The Senate

Standing Committee on Rural and Regional Affairs and Transport

Water management in the Coorong and Lower Lakes (including consideration of the Emergency Water (Murray-Darling Basin Rescue) Bill 2008)

October 2008

ISBN 978-0-642-71992-8

This document was prepared by the Senate Rural and Regional Affairs and Transport References Committee, and printed by the Senate Printing Unit, Department of the Senate, Parliament House, Canberra.

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ABBREVIATIONS

ACCC	Australian Competition and Consumer Commission
AHD	Australian Height Datum
BoM	Bureau of Meteorology
COAG	Council of Australian Governments
DEWHA	Department of Environment, Water, Heritage and the Arts
EC	Electrical Conductivity
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
GL	Gigalitres (1000 megalitres)
ha	Hectares
IGA	Intergovernmental Agreement
km	Kilometres
m	Metres
MDBA	Murray-Darling Basin Authority
MDBC	Murray-Darling Basin Commission
Ministerial Council	Murray-Darling Basin Ministerial Council
ML	Megalitres
NSW	New South Wales
NWI	National Water Initiative
SA	South Australia
the Agreement	The Murray-Darling Basin Agreement
the Authority	The Murray-Darling Basin Authority
the Basin	The Murray-Darling Basin

Chapter 1

Introduction

Terms of Reference

1.1 On 27 August 2008, the following matter was referred to the Senate Standing Committee on Rural and Regional Affairs and Transport for inquiry and report by 30 September 2008:

(a) the volume of water which could be provided into the Murray-Darling system to replenish the Lower Lakes and Coorong;
(b) options for sourcing and delivering this water, including:
    (i) possible incentive and compensation schemes for current water holders who participate in a once-off voluntary contribution of water to this national emergency,
    (ii) alternative options for the acquisition of sufficient water,
    (iii) likely transmission losses and the most efficient and effective strategies to manage the delivery of this water,
    (iv) Commonwealth powers to obtain and deliver water and possible legislative or regulative impediments, and
    (v) assessment of the potential contribution of bring forward Australian Governments agreement to deliver water to save the Coorong and lower lakes;
(c) the impact of any water buybacks on rural and regional communities and Adelaide including compensation and structural adjustment; and
(d) any other related matters.

1.2 On 28 August 2008, the Senate referred the Emergency Water (Murray-Darling Basin Rescue) Bill 2008 to the committee for consideration in conjunction with the above matter.

Scope

1.3 The inquiry is divided into two sections, the first covering the immediate problems facing the Coorong and Lower Lakes, the second addressing broader management issues across the Murray-Darling Basin. Although matters of relevance to the second phase of the inquiry have been raised, this report focuses on the first phase.

Conduct of the Inquiry

1.4 Following the referral of the inquiry, the committee advertised the references in *The Australian* on 3 September 2008. The committee received 84 submissions from state and federal government departments, key organisations and stakeholder groups and individuals. A list of written submissions is included at appendix 1.

1.5 The committee held public hearings in Adelaide on 10 September 2008 and in Canberra on 9, 18, 19 and 26 September 2008. It heard evidence from a number of witnesses, including representatives from the relevant Federal, Queensland, South Australian and New South Wales Departments, farmers' and irrigators' groups, the Australian Conservation Foundation, local councils and residents; and technical experts. A complete list of the witnesses who appeared at the hearings is included at appendix 2. The Hansard transcripts of the committee's hearings are available on the Parliament's homepage at http://www.aph.gov.au.

Acknowledgements

1.6 The committee appreciates the time and work of all those who provided oral and written submissions to the inquiry, particularly given the short timeframe for the inquiry. Their work has assisted the committee considerably.

Chapter 2

Background

Introduction

2.1 This chapter provides an overview of the physical characteristics of the Coorong and Lower Lakes, including its geography and ecosystems. The chapter then provides an overview of water management within the Basin before setting the Coorong and Lower Lakes within the wider context of the Murray-Darling Basin.

Geography

2.2 The Coorong, Lower Lakes and Murray Mouth are a system of lakes, lagoons and wetlands which form the terminus of the River Murray. The diverse environmental, economic, social and cultural values offered by the Coorong and Lower Lakes has been formally recognised by the declaration of portions of the system as a wetland of international importance under the Ramsar convention and the area's nomination as an Icon Site under the Living Murray Initiative. The system covers approximately 140 500 hectares (ha) and contains both fresh water and estuarine ecosystems. There are three major bodies of water – Lake Alexandrina, Lake Albert and the Coorong.

Lake Alexandrina

2.3 Lake Alexandrina is the largest of the lakes with an area of 76 000ha. The lake is relatively shallow, with a maximum depth of approximately 4 metres (m), and is fed by fresh water from the Murray River and rivers from the Mt Lofty ranges. The Murray passes through Lake Alexandrina to the sea. The lake receives the majority of its fresh water from the Murray, although local rainfall and runoff from the Mt Lofty Ranges also contributes substantial inflows. Historically, the lake has been a predominantly fresh to brackish water system which, in the pre-European period would have occasionally become saline for short periods during extreme droughts. Currently the water in the lake is highly saline near the barrages and brackish in the centre.

Lake Albert

2.4 Lake Albert is a smaller fresh water lake connected to Lake Alexandrina. It has an area of 16 800ha and is shallower than Lake Alexandrina. It has no other significant inflows and is not connected to the sea.

The Coorong

2.5 The Coorong is a chain of lagoons which stretch along the coast for approximately 140 kilometres (km) and is divided into the North Lagoon and the South Lagoon by the narrows at Parnka Point. The two lagoons are distinct from the Murray Estuary leading from the mouth to Goolwa Barrage. The aquatic environment

ranges from estuarine in the North Lagoon to hyper-saline in the far reaches of the South Lagoon. The Coorong relies on river flow, tidal exchange, runoff and ground water from the Upper South East Drainage scheme area and wind mixing for water to balance evaporation. As a consequence of low or no inflows over the past ten years, reduced tidal prism and silting of the mouth, hypersalinity in the South Lagoon has been increasing beyond natural limits.

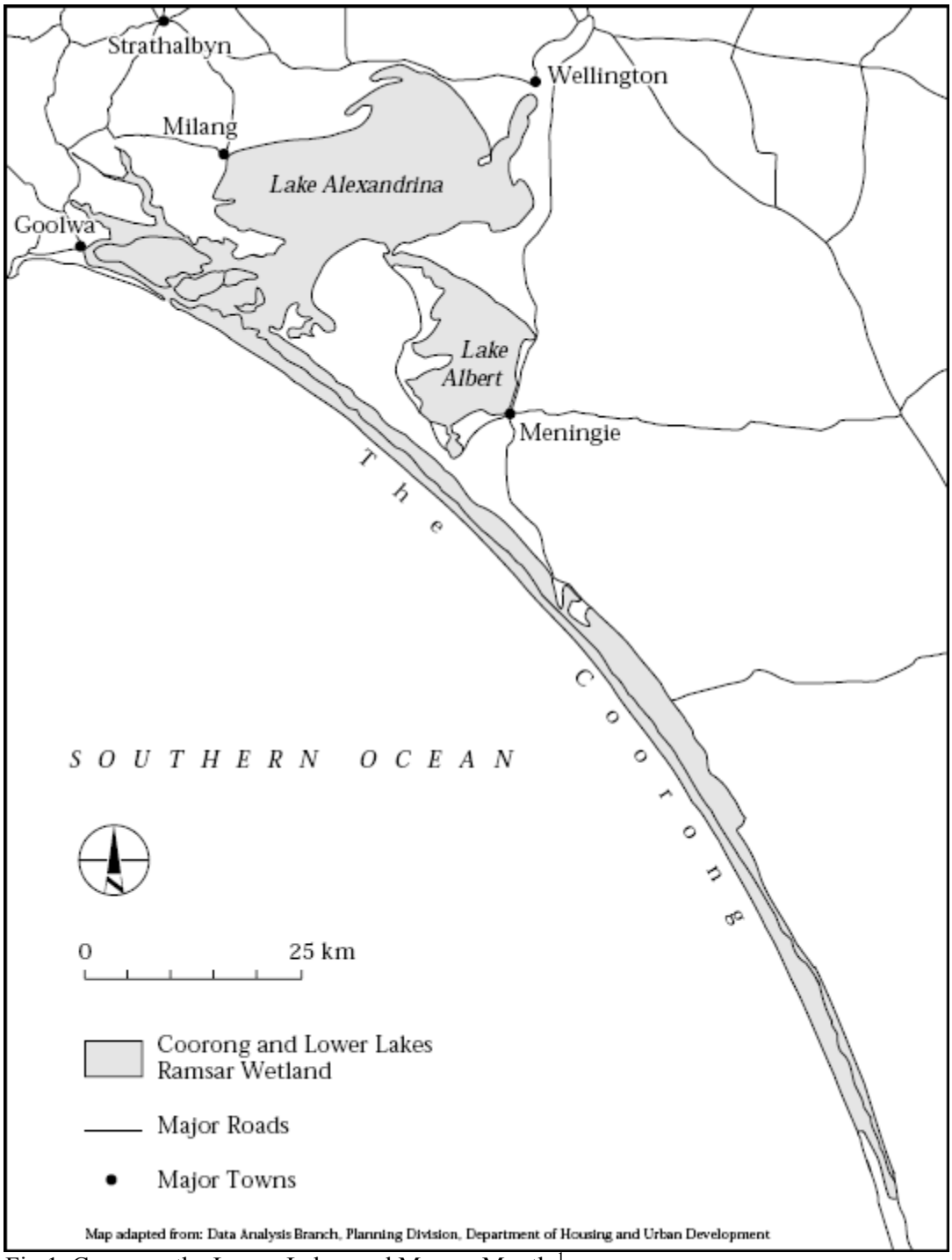

Fig 1. Coorong, the Lower Lakes and Murray Mouth.[1]

1 South Australian Department for Environment and Heritage, *Coorong, and Lakes Alexandrina and Albert Ramsar Management Plan,* 2000, p. 5.

Ecosystem

2.6 The region contains a variety of wetland ecosystems which are home to a number of threatened or endangered bird, fish and plant species.[2] The region's natural values have resulted in it being listed as a Ramsar convention protected wetland.[3] The Lower Lakes have historically been a predominantly fresh water environment, although there is evidence of periodic intrusion of salt water.

2.7 Sediment sampling indicates that the tidal prism regularly extended into Lake Alexandrina throughout the last 6000 years[4] Murray-Darling Basin Commission (MDBC) modelling based on data from 1891 to 2007 indicates that under natural conditions without human modification of the river flow, there would have been periodic reverse flows of sea water into the lakes resulting in high salinity in 17 per cent of years and in 5 per cent of years these reverse flows would have exceeded 70 gigalitres (GL).[5] Accounts from Charles Sturt's 1829 expedition indicate that there was a gradient of salinity on entering the lake, with the lake becoming more saline as he approached the mouth.

2.8 Despite this evidence of past salinity, the Lakes have been predominantly fresh since the construction of the barrages and are maintained as a fresh water ecosystem.

2.9 The Coorong lagoons support a variety of ecosystems, ranging from an estuarine environment in the North Lagoon, to a specialised hypersaline ecosystem in the far reaches of the South Lagoon. Some of the estuarine fish species of the north end of the Coorong are adapted to live in both the Coorong and Lower Lakes and a fishway has been constructed in the barrages to allow these species access to the lakes. The hypersaline species in the South Lagoon are adapted to live in water approximately three times as saline as sea water.

The Barrages

2.10 Lake Alexandrina is separated from the Coorong by a system of barrages constructed in the 1930s. These are low dams across the channels leading from Lake Alexandrina to the Coorong. The purposes of the barrages are to: reduce salinity levels in the lower reaches of the River Murray and associated lakes caused by tidal effects

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2 *Threatened Ecological Community Nomination Form*, Humane Society International, attachment to *Submission* 17, p. 5.

3 The Ramsar Convention on Wetlands is a global treaty adopted in the Iranian city of Ramsar in 1971. The treaty supports international cooperation for the 'conservation and wise use of wetlands and their resources' and is the only global treaty that deals with a particular ecosystem (wetlands). Aside from the River Murray Channel, all of the six Icon Sites identified under the Living Murray Initiative are listed as, or are part of, Wetlands of International Significance under the Ramsar Convention.

4 P. Gell and D. Haynes, *A Palaeoecological Assessment of Water Quality Change in The Coorong, South Australia*, Diatoma, University of Adelaide, 2005, p. 12.

5 Murray-Darling Basin Commission (MDBC), *Submission* 76, p. 14.

and salt water intrusion during periods of low flow; stabilise the river level, and normally maintain it above the level of reclaimed river flats between Wellington and Mannum for irrigation; concentrate releases to the ocean to a small area in order to scour a channel for navigation; and maintain pool water that can be pumped to Adelaide and the south-eastern corner of South Australia.

2.11 The barrages reduce the tidal prism through the Murray Mouth by approximately 90 per cent.[6]

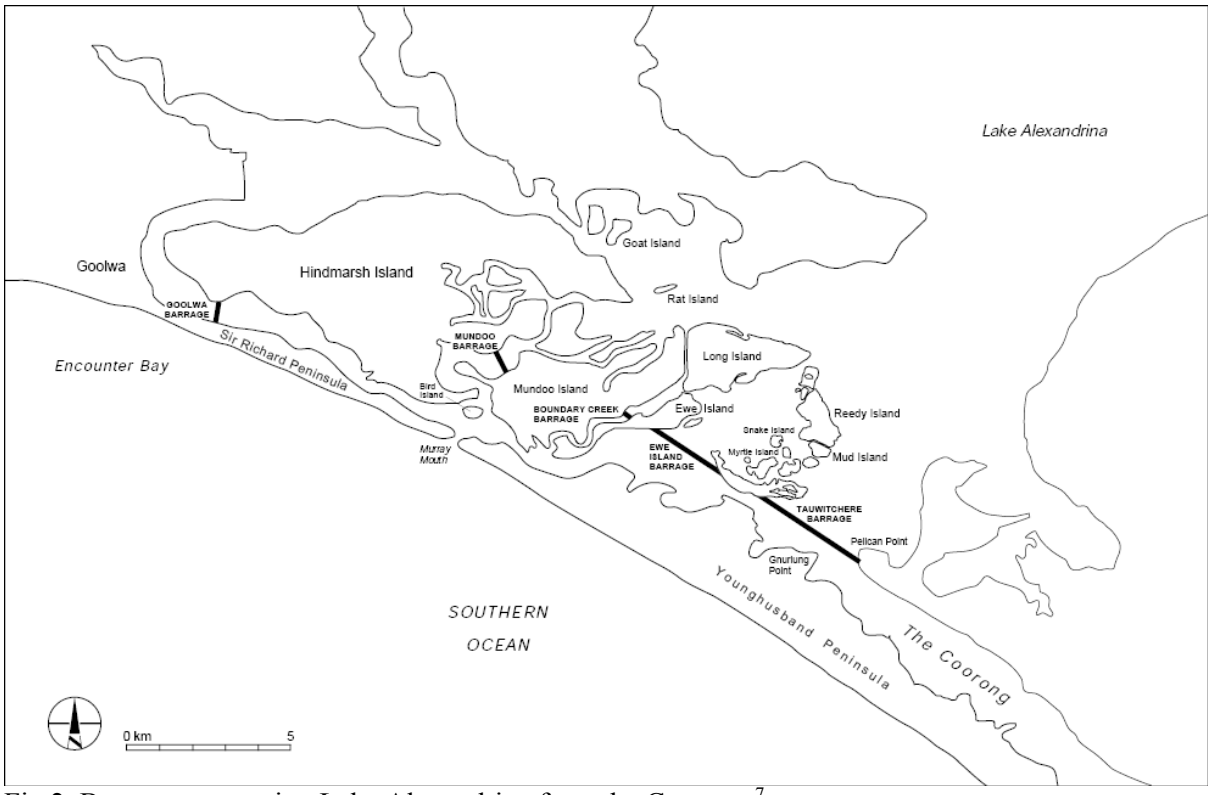

Fig 2. Barrages separating Lake Alexandrina from the Coorong.[7]

2.12 There are 5 barrages: Goolwa Barrage, Mundoo Barrage, Boundary Creek Barrage, Ewe Island and Tauwitchere Barrages. Goolwa Barrage, located 8km upstream of the Murray Mouth, is the deepest of the barrages and is constructed on fine sand and silt. It is founded on timber piles and sheet piling up to 14m deep. Ewe Island and Tauwitchere Barrages are wide and shallow barrages built on a calcareous reef, with earth embankments at both ends. The Mundoo Barrage and Boundary Creek Barrage are the shortest of the barrages and are founded on a limestone reef.

2.13 Goolwa contains a lock chamber 30.5m by 6.1m and Tauwitchere has a lock of 13.7m by 3.8m but no provision was made in the other barrages to allow the passage of shipping. The barrages also contain fishways which, when operational, allow passage for estuarine species that require access to the fresh water environment of the lakes. These fishways begin to operate effectively when the lakes are above

6 Dr Ian T. Webster, *An overview of the Hydrodynamics of the Coorong and Murray Mouth*, CSIRO, p. 3.

7 South Australian Department for Environment and Heritage, *Coorong, and Lakes Alexandrina and Albert Ramsar Management Plan,* 2000, p. 10.

0.3 metres higher than mean sea level, formally known as Australian Height Datum (AHD).

2.14 In normal operation, as designed, the barrages raise the level of fresh water in the Lower Lakes to approximately 0.75 metres AHD. The barrages cause an increase in water level of approximately 50cm as far upstream as Lock 1 at Blanchetown (274km upstream).[8]

2.15 At full supply the lakes hold approximately 2200GL. Estimates of evaporation vary, but the lakes probably require 700-950GL to maintain their normal level. When flow exceeds this volume it is released to the Murray Estuary and flows into the Coorong North Lagoon or out the Murray Mouth.[9]

Water management

2.16 Water levels in the Lower Lakes have followed an annual cycle of drawdown during the summer/autumn period, when extraction and evaporation exceed entitlement flows, and refill during winter and spring as flows increase and extraction and evaporation decreases.

2.17 The main operating rule for the Lower Lakes has been to maintain an average water level of 0.75m AHD. This is compared to a mean sea level of -0.03m AHD at Victor Harbour. This level is regulated through the opening and closing of barrage gates.

2.18 When flows from the Murray are limited to entitlement flows, evaporation from the lakes exceeds inflow and lake levels drop unless some action is taken to reduce the drawdown. To mitigate this effect, in normal operation the barrages are closed and the lakes surcharged to 0.85m AHD at the beginning of summer to allow for evaporation dropping the level to an average minimum of 0.60m AHD in autumn.

2.19 Irrigation development and management of salinity and algal blooms have all placed operational constraints on the management of the Lower Lakes. Irrigation development around the lakeshore is generally based on gravity systems that rely on water levels being maintained above a minimum level of 0.6m AHD. Current operating rules have aimed to maintain the water level within a narrow band of 0.6m-0.85m AHD for the purpose of water supply, irrigation and bank stability.

2.20 Several small communities rely on pumping water from the lakes for domestic supply. High salinities and algal counts are of concern to these communities and water users. The salinity of the Lower Lakes can increase substantially during low flow periods. Salinity in the Lower Lakes has been managed in the past by decreasing the water level to 0.65m AHD to allow flushing. Reclaimed irrigation areas in the Lower

8 MDBC, *Design and operation of the Barrages,* http://www.mdbc.gov.au/rmw/river_murray_system/barrages/design_and_operation_of_the_barrages

9 MDBC, *Lower Lakes Fact Sheet*

Murray can be a source of nutrient loads to the river, but rehabilitation of these areas to minimise such returns is well advanced.[10]

The Murray-Darling Basin

2.21 The Murray-Darling Basin (the Basin) covers approximately 1 059 000 square kilometres or 14 per cent of Australia's land area. Two million people (10 per cent of Australia's population) live in the Basin and are dependent on it for their drinking water, as are another 1.1 million residents of the city of Adelaide.

