

September 2008

Submission to the Senate Inquiry into the Urgent Provision of Water to the Coorong and Lower Lakes

Prepared by Dr Arlene Buchan, Coordinator of the Healthy Rivers Campaign, Australian Conservation Foundation.

“without sufficient water, ecosystem recovery from the current impacts may take years to decades depending on an individual species’ ability to recolonise. Some species will not be recoverable. Many of the unique ecological attributes that make this area significant internationally will be irreversibly lost. ¹

The problem

The condition of the Lower Lakes, Coorong and Murray Mouth speak volumes about the condition of the catchment upstream upon which they rely - the entire Murray-Darling Basin. For decades the basin’s governments have allowed far too much water to be extracted from the rivers and aquifers of the Murray-Darling Basin, far more that the system is able to sustain and as a result the whole system is collapsing. Whilst the starkest evidence of system collapse is observed in the Lower Lakes, Coorong and Murray Mouth, the degradation and consequently the impacts on wetland condition, flora and fauna and productive industries that are underpinned by the natural resource base are becoming increasingly evident across most of the basin. Already, 80 per cent of the wetlands of the Murray-Darling Basin have been permanently lost.

The primary cause of the problem is clear – extracting too much water. The impact of this is exacerbated by drought and will almost certainly get worse as the impacts of climate change take hold.

¹ Extract from a Report by the South Australian Murray-Darling Basin Natural Resource Management Board (April 2008) to the Murray-Darling Basin Ministerial Council on 23 May 2008.

The solution

The solution is also abundantly clear – enough water must be returned to the environment to restore it to a healthy working condition and facilitate resilience in the face of climate change. The future of Australia's food-bowl and the two million people who live there, depend on a healthy working river system.

A series of recent government policies and decisions recognise both the problem and the solution, not least the Commonwealth Government's \$12.9 billion *'Water for the Future'* program and the establishment of an independent MDB Authority, responsible for developing a Basin Plan, based on environmental watering plans and sustainable water extraction limits. The *'Water for the Future'* Plan provides \$3.1 billion to buy-back water entitlements for the environment and \$5.8 billion for infrastructure investment and structural adjustment for affected communities.

These provide a good framework for change but the scale and pace of reform to date is too slow to get ahead of the rate of decline and the acquisition of water under the *'Water for the Future'* must be accelerated. The currently envisaged 10 year timeframe for rolling out the \$9 billion for water acquisition is too long – the entire system will be beyond repair by then – and based on current knowledge there is no reason why most of the money cannot be allocated within the present term of the Commonwealth Government.

In addition to the existing and on-going water recovery programs, an additional program for securing multiple benefits from integrating investment in water acquisition with infrastructure improvement and structural adjustment in geographically targeted zones should immediately be adopted on a large scale. A strategy to this effect is currently under development by the Torrumbarry Reconfiguration & Asset Modernisation Strategy (TRAMS), a customer committee of Goulburn-Murray Water.

The strategy envisages redesigning the Torrumbarry Irrigation Area (TIA) with a view to retaining irrigation in the future but in a more targeted way than at present. They envisage a future that involves a 30% reduction in G-MW assets, 50% of the delivery system modernised, fewer assets and hence less costs, improved customer service, improved outcomes for local ecological assets and increased irrigator and community confidence in the future.²

The TRAMS project is a great example of what irrigation dependent communities can achieve given the appropriate information and opportunity to create and implement their own vision for the future.

Remove impediments and accelerate reform

To accelerate the rate of reform, impediments to rolling out the Commonwealth's water reallocation programs must be removed. In particular, the 4 per cent annual cap on trading water out of irrigation districts should be abolished immediately. This barrier to trade not only stands in the way of reallocating water to the environment and solving the underlying problem of water overextraction, it also reduces the range of choices available to irrigators trying to make good business decisions in the face of drought, debt, and other pressures.³

² Website currently in development. Call 1800 013 357 in the meantime for further details.

³ Hyder Consulting (2008) for DEWHA. Review of interim threshold limit on permanent water trade.

COAG failed to deal with the issue of removing the 4 per cent cap on trade in July of this year under pressure from the Victorian Government, which itself ignored advice from its own Department of Sustainability and the Environment (DSE) which said "*the four per cent limit on trade out of irrigation districts should be removed to ensure that entitlement-holders have as much flexibility as possible to manage through dry and drought years*".⁴

The question of whether the 4 per cent cap on trade is reasonable given the guarantee of free trade and commerce between states as set out in the Constitution remains open.

The Victorian Government's 10 per cent limit on the amount of water that may be owned by non-landholders in a region is also a likely impediment to government water acquisition at the scale necessary to restore system health and should also be abolished.

Water recovery targets and an interim basin plan

Whilst further detailed studies are required across the basin to establish exactly how much water needs to be reallocated to the environment in the long-term and exactly what sort of flow regime specific rivers and wetlands need to maintain their integrity, there is enough scientific information currently available to immediately develop an 'interim basin plan' that will guide investment towards water recovery at the scale and pace required to address the problem.

The essential features of an 'interim basin plan' have been established by the Wentworth Group of Concerned Scientists on the basis of best available scientific information. Their analysis indicates that "*consumptive use of water across the MDB may have to be cut by between 42 and 53 per cent below the current cap*" and that "*we need to recover over 4,000 GL of water to have a good chance of securing river health. The total cost sits between \$8 billion and \$9 billion*".⁵

This will require a huge amount of change in the MDB but the longer we delay, the worse the problem will become and the more difficult and expensive it will become to fix it. We have already delayed for too long and this is why the Lower Lakes and Coorong are presently in such a critical condition along with the communities that live around the area and rely on it.

The precise amount of water required on a valley by valley basis will be established by the MDB Authority in developing the Basin Plan, which can refine the water recovery targets and processes for water recovery as set out in the interim plan. In the meantime however, the basin-wide water recovery targets put forward by the Wentworth Group should form the broad basis for investment.

