Submission **Trevor Harden (Resident, Lower Lakes)**

Lower Lakes and Coorong Recovery 'Securing the Future' Long-term Plan
(Draft for Public Comment) December 2009

Submission Overview and Conclusions

The document is fundamentally flawed, lacking intellectual rigour and credibility

It falls far short of the objective and well reasoned rationale required in a matter as important as the long term management of the Lower Lakes of the Murray River in times of drought and low flows.

Bias and internal contradiction can be demonstrated at both the macro and micro levels of the document's supporting rationale.

The consultative process has lacked transparency and integrity.

This submission identifies some examples of inadequacy; significant errors, omission of relevant facts and flaws in logic which together bring into question the efficacy and validity of the planning processes and outcomes of the SA Government's Department for Environment and Heritage in preparing this document.

If there is to be a genuine, scientifically valid, community based and practicable long term plan for the climatic uncertainties facing this region, the SA Government must revisit the planning process and correct the inadequacies identified in this submission.

Note: Given the apparent lack of response to detailed, well reasoned, fact based submissions in the previous 'Murray Futures' community consultation stages this submission does not attempt to comment on the 'Securing the Future' draft on a chapter by chapter or page by page basis but rather to identify sufficient examples and fact based arguments to call into question the draft itself, its main themes and the consultation processes by which it has been developed.
This submission should be considered in the context of the previous submissions by this author.

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The Fundamental Flaws

- **an overstatement of the case for freshwater,**
- **an understatement of the case for a seawater/estuarine alternative;**

together with

- **an understatement of the negative effects of the current crisis,** and
- **an overly optimistic analysis of the benefits of planned mitigation action.**

Examples

Freshwater History

Section 1.2 of the draft plan, 'The historic extent of marine incursions', uses four referenced sources to support its rationale.

Reference *5* – CSIRO Sustainable Yields Project report 2008
This report's predictions that even in an 'extreme dry' future climate scenario the Murray/Darling catchment would supply sufficient water for end of river flows all but a very small percentage of the time, underpins the government's 'freshwater only' position.

However **it is a fact** that the two years immediately following the completion of the 'Sustainable Yields' study were very much drier than the modelling predicted.

When there is dissonance between a model's predictions and subsequent reality the scientific approach is to adjust the model to take account of the new data and thus improve its efficacy but to do so here would have brought in to question the extent to which the Murray/Darling Basin could be relied upon to provide freshwater to the Lower Lakes - a fundamental issue for long term planning.

What the DEH has chosen to do is to label these past two years of extreme drought as 'unusual' and 'atypical' and discount them as irrelevant to the long term planning process; the very climatic conditions which have created the current crisis!

With the Murray/Darling, an arid river system displaying huge variation over the 118 years of inflow records, to choose to apply an 'atypical' label to an inconvenient reality beggars belief and is a blatant contradiction to the claim that this draft plan has a sound scientific basis.

But it is not surprising that the CSIRO modelling has been so quickly shown to be inadequate given the DEH's own acknowledgement in the earlier (May 2009) draft long term planning document, 'Directions for a Healthy Future', that *"--- the modelling contains significant uncertainties about the rate and extent of climate change."* and *"--- the length of time for which records exist does not allow events which recur at intervals of more than 50 years to be accurately modelled."* Drought in the Murray/Darling catchment falls into that category.

And yet the DEH, with this draft plan, base mitigation and management actions on the ongoing availability of freshwater from the Murray. It is assumed that the current drought is 'atypical' and that mitigation strategies will be sufficient and temporary.