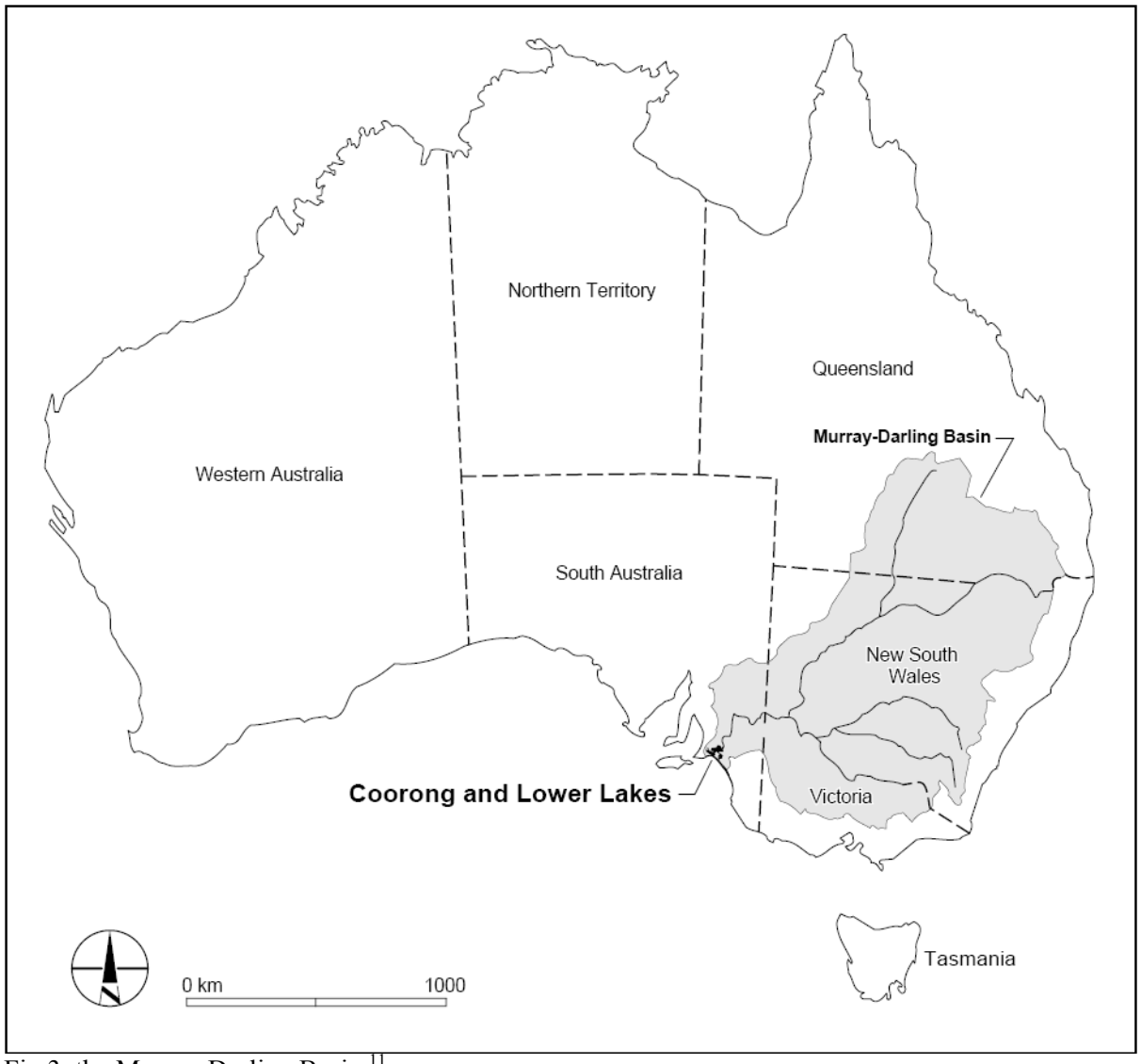

Fig 3. the Murray-Darling Basin.[11]

10 MDBC, *Lower Lakes, Coorong and Murray Mouth Icon Site Environmental Management Plan 2006-07,* pp 16-17, http://www.thelivingmurray.mdbc.gov.au/publications#pub_icon (accessed 29 September 2008.)

11 South Australian Department for Environment and Heritage, *Coorong, and Lakes Alexandrina and Albert Ramsar Management Plan,* 2000, p. 4.

Water availability

2.22 The Basin is one of the driest catchments in the world. By way of comparison, the catchment of the Mississippi River contributes 20 times more runoff per square kilometre, and the Amazon catchment 75 times more runoff per square kilometre, than the Basin. The average annual flow of the rivers of the Murray-Darling would pass through the Amazon River in less than a day.

2.23 The estimated long term average annual runoff into all rivers in the Basin is approximately 23 609GL which is approximately 4 per cent of the average annual rainfall of 530 618GL. There is considerable variation in runoff from one part of the Basin to another.

2.24 The catchments draining the Great Dividing Range on the south-east and southern margins of the Basin make the largest contributions to total runoff. For example, the Murrumbidgee and Goulburn, Broken and Loddon river catchments account for 35 per cent of the Basin's total runoff from 12 per cent of its area. The Upper Murray catchment alone accounts for 17.3 per cent of runoff from just 1.4 per cent of the Basin. In contrast, and further illustrating the Basin's climatic differences, runoff in the Darling Basin is estimated to be just 30 per cent of total runoff in the entire Basin, despite the Darling Basin accounting for 70 per cent of the Basin's total area.

2.25 Runoff variability in the Basin over time is considerably high. Over the period from 1894-1993, the annual discharge at the mouth of the Murray-Darling system ranged from 1626GL to 54 168GL. Except during very wet years, some 86 per cent of the Basin contributes virtually no runoff to the river systems.

2.26 The MDBC noted that it has been estimated that under natural conditions almost 11 000GL/year were contained in wetlands, on the floodplains or lost to evaporation from the river surface and that only 12 890 GL/year or 54 per cent of the runoff reached the sea. Some of the water that would have been consumed by wetlands and the floodplain under natural conditions is now used for irrigation or is evaporated from reservoirs.[12]

2.27 The CSIRO Sustainable Yield Project has modelled the aggregated flow impacts through the connected rivers of the Basin and identified (under the current climate and development scenario) that the current development of the water resources in the Basin has reduced the flow to the Murray Mouth by 61 per cent and that the river now ceases to flow 40 per cent of the time compared to 1 per cent of the time without the current level of development.[13]

12 MDBC *Submission* 76, Part 2, p.3. See also Senate Standing Committee on Rural and Regional Affairs and Transport, *Water Policy Initiatives*, December 2006, pp 21-27.

13 CSIRO, *Water Availability in the Murray-Darling Basin: A Report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project*, 2008, p. 5.

2.28 To regulate the River Murray system, River Murray Water utilises four major storages, sixteen weirs, five barrages and numerous other smaller structures. Major storage capacity in the Murray system (Dartmouth, Hume, Lake Victoria, and Menindee) is approximately 9000GL and in all Basin storages is approximately 23 000GL.

2.29 The total net open water evaporation from major water bodies within the Basin is in the order of 3000GL/year. Of this, the Menindee Lakes account for about 460GL/year, Lake Victoria 120GL/year, and Lake Hume accounts for about 60GL/year of evaporation. The Lower Lakes account for net evaporation of approximately 700-950GL per year, almost a third of the total estimated evaporation.

2.30 Inter-Basin transfers are also a feature of the system with water being transferred into the Basin via the Snowy Mountains scheme. However, these flows are only equivalent to less than 5 per cent of the natural runoff.[14]

Land use

2.31 The Basin accounts for 40 per cent of the value of Australia's agricultural output.[15] It should be noted however, in previous years this percentage has been higher. Some 84 per cent of the land in the Basin is owned by businesses engaged in agriculture and 67 per cent of this land is used for growing crops and pasture. The vast bulk of agricultural land in the Basin is not irrigated, with only 2 per cent of Basin land under irrigation – this produces 44 per cent of the value of Australia's irrigated agricultural output.[16]

2.32 The total gross value of production of agricultural crops in the Basin in 2005-06 was $15 billion, which is nearly 39 per cent of the total Australian gross value of agricultural production.

2.33 Irrigated agriculture covers a total of almost 1.65 million hectares in the Basin and is the single greatest water user. Average annual diversions in the Basin are about 11 500GL per year; about half of the annual flow in the Basin. Around 95 per cent of this diversion is for irrigation. In 2006-07, water diverted from the Murray, Murrumbidgee and Goulburn Rivers accounted for about 72 per cent of all the water diverted in the Basin.[17]

2.34 Irrigation within the Basin can be broadly characterised by several main industries with different patterns of water use. These are:

- pasture in the southeast which is often flood-irrigated and occurs throughout much of the year (17 per cent);

14 *Submission* 76, Part 2, pp 3-4.

15 See MDBC *Submission* 76, Part 2, p. 4, quoting Australian Bureau of Statistics figures for 2008.

16 *Submission* 76, Part 2, p. 4.

17 *Submission* 76, Part 2, p. 4.

- rice in the Murray and Murrumbidgee which is flood-irrigated (standing water) for about three months in the summer (16 per cent);
- dairy farming (17 per cent);
- cotton in the northern Basin catchments which is flood-irrigated for about three months in the summer (20 per cent); and
- Horticulture, including grapes, other fruit, nuts and vegetables (13 per cent).[18]

Environmental conditions

2.35 The Coorong and Lower Lakes are one of fifteen wetlands and one of six Icon Sites under the Living Murray Initiative in the Basin that are recognised internationally for their environmental significance.[19] For example, it provides habitat for more than 30 per cent of the migratory waders summering in Australia.[20]

2.36 It should also be noted that there are numerous other wetlands of significance across the Basin and that the rivers themselves support important environmental values.

2.37 The prolonged dry period across the southern half of the Basin continues to severely impact on wetland and floodplain ecosystems across the Basin. Whilst portions of the Barmah-Millewa Forest have received limited flooding as recently as 2005, there has not been any significant flooding in the mid and lower floodplains of the Murray downstream of Euston for many years. Floodplain vegetation is under severe stress. The 2007 Living Murray Icon Site condition report indicates that up to 80 per cent of River Red Gums are declining or dead significant wetlands along the Murray, such as the Koondrook-Perricoota Forest and the Chowilla floodplain.

2.38 In November 2007, aerial surveys of waterbirds along the Murray indicated that the drought had greatly reduced the availability of wetland and floodplain habitat and this had a severe impact on waterbird abundance and breeding. The greatest number of birds was recorded in the Lower Lakes, Coorong and Murray Mouth where a total of about 250 000 birds and 42 species were observed. Most of the other Living Murray Icon Sites supported low numbers and very little breeding.

2.39 In May 2008 a small volume of environmental water (7.7GL) was delivered to Gunbower Forest and this has stimulated an encouraging response from plant and animal life. The MDBC noted that this response emphasises the importance of using

18 *Submission* 76, Part 2, p. 4.

19 The Living Murray Initiative is a partnership of the Federal, NSW, Victorian, South Australian and ACT governments established in 2002. The first step of the program focuses on recovering 500 gigalitres of water for the River Murray along with improving the environment at six Icon Sites chosen for their high ecological value. Most are listed as internationally significant wetlands under the Ramsar convention. The six sites are: Barmah-Milewa Forest; Gunbower-Koondrook-Perricoota Forest; Hattah Lakes; Chowilla Floodplains and Lindsay-Wallpolla Islands; Lower Lakes, Coorong and Murray Mouth and River Murray Channel.

20 Wentworth Group of Concerned Scientists, *Submission* 71, p. 1.

the small volumes of environmental water available to maintain drought refuges along the river and avoid loss of threatened species.

2.40 Overall, however, the riverine environments across the southern and central regions of the Basin are in severe decline and this is not expected to improve until there is a very significant improvement in rainfall and system inflows.

2.41 In the northern Basin, the benefits of good summer rainfall and associated flooding are still evident at some sites. Although most wetlands and lakes along the Warrego and Paroo Rivers are drying up, those still containing some water are supporting large concentrations of waterbirds.[21]

Water management in the Basin

2.42 Water resources in the Basin are managed through the Murray-Darling Basin Agreement (the Agreement). The Agreement sets out the arrangements for sharing water between New South Wales (NSW), Victoria and South Australia (SA). Part X of the Agreement regulates the sharing of the waters of the 'upper River Murray' (water upstream of the SA border) the waters of the Murray tributaries below Albury and the waters for the Darling River and its tributaries upstream of Menindee Lakes remain under the control of the relevant state, although only when below an agreed level for the Menindee Lakes. [22]

Water sharing arrangements

2.43 Under the basic sharing provisions of the Agreement, SA is entitled to receive a minimum volume of 'entitlement' water from the upper States (1859GL per year). The upper states retain access to their own tributary inflows to the Murray except for inflows upstream of Albury/Wodonga (including Snowy Scheme releases) and inflows to Menindee Lakes when under MDBC control. The inflows above Albury and into Menindee Lakes are 'shared' equally between NSW and Victoria.[23]

2.44 The Agreement provides each state with flexibility to manage its water share as it wishes within certain limits. Each state can manage its water use according to its own water security profile. Victoria and NSW have equal access to the storage capacity of the major MDBC reservoirs upstream of the SA border. Victoria, NSW and SA can each, by way of its own policy, choose to consume its share or hold it in storage for a future time. Each of the three states may also permit an individual water license holder to 'carry over' water from one year to the next.

2.45 Security of water for SA is provided via three key mechanisms under the Agreement. SA's dilution and loss component is the most secure water in the

21 MDBC, *Murray System Drought Update No.15*, September 2008, pp 5-6. See also Senate Standing Committee on Rural and Regional Affairs and Transport, *Water Policy Initiatives*, December 2006, pp 26-27.

22 *Submission* 76, Part 2, p. 5.

23 *Submission* 76, Part 2, p. 6.

Agreement, together with system losses upstream of the SA border. Special accounting provisions in the Agreement also apply during drier times and a concept of a minimum reserve of water held in major MDBC storages reserves a proportion of water for SA's access in the following year once SA's share reaches full entitlement.[24]

Interim water sharing arrangements

2.46 The record low inflows observed in 2006-07 combined with record low storage levels both in the Snowy Scheme and MDBC storages have required interim water sharing arrangements to be agreed to by the Murray-Darling Basin Ministerial Council (Ministerial Council) in 2007-08 and 2008-09.

2.47 In 2007-08 the agreed interim arrangements meant that SA's share was initially reduced to ensure availability of critical water to the upper states. Initial improvements in water availability were shared between all states, instead of going solely to SA, to protect industry and permanent plantings in all three states. The arrangements then directed further improvements towards increasing SA's share.[25]

2.48 In 2008-09 a new set of arrangements were agreed which included contingency arrangements to ensure availability of SA's full dilution and loss entitlement. The arrangements permitted all three states to carryover water to meet critical human needs as well as those volumes carried over by individual license holders in each state.

2.49 Under both sets of arrangements SA's share was higher than it would have otherwise been under normal sharing arrangements and SA owed a debt in the form of 'drought imbalance' to the upper states.[26]

Water entitlements

2.50 Approximately 350GL of River Murray Water is used by urban and domestic consumers each year. The largest consumer of this water in dry years is SA (200GL), near the end of the River Murray.[27]

2.51 Water use throughout the Basin is managed through the granting of some form of water access entitlement and water allocation.[28] A 'water access entitlement',

24 *Submission* 76, Part 2, pp 6-7.

25 *Submission* 76, p. 78.

26 *Submission* 76, pp 8-9.

27 *Submission* 76, Part 2, p. 4.

28 In NSW water access licences specify a share component and an allocation component; in SA there are currently two types of water licences – a licence endorsed with a water (holding) allocation and a licence endorsed with a water (taking) allocation, will change shortly. In Queensland water entitlements specify the conditions for the taking of water and water allocations are only created once a resource operations plan has been finalised for the relevant water resource area, in Victoria water may be allocated by the minister as an environmental entitlement, a bulk entitlement (held by operators), a water share or other licences to take and use water.

such as a water licence, is defined in the National Water Initiative (NWI) as 'a perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan'. A 'water allocation' is defined as 'the specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan'. [29]

2.52 Ms Jenni Mattila, coordinator of the Bondi Group[30] explained to the committee the distinction between water entitlements and water allocations by likening permanent water entitlements to an empty glass in so far as they represent a maximum capacity but not a physical asset. She said:

> At the start of each season, the state crown determines the percentage of the glass that will be filled with the annual allocation. That is the physical water. [31]

2.53 Long term average water diversion in the Murray system is approximately 4068GL. However, there is a total of 5280GL of River Murray water entitlements. There is 2487GL of high reliability water entitlements and 2793GL of low reliability water entitlements.

2.54 From 1955 consumptive use of Murray-Darling water rose extremely rapidly and by 1965, according to the Wentworth Group, was exceeding sustainable yields. Consumptive use continued to rise in the 1970s and 80s.[32] In 1995, in response to the findings of an audit of river use, a cap was imposed on the volume of water which could be diverted from the rivers for consumptive uses, and was put into effect from 1 July 1997.

2.55 For NSW and Victoria, the cap is defined as 'The volume of water that would have been diverted under 1993/94 levels of development.' For Queensland and the Australian Capital Territory, the cap arrangements are still being finalised, but Queensland has had a moratorium on new development in place since 2000.[33]

2.56 The type of entitlement and the share of water for a given water resource system is established through water sharing plans. As a result, the specific attributes of high and low reliability irrigation water entitlements vary between states and river valleys. On the River Murray, the long term average allocation against the high reliability Victorian entitlement is called a 'high reliability water share'. The long term average allocation against the low reliability Victorian entitlement is called 'low

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29 *Intergovernmental Agreement on a National Water Initiative*, 25 June 2004, Schedule B(i) Glossary of Terms, p. 30, http://www.nwc.gov.au/resources/documents/Intergovernmental-Agreement-on-a-national-water-initiative.pdf (accessed on 27 September 2008).

30 The Bondi Group is an incorporated organisation which represents the interests of Australian private irrigation water supply enterprises in the continuing public debate over water and the policy setting which follows that debate.

31 *Committee Hansard,* 19 September, 2008, pp 60 – 61.

32 The Wentworth Group, *Submission* 71, p. 7.

33 http://www.mdbc.gov.au/nrm/the_cap (accessed 2 October 2008). The cap does not constrain new developments provided they do not result in additional water extraction.

reliability water share'.[34] In NSW a distinction is made between 'high security' and 'general security' users.

2.57 Ms Mattila explained the practical difference in security or reliability of entitlements for the committee with reference to NSW. General security growers in NSW do not receive any annual allocation until the high security growers receive 80 per cent of their entitlement.[35]

Water trading

2.58 Under the NWI, water trade is the transfer of water access entitlements (permanent) and seasonal water allocations (temporary) between different entities including irrigators, environmental water managers and infrastructure operators. Water trading is intended to allow access to scarce water resources to be reallocated over time to their most productive uses. The 1994 Council of Australian Governments (COAG) water reforms sought to open up trading arrangements, including interstate trading. Through the NWI, COAG has agreed to 'an expansion of permanent trade in water bringing about more profitable use of water and more cost effective and flexible recovery of water to achieve environmental outcomes'.[36]

2.59 Temporary or permanent trading of access entitlements is provided for under state and territory legislation. In many cases, statutory water access entitlements are held by irrigators. In these circumstances the irrigators have clearly defined water rights that can be traded. However, in NSW and SA water entitlements are typically held by irrigation infrastructure operators on behalf of member irrigators.[37] There is evidence to suggest that the actions of such operators can impede trading processes.

2.60 The Australian Competition and Consumer Commission (ACCC) is considering the form of water market rules and water charge rules as part of its new functions under the *Water Act 2007* (the Act). In particular, the ACCC has noted how the actions of operators may impede the development of efficient water markets and has considered ways to improve transformation and/or trading processes and outcomes.[38]

2.61 In the southern Murray-Darling Basin the amount of water that can be permanently traded out of an area is limited to four percent of the total water entitlements of that area, per annum (the four per cent cap). Evidence suggests that the

34 *Submission* 76, Part 2, p. 4.

35 *Committee Hansard*, 19 September 2008, p. 62.

36 COAG Communique, *Council of Australian Governments' Meeting – 25 June 2004*, http://www.coag.gov.au/coag_meeting_outcomes/2004-06-25/index.cfm.

37 Australian Competition and Consumer Commission, *Water market rules: position paper-July 2008*, p. xi.

38 Transformation allows an irrigator to permanently transform an entitlement held on their behalf by an operator into an independently held water access entitlement registered on a state water registry. Once the water access entitlement is independently held, an irrigator can also trade the entitlement if they choose to do so.

cap is impeding structural adjustment in the agricultural sector, making it more difficult for those who can most productively use water to buy it and constraining environmental water purchases. Under the NWI, such caps on permanent trade are required to be removed altogether by 2014 at the latest.[39]

The Water Act 2007

2.62 The Act, which came into effect on 3 March 2008, creates new institutional and governance arrangements to address the sustainability and management of water resources in the Basin. The Act builds on earlier reform initiatives including the NWI, and the Murray-Darling Basin Agreement.

