landscape and the whole biodiversity. We must protect that biodiversity with every means available to us, and that will no doubt mean that, for continued sustainability, we must act on change urgently; more urgently than we have done in the past.[9]

1.16 The South Australian Farmers Federation expressed a similar sentiment:

> We believe that there has to be accelerated purchase of water to support the environment because environmental water seems to be a misunderstood thing. If we do not have a healthy river, we do not have good water to irrigate with. All these things go hand in hand. They are absolutely essential.[10]

1.17 The Mannum Progress Association put it succinctly:

> …in future there must be an allocation of water for the environment. Without an allocation of water for the environment, we do not have a healthy river and we will not ever have healthy communities.

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6 Inquiry into Water Policy Initiatives, RRAT Committee 2005-06; Inquiry into Additional Water Supplies for South East Queensland - Traveston Crossing Dam, RRAT Committee 2007.

7 Inquiry into Climate Change and the Australian Agricultural Sector, RRAT Committee 2007-08.

8 Inquiry into the Murray-Darling Basin Amendment Bill 2006, RRAT Committee 2006.

9 Murray Darling Basin Association, *Committee Hansard*, 10 September 2008 p. 39.

10 SAFF, *Committee Hansard*,10 September 2008, p. 88.

> …We cannot go on. We know how this system has deteriorated. We know why. In the future we really have to get it right, and we have to get it right fairly soon.[11]

1.18 In light of this level of community concern and engagement with the issues surrounding the long-term sustainability of their communities and the river system on which they depend, it is crucial that there be a much greater level of community consultation. In a situation where communities are struggling to get by in the face of severe ongoing reductions in available water there is a pressing need for a much greater level of facilitated community engagement in sharing coping strategies and planning for the future. Basin governments need to be providing much greater levels of information and resources to basin communities and giving them more opportunities to have input.

1.19 An excellent example of community collaboration, innovation and planning in the face of adversity is given by the Torrumbarry Reconfiguration & Asset Modernisation Strategy (TRAMS) in the Goulburn Valley. This is a community-driven strategy to redesign their local irrigation area to get by with substantially less water in the face of climate change. It involves local landholders signing on to a joint agreement to modernise 50% of their delivery system and decommission 30% to maintain productivity and deliver better environmental outcomes.[12] This particular community-driven project shows what is possible when communities are given the information, tools and support to work together on local challenges and envisage a shared future.

1.20 A discussion of the kinds of processes and outcomes that we would like to see for basin communities and the principles and values on which we believe decision-making should be based are discussed in more detail in the last section of this Report below. This issue will of course be taken up in more detail in the second phase of the Committee Inquiry.

The threat to the Coorong and Lower Lakes

1.21 The Coorong is a large, Ramsar-listed estuarine system at the mouth of the Murray River, which is host to a range of important and threatened species. The Lower Lakes - lakes Albert and Alexandrina are adjacent freshwater ecosystems.

1.22 The Coorong and the Lower Lakes have not experienced natural flow cycles for over 70 years – since barrages were built to protect freshwater access for local communities. The evidence presented to the Committee suggests that prior to the creation of the barrages the flow regime through the Murray mouth meant that Lakes Alexandrina and Albert were predominantly freshwater systems which experienced

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11 Ms Helen Gillian, Mannum Progress Association, *Committee Hansard*, 10 September 2008, p. 114.

12 Dr Arlene Buchan, ACF, *Submission 81*, p. 2.

varying seasonal pulses of salt water. Regular seasonal flushing events meant that there was little opportunity for any significant salinity concentrations to build up.

1.23 Until recent events, the flow regime in the modified systems of the lakes was such that as predominantly freshwater systems they were able to preserve much of their natural values and continued to support many internationally significant species. The change in the flow regimes in recent years (as a consequence of the combination of record low flows and continuing unsustainable extraction) has led to increasing threat of exposure of the lake beds and the emergence of an acid-sulphate soils problem.

1.24 As the report in April from the SA Murray Darling Basin Natural Resource Management Board notes:

> Prior to European settlement, Lakes Alexandrina and Albert offered a mosaic of mostly fresh, but occasionally brackish open water habitats with freshwater, saline and hypersaline fringing wetland systems that were interconnected.
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> Sediment studies provide evidence that there was very little tidal or marine influence on the Lakes due to the significant river flows except under extreme drought conditions.
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> There is also evidence that under most circumstances the water level in the Lakes was usually between approximately +0.3m and +0.6m AHD and never fell below sea level (approximately 0.0m AHD). The dominant freshwater character of the Lakes prior to regulation of the Murray system is further reinforced by the fact that river flows were sufficient to keep the river mouth open. It has only closed once (in 1981) in the past several thousand years.[13]

1.25 This analysis was confirmed in evidence to the Committee by Coorong and Lower Lakes expert Dr Kerri Muller[14] and by Ramsar expert (and former Deputy Secretary General of the Ramsar Convention) Dr. Bill Phillips.[15]

1.26 The report from the SA Murray Darling Basin Natural Resource Management Board also states:

> The condition of the Coorong and Lower Lakes has deteriorated considerably since its designation as a Ramsar site in 1985. This decline is primarily due to the impacts of ongoing low inflows at the site. In 2002 it was estimated that median freshwater flows at the Murray Mouth had been reduced to 27% of natural flows and flows have diminished further since

13 South Australian Murray-Darling Basin Natural Resource Management Board, *Lakes Alexandrina and Albert ecological condition report to the Murray Darling Basin Ministerial Council*, April 2008. p. 4.