How much water is needed for the Lower Lakes and Coorong in the short-term?

There is a rapidly closing window of opportunity to provide sufficient freshwater flows to prevent irreversible ecological loss and damage to the Lower Lakes and Coorong from acidification, pending the development of medium and long-term management options for the area.

Nevertheless, greater than average local rainfall in July and August mean that only 60 GL of additional freshwater now has to be found, which in addition to the 350 GL guaranteed to the area

⁴ DSE (2008). Position Paper for noting provided to NRSWS Consultative Committee.

⁵ Wentworth Group (2008). Submission to the Senate Inquiry into the Urgent Provision of Water to the Coorong and Lower Lakes. See: <http://www.worldexpeditions.com/au/index.php?section=trips&id=227>

as part of South Australia's guaranteed dilution flow, will be enough to maintain all management options open until the end of September 2009.⁶

In short, nature itself has given decision makers some breathing space and the opportunity for governments to acquire more permanent water entitlements or plan for different scenarios so that when it does rain there will be water allocations available.

Beyond September 2009, the SA Government currently estimates that under continuing worst-case conditions 350-400 GL of additional water would be required every year to manage the acidification risk in both lakes.⁶ This remains less than the water entitlement required to enable the River Murray to maintain an open Murray Mouth which is currently kept open by constant dredging.

Where would it come from?

ACF outlined a series of options for providing water for the Lower Lakes and Coorong earlier this year in a paper entitled "An Emergency Rescue Package for the Coorong and Lakes Alexandrina and Albert – Internationally Significant Wetlands on the Brink of Extinction". This paper and the options for water recovery described therein is attached as Appendix 1.

ACF and the Inland Rivers Network produced another paper entitled "Opportunities to deliver immediate and ongoing water for the ecological crisis in the internationally significant Lower Lakes and Coorong". This second paper exemplified the benefits that could be secured in terms of water recovery for the MDB by purchasing strategically important properties in the Darling Basin. This paper is attached as Appendix 2.

All of these water recovery options remain viable although some of the actual numbers quoted will have changed as water in storage is used, evaporates etc.

None of these or any other water recovery options are mutually exclusive and indeed 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 and provide the outstanding 60 GL of freshwater needed.

Briefly, these water recovery options include:

- Short term emergency changes in the operating rules for Menindee Lakes or releasing water from Menindee Lakes and offsetting it with water acquired from further upstream or freeing up water in Menindee for the Lower Lakes and Coorong by reverting to accounting for conveyance losses in the River Murray from Hume Dam;
- Purchasing permanent, and if necessary, temporary water from both the southern connected Murray River system and the Darling River system (noting that Murray Valley high security irrigators can now access 50 per cent of their irrigation entitlement; Murrumbidgee Valley high security irrigators can now access 75 per cent of their irrigation entitlements and that SA has twice increased it's allocations to irrigators recently when it could have allocated some or all of that water to the Lower Lakes and Coorong);
- Repaying 113 GL of water borrowed from the environment in the Murrumbidgee Valley and using part of it for the Lower Lakes and Coorong;

⁶ SA Government (2008). Submission to the Senate Inquiry into the Urgent Provision of Water to the Coorong and Lower Lakes. See: http://www.aph.gov.au/senate/committee/rrat_ctte/lowerlakes_coorong/submissions/sub73.pdf.

- Improved metering, monitoring and compliance in areas including the Murrumbidgee and major storages on the Darling System;
- Loans or leases from allocations;
- Strategic purchase of properties with large water entitlements attached to them (exemplified by the recent purchase of Toorale Station).

Transmission losses and the Darling River system

Whilst recognising the severity of the ongoing drought and that major dams on the River Murray are at record lows there *was* enough water in the Darling system in the first few months of 2008 to contribute water towards the Coorong and Lakes Alexandrina and Albert. There were two major floods in the Darling system within the last 12 months and much of that water was captured on properties. Toorale Station, for example, is a single property that took 180 GL from a flood in the Warrago River which otherwise would have entered the Darling River.

If that water had been mobilised during April to June of this year when the Darling River was running and the relatively low seasonal temperatures meant that transmission losses from evaporation and seepage were minimised, *it is likely* that a substantial amount of that water could have been passed through the Darling River to Menindee Lakes to offset water released from Menindee Lakes for the Lower Lakes and Coorong.

Now that the Darling has dried up again and much of the water once it is captured in private storages cannot be released back into the system, the losses from trying to move water through the system would be huge and unfeasible in terms of making a significant contribution towards the Lower Lakes and Coorong. Assessments made on how much water would get through the system in August and September of this year will be very different from what was possible in April or May.

Actual transmission efficiencies vary with flow, season and other factors and it is overly simplistic to make unqualified statements to the effect that water acquired in the Darling River system is useless for contributing towards the Lower Lakes and Coorong because it would never get there. Preliminary modelling based on 'without-development' flows from 1895 to 2006 shows that during times of drought in the River Murray and flood in the Darling River, there were occasions when the contribution of water from the Darling River far exceeds that of the River Murray as shown in Figure 1 below.⁷ We are advised that the best, current understanding of the transmission losses is summarised in the whole of Basin report which is not yet publicly available.

Also, climate change predictions would suggest that changing weather patterns will make the Darling River a more important contributor of water to the Lower Lakes and Coorong in the future than it has been in the past.

A modelled analysis should be done to understand more clearly what is and what is not possible in terms of water transmission from the Darling River system through to Menindee Lakes so we can make decisions on the basis of scientific understanding rather than hypothesising without any real data to underpin assumptions.

⁷ Pers Comms Dr Bill Young, CSIRO.