Reference *6* – Fluin J et al University of Adelaide 2009

The Fluin research it is claimed *"--- provides strong evidence that the Lower Lakes have been predominantly freshwater for the last 7000 years and that seawater ingressions, when they did occur, did not extend northwards of Point Sturt."* (Draft report – page 4)

But **it is a fact** that traces of estuarine diatom fossils were found, by Fluin and her co-researcher Professor Peter Gell (then Director of the University of Adelaide diatom research unit), in sediments at Pomanda Point at the very entrance of the Murray to the lakes – exactly what might be expected if during periods of drought and low river flows the lakes had an estuarine mix of salinities ranging from seawater nearer ocean mouth to brackish further upstream. **It is a fact** that Professor Gell and Dr Fluin differ in their interpretation of the diatom record of core sediments as it relates to the freshwater history of the lakes, with Professor Gell subsequently stating, *"--- studies from Lake Alexandrina attest to a past tidal condition that decreases from the main opening to the ocean to the point where the River channel joins the lake. Past tidal conditions disappeared once barrages were* --- (in place)." and he describes *"---lakes that have had, at least in part, a tidal history."*

Thus the diatom record is hardly the "strong evidence" claimed by this DEH draft plan.

Reference *7* – 'A Fresh History of the Lakes --- ' Sim/Muller (2004)

That this flawed and discredited document should be included in the reference list is itself a strong indication of a lack of objectivity by the DEH in developing this long term planning document. **It is a fact** that this 'amateur' document selects historical data which supports its clearly predetermined conclusions that the lakes have displayed estuarine characteristics only since settlement and that prior to that they were essentially fresh. Data is used out of context to mislead and other equally relevant and valid data which refutes the document's 'freshwater only' conclusions is blatantly ignored. This document was 'researched' and written by Mr Terry Sim and in an (apparently successful) attempt to attach some academic credibility to it, Dr Kerry Muller, (an academically qualified freshwater ecologist with a strong publicly expressed ideology about the freshwater status of the lakes), has appended her name to it as nominal co-author.

A specific example of the limitations of this reference document.

The Sim/Muller document uses over 200 dated extracts from a range of historical sources to make its case. A clear example of bias appears early in only the fourth of these extracts on page 9 with Captain Charles Sturt's observation in 1838, *"During my late visit I never observed the sea running in, but a strong current always setting out of the channel."* Apparently strong evidence, but what Mr Sim omits is the context of this statement – **in fact** made when contrasting the mouth in 1838 with the extremely low flows experienced by Sturt on his epic journey just eight years earlier in 1830. What Sturt was **in fact** describing was the extreme variability of the system well before the impact of white settlement.

Other very relevant data examined by Mr Sim but which he chose not to include was Sturt's diary account of his experience in 1830 at Pomanda Point as he was entering the

lakes from the river, viz *"The transition from fresh to saltwater was almost immediate -",* evidence which directly refutes the Sim/Muller conclusions.

Mr Sim justifies his failure to include **this fact** on the basis that the water Sturt described as "salt" would not have been seawater but only "brackish" - **in fact** exactly what would be expected in an estuarine system where the river flow enters the lakes and consistent with the diatom record referred to above.

What this example shows is the mindset of the author(s) of Reference *7* and begs the question of what other valid evidence has been dismissed and/or manipulated to support a biased conclusion – as supporting evidence for the DEH 'freshwater only' planning policy Reference *7* it is of no value. To be cited as a supporting source by DEH calls into question the objectivity of DEH and its planning processes.

Reference 8 - Gell and Haynes (2005) University of Adelaide

While this reference relates to conditions within the Coorong on the ocean side of the barrages and so is not as relevant to this submission, it appears to conflict in the conclusions drawn from it with the more recently published research by Professor Gell from which he concludes that the Coorong has developed essentially as a separate marine system to the lakes with very little evidence of freshwater incursions from the Murray into the North Lagoon. One would hope that the DEH planners have not themselves been unduly selective of research which supports their preferred options to the exclusion of other very relevant evidence. To do so would confound the claim that the 'Securing the Future' document was founded on the best available science.

Thus, far from supporting the DEH position that the lakes have always been a freshwater system and so must remain so, the evidence used by DEH is at the very least ambiguous and in some cases clearly false. To eliminate without careful consideration and analysis, the use of readily available sea water to create an estuarine wetland environment as an alternative to "allowing the lakes to dry down" - with mitigation and remediation action which can at best deal with only a small proportion of the vast areas affected - , on the basis of such flimsy evidence is not scientifically or intellectually valid.