14 Dr Kerri Muller, NRM, *Submission 40*.

15 Dr Bill Phillips, Riversmart Australia, *Submission 12*.

> that time. Since 2000, the situation has been exacerbated by the drought with 12 periods of up to 600 days of barrage closure.
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> Accordingly, the Murray Mouth has been continuously dredged since 2002 to ensure it remains open. The last few years have had record low River Murray inflows to South Australia and this has had serious consequences in the Lower Lakes and Coorong.[16]

1.27 In evidence to the Committee, Dr Phillips reported on assessments of the ecological character of the Coorong and Lower Lakes Ramsar site undertaken in 2006 and 2008, stating:

> Of the 54 vital signs that we looked at, green indicated that things were okay within expected boundaries, but if they were red then things were very concerning and required urgent intervention. You can see that in 2006 nearly half of the vital signs of this system were red and nearly one-third were amber—heading in that direction. They cover everything: the abundance of species; the area covered by certain habitat types; the orange-bellied parrot and species like that; and salinity and a whole suite of water quality parameters. It is a full gamut of things which tell you about the health of that ecosystem.
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> … we have recently found—it will not surprise any of you—that 13 of those parameters have gone off the scale and the others are travelling very quickly and sliding in that direction. This is a system that is very rapidly deteriorating—a deterioration that, to be honest, has been happening for 30 to 40 years but that has been accelerated over the last three to four years and particularly over the last 12 months.[17]

1.28 The threat in Lake Albert is particularly acute, and there has been an ongoing program of pumping from Lake Alexandrina to ensure that falling water levels do not expose acid sulphate soils in the lake-beds. Once these soils are exposed and oxidised we will see an irreversible process – the outcome of which is the production of sulphuric acid and the destruction of a wetland of international significance on which a number of highly threatened species of migratory birds are dependent.

1.29 As of 31st August 2008 Lake Alexandrina was at -0.27 AHD and Lake Albert at -0.13 AHD. The current management trigger level for Lake Albert is -1.0 AHD – which is the point beyond which current science suggests it is approaching the tipping point for runaway acidification.[18] Lake Albert was at -0.5 AHD (which is 1.2m below

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16 South Australian Murray-Darling Basin Natural Resource Management Board, *Lakes Alexandrina and Albert ecological condition report to the Murray Darling Basin Ministerial Council*, April 2008. p. 4.

17 Dr Bill Phillips, *Committee Hansard*, 9 September 2008, p. 103.

18 Dr Kerri Muller, *Submission 40*; SA Government, *Submission 73*; and MDBC, *Submission 76*. Note however that the evidence of Dr Bill Phillips seemed to indicate that the new management plan for the Coorong and Lower Lakes which is currently under consideration contains a tipping point management threshold of -0.8 AHD. See *Committee Hansard*, 9 September 2008, p. 109.

their normal pool levels) when the threat of acidification was brought to the attention of the Murray Darling Basin Ministerial Council in April 2008 by the South Australian Murray-Darling Basin Natural Resource Management Board.[19]

1.30 Urgent intervention is clearly needed to prevent the exposure of acid-sulphate soils in the lake-beds.

1.31 It is important to appreciate that what we are discussing here is a short-term emergency intervention to simply keep the Coorong and Lower Lakes alive during a period of the lowest flows on record. These do not reflect the environmental requirements to restore and maintain the health of these systems beyond the immediate water crisis.

1.32 The Living Murray Icon site Environmental Management Plan for the Lower Lakes, Coorong and Murray Mouth identifies three key ecological objectives for the site, which were agreed by the Murray Darling Basin Ministerial Council in 2004: (i) an open Murray mouth; (ii) enhanced migratory water bird habitat in the Lower Lakes and Coorong; and (iii) more frequent estuarine fish spawning and recruitment.[20]

1.33 The MDBC submission notes that much greater volumes of water flowing through to the end of the system would be required to meet these objectives. The volume to keep the Murray Mouth open is in the vicinity of 2000ML/day or approximately 730GL/annum. Without periodic flows over the barrages to allow fishways to function effectively those estuarine and marine species that rely on the Coorong for part of their life cycle are severely threatened. MDBC estimates that an additional 550GL annually is required for optimum operation of the barrages, and 270GL would be required if fishways were only operated from September to February. These flow requirements are on top of those required to return the level of the lakes up to their operating height (at least 0.3m AHD) – which requires the additional 730GL mentioned previously (i.e. a total of 1000GL).[21]

1.34 During a period of extended drought it is obviously difficult if not impossible to maintain this healthy flow regime, and the community will wish to prioritise the use of limited resources to ensure the survival of other environmental and community assets. In choosing to do so it is important to appreciate that this strategy is only viable in the short-term, and the current reduced flow regimes in the Coorong and Lower Lakes and other Ramsar wetlands and Living Murray Icon Sites comes at the expense of ecosystem function, resilience and ongoing viability.