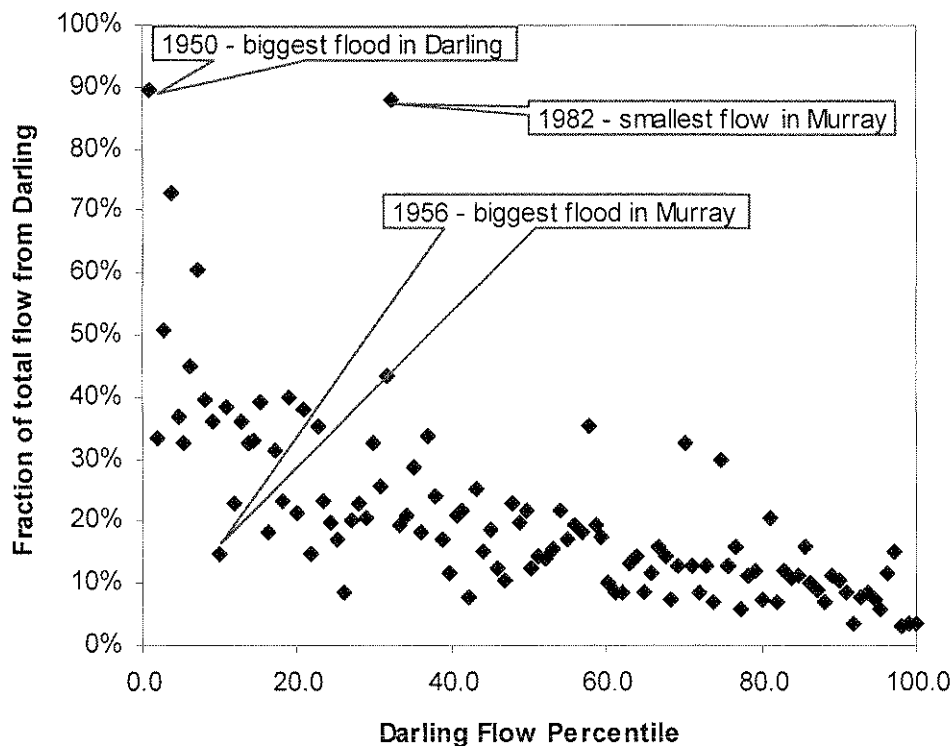


Figure 1 shows the fraction of water contributed by the Darling River to the Lower Lakes and Coorong based on modeled data. In general, a high fraction of flow comes from the Darling when the flow in the Darling River is high and flow in the River Murray is low.

Where to from here

It is crucial that no decision or action is taken in the short-term that would have irreversible effects or compromise the ability to develop medium and long-term management plans for the Lower Lakes and Coorong that will maintain the characteristics for which the area is listed under the Ramsar Convention as being internationally significant. This rules out any short-term decision to open the barrages and build a weir which would have irreversible consequences and could indeed make the problem of acidification worse.⁸

In the meantime, all stakeholders need to work on developing a vision for longer term management objectives for the Lower Lakes and Coorong, especially in the light of the sea-level rise and other impacts of climate change, and what the optimum outcome for the area would be before developing strategic pathways for getting there.

The Commonwealth has committed to conducting an independent audit into water storage across the Darling River Basin. It appears however that all this amounts to is an independent assessment of the methodology used by the MDBC to undertake its own audit. This misses an important opportunity to understand what may or may not be possible in terms of mobilising water in the Darling Basin and transmitting it to Menindee Lakes under different scenarios where it could offset water released from Menindee for the Lower Lakes and Coorong. Such an understanding should be commissioned quickly otherwise we may see more significant floods occurring across

⁸ Submission to the Parliament of Australia Senate Inquiry into water management in the Coorong and Lower Lakes. See: <http://www.worldexpeditions.com/au/index.php?section=trips&id=227>

the Darling system yet remain in the dark about what opportunity they may or may not provide in relation to the Lower Lakes and Coorong or other more southerly ecological assets.

There has been considerable snow fall in the high country which will contribute to water in major storages as it melts. It will be important to maintain a running understanding of what this delivers and therefore what difference this might make to allocations and the ability to secure the additional 60 GL necessary to avoid acidification until the end of September 2009 and avoid the need to make irreversible management decisions.

APPENDIX 1

June 2008

An Emergency Rescue Package for the Coorong and Lakes Alexandrina and Albert - Internationally Significant Wetlands on the Brink of Extinction

Prepared by Dr Arlene Buchan, Coordinator of the Healthy Rivers Campaign, Australian Conservation Foundation.

"The decline in ecological character [of the Coorong and Lakes Alexandrina and Albert] can only be halted and reversed if substantial freshwater inflows are received within the next six months".⁹

Objective

There is a rapidly closing window of opportunity to provide sufficient freshwater flows to the Coorong and Lakes Alexandrina and Albert to prevent irreversible ecological loss and damage, pending the development of medium and long-term management options for the area. This short paper outlines measures that can and should be evaluated for their feasibility within a couple of weeks to enable options for an emergency rescue package to be presented to COAG for decision on 3 July 2008. The Scientific Reference Panel (SRP) and the Socio-Economic Reference Panel (SERP) of the Murray-Darling Basin Commission (MDBC) are made up of distinguished, renowned, leading practitioners who are ideally positioned to draft the Terms of Reference for the feasibility studies which should then be commissioned and / or conducted by the office of the MDBC.

⁹ Extract from a Report by the South Australian Murray-Darling Basin Natural Resource Management Board (April 2008) to the Murray-Darling Basin Ministerial Council on 23 May 2008.

