NSW

19.04.2018

The Commissioner.
Murray-Darling Basin Royal Commission'
G.P.0 Box 1445
Adelaide, S.A 5001.

Submission.

Dear Sir.
I am pleased to be able to take advantage of the opportunity to submit this submission on the social, economic and environmental impacts that the implementation of the Murray Darling Basin Plan may have on regional communities.

If my assumptions are correct and the changes precede then Broken Hill and the Lower Darling communities and environment will be severely impacted particularly during dry periods when the security of supply to South Australia may be reduced.

Many proposals and or suggestions that huge savings can be gained by changed management at the Menindee Storages may have serious consequences in future years.(A 1) Having been a Community Member on the Broken Hill Water Board, Darling River Water Savings Project, State of The Darling Report, Lower Murray Darling Catchment Management Board and numerous other investigations concerning water, modelling showed that the largest water savings from the Menindee Lakes can be gained by reducing evaporation by holding the least amount of water in storage for the least possible time, in other words run the system on empty. This practice could have devastating effects on a large portion of the entire Basin particularly in dry periods unless significant structural changes are made such as restoring the Menindee Storage system back to its full design capacity level of 2,500,000 ML level instead of 1,800,000ML that it now operates from. (A 2) I restrict my submission largely to the Menindee Lakes and Lower Darling River area because of my understanding of this region and the fact that the Menindee Lake system will play a significant roll in enabling the N.S.W Government to achieve its water recovery target under the Basin Plan. At the same time it is of equal importance the Plan protects the environmental values of eco systems and in some instances necessitates restoration.

My submission is influenced largely on the following three publications

1. Sharing the water, One hundred years of River Murray Politics by Chris Guest. Published by Murray Darling Basin Authority. MDBA Publication No 43/16. ISBN (print) 978-1-925599-04-06. ISBE (online) 978-1-925599-05-

2. THE DARLING RIVER. A National Estate Study of the Natural Environment.
   (919-449 HEL) Report by Peter Helman. Copies in Archives section , Broken Hill Library . (115 pages

3. BACKGROUND REPORT ON MENINDEE LAKES STORAGE. New South Wales. Report No (82/44 (1696W)
   Publication by Water Resources Commission. New South Wales.
   Authors. W. Martin, A.Hamroizi. & J. Coolhaas.
   A copy of this last report may be hard to obtain . I have an original copy with working drawings etc. (47 pages plus drawings)

MURRAY RIVER

Prior to the construction of the Menindee Storages in 1950/60s irrigation development was limited to a large extent to the Murray and Murrumbidgee river areas because the only major storage to guarantee water supply down the Murray River was the Hume Reservoir.

25,000 ML p/d can be releases from the Hume Reservoir; however that flow is restricted to 8,500 ML p/d by the Barmah Choke, from that reduced flow below the Choke South Australia is entitled to a 7,000 Ml flow P/D into South Australia in months December /January. (A 3). Below the Choke all Murray urban, stock and domestic and industrial water demands must also come out of that 8,500ML of Murray flows unless there is surplus water in the Murrumbidgee or Darling systems.

There have been times when the Murray River has been under stress and ceased to flow such as in 2001 when the Murray River between Lock 10 (Wentworth) and Lock 11(Mildura) flowed backwards. (A 4)

This event was at a time when S.As water entitlement was at or near peak demand and the shortfall was taken out of the 480,000 ML Lower Darling Drought Reserve at Menindee. Local Murray River residents were warned not to swim, play or fish in that part of the river and keep animals away from the water if possible because of its poor quality. Some 30km above Lock 11 at Bottle Bend there have been pH levels as low as 1.6 and conductivity exceeding 140,000 Scn. (A 5)

The drought continued leaving all Lower Darling, Broken Hill &, Menindee communities suffering from health problems, having to have water carted to residences, purchase drinking water, loss of agriculture crops while the environment suffered enormously. I believe under original guidelines of the Snowy Mountains Scheme Agreement the shortfall should have came from

Murrumbidgee water not out of the Drought Reserve of Lower Darling Water stored at Menindee.(A6)

Attachment A4 clearly demonstrates the fragility of management of supply to meet the demands for this nations most precious commodity 'WATER' considering the irrigation expansion and the increase in population since year 2001.

SNOWY MOUNTAINS SCHEME

The Snowy Mountains Scheme raised its head in early 1956 when the then South Australian Premier Tom Playford threatened court action to stop the Snowy Scheme being built believing that S.A would be deprived of water flow because the scheme would be harnessing the Murray headwaters.

Agreement was reached 1958 when S.A was granted an assurance that if the Murray failed supply then any shortfall would come from either the Darling or the Murrumbidgee system.(A5) P 87/91.Sharing the Water.(A6)

With the completion of construction of the Menindee Storages in 1960 there were now two storages or cornerstones in the Murray-Darling river system, the Hume and Menindee Lakes reservoirs, which gave river management the ability to shift water from one region to another i.e. supply all S.As water entitlement from the Darling and allocate more water to Murray or Murrumbidgee developments.(A.6.)

If the Menindee Storage is to be operated at or near empty as quickly as possible it means returning to the situation to near or at what existed prior to the construction of the Menindee system with only one cornerstone creating greater chances of calling on Murrumbidgee water if the Murray is unable to supply demand as in January 2001(A4) This attachment explains the magnitude of this situation considering the unknown future effects such as climate change and demand from population growth etc.

MENINDEE LAKES STORAGE

In 1984/5 the N.S.W Water Resources Commission, commissioned messes W.Martin, A. Hamrozi and J. Coolhass to bring down a report on the history of the Menindee Lakes System ."BACKGROUND REPORT on the MENINDEE LAKES." 1696w. (48 pages plus appendix and drawings)

This report found in favour of
"The storage being raised to its full design capacity level of 2,500,000 megalitres and the works should start immeadiately".

The cost of the works was $1,700,000 at 1984 dollars'. The additional yield resulting from the return to the design capacity of 2,500,000 ML can be fully utilised by New South Wales immediately and that the Water Resources of New south Wales should proceed immediately to prepare detailed final design for works to increase the active storage capacity of the Menindee Lake from 1,800,000 megalitres to 2,500,000." (A 2).

Such a change would increase the depth of the lakes by approximately 1.5 metres, reducing the evaporation rate because of the extra depth of water with no increase in residual pools should result in greater efficiencies. I believe that a proportion of this additional 700,000 ml could increase the volume of water available to the N.S.W. State to meet its environmental water sharing target and a portion held in reserve to enable irrigation water transfers to continue further into a future drought period.

THE DARLING RIVER

The Darling River is an " events" flow river, meaning that at times the river ceases to flow and the Menindee Storages can be empty for unpredictable periods.(A 6) It is therefore necessary to have a drought reserve of 480,000 Ml reserved within the lake system , this allocation was calculated to last Broken Hill and Lower Darling River requirements for an estimated 18 months water supply.(A2).In 2012 The Basin Authority was given permission to access environmental water out of the Menindee Lakes system with the outcome being the drought reserve was again reduced by 50% the drought continued and many millions of dollars spent endeavouring to find an alternate water supply for Broken Hill and Lower Darling River communities. The people and industry on the river were severely inconvenienced and the environment suffered. The Broken Hill and River communities once again suffered from severe water restrictions and poor quality water creating numerous health problems etc..

These events prove that crises events arise in time of severe drought, management mistakes or structural failures have happened in the past and will again in future years and without a significant accessible drought reserve retained in the Menindee system there will be instances when Murrumbidgee irrigators will be called upon to service South Australia entitlement.

Darling River flows are varied and unpredictable(A 7). The small and medium flows originating in the Northern reaches of the Darling System are vital to the health and stability of the entire Darling River system. On numerous occasions Northern irrigators have been allowed to pump medium to low flows for low security irrigation crops with the excuse that these smaller flows are of no or little benefit to downstream users whereas the MDBA 7.3.2018 emphasises the importance of these flows to the environment(A 8)

If embargos on smaller northern flows are lifted it means that low security irrigation license holders are able to access water ahead of or at the expense of urban and stock and domestic consumers further down the system.(A 8)

Compounding the effects of supply is its QUALITY of supply. The urgency QUALITY OF SUPPLY of this situation is explained in more detail in attachment (A4) it identifies the enormous problem of quality within the system not only for human consumption but industrial uses and stock and domestic (A 4). This situation can only be addressed in the short term of high river flow enabling management to dilute and flush it further downstream. It is therefore important that compliance of licence conditions is enforced.