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19 South Australian Murray-Darling Basin Natural Resource Management Board, *Lakes Alexandrina and Albert ecological condition report to the Murray Darling Basin Ministerial Council*, April 2008.

20 *Icon site Environmental Management Plan for the Lower Lakes, Coorong and Murray Mouth*, The Living Murray Initiative.

21 MDBC, *Submission 76*, pp 4-5.

1.35 We face a real risk if extreme water rationing continues indefinitely because we are locking into place 'crisis' water sharing regimes that are not sustainable for either the communities of the basin or its ecosystems.

1.36 We note that in evidence to the Committee, Ramsar expert Dr Bill Phillips indicated that many of the Ramsar wetlands within the Basin are in poor to very poor health, including Macquarie Marshes, Narran Lakes, the Lower Gwydir, the Fivebough-Tuckerbil Swamps system. He also indicated that similar concerns were held for several of the Living Murray Icon Sites, including the Barmah- Millewa Forest, the Gunbower Forrest, the Hattah-Kulkyne Lakes and the Chowilla Floodplain.[22] We believe that urgent assessment of the state of these systems is required and management plans for their recovery and protection need to be implemented as a matter of urgency.

1.37 The danger faced by the Coorong and Lower Lakes and the other internationally recognised and iconic wetlands and ecosystems throughout the Murray Darling Basin is that if we keep on going the way we are we will ultimately pass tipping points beyond which the resilience of these systems are fatally compromised. The wetlands of the basin play a crucial role in maintaining the quality of the water within the system (in addition to their important natural heritage role as habitats for threatened species). When we consider that 80% of the wetlands of the basin have already been lost and those remaining are degraded and highly threatened, continuing on with a water sharing regime that puts the needs of the environment last could mean the collapse of these systems. This would result in severe degradation of the quality of the water throughout the system to the point where it was unsuitable for the communities and industries that depend upon it.

1.38 It is important to note that the Coorong and Lower Lakes are separate (but inter-related) ecosystems which will require separate management responses. These management options are discussed as separate sections below.

Ruling out the salt water option for the Lower Lakes

1.39 The healthy functioning of the Lower Lakes historically depended on regular freshwater flows and occasional large flushing events to maintain their function as predominantly freshwater systems.

1.40 The initial presentation from the Department of the Environment, Water, Heritage and the Arts presented flooding the Lower Lakes with seawater as the most likely option at that time for addressing the threat of acidification.[23]

1.41 We do not accept that flooding the Lower Lakes with salt water should be countenanced as a management option for a number of compelling reasons:

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22 Dr Bill Phillips, *Committee Hansard*, 9 September 2008, pp 105-7.

23 Department of Environment, Water, Heritage and the Arts, *Submission 1*.

(a) The evidence presented to the Senate Inquiry[24] shows that the introduction of any significant volume of salt water into the Lakes is likely to lead to irreversible changes and the loss of ecosystem values and should be ruled out. As stated in evidence by Dr Muller,

> I believe that that would be extremely detrimental to the ecology of the system, as well as the socioeconomic assets of the area. The lakes have been freshwater for 7,000 years before European settlement of this country. I believe that they should stay as freshwater systems and I believe that letting in sea water will not prevent acidification of the lakes and is likely to exacerbate the situation.

(b) The introduction of salt water to acid sulphate soils presents a serious risk of creating a greater acidification problem. Significant concentrations of sulphate ions in seawater increase the likelihood of sulphuric acid production. The introduction of salt water also increases the risk of heavy metals being mobilised, and of stratification taking place within the lake body (with the heavier layer of salt water at the bottom) thus increasing the risk of anoxia (i.e. detoxification of the saltwater layer).[25]

(c) If low flow conditions continue and there is an absence of any significant flushing events the introduction of salt water into the lake system will ultimately result in increasing salinity problems in the lakes as evaporation leads to increasing concentrations of salt. This would create environmental problems similar to those being experienced in the Southern Lagoon – with the added complication of acid-sulphate soils increasingly reacting with these salt ions. The ecological consequences of hyper-salinity in the lakes would be more extreme as these are now freshwater environments.

(d) Another uncertain risk factor is the possible impacts of the introduction of salt water on groundwater systems that are contiguous with the lakes. Not enough is known about how these systems interact, and there is a possibility that the introduction of salt and the mobilisation of heavy metals could contaminate these groundwater systems, having serious knock-on impacts on the communities that depend on this groundwater and high value ecosystems that are connected to them.

1.42 As stated in evidence by Dr Phillips,

> It will change ultimately the fundamental chemistry of the system perhaps forever. The biota and macro invertebrate systems will be so significantly

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24 See evidence of Dr William Phillips, RiverSmart Australia, *Committee Hansard*, 9 September 2008, p. 110; and Dr Kerri Muller, NRM, *Committee Hansard*, pp 9 and 16-17.