The Issue

The Coorong and Lakes Alexandrina and Albert were jewels in the crown of Australia's wetlands estate yet they are in immediate danger of irreversibly losing all of the values for which they are recognised as internationally significant. Decades of regulation and over-extraction of water from the River Murray has diminished freshwater flows through the Lakes and Coorong with ecologically damaging consequences that have been exacerbated by recent drought. The Lakes are now 0.5m below sea level – the first time this has happened in the 7,500 years since they formed despite frequent and intense natural droughts throughout that period – and as declining water levels expose acid sulphate soils, scientists worry that a "tipping-point" could be reached beyond which the buffering capacity of the environment is exceeded and the reversal of progressive acidification becomes impossible¹⁰. All but one indicator of ecosystem health is negative and getting worse, including those for native plants, turtles, fish, frogs, birds and everything else that relies on this unique ecosystem for its feeding and breeding habitat.

Scientists say "the situation in the Lakes will worsen without intervention" and that "without sufficient water, ecosystem recovery from the current impacts may take years to decades depending on an individual species' ability to recolonise. Some species will not be recoverable. Many of the unique ecological attributes that make this area significant internationally will be irreversibly lost".¹

"The window of opportunity to prevent irreversible loss of the Lakes and Coorong Ramsar site will close in spring 2008".²

The Commonwealth Government is rolling out a \$12.9 bn "Water for the Future" programme, much of which will focus on redressing water overextraction across the whole Murray-Darling Basin. ACF welcomes and supports this medium to long-term programme. The scale and pace at which this programme is being rolled out is not enough however to deal with the immediate crisis facing the Coorong and Lakes Alexandrina and Albert. The risk of irreversible loss of these internationally significant wetlands is so severe and so immediate that it warrants an emergency rescue package to provide enough freshwater flows within six months to sustain the area for long enough in the short term for it to benefit in the medium to longer term from the "Water for the Future" package.

The Solution

Winter and spring flows in the order of 400 to 450GL of freshwater are required by the end of this calendar year to return the Lakes to approximately sea level and prevent irreversible changes to the ecological character for which the site is Ramsar listed.²

Whilst recognising the severity of the ongoing drought and that major dams on the River Murray are at record lows there *is* enough water in the Murray-Darling system to provide a suite of

¹⁰ Muller, K. (May, 2008). A Blueprint for the Survival of the Lakes and Coorong ecosystem, Indigenous peoples and farming communities.

opportunities which in combination, would provide enough water to prevent extensive changes to the ecological character of the Coorong and Lakes Alexandrina and Albert and provide a short-term reprieve from irretrievable damage and multiple species and ecosystem function loss.

The combination of measures described below is not intended, and would not be capable, of reconnecting wetlands or restoring the Coorong and Lakes to ecological health but could avert the ecological catastrophe scientists suggest will happen by the end of this calendar year without action.

Short term emergency change in the operating rules for Menindee Lakes

Complicated rules govern the control of Menindee Lakes depending on water storage levels so that below 480GL all rights to the water stored in the system go to NSW and above 640GL the MDBC assumes control and most of the water is assigned to South Australia.¹¹

Currently there is approximately 550GL of water in Menindee Lakes, below the level required to return management of Menindee to the Murray-Darling Basin Commission. It appears that NSW is ensuring that it regulates the water levels, inflows and outflows to make sure that this remains the case as evidenced, for example, by irrigators on the Barwon-Darling, whose licences are typically low security, having 300% of their annual allocation.

Queensland tributaries provide up to 30% of Menindee inflows and can take up to three months to arrive. It is not yet clear if all the inflows from high rainfall events earlier in the year have arrived yet.

The dire state of the Coorong and Lakes Alexandrina and Albert warrant an environmental emergency situation being declared with a view to temporarily setting aside the NSW / MDBC triggers on control and the Menindee Lakes Storage Agreement with a view to managing Menindee Lakes so that as much water as possible is provided to the Ramsar listed sites end of the system. This would also benefit Victorian irrigators whose level of security would increase if water is released from Menindee to Lake Victoria.

This would be a low cost way of securing some of the water for the Coorong and Lower Lakes.

Purchasing temporary and permanent water from private storages on the Darling River system

At least 1,200GL of water is currently held in major storages in northern NSW¹² as a result of two recent, major rainfall events, one in late 2007 and the other in early 2008. Also, there are 2000+ turkey nest dams in the area which at a very conservative estimate would be holding at least 500GL.

Given the current price for cotton and evidence of willingness to sell from water entitlements holders, it is clear that a substantial volume of water currently stored in the system could be bought from willing sellers in the region using both the temporary and permanent markets. We

¹¹ Water sharing arrangements as specified in the MDB Agreement - Cl 92, 96, 104, 119-120 and part XI of MDBA.

¹² <http://waterinfo.nsw.gov.au/drr/darling.shtml>.

have heard from at least one cotton grower with an entitlement for 18GL that they would 'prefer to sell their water to the environment this year and only if the water cannot be sold will they use it to grow cotton'.

Given that the system has seen two substantial flood events recently it should be reasonably well primed and whilst significant transmission losses will occur the local channel conditions are such that 50 per cent of releases should be conveyed to its destination¹³.

There is a successful precedent for this type of measure in the region as exemplified by the recent purchase of 11,000ML of water from entitlement owners earlier this year which sustained flood waters in the Narran Lakes to enable colonially-nesting water birds to complete their breeding cycle resulting in the most significant ibis breeding event in the Murray-Darling Basin this millennium.

Noting that temporary water was bought recently for the Narran Lakes as described below at an average \$185/ML, if water could be purchased at an average of \$400/ML it would cost in the region of \$180 million to buy 450GL of water on the temporary market with an expectation that at least half of that would be available in the Coorong and Lower Lakes within the window of opportunity identified by the SA MDB NRM Board¹.

Also, the ability to trade some or all of their stored water to the environment as part of an emergency rescue package for the Coorong and Lower Lake could provide an additional income stream to water-holders in the area who are as yet currently unable to trade water from unregulated to regulated systems.