ENVIRONMENT

The natural environment of the Menindee Lakes is unique although significantly changed by the construction of the water storage scheme. The lakes are amongst the most important breeding areas for native fish in the entire Murray- Darling River system as well as bird life, which includes some rare and endangered species as well as migratory species and is often referred to as an Icon Site. The importance of the Menindee Lakes for water supply for towns, irrigation, agriculture and industry cannot be overstated.

Nor can the need to protect the sites and features of the lakes and their surrounds, which are significant for the Aboriginal culture. Equally important is the need to protect the biodiversity and ecological integrity of the natural ecosystems.

Water from this significant and often referred to as a Darling River Icon site should not be sacrificed to the benefit of Murray Icon sites.

In 1985/6 The NATIONAL TRUST OF AUSTRALIA (NSW) employed a consultant, Peter Helman, to undertake an assessment of the National Estate value of the Darling River', (A 9)

The report is the result of his assessment The major recommendation of his report is "that the Darling River should be considered by Australian Heritage Commission for inclusion in the Register of the National Estate

- As the most significant riverine environment in the southern part of the Australian Arid Zone;
- As the least disturbed representative habitat for aquatic species in the MURRAY DARLING system; and
- As an area that contains both representative and unusual examples of geomorphic landscapes and processes, (clay dunes and anabranches) connected with both past and present).

The trust wholly endorses this recommendation and will nominate the Darling River for inclusion in the REGISTER of the NATIONAL ESTATE " .

I have been informed that the National Estate would now be a RAMSAR listing. His report contains some 115 pages, copy accessible in the Archives section of the Broken Hill Library (919.449 HEL)

The report highlights that the Darling River holds a special place in the Australian environment, being one of the nation's great rivers that drain half the area of New South Wales. This catchment is increasingly being development for more intensive agriculture. This development is altering both the landscape of the river and effecting the quality of water.(A 9)

In 2002 the Menindee Lakes Ecological Sustainable Development Project reported that there are seven requirements of which only one may enable an application for RAMSAR listing. The Menindee Lakes Ecological Sustainable Development Project found that of seven requirements available for listing as a RAMSAR site all seven can be reached at Menindee . (A. C.D 10)

RECOMMENDATIONS.

RESTORE MENENDEE LAKES STORAGE CAPACITY TO 2,500,000 ML
Menindee Storage increases to original size / capacity 2,500,000 Ml, as per recommendation in Background Report on Menindee Lakes (A 2)
Any disturbance or construction work in or around the Menindee Lakes area will activate acts protecting evidence of early Aboriginal presence. This would necessitate a" keeping place" be erected to hold and protect that evidence some of which may be secrete to aboriginal beliefs
This keeping place could form a part of a much larger structure holding photos and memorability and perhaps instruments used in the construction of the Lake System. Inside could be a model (preferably working) of the Murray Darling System. I estimate this would create employment opportunities for up to 10 aboriginal people

RAMSAR LISTING

That an application be prepared and lodged for the Menindee Lakes and surrounds to become listed as a RAMSAR Site. "as per the recommendation by Helman and C.H. Pratten in report to National Trust.

- As the most significant riverine environment in the in the southern part of the Australian arid zone.
- as the least disturbed representative habitat for aquatic species in the MURRAY –DARLING SYSTEM ; and
- as an area that contains both representative and unusual examples of geomorphic landscapes and processes, (clay dunes and anabranches with both past and present river systems and
- as the most significant river traversing the semi-arid zone in Australia.
- (for more details see THE DARLING RIVER appendix 9)

SMALL TO MEDIUM FLOWS & COMPLIANCE.

Small to medium flows originating in the Northern Darling reaches should be protected until inflow reaches the Murray weir Pool.

Taking small and medium flow water from the Northern Darling system rivers for commercial use must be embargoed. To allow pumping for commercial or irrigation purposes is putting high security irrigation licence users ahead of urban and stock and domestic consumers lower down the river on the same level.

COMPLIANCE
Appropriate department should be adequately funded to employ sufficient personnel to enforce licence conditions.

All irrigators must be encouraged to comply with licence conditions and any person who knowingly misappropriate or takes water or person who is an accessory to the act may be prosecuted

INCREASE DROUGHT RESERVE IN MENINDEE
Increase drought reserve to 600,000 to enable water transfers into a drought.

Risk Management Plan.
That a risk management plan of the risks of implementation of the B**asin Plan** be done enabling the public to fully understand the negatives of the changes occurring by the implementation of the Basin Plan

Signed.

Thomas Stanley (Stan) DINEEN

ATTACHMENT 1

Back then In 1994, the local Veteran, Vintage and Classic Motorcycle Club held a rally that was expected to draw people from all over the country with about 65 riders taking part.

BDT 17.3.19

The Tandou Letter: Blair responds

By Kara de Groot

NSW Water Minister, Niall Blair, has struck back at the opposition's claim that he is either incompetent or lying about Tandou being paid $78 million for its water rights at Menindee.

State Shadow Minister for Water, Chris Minns, made the claim after Mr Blair was unable to say when, or whether, he knew about the 'Tandou Letter', written by a senior member of his department that encouraged ex-federal water minister, Barnaby Joyce, to authorise the controversial purchase of Tandou's water.

The Australian Bureau of Agricultural and Resource Economics and Sciences had estimated the worth of the Webster-owned property at $24 million.

Mr Blair took the question on notice, but Mr Minns said it strained credulity that the Minister would not know about a senior member of his department sending letters on behalf of the NSW Government.

The letter was written to Mr Joyce by Gavin Hanlon who was the deputy director of the NSW Department of Primatry Industries' water division.

Mr Hanlon resigned last year after an independent inquiry recommended that he be investigated for misconduct for sharing confidential government information with cotton farmers.

"Niall Blair is either presiding over an out of control bureaucracy that pays no attention to him or he is refusing to reveal his part in the 'Tandou Letter'," Mr Minns said.

"The involvement of the NSW Government in the Tandou purchase has been an ongoing mystery with stakeholders questioning why the NSW Government would involve itself at all, let alone suggesting a water buy-back purchase from an irrigator."

While Mr Blair didn't address the question of his knowledge of the letter, he shot back at Mr Minn's claims, saying any suggestion the NSW Government intervened in the Commonwealth government's decision to acquire Tandou's water entitlement was untrue.

He said while his department supported the sale, the purchase was purely a matter for the Commonwealth Government.

"The NSW Government was not a party to the transaction or privy to the contractual details entered into between the Commonwealth and the seller," Mr Blair said.

"My Department has been clear that the Tandou purchase is fundamental to achieving the maximum water recovery offset from the Menindee Lakes Water Savings project, which will help NSW meet the water recovery targets under the Murray-Darling Basin Plan.

"The buy-back delivered good environmental outcomes through a direct reduction in water coming out of the system and also provided significant addition environmental benefit as less water was being lost while servicing this entitlement.

"The purchase of irrigation water by the Commonwealth to be delivered back to the environment is a core function of the Basin Plan and has occurred under various governments."

EDT 17/3/19

(1696W)

Pat & Stan Dixon
ATTACHMENT No A. 2

A 2

WATER RESOURCES COMMISSION
NEW SOUTH WALES

BACKGROUND REPORT
ON
MENINDEE LAKES STORAGE

5. PROPOSAL TO RESTORE MENINDEE LAKES STORAGE TO ORIGINAL CAPACITY

In July 1978, the Water Resources Commission advised the River Murray Commission of the results of studies into a proposal to raise the Menindee Lakes Storage to 2 500 000 megalitres.

The report as presented to the R.M.C. is attached as Appendix A.

The conclusions drawn from the report were:-

(i) The cost of the works necessary to increase the present storage from 1 800 000 megalitres to the former storage capacity of 2 500 000 megalitres is $1,700,000 at 1984 cost estimate.