25 Dr Kerri Muller, NRM, *Submission 40*; MDBC, *Submission 76*; *Committee Hansard* 10 September 2008, pp 59-60.

> altered that the recovery process will be made that much more difficult. We do not know, for example, what will happen if you add sea water into that part of the system. It is highly likely it will end up in the groundwater systems, which could then flow up into the critically endangered Fleurieu Peninsula swamps. You might essentially kill off a critically endangered ecological community and the emu wrens that live there. So there are all sorts of collateral impacts that could happen from opening the barrages which force us to say that it has to be the absolute last resort.[26]

1.43 Given the high level of scientific knowledge of the natural values of these ecosystems, the decade or more of warnings given by the scientific community about their deteriorating values, and the serious threats posed by acidification, heavy metal mobilisation and hyper-salinity – we were surprised to learn that a risk assessment had not been carried out on the option of flooding the lakes with salt water. Given the constitutional responsibility of the Minister for the Environment under the Ramsar treaty and his responsibilities under the EPBC Act,[27] it is disturbing to hear evidence that the Commonwealth was advocating this option while at the same time arguing that the responsibility for such a risk assessment lay wholly with the SA state government.[28]

1.44 We submit that bioremediation to convert Lake Albert to an ephemeral wetland through replanting would be a better option to letting salt water into this already degraded and fragile system. This view is supported by the evidence of Dr Muller, who stated that

> …bioremediation is a far preferable situation to letting in the sea, because the sea will be irreversible, whereas planting around the lakes and using mulch is a way of dealing with the acid that does not require water.[29]

We note however that bioremediation of this kind and on this scale has never been undertaken and presents some significant challenges that require further research.

1.45 The time that bioremediation at this scale would require may rule it out as an immediate option for the lake as a whole, however in the short-term it may prove an effective strategy to target particular high-risk areas around the lake fringe. We recommend that further bioremediation trials should continue and a feasibility study into various bioremediation options should be produced.

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26 Dr. Bill Phillips, *Committee Hansard*, 9 September 2008, p. 110.

27 *Environmental Protection and Biodiversity Conservation Act 1999.*

28 Mr Tony Slayter, Department of Environment, Heritage, Water and the Arts, *Committee Hansard*, 18 September 2008, pp 12-13.

29 *Committee Hansard*, 10 September 2008, p. 16, see also p. 17.

Prognosis and prospects for the Lower Lakes

1.46 Recent rain in the Mount Lofty catchment and the lower Murray has brought with it a valuable window of opportunity – both extending the timeframe within which water can be sourced to maintain lake levels above the critical threshold and reducing the quantum of fresh water needed to ensure acid sulphate soils remain covered.

1.47 This was highlighted by Dr Wendy Craik in evidence, where she stated that:

> Under the worst case scenario a relatively small amount of water could be required to avoid acidification before next winter. Given the rainfall and the reduced evaporation, we believe that we only need a relatively small amount of water to get through to next winter. Under anything less than the worst case scenario the lakes are at a low risk of acidification before the next winter in flow period.

1.48 From a situation where we had a level of -0.5 AHD in April 2008, with the likelihood that the level in Lake Albert would drop below the critical threshold if we were unable to source 450 – 500GL of water by the end of this year, these recent rains have lifted the level to -0.27 in Lake Alexandrina and -0.13 in Lake Albert.[30] This means that the best estimates are that we now have a window of opportunity through to next September and that we probably only need to source 30-60GL of fresh water to get us there. We believe that this is an achievable objective.

1.49 This position is supported by the evidence of Dr Arlene Buchan who commented in evidence that:

> I think there is every opportunity of being able to find another 60 by the end of September next year if we look at all the different options right across the Darling basin, the Murray basin, what we can get from permanent entitlements and what we might perhaps buy through temporary entitlements – there are a whole range of different measures there. I think that 60 gigs is perfectly doable. I say that because, in my conversations with some of the CSIRO scientists and so on who work on this and with staff within the Murray-Darling Basin Commission, they think that 60 gigs is achievable…Sixty by the end of next September should not be an enormous task.[31]

1.50 It is crucial that these recent modest rains do not encourage us to lose momentum on the need to address the ongoing threat to the ecosystems of the Coorong and Lower Lakes.

1.51 We must also appreciate that these are the best estimates based on our current state of knowledge of the likely evaporation rates and the dynamics of the acid sulphate soils involved. What is required is an ongoing monitoring and evaluation

30 MDBC, *Submission 76*, p. 3.

31 *Committee Hansard*, 26 September 2008, pp 20-21.

process of water levels, evaporation rates and soil acidification to enable the adaptive management of the problem. The most effective solution is an adaptive management approach, in which we monitor water and acid levels and deliver water as it is needed to top it up so we maintain levels no lower than -0.4AHD. Such an approach keeps the amount of water required at a minimum by minimising evaporation losses.

A very near miss?

1.52 At the time the crisis in the Lower Lakes was brought to the attention of the Ministerial Council the predicted crisis point was October and there was no reason to expect that a rainfall event of the extent recently experienced in the Coorong and Mount Lofty Ranges region was at all likely. Despite this critical deadline, the next meeting of the Council was not scheduled until November and no action was taken to source fresh water within the system to avoid this looming catastrophe. Were it not for the recent fortuitous rain, Lake Albert would now be rapidly approaching the tipping point.

1.53 This demonstrates an extremely poor approach to ecosystem management which must be addressed as an urgent priority so that it does not occur again in this and other threatened high-value ecosystems.

