

The Facts about the Fact Sheets

- **what the DEH are choosing NOT to tell you**
- **about freshwater in the Lower Lakes**

The Department of Environment and Heritage have just released two new fact sheets about fresh water in the Lower Lakes but they are creating a false impression by telling only half the story. The issue here is how often and how long during the past several thousands of years did seawater enter the lakes and create an estuarine wetland environment. DEH would have us believe that this was a very rare occurrence but the full facts suggest otherwise. In this time of severe drought would the ‘**natural**’ state of the Lower Lakes be estuarine? - and if so, why are we letting the lakes dry out while planning for a fresh water future which may not be possible?

Here are the facts about the facts that they are not telling you.

DEH ‘fact’ statement: *“The Lower Lakes have predominantly contained fresh water for over 7,000 years, only occasionally becoming a more estuarine environment for a short period of time.”*

Comment: The key ideas here are “*predominantly*”, “*occasionally*”, “*more estuarine*” and “*short*”. These qualifying words give the clue to how dodgy these fact sheets might be. They do not refute the notion of the Lower Lakes becoming estuarine in times of low river flow but they beg the question of just how significant these times have been – the DEH inference/conclusion is that the estuarine component has been negligible.

But what is their evidence for this conclusion? Two sources are quoted.

Firstly, University of Adelaide research into diatom fossils preserved in lake bed sediments (paleolimnology) provides a good indication of salinity in the aquatic environment of the lakes over the past several thousands of years.

DEH ‘fact’ statement: *“Analysis of diatoms found in sediments at a number of locations in the Lower Lakes indicates that Lake Alexandrina has been predominantly a freshwater environment over the past 7000 years”.* That word, “*predominantly*” again – but just what does it mean here?

Comment: This research analysed two sediment core samples, one near the southern edge of the main body of the lake just north of Point Sturt - which found significant numbers of estuarine ‘indicator’ diatom fossils in all examined levels representing the last 6,000 years, and the other at the extremity of the lake furthest from the sea where the river channel enters the lake - which found traces of estuarine ‘indicator’ diatom fossils.

But this is precisely what could be expected if the lake had significant periods of estuarine history, with salinity regimes greater nearer the sea and reducing to the north with proximity to freshwater flows from the river. To interpret these results as ‘proof’ of a 7,000 year **fresh water** history is at the very least, **contentious**, given that the very experienced paleolimnologist and former Director of the University of Adelaide’s Diatom research team, Professor Peter Gell, (who has intimate knowledge of this research) has recently stated that “---*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.*”

Secondly, DEH refer to the CSIRO's 2007 'Sustainable Yields' project which used available climate data and modelled the historical, pre-development flow status of the River Murray which was then extrapolated into the future with further modelling for a range of climatic condition and catchment inflow scenarios. In a number of recent documents DEH refer to this modelling as the basis for their claim that under pre-development conditions the River Murray flowed to the sea for all but 1% of the time.

DEH 'fact' statements: "*--- the (CSIRO) project predicts that the recent extremely low river flows caused by drought should only occur 1% of the time in the current climate and approximately 4% of the time in a future extremely dry climate.*"

and

"Even in an extremely dry climate the report is optimistic that the Lower lakes would remain predominantly fresh water, but there would be occasional periods where the lakes were below sea level."

Comment: Where to start??

Put aside for now the fact that the CSIRO modelling for pre-development river flows included the Snowy River Scheme's contribution of water from outside the Murray catchment – (an average of 520 Gegalitres per year) – meaning that without this extra water the actual pre-development 'cease to flow at the mouth' percentage would have been greater than 1%, even if the modelling is otherwise sound (see below). Yet the 99% - 1%, freshwater – estuarine split is now quoted as fact by DEH and others.

But the major flaws in the 'Sustainable Yields' modelling become even more apparent when we match their 2007 predictions against the more recent reality.

The "current climate" referred to above by DEH was the most recent ten year period when the 'Sustainable Yields' project took place in 2007, that is the period from 1997 to 2006. This drier period data was considered more relevant to the future than the longer term 'historical' data from when records were first kept. This means that the modelled predictions of low river flows only 1% of the time were immediately confounded by the fact that both the 2007 and 2008 data years remained at record low inflow levels and in that time the Lower Lakes have fallen to over a metre below sea level – only the barrages keeping the sea water out.

DEH, in their preamble to one of the Murray Futures long term management planning process documents, refers to these as "*atypically low annual flows*" and suggest that they conform with what "*--- the project predicted --- would continue to occur 1% of the time under a continuation of the 1997 – 2006 climate, and 4% of the time under a future extremely dry climate.*"

Dare we suggest that if the same modelling had been done in 2009 using the now most recent ten year period data, that is 1999 – 2008, the predicted outcomes would have much more closely matched the current reality of vast expanses of dry lakebed – and the CSIRO's "*optimistic*" predictions of only occasional levels below sea level would have been shown to be unsustainable. The last two years of catchment inflows hovering around all time record lows would have been part of the modelled data and would have influenced the modelling to produce much less optimistic predictions. To refer to them now as "*atypical*" is to avoid an unpleasant reality. With these two years included in the modelled data, it is clear that insufficient catchment inflows to provide sufficient fresh water down the river to prevent lake water levels falling below sea level (as they are now) is a much more likely scenario than DEH appears willing to confront.

It can be seen from the above that the CSIRO ‘Sustainable Yields’ project modelling re the freshwater future of the Lower Lakes, upon which DEH is basing its planning, is unconvincing.

Further, the uncertainties of climate change make the modelled predictions even less reliable. As DEH acknowledges in its May 2009 ‘Murray Futures’ document, ‘Directions for a Healthy Future’, “--- the modelling contains significant uncertainties about the rate and extent of climate change.” But even more of a problem with the CSIRO’s river flow modelling is the fact stated by the DEH itself in the same ‘Directions for a Healthy Future’ document, “--- 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.

Other Evidence?

The other ‘evidence’ put forward by DEH in their ‘A fresh water future for the Lower Lakes’ Fact Sheet is a document so flawed and discredited for its bias and lack of objectivity that its claim to ‘prove’ the predominance of freshwater in the lakes before settlement cannot be taken seriously. ‘**A Fresh History of the Lakes: Wellington to the Murray Mouth 1800s to 1935**’ by Sim and Muller selects historical data which supports its thesis and blatantly ignores equally relevant and valid data which indicates an estuarine component to the history.

A good example of this document’s limitations is its treatment of statements by Captain Charles Sturt in 1838 – taken out of context to create an impression of support for their ‘freshwater only’ thesis – but excluding Sturt’s clear description of what he found near the River’s entrance to Lake Alexandrina near Pomanda Island in 1830, viz “*The transition from fresh to saltwater was almost immediate* ----“. - an observation consistent with Professor Gell’s interpretation of the diatom core sediment evidence referred to above.

That DEH should have recommended this document as a source of evidence in a fact sheet is a further indication of the lack of objectivity in the DEH ‘freshwater only’ position.

Conclusion

The DEH ‘freshwater future’ goal for the Lower Lakes reflects what most people would want to believe is possible but the supporting evidence is unconvincing. And yet, in its long term planning for the management of the Lower Lakes, DEH is placing all its eggs in the freshwater basket, with no consideration given to possible management strategies if there is insufficient freshwater available to maintain lake levels above sea level.

Lakes need water to be lakes – and an estuarine wetland may be the natural solution, sooner rather than later – with the extent of the fresh/marine mix depending from year to year upon catchment inflows in this highly variable system. The physical and chemical consequences of an empty lake are too serious to be ignored.

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