(ii) Construction of these works would increase the yield of the Menindee Lakes Storages by an estimated 46 000 megalitres per annum.

(iii) The additional yield resulting from the enlargement of storage capacity can be fully utilised by New South Wales immediately.

(iv) No significant adverse environmental impacts are expected to result from the works proposed. A slight deterioration of water quality in the lakes may be expected. (See 10).

The following recommendations were made:-

(i) The Water Resources Commission of New South Wales should proceed immediately to prepare detailed final designs for works to increase the active storage capacity of the Menindee Lakes from 1 800 000 megalitres to 2 500 000 megalitres.

(ii) The project be deemed a work of New South Wales and the increased yield a New South Wales resource rather than River Murray Commission resource.

(iii) The cost of the works, estimated at $1 million, be borne by New South Wales.

(iv) The River Murray Waters Agreement and the Menindee Lakes Storage Agreement be amended appropriately to accommodate the proposed works and revised operating procedures for the enlarged storage complex.

Rec 3rd page

Execution of the option on the part of New South Wales to restore the original storage capacity would provide an increment in yield of 46 000 megalitres per annum which could be used either by the River Murray Commission or allocated to New South Wales for increased supply to the Lower Darling River system. The cost of the necessary works is estimated at only $1 000 000 and is an attractive investment. These works will restore the Storage scheme, which New South Wales constructed at a cost of $11 million, to the originally intended capacity of 2 500 000 megalitres.

Whilst the need for the provision of additional regulated flows for water users along the Murray River is recognised, demands along the lower Darling River System can only be met by developing the water resources of the Darling River.

There is a pressing need for an increase in the New South Wales annual quota from the Menindee Storages and the whole of the incremental yield of 46 000 megalitres per annum resulting from enlargement of Lakes capacity to 2 500 000 megalitres could be immediately utilised to this end. For this purpose New South Wales would undertake the works necessary for the restoration of the original storage capacity at its own cost. Variation to the Menindee Lakes Storage Agreement would be necessary with both the New South Wales annual quota and the reserved storage figures being increased.

Should the increase in yield be regarded as a River Murray resource, then the specified reserve storage volumes must still be raised to increase the realiability of supply of the New South Wales entitlement from the storage. However, in view of the relatively small benefits to the three States this alternative should not be preferred.

THE STORAGE AGREEMENT

The entitlements of the three states to the waters of the Menindee Lakes Storage are set out in the Menindee Lakes Storage Agreement. The provisions of this agreement which are relevant to the proposal to increase the storage capacity as a work of New South Wales are set out in Schedule B.

The major requirement is for the variation of the reserve storage provisions and amendment of the New South Wales quota to allow up to 170 000 megalitres per annum to be available to New South Wales at an acceptable level of reliability without debit of its share of the River Murray Water Resources (Clauses 7 and 8 apply). At this time investigations have not proceeded to the stage where revised reserve storage levels can be nominated.

Full supply levels of the Lakes referred to in the Agreement would need to be varied (Clause 6 applies). Consideration would need to be given to the mode in which any additional maintenance costs are to be met (Clauses 9(B) and 11 apply).

Finally consideration would need to be given to the effect that any variation in the levels of reserve storages might have on payments under Clause 9(A) of the Agreement.

CONCLUSIONS

(i) The cost of the works necessary to increase the present storage from 1 800 000 megalitres to the former storage capacity 2 500 000 megalitres is $1 000 000.

(ii) Construction of these works would increase the yield of the Menindee Lakes Storages by an estimated 46 000 megalitres per annum.

(iii) The additional yield resulting from the enlargement of storage capacity can be fully utilised by New South Wales immediately.

(iv) No significant adverse environmental impacts are expected to result from the works proposed. A slight improvement of water quality in the lakes may be expected.

- The Water Resources Commission of New South Wales proceed immediately to prepare detailed final designs for works to increase the active storage capacity of the Menindee Lakes from 1 800 000 megalitres to 2 500 000 megalitres.

- The project be deemed a work of New South Wales and the increased yield a New South Wales rather than River Murray Commission resource.

- The cost of the works, estimated at $1 million, be borne by New South Wales.

- The River Murray Waters Agreement and the Menindee Lakes Storage Agreement be amended appropriately to accommodate the proposed works and revised operating procedures for the enlarged storage complex.

New South Wales and Victoria must supply half each of both the South Australian entitlement flow and any additional dilution flow of 3000 megalitres a day. If the lakes are spilling and flow at the South Australian border is forecast to exceed any regulated flow requirement (that is the spill cannot be stored in Lake Victoria and is not useful to meet any diversion requirement upstream of the border), then water diverted need not be debited against allocation. The spill from the lakes will be apportioned in the accounts with the aim to equalise any out-of-balance in State water components in Lake Victoria. However as usual any diversion will be accounted against the State which diverts.

4.2 South Australia Entitlement Flow

Under the Murray-Darling Basin Agreement, except during times of restriction, South Australia's entitlement must be supplied (provided in equal proportions by New South Wales and Victoria) with an annual entitlement flow of 1 850,000 megalitres, consisting of the monthly entitlements shown in Table 10.

Month	Entitlement (megalitres)	Equivalent Average Daily Flow (megalitres / day)
July	108,500	3,500
August	124,000	4,000
September	135,000	4,500
October	170,500	5,500
November	180,000	6,000
December	217,000	7,000
January	217,000	7,000
February	194,000	6,930*
March	186,000	6,000
April	135,000	4,500
May	93,000	3,000
June	90,000	3,000
TOTAL	**1,850,000**	*except in leap year

Table 10 : South Australian Entitlement Flow

Entitlement flow to South Australia may be drawn from Lake Victoria, the River Murray, and sometimes partly from Menindee Lakes. The contributions from each of these sources at any time is dependent on the prevailing river flows, and the operation of all storages in the River Murray system (including Menindee Lakes) according to operating rules. For example, if there is sufficient water in Lake Victoria or in the River Murray upstream of the Darling junction to meet downstream requirements, MDBC releases are not required and water is conserved in Menindee Lakes.

On average, water supplied from Menindee Lakes to the Lower Darling which then flows to the River Murray, is about is 720,000 megalitres per annum.

Under the combined operating rules for Menindee Lakes and Lake Victoria, additional dilution flow to South Australia of 3,000 ML/day may be provided under certain conditions. This operation has no adverse effect on water supply as there is reduced evaporation from Menindee Lakes by drawing on the storage to supplement River Murray flows. This provision is assessed as resulting in average salinity reduction of 35 EC units at Morgan in South Australia. When storage in Menindee Lakes exceeds specified targets (as listed in Table 11), and when the combined storage of Hume and Dartmouth Reservoirs exceeds 2,000,000 megalitres, the additional dilution flow may be provided.

Under the combined operating rules for Menindee Lakes and Lake Victoria, releases from Menindee Lakes are made to meet storage operating targets in Lake Victoria, which is then used to supply flow to South Australia.

ATTACHMENT 4

SECURITY OF WATER RIGHTS IN THE NEW SOUTH WALES MURRAY VALLEY

David Harriss
Regional Director, NSW Department of Land and Water Conservation
NSW Deputy Commissioner, Murray-Darling Basin Commission

Abstract

In the River Murray system, the rules for sharing water between NSW, Victoria, South Australia, and more recently Queensland and the ACT, are set out in the Murray-Darling Basin Agreement. These rules, and State water sharing policies, were developed during a period of water resource development, where irrigation expansion was seen as a basis for regional economic development.

Each State has different water sharing policies that reflect different agricultural practices and, to a lesser degree, the commitment of each State to their rivers and riverine environments. In the NSW Murray Valley, the water sharing policy protects high security water entitlements throughout all recorded droughts. General security entitlements are far more variable, reflecting the opportunistic nature of the agricultural practices for which they were developed.

In the past four years, a sequence of dry years has demonstrated how variable water resource availability can be. Changed irrigation practices now require water, which was previously supplied over spring, summer and autumn, to be delivered over a much shorter period, mostly in January and February, stretching the capacity to deliver. Similarly, providing environmental flows will reduce the amount of water available for consumptive use in the Murray Valley.