Improved metering, monitoring and compliance in areas including the Murrumbidgee and major storages on the Darling system

There is a general feeling amongst many landholders, water entitlement holders and others interested in improving water management in the area¹⁴ that an effective metering, monitoring and compliance regime would generate significant water savings that could be made available to the environment and in this case to the Coorong and Lakes Alexandrina and Albert.

For example, water is metered as it is used rather than as it is captured, and thus does not account for losses of 30-40%. The current system takes all the small to medium flushes, dampening the variability in the system as well as reducing water supply to the environment. Compliance to access is not monitored.

A compliance audit would be a low-cost, no-regrets option that could generate considerable water savings that could be used for environmental purposes and should be implemented immediately.

Loans from water in the River Murray once irrigation season starts

¹³ Pers comms from various landholders and water entitlement holders in northern NSW / Darling system.

¹⁴ For example, the recent Maunsell Report.

Whilst compulsory acquisition of water is not allowed the Commonwealth could shave-off a percentage of water from all River Murray allocations once the irrigation season starts as a 'loan' of water from the irrigation sector to the emergency rescue package for the Coorong and Lower Lakes that will be repaid to the irrigation sector when conditions improve.

'Just in time' engineering solutions that generate water savings in the southern connected basin

New technologies involving geotextiles etc could be rolled out very quickly in hot-spot areas for seepage and leakage with the water savings made available to the Coorong and Lower Lakes immediately. This could be an expensive but effective way of securing water from the Murray system.

Groundwater

Groundwater should be considered to be connected and interchangeable with surface water until proven otherwise and should be managed with surface water as a single resource and as an insurance policy against drought. There may well be opportunities however to use some groundwater, including lower quality groundwater, explicitly 'borrowed against the future' to provide additional environmental flow as part of an emergency package of measures to prevent the irreversible loss of the characteristics for which the area has been listed under the Ramsar Convention as internationally significant.

Non-flow related management issues

Other, non-flow related bioremediation and complementary management activities are important, not only for rehabilitating the area but because they would provide income streams for local indigenous and non-indigenous communities whose local economies have been severely compromised by the ongoing degradation of their natural resources. Relevant opportunities are discussed in Appendix 1 [Muller (2008)]. The same paper briefly discusses the longer-term water needs of the Coorong and Lakes Alexandrina and Albert too.

For more information, please contact

Dr Arlene Buchan Phone: 03 9345 1124 **Mobile:** 0407 883 907 **Email:** a.buchan@acfonline.org.au

The Australian Conservation Foundation is committed to achieve a healthy environment for all Australians. We work with the community, business and government to protect, restore and sustain our environment.

www.acfonline.org.au

Authorised by Don Henry, Executive Director, Australian Conservation Foundation, Floor 1, 60 Leicester Street, Carlton VIC 3053

A Blueprint for the Survival of the Lakes and Coorong ecosystem, Indigenous peoples and farming communities.

Dr Kerri Muller, Lakes and Coorong Expert
Mobile: 0428 211 271. email: km@kmnrm.com.au

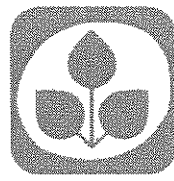
- It is clear that urgent remedial action is required for Lakes Alexandrina and Albert to prevent them becoming the Aral Sea of the South. Extensive changes in ecological character have already occurred and continue to occur leading to extensive changes in the agricultural and cultural communities that depend on the Lakes' ecoservices. If the Lakes drop to a level of -1.0m AHD there will be irreversible ecosystem collapse (NB -1.2m AHD is commonly held view for acid sulfate "tipping point" the figure of -1.0m AHD pertains to the collapse of the Ramsar-listed ecosystem as a whole).
- Winter and spring flows in the order of 400 to 450 GL of freshwater are needed this year to return the Lakes to approximately sea level and prevent irreversible changes to the ecological character for which the site is Ramsar listed. Water for the Lakes is the highest priority water use in the basin if the principles of wise use are followed that dictate management should seek to prevent irreversible changes such as extensive losses of species, habitats and genetic diversity before other competing priorities. The water will benefit other Icon sites and agricultural communities on the way down to the Lakes. The window of opportunity to prevent irreversible loss of the Lakes and Coorong Ramsar site will close in spring 2008. We need to release water now to allow for conveyance time.
- This amount of water (450 GL for delivery in winter/spring 2008) is available in storage in NSW and Victoria and can be supplemented by rainfall on the Lakes and by inflows from the Eastern Mount Lofty Ranges. Failure to deliver adequate water to the site remains a matter of management priorities and cannot be blamed on the drought and lack of water in storage. This volume of water represents the difference between Lakes survival and complete ecosystem collapse in the next few years.
- In the meantime we need to bioremediate the lake bed that has been exposed and acidified with a mixture of strategies for different locations.
- Sea water whilst it is not the answer for the Lakes as a whole, does have a part to play in quenching 3km of acidified mudflats between Ewe Island and Pelican Point. A trial needs to be undertaken immediately to determine the best way in which to use sea water in terms of rates of inundation and subsequent mobilization of toxic metals (if any).
- Liming is difficult to apply because the lake bed is so large that many machines would be required and so sticky that machinery used would be rapidly bogged. Aerial applications of lime may be possible but the lime needs to be incorporated into the soils which cannot be done from the air. It may be best solution for some near shore acid hot spots but will not be the answer for the Lakes as a whole.
- River water has four times the alkalizing power of sea water and is the only answer for treating exposed acid sulfate soils of the magnitude that we see in the Lakes but before delivery, the lake bed needs to be primed over winter to receive these River Murray and Eastern Mount Lofty Ranges inflows. This priming can be done by mulching the lakebed and planting native aquatic species that can bioremediate the exposed lake bed and prevent or reduce mobilization of toxic metals.
- Mulch can be supplied by local farmers as an immediate source of income if mobilized by a Government purchase order for bulk materials. We need mulch with a high carbon and low nitrogen content and we need to develop a method for spreading it out, probably from the lake edge. This needs to be trialled immediately and quantities of mulch need to be estimated and grown to order over winter 2008.
- Ngarrindjeri people, irrigators, dryland farmers and other community members that have lost their primary incomes because they have no water, can be employed to mulch and revegetate the edge of the water with reeds and other aquatic plants to provide habitat for fish and to provide carbon to recover the carbon cycle and fuel healthy bacterial action that does not lead to the production of sulfuric acid.