2.63 The key elements of the Act are:

- the establishment of the Murray-Darling Basin Authority with a range of function and powers;
- the preparation of a Basin Plan for the integrated and sustainable management of water resources in the Murray-Darling Basin, including:
  - limits on the amount of water that can be taken from Basin water resources;
  - identification of risks to Basin water resources;
  - an environmental watering plan
  - a water quality and salinity management plan; and
  - rules about trading of water rights in relation to Basin resources.
- The establishment of a Commonwealth Environmental Water Holder to manage the Commonwealth's environmental water to protect and restore the environmental assets of the Murray-Darling Basin, and outside the Basin where the Commonwealth owns water;
- The development and enforcement of water charge and water market rules by the ACCC; and
- Authorisation of the Bureau of Meteorology to collect and publish high-quality water information, including the National Water Account and periodic reports on water resource use and availability.[40]

39 COAG Working Group on Climate Change and Water, *Report to Council of Australian Governments*, March 2008, p. 11.

40 Explanatory Memorandum, Water Bill 2007.

Chapter 3

The problems facing the Coorong and Lower Lakes

3.1 The Coorong and Lower Lakes system are suffering from the effects of inadequate inflows of fresh water. The Murray-Darling Basin (the Basin) is currently experiencing the worst drought on record, water volumes in the entire Basin are very low and River Murray flows into the lakes are well below that required to exceed evaporation from the lakes' surface. This has led to the level of fresh water in the lakes falling below sea level and has halted the release of fresh water into the Coorong North Lagoon, in turn contributing to the closing of the Murray Mouth.

3.2 The committee notes the view of the MDBC that the general ecological decline in the Lower Lakes and Coorong has occurred over many decades and needs to be considered within the context of climate change and wider Basin reforms.[1]

The current drought

3.3 Submissions commented on the unprecedented nature of the current drought. The Wentworth Group stated that two years ago the Group warned that evidence was growing 'that this was more than just a drought' and since then conditions have worsened:

> We warned that our continent is getting hotter, that rainfall patterns have changed significantly and it is likely that southern Australia has experienced a steep change in its weather patterns, more reminiscent of the pre 1950s, than the high rainfall period we experienced since.[2]

3.4 The MDBC stated that for large parts of southern and eastern Australia, dry conditions have persisted since October 1996, but have been exacerbated in recent years. During the last seven years in particular, the Basin has experienced severe rainfall deficiencies. The period from September 2001 to August 2008 was the second driest seven-year period on record (the driest was from 1939 to 1946). This rainfall deficiency, particularly in the alpine areas, has been the main cause for the record low inflows to the Murray system.

3.5 The current dry period and low water availability can be put into perspective by comparisons with similar extended droughts in the early and mid-twentieth century. The average annual Murray inflow of 3800GL/yr during the current drought (2002 to 2008) is lower than that experienced in the previous worst two droughts on record – 4900GL/yr in 1897 to 1904, and 5600GL/yr in 1938 to 1946.

3.6 Rainfall during this drought has been comparable to previous dry periods. However, inflows and water availability have been considerably lower. The current drought has also recorded the lowest inflows for virtually all periods from one month

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1 Murray-Darling Basin Commission (MDBC), *Submission*. 76, p. 2.

2 Wentworth Group, *Submission* 71, p. 7.

to ten years. In particular, for the two years ending August 2008, Murray system inflows were 3540GL which is almost half the previous two year minimum prior to this drought (of 6800GL in 1943-45).[3]

3.7 The MDBC has identified five factors that have contributed to the severity of the current drought:

- Over allocation – the second half of the 21st century was significantly wetter than the first half. Consistently wet weather, dam construction between the 1950s and 1990, and the accepted wisdom that only a percentage of new entitlements would be utilised, underpinned an expansion in irrigation entitlements. A larger number of irrigators dependent on the resource than previous droughts exacerbated the impact of the water shortage.
- Higher temperatures – three of the last five years, in the Basin, have been the hottest on record (of approximately 100 years of records). Higher temperatures increase evaporation and dry the catchment, resulting in less runoff. The impact of higher temperatures and a drier catchment have been clearly evident since September 2007 when a La Nina system bought above average rainfall to most of the River Murray catchment between September 2007 and March 2008, yet inflows remained very low.
- Changed rainfall patterns – Research indicates that a significant reduction in autumn rainfall has occurred over the MDB. Research points to a strengthening of a 'subtropical ridge' of high pressure over the Basin during the autumn months. Historically, the subtropical ridge is present in summer but weakens and moves rapidly north during autumn, allowing frontal systems to bring rain to the Basin (and south eastern Australia generally). Research links the persisting southerly subtropical ridge to climate change and the effect of diverting autumn storm systems to the south of the Basin.
- The lowest inflow year on record – total annual River Murray system inflow during 2006-07 was 1040GL, approximately 60% below the previous record minimum. Such an unprecedented dry year almost completely exhausted the River Murray's main drought storage, Dartmouth Dam. This has resulted in the current situation of allocations being almost entirely dependent on inflows.
- Two consecutive very dry years – following 2006-07, the driest year on record, 2007-08 has also been a very dry year. Never before, in the historical record, has an extreme dry year, been followed by another very dry year. Previously, the driest years on record 1902/03, 1914/15 and 1982/83 were followed by significantly wetter years.[4]

3.8 The Bureau of Meteorology (BoM) also commented on the current long drought across the Murray-Darling Basin noting that:

> The current drought event commenced in southern parts of the basin in late 1996 and more generally across the basin in around 2002. The El Niño years of 1997, 2002 and 2006 were each notably dry across the basin. Since 2001 each calendar year has seen below-average Murray-Darling Basin

3 MDBC, *Submission* 76, Part 2, pp 7-8.

4 MDBC, *Submission* 76, Part 2, pp 14-18.

> rainfall – a run of seven calendar years which is unprecedented in our records. During the last seven years, averaged across the whole basin, there has been a total of 2860mm rainfall (an average of 407mm a year) which makes this seven-year period the second-driest seven-year period since 1900, after the 1939-1946 drought event (with a total rainfall of 2757mm, and an average of 394mm a year). If the current drought event persists through 2009, it will likely overtake the 1930/1940s drought in terms of rainfall deficits.[5]

3.9 The BoM commented that an unusual feature about this drought is the repeated failure of the autumn rainfalls. There have been eight below-average autumn rainfalls in consecutive years, and 16 of the last 18 autumns have experienced below-average rainfall. This has major consequences for runoff, and in part explains why the runoff has been proportionally lower during this long drought event.[6]

3.10 The BoM also stated that perhaps the most notable feature of the current drought is the exceptionally high temperatures which have been experienced. The year 2007 was the Basin's warmest year on record (+1.13ºC above the 1961-1990 average); while 2005 was the second-warmest year on record, and 2006 the fourth-warmest year. As a whole, this long drought has been 1 to 1.5ºC warmer than the 1930-1940s drought. The BoM stated that this difference is the local reflection of the global warming trend, which is substantially driven by the enhanced greenhouse effect. Australia and the Murray-Darling Basin have warmed by about 1ºC since the 1950s.[7]

3.11 Mr Don Blackmore gave evidence of a low ratio of average run off to rainfall in the Basin and emphasised the relationship between rainfall and run off is not linear. His evidence suggested that runoff is likely to be reduced at a much faster rate than any concurrent reduction in rainfall. Furthermore:

> As we know, a 10 per cent reduction in runoff does not relate to a 10 per cent change in the flow to South Australia—it is a 20 or 30 per cent change because of the cumulative effect.[8]

The pace of water reform

3.12 As a result of a range of initiatives flowing from the COAG water reform framework, states and territories have made considerable progress towards more efficient and sustainable water management. Through the National Water Initiative (NWI) a range of planning, policies and legal and institutional frameworks have been developed, providing the platform for the on-ground delivery of reform.

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5 Bureau of Meteorology (BoM), *Committee Hansard*, 26 September 2008, Written opening statement.

6 BoM, *Committee Hansard*, 26 September 2008, Written opening statement. See also *Submission* 71, p. 7.

7 BoM, *Committee Hansard*, 26 September 2008, Written opening statement.

8 Dr Don Blackmore, *Committee Hansard*, 9 September 2008, p. 91.

3.13 Significant action is still required to address overallocation, improve environmental management of water, and develop efficient water markets and trading mechanisms.[9]

3.14 In its March 2008 report to COAG, the Working Group on Climate Change and Water noted that:

> … while significant action is being taken by jurisdictions, in the face of a drying climate and rising demand, significant challenges remain. For example, current best estimates indicate the [Murray-Darling Basin] is expected to experience a fall in annual stream flow of 10-25% by 2050, with projections of up to 48 per cent by 2100. Moreover, in the absence of increased regulation, new estimates are that in the MDB alone, within 20 years a further 1200-3400 gigalitres of water will be intercepted annually by activities that currently do not require a water access entitlement, such as farm dams and bores and plantation forestry.[10]

3.15 COAG has since signed an Intergovernmental Agreement (IGA) on Murray-Darling Basin Reform. Under the IGA, governments commit to a new culture and practice of Basin-wide management and planning, through new structures and partnerships.[11] COAG has also initiated work to coordinate efforts in purchasing water for the environment, and enhance the effectiveness of water markets. COAG has also commissioned the development of a comprehensive new work program of water reform to address overallocation and improve environmental outcomes, including actions to address overallocation and improve environmental outcomes.[12]

3.16 As noted in chapter 2, under the *Water Act 2007* the new Murray-Darling Basin Authority is charged with preparing a Basin Plan for the integrated and sustainable management of water resources in the Basin. The Basin Plan is expected to play an important role in identifying responsibilities for managing risks associated with reductions in water availability and changes in reliability. A key element of that plan will be the introduction of sustainable and integrated diversion limits on groundwater and surface water extraction. The Basin Plan will be prepared in consultation with Basin states and communities and is expected to be in place in 2011.[13]

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9 Working Group on Climate Change and Water, *Report to Council of Australian Governments*, March 2008, p. 2, http://www.coag.gov.au/coag_meeting_outcomes/2008-03-26/docs/CCWWG_water_report.doc (accessed on 29 September 2008).

10 Working Group on Climate Change and Water, *Report to Council of Australian Governments*, March 2008, p. 9, http://www.coag.gov.au/coag_meeting_outcomes/2008-03-26/docs/CCWWG_water_report.doc (accessed on 29 September 2008).

11 Council of Australian Governments Communiqué, 3 July 2008, http://www.coag.gov.au/coag_meeting_outcomes/2008-07-03/index.cfm#water (accessed 29 September 2008).

12 Council of Australian Governments Communiqué, 26 March 2008, http://www.coag.gov.au/coag_meeting_outcomes/2008-03-26/index.cfm#water (accessed 29 September 2008).

13 Mr Robert Freeman, MDBA, *Committee Hansard*, 26 September 2008, p. 75.

3.17 Notwithstanding these initiatives, concerns remain that the pace of water reform in the Basin in particular is not adequate to address issues such as those currently faced by the Lower Lakes and Coorong.

Impact on the Lower Lakes and Coorong

3.18 The overall impact of the current drought and water extraction for consumptive use has been a dramatic fall in the level of fresh water in the lakes. Lake Alexandrina is now at its lowest recorded level.

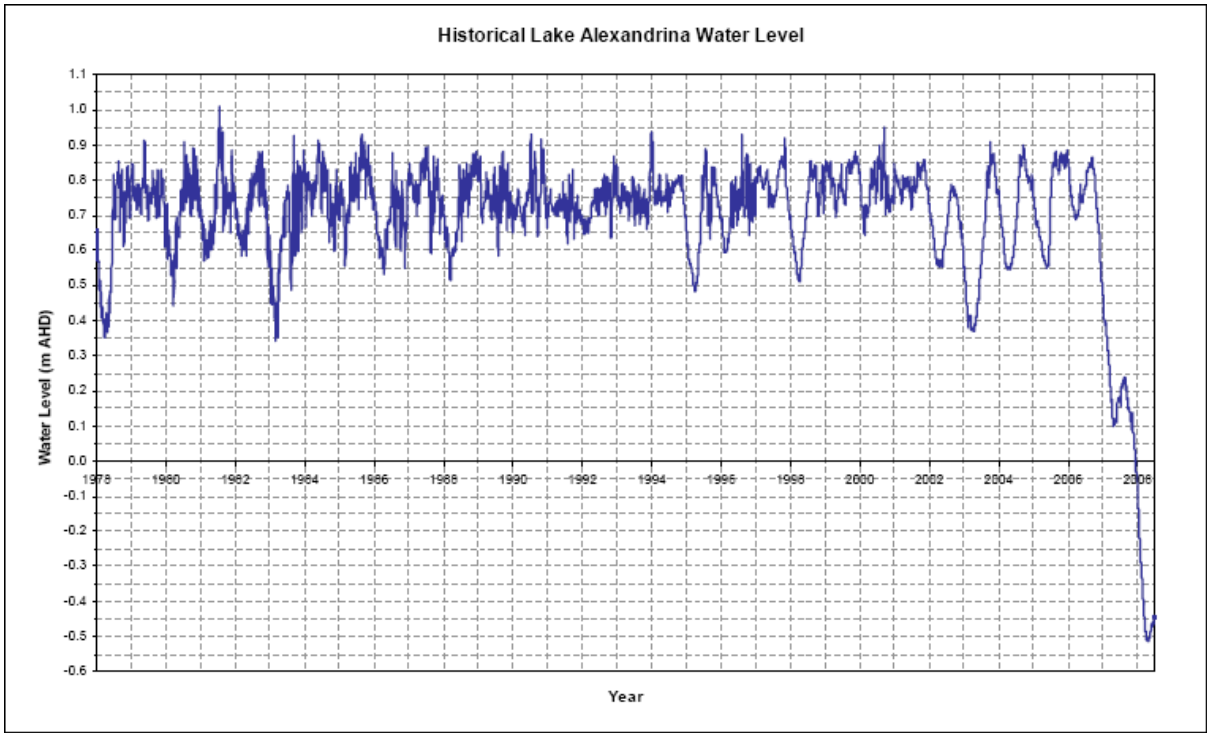

Fig. 3 Graph of Lake Alexandrina's levels since 1978[14]

3.19 In 2008-2009, the Murray-Darling Basin Commission estimates that 350GL of dilution flows for drinking water will flow into the lakes from the Murray. Some additional water will come from local rainfall and runoff from the Mt Lofty Ranges, but it is highly likely that water levels in the Lower Lakes will continue to fall and almost certain that there will be no release of lake water into the Coorong.

Lower Lakes

3.20 The low flows into the Lower Lakes have resulted in the drying of wetland habitat, steadily increasing levels of salinity and has exposed sulphur bearing sediments which have oxidised to form acid sulfate soils, releasing sulphuric acid into the lakes.

Acid sulfate soils

3.21 Acid sulfate soils are formed when anoxic waterlogged sulphur bearing sediments are allowed to dry out. Oxygen penetrates the soil, reacting with the sulphur

14 http://www.dwlbc.sa.gov.au/murray/drought/index.html (accessed 29 September 2008).

compounds, to form sulphuric acid. This acid is then washed out of the soil to form acid runoff. The acids also solubilise aluminium and heavy metals in the sediments.[15]

3.22 The Lower Lakes contain extensive areas of sulphur bearing sediments below 0.0 AHD. As the lakes' levels fall, the shallow bottom profile exposes extensive areas of lake bottom sediment, which oxidise to form acid sulfate soil. At the same time, the overall volume of water in the lakes available to dilute or 'buffer' the acid formed is reducing, resulting in a rapidly rising level of acidity in the lake. While small quantities of acid can be absorbed by the system, continued falls in lake levels have the potential to generate an exponential increase in acidity and consequent environmental collapse. [16] Dr Matt Hipsey described the problem:

> Our best understanding at the moment is that we have what we call a threshold event, where you would have a very large volume of acid sulfate soil which is increasing exponentially. We have a reducing volume of water to buffer that acidity. What happens is you have two exponential graphs superimposed on each other and you end up with a critical value where all of a sudden the lake can no longer withhold it. There is much uncertainty about when that threshold event occurs, but it does seem to occur as a threshold event. It is almost impossible to say what volume of water is going to be required. But if I were a risk averse manager, I would like to ensure that the water level was kept above negative one metre AHD.[17]

3.23 At the moment local rain and runoff from Mt Lofty Ranges has raised the level of water in Lake Alexandrina to approximately -0.26m AHD, but it has fallen as low as -0.55m in 2008. The critical level below which the impact of acid sulfate soils becomes catastrophic is uncertain, but general consensus places it at -0.5 AHD for Lake Albert and -1.0 to -1.2m AHD for Lake Alexandrina. Based on projections from September 2008, if there are no significant increases in inflows, these levels could be reached in mid to late 2009.

Salinity

3.24 Salinity levels in the lakes have been steadily rising. The Murray River deposits approximately 500 000 tons of salt in the lakes every year. With no outflow, this salt has been concentrated by evaporation. This has been exacerbated by seepage of saline groundwater. With the lake level substantially below sea level, sea water has been seeping through sandy sediment, particularly under the Goolwa Barrage. The net effect has been steadily increasing salinity levels. On 23 September, when Lake Alexandrina was at -0.29m AHD, salinity was measured as 4044EC[18] at Milang and

15 Rob Fitzpatrick, Steve Marvanek, Paul Shand, Richard Merry and Mark Thomas, *Acid Sulfate Soil Maps of the River Murray below Blanchetown (Lock 1) and Lakes Alexandrina and Albert when water levels were at pre- drought and current drought conditions,* CSIRO Land and Water Science Report 12/08, February 2008.

16 Dr Matt Hipsey, *Committee Hansard,* 19 September 2008, p. 54.

17 Dr Matt Hipsey, *Committee Hansard,* 19 September 2008, p. 54.

18 EC – Electrical Conductivity, a quick and easy, but not completely accurate measure of salinity.

16 915 at Goolwa, although several witnesses referred to measurements as high as 25 000. [19]

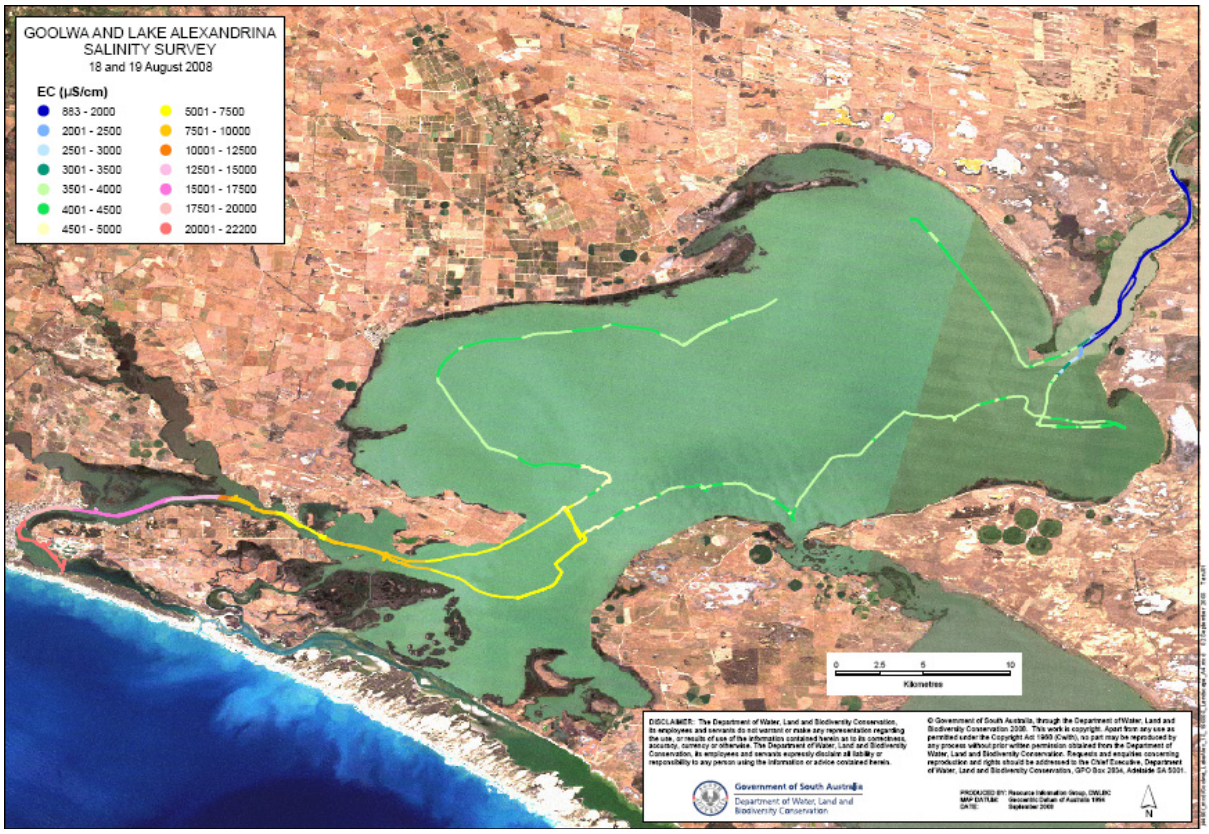

Fig 4 Plot of salinity levels measured in Lake Alexandrina.[20]

3.25 These rising salinity levels are affecting the fresh water ecosystem of the lakes. Fresh water plant and marine life are suffering from the increasing salinity and more estuarine and marine species are appearing in the lakes.[21]

3.26 Increased salinity has also rendered the lake water unsuitable for human consumption for irrigation or watering stock.