This paper outlines the current arrangements for water sharing in the NSW Murray Valley, the constraints to delivering water and the potential impacts of providing water for environmental purposes.

Key words

water, irrigation, security, environmental flows

2-11-01 ?

There are two situations in which, as a consequence of channel constraints, water supply in the River Murray below Torrumbarry may be significantly restricted.

i. when South Australia's water supply is being provided from the Menindee Lake and Lake Victoria and,

ii. when all of South Australia's water supply is being provided from the River Murray

i. Potential for restrictions to irrigation water supplies

In years when the South Australian entitlement is being met from the Menindee Lakes and Lake Victoria, such as in the summer of 2000-01, the minimum flows at Euston have not been sufficient to meet peak irrigation demand in the Sunraysia region while maintaining a flow over Mildura weir.

In January 2001, the MDBC reported flows in the Darling River at Burtundy of 12,180 megalitres per day. Flow at Euston was 4,400 megalitres per day. On the same day flow downstream of Wentworth was 12,120 megalitres per day. While accepting variations because of flow times, based on these numbers, the Murray River between Wentworth and Mildura weir was flowing backwards.

During periods of peak irrigation demand when South Australia's water entitlement is provided from the Menindee Lakes and Lake Victoria, it will be difficult to meet demand and maintain a flow in the river between Mildura and Wentworth. These conditions are particularly apparent on weekends, when diversions are increased during periods of off-peak electricity prices.

During these periods of reduced flow the potential for the development of algae blooms and reduced water quality increases. In recent summers, River Murray Water has pulsed water from Euston weir to meet the increased weekend demand, claiming that this may also alleviate water quality issues. This strategy provides additional water to meet peak demand and maintains the river at constant levels. However, there is no evidence that the volume of increased flows will suppress algae development, particularly in the Wentworth weir pool of the Murray River upstream of the junction of the Darling River to Mildura weir. This is currently being investigated by the Murray-Darling Basin Freshwater Research Centre.

There will inevitably come a time when the Menindee Lakes are dry, Lake Victoria is reduced and all of South Australia's entitlement is being supplied from Murray River reservoirs. Under these conditions, during peak demand in January, 7,000 megalitres per day will be required to flow to South Australia.

Only 8,000 megalitres per day can pass through the Barmah Choke and 1,950 megalitres can be diverted around the choke through the Edward River and Gulpa Creek. Consequently, only 2,950 megalitres per day minus losses will be able to be extracted downstream of Torrumbarry weir by all NSW and Victorian irrigators. Additional volume can be provided from the Murrumbidgee and Goulburn Valleys or through the Mulwala Canal. However, it may be expected that during periods of peak demand, flows in these sources are also fully committed.

ii. Minimum flow requirements in Sunraysia

Under current arrangements agreed by the MDBC, the minimum flows required at Euston weir include 2,500 megalitres per day plus sufficient volume to meet diversions within the irrigation districts.

BACKGROUND

Thought to be a problem of coastal regions, sulfidic sediments (potential acid sulfate soils) have emerged as a significant threat to the long-term ecological sustainability of Australia's inland wetlands and needs to be considered in wetland management plans.

The alarm was first raised by the NSW Murray Wetlands Working Group and Murray Darling Freshwater Research Centre after a drying and wetting cycle in 2002/03 at Bottle Bend lagoon in the Gol Gol State Forest near Mildura, Victoria, resulted in a massive fish kill and eventual death of thousands of trees and other vegetation.

Long term wetting, combined with increased salinity leads to formation of sulfidic sediments. When sulfidic sediments are dried and re wet a chemical process occurs which releases lots of acid into the system. Water quality analysis also showed heavy metals like aluminium and manganese were being released from the sediments. The end result was a toxic cocktail deadly to aquatic life.

Recent electrical conductivity readings at Bottle Bend were 140,000 EC (sea water is 60,000 EC). Bottle Bend is not an isolated case. The NSW Environmental Trust and NSW MWWG funded a major project in 2004 that examined a range of wetlands in NSW. Of the 81 NSW wetlands surveyed by the Murray-Darling Freshwater Research Centre, 20% showed some evidence of sulfidic sediments, which, if mismanaged, can potentially lead to ecological damage.

FOR FURTHER INFORMATION CONTACT:

Murray Darling Freshwater Research Centre

www.mdfrc.org.au

NSW Environmental TRUST

The Murray-Darling Freshwater Research Centre

NSW Murray Wetlands Working Group

SULFIDIC SEDIMENTS

THREATENING AUSTRALIA'S INLAND WETLANDS

www.mdfrc.org.au

WHAT ARE SULFIDIC SEDIMENTS?

Sulfidic sediments in inland wetlands are generally a sign of poor wetland condition, particularly due to salinity and being wet for most of the time.

- Sulfidic sediments form naturally when soils are inundated for extended periods by sulfate-rich water
- Sulfate is reduced to sulfide by anoxic bacteria in the presence of organic carbon
- Sulfides react with metals in the soil to form sulfidic minerals such as iron pyrite
- Sulfidic sediments cause no harm if left undisturbed and submerged
- However, if exposed to air (as in a natural or manipulated drying phase) the pyrites oxidise to produce sulfuric acid and other toxins
- When the soil is re-wetted, excess acid may be flushed into the water and cause harm to fish and vegetation

IDENTIFYING SULFIDIC SEDIMENTS WHAT TO LOOK FOR:

- Red discoloration from bank seepage which indicates groundwater intrusions high in iron content.
- Coppery coloured scum on banks and debris
- Iron bacteria residue which has an oil slick look and rust colored deposits
- Just under the surface of the scum, the soil resembles black 'ooze'
- Waters look unhealthy and are murky with an orange brown tinge
- A distinct 'salty' odour

WETLANDS WHICH ARE MOST AT RISK ARE THOSE THAT HAVE:

- been inundated for extended periods of time
- elevated groundwater levels and/or disposal basins in the surrounding area
- been identified as definitely containing suldific sediments or most probably contain them (see map)
- water with an electrical conductivity of:
  > 1750µS cm and /or sediment salinities of
  > 400µS cm

WHAT TO DO?

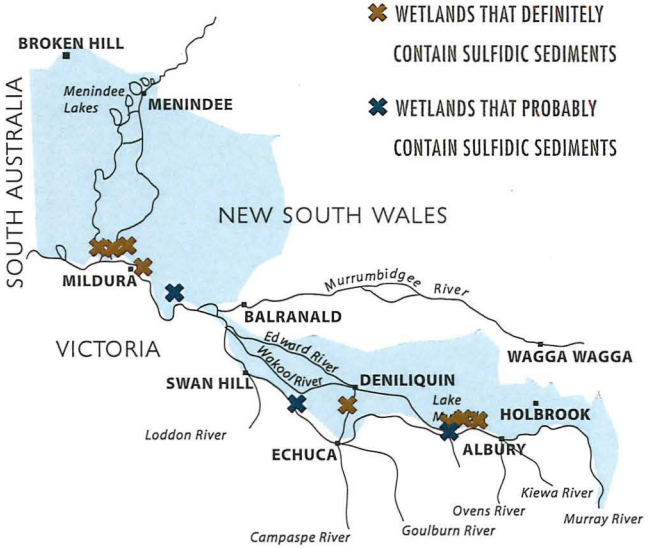
- If you suspect a wetland has sulfidic sediments, you will need to undertake a full assessment for the presence of sulfidic sediments before initiating a drying cycle It may be necessary to keep water in the wetland in the short term. The **Murray Darling Freshwater Centre** has developed a ***Rapid Screening Tool*** to assist you in indentifying wetlands that are at risk.

Contact **The Murray Darling Freshwater Research Centre** on (02) 6058 3200 for advice and to obtain a copy of the Tool.

WHAT IS IN THE FUTURE?

The Federal Government National Water Commission and the NSW Murray Wetlands Working Group are funding a large research project, being conducted by The Murray Darling Freshwater Research Centre, on the problem. Tools and guidelines will be developed on how best to manage inland wetlands and the NSW Environmental Trust is providing additional funding to promote and educate wetland managers across NSW. Through this collaborative effort, we hope to make significant progress within two years to help wetland managers and improve wetland condition.