1.54 The delay between the warning of this approaching crucial threshold, public knowledge of the emergency, and our ability to respond to it could yet prove to be critical for the survival of the Coorong and Lower Lakes. On the basis of the evidence presented to the Committee it is clear that the best opportunity to source and supply fresh water would have been through the winter – when channels were wet, temperatures were low, and there were some stream flows to support conveyancing.

1.55 In the period during which the issue has been being debated many of the sources of water initially identified as being worthy of consideration[32] have since been committed or become impractical. This particularly applies to potential sources in the northern basin, as the drying out of the channel means that transmission losses would now be so high as to be unacceptable (80-90%).

1.56 However, the evidence presented by the Bureau of Meteorology suggested that there is a reasonable possibility of a significant summer rainfall event in the sub-tropical northern part of the basin over this Christmas. As Dr Jones indicated in evidence:

> In the northern part of the basin, the rainfall outlook is somewhat positive. There are shifts towards wetter than average conditions, and we are also

32 Dr Arlene Buchan, Inland Rivers Network and Australian Conservation Foundation, Opportunities to deliver immediate and ongoing water for the ecological crisis in the internationally significant Lower Lakes and Coorong, *Submission 81*, Attachment 2.

> moving now into the higher rainfall time of year, so there is some prospect for reasonable rainfall in the north of the basin.[33]

1.57 Under these circumstances we believe that it is crucial that the Commonwealth and the Ministerial Council look into the legislative and regulative impediments that might prevent some of this water getting through to the Coorong and Lower Lakes (and other severely stressed basin ecosystems) were such an event to occur. This includes the 4% cap on the transfer of water out of a district, and those licence conditions in the northern basin under which extraction is permitted once flows pass a certain level.

1.58 Were it not for the intervention of significant rain in the southern regions the failure to act of the Ministerial Council, particularly the South Australian Government and the Commonwealth Ministers (who have direct responsibility for oversight of Ramsar wetlands and the Water Act 2007), means we would now be looking at irreversible ecological destruction in Lakes Albert and Alexandrina at a scale unprecedented in our nation's history.

1.59 We need to learn the lessons of this crisis to ensure that, if we manage to dodge a bullet this time, this sort of catastrophe cannot threaten without an appropriate response being taken in the future.

Where is there water in the system?

1.60 The Murray Darling Basin Commission (MDBC) presented to the Committee an up-to-date summary of the best information they had available on current water resources within the basin. This information is limited to the extent that it does not cover water in private storages and is dependent on figures supplied by state authorities.

1.61 The MDBC evidence suggested that as 31st August there was approximately 5840 GL of water in active storage across the Basin (24% of capacity) and approximately 1850GL had been allocated to users (16% of average annual use). Dr Wendy Craik said in evidence that there is between 1400 and 1600GL that has been allocated. The MDBC confirmed to the Committee on notice that as of 21st August 1499GL of water, including carryover water from 2007-08 had been set aside for allocations in the southern interconnected basin (excluding South Australia) and that 250GL of this water including carryover was allocated within Victoria.

1.62 While this amount represents a very small allocation for irrigation needs, it does suggest that the accessing 60GL in the southern connected system remains a possibility.

1.63 The NSW Government indicated in its evidence that it intended to supply the agreed river flows and conveyancing losses to South Australia from Menindee Lakes.

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33 Dr David Jones, Bureau of Meteorology, *Committee Hansard*, 26 September 2008, p. 4.

This means that 696 GL has been allocated from storage at Menindee Lakes to provide 350GL of dilution flows at the South Australian border.[34] While this suggests on the one hand that any water sourced from or below Menindee lakes can be delivered to the lower lakes without transmission losses, it also raises some questions about why NSW is sourcing this water from Menindee rather than the Hume Dam. It is uncertain at this stage what waters may become available in Hume as the season progresses, and how the state may be planning to allocate these waters if and when they become available. Returning to the usual practice of accounting for conveyancing losses in the River Murray from Hume Dam might be one way to free up sufficient water for the Coorong and Lower Lakes.

1.64 Evidence from Murrumbidgee Irrigation Ltd[35] and Dr Arlene Buchan of the Australian Conservation Foundation (ACF)[36] highlighted the fact that there is an outstanding loan of 113GL of environmental water from the Murrumbidgee which has not yet been returned. We understand that the Murrumbidgee Catchment Management Authority has indicated that, should this water become available, they probably only need 5GL for a southern bell frog habitat and a bit more to wet local wetlands in the lower Bidgee and then would be happy to provide water to assist the crisis in the lower lakes.

1.65 Given the evidence presented to the Committee on transmission losses, and the provision of conveyancing water by NSW, the suggestion is that emergency water for the lower lakes might be more efficiently sourced below Menindee Lakes and in the lower Murray connected system.

1.66 Dr Arlene Buchan suggested in the ACF submission that '…it is likely that the cumulative effect of acquiring small volumes of water from a mix of different options will provide the most cost-effective, short-term approach…'.[37] This might include: a mix of purchasing both permanent and temporary water from the southern connected system, repayment of some of the 113GL borrowed from the environment in the Murrumbidgee valley, short-term changes to the operating rules for Menindee Lakes, or releases from Menindee if more water becomes available upstream as a result of monsoonal activity; accounting for River Murray conveyance losses from the Hume Dam rather than Menindee; loans or leases from allocations; and more strategic purchases of properties with large water entitlements.