- Local farmers can also be encouraged to sell their water allocations and move into carbon forestry of mixed species of mallee and pink gum which represents high value "Gold Standard" carbon credits and can be linked to form wildlife corridors to facilitate adaptation of native species to climate change. Dairy farmers and viticulturalists on sandy soils, in particular, are unlikely to be able to return to pre-2006 farming practices and should be encouraged to investigate carbon forestry.
- Ngarrindjeri people can also be offered hope and an income stream by carbon farming at Raukkan and on other lands made available to them. Crown Land could be revegetated to meet part of the State's carbon sink needs. SA DEH have maps of where to plant carbon forestry to meet Nature Links objectives and support rehabilitation of the Ramsar site.
- Once the Lakes have been recovered to sea level then we need to incrementally reach +0.3 mAHD and +0.6 mAHD and operate the Lakes within this range and not surcharge to +0.81 mAHD. This will require modifications of some of the fish ways to allow for water release at this level and will also represent a saving of approximately 200GL from old operation (this figure is an estimate and needs to be refined).
- The aim then is to have a formal allocation for flow through the Lakes and out the Murray Mouth that enables us to meet water quality targets laid out in the Living Murray Asset Plan, the Ramsar Management Plan (in preparation) and the Ecological Character Description for the site. This is likely to be in the order of 750 GL per annum. Flow of that quantity will rehabilitate and maintain the Lakes and the North Lagoon of the Coorong and enable them to continue to provide us with ecoservices under a future changed climate.
- The South Lagoon of the Coorong will not be fixed by River Murray flows (water cannot physically enter South Lagoon from North Lagoon) nor will it be fixed by flows from the South-East drains (too little water available). It is likely to need some intervention such as the following "soft" engineering solutions where there are no permanent modifications and the adverse impacts are mitigated.
 - pump the very saline water out of South Lagoon onto the land and treat as a contaminated waste stream
 - refill South Lagoon with a combination of fresh water that is reclaimed from the waste stream process via desalinization and sea water pumped in from North Lagoon on the high tide.
 - Once a healthy salinity gradient is re-established South Lagoon and North Lagoon could be reconnected via a low impact regulator.

it is imperative that the important that the poor quality water in South Lagoon is not drained through North Lagoon to the sea because it will damage the already very vulnerable ecosystem in North Lagoon which currently is the only refuge for Coorong biota and may contaminate near shore environments which support an important cockle industry.

If this type of long term thinking and planning is not applied to the site it will continue to deteriorate to the point where ecological collapse will occur and it will have to be fenced off and treated as a vast contaminated site. This "runaway" collapse of the system will happen very quickly if the Lakes are allowed to drop below -1.0 mAHD. We must deliver 400 GL of water in spring 2008. Collapse of the system is likely to have severe international ramifications (as the collapse of the Aral Sea did) and result in reduced tourism, investment and market access for irrigated product such as wine.

Appendix 2



AUSTRALIAN
CONSERVATION
FOUNDATION

Opportunities to deliver immediate & ongoing water for the ecological crisis in the internationally significant Lower Lakes & Coorong

05 August 2008

ACF and IRN request that the Commonwealth and State Governments immediately target water entitlement and property acquisitions in the Darling system to return water to the environment of the Darling River system and lower Murray River.

There is a significant opportunity to demonstrate strong and powerful leadership on the Murray-Darling water crisis and a positive outcome for the Lower Lakes and Coorong by purchasing water entitlements and/or properties in the Darling River system.

This proposal identifies six properties¹⁵ that could be purchased by the Commonwealth, NSW or Queensland governments which are strategically important to the Darling and Murray Rivers. They can provide at least 300 gigalitres (GL) in the short term to address the immediate crisis in the Lower Lakes and Coorong, and over 400 GL could be recovered each year on average for the Darling and Murray Rivers for years to come.

A targeted water purchase approach can be used immediately to assist governments to avert the ecological crisis unfolding in the Ramsar-listed Lower Murray Lakes and Coorong, where scientists say at least 400 GL is needed by the end of spring to avoid irreversible ecological damage¹⁶.

Such action would also be very timely as there will be minimal 'losses' incurred in moving the water through the river system now due to lower evaporation rates over winter and less seepage due to recent floods.

¹⁵ This paper does not provide an exhaustive list of properties or opportunities in the Darling Basin, rather it is intended to provide a number of examples that exemplify the opportunities that exist in the Darling Basin.

¹⁶ Lakes Alexandrina and Albert Ecological Condition Progress Report, April 2008; Report by the South Australia Murray-Darling Basin Natural Resource Management Board.

However, if this water is not purchased, there will be significant volumes left in storages throughout the Darling system that will be lost. Losses of up to 40 per cent are predicted if water is retained for summer irrigation.

A range of purchase opportunities exist.

Purchasing the full water entitlements from a property, or purchasing the whole property including its entitlements, will have double benefits by helping a seller exit the industry or their business if desired, and also enabling the removal the banks and channels that are funnelling water away from the rivers. Some properties may also have high ecological value and their retention would provide valuable additions to the National Reserve System.

Options such as leasing several large commercial operations, with an option to purchase in 5 - 10 years, should also be considered. This approach will immediately recover water used by the leased properties and enable it to be used for the next few years while the Commonwealth develops the Basin Plan and the sustainable diversion limits for the Basin.