SOME IDENTIFIED SULFIDIC SEDIMENT SITES ALONG THE MURRAY RIVER:



NSW Murray Wetlands Working Group

Bottle Bend Lagoon, Gol Gol State Forest, NSW – An Inland Wetland with Sulfidic Sediments

For many years the impact of sulfidic sediments (potential acid sulfate soils) has thought to be confined to coastal areas. However with the continuation of the current drought findings have shown that it is a significant threat to the long-term ecological sustainability of Australia's inland wetland and river systems.

The NSW Murray Wetlands Working Group (MWWG) is one of the leading organisations in Australia which is focussing on the impact of sulfidic sediments and is trying to develop management options for effected inland wetland systems.

Background - Bottle Bend Lagoon:

The NSW Murray Wetlands Working Group (MWWG) and the Murray Darling Freshwater Research Centre (MDFRC) were first alerted to the detrimental impacts of sulfidic sediments following a drying and wetting cycle that occurred at Bottle Bend Lagoon, NSW, during 2001/2002.

Bottle Bend Lagoon is a natural ephemeral wetland that is located within the Gol Gol State Forest on the NSW-side of the Murray River, approximately 30 km NE of Mildura, Victoria. For many years the wetland was semi-permanently inundated due to the influence of the Lock 11 weir pool at Mildura (Figure 1).

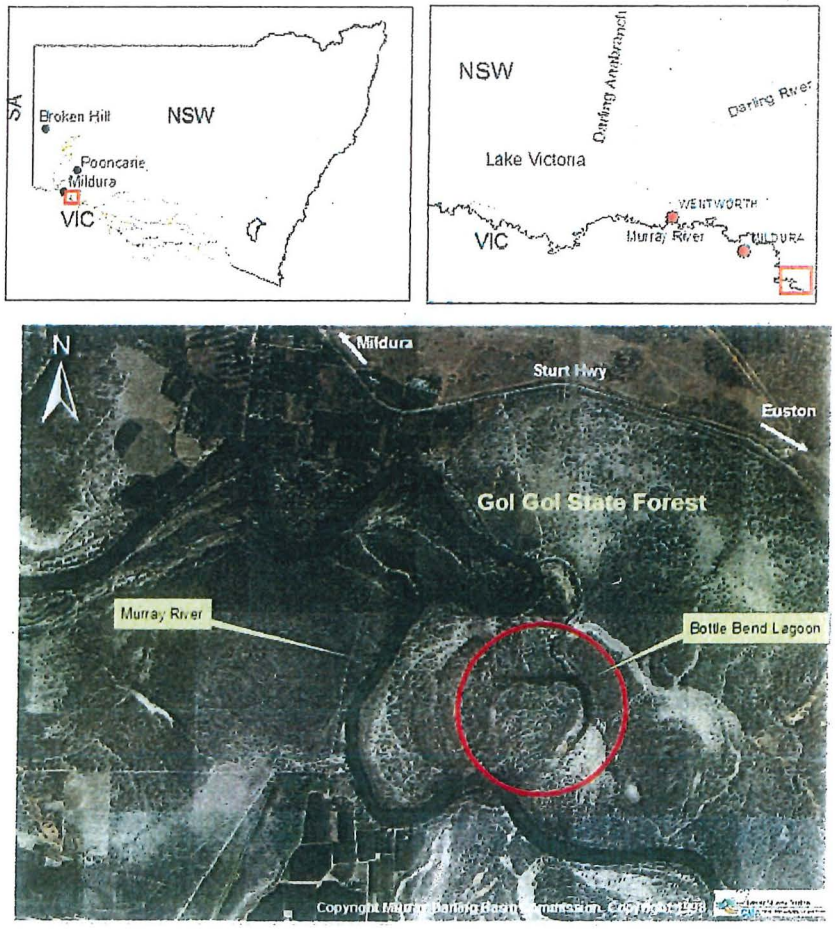


Figure 1: Bottle Bend Lagoon locality map

With the on-set of the current drought, low river flows (<3,500 ML/d) resulted in Bottle Bend Lagoon partially drying out over the summer months of 2001/2002 (Figure 2).

Figure 2: Partial drying of Bottle Bend Lagoon, Gol Gol State Forest, NSW, 2001-2002

Monitoring of the wetland showed the following results (McCarthy *et al.*, 2003):

- pH level decreased from 7.24 (April 2002) to 3.69 (June 2002)
- intrusion of highly saline groundwater (>30,000 μScm^{-1})
- groundwater is influenced by the operation of the Mildura weir pool
- liberation of heavy metals, such as aluminium and manganese, in lethal concentrations
- massive fish kill - decrease in diversity (7 genera reduced to 1 genus) and decrease in abundance (3,524 individuals sampled in May 2002, 48 individuals sampled October 2002)

As low flows continue within the Murray River, Bottle Bend Lagoon continues to undergo partial drying and re-wetting events, and therefore a cycle of acid production. Water quality readings at Bottle Bend Lagoon in 2008 showed pH levels as low as 1.6, and conductivity exceeding 140,000 μScm^{-1} (2007). Bottle Bend Lagoon is now a severely degraded freshwater wetland, and is a shadow of its former self (Figures 3 & 4).

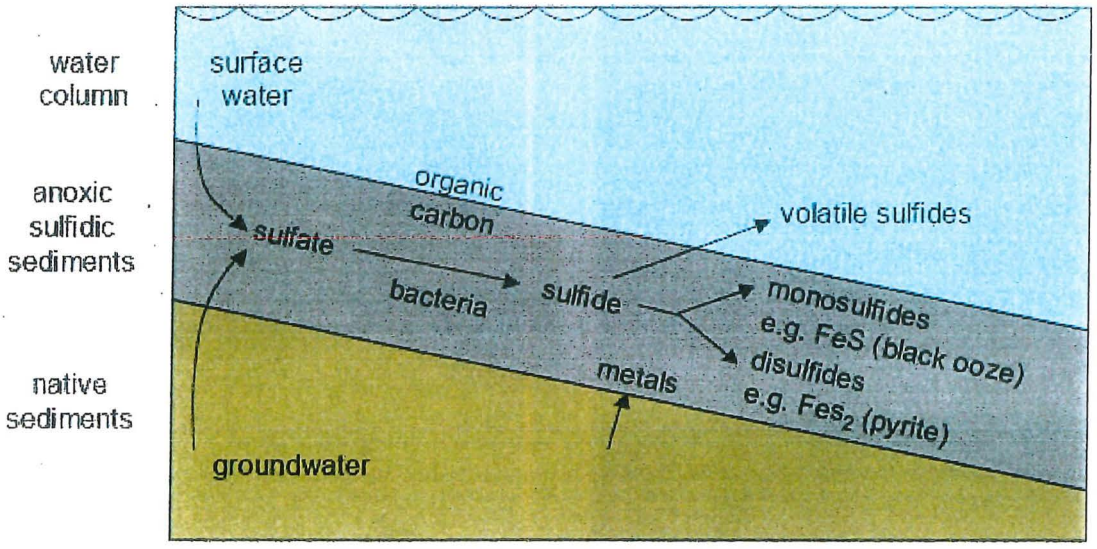
Figures 3 & 4: Bottle Bend Lagoon in October 2001 (left) and in May 2007 – impacts of sulfidic sediments and saline groundwater.

Unfortunately Bottle Bend Lagoon is not an isolated case. In 2004 the MDFRC conducted a major project looking at the prevalence of sulfidic sediments in wetlands within the NSW section of the Murray-Darling Basin. The project was funded by the NSW Environmental Trust and the MWWG. Of the 81 wetlands surveyed, 20% of wetlands showed evidence of sulfidic sediments, which if mismanaged, can potentially lead to ecological damage.

What are Sulfidic Sediments?

Sulfidic sediments form naturally when soils are inundated for extended periods by sulfate-rich water.

- Sulfate is reduced to sulfide by anoxic bacteria in the presence of organic carbon
- Sulfides react with metals in the soil to form sulfidic minerals such as iron pyrite
- Sulfidic sediments cause no harm if left undisturbed and submerged
- If exposed to air (as in a natural or manipulated druying event), sulfidic sediments oxidise to produce sulfuric acid and other toxins
- When the sediments are re-wetted, excess acid may be flushed into the water and cause harm to fish, water bugs and vegetation.