The Case for Seawater at Sea Level

- **to create an estuarine system in the lakes when river flows are low**

Appendix 4: 'Alternatives considered but not proceeded with' (Draft – page 82)

To be lumped in with such clearly impractical an ill informed suggestions as 'piping water from the north' and 'cloud seeding" does no justice to the range of well considered, detailed and fact based arguments which have been submitted by a number of competent and well informed people at each stage of the planning/consultation process.

To be dismissed on the basis of such statements as, *"There is no doubt that there were occasional incursions of seawater well into the Lower lakes and the lower reaches of the River Murray prior to the development of the Murray-Darling Basin.* (???), is an insult. Allowing for the fact that this is probably an error and should refer to the barrages (?), the statement is at odds with other claims within the document and the error is indicative of the apparent DEH dismissive attitude towards this option.

The next statement about the *"solid evidence"* claimed for a *"predominantly"* freshwater history and ecological character has already been shown to lack credibility.

Re the ecological character of the Lower Lakes there are two observations to make -
(1) the lakes have been artificially maintained behind the barrages for the past 70 or so years and the capacity for species to colonise into changed ecological environments is a feature particularly evident in arid ecosystems – what is there now does not necessarily reflect the 'natural' range and diversity of freshwater species pre-settlement, and
(2) the shores of the lakes which have been subject to intermittent inundation over thousands of years show ample evidence of characteristic salinity resistant vegetation such as Samphire but none of the freshwater River Red Gum vegetation so evident in freshwater wetlands up stream.

Of most concern is the claim that scientific modelling shows the lakes would become hyper-saline within two years and use of Reference 39 to support this contention. Again the science used by DEH to justify its position is found wanting.

Bice and Ye – SARDI (2009) had the brief of examining risk factors for the resident fish community under various management scenarios for the Lower Lakes and it is in that context that the use of sea water through the barrages to raise lake levels above those otherwise resulting from diminishing freshwater flows.

It would seem that the major issue for these researchers, with varying water levels, concerned connectivity between components of the system – affecting the capacity for recruitment and re-colonisation of species as well as the need for some estuarine species to move between varying salinities for spawning etc.

The option considered for allowing sea water into the lakes involved a 'one shot' movement of water over the barrage gates – a mechanism described as *"ecologically absurd"* by the researchers – and takes no account of the more sophisticated strategies suggested by other submissions in past consultation stages and for which there is world wide expertise and numerous 'best practice' examples to be called upon for analysis and guidance.

Further, the credibility of the Bice/Ye research itself might be questioned when in July 2009 ,while acknowledging levels ***may go higher (!)***, it assumes for the purposes of the research a salinity level of 1500 EC units in the Goolwa Channel refuge at a time when salinity levels at Goolwa and Clayton and in Lake Alexandrina were so far in excess of that 'freshwater ' figure as to make such an assumption ludicrous.

To use this research as a basis for dismissing an estuarine solution in times of severe drought is itself ludicrous.

'Adequate' flows of freshwater from the river!?

The 'hypersalinity' objection to use of sea water to maintain water levels assumes an absence of adequate flows from the river to flush accumulated salt. While there a feasible strategies to generate circulation and mixing with in the lakes utilising a tidal prism which will increase as scouring of the channels brings them back nearer to pre-barrage dimensions, there is no doubt that 'adequate' freshwater flows are desirable to maintain the health of the river whatever management regime is implemented.

As stated on page viii of the draft (Introduction), *"There is no desirable future for the Lower Lakes if water levels continue to be below sea level for an extended period of time."* Therefore, to use a lack of 'adequate' flows as an argument against the use of sea water in the lakes is clearly a nonsense. Without adequate flows, the choice is between 'drying down' with 'no desirable future' or a cleverly managed estuarine system which retains the economic, social and environmental benefits of a viable wetland ecosystem.