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34 NSW Government, *Submission 65*; and SA Government, *Submission 73*.

35 Mr Dick Thompson, Murrumbidgee Irrigation Ltd, *Committee Hansard*, 26 September 2008, pp 34-35.

36 Dr Arlene Buchan, ACF, *Submission 81*, p. 4. See also Inland Rivers Network, *Submission 69*, p. 5 and Dr Arlene Buchan, ACF, *Committee Hansard*, 26 September 2008, p. 25.

37 Dr Arlene Buchan, Australian Conservation Foundation, *Submission 69*, p. 4.

1.67 The evidence presented to the Committee shows that there is water available within the system to assist the Lower Lakes.

The Sugarloaf Pipeline

1.68 The Inquiry received evidence from a number of witnesses who were concerned about the increase in demand on the river system of other consumptive uses, including particular concern about the definition and growth of priority water for 'critical human needs' and of non-Basin populations increasing their reliance on the system. Of particular concern is the current reliance of Adelaide on water extraction from the Murray, and the recent decision by the Victorian Government (with the support of the Federal Environment Minister) to start extracting significant quantities of water from the Goulburn for Melbourne.

1.69 The proposal to extract an additional 75GL/yr from the Goulburn via the Sugarloaf Pipeline for consumptive use in Melbourne also represents a substantial increase (21%) in the amount of River Murray water prioritised for critical human needs (on top of the current 350GL allocated to urban and domestic consumption).

1.70 The Inquiry received a submission and heard evidence from the Plug the Pipe group in Victoria and their concern that the North-South Pipeline project would, with its 75 gigalitres extracted from the Basin for Melbourne's water use, pose a serious environmental and sustainability risk.

1.71 In its evidence to the Committee, Plug the Pipe questioned the validity and adequacy of the assessment process used to approve the project. Their main contention was that

> …there is no evidence that any independent, scientific, environmental impact assessment was conducted to inform the Minister of the likely impacts on wetlands and migratory species of the diversion of a further 75 billion litres of water.[38]

1.72 Plug the Pipe was critical of the lack of sensible precautions such as a basic environmental audit,[39] and also questioned the projected water savings claimed by the Victorian Government.[40] Rather, they asserted that the project was 'robbing' environmental water allocations.[41] The Victorian Auditor General's report on the project was highly critical of the figures and the methodology used by the Victorian Government to derive their projected water savings for the food bowl project noting that:

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38 Plug the Pipe, response to Question on Notice, p. 2.

39 *Committee Hansard*, 26 September 2008, p. 42.

40 Plug the Pipe, *Submission 42*, pp 3-4.

41 Plug the Pipe, *Submission 42*, p. 4.

> The announcement of the food bowl project in June 2007 was not informed by a rigorous cost analysis and full validation of the water savings estimates.[42]

1.73 Given the severe stresses on the ecosystems in the Basin there are serious concerns raised over the impact of the North-South Pipeline. Further, the approval process and the role and authority of both the MDBC and the MDBA to effectively deal with the concerns raised requires an urgent review. Dr Wendy Craik, the CEO of Murray Darling Basin Commission (MDBC), stated that the MDBC did not have a view on the pipe to Melbourne because the MDBC has not seen the modeling for the pipe and had not been consulted or included by the Victorian Government in its planning processes.[43]

1.74 There is a strong argument that urban communities located in catchments outside of the Murray Darling Basin should not be relying on extraction from the basin for their domestic and industrial supplies – particularly where those urban centres are located in wetter catchments and are making very inefficient use of their own incident rainfall. This issue is particularly problematic when we take into account the relative impacts of the recent drought onto coastal versus inland catchments, with a greater decrease in rainfall and run-off occurring in inland catchments – an issue which is exacerbated when we consider the modelled impacts of climate change.

1.75 While there have been improvements in water conservation measures over the last few years, Australian cities still rank as having some of the highest per capita rates of water consumption, despite our living in a highly variable and relatively arid climate. There are great opportunities within both Melbourne and Adelaide to improve water use efficiency, to increase the capture and re-use of storm water run-off, and to maximise the benefits achieved from fit-for-purpose water recycling for industry. Urban water authorities should be exploring and investing in these options to improve the sustainability of their water use before they pursue the politically easy option of taking water from inland catchments facing greater climactic risk.

1.76 Given the huge problem that already exists with over-allocation within the Basin all of the water being saved through efficiency measures should be returned to the river. While we strongly dispute the claimed level of savings from the Victorian 'Foodbowl' project it is clear that any savings need to go to the system, not to Melbourne.

Opportunities in stormwater harvesting

1.77 The Inquiry heard evidence on the potential benefit of a number of projects being undertaken that would lead to increased water being available for the system. These include engineering works to reduce the evaporation in the Menindee Lakes and

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42 Victorian Auditor General, *Planning for Water Infrastructure in Victoria*, 2008, p. 32.