The Coorong

3.27 Under natural conditions, the Coorong received significant fresh water inputs from the Murray, the water courses of the southeast of South Australia and the regional groundwater. As a result the Coorong was regularly flushed with fresh water inputs from both the north and the south which would have reset the estuarine

19 http://data.rivermurray.sa.gov.au/ (accessed 23 September 2008). For the higher figure see Minister Maywald, *Committee Hansard,* 19 September 2008, p. ****. Water above 2500EC is not regarded as suitable for human consumption or irrigation except for salt tolerant plants. Pigs, poultry and dairy cattle can tolerate water up to 10 000EC. Sea water is approximately 50 000EC.

20 http://www.dwlbc.sa.gov.au/murray/drought/index.html (accessed 29 September 2008).

21 A much publicised example has been the appearance of a bristle worm which attaches to the shells of freshwater turtles, weighing them down and eventually killing them.

conditions and replenished its nutrient and organic matter. Under current conditions, flows from the Murray have been the major fresh water inputs to the Coorong because of extensive drainage of the southeast and alterations to the regional groundwater system.[22]

3.28 Salinity distribution in the Coorong is determined by evaporation, mixing of water both within and between lagoons, fresh water inputs via barrage releases and ground water. In the Coorong, the silting up of the mouth has resulted in reduced tidal exchange, particularly into the South Lagoon. When coupled with a reduction of fresh groundwater seepage and a reduction in runoff from the upper southeast drainage scheme area, steady evaporation has resulted in worsening hypersaline conditions which are exceeding the levels that even the specialised ecosystems in this area are able to cope with.

3.29 In 2005-06 it was noted that more than 75 per cent of the Coorong has salinities greater than double that of sea water (>110 000EC) with salinities reaching up to seven times sea water (>380 000EC) in the South Lagoon. Salinities of 100 000EC are a critical threshold for many ecological components and processes. The length of time that salinities of this magnitude persist determine the extent of the damage caused as most species can tolerate only short periods of less than 30 days exposure to high salinities.[23]

Economic and social impact

3.30 The Lower Lakes and the Coorong form the basis of the local economy and contribute significantly to the South Australian economy. The area surrounding the Coorong and Lower Lakes supports extensive economic industries including irrigated and dryland agriculture, commercial fishing and cockle harvesting, tourism, and some urban developments. Each of these activities is in some way dependent upon, and at the same time has an impact on, the ecological health of the system.[24]

3.31 The committee received a range of evidence that stressed the significance of the Lower Lakes and the Coorong to local industries:

> Until recently, the Lower Lakes and the Coorong supported a thriving dairy industry, irrigated horticulture, fodder production and beef cattle production. [25]

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22 MDBC, *Lower Lakes, Coorong and Murray Mouth Icon Site Environmental Management Plan 2006-07*, p. 25, http://www.thelivingmurray.mdbc.gov.au/publications#pub_icon (accessed 29 September 2008).

23 MDBC, *Lower Lakes, Coorong and Murray Mouth Icon Site Environmental Management Plan 2006-07*, p. 2, http://www.thelivingmurray.mdbc.gov.au/publications#pub_icon (accessed 29 September 2008).

24 MDBC, *Lower Lakes, Coorong and Murray Mouth Icon Site Environmental Management Plan 2006-07*, p. 21, http://www.thelivingmurray.mdbc.gov.au/publications#pub_icon (accessed 29 September 2008).

25 Cr Strother, Mayor of Coorong, *Committee Hansard,* 19 September 2008, p. 47.

> Between Goolwa and Wellington, there is a $100 million a year boating-tourism industry. We have within our council area some 8,000 hectares of vines, which on average is about an $800 million a year industry.[26]

3.32 The Lower Lakes, and Coorong region is also of high cultural, economic, spiritual and social value to the Ngarrindjeri people. The Ngarrindjeri are the traditional owners of the region and maintain a continuous, strong relationship with their land and waters.[27]

3.33 However, the exposure of acid sulfate soil threatens an environmental collapse in the Lower Lakes. The Ramsar listed wetlands could be irreparably damaged. Local communities which rely on tourism, fishing and the dairy industry are already suffering and would be further damaged.

3.34 In the Coorong, increasing hypersalinity will reduce biodiversity, accentuating the damage to the area's natural value and the commercial fishing industry.

3.35 The town of Goolwa is particularly dependent on boating and the current low levels in the Lake Alexandrina have already rendered the majority of its dock facilities useless.

Current management of the Lower Lakes and Coorong

The Living Murray Initiative

3.36 As mentioned in the previous chapter, the Lower Lakes and Coorong, together with the Murray Mouth, has been identified as one of six Icon Sites under the Living Murray Initiative. The Living Murray Initiative includes a water recovery target of an average of 500GL of new environmental water per year by 2009. This is being achieved through a coordinated effort by the state and federal governments and the MDBC using a combination of infrastructure, regulatory, urban and market based water recovery projects.[28]

3.37 To date 133GL of water entitlements has been recovered under the Living Murray Initiative; however, the actual volume of water available at any time is dependent on the allocations. At present there is only 1.218GL of water available to the environment in 2008-09 although this may increase modestly if higher allocations are announced against entitlements this water year. These low allocation figures affect both irrigation and environmental entitlements equally.

3.38 Environmental watering of Icon Sites has been managed under the Living Murray Environmental Watering Plan since 2005-06. This plan provides for coordinated watering at Icon Sites, regardless of the type of environmental entitlement

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26 Mayor McHugh, Mayor of Alexandria Council, *Committee Hansard,* 10 September 2008, p.100.

27 MDBC, *Lower Lakes, Coorong and Murray Mouth Icon Site Environmental Management Plan 2006-07*, p. 10, http://www.thelivingmurray.mdbc.gov.au/publications#pub_icon)accessed 29 September 2008).

28 MDBC, *Submission* 76, Part 2, p. 11.

or source of water. A limited amount of watering has been undertaken during 2006-07 and 2007-08 but the MDBC considers that this has 'demonstrated that excellent, though localised, environmental outcomes can be achieved where water is actively provided and managed for environmental outcomes.'[29]

MDBC Ministerial Council Initiatives

3.39 In March 2008 the MDBC Ministerial Council (the Ministerial Council) approved the Lake Albert Water Level Management project at a budget of $6 million. A temporary structure has been built to separate the lakes and pumping from Lake Alexandrina to Lake Albert commenced on 2 May 2008.

3.40 The Ministerial Council also directed the MDBC to develop risk management strategies and future management options for the Coorong and Lower Lakes and to report to Council in October 2008. The Ministerial Council has agreed to the following short term management objectives (defined as the next 6-24 months):

- Avoid irreversible damage, especially acidification of the Lakes system;
- Actions taken must not adversely impact on water quality for major water supply offtakes.
- Use treatments that as far as possible do not compromise long-term options.

3.41 To achieve these management objectives, South Australian agencies have developed critical acidification thresholds and water level management triggers. The modelling for these thresholds and triggers is being regularly reviewed against actual data to improve its predictive capacity.

3.42 A draft real time management strategy for 2008-09 is currently being considered by Ministerial Council. This strategy is being supported by a number of ongoing activities including regular review of lake levels, water quality and acidification data and forecasting of the projected date to reach the water level management trigger. Field trials are also being undertaken in relation to the potential for bioremediation to manage localised acid affected areas.

3.43 The MDBC also advised the committee that longer term options have been identified in relation to three scenarios:

- a fresh water Lakes system;
- a variable Lakes system (fresh with times of estuarine at low flow); and,
- a marine/estuarine Lakes system.

3.44 The MDBC told the committee that these scenarios will be developed in the light of long term water availability, climate change, and sea level rise forecasts. The identification of the potential risks of each scenarios will be identified and assessed including the impact of sea water on environmental, economic and social values should an estuarine/marine system be seen as a possible future. The first report on the development of these longer term options is expected to be provided to the MDBC and the Ministerial Council in early 2009.[30]

29 *Submission* 76, Part 2, p. 11.

30 *Submission* 76, Part 2, p. 13.

Commonwealth Government Initiatives

3.45 Under the Water for the Future initiative the Australian Government recently announced $320 million in Commonwealth funding. This includes:

- $120 million towards the piping of fresh water supplies to take to dependant communities and
- $200 million towards the development of a long term plan to address the environmental issues facing the Lower Lakes and Coorong.

3.46 The Water for the Future program has also allocated $3.1 billion for the purchase of water entitlements to be held by the Commonwealth Environment Water Holder, together with other initiatives which will also see the water efficiencies return to the rivers.

Chapter 4

Emergency Water (Murray-Darling Basin Rescue) Bill 2008

Introduction

4.1 On 28 August 2008, the Senate, on the motion of Senator Nick Xenophon, referred the Emergency Water (Murray-Darling Basin Rescue) Bill 2008 (the bill) to the committee for inquiry and report by 30 September 2008, in conjunction with the inquiry into water management in the Coorong and Lower Lakes.

Provisions of the bill

4.2 The purpose of this bill is to ensure the environmental and economic sustainability of the Murray-Darling Basin by empowering the minister and the Murray-Darling Basin Authority to establish an Interim Basin Plan as an emergency measure, until such time that a Basin Plan is adopted under the *Water Act 2007*.[1]

Powers of the minister in relation to management of Basin water resources

4.3 Part 2 of the bill gives the minister the power to direct the Murray-Darling Basin Authority to prepare an Interim Basin Plan and to make decisions about how best to allocate water, and to share, manage and allocate the Basin water resources as well as manage all processes that may adversely affect them.

> In this respect, the Minister will also be responsible for determining the share of water that is needed to maintain essential system functions and water quality, the share of the remaining non-flood water to which a Basin State is entitled and, the share, if any, to be granted to the environment as a clearly identifiable and inalienable entitlement to a water allocation in the water resource plan area.[2]

4.4 The bill prohibits persons or agencies of states from limiting or impeding the transfer or sale and purchase of water access entitlements, water access rights and water allocations among Basin states. It also proscribes any state or territory from acting in a manner inconsistent with an Interim Basin Plan or a determination made under the bill.

4.5 Thirdly, the bill prohibits constitutional corporations from undertaking activities that impede the flow of water from the Murray-Darling or taking part in activities that divert or significantly intercept water from the system.

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1 Explanatory Memorandum, Emergency Water (Murray-Darling Basin Rescue) Bill 2008, p. 2.

2 Second Reading Speech, Emergency Water (Murray-Darling Basin Rescue) Bill 2008.

4.6 Fourthly, the bill allows the minister to acquire, on just terms, a proportion or all of a water access entitlement or a water access right in a water resource plan area, or any land associated with an acquired water access entitlement or an acquired water access right if appropriate.

4.7 Fifthly, the bill addresses the issue of taxation schemes that are detrimental to the management of Basin water resources by requiring the ACCC to inquire into the effects of arrangements in the *Income Tax Assessment Act 1997* on the water market, and on the nature of irrigation practice and investment.

4.8 The bill also addresses the issue of states that fail to comply with an Interim Basin Plan by reducing their share in the Basin water resources by ten times the quantitative effect of that failure to comply. It also enables the minister to apply an injunction against a Basin state that continues to fail to comply.[3]

Issues raised by the bill

Interim plan

4.9 The *Water Act 2007* has already established the Murray-Darling Basin Authority (MDBA, the Authority), reporting to the Minister for Climate Change and Water and requires it to prepare a strategic plan for the integrated and sustainable management of water resources in the Murray-Darling Basin. This plan is referred to as the Basin Plan and will be available in 2011, and a draft plan will be out at the beginning of 2009.[4]

4.10 The committee is not persuaded that an additional act is necessary to direct the Authority to prepare an interim plan, given that a draft of the final plan will be completed soon and that accelerating such a complex process is not likely to result in a useful document. The head of the MDBA outlined the current timeframe for a draft plan and the complexity of the task:

> To satisfy the statutory requirements of the Water Act, we will need to have a draft plan out by the end of next year in order to meet the 2011 date. There are 16 weeks of public consultation; there is statutory consultation with states et cetera. We will have a draft plan to meet that 2011 date developed by 2009. It is the issue about tactics versus strategy, isn't it? The there is clearly a crisis in the Lower Lakes clearly, and we need to be able to respond. The Basin Plan is a strategic document which is trying to make quite explicit those trade-offs between social, economic and environmental assets. That has never been done explicitly. At the moment, we are seeing environmental assets deteriorate and communities implode. We need to make some hard decisions on whether we can sustain all the environment or whether we can sustain all the economy that is currently reliant on that river

3 Second Reading Speech, Emergency Water (Murray-Darling Basin Rescue) Bill 2008.

4 Mr Robert Freeman, Murray Darling Basin Authority (MBDA), *Committee Hansard* , 26 September 2008, p. 75.

> system. That is why it is such a long-run issue. To identify in a year all the social, economic and environmental assets of the basin, the water requirements that are necessary to sustain those and then have quite an explicit trade-off process, not only within classes that say, 'This bit of the environment is more important than another bit of the environment,' but across classes—between the environment and economic classes, for instance. That is what the Basin Plan is on about. I think it is fair to say that it is a planning task that has never been undertaken at that level of complexity in the world.[5]

4.11 The NSW Irrigators Council expressed their opinion of the feasibility of the proposed interim plan:

> In terms of the preparation of a basin plan within 30 days, the time frame is absolutely outrageous at best. It is simply not possible to engage in the level of scientific, social and economic work needed to prepare a plan for managing water across the basin in that time frame. I think that is recognised by the process that the current Water Act sets out, requiring a basin plan to be in place, I understand, by 2012. That time frame, in and of itself, is reasonably short to achieve the massive ends that the Water Act sets out. We do believe it is achievable, but it certainly cannot be done within 30 days.[6]

4.12 The committee also heard that the MDBC has the authority to take action in the short term to deal with immediate environmental issues.[7]

Acquisition of rights and entitlements

4.13 The government is already acquiring water entitlements on the open market under the guise of the Commonwealth Environmental Water Holder. The bill would extend this power to allow compulsory acquisition.

4.14 Attitudes to compulsory acquisition differed among farming groups, with some opposed and others feeling it would depend on the terms offered.

> The New South Wales Irrigators Council is unanimously opposed to compulsory acquisition and notes the position of the national irrigators council, which is also unanimously opposed to compulsory acquisition. We do not believe that compulsory acquisition will provide any solutions that market activity cannot.[8]
>
> We are certainly opposed to compulsory acquisition. Irrigators have a property right to water entitlements. There is a market and trade there. The

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5 Mr Robert Freeman, MDBA, *Committee Hansard*, 26 September 2008, p. 75.

6 Mr Andrew Gregson, New South Wales Irrigators Council, *Committee Hansard,* 9 September 2008, p. 33.

7 Dr Wendy Craik, MDBC, *Committee Hansard*, 26 September 2008, p. 75.

8 Mr Gregson, *Committee Hansard,* 9 September 2008, p. 33.

> devastation of having carryover water suspended in New South Wales—it was 52 per cent of our carryover water in 2006—was caused by government interference in the market. That water was carried over water or water that people had gone out in the market and bought to set up their own drought management strategy. To have the government then pull the rug out from under them really did interfere with that market and the confidence people had that they could manage their own risk and security by entering the market.[9]
>
> It depends on equity in compensation for people and it has to be a good outcome. It has to be more than feel-good….but it is about getting good outcomes. No farmer wants to be sold up or compulsorily acquired. The reality is, and it has happened in the South-East, that industries fail and one way or another people are given an opportunity to get out of industries with some dignity. It happened in the South-East with the MIS schemes which we bitterly opposed, but there were good outcomes from them. [10]

4.15 The issue of assessing 'just terms' in the context of water rights appears to need greater clarification. The loss of a water right is likely to affect property values and the viability of local communities in far reaching ways. Any proposal to compulsorily acquire water rights would need to take these impacts into account.

4.16 The committee also notes that the bill would not, in its current form, allow acquisition of current allocations or physical water in storages. As a result the exercise of this power might not have the intended effect of returning water to the system immediately.

4.17 The committee agrees that a more efficient water market would be of considerable benefit in terms of managing the basin.

Failure to comply

4.18 The committee regards the bill's proposed mechanism to ensure compliance – reducing a state's share of basin water resources by ten times the quantative effect – is problematic. The end result of such an act would potentially be to punish water end-users in a devastating way, for an action by a state government which is beyond their control. The bill also proposes punishing state governments for failing to comply with an interim plan, however, the bill does not allow or require consultation with or approval by those state governments.

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9 Mr Stewart Ellis, Murray River Irrigation, *Committee Hansard,* 19 September 2008, p. 15.

10 Mr Kent Martin, South Australian Farmers Federation, *Committee Hansard,* 10 September 2008, pp 88,89, (MIS – Managed Investment Scheme).

Chapter 5

Possible Solutions

Introduction

5.1 The fundamental long term solution to the problems being experienced by the Lower Lakes and the Coorong is an end to the current drought, but the urgency of the current situation in the Lower Lakes requires immediate action to ensure the system survives until that time. There are only three basic options for the system, increase fresh water flows, admit sea water into the Lower Lakes or allow part or all of the lakes to dry completely and remediate the acid sulfate soil.

5.2 The focus of the inquiry's terms of reference have been on obtaining additional fresh water for the lakes, but the problem of potential acidification appears to outweigh the possible environmental damage from salinity. Consequently the committee has also examined the possibility using sea water to address the problem.

5.3 The Department of Environment, Water, Heritage and the Arts (DEWHA) submission examines, in addition to its ongoing pumping program for Lake Albert, the following options:

- releasing water from the Menindee Lakes;
- purchasing temporary and permanent water from private storages on the Darling;
- purchasing allocations and carryover water from irrigators;
- obtaining water from the Snowy scheme;
- using water from the Living Murray and other Government purchased water;
- opening the barrages to allow sea water into the lakes; and
- delivering Coorong water to Lake Albert while maintaining Lake Alexandrina with fresh water.

5.4 These options are examined below, along with the Wentworth Group's suggestion that Lake Albert be decommissioned, allowed to dry and remediated.

Increase fresh water flows

5.5 Increased fresh water flows are a solution which involves the least impact on the lakes and offers the most desirable option for local residents and water users. Increased fresh water flows, should they become available, would reduce the salinity problem, prevent the formation of acid sulfate soils and preserve the fresh water character of the lakes.

5.6 The amount of fresh water required depends on the management objective and the level of evaporation experienced by the lakes. The options for managing levels are to slow the rate at which the lakes' levels are falling to keep them above the critical acid sulfate threshold, maintain them at the current level, return the lakes to a sustainable height or to raise them back to an operating height to allow releases of water to the Murray Mouth. Options which raise the lakes' levels also increase their surface area and therefore increase the quantity of water which evaporates.

5.7 Estimates of evaporation vary. The Murray-Darling Basin Commission (MDBC) uses standard evaporation pan methodologies and a pan evaporation coefficient of 0.85 to develop its estimates.[1] However several submitters cite a paper by Bruce Brooks and Mike South which claims this over-estimates losses, leading to higher estimated requirements. A lower figure for evaporation would reduce the amount of fresh water required. As a result the MDBC figures adopt a figure appropriate for worst case scenario planning.[2]

5.8 Under current plans, the MDBC has earmarked 350GL of dilution flows for drinking water which will flow into Lake Alexandrina. The MDBC's modelling indicates that at this level of flow, the lake level will have dropped to approximately -0.75m AHD – the verge of acidification – by the end of June 2009 if the weather is an average year. Lower rainfall and runoff or higher evaporation will see lower levels reached sooner.[3]

5.9 Estimated requirements for additional fresh water inflows range from a minimum of 10GL, to keep the lakes above the indicative acidification threshold, up to approximately 950GL to get the fishways in the barrages functioning again.[4]

5.10 At this point in time and with worst case assumptions of net inflow, local rain and net losses, up to 10GL of additional fresh water would be required to hold lake levels above an indicative critical threshold, and would increase the likelihood that the level will remain above the critical threshold for acid sulfate soil until next winter.