The case for use of sea water to maintain levels in the Lower lakes at or near sea level requires a genuine and much more detailed analysis than DEH has been willing to apply – the alternatives are horrendous; socially, economically and for the environment.

It would be most unfortunate if political motivation in the contest for water share prevented optimum outcomes from this planning process. Economic considerations re the need for a barrier near Wellington need to be considered against the costs of the alternatives – an objective and careful consideration of the options is essential.

The negative effects of the current crisis are understated by DEH

In listing the negative impacts of falling water levels in the Lower lakes this draft report continues to omit significant matters brought clearly to attention in previous submissions.

The impact of wind driven erosion of exposed lake beds goes much further than potential nuisance and health problems from dust and the loss of visual amenity.

Thousands of tonnes of sand have been redistributed along shoreline creating sandy shallow beaches where there were previously deeper stony bottoms – the ecological implications of these **physical changes to the shore line** and effects on both plant and animal biota do not appear have been considered to any significant degree by DEH ecologists and yet the changes are already profound and further/continued exposure of increasing areas of lakebed in this very windy region will exacerbate this problem.

Of equal concern is the movement of acidic soils from the lakebed onto structures and human habitation.

The **acid corrosion of zinc coated corrugated iron and structural steel** on a new lakeside home early in 2009 **is a fact** – and but for raised water levels in the Goolwa Channel this home would have continued to be under severe threat (and as water levels fall faster than predicted may yet again be threatened this summer).

The EPA have examined this corrosion, the CSIRO have tested a sample confirming the involvement of acid soils, the matter has been brought to the attention of DEH both in submissions and independently – and yet the issue has been and continues to be ignored.

Zinc coated corrugated iron and steel structural components on buildings within the vicinity of the shores of Lake Alexandrina and Lake Albert continue to be at risk until water levels can be raised to cover acid sulphate soils.
The risk posed by ASS is not just to the water body.

Optimistic analysis of planned mitigation strategies

Apart from the 'temporary' regulators managing water levels in the Goolwa Channel the DEH planning response to falling water levels in the Lower Lakes is essentially limited to managing the 'drying down' of the lakes, ie attempting to reduce wind erosion with vegetation projects (with associated fencing and vermin control measures) and dosing acid suplhate soils with lime.

This means that now and in the future when severe drought reduces the availability of freshwater flows from the Murray River, seawater will be kept out by the barrages and the lakes will move towards the range of disastrous consequences described in several place of the draft – towards "no desirable future".

This in the hope that freshwater flows will return in time – as no doubt they will in a catchment system of such historical variability. But with the uncertainties of climate change and the realities of the current situation it is clear that when water levels fall below sea level DEH has no plan that will address that issue – just manage the drying out best we can.

The real limitations of low water mitigation strategies need to be examined and acknowledged, and they relate to the scale of the problem in relation to the capacity available to address it.

The Lakes have an area of over 80,000 hectares (800 square kilometres) at the desired pool level above 0.5AHD. At sea level this reduces to about 75,000 hectares leaving approximately 50 square kilometres of exposed lakebed – an area which might possibly be managed with the mitigation strategies of this draft plan – (vegetation and treatment with lime as needed) – with a huge effort and at great cost. But when the water levels fall to the vicinity of one meter below sea level, the total exposed area of lakebed is over 200 square kilometres and that is what exists now – beyond the scope of anything more than dabbling around the edges – as well intentioned as such projects might be. At -1.5 AHD levels we are approaching 400 square kilometres of exposed windblown lake bed – way beyond the resources available to mitigate in any meaningful way and yet that is the level at which DEH has conceded that sea water might be used, and then only to mitigate exposed acids. The stated plan to wait until the end of summer and then aerial sow grasses in time for the autumn rains is so clearly not a solution to the windblown erosion of summer that it hardly warrants consideration.

These are the facts of the matter
- a reality that must be faced when considering the alternatives

Logical Implications

The examples outlined above represent facts and logical implications which are very relevant to consideration of available options in managing the Lower lakes through periods of extremely low freshwater flows.