43 Dr Wendy Craik, MDBC, *Committee Hansard*, 26 September 2008, pp 62-63, 72-73 and 78-80.

also the enormous potential benefits of stormwater harvesting both for Adelaide and Melbourne, which was flagged as one of the lower cost and environmentally and socially attractive options. Dr Tom Hatton indicated that there is 'huge potential for stormwater capture, storage, treatment and reuse on the plains in Adelaide.'[44] He suggested that Adelaide could move a huge distance toward being off the river in a 10-12 year period if investment were made in options such as stormwater harvesting.[45] The Conservation Council of South Australia also highlighted that weaning Adelaide off dependence on the Murray River is a worthwhile goal.[46]

1.78 Evidence was also presented about stormwater being the most underutilised resource, with approximately 1.8 times Adelaide's annual take on the Murray in the average year going out to the gulf as stormwater outflow each year.[47] Mr James Danenberg pointed out that even in a dry year that still equates to about one-third of Adelaide's annual consumption of Murray-River water. He considered it an 'absolute tragedy and travesty that this resource is not being adequately harvested.'[48] The Salisbury Council in South Australia, who have recently had delegates from a number of South East Asian countries attend their wetlands to take lessons from the stormwater harvesting and management programs that are occurring there, was highlighted as a world-leading innovator in this area. Mr Danenberg stated that this program has not been adequately funded or resourced and that the potential of stormwater harvesting needs to be investigated further.[49]

1.79 The Commonwealth and relevant States should fast track measures such as stormwater harvesting that will wean Adelaide off its reliance on the Murray and prevent Melbourne developing a similar reliance.

Hyper-salinity in the southern Coorong

1.80 The combination of high levels of evaporation and the sustained lack of flushing events in the Coorong (with no flows of freshwater over the barrages in the last 6 years) have lead to hyper-salinity in the southern lagoon, with salinity levels of 180-200 TDS. These concentrations of salts, which are equivalent to 5-6 times the salinity of sea-water, exceed the maximum levels that key fauna such as midge larvae and hardyhead fish can tolerate. This is having a knock-on effect onto dependent populations of waders and fish-eaters. The changing flow regime also prevents the

44 *Committee Hansard*, 9 September 2008, p. 23.

45 *Committee Hansard*, 9 September 2008, p. 27.

46 *Committee Hansard*, Wednesday 10 September, p. 4.

47 *Committee Hansard*, 10 September 2008, p. 4.

48 *Committee Hansard*, 10 September 2008, p. 4.

49 *Committee Hansard*, 10 September 2008, p. 4.

procreation of Ruppia tuberosa - a key aquatic plant and critical food source for waterfowl.[50]

1.81 It is clear that unless these levels of hyper-salinity are reduced the ongoing viability of the Southern Lagoon of the Coorong as a habitat is severely threatened, and urgent remedial action is required.

1.82 We recommend that as an interim management measure the pumping of approximately 50GL of hyper-saline water from the southern lagoon (and its consequent replacement with a similar volume of fresh seawater) is undertaken.

1.83 Evidence was also presented by a number of witnesses about the viability of the upper south east drainage scheme being diverted into the southern reaches of the Coorong to reduce hypersalinity.[51] This possibility should be urgently assessed.

1.84 We further recommend that a longer term management plan for the Coorong, which takes into account projections of likely temperature and flow regimes be prepared and resourced as part of a wider consideration of the management of the Lower Lakes and of the health and amenity of the Murray Darling system. This plan will also need to take into account management options for projected sea level rises as a result of climate change.

The Emergency Water (Murray-Darling Basin Rescue) Bill 2008

1.85 During evidence, reference was made to the Emergency Water (Murray-Darling Basin Rescue) Bill 2008, which was referred to the Committee on 28 August 2008. Professor Mike Young highlighted a number of points with respect to the bill, including the importance of arming the Commonwealth Water Minister with the requisite tools needed to take action at a time of 'governance crisis'. He stated:

> The intent of the…bill… is to enable the minister to act and to put aside one of the biggest stumbling blocks, which is the legislative hurdle. At the moment Minister Wong does not have the authority to take over and solve this problem. We have talked about solving it for a long time. What the minister actually needs is a full tool kit. When you have a crisis you need a full tool kit. At the moment her hands are tied behind her back. The bill identifies a need for a new sharing system, the removal of barriers to trade so that we can expedite adjustment. It stresses the need to give the

50 Dr Kerri Muller, NRM, *Submission 40*; Dr Bill Phillips, RiverSmart Australia, *Submission 12*; and Wentworth Group of Concerned Scientists, *Submission 71*.

51 Dr. Bill Phillips, RiverSmart Australia, *Committee Hansard*, 9 September 2008, pp 103-4; The Hon Karlene Maywald, Minister for the River Murray and Minister for Water Security, South Australian Government, *Committee Hansard*, 19 September 2008, p. 40; Councillor Roger Struther, Mayor Coorong Shire, *Committee Hansard*, 19 September 2008, p. 49. Conservation Council of South Australia, *Committee Hansard*, 10 September 2008, p. 5. See also Answers to Questions on Notice from the Department of Environment, Water, Heritage and the Arts, p. 3.