Buying properties or entering into leasing arrangements as suggested here would contribute towards solving problems in the short, medium and long term. If necessary the acquisition of these properties could be supplemented by the purchase of temporary water allocations to address the immediate crisis.

As many of these properties occur outside of defined irrigation areas the restrictions imposed by the retention of the 4 per cent cap on market trade¹⁷ will not be an impediment to purchasing water entitlements in these areas. Similarly leasing arrangements will not be subject to the 4 per cent market cap.

Such purchases also need to be made in light of the high, and extremely high, levels of water extraction and estimated reductions in stream flow from climate change, contained within the CSIRO hydrology "sustainable yields" reports¹⁸. The need for change throughout the Murray-Darling Basin, including all valleys in the Darling system, is inevitable due to current and future water availability and needs to be part of any approach for modernising irrigation areas and developing resilient regional areas.

There is an immediate crisis in the Lower Lakes and Coorong. Currently, there is little or no water in the Murray system to release for these areas and according to official sources¹⁹ most of the water in Menindee is earmarked for critical human needs. However, water in Menindee could be used in the short-term to benefit the Lower Lakes and then replaced, in part or whole, with water purchased and transmitted from farther north in the Darling Basin. Dr Bill Young, principal research scientist CSIRO Land and Water, recently stated that more than 50 per cent of water released from Menindee would reach the Lower Lakes²⁰.

¹⁷ NWI Section 60 iv) b) commits the parties of the NWI to the "immediate removal of barriers to permanent trade out of *water irrigation areas* up to an annual threshold limit of four percent of the total water entitlement of that area, subject to a review by 2009 with a move to full and open trade by 2014 at the latest, except in the southern Murray-Darling Basin where action to remove barriers to trade is agreed as set out under paragraph 633..."

¹⁸ See: www.csiro.au/partnerships/MDBSY.html

¹⁹ Though note no formal figures have been released to support these assertions

²⁰ See: www.news.com.au/adelaidenow/story/0,22606,24029821-2682,00.html

If you have any questions or comments in relation to this paper please contact: IRN Coordinator
Ms Amy Hankinson: Phone (02) 8270 9904, mobile 0407 279 088 or ACF Healthy Rivers
Campaigner Dr Arlene Buchan: Phone (03) 9345 1124, mobile 0407 883 907

Inland Rivers Network
Suite 504, 32 York St
SYDNEY, NSW 2000
Ph: (02) 8270 9904
Fax: (02) 8270 9988
Email: coordinator@irnsw.org.au
www.irnsw.org.au

Australian Conservation Foundation
Floor 1, 60 Leicester Street
CARLTON, Vic 3053
Ph: (03) 9345 1111
Fax: (03) 9345 1166
a.buchan@acfonline.org.au
www.acfonline.org.au

Potential properties for targeted purchase

Toorale Station, Warrego system

Toorale Station is a 91,000 hectare property owned by Clyde Agriculture that sits on the junction of the Darling and Warrego Rivers, downstream from Bourke, and has six privately-owned dams across the Warrego River.

It is *on the market* and extracted 180-200 GL from the Warrego in the last flow. It is currently holding approximately 20 GL in storage.

Not only would the purchase of Toorale Station provide useful volumes of water relatively close to the Lower Murray, its purchase will provide significant environmental flow benefits in the longer term. The removal of the six dams that exist on Toorale, that currently impede flows in the Warrego's lower reaches, would be expected to greatly improve the health of the Warrego and Darling and their ecological communities. Over the *past 10 years* an average of 50GL/yr would have reached the Darling if Toorale's dams were removed. This water comes as pulses each 10 months on average.

Estimates for the purchase price of the property range from \$12 million – approximately \$6 million each for the land and the water – through to \$40 million. As only about 2,000 hectares of this property has been developed, there is still valuable and high quality floodplain in the area. If the property were retained for conservation purposes it would make a valuable addition to the Paroo Darling National Park. It should also be noted that this area falls within the Darling Riverine Plains Bioregion, which has been recently identified by WWF as one of the top priority bioregions for further protection due to both threats and the current lack of protection afforded to the bioregion's values²¹.

Darling Farms, Darling system

Darling Farms is a large irrigation property located on the Darling River near Bourke. It is currently *on the market* and estimates are that it could be purchased for approximately \$70 million. It holds entitlements for 23,000 ML/yr, which are continuously accounted (so are entitled to take far more than that in wet years that follow dry years). Currently it is holding approximately 30 GL in storage. Not only would it provide useful volumes of water in the short term, its purchase would provide significant medium and long term benefits as it takes about 10 percent of water extracted from the Darling River around Bourke.

Cubbie Station, Condamine-Balonne system

Cotton farm Cubbie Station is well known throughout the Basin as an icon of excessive water extraction and its purchase would generate widespread support across Australia. The purchase of this station would provide significant quantities of water – as much as 200GL – that could be immediately transferred to Menindee to offset water released from there to address the crisis in the Lower Lakes and Coorong. It would also recover an average of 200GL annually, though in some years it can capture as much as 460GL – equivalent to Sydney Harbour and more

²¹ Sattler, P.S. and Glanznig, A. (2006). *Building Nature's Safety Net: A review of Australia's terrestrial protected area system, 1991-2004*, WWF-Australia Report, WWF-Australia, Sydney

than Melbourne uses in an average year. Water is extracted by Cubbie both directly from the river and also diverted from the floodplain. Cubbie is often cited as an example of how agricultural wealth has shifted from downstream landholders to upstream users and its purchase would provide significant medium and long-term benefits to downstream communities and industries as well as the environment.

If Cubbie Station were purchased by governments and decommissioned, the result would be that significant amounts of water would be returned to the Culgoa River. The Culgoa in turn provides important flows into the Darling River, as well as supporting the nationally important Lower Culgoa floodplain which is a site for extensive waterbird breeding. The purchase of Cubbie would also return flows to the internationally-listed Narran Lakes²².