A diagrammatic representation of chemical processes that occur to form sulfidic sediments

Identifying Sulfidic Sediments – What to Look For:

- Red discoloration from bank seepage which indicates groundwater intrusions high in iron content (photo A)
- Coppery coloured scum on banks and debris (photo B)
- Iron bacteria residue which has an oil slick look and rust coloured deposits (photo C)
- Just under the surface of the scum, the soil resembles black 'ooze' (photo D)
- Waters look 'unhealthy' and are murky with an orange-brown tinge (photo E)
- A distinct 'salty' odour

Photo A

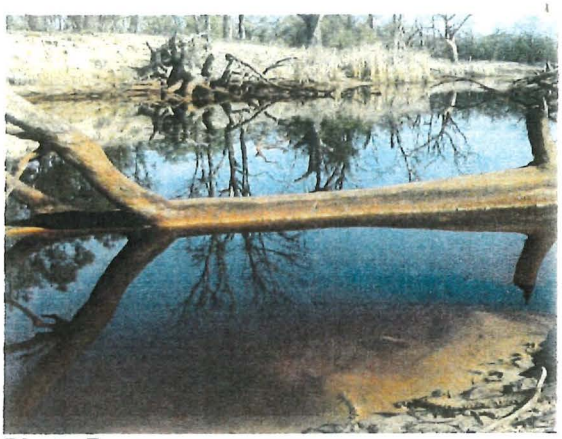


Photo B

Photo C

Photo D

Photo E

Wetlands Which Are Most At Risk Are Those That Have:

- Been inundated for extended periods of time
- Elevated groundwater levels and/or disposal basins in the surrounding area
- Been identified as definitely containing sulfidic sediments or most probably contain them
- Surface water with an electrical conductivity of >1,750 µScm and/or
- Sediment salinities of >400 µScm

What is in the Future?

The Australian Government's Raising National Water Standards Programme and the NSW Murray Wetlands Working Group are funding a large research programme being conducted by the Murray Darling Freshwater Research Centre.

The project is entitled "*Minimising Environmental Damage from Water Recovery from Inland Wetlands: determining water regimes to minimise the impact of sulfidic sediments (potential acid sulfate soils)*". The objective of the project is to provide tools and guidelines on how best to manage inland wetlands. The project aims to:

- Determine appropriate watering strategies in inland wetlands to minimise the formation of sulfidic sediments;
- Identify changes to hydrologic regime that minimise ecological harm in wetlands where sulfidic sediments are already present, particularly where a drying regime is being used as part of a water recovery strategy.

The NSW Environmental Trust is providing additional funding to promote and educate wetland managers across NSW.

Through these collaborations, it is hoped that significant progress will be made within two years to help wetland managers and improve wetland condition.

References:

McCarthy, B., Conallin, A., and Walsh, R. (2003). *Aquatic survey of Bottle Bend Lagoon, near Buronga NSW: Salinisation and acidification impacts.* Report to the NSW Murray Wetlands Working Group. Murray-Darling Freshwater Research Centre, Mildura.

Hall. K., Baldwin, S., Rees, G.N. and Richardson, A. (2006). *Distribution of Sulfidic Sediments in Wetlands along the Murray River.* Report to the NSW Murray Wetlands Working Group. Murray-Darling Freshwater Research Centre, Wodonga.

Hall. K., Baldwin, S., Rees, G.N. and Richardson, A. (2006). *Extent of sulfidic sediments in NSW inland wetlands.* Report to the NSW Environmental Trust.

McCarthy, B., Conallin, A., D'Santos, P. and Baldwin, D. (2006). *Acidification, salinisation and fish kills at an inland wetland in south-eastern Australia following partial drying.* **Ecol. Mng & Restoration 7(3):**221 – 223.

For more information please contact:

Dr. Deborah Nias
NSW Murray Wetlands Working Group

ommission started in
parliaments seemed
The Bill passed every
eration.

The Agreement is tested

The Snowy Mountains Hydro-Electric Scheme

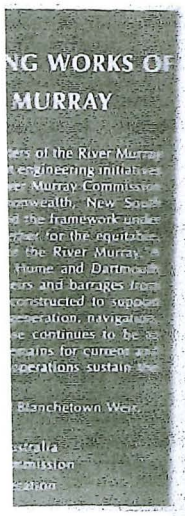
The South Australian Government learned in early 1956 that New South Wales and Victoria were negotiating to share the additional water that would be diverted into the upper Murray as a result of the Snowy Scheme. The discussions were between the Commonwealth, New South Wales and Victoria, and excluded South Australia. Requests by South Australia for drafts of the Snowy Mountains Agreement were rejected. On the face of it, excluding South Australia from the negotiation was aggressive. From the perspective of the Agreement, the water introduced to the Murray was Murray water and therefore subject to the Agreement. To an extent, however, the exclusion reflected the origins of the Snowy Scheme.

The idea for the scheme was first developed in 1943 by New South Wales as an irrigation project for the Murrumbidgee Valley. Further investigation suggested that it might be more profitable to divert water to the Murray for irrigation. With this finding, Victoria was drawn into the project. Following engineering design innovations, which reduced the cost of hydro-electric power, and electricity shortages at the end of the Second World War, the economic focus of the Snowy Scheme shifted from irrigation to hydro-electricity.[45]

The two states demanded the Commonwealth become involved to fund the project as a national work. Labor Prime Minister Ben Chifley was receptive to the states' call. The result was the political dynamic of the project was between New South Wales, Victoria and the Commonwealth.

The South Australian premier, Tom Playford, was the central player in the dispute that followed. Playford's biographer, Stewart Cockburn, describes him as 'the greatest of all South Australians'. Playford lived his whole life on the family's orchard in the Adelaide Hills. His grandfather had twice been South Australian premier at the turn of the century and a minister in the Commonwealth Government. Having entered parliament in 1933, Playford became premier in November 1938, as the Leader of the Liberal and Country League. By remaining in office until March 1965, he was the longest serving political leader in Australia. With longevity came dominance — the South Australian Parliament was nicknamed 'Uncle Tom's Cabin'.

In relation to economic policy, for Playford the role of government was to engineer the industrial development of the state. His economic policies aimed to secure cheap electricity, land, housing and water through public ownership, along with low business taxes, all in the interests of promoting manufacturing investment. He was a conservative politician running an interventionist government. On social policy, Playford was deeply and stubbornly resistant to change. This is what brought him undone, as community values became more liberal.



Playford pursued getting access to the draft Agreement with his characteristic directness and determination. When Menzies denied his request to see the draft, he flew to Canberra. It appears he met the Commonwealth Minister for National Development and President of the Commission, Bill Spooner, by accident in the corridor outside the Prime Minister's office. Spooner had a copy of the draft Agreement under his arm, but refused to show it to Playford. Although 'Menzies professed to be quite afraid of Playford, and to dread his descents upon Canberra',[46] Menzies would not assist him. And so South Australia did not see the Snowy Mountains Agreement until it was signed in September 1957.

The exclusion of South Australia led to 'nearly three years of difficult and complicated negotiations'.[47] An early conference occurred in November 1957 between Menzies and Playford. Menzies had invited Playford to Cooma, where the Snowy Mountains Hydro-Electric Authority (Snowy Mountains Authority) was based. The purpose of the meeting was to brief Playford on the way the Snowy Scheme would operate.

The meeting did not go well. As Marianne Hammerton tells it

> *With the aid of a few pointed questions from Playford, it became obvious that the Snowy representatives could not be sure about the practical benefits for South Australia. Furthermore they had not devised any means of bookkeeping the waters involved. Menzies lost his affability and stormed off to his aeroplane. On the way back to Canberra he sat in the front seat, Playford sat half way down the plane, and Spooner was in the back seat.*[48]

In December 1957, Menzies wrote to Playford to propose that the River Murray Commission be asked to 'examine and report on the technical aspects of the effects of water regulation by the Snowy Mountains Authority'. Playford replied quickly. He rejected the proposal, because the Commission was 'composed of representatives of the four interested parties and could therefore hardly be regarded as an independent authority'.