5.11 The MDBC estimates that a total of 830GL would be required to return the lakes to sea level by June 2009, under average conditions. 1300GL would be required to raise the lake to a level where the fishways could be operated and a flow of 550GL would be required to operate them for 12 months. A further 180GL (a total of 730GL

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1 DEWHA, *Answer to question on notice,* received, 2 October 2008.

2 Bruce Brooks and Mike South, *Applying a Localised Water Balance approach to estimate losses from Lake Alexandrina and Lake Albert for the years 1970 to 2006*. Cited in several submissions, See, for example Mr M. Williams MP, *Submission* 24, and Ms Liz Yelland, *Submission* 32.

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

4 See the Hon Karlene Maywald, Minister for the River Murray and Minister for Water Security, *Committee Hansard,* 19 September 2008. See also *Submission* 76.

per annum) through the barrages would be required to be sure of keeping the mouth of the Murray open to assist with tidal flows into the Coorong.[5]

5.12 The phenomenon of transmission losses complicates the issue of calculating how much water needs to acquired upstream. According to Dr William Young of the CSIRO, transmission losses are highly variable and are affected by the quantity of water released, the time of year the release takes place, the amount of water already in the system and the condition of the river system and surrounding floodplains.[6]

5.13 As a general rule of thumb, the further from the lakes water is released into the system, and the smaller the amount released, the more will be lost. Losses could be as high as 80 to 90 per cent for small quantities released into the system at the far upper reaches.[7]

5.14 Conveyancing water is a mechanism to counteract transmission losses. The New South Wales Department of Water and Energy stated that there was sufficient conveyancing water in the system to ensure that water purchased on the water market could be delivered.[8] However for the release of large volumes, the conveyancing water currently in the system would not be sufficient to cover transmission losses.

5.15 The CSIRO has developed a model which can predict transmission losses and have offered to make it available,[9] but the committee was not able to employ this resource in the time available. Table 2 in the MDBC submission also provides an indication of transmission losses for rivers in the system which draws on CSIRO modelling.[10]

Committee view

5.16 The committee notes the results of the modelling indicate that, as a result of recent increases in the lakes' levels, the Lower Lakes are likely to remain above the acidification threshold with the addition of a maximum of 10GL of either fresh water or sea water between now and next winter (June 2009).

5.17 Should the introduction of sea water be considered the committee notes that public consultation and a process of environmental impact assessment would be required. This should inform an application for approval under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

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5 *Submission* 76, p. 4.

6 Dr William Young, CSIRO, *Committee Hansard,* 9 September 2008, p. 24.

7 Dr Young, *Committee Hansard,* 9 September 2008, p. 24, and several other submissions and witnesses.

8 Mr David Harriss, NSW Department of Water and Energy, *Committee Hansard,* 18 September 2008, p 32.

9 Dr Thomas Hatton, CSIRO, *Committee Hansard,* 9 September 2008, p. 16.

10 *Submission* 76, p. 10.

5.18 The committee notes that the Lower Lakes do not appear to have any dedicated environmental entitlement or allocation of their own, but depend on dilution flows for drinking water and the volume of this dilution flow depends on the salinity of the Murray. This is not dissimilar to environmental flow arrangements for other identified environmental assets, including Ramsar sites, across the Murray-Darling Basin.

5.19 The committee notes that the allocation of scarce environmental water often involves considerable trade offs with competing environmental uses. In determining how much water will need to be required for any environmental sites including the Lower Lakes and Coorong, transmission losses and the needs of other environmental assets need to be accurately determined and factored in to planning.

Rainfall

5.20 The problems in the Lower Lakes are primarily the result of the current drought, and management scenarios are heavily influenced by how long it will be before there is enough rain to deliver adequate flows to the Lower Lakes.

5.21 According to the BoM, neither 'la Nina' nor 'el Niño' are expected in 2009. The rainfall expectation in the north of the Basin is better than average, with a probability in excess of 70 per cent that the north will receive a wetter than average year. However, the probability of good rain drops progressively across the Basin towards the south. Across the Basin as a whole, there is at best a 50 per cent chance of reasonable rainfall and less than 50 per cent in the southern part of Basin.[11]

5.22 The committee notes the phenomenon of proportionally lower runoff currently being experienced will also reduce the flows generated by any additional rain.

5.23 A substantial increase in flows into the upper reaches of the system as a result of snowmelt appears unlikely. Both the BoM and Snowy Hydro Ltd indicated that there is limited good data on snow in Australia, but the indication is that the current snow pack is quite modest in extent, below long term averages and there has already been extensive melting.[12]

5.24 The BoM is not able to say whether the current drought is linked to human induced climate change. The BoM has identified a temperature rise consistent with climate change models across the Basin, but linking this to long term rainfall patterns is currently beyond the capability of its predictions. Long term modelling indicates southern Australia will experience a reduction in rainfall. The current drought is not

11 Dr David Jones, BoM, *Committee Hansard,* 26 September 2008, p. 3.

12 Dr Jones, *Committee Hansard,* 26 September 2008, p. 5 and Mr David Harris, Snowy Hydro Ltd, *Committee Hansard,* 26 September 2008, p. 99.

entirely consistent with the projections, but is certainly an indicator of what could be experienced.[13]

5.25 However, CSIRO expert opinion is that the current drought does have some characteristics of human induced climate change. [14]

Committee view

5.26 The committee notes that rainfall sufficient to generate enough runoff to increase flows at the lakes end of the system is unlikely in the near future. The committee accepts that human induced climate change may well be a factor in the current drought. The committee understands the current models predict a dryer future for the basin, which will make reform for the levels of diversions permitted under the Murray-Darling cap more pressing.

5.27 The committee particularly notes that current science predicts the possibility of a 25 – 50 per cent reduction in runoff in the Murray Darling Basin over the next 50 years, which could lead to 5900 to 12,000GL less water available to the river system.[15]

5.28 There are several possible sources for additional fresh water for the Lower Lakes and the Coorong. The Murray River is the most significant source, but the recent rise in lake levels indicate that other sources such as local rainfall runoff from the eastern Mt Lofty Ranges need to be considered and in the longer term even more capital intensive options such as groundwater or desalination could play a part.[16]

The Murray-Darling

5.29 The Lower Lakes receive the majority of their water from the Murray. Submissions to the inquiry indicate there is a popular perception that a major

13 Dr Jones, *Committee Hansard,* 26 September 2008, p. 8.

14 Dr Hatton, *Committee Hansard*, 9 September 2008, p. 11.

15 ABS 4610.0.55.007 *Water and the Murray-Darling Basin: A Statistical Profile 2000-01 to 2005-06*, p.13 and CSIRO *Rainfall-runoff modelling across the Murray-Darling Basin: A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project.*

16 The committee received some submissions with alternative sources and solutions which arrived too late for detailed consideration, these included short term solutions, such as using tankers to move water from northern Australia – see Professor Allan Barton, *Submission 79* – and longer term proposals for reducing water requirements in agriculture through biodynamic techniques – see Biodynamic Agriculture Australia, *Submission 80*.

contributing factor to the lakes' current low levels is overallocation of water for irrigation and the unnecessary storage of water for 'Human critical needs' upstream.[17]

5.30 There is considerable uncertainty about how much water is actually available across the basin. An audit is under way but definitive figures are not available. DEWHA state in their submission that as at 19 September there was 4378GL in storage and 4359GL committed,[18] whereas more recent MDBC figures identify 5840GL of active storage,[19] reflecting recent rainfall. However, despite uncertainty of the likelihood of significant rainfall in coming months, there is broad consensus that storage volumes are very low and the available water will be required for high priority needs. There is unlikely to be enough water in the system to achieve the flows necessary to achieve a significant increase of fresh water flows into the Lower Lakes.

5.31 The quantity of water held in on-farm storages is unknown. The MDBC has made a rough assessment, based on estimated water harvest and estimated water use in the summer 2007-08 but this is a rough guideline only. Very little of this water is available on the water market and it would be difficult to extract it from these storages and return it to the river. In the northern Basin, transmission losses associated with any release from on-farm storages would be high. In the southern Basin, the vast majority of on-farm storages are extremely small (farm dams).

5.32 The perception that there is surplus water upstream that could be used to save the Lower Lakes appears to be unfounded. Many witness spoke of there being a case of 'robbing Peter to pay Paul' if water was to be found from within the Murray Basin. Professor Richard Kingsford told the committee:

> I think the Menindee Lakes issue is an interesting one in that we need to be careful that we are not robbing Peter to pay Paul. There are issues about trying to move water very efficiently through that system. But that could impact on the ecology of Kinchega National Park, particularly large channels that have been considered for doing that. I think ecologically Kinchega National Park and Menindee Lakes are very important from a wetland point of view and for water birds and fish and so on. They have been dry for some time as a result of less water coming to them from upstream in the same way as the Lower Lakes are feeling that pressure.[20]

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17 The committee notes the loose usage of the term 'overallocation' and believes this needs to be clarified. In the committee's view, overallocation has been used to describe the excessive issuing of water entitlements – which the current government's buyback program is intended to address; the allocation of too much actual water to high priority users – such as permanent planting and human critical needs; and over-harvesting of unregulated flows, such as overland flows.

18 DEWHA, *Submission* 1, p. 5.

19 MDBC, *Submission* 76, p. 6.

20 Professor Richard Kingsford, *Committee Hansard,* 19 September 2008, p. 6.

5.33 Professor Kingsford went on to describe some of the other areas that may be impacted in 'robbing Peter to pay Paul':

> Think of all the river Basins internally within the Murray-Darling. Most of them have a major wetland at the end of them. The Border Rivers used to have magnificent wetlands. I think they do not any more. Obviously the Gwydir used to have an important wetland system and then the Namoi less so. The Macquarie obviously has the Macquarie Marshes. The Darling has its own wetland system when the water gets up, the Menindee probably being the key one. There is a string of lakes there that are very important. The Lachlan has both the Cumbung Swamp right at the bottom and the Booligal wetlands, which is an offshoot that heads west. Then, of course, you get to the Murrumbidgee, and it has this magnificent wetland that was once near Balranald called the Lowbidgee. The River Murray obviously has all of the icon sites of Barmah and Chowilla Forest et cetera. From the north, obviously, the Condamine-Balonne has Narran Lakes and the Lower Balonne system and Culgoa National Park. If you go further west, the Warrego has the Cuttaburra and the Paroo overflow and Currawinya Lakes. So, if you like, there are as many jewels on the Lower Lakes on other river systems from an environment point of view that are probably every bit as important but have not had the attention. They may be in just as bad a state as the Lower Coorong.[21]

5.34 Dr Arlene Buchan of the Australian Conservation Foundation also highlighted the legitimacy of the claims of non-environmental water users to a water allocation. She said:

> The key users across the Murray-Darling Basin are irrigators, dryland farmers, flood plain graziers, the environment, towns and cities. Those are the categories. In terms of privatising, we are all legitimate users of that water. There is a lot of conflict within the use of that water, but they are all legitimate users. There is no room for any of those users to say that the rights of the others should be squashed. We are all legitimate users. But the level of water use currently means that the condition of the entire catchment is degrading such that the beneficial use that all of those users are taking is in decline.[22]

5.35 The committee heard extensive evidence during hearings regarding the capture of overland flows.[23] This issue is important for the future management of the river, and needs to be addressed in a systematic manner to avoid future repeats of the current situation. Excessive collection of overland flows is likely to limit the benefit of a major rainfall event on environmental sites lower down the Murray, but does not

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21 Professor Richard Kingsford, *Committee Hansard,* 19 September 2008, p. 6.

22 Dr Arlene Buchan, Australian Conservation Foundation (ACF), *Committee Hansard,* 26 September 2008, p. 26.

23 See the Queensland Department of Natural Resources and Water evidence, *Committee Hansard*, 9 September 2008; and Professor Kingsford, *Committee Hansard* 19 September 2008.

provide a potential source of additional fresh water to solve the lakes' immediate problems. It will be examined in more detail in the second phase of the inquiry.

Acquisition of water on the temporary water market

5.36 While there are a variety of programs in place to purchase water entitlements, such as the Living Murray and other Commonwealth Environmental Water Holder programs the very low allocations mean that while the purchase of these entitlements will assist in mitigating the impact of future dry years and assist in the management of the river, very little water will be available in the near future to return to the system.

> You can come to Murray Irrigation and buy 1½ million water entitlements and, sadly, carry it home in your briefcase because it is only a piece of paper.[24]

5.37 For example, while the recent acquisition of Toorale will return an average of 20GL of water to the river system, there is only a small amount of water actually stored on the property at the moment which could conceivably be returned to the river. The DEWHA submission states that as a result of low allocations across the board, the total volume of purchased water available this year was likely to be in the order of 5 to 6GL,[25] most of which is unlikely to reach the Lower Lakes, if it were decided to use this water for that purpose.

5.38 While the river is probably 'overallocated' in terms of water entitlements issued, actual allocations of water have been very low. Mr David Harriss, Deputy Director General of Water Management within the NSW Department of Water and Energy told the committee:

> For example, in New South Wales our high- security users in the Murray Valley now have 50 per cent of entitlement. Our high-security users in Murrumbidgee valley have 75 per cent of entitlement. By comparison, the Victorian Murray Valley users have six per cent of entitlement. The Victorian Goulburn valley users have four per cent of entitlement. In South Australia they have 11 per cent. At the same time, however, our general security users, which constitute most of our opportunistic water use, have zero per cent allocations. In the Murray valley this will be the third year straight of zero allocations.[26]

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24 Mr Stewart Ellis, *Committee Hansard,* 19 September 208, p. 15.

25 *Submission* 1, p. 8.

26 Mr David Harriss, NSW DWE *Committee Hansard,* 18 September 2008, p. 24.

5.39 DEWHA provided the following statistics in its submission.[27]

		Allocation (%)	**Water (GL)**
NSW Murray	High security	50	90
	General security	0	0
NSW Murrumbidgee	High security	75	259
	General security	0	0
NSW Darling	High security	100	8
	General security	0	0
Vic Murray	High reliability	6	71
	Sales water	0	0
Vic Goulburn	High reliability	4	40
	Sales water	0	0
SA Murray (effective 1 October)	All	11	63
Total water			**531GL**

5.40 Because general security allocations are extremely small, and high security allocations are less likely to be sold, the volume of water available on the market is quite low. According to a water market report from www.waterexchange.com tabled by the Bondi group, 39 983 megalitres (ML) were on the temporary market on 15 September 2008.[28] The committee did not receive any evidence as to whether and to what extent a higher price for water would lead to more water appearing on the temporary market.

5.41 Water in private storages in the Darling was identified by DEWHA as a possible source of additional fresh water.[29] A sufficiently high price for water might lead to some of this water becoming available. The committee notes, however, that

27 *Submission* 1, p. 7.

28 *Water Market Report: Spot Allocations as at 15 September 2008,* tabled by Ms Mattila, 19 September 2008.

29 *Submission* 1, p. 6.

this water would be difficult to extract from its current storages and return to the river, and would suffer badly from transmission losses before reaching the Lower Lakes.

5.42 The four per cent cap on trading presents an impediment to using the open market to obtain additional fresh water. According to the Australian Conservation Foundation the cap prevented the trade in 2007-08 of 7500GL in Victoria alone, some of which was intended for environmental purposes:

> It is an impediment to trade. It is stopping the government from rolling out its package at the rate that it needs to roll it out, at the scale and pace to address the problem, and it is a bad deal for farmers, who are trying to maximise their choices in how they deal with difficult situations.[30]

5.43 DEWHA gave evidence that there is considerable depth to the water market. This suggests that the rate of water purchased from willing sellers could be accelerated considerably with only minimal impact on the market price of water entitlements.

5.44 Attitudes to the desirability of the government sourcing a large quantity of water on the open market appear to depend heavily on whether you are currently looking to buy or sell. With the current low allocations to high security consumers, many will be looking to purchase water on the open market to ensure their operations remain viable and with zero allocations for general security users, purchasing water may be the only option they have to generate an income. Removing a large proportion of the available water at a high price is likely to be a significant obstacle for these operations.

5.45 However, the committee notes that an increase in the price of water, and an increased ability to trade it would benefit any farmer who is able to spare the water:

> I do not have a problem with land and water being purchased…Most trade happens with land at the moment, but as the price of water goes up people will maximise their sale when they are selling their property. They will sell water and land separately, and a lot more water will be coming on the market…I have no problem with water being purchased and taken off properties. We irrigators fought for property rights, and we have them. We said, 'If you want water for the environment, come and buy it'.[31]

5.46 The committee notes that both temporary and permanent water markets play a crucial role in enabling the movement of water to its highest value end use.

Compulsory acquisition

5.47 As there does not appear to be enough water available on the open market to meet even the minimum necessary additional flows to provide life support for the

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30 Dr Arlene Buchan, ACF, *Committee Hansard,* 26 September 2008, p. 21.

31 Mr Dick Thompson, Murrumbidgee Irrigation, *Committee Hansard,* 26 September 2008, pp 32-33.

lakes, the only alternative for acquiring allocated irrigation water would be compulsory acquisition of allocations.

5.48 Compulsory acquisition of allocations is provided for in the Emergency Water (Murray-Darling Basin Rescue) Bill 2008. While the bill does not directly address the issue of allocations, the bill would give the minister power to acquire on just terms a water access entitlement or right. It is unclear to what extent this would apply to allocations and, in particular, private storage.

5.49 With little or no general security allocations the only water available for compulsory acquisition would be from high security users. The acquisition of such water would have a disproportionate impact on operations such as orcharding, where the high security allocation is necessary to keep permanent plantings alive. Compulsory acquisition of this water has the potential to cause such profound consequences on individual properties that 'just terms' would be difficult to achieve. For example, 'just terms' for water that keeps permanent plantings alive would conceivably need to compensate a grower for the lost capital value of the plantings and lost future income until the plantings could be re-established. This would not take into account the impact on local communities of the lost jobs and income for secondary and tertiary industry supported by the agriculture.

5.50 The committee notes that compulsory acquisition would be likely to be applied unevenly, as high security water allocations vary by region. The possible effect of this was highlighted by Ms Mattila:

> The water rights in the northern Murray-Darling Basin are predominantly general security rights. As you move down through the Basin, the closer you get to the Murray Mouth, the percentage starts to swing heavily towards high security entitlements. So, if you are looking for water, it is more likely to be at the bottom of the Basin than the top.[32]

5.51 It is the committee's view that compulsory acquisition is neither warranted or appropriate.

Public storage

5.52 There are a number of large scale public storages in the system that have been identified as potential sources of water. Unfortunately evidence presented to the committee indicates that the vast majority of this water is either required for other purposes or difficult to return to the river system.

5.53 Dr Blackmore summed up the situation:

> That is the issue—where are you going to get it? Let us open up all the doors—is it in the Snowy? The answer is: I do not think so; the Snowy is now below target, so that is going to be an issue. Is it in some of the Snowy

32 Ms Jenni Mattila, Bondi group coordinator, *Committee Hansard,* 19 September 2008, p. 61.

> resources? They do have one reservoir which has 500 or 600 gigalitres in it, called Talbingo, but there is no outlet to get it out because it is designed for hydropower. The outlets are high and it is designed for elevation. That is just over the back here. It is 700 gigalitres of water but it would switch off power generation at Talbingo and that would cause significant economic loss. You would have to build an outlet to get it and then you would have to transmit it down the Murrumbidgee and, by the time you did that, you would probably see about two-thirds of it at the bottom end. There is not much in dead storage in Dartmouth or Hume, and they are going to be empty, or very close, when they have met their critical human needs, and there is nothing in Lake Victoria beyond what is needed to get us through the summer. So I struggle to see where you could obtain water right now that would make more than a cosmetic difference, and that is my problem.[33]

Menindee Lakes

5.54 Menindee Lakes are frequently cited as a potential source of water for the Murray. According to DEWHA, in late August 2008 the lakes held approximately 512GL. Of this, approximately 20GL is required to supply Broken Hill for two years without rain and a further 11GL is required for high security allocations. Menindee Lakes also have a 'dead storage' volume of 34GL which can not be accessed. However, losses from the Menindee Lakes are very high. In order to ensure that Broken Hill is still able to draw the last of its 20GL in two year's time, water managers need to allow for the evaporation of 200GL.[34]

5.55 The NSW Department of Water and Energy described the commitments for water in the Menindee Lakes in its submission.

> 109GL of the volume remaining in the Menindee Lakes was previously committed by the NSW Government to underwrite the volumes required to convey water to meet the critical human needs of the communities along the Murray Valley.
>
> As inflows into the Murray Valley, above the minimum inflow sequence used in planning by the Senior Officers Group, this volume (up to 200GL) has been redirected to provide the stock and domestic needs in the NSW Murray Valley, and to contribute to the provision of unused water carried over from 2007-08 and the announced high security water allocations in the Murray and Lower Darling River Valleys of 25 percent of entitlement and 100 percent of entitlement respectively.
>
> The remaining volumes in the Menindee Lakes will be required to secure water supply to Broken Hill and users in the Lower Darling until autumn 2010, allowing for approximately 200 GL of evaporation losses during that period.