Balandool Station, Condamine-Balonne system

Balandool Station is on the Culgoa River downstream of Cubbie station. It has been on the market for some time and was one of the properties that the Queensland Government attempted to buy in 2006 (it was unable to due to a lack of support from the Commonwealth and NSW). It has been estimated that the property, of some 68,000 acres, could be purchased outright for approximately \$20 million. With levee banks and infrastructure removed, the property could be sold as a dryland property for an estimated \$7 million. While it only gets "leftover water" after Cubbie extracts its water (it gets about 20% of what Cubbie gets) it would still be an important purchase either prior to or in conjunction with the purchase of Cubbie, to ensure that its value does not increase with the retirement of Cubbie Station, or that it doesn't extract water recovered from such a retirement.

Tandou, Lower Darling system

Tandou is located south of Menindee Lakes on the Lower Darling between Broken Hill and Mildura. It currently holds around 30 gigalitres of water in Menindee, possibly more.

It holds entitlements for up to 250 GL of high flow water and gets approximately 100 GL on average each year. Tandou is a publicly listed company and provides a good example for options such as leasing arrangements.

Colly Farms, Gwydir system

Colly Farms, owned by Twynams, is by far the largest cotton property in the Gwydir and is considered the Cubbie Station of the Gwydir valley.

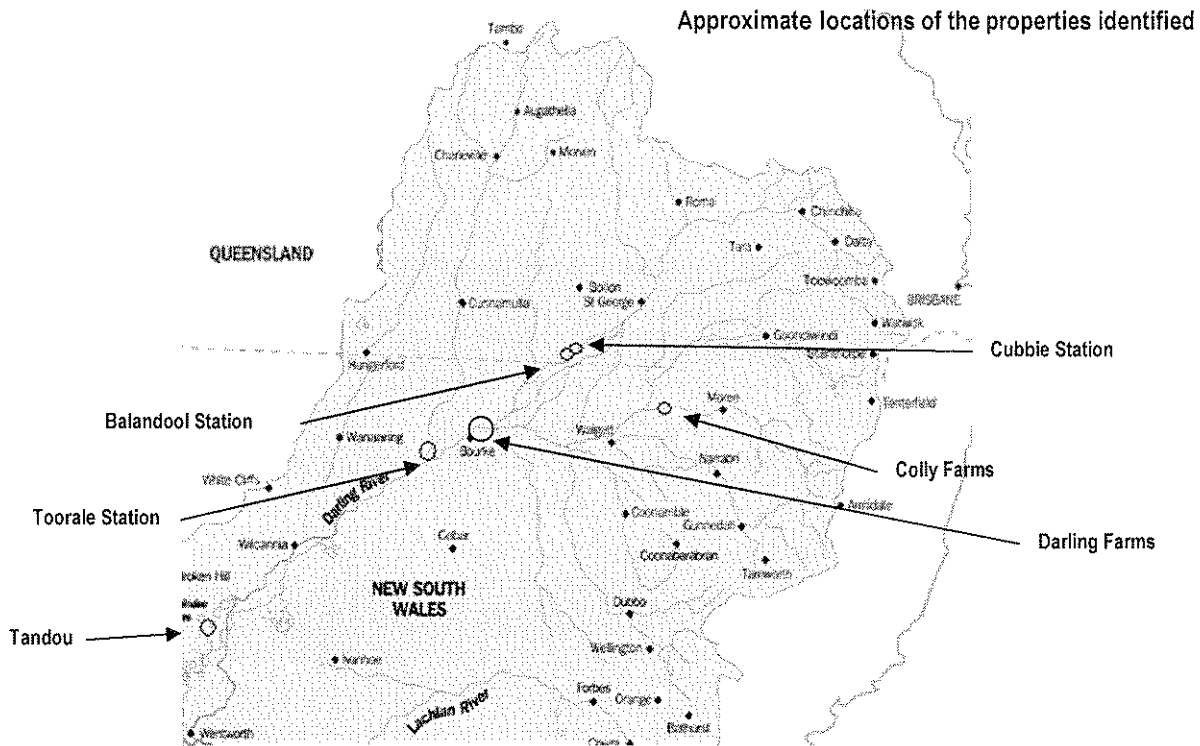
The property has water entitlements on both the Gwydir system (via the Mehi) and the Barwon River, and has over 50 water licences. The entitlements on the Gwydir are estimated to be for about 60-70 GL, and it currently holds 10 per cent allocations on these entitlements. It is unclear as to the extent of the licences held in the Barwon, but on average the property is known to get a great deal of water out of this system via high flow licences, with large off river storages to hold water taken through floodplain harvesting or otherwise. The purchase of this property would not only

²² Even though the Narran Lakes are located on another distributary river in the Condamine-Balonne system to Cubbie Station, most flow events in that system drown out the bifurcations in the system, essentially resulting in one large flooded area. Hence when Cubbie Station extracts significant volumes of water from this flood water less water will flow into the Narran Lakes.

supply water now, but would also deliver clear benefits to the Ramsar wetlands in the Gwydir and the Darling system in the future.

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These are only six of a multitude of strategically important opportunities to recover water to address overallocation and overuse by buying properties. IRN and ACF encourages the Commonwealth and State Governments to assess these opportunities and their capacity to provide emergency water to the Lower Lakes within the timeframe that scientists say is necessary to avoid irreversible loss of the characteristics, for which the area is an internationally significant wetland system.²³ These actions have the potential to make a substantial medium and long-term contribution to addressing overallocation and overuse in the Murray-Darling Basin.



²³ Lakes Alexandrina and Albert Ecological Condition Progress Report, April 2008; Report by the South Australia Murray-Darling Basin Natural Resource Management Board.