It can be seen that in assessing their relative merits DEH

- has overstated the case for a freshwater solution – (even when that solution may not be available)
- given inadequate consideration and analysis to options involving sea water and an estuarine environment
- overlooked important negative impacts which need to be addressed, and
- given an unrealistically optimistic impression of the potential for effective mitigation of low water levels on the vast scale required.

There appears to be no obvious reason why the decision making framework shown by flow chart on page 50 of the draft report should have excluded sea water options from genuine and detailed technical feasibility assessment

Some Other Concerns

Lack of transparency and potential bias re community consultation and governance
Given the overwhelming weight of submissions in the previous stage of community consultation that expressed a preference for a sea water option to maintain water levels and the relatively few freshwater proponents making submissions it is difficult to understand the DEH claim that the community has made a significant contribution.

And, given the denial by DEH of a request for information about the composition of the 'by invitation' community reference group*("for privacy reasons"),*

- it would appear that a small **highly organised and high profile group** claiming to represent the community but in fact representing a minority extremist environmental ideological position may have infiltrated the DEH processes and had a degree of influence upon outcomes that is unjustified and unrepresentative of the wider Lower Lakes and Coorong community.

In this context, it is also of concern that the **Ngarrindjeri** Regional Authority has sufficient influence to delay and amend planned strategies to the potential economic and environmental detriment of the community at large, on the apparent basis that the pre settlement environment had characteristics which may or may not have been subject to similar changes under pre-settlement conditions as are occurring today.

Questions which must be asked.

- How valid is this influence?
- How genuinely representative is the Ngarrindjeri Regional council of the 4,000 Ngarrindjeri people said to live in the Lower Lakes and Coorong region?

- Who is actually determining the Ngarrindjeri position on these matters? (given the close links between key members of the River Lakes and Coorong Action Group and the Ngarrindjeri group and the close similarities in their respective positions).
- What mechanisms are there for the Ngarrindgeri Regional Council to ascertain and represent the genuine views of their people in these matters?
- Should 4,000 Ngarrindjeri people have the potential to thwart the interests of the 440,000 non Narrindjeri residents and the wider community in this time of modern day climate crisis on the basis of potentially contentious assumptions about climate and environment before settlement.

It would be most unfortunate if the goodwill within the community towards the genuine cultural aspirations of the Ngarreindjeri people was to be damaged by others with their own environmental and/or political agendas to achieve outcomes which may not be in the best interest of the broader Ngarrindjeri community or the community at large.

RAMSAR values and considerations

Activist protest groups and their political followers have given great prominence to the RAMSAR status of the Coorong and Lower Lakes.

The question which must now be asked, on behalf of the environment and the migratory birds upon which RAMSAR accreditation was based-

Would a sea water based estuarine mix of salinities within the Lower Lakes at or near sea level with tidal movement have the potential to meet RAMSAR requirements? The answer is clearly 'YES'.

Alternatively, would a 'dried down' lake system with water levels a metre or more below sea level but to some extent vegetated with grasses and shrubs be a viable habitat for wading birds and meet RAMSAR requirements. The answer is clearly 'NO'.

And yet the very groups who made such an issue of the RAMSAR status are leading the charge to plant up the lake bed and keep out sea water!

Note: This submission focuses primarily upon the Lower Lakes and upon the lack of potential management strategies in the 'Securing the Future' long term plan to address extremely dry climatic conditions and the falling water levels which are inevitable in the absence of sufficient fresh water if sea water is not used to compensate.

Footnote:
This quote from the Introduction (Page viii of the draft report) captures the sense of unreality which pervades the draft, challenges intelligent appraisal and suggests the writer 'does not want to know' that it is only the barrages built 70 years ago currently keeping levels un-naturally low.

"Water levels have not fallen to this extremely low level since sea levels rose some 7,000 years ago. There is therefore no precedent for dealing with environmental impacts on this scale"