33 Dr Blackmore, *Committee Hansard,* 9 September 2008, p. 99.

34 *Submission* 1, p. 5.

> Consequently, any releases of additional volumes for the Lower Lakes would reduce the volumes already allocated for high security users, stock and domestic supplies reduce the security of supply for Broken Hill and other towns.
>
> While the current assessment is conservative and assumes no inflows into the Menindee Lakes, it must be realised that flows in the Darling River are extremely variable.[35]

5.56 As Professor Kingsford noted in his evidence the retention of water in the Menindee Lakes supports environmental values that are significant in their own right.[36]

Lake Victoria

5.57 Lake Victoria was described by the Hon Karlene Maywald, Minister for the River Murray and Minister for Water Security, as a regulating lake. All the water in it is allocated for human critical needs and conveyancing flows into South Australia. Minister Maywald told the committee that:

> Basically, what Lake Victoria does is acts as a buffer to be able to supply South Australia's needs when South Australia needs it. We have restrictions in the system, such as the Barmah choke, which means that we cannot get all the water that is needed downstream of the Barmah choke through the Barmah choke at the same time. Therefore, Lake Victoria acts as a regulating facility for New South Wales and Victoria to supply their obligations to South Australia. That water in Lake Victoria is fully allocated for those purposes….and the conveyancing and dilution flow water. The dilution flow is 696 and our critical human needs is 201. We also need that 696 and most of the 201 to get down to Murray Bridge to actually maintain the salinity levels in that reach of the river at a fit-for-purpose level. So the critical human needs amount is actually acting as a part dilution flow prior to being extracted. [37]

5.58 In effect, the water in Lake Victoria is already on its way to the lower Murray.

Snowy River

5.59 The Snowy River system is currently suffering from the same drought as the Murray and is now operating under a dry inflow sequence and has reduced the volumes that it releases to the Murray and Murrumbidgee. Snowy Hydro Ltd storages are currently at approximately 10 per cent of their design capacity and have not been on target since 1996. In 2008, the inflows have been 1692GL less than the design dry inflow sequence. The current year outlook is that it is most probable that flows will be

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35 NSW DWE, *Submission* 65, p. 18.

36 Professor Kingsford, *Committee Hansard*, 19 September 2008, pp 5-6.

37 Minister Maywald, *Committee Hansard*, 19 September 2008, p. 36.

very low again this year and there is almost no prospect of storage levels returning to average levels within the next three years. [38]

5.60 Snowy Hydro Ltd highlighted the fact that all of the water in its storages is pre-allocated, and rights to the allocations would need to be acquired from the actual owners.[39]

5.61 Snowy Hydro Ltd also pointed out that releasing water from the scheme is effectively reducing energy reserves, and the unplanned electricity generation associated with releases of additional water would have an impact on the electricity price.[40]

Weir pool levels

5.62 The lower Murray River has a number of weirs, nine in South Australia and one in New South Wales. The purpose of these weirs is to provide permanent navigation between the Murray Mouth and Wentworth and a relatively constant pool level to facilitate pumping for irrigation and water supply.[41]

5.63 Several submitters and witnesses suggested lowering the pool levels on the locks on the lower Murray between Lock 1 and Lock 9 by a small amount. One witness stated that lowering the pool level by 150mm might release 50GL of water.[42]

5.64 This option has a potential impact on water quality at drinking water off-takes below Lock 1. However, evidence was also heard from several witnesses that the ecology of impoundments in the Basin would be improved by a more natural wetting and drying cycle.[43]

5.65 It must be noted that any water released as a result of lowering weir pool levels must ultimately be replaced. This option does not provide additional water but rather may provide some greater flexibility in managing (eg. pulsing) the provision of flows to the Lower Murray, Lower Lakes and Coorong.

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38 Mr David Harris, *Committee Hansard*, 26 September 2008, p. 96.

39 Mr David Harris, *Committee Hansard*, 26 September 2008, p. 97.

40 Mr David Harris, *Committee Hansard*, 26 September 2008, p. 97.

41 http://www2.mdbc.gov.au/river_murray/river_murray_system/locks_and_weirs/locks_and_weirs.htm Weir 9 also raises the water level high enough to allow gravity diversion to Lake Victoria.

42 Mr Raymond Najar, *Committee Hansard,* 10 September 2008, p. 42. See also Mr Neil Shilabeer, p. 59 and Mayor McHugh, p. 101.

43 Professor Kingsford, *Committee Hansard,* 19 September 2008, p. 6. Minister Maywald also talked about the possibility of pumping wetlands to achieve a more natural cycle (p. 42) and Dr Matt Hipsey talked about the acid sulfate issues from permanent lying water all through the system. (p. 57)

Adelaide

5.66 The committee canvassed the opinions of several witnesses on the desirability and feasibility of reducing Adelaide's reliance on the Murray for water. General consensus was that reducing Adelaide's draw of Murray water would not provide a solution in the necessary timeframe, and a possible reduced need for dilution flows would need to be balanced against reduced consumption.[44] However, it is the committee's view that locating additional sources of water for Adelaide should be pursued as a means of reducing the magnitude of the city's impact on the lakes in future years.

5.67 In particular the committee noted that there may be considerable potential for stormwater harvesting in Adelaide that warrants further investigation and cost benefit analysis.

Goulburn River pipeline

5.68 In June 2007, the Victorian Government announced a plan for supplying Melbourne with water involving a pipeline from the Goulburn River to the Sugarloaf Reservoir where the water would be treated for use in Melbourne. The pipeline would pump 75GL and would involve taking one-third of 'new water' obtained through upgrading irrigation infrastructure.

5.69 On 12 September 2008 the Commonwealth Minister for the Environment, Heritage and the Arts approved the Victorian Government's project, subject to a number of conditions to protect matters of national environmental significance. The Minister stated that:

> I have made it a condition of my approval that all savings to be taken for the pipeline could only be taken following the assessment of their potential impact on matters of national environmental significance. These savings must be audited and available before they can be sent down the pipeline….
>
> Conditions of approval for this project include that no water come from the Living Murray initiative or the Water for Rivers entitlements.[45]

5.70 Plug the Pipe argued against the pipeline proposal claiming that it was not subject to adequate environmental assessment. Plug the Pipe claimed that the project was 'robbing' environmental water allocations. Plug the Pipe also questioned the projected 'water savings' from improved irrigation infrastructure claimed by the Victorian Government.[46]

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44 See for example, Dr Hatton, *Committee Hansard,* 9 September 2008, p. 24.

45 The Hon Peter Garrett MP, Minister for the Environment, Heritage and the Arts, 'Pipeline Approved with Environmental Conditions', *Media Release,* 12 September 2008.

46 Plug the Pipe, *Submission* 42, pp 2-6. See also Mr Pattison/Mr Richardson, Plug the Pipe, *Committee Hansard*, 26 September 2008, pp 41- 45.

5.71 The committee questioned the MDBC on the proposal. Dr Wendy Craik, Chief Executive of the Commission stated that the Commission did not have a view on the project. Dr Craik added that:

> Victoria have always had a good history of not exceeding their caps on any of the valleys in the system. They have been quite responsible in all that. I do not imagine they are proposing to do that at the moment. Certainly, with the new Basin Plan, all the water in the system will be taken into account in terms of extractions
>
> …whatever is extracted it is going to have to be sustainable from the Basin and the plans for each valley will determine that.[47]

5.72 The committee considers that, given the dire predicament of the Murray-Darling Basin generally and the significant environmental issues facing the Basin, any new projects need to ensure that there will be no adverse impact on environmental flows.

5.73 On the basis of evidence received, some members of the committee feel strongly that claimed water savings of up to 75GL of water intended to be delivered to Melbourne via the Sugarloaf pipeline may not be real savings and may therefore impact adversely on flows on the Murray River.[48]

5.74 There is also a view among some members of the committee that it is inappropriate for Melbourne to be taking water from the Murray-Darling Basin when alternative water supply options, such as recycled waste water, may be available.

5.75 Some other committee members noted the critical water supply situation facing greater Melbourne and the likelihood that the pipeline will be vital in providing water to Melbourne when it is complete in 2010.

5.76 The committee emphasised the importance of the Minister for Environment, Heritage and the Arts' conditions of approval for the SugarLoaf Pipeline, and believes it would be inappropriate for the Victorian Government to use this pipeline in ways that would reduce flows in the River Murray.

Eastern Mt Lofty Ranges

5.77 According to some estimates, runoff from the Mt Lofty Ranges contributes over 100GL of water per year to the Lower Lakes.[49] It is the committee's view that this can be expected to be a much lesser volume during periods of drought.

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47 Dr Craik, MDBC, *Committee Hansard*, 26 September 2008, p. 62.

48 Mr Kenneth Pattison, Plug the Pipe, *Committee Hansard,* 26 September 2008, p. 44.

49 Bruce Brooks and Mike South, *Applying a Localised Water Balance approach to estimate losses from Lake Alexandrina and Lake Albert for the years 1970 to 2006*.

Groundwater

5.78 The committee received one submission that indicated an artesian flow of 7ML per day could be available from the Penola area which could be piped to the Murray in the vicinity of Tailem bend.[50] The committee notes that 7ML per day is unlikely to be enough water to resolve the Lower Lakes issues. The committee also notes that a pipeline would be prohibitively expensive and the environmental and water resource impacts of employing this resource is untested. However, the proposal does indicate that other possibilities exist in terms of utilising groundwater to mitigate the current situation in the lakes.

5.79 The committee also heard that the problem of hypersalinity in the southern Coorong has probably been exacerbated by reduced inflow from the former wetlands of the Upper South East Drainage Scheme area. Dr Bill Phillips told the committee:

> As for waters coming in from the south-east of South Australia, in documenting the history of the Ngarrindjeri people and some of the older fisherman of this region in our 2006 report, they all related stories of how during periods of high rainfall waters would flow very strongly from the south-east through the lagoons down to the mouth of the Murray. That came to an end many years ago with the loss of wetlands in the south-east of the state. That has now been replaced by the Upper South-East Drainage Scheme to intercept rising groundwater problems.[51]

5.80 While saline, this water is far less salty than the Coorong and diverting as much as possible of the groundwater drained by this scheme back to the southern Coorong has the potential to contribute to alleviating the hypersalinity problem.

> There are some options to recover water from the south-east of South Australia. Wetlands such as Piccaninnie Ponds are currently draining to the ocean. That is not a natural situation. Those wetlands should be contained and should be flowing back towards the Coorong.[52]

5.81 The committee has not had time to assess the potential impacts of increased groundwater utilisation on surface water flows in the Murray-Darling Basin.

Treated effluent

5.82 The use of treated effluent was not raised in evidence presented to the committee during this inquiry. The committee notes that in the long term, treated effluent could be used to reduce the reliance of capital cities on the Basin if such water were made available for secondary purposes.

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50 Mr John King, *Submission* 4.

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

52 Dr Kerri Muller, *Committee Hansard,* 10 September 2008, p. 12.

5.83 In theory a significant fraction of what Adelaide takes out could be returned. The quality of the returned water would need to meet strict guidelines but is technically possible. However timeframe would rule this out as an immediate contribution to a solution for the Coorong and Lower Lakes.

Committee view

5.84 The committee acknowledges that quantities of water in storage right through the Basin are very low. Obtaining any additional water for the Lower Lakes will need to be acquired from water set aside for some other high priority purpose.

5.85 With so little water available at this time to provide for urban water needs and to maintain permanent plantings and stock and domestic supplies it is not reasonable to expect that purchase of water on temporary markets will be undertaken to maintain water levels in the Lower Lakes.

5.86 It is important to note that purchase of water on temporary markets for the Lower Lakes may reduce funds available to purchase permanent water entitlements to return to the rivers.

5.87 The committee does not believe that compulsory acquisition of water allocations or entitlements is either necessary or desirable at this stage.

5.88 The committee feels that there may be scope to re-examine the extent of the impact of manipulating weir pool levels in improving the management of fresh water inflows to the Lower Lakes, but not as a means on maintaining lake levels for any extended period of time. In the view of the committee, the salinity impacts of lowering weir pool levels on drinking water has not been adequately proved and the potential of this option should be investigated further.

5.89 The committee notes the unsatisfactory timeframes which currently exist for the transfer of water which arise out of existing barriers to trade and inefficient water registers.[53]

5.90 The committee believes that in view of the relatively small quantities of water required, the state governments should re-examine the assumptions behind the volumes of water needed to secure water supplies to determine if other small quantities could be released.

5.91 The committee notes the gesture of the Queensland government in pledging to donate unallocated water entitlements to the Commonwealth Environmental Water Holder.

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53 *Water Market Report: Spot Allocations as at 15 September 2008,* tabled by Ms Mattila, 19 September 2008.

5.92 The committee notes that there is potential to accelerate the purchase of water entitlements from willing sellers.

Sea water

5.93 An alternative to increasing fresh water flows into the Lower Lakes is to admit sea water into the lakes. This would stave off the problem of potential acid sulfate soils, but would have an as yet unquantified impact on the fresh water ecosystem of the Lower Lakes.

5.94 No options for the introduction of sea water involve cutting off fresh water flows into the lakes entirely. Under the current arrangement, there will always be the dilution flow for Adelaide's drinking water flowing into the lakes from the Murray, in addition to the Mt Lofty Ranges runoff and direct rainfall onto the surface of the lakes.

5.95 Given the environmental character of the lakes, the introduction of salt water would certainly have an impact on the current environment in the Lower Lakes. While there have almost certainly been periods in the past when the lakes have contained salt water, these periods have probably been short and were likely the result of a gradual shift in the salinity of the water and tidal exchange, rather than a sudden inundation with sea water.[54] There is also the likelihood that the lake ecosystem was better adapted to brackish or saline water in its original state than it is now, after over 60 years of being exclusively fresh water.

5.96 Dr Matt Hipsey described the effect of a sudden influx of sea water and how it could be managed:

> If you just open the barrages and let a flux of sea water straight in, you are going to get a massive shock to the ecology of the lakes. It is these sorts of shocks that can result in negative impacts. So what I would foresee is that you have a gradual management change, where you have some salt water coming in, say, through Goolwa barrage, to maintain water levels. This would be guided in part by monitoring the alkalinity and water quality of the lakes. Then you would also supplement the other end of the lakes with fresh water.[55]

5.97 In the committee's opinion, the question which needs to be answered in considering this option is 'would the damage from sea water outweigh acid sulfate soil formation?'. The general consensus of experts was that sea water is the less damaging option.[56]

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54 Dr Matt Hipsey, *Committee Hansard,* 19 September 2008, p. 57.

55 Dr Matt Hipsey, *Committee Hansard,* 19 September 2008, p. 57.

56 See for example, the South Australian Government, *Submission* 73 and Wentworth Group, *Submission* 71.

5.98 An unresolved issue that the committee was not able to get expert advice on was the potential impact of salt on groundwater. There was some concern from witnesses that sea water could contaminate the groundwater of the region.

> We know that the eastern Mt Lofty Ranges and the lakes are connected through groundwater. We know that the head levels of the groundwater are dropping because of the lakes having dropped…. What we do not understand is how the salt may move through the aquifers that feed the EPBC-listed wetlands at the bottom of Currency Creek, Tookayerta Creek and the Finniss River.[57]

5.99 This issue needs to be investigated further before any sea water is admitted to the lakes. The committee also notes that regardless of whether the option of sea water eventually becomes necessary, the increasing salinity of the lakes means the impact of salt on the ecosystem will need to be investigated.

5.100 There was also concern for the potential for the intrusion of salt water up-stream, where it could contaminate drinking and irrigation water. If sea water were admitted to the lakes, a temporary weir may be need to be constructed to prevent this flow. The committee notes that the South Australian government has already commenced 'no regrets' preliminary work which would enable the construction of such a weir, should it be required.[58]

5.101 There are a number of proponents for returning the lakes to their pre-barrage state and allowing sea water to flow in and out of the lakes as conditions dictate,[59] but community opinions vary.

> To give you a snapshot of the reaction of both the Murray Bridge meeting and the Moama meeting, at Murray Bridge there was a very strong view that salt water was not an option and that only fresh water could be used. There was a very strong view that it was about protecting the environment, protecting a critical habitat area, a Ramsar wetland. The meeting at Murray Bridge was also amenable to looking at a range of other options, but it was not going to countenance the saltwater option.[60]

Sea water options

5.102 Proposals for admitting sea water potentially cover a range of options, including:

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57 Dr Kerri Muller, *Committee Hansard,* 10 September 2008, p. 15. (EPBC - Environment Protection and Biodiversity Conservation, refers to the 1999 Act)

58 There has been some concern that salt will accumulate above this weir and contaminate drinking water, however dilution flows will carry salt on into the Lower Lakes.

59 See, for example, the NSW Farmers Federation *Submission* 63 and *Committee Hansard*, 9 September 2008; and Dr Peter Marsh, *Submission 38*.

60 Mr Lee O' Brien, *Committee Hansard*, 9 September 2008, p. 64. See also the Coorong Council *Submission 66*, p. 8.

- temporarily admit a small quantity of sea water to stave off the formation of acid sulfate soils;
- divide the lakes in two and admit sea water to one section; or
- remove the barrages and return the lake system to an open estuarine system.

Temporary additions

5.103 Allowing a small quantity of sea water in to Lake Alexandrina would assist in preventing the formation of acid sulfate soils, but it would exacerbate the problem of rising salinity in the lakes. Ongoing evaporation and the continued deposition of salt from the Murray and from seepage under the barrage at Goolwa would result in steadily increasing salinity. This could be acceptable if the situation were envisaged to be of short duration. But if prolonged, it would eventually result in a hypersaline situation developing in the lakes unless salt water could be recirculated through the system. The environmental impact of this scenario is obvious, but, additionally, under these conditions the problem of potential acid sulfate soils would be worse if the lakes were allowed to dry again. Professor Fitzpatrick of the CSIRO highlighted this problem:

> For example, we know that sea water can neutralise acid sulfate soils. It is a common practice on the east coast, but that is in the situation where you can get sea water in and you can get the sea water out quickly. Here is a situation where we know, if we get sea water in, we can predict what may happen in terms of further formation of the sulfidic material, … If you can get it out, that is not a problem, but if you cannot get it out, you will create a hypersaline situation, with the formation of potential acid sulfate soil conditions that we call monosulfidic black ooze gels.[61]

5.104 Salt water could only be removed by increasing flows to the point where the system could be repeatedly surcharged to a high level and allowed to recirculate back to the sea, or flushed, or during a major flood event. Although several witness claimed that it would be impossible to get sea water out of the lakes once it was admitted the committee notes that the original construction of the barrages did require the same process.[62] However, it would require substantially greater flows than are currently available, so the lakes would probably be saline for a considerable period before such a process could be initiated.

5.105 No evidence was presented to the committee on the potential to recirculate sea water in absence of flushing fresh water inflows. This would require further investigation.

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61 Professor Robert Fitzpatrick, *Committee Hansard,* 10 September 2008, p. 74.

62 R.P. Bourman and E. J. Barnett, *Impacts of River Regulation on the Terminal Lakes and Mouth of the River Murray, South Australia,* Australian Geographical Studies, 33(1), p. 104.

5.106 The committee did not receive evidence of exactly how saline the lake would become immediately if some fraction of the minimum 10GL necessary to prevent excessive acidification were to come from sea water. This kind of modelling would need to be done to fully inform any decision to take this option. The committee notes that some preliminary modelling of this has already been done.[63]

5.107 As was previously noted, any addition of sea water into the Lower Lakes would require thorough environmental impact assessment and community consultation.

Divide the lakes

5.108 The following suggestions aim to reduce the amount of fresh water flow needed to bring the lakes up to a safe level and counter evaporation by replacing a section of the lakes with sea water.

5.109 The DEWHA submission describes a proposal to cease pumping fresh water from Lake Alexandrina in to Lake Albert and admit sea water into the Lake Albert via the Coorong. Lake Albert and Alexandrina are already separated by a bund, so this option would be relatively easy to implement. Lake Alexandrina would evaporate slower and fill more easily and the Coorong would get a flow of less saline water via the mouth.

5.110 There is a secondary proposal is to temporarily divide Lake Alexandrina in the vicinity of Goolwa. This proposal suggests a temporary barrier across the narrow section of the lake upstream of the town. This would allow flooding of this region with sea water. This is not intended as a solution to the environmental problems facing the lake, but would allow enough water in the channel to allow the lock in the barrage to open and revive the area's boating based economy.[64]

5.111 As the water in this channel is already highly saline, flooding with sea water would not have a dramatic impact on the environment, however the issue of salt water seepage would probably be increased. The committee is also aware of another proposal entitled 'Twin Lakes' where Lake Alexandrina would be segmented into separate fresh water and sea water sections.