The letter emphasised it was 'vital' that South Australia 'take whatever steps were open to it to protect the State's interests', and this could 'well have to include a challenge to the constitutional validity of the whole scheme and the legislation on which it is based'. 'In the hope of avoiding this action', Playford said he was

> *willing to take part in a further conference...with a view to arriving at an amendment of the River Murray Agreement to deal with the altered circumstances of the River arising from work being undertaken by the Commonwealth Authority.*[49]

Menzies' reply took a little longer, perhaps because he was marshalling support from the other states for asking the River Murray Commission to do the investigation he had proposed. In due course Menzies advised Playford that he had, with the support of Victoria and New South Wales, gone ahead and sought the advice of the Commission, in spite of Playford's objection.

In Menzies' view, no satisfactory negotiations could occur without expert advice about the effect of the Snowy on water to South Australia and about what would be required for New South Wales and Victoria to meet the South Australian 'request to share in the diverted waters'. Once the report was received, Menzies said he would be 'prepared to arrange a ministerial meeting'.[50]

South Australia's response was to take out a High Court writ against the Commonwealth in April 1958. Among other things, the writ sought a declaration that the *Snowy Mountains Hydro-Electric Power Act 1949–56* was beyond the power of the Commonwealth and therefore invalid. A decision would raise the issue of whether the Snowy Scheme itself was constitutional. Following the South Australian application to the High Court, negotiations progressed more quickly.

The River Murray Commission produced the report Menzies had asked for and a conference of ministers was convened in June 1958. It was attended by Menzies, Playford, Arthur Rylah (Victoria's Chief Secretary) and Bob Heffron (acting premier of New South Wales). Menzies was even-handed between the parties, while displaying an impressive understanding of the issues, or at least as good as anyone else, and worked hard to find a resolution. This was made difficult by the considerable animosity between Playford and Rylah, and by the lack of 'natural rapport' between Menzies and Playford.[51]

The New South Wales ministers were noticeably the least active participants. Much of the New South Wales case was left to the Crown Solicitor, Finlay McRae, who did not serve his state well. After an unhelpful analysis of the purpose of the Snowy Scheme, McRae overreached himself by saying that if the present arrangements were changed in any way, New South Wales would have to 'consider the whole of the financial provisions of the Snowy agreement'. Menzies described this 'as a most unpleasant remark'. McRae replied that it was 'factual', to which Menzies responded that if it were, he would resign. This was upping the stakes beyond a Crown Solicitor's remit.

Aside from the personal animosities, reaching a resolution was difficult because the issues were complicated. As Menzies put it

> *the Commission's English is not always frightfully plain to me. The River Murray Waters Agreement has only one rival in the field of draftsmanship, and that is the General Agreement on Tariffs and Trade, which is a dreadful affair.*[52]

Even expert officials struggled. Louis Loder, the Commonwealth deputy commissioner on the River Murray Commission and the Director-General of the Department of Works, confessed that 'no member pretends to understand Clause 51 of the Agreement'. This was the clause that provided for 'arrangements in periods of unusual drought', and was central to what was being discussed at the conference. As a result, a great deal of time was spent trying to comprehend what various parts of the Agreement meant.

While the conference did not resolve the dispute, the negotiation served to make clear what South Australia wanted — three-thirteenths of the increase in the flow of the Murray during periods of restriction, consistent with the 5:5:3 ratio by which water was shared between New South Wales, Victoria and South Australia under the Agreement. Unfortunately, that opened up a highly technical discussion about how the increase was to be calculated, which was all too much for a conference of ministers. At that point, Menzies suggested officials leave the room to allow an in-camera discussion.

The ministers reconvened a month later, in July, once again in Canberra. The opening statements were not encouraging. Playford restated the position he had put at the previous conference. Heffron put a lengthier case this time. His position was that New South Wales and Victoria were bearing the cost of the Snowy Scheme, and therefore New South Wales wanted to keep its half of the extra water accruing from the scheme.

At this rather dispiriting juncture, Arthur Rylah asked for a private discussion with Heffron. They returned with a proposal that South Australia would get its three-thirteenths share of the Snowy waters in a period of restriction, with the declaration of such a period to be by a three-quarters majority of the Commission. While ministers danced around the extent to which they could commit to the proposal, there was a clear sense that a landing had been reached. The Prime Minister closed the conference by saying that, while the states' Cabinets considered the matter, the draftsmen could start working on a new Agreement.

The fourth further amending Agreement (the 1958 Agreement) largely reflected the position reached at the July conference. South Australia's Engineer-in-Chief, Julian Dridan, estimated his state would gain 145 gigalitres annually in a drought contributed equally by Victoria and New South Wales. According to Dridan, this was an increase of a third over the quantity South Australia would have received without Snowy water. The concession by South Australia was to give New South Wales and Victoria the flexibility of taking excess water from the Murray and replacing it with water from tributaries below Albury. This meant New South Wales could use water from the Darling River, stored at the Menindee Lakes, to meet its obligations to South Australia and use the Murray and Murrumbidgee waters for the adjoining irrigation areas.

The three-quarters majority for the declaration of a period of restriction proposed by Rylah and Heffron was not adopted in the Agreement. Instead, the Agreement prescribed that the Commission declare a period of restriction when water stored in Hume Dam and Lake Victoria fell to 1,233 gigalitres, unless it agreed unanimously not to do so. This was to prevent South Australia from vetoing the declaration of a restriction, which it had an incentive to do, because it received a fixed amount in normal times and only a portion in a drought. During a restriction, the available water was to be shared between the three states in the unchanged ratio of 5:5:3.

The 1958 Agreement was the first to include an explicit reference to the need to use dilution flows to manage salinity. It provided that, after a period of restriction

the Commission was to determine the quantity of water to be allowed for dilution within South Australia.

The Bill comfortably passed all parliaments, ushered through by second reading speeches that were very similar. In every case the Opposition supported the Bill, though with some misgivings. In the House of Representatives, the South Australian Clyde Cameron put the Labor Opposition case. He believed South Australia should have received far more of the water diverted by the Snowy Scheme. On balance, however, he supported the Bill because South Australia had gained water, and it cleared the way for the Snowy Hydro Scheme.

In the state parliaments there were reservations about whether their state had gained all it could, or had given away too much. There was the sense, however, that parliaments could not refuse to ratify the Bill. Dissent was a matter of venting dissatisfaction with some aspect, raising pet concerns or playing out unrelated tensions.

In the South Australian Parliament, aside from Playford's assertive telling of his role in protecting his state's interests, the mood was one of quiet relief. The Opposition Leader 'congratulated all concerned'.[53]

There was some disquiet among backbenchers in the Victorian Parliament about the state not doing well. According to George Moss, the Country Party Member for Murray Valley, the Bill was 'not one that Victoria can be proud of', because Victoria had not received its fair share of water. Victoria would have made better use of the additional water than South Australia. The Country Party, however, would 'let the Bill go through'.

With support by the Labor Opposition and the Country Party, the passage of the Bill was never in doubt. Arthur Rylah chose to strongly defend it in the face of the criticisms by backbenchers. He may have felt a personal responsibility for the Bill, having initiated the deal with Heffron that settled the dispute. He told the House that, while 'we fight to the limit in the interests of our own state, we are all Australians'. He did not believe it was right to go into negotiations saying, 'We will do the other states if we can under any circumstances'.[54]