> environment a share, something which this nation promised to do back in 2004 under the National Water Initiative and which no-one has done yet. It recognises the need to provide a minimum amount of water to maintain the system at a minimum level.[52]

1.86 The Emergency Water (Murray-Darling Basin Rescue) Bill 2008 provides the legislative framework and mechanism to give the Minister the power to urgently address the problems in the Basin, which is lacking in the IGA of the 3rd July 2008.

1.87 Evidence to the Committee raised a number of interesting points which we believe are worthy of further consideration. We believe these issues should be further taken up in the second phase of this Inquiry.

Constitutional Powers

1.88 In addition to the powers proposed in the Emergency Water (Murray-Darling Basin Rescue) Bill 2008, evidence presented by Professor John Williams suggested that there are two alternatives approaches to the question of whether or not Commonwealth control of the river system could be achieved.

1.89 The first option would involve a negotiated incremental takeover through the referral of powers by states. Whilst Professor Williams saw this as the preferred option, some doubt was raised as to the likelihood of it being adopted.[53] He stated that whilst this was the preferred option, it was probably also the unlikely option.[54]

1.90 The second option discussed by Professor Williams would involve the Commonwealth wresting control over the rivers from the states by using existing powers. He outlined a number of powers that could be used by the Commonwealth to achieve this including, trade and commerce powers, corporations powers, external affairs powers and powers relating to the acquisition of property on just terms. After taking into account all of the possible arguments against these options, Professor Williams indicated that the Commonwealth would be on strong constitutional ground if it were to enact legislation allowing them to deal with significant aspects of the management of the Basin.

1.91 We believe that this discussion raises important points that should be further considered during the second phase of the Committee's Inquiry.

A Time for Action

1.92 In effectively tackling the crisis in the Coorong and Lower Lakes we need to be putting forward two things: Firstly, we need an emergency response plan to manage the threat of acidification over the coming summer to prevent irreversible

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52 *Committee Hansard*, 10 September 2008, p. 21.

53 *Committee Hansard*, 10 September 2008, p. 50.

54 *Committee Hansard*, 10 September 2008, p. 53.

damage and ensure the survival of the system. Secondly, we need an ongoing plan for the medium and long-term to manage the health and ecosystem values of these systems in the face of a drying and uncertain future.

1.93 On this basis, and keeping in mind that we will be producing a second report on the longer-term whole-of-basin management issues, we make the following recommendations.

Recommendations

1.94 That the Commonwealth source 30 - 60GL of fresh water between now and September 2009 to maintain the level of the Lower Lakes above the critical acidification threshold.

1.95 That flooding the Lower Lakes with salt water should not be countenanced as a management option and must be ruled out.

1.96 That an adaptive management approach be taken, based on monitoring water and acidity levels to maintain the health of the lakes while minimising evaporative losses.

1.97 That the Minister for the Environment immediately notify the Ramsar Convention of the change in ecological character of the Coorong and Lower Lakes for listing on the Montreaux Record as threatened and degraded.

1.98 That the Minister for the Environment urgently investigate the changed ecological character of other Ramsar sites within the Murray Darling Basin to determine how many others also need to be listed on the Montreaux Record.

1.99 That legislative and regulative impediments to the conveyance of water from the northern basin in the event of a significant summer event be addressed.

1.100 That the Commonwealth investigate the non-return of 113GL of environmental water loaned from the Murrumbidgee and expedite its return.

1.101 That 50GL of hyper-saline water be pumped from the Southern Lagoon and replaced with an equivalent amount of seawater.

1.102 That a Taskforce be established to oversee the short term management of the Coorong and Lower Lakes and to look at management and remediation options for in the medium and longer terms.

1.103 We support the approach of giving the Commonwealth greater powers as suggested in the Emergency Water (Murray-Darling Basin Rescue) Bill 2008 which we recommend be further considered in the second part of the inquiry.

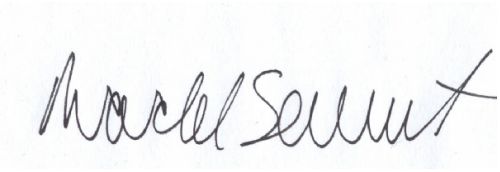
1.104 That consistent with the Wentworth Group of Concerned Scientists' submission and evidence, there be a significant reduction in water use across the entire system to ensure the economic and environmental sustainability of the Basin, and further ensuring that enough fresh water is maintained to keep ecosystems including the Coorong and the Lower Lakes alive and sustainable.

1.105 That the potential impact of the north south pipeline on the Basin be urgently reviewed by the Commonwealth,

1.106 That the adequacy of the powers of the MDBA to deal with this type of additional new extraction from the system be reviewed.

1.107 That the Sugarloaf Pipeline which will extract 75GL from the Goulburn for domestic consumption in Melbourne should not go ahead.

1.108 That the Commonwealth and relevant States should fast track measures that will wean Adelaide off its reliance on the Murray and prevent Melbourne developing a similar reliance – including demand management, stormwater harvesting, fit-for-purpose recycling and domestic rainwater tanks.



Senator Rachel Siewert

Senator Sarah Hanson-Young

Senator Nick Xenophon