5.112 The committee considers that it does not have sufficient information to properly assess the environmental impacts and cost effectiveness of any of these proposals.

Long term management arrangements

5.113 Few submissions addressed the longer term management challenges for the Lower Lakes and Coorong. The committee notes however that the likely impacts of

63 Mr David Wainwright, WBM Consulting, *Committee Hansard,* 19 September 2008, p. 54.

64 Minister Maywald, *Committee Hansard,* 19 September 2008, p. 45

climate change may require a review of the long term viability of current management arrangements.

Permanently open the barrages

5.114 Without question opening the barrages and allowing sea water to flow in would permanently solve the problem of potential acid sulfate soils.[65] However, other impacts, including on Ramsar values, would require detailed evaluation.

5.115 The committee notes that the Australian Government has committed $200 million to the South Australian Government towards the development and implementation of a plan that addresses the long term threats to the environmental values of the Lower Lakes and Coorong Ramsar site.

The Coorong

5.116 The Coorong has distinctly different management issues and sea water is a viable solution the immediate problem of hypersalinity in the South Lagoon. The committee heard evidence that pumping hypersaline water out of the Lagoon into the ocean would substantially reduce salinity in the area and might lower the level to a point where a specialised ecosystem would remain viable. Dr Ian Webster told the committee:

> There is a proposition on the table that has been suggested…that we can ameliorate the problem in the South Lagoon by pumping water out of the South Lagoon. Effectively what that causes to happen is you get an increased amount of sea water coming in through the mouth and ultimately winding up in the South Lagoon and lowering the salinity. I think the preliminary modelling we have done on this suggests that this is an option that could lower salinity to the point within range of being ecologically viable for the South Lagoon….
>
> Sea water would flow in through the mouth and down through the north lagoon and enter the South Lagoon and replenish the water level in the South Lagoon…..
>
> So what you are doing is pumping salt out. The concentration of salt in the South Lagoon at the moment is something like five times sea water. So for every litre of water that you pump out, you pump out five times as much salt as there would be in the same volume of sea water. But you are bringing in a volume of salt which is equal to the volume that is in sea water. So, in effect, by pumping the South Lagoon, you are causing a net loss of salt to the system.[66]

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65 Although the sediments would be accumulating more *sulfate* ions, they would remain waterlogged permanently and the volume of water would be better able to buffer any existing acid.

66 Dr Ian Webster, *Committee Hansard,* 19 September 2008, pp 54, 57

Committee view

5.117 The committee believes that pumping the South Lagoon is an option that warrants serious consideration subject to further investigation

Drying and remediation

5.118 The committee also heard proposals that part or all of the lakes should be allowed to dry out. The most concrete form of this proposal was to allow Lake Albert to dry and remediate the acid sulfate soil.

> Another option is to decommission Lake Albert as a permanent lake, converting it into an ephemeral wetland or swamp, perhaps with areas of paperbark ti-tree, reeds and/or samphire established within the lake's footprint. The freshwater (sic) saved from Lake Albert (which could be as much as 200GL) might then be used to increase the volume of fresh water available to Lake Alexandrina, and the Coorong and Murray Mouth.[67]

5.119 This would reduce the surface area of the lakes by up to 16 800ha and substantially reduce water lost through evaporation, but would result in the formation of acid sulfate soils which would be extremely difficult to adequately remediate.

5.120 Bioremediation of acidic areas is one option. The committee heard that mulching the drying areas to prevent drying and wind erosion and provide some alkalinity, together with planting acid tolerant species such as Phragmites, has shown promise as a means of limiting the acidification of the sediments.[68]

5.121 Remediation with lime to neutralise the acidity is another possibility, but the committee heard evidence that the soils could be extremely acidic, far beyond the usual levels controlled by lime in agricultural situation, and could take over 100 tons of lime per hectare.[69] As there are thousands of hectares requiring remediation, and the usual methods of spreading lime best adapted to dry agricultural land rather than drying lake bottom sediments with potentially hazardous levels of acidity, lime would be an extremely expensive and technically difficult solution. [70]

5.122 There does not appear to have been a great deal of community consultation on the option of decommissioning the lake. The Mayor of Coorong stated that the council has not really looked at proposals for decommissioning Lake Albert:

> We have been relying on what the scientists have been telling us. The information we are receiving really concerns us. If you decommissioned Lake Albert particularly, the results would be catastrophic for the environment and potentially even for the people living around that lake….I

67 Wentworth Group*, Submission 71,* p. 5.

68 Professor Fitzpatrick, *Committee Hansard*, 10 September 2008, p. 73.

69 Professor Fitzpatrick, *Committee Hansard*, 10 September 2008, p. 71.

70 The committee is not aware of any previous remediation project on this scale elsewhere.

> understand that if it were decommissioned, assuming that you allowed acid sulfates to become active, it would become uninhabitable around the lake shores. So that means people would need to be moved away from the affected areas.[71]

5.123 Unfortunately the committee did not have the opportunity to consult with the local Ngarrindjeri people on their views.

Committee views

5.124 The committee is not in a position to evaluate any of these drying and remediation options. In any event such options should be subject to further environmental impact assessment and community consultation.

71 Councillor Roger Strother, *Committee Hansard*, 19 September 2008, p. 49.

Chapter 6

Conclusion

6.1 There is not enough water in the system. This is the result of historic overallocations, the current unprecedented drought, and the emerging impacts of climate change.

6.2 The situation in the Coorong and Lower Lakes is not unique. Sites right through the Basin are suffering, all users have very little water and the majority of water held in storages is required for very high priority needs or to cover losses.

6.3 Future decisions to allocate scarce environmental water need to take into account this broader predicament.

6.4 Compulsory acquisition is neither necessary nor desirable.

6.5 Transmission losses are a factor in the uses to which environmental water should be put. As a general rule, the location and watering needs of environmental values and assets across the Basin informs where environmental water entitlement should be purchased.

6.6 While sea water is not the preferred option for saving what is now a predominantly fresh water ecosystem, the problems sea water would cause are less dramatic than runaway acidification.

6.7 The committee notes the urgent need for a holistic approach to managing the Basin, as it provided for in the July Intergovernmental Agreement between Basin jurisdictions.

6.8 The committee notes that the potential introduction of sea water together with some other management options requires investigation, environmental impact assessment and community consultation. To provide for the possibility that the introduction of sea water is required, the committee notes that approval for such action, under the EPBC Act, would be required.

Recommendations

Recommendation 1

6.9 Given the long term challenges posed by climate change in particular, the committee supports the need for a management plan to address the long term threats to the site's environmental values. The committee also notes that the Australian Government has committed $200 million to support the South Australian Government in developing such a plan.

Recommendation 2

6.10 Impediments to trading water should be lifted to allow a more efficient water market.

Recommendation 3

6.11 The potential value of bioremediation of exposed acid sulphate soils should be investigated further.

Recommendation 4

6.12 If the admission of sea water becomes necessary, the potential environmental impacts should be subject to further detailed investigation and community consultation. The committee expects all necessary approvals required under the EPBC Act would need to be sought.

Recommendation 5

6.13 The feasibility of pumping hypersaline water in the southern Coorong into the ocean should be assessed as part of the development of a longer term plan for this site.

Recommendation 6

6.14 In the longer term, drainage water from the upper south east should be diverted to the Coorong.

Senator Glenn Sterle
Chair

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.
>
> 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.
>
> 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.
>
> 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.
>
> … 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.

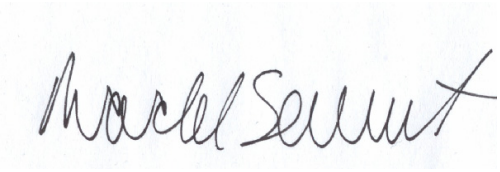
1.104 That consistent with the Wentworth Group of Concerned Scientists' submission and evidence, there be a significant reduction in water use across the entire system to ensure the economic and environmental sustainability of the Basin, and further ensuring that enough fresh water is maintained to keep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

Coalition Senators' Additional Comments

Background

1.1 Coalition Senators acknowledge and agree that there is insufficient water within the Murray Darling Basin to meet the wants and demands of all stakeholders. This necessitates both difficult decisions and some sacrifice. We thank all of those who have made submissions and provided evidence to this inquiry thus far, many of whom are directly impacted by the state of the Basin. We are extremely mindful of the fact that, in addition to the environmental threats evident throughout the Basin, the livelihoods of many people and sustainability of many communities are not only threatened, but potentially at stake.

1.2 The need to conduct this inquiry is regrettable. It is the direct result of mismanagement of the finite resources within the Basin; the impact of which has been dramatically escalated as a result of prolonged drought throughout much of the Basin area.

1.3 The requirement to change the management of the water resources within the Basin was recognised by the previous Coalition Government, when then Minister for the Environment and Water, Malcolm Turnbull, sought to overturn a century of precedence and seek a full referral of powers for management of the system from the States and Territories to the Australian Government. We are gravely concerned that continued politics and parochialism, especially from the Victorian Government, have delayed and undermined this effort. This has been especially unfortunate given the continued deterioration in climatic conditions, especially water inflows across the Basin, since former Minister Turnbull's announcement in January 2007.

1.4 Coalition Senators recognise that the majority report broadly reflects the range of evidence provided to the Committee and understand that many issues relating to the long term sustainable management of the system will be explored in greater depth in the report to the second term of reference, due by 4 December 2008. However, we disagree with some of the conclusions drawn in this initial report and believe the situation confronting the entire system demands a clarity in purpose, robustness of process and overriding sense of urgency, each of which has been lacking in the Government's approach thus far.

Immediate requirements of the Lower Lakes

1.5 Since the referral of this reference by the Senate on 27 August 2008, thankfully the prognosis for the Lower Lakes has improved marginally. This has predominantly been a result of increased rainfall in the Eastern Mount Lofty Ranges, which has seen increased flows into Lake Alexandrina from the Finniss River and Currency Creek, and climatic conditions resulting in lower rates of evaporation from the lakes.

1.6 As a result of these improved conditions, lower freshwater inflows are now required to keep the lakes above the estimated water level required to manage the risk of acidification. In a response to questions from the Committee circulated on 1 October 2008, the Murray Darling Basin Commission (MDBC) stated that:

> Based on modelling using the worst case scenario (highest evaporation, lowest inflow), 30 GL in addition to the 350 GL dilution flow would be enough to keep the lakes above minus 1.0 m AHD (the water level trigger to manage the acidification risk) until winter 2009.

1.7 The 350 GL of dilution flows, which are allocated to ensure salinity is kept at acceptable levels at major urban pump off-takes, appear relatively secure. In the same series of responses the MDBC indicated that as "at 15 September 2008 South Australia was entitled to receive an annual entitlement of 1030 GL plus a further 57 GL of trade adjustment". Whilst noting that the South Australian Government "decides how to allocate that water within South Australia" the MDBC stated that it understands the South Australian Government "has determined that it will plan to have 350 GL flow past Wellington to the Lower Lakes". Coalition Senators expect the South Australian Government to honour this commitment.

1.8 According to the MDBC, based on worst case evaporation, local tributary inflow and rainfall scenarios, this leaves a shortfall of an estimated 30 GL. This evidence is consistent with responses to questions provided by the Department of the Environment, Water, Heritage and the Arts circulated on 2 October 2008, which stated:

> Based on 'worst case' assumptions, latest water allocation figures, and the current assumed acidification management trigger levels, we understand the Lower Lakes will have a shortfall of between 10 and 50 GL by next March. A very small improvement from these worse case assumptions will mean that water levels in the Lower Lakes will remain above the current management trigger level through the 2009 winter months.

1.9 Having come so close to the brink in reaching levels that would have precipitated the making of hard decisions earlier this year, the Lakes have been granted a short-term reprieve by Mother Nature. Coalition Senators acknowledge that, even if worst case scenarios are not realised over the next 9 months or the additional 30 GL of water are found to deal with to such scenarios, this is still only a short term reprieve. However, it is a reprieve governments must use. Absent long

term solutions, another season of record low inflows will likely force the making of hard decisions.

1.10 However, Coalition Senators believe that it is far preferable to utilise this window of time to maximise the chances of recovery or to ensure any management decisions are fully informed. This must include the full range of available options, and their inferred and potential consequences. It is unacceptable to make potentially damaging decisions without full consideration of all long-term management approaches that would maximise benefits to river communities, the environment and the economy.

1.11 While finding even 30 GL of water for the Lower Lakes is not an easy task, Coalition Senators believe the Australian and South Australian Governments must give an assurance that, if possible, it will be delivered. Coalition Senators note the majority report leaves open the possibility of delivering this amount of water by slightly lowering the weir pool levels, possibly in combination with some temporary addition of seawater through a 'shandying' effect.[1] Measures such as these, which have become feasible due to the smaller quantities of water now required to stave off disaster, should be pursued ahead of other options that would result in significant transmission losses or the potential imposition of further pain on irrigation communities throughout the Basin.

1.12 Evidence was given by stakeholders who felt that they had not, prior to this inquiry, been provided with an opportunity to explain their views as to options to save the Lower Lakes and Coorong. During the course of the inquiry, evidence was given about options varying from and/or additional to those options outlined to the Committee in the submission from the federal Department of Environment, Heritage, Water and the Arts. Coalition Senators are concerned at the lack of engagement with all stakeholders in the Basin, which appears to have resulted in a failure to explore all possible management options.

Recommendation 1

1.13 That the government immediately commence:

- **re-considering and re-assessing the options available, including additional and variant options the subject of evidence to the Committee; and**
- **consulting extensively with stakeholders, including those who have provided submissions to this inquiry, as an inherent part of this process.**

1 Wentworth Group of Concerned Scientists, *Submission 71*, p. 4.

Recommendation 2

1.14 That the Australian and South Australian Governments commit to delivering, at least until winter 2009, the water required to maintain the Lower Lakes above levels that would otherwise trigger the risk of acidification.

Recommendation 3

1.15 Should worst case assumptions appear imminent, so that between 10 and 50 GL over and above the already budgeted 350 GL 'dilution flows' are required to maintain the level of the Lower Lakes, then governments should ensure such water should be sourced through the lowering of weir pool levels, temporary addition of minimal seawater as part of a 'shandying' process or other measures that will not negatively impact on permanent plantings or irrigation communities.

Immediate action for the Coorong

1.16 Evidence was given as to the environmental differences between the Lower Lakes and the Coorong. Numerous experts expressed their opinions as to how and why these different environments are therefore able to sustain different solutions. This fact appears to have been in some part overlooked in options considered by governments prior to this inquiry.

1.17 Increasing levels of salinity in the South Lagoon of the Coorong, now reaching levels of hyper salinity that are reported at up to seven times the salinity of seawater, threaten the unique environment of this region in ways that are as serious as, but decidedly different from, the threat of acidification in the Lower Lakes. Much public debate in recent times has centred on the threats to the lakes from declining inflows, yet there is a clear concomitant threat to the Coorong.

1.18 As with the lakes and the entire Basin system, the approach to the Coorong can be considered in both short and long term contexts. In the longer term, possible redirection of freshwater from the Upper South East Drainage Scheme[2] could aid the sustainability of the Coorong, and should be further investigated. In the shorter term, Coalition Senators found evidence regarding the feasibility and benefits of removing hyper-saline water from the South Lagoon of the Coorong and replacing it with sea water, as warranting urgent investigation.

Recommendation 4

1.19 That government immediately investigate and, where appropriate, implement the removal of hyper saline water from the South Lagoon of the Coorong, enabling refreshment with sea water while further considering the redirection of fresher waters from the Upper South East Drainage Scheme.

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2 Dr Bill Phillips, *Submission 12,* p. 2.

The Wellington Weir

1.20 Coalition Senators note and welcome evidence from South Australian Water Minister Karlene Maywald that the South Australian Government now considers it has until September 2009 to decide whether to proceed with its proposal to build a weir near Wellington in South Australia. Climatic conditions that are better than previously postulated scenarios have, again, provided some breathing space in this regard. This space must be used wisely.

1.21 Assessment of the implications of the weir appear inadequate. With the South Australian Government confirming that 'no regrets' preparatory work on the construction of the weir are being undertaken,[3] including the construction of access roads to the site, it seems inconceivable that similar 'no regrets' environmental assessments have not commenced.

1.22 The option of building the weir and flooding the lakes with seawater has been on the table for several years now, although assurances have repeatedly been given that it will be a 'last resort' option.[4] The purpose of a weir – for what and for whom – is unclear. A so-called 'last resort' must not become a refuge for hasty decisions and tight timeframes, meaning that alternatives to building a weir are overlooked and environmental and other assessments are rushed, will only further aggravate understandable public angst over the proposal.

1.23 There are many concerns expressed by experts and across the community at large about the impact of such a weir. These include concerns about the impact on the ecology of the lakes, the potential for salt build-up within the river and concerns about the ongoing requirement for freshwater to maintain some element of estuarine environment in the lakes. Ensuring broad public understanding of the consequences of building a weir and confidence that there are not unintended or unforeseen effects should be a priority for both the Australian Government and, especially, the South Australian Government, if they intend to continue to contemplate the weir.

1.24 Any decision to build the weir must be soundly evidence based, with all consequences (both positive and negative) fully understood, and be made only if and after all alternative approaches have been fully explored. Should available science and appropriate planning for the future of the Basin indicate that the lakes cannot be sustained as totally freshwater then all other alternatives, such as the potential to 'decommission' Lake Albert, as countenanced by Professor Mike Young[5] and the Wentworth Group of Concerned Scientists,[6] should have been explored prior to any final decision on building the weir.

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3 Hon Karlene Maywald MP, *Committee Hansard*, 19 September 2008, p. 44.

4 Hon Karlene Maywald MP, *Committee Hansard*, 19 September 2008, p. 32.

5 Professor Mike Young, *Committee Hansard,* 10 September 2008, p. 24.

6 Wentworth Group of Concerned Scientists, *Submission 71*, p. 5.

Recommendation 5

1.25 That, if governments intend to continue to contemplate the weir near Wellington:

a. that governments specify the purpose of building the weir.

b. then all appropriate environmental considerations and approvals, including assessment under the Environment Protection and Biodiversity Act, into construction of the proposed weir be undertaken as soon as possible and be made publicly available.

c. that no decision be made to build the weir unless and until all alternatives to the construction of the weir including alternative long term management models for the Lower Lakes have been fully assessed and discounted in a transparent and evidence based way.

The Goolwa & Lower Lakes Communities

1.26 Coalition Senators note the strong representations made from organisations representing the tourism, boating and fishing industries, especially in the communities around Goolwa, including the Alexandrina Council and the Southern Alexandrina Business Association (SABA). While communities throughout the Basin are suffering, we acknowledge the potential for a unique solution to the problems facing the Goolwa community, which may not require a 'freshwater solution', as a community with a pool level that is "the only one which is below sea level together with high salinity levels".[7] Specifically, SABA calls for:

> …the raising of the Goolwa pool to +0.3 m AHD and the re-commissioning of the Goolwa Lock by Christmas 2008. Our suggestion is to construct a temporary barrier at Laffin's Point (Goolwa North) and to fill the Goolwa pool with either sea or fresh water as appropriate. We are also calling for the re-commissioning of the Goolwa Lock (associated with the Goolwa Barrages) so as to restore communication between the Goolwa Channel and the Coorong.[8]

1.27 Consideration must be given to this proposal from the Goolwa community, which could both increase the pool level at Goolwa (assisting the local boating and tourism industry) whilst also protecting Lake Alexandrina from the increasing salinity in the Goolwa Channel, especially the estuarine environments at the mouths of the River Finniss and Currency Creek.

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7 Southern Alexandrina Business Association, *Submission 13*, p. 1.

8 Southern Alexandrina Business Association, *Submission 13*, p. 3.

1.28 In response to requests that were now made some months ago by the Alexandrina Council and the Goolwa community, the South Australian Government has been undertaking a feasibility study into this proposal, which Minister Maywald indicated to the Committee was due to be completed as soon as possible.[9] Like so many issues facing the Basin, Coalition Senators believe the assessment of this proposal has taken far too long for a community in dire need of assistance.

Recommendation 6

1.29 That the South Australian Government immediately complete and publicly release the much anticipated feasibility study into the Laffins Point proposal.

Recommendation 7

1.30 That the Australian Government provide an immediate assistance package of a minimum $50 million for Lower Lakes and Coorong communities to help farmers, small businesses, tourism and community sectors to respond to the crisis caused by the lack of water.

Water buybacks, infrastructure spending and future planning

1.31 Coalition Senators acknowledge the role for the voluntary acquisition of water entitlements, as was originally planned and funded by the former Coalition Government. Over many years State Governments have clearly issued entitlements that exceed any reasonable expectation of available resources in the basis. Given this gross mismanagement, and the likelihood that climatic conditions will lead to further reductions in available water resources, buying back entitlements must be part of the long term solution in the Basin.

1.32 However, water entitlements differ from water allocations and their purchase will only be of benefit when water is actually allocated to those entitlements. Shamefully, the Government appears to have exploited a general misunderstanding of the difference between entitlements and allocations, allowing the community to presume that increasing the pace of buying back entitlements will somehow provide immediate relief to the Lower Lakes and Coorong.

1.33 The reality is very different and has been exposed in evidence to this inquiry. The MDBC has reported that of 133 GL of entitlement purchased under the Living Murray initiative, only 1.2 GL of water is likely to be available to the environment this year. DEWHA figures reveal that of the buybacks announced with much hype by the Prime Minister and Minister Wong this year, only 4.8 GL of entitlements have actually been transferred into Commonwealth ownership, against which just 443.7 ML of water is actually available this year.[10]

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9 Hon Karlene Maywald MP, *Committee Hansard*, 19 September 2008, p. 46.

10 DEWHA, *Answers to Questions on Notice*, 2 October 2008.

1.34 These buybacks, which with the recent purchase of Toorale Station extended to property purchases, are proceeding with no plan or clear targets, no apparent strategy or targeting to catchment areas and no adjustment support for the communities they strip of income and viability. They have been rushed for the sake of cheap headlines and it is little wonder they have generated so much resentment and concern in irrigation communities throughout the system. The Government must provide the evidence upon which it has based these decisions, so that it can show they are the right decisions.

1.35 While the buying back of entitlements has been hastened, investment in upgrading on-farm and off-farm irrigation infrastructure appears to have been stalled or placed on the backburner pending deals with State Governments over where funds should be allocated. Such infrastructure investment remains amongst the best ways to save water, delivering increased flows to the environment while helping to guarantee both future food security and the future viability of regional communities.

1.36 Coalition Senators consider that buybacks, along with infrastructure spending, must be part of a total, transparent package and plan. However, the current random approaches to water buybacks are lacking in evidence or strategy. Australians must be provided with confidence that the Government actually has an immediate strategy for the management of the Basin, not just a media strategy to last until the long-term Basin Plan is developed.

1.37 Important to any Minister's ability to manage the Basin, either in the short or long term, is the referral of powers to the Commonwealth. Coalition Senators are damning of the watering down of and backroom deals that have undermined the intent of the plan announced by the former Coalition Government in January 2007 for true, unimpeded management of the Basin by the Australian Government in the national interest. Although these matters will be explored further in the second stage of this inquiry, and in the assessment of the recently introduced Water Amendment Bill 2008, we repeat our calls for unconditional referral of powers by the States.

Recommendation 8

1.38 That the Government immediately develop and release an economic and social impact statement and evidence of a strategy to guide water buybacks, infrastructure spending and other measures to be undertaken so as to provide certainty and transparency for all stakeholders in the system.

Recommendation 9

1.39 That the Government hasten both on-farm and off-farm infrastructure spending where it delivers water savings and increased environmental flows while enhancing both food security and the viability of regional communities.

Recommendation 10

1.40 That a full and unconditional referral of powers to the Australian Government over management of the Basin be undertaken by all relevant state and territory jurisdictions to deliver a river and basin system able to be governed nationally, consistently, transparently and equitably.

Urban water supplies

Broken Hill & Menindee Lakes

1.41 Many witnesses suggested that water for the Lower Lakes be sourced by releasing storages from the Menindee Lakes. Other evidence was provided about the likely transmission losses and difficulties in releasing such water, as well as some areas of environmental note around the Menindee Lakes, which are explored in the majority report.

1.42 Clear evidence was provided as to the inefficiencies in supplying water for Broken Hill. The committee was informed by both DEWHA [11] and the New South Wales Department of Water and Energy[12] that 20 GL was held in the Menindee Lakes to secure Broken Hill's water supply for two years, against which managers need to allow for evaporation of 200 GL.

Recommendation 11

1.43 That the Federal and New South Wales Governments immediately assess new ways to secure the water supply for Broken Hill and, where environmentally appropriate, re-engineer the Menindee Lakes to reduce evaporative losses.

Adelaide

1.44 Coalition Senators also believe that further steps need to be made by the South Australian Government to ensure that Adelaide becomes more self-sufficient for its water needs. Minister Maywald's following comments made during questioning, are vague and, in the circumstances, unconvincing:

> In years where there is lots of water around, we do not believe that Adelaide should have to take that infrastructure that is already there in place out of production. It is infrastructure that has a long life. If there are years when we have high flows, South Australia should be able to use that

11 DEWHA, *Submission 1*, p. 5.

12 NSW Department of Water & Energy, *Submission 65*, p. 18.

> infrastructure. If we engineered a solution for the one in 100-year event so that we never used the River Murray for the rest of the time, I think it would be in fact over-engineering the solution for South Australia.[13]

1.45 Coalition Senators believe that self sufficiency of urban water supplies should be an objective of all state governments and urge the South Australian Government to strive towards this objective through increased efforts in areas such as desalination, stormwater capture, water recycling and improved efficiency.

Recommendation 12

1.46 That the Australian and South Australian Governments commit to self sufficiency independent of the Murray for Adelaide as a key objective of their water policy plans through increased efficiency in water usage and greater efforts in areas such as stormwater capture, desalination and water recycling.

Melbourne and the Sugarloaf or North-South Pipeline

1.47 Coalition Senators note that Minister Garrett approved construction of the Sugarloaf or North-South Pipeline during September 2008, ignoring a request from non-Government committee members that he delay so doing until the reporting date for the first part of this inquiry. In so doing, the Minister has deprived the Government of the opportunity to be informed by evidence provided to this Committee during the inquiry.

1.48 As a result of that evidence, Coalition members consider that the decision to build the pipeline is based upon politics, not upon evidence. It is clearly part of a deal to get the Victorian Government to agree to even a watered down version of national management of the Basin.

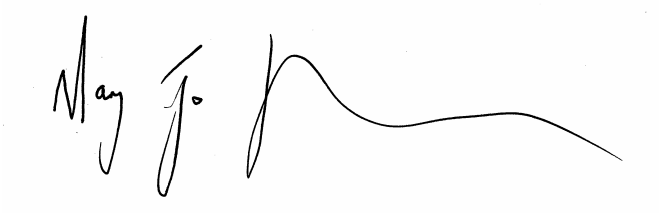
1.49 The decision to build the pipeline gives priority to the interests of Melbourne, a city outside of the Basin area, over other communities, with no convincing evidence as to why that should be so. Nonsensically, it increases the reliance of one major city on the system, just at the time when other major cities, notably Adelaide, are responding to pressure to decrease their reliance on the system.

1.50 Even if cited water savings can be found, about which Coalition Senators are very doubtful, to provide for the pumping of 75 to 110 GL to Melbourne, the redistribution of this water from the Goulburn will clearly have a detrimental impact on communities to the north, as well as flows into the Lower Lakes and Coorong.

13 Hon Karlene Maywald MP, *Committee Hansard*, 19 September 2008, p. 40.

Recommendation 13

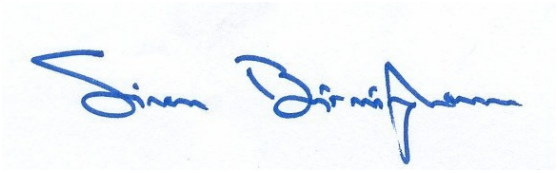
1.51 That construction of the North-South Pipeline to extract water for Melbourne not proceed.



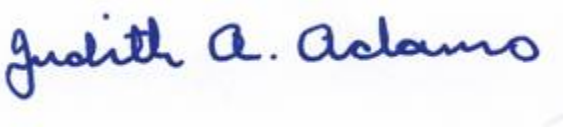
Senator Mary Jo Fisher

Senator Fiona Nash

Senator the Hon Bill Heffernan



Senator Simon Birmingham



Senator Judith Adams

Appendix 1

List of Submissions

1. Department of the Environment, Water, Heritage and the Arts

1A. Department of the Environment, Water, Heritage and the Arts

1B Department of the Environment, Water, Heritage and the Arts

2. WMAwater NSW

3. Fair Water Use (Australia)

4. Mr John (Jack) King SA

5. Ms Cherril Jones VIC

6. Mr Allan Jones VIC

7. Mike and Mary Galea SA

8. Mr Trevor Giles

9. Ms Janie Wilson

10. NSW Irrigators' Council NSW

11. Mr Bob Hamilton-Bruce

12. MainStream Enviromental Consulting Pty Ltd and RiverSmart Australia

13. Southern Alexandrina Business Association SA

14. Mr Steve Posselt

15. Mr Henry Jones SA

16. Boating Industry Association of South Australia Inc. SA

17. Humane Society International NSW

18. Vesper Tjukonai SA

19. Mr Mike South SA

20. Mr Peter Murray VIC

21. Alexandrina Council SA

22. Goulburn Valley Environment Group VIC

23. Ms Paula Horbelt SA

24. Mr Mitch Williams MP SA

25. Mr George Gordon VIC

26. GetUp! Action for Australia NSW

27. River Lakes and Coorong Action Group Inc. SA

28. Mr George Bennett

29. Bruce and Annette Allnutt SA

30. Mr John Eckermann

31. Australian Management Consolidated Pty Ltd VIC

32. Ms Liz Yelland SA

33. Mr Matthew Dowling

34. Ms Kathryn Rothe

35. CSIRO Government and International ACT

36. Mannum Progress Association SA

37. Mr Ali Baker SA

38. Mr Peter Marsh

39. Ms Lesley Fischer

40. Kerri Muller NRM SA

41. Ms Karyn Bradford SA

42. Plug The Pipe

43. Ms Maria Riedl

44. Acheron Valley Watch Inc VIC

45. Environmental Defenders Office (SA) Inc. SA

46. Professor Diane Bell

47 Name withheld

48. Waterfind Environment Fund SA

49. Ms Mary Chandler

50. Cotton Australia

51. Mr Peter Smith OAM

52. Earth and Environmental Sciences SA

53. Sugarloaf Pipeline VIC

54. Queensland Farmers' Federation QLD

55. Mr Barry McClure

56. Ms Anne Hartnett

57. Coorong, Lakes and Murray Waterkeeper

58. University of South Australia SA

59. Mr Nigel Croser SA

60. Department of Natural Resources and Water QLD

61. Murray -Darling Basin Water Crisis Management Council NSW

62. Mr Keith Loeser

63. NSW Farmers' Association NSW

64. Mr Tony Windsor MP

65. NSW Department of Water and Energy

66. The Coorong District Council

67. Joe, Lorraine & Michael Leese

68. National Farmers' Federation

69. Inland Rivers Network

70. Mr John (Jack) King

71. Wentworth Group of Concerned Scientists NSW

72. Murray Irrigation Limited

73. South Australian Government

74. Professor Jerry Vanclay, D.Sc.For.

75. Dr. R.W Vervoort

76. Murray-Darling Basin Commission

77. Murray-Darling Association SA

78. Chris and Cheryl Bagley

79. Professor Allan Barton ACT

80. Biodynamic Agriculture Australia

81. Australian Conservation Foundation VIC

82. Mr John Caldecott SA

83. Mr R Ian Morse NSW

84. Mr Robert S. Burke SA

Appendix 2

Witnesses who appeared before the committee at the public hearings

Tuesday, 9 September 2008
Parliament House
CANBERRA

Department of Environment, Water Heritage and the Arts
Mr Tony Slatyer, First Assistant Secretary, Water Reform Division
Ms Mary Harwood, First Assistant Secretary, Water Efficiency Division
Mr Mark Flanigan, Assistant Secretary, Strategic Approvals and Legislation Branch, Approvals and Wildlife Division

CSIRO
Dr Thomas Hatton, Director, Water for a Healthy Country Flagship
Dr William Young, Theme Leader, Healthy Water Ecosystems

New South Wales Irrigators Council
Mr Andrew Gregson, Chief Executive Officer

Department of Natural Resources and Water, Queensland
Mr Scott Spencer, Director-General
Mr Greg Claydon, Executive Director, Strategic Water Initiatives
Ms Debbie Best, Deputy Director, General Water and Catchment Services

Community Advisory Committee of the Murray-Darling Basin Ministerial Council
Mr Lee O'Brien, Chairman

National Farmers Federation Water Taskforce
Mr Laurie Arthur, Chair
Ms Deb Kerr, Natural Resource Management Manager

Dr Donald Blackmore, Private capacity

MainStream Environmental Consulting Pty Ltd; RiverSmart Australia
Dr William Phillips, Director

Wednesday, 10 September 2008
Stamford Grand Hotel
ADELAIDE

Conservation Council of South Australia
Ms Julie Pettett, Chief Executive
Mr Jamnes Danenberg

Dr Kerri Muller, Private capacity

University of Adelaide
Professor Michael Young, Research Chair, Water Economics and Management
Professor Justin Brookes, Research Scientist and Leader CLLAMMecology

Central Irrigation Trust
Mr Gavin McMahon, Operations Manager

Murray-Darling Association Inc.
Mr Raymond Najar, General Manager

Adelaide University
Associate Professor Williams, Associate Dean, Law School

Lower Lakes and Coorong Infrastructure
Mr Neil Shillabeer, Chair

CSIRO
Professor Rob Fitzpatrick, Chief Research Scientist and Professor Flinders University
Dr Paul Shand, Principal Research Scientist

River, Lakes and Coorong Action Group Inc.
Mr Paul Davis, Lakes and Murray Waterkeeper and Committee Member

South Australian Dairyfarmers Association
Mr David Basham, President

South Australian Farmers Federation
Mr Kent Martin, Board Member
Dr Nigel Long, Natural Resources Manager

Alexandrina Council
Mayor Kym McHugh

Mr Henry Jones, Private capacity

Mannum Progress Association
Ms Helen Griffiths, Member

Thursday, 18 September 2008
Parliament House
CANBERRA

Department of Environment, Water Heritage and the Arts
Mr Tony Slatyer, First Assistant Secretary, Water Reform Division
Ms Mary Harwood, First Assistant Secretary, Water Efficiency Division
Mr Harry Abrahams, Acting Assistant Secretary, Water Reform Division
Mr Mark Flanigan, Assistant Secretary, Strategic Approvals and Legislation Branch, Approvals and Wildlife Division

Inland Rivers Network
Ms Amy Hankinson, Coordinator

New South Wales Department of Water and Energy
Mr David Harriss, Deputy Director General, Water Management

Friday, 19 September 2008
Parliament House
CANBERRA

Professor Richard Kingsford, Private capacity

Murray Irrigation Ltd
Mr Stewart Ellis, Chairman, Board of Directors
Mrs Claire Gibson, Communications Officer

Wentworth Group of Concerned Scientists
Mr Peter Cosier, Director
Professor Bruce Thom, Member
Dr John Williams, Member
Professor Michael Young, Member
Mr Richard Harvey, Member

Mr Ian Kowalick, Private capacity

Ms Ilona Millar, Private capacity

South Australian Government
The Hon. Karlene Maywald, Minister for the River Murray and Minister for Water Security

Department of Water, Land and Biodiversity Conservation, South Australia
Mr Scott Ashby, Chief Executive
Mr Andrew Beal, Chair, Water Security Technical Working Group

Coorong Council
Councillor Roger Strother, Mayor

CSIRO Land and Water
Dr Ian Webster

University of Western Australia
Dr Matthew Hipsey, Research Fellow, Centre for Water Research

WBM Consulting
Mr David Wainwright

Bondi Group and National Irrigation Corporation Water Entitlements Register
Ms Jenni Mattila, Coordinator

Department of Environment, Water Heritage and the Arts
Mr Tony Slatyer, First Assistant Secretary, Water Reform Division
Ms Mary Harwood, First Assistant Secretary, Water Efficiency Division
Mr Harry Abrahams, Acting Assistant Secretary, Water Reform Division
Mr Mark Flanigan, Assessment of Wildlife Division

Friday, 26 September 2008
Parliament House
CANBERRA

Bureau of Meteorology
Mr Neil Plummer, Acting Superintendent, National Climate Centre
Dr David Jones, Supervisor, Climate Analysis Section, National Climate Centre

New South Wales Farmers Association
Ms Louise Burge, Chairman, Conservation and Resource Management Committee

Australian Conservation Foundation
Dr Arlene Buchan, Coordinator, Healthy Rivers Program

Murrumbidgee Irrigation Ltd
Mr Richard (Dick) Thompson, Chairman

Plug the Pipe
Mr Robert Richardson, Organiser
Mr Kenneth Pattison
Mr Christopher Harrison

Australian Floodplain Association
Mrs Deborah Kaluder, Committee Member

Murray-Darling Basin Commission
Dr Wendy Craik, Chief Executive
Mrs Jody Swirepik, Director, Living Murray
Mr Alan (David) Dreverman, General Manager, River Murray Water

Murray-Darling Basin Authority
Mr Robert Freeman, Acting Chair and Chief Executive

Victorian Farmers Federation
Mr Richard Anderson, Chair, Water Council
Mr Graeme Ford, Executive Manager, Policy

Snowy Hydro Ltd
Mr David Harris, Executive Officer, Regulatory Strategy, Legal and Water
Mr Andrew Nolan, Manager, Water

Appendix 3

Tabled Documents

Index of Documents Tabled at Canberra Hearing
Tuesday, 9 September 2008

Lodged by	Title/Description	No of Pages
Mr Lee O'Brien	*Community Advisory Committee Terms of Reference*	1
Laurie Arthur and Deb Kerr, NFF Water Taskforce	Opening statement, notes and graphs: *Water Briefing Note*	11
Dr Bill Phillips, Mainstream Environmental Consulting	Document containing series of photographs and graphs: *What made the Coorong and Lower Lakes a Wetland of International Importance?* -	9

Index of Documents Tabled at Adelaide Hearing
Wednesday, 10 September 2008

Lodged by	Title/Description	No of Pages
Professor Mike Young	*Living Murray Business Plan*, 1 April 2005	66
Professor Mike Young	Report: Professor Mike Young and Jim McColl, *A future-proofed Basin: A new water management regime for the Murray-Darling Basin*, 2008	34
Professor Mike Young	*Review of Options to Reduce evaporation Losses in the Southern Connected River Murray System: Suggested Terms of Reference*	1
Professor Mike Young	Table: *Table 2: Cap factors for water products in New South Wales, Victoria, South Australia and the Australian Capital Territory*	1

Professor Mike Young	Submission to Senate Enquiry into the Urgent Provision of Water to the Coorong and Lower Lakes: *A Future for the Coorong and Lower Lakes*, Associate Professor David Paton, Dr Daniel Rogers, Dr Kane Aldridge, Dr Brian Deegan and Associated Professor Justin Brookes, School of Earth and Environmental Sciences, University of Adelaide, September 2008	7
Professor Rob Fitzpatrick	Documents containing maps, diagrams and graphs: *Lake Albert scenario maps for acid sulfate soil materials* and *Lake Alexandrina scenario maps for acid sulfate soils materials*	2
South Australian Farmers' Federation	SAFF Policy: *Murray Darling Basin*	2

Index of Documents Tabled at Canberra Hearing
Friday, 19 September 2008

Lodged by	Title/Description	No of Pages
Professor Richard Kingsford	Paper: *Classifying landform at broad spatial scales: the distribution and conservation of wetlands in New South Wales, Australia*	15
Murray River Irrigation	Two photographs of Wakool River, "Coobool", August 2008	2
Murray River Irrigation	Imagery: *Comparison of land use for agricultural production in the Murray Irrigation area of operations from between 2001 and 2008*	1
Murray River Irrigation	Maps of rice grown in the Murray Irrigation Limited area of operations over successive years	1
Ms Jenni Mattila	List of water prices: *Water Market Report: Spot Allocations as at 15 September 2008*	2

Department of Environment, Water, Heritage and the Arts	*Update to first submission – Attachment A: Options for short-term management interventions to improve the health of the Coorong and Lower Lakes*	2
Department of Environment, Water, Heritage and the Arts	Table: *Table 1: Volume of water purchases currently being pursued by catchment and entitlement type*	1

Index of Documents Tabled at Canberra Hearing
Friday, 26 September 2008

Lodged by	Title/Description	No of Pages
Dr Arlene Buchan, Australian Conservation Foundation	Paper: *Trading Rules*	12
Snowy Hydro	Document containing illustrations relating to the Snowy Hydro Scheme	10