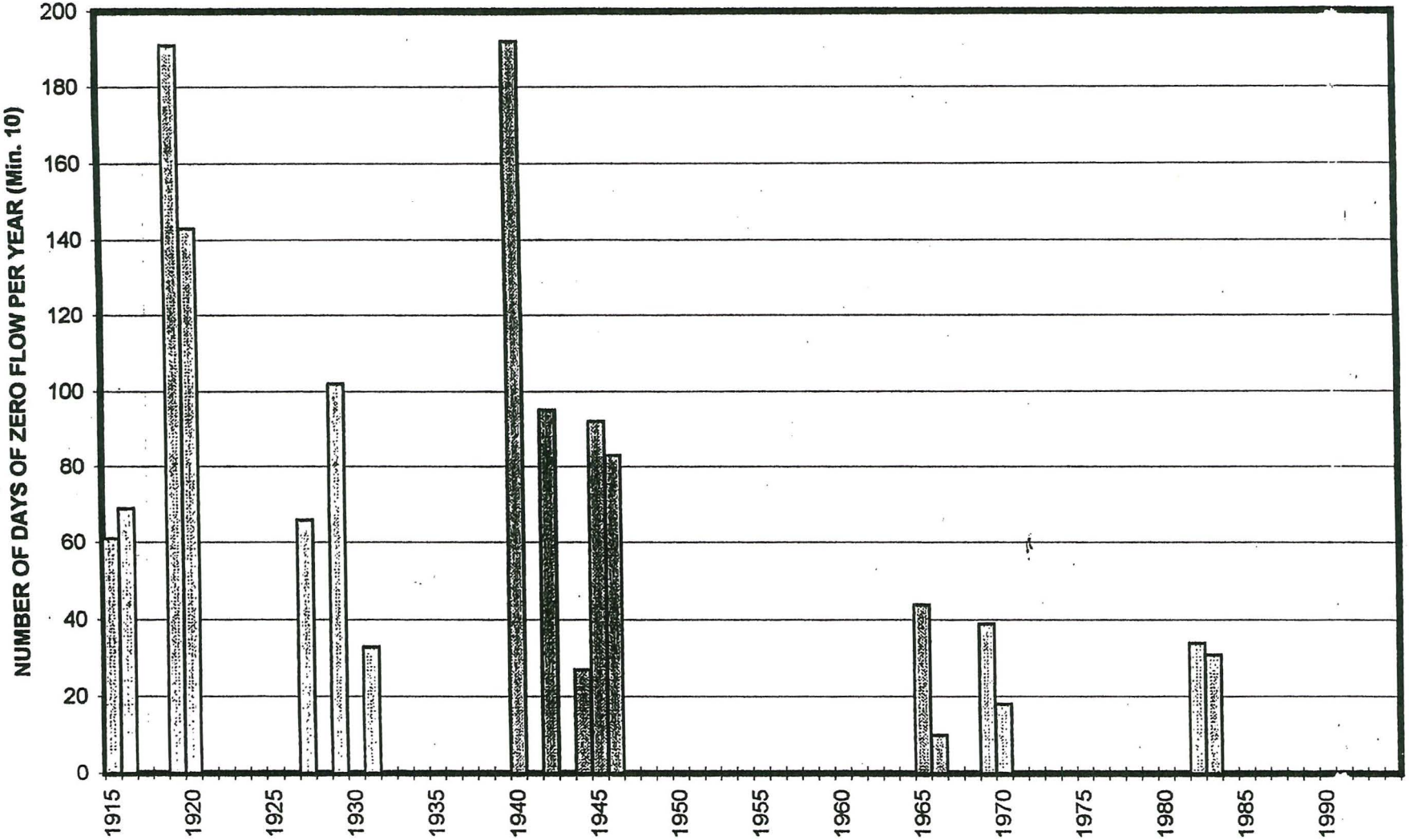
Once the 1958 Agreement was ratified, South Australia withdrew its High Court writ application early in 1959. In this, Playford was true to his word, having told other governments that he would not withdraw the writ until the Agreement had been ratified.

Chowilla Dam

'Alarmed by the Snowy waters experience and by the narrowness of his victory', Playford began to talk with Julian Dridan, South Australia's Engineer-in-Chief, about a major new dam in South Australia to underwrite the state's water security. As it happened, one of Dridan's staff, Harold Beaney, was working on an idea for such a storage at Chowilla, which became an 'obsession' for Playford.[55]

ATTACHMENT 7

PERIODS OF NO FLOW AT WILCANNIA



Months on end of very low flows - even zero flows - are not uncommon in the Barwon and Darling rivers. At Wilcannia the river has dried up completely on numerous occasions - once for 363 days straight.

Water Resour

ATTACHMENT 8

Standineen@bigpond.com

From: "Murray-Darling Basin Authority" <webmaster@mdba.gov.au>
Date: Wednesday, 7 March 2018 11:31 AM
To:
Subject: MDBA Media release - 07 March 2018

MDBA

Media release

MDBA analysis shows importance of protecting environmental water and small flows

07 March 2018

Reports released by the MDBA today show that regular small in-channel flows are critically important to the health of the Basin—but th since 2000, there have been much longer periods of no to very low flows.

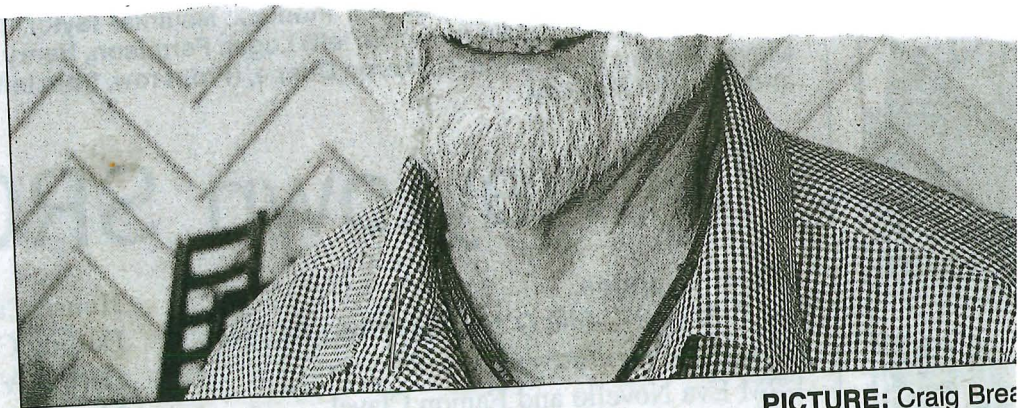
Read more

Please do not reply directly to this email.

For more information, contact the MDBA Media Office at media@mdba.gov.au or 02 6279 0141.

Follow the MDBA on Twitter: @MD_Basin_Auth.

To unsubscribe, please browse to the unsubscribe page, select what you no longer wish to receive, enter your email address and click "Unsubscribe".



Professor Peter Waterman. **PICTURE:** Craig Brea

nships in the Far West it was often a different ry, Prof. Waterman said at the meeting held at Democratic Club.

"Are your needs being met?" he asked. "In oken Hill, yes, but if you are on a station you on your own."

Stations and some remote towns draw their ater from bores, dams and tanks, and that eans it must be treated to make it safe for omestic use and for stock.

Prof. Waterman said sample testing of such serves on nearly 300 stations in Queensland ound that three-quarters of them had bacteria.

The presence of bacteria indicated a risk that ne water could cause legionella, meningitis or ther types of illness, he said.

The same problems were found in "third world" countries in which he had worked, ncluding the Pacific islands and Sri Lanka, the rofessor said.

This was despite the Commonwealth Water Act of 2007 stating that "critical human needs" were to be given the highest priority - that is, before industry, agriculture and stock, he said.

"It is a moral issue, an ethical issue. They rate you, they tax you, but they don't support you."

The best solution to the problem was, therefore, for people to get together and share information about how to make their drinking water safe, Prof. Waterman said.

He said finding and disseminating this information had been made much easier with the advent of the internet, upon which could be found practical ways to chlorinate, filter and disinfect untreated water.

The best advice came from government health and water department websites, he said.

Prof. Waterman also said people should not drink from rainwater tanks unless they treated the water by allowing the "first flush" of rain to drain away and adding filters and chlorin their tank.

Today Prof Waterman will hold a public m ing in White Cliffs and Wilcannia; in Meni on Wednesday, and Pooncarie on Thursday.

4/4/18

7/03/2018

ATTACHMENT 9

THE DARLING RIVER

A National Estate Study of the Natural Environment

PREFACE

The Darling River holds a special place in the Australian environment, being one of the nation's great rivers. It attains greater importance because it is one of the less disturbed rivers in the Murray-Darling system.

The threat of increased development along the Darling led the National Trust to consider that a survey of the heritage value of the River was necessary. With the support of funding from the Australian Heritage Commission National Estate Program the Trust employed a consultant, Peter Helman, to undertake an assessment of the National Estate values of the Darling River.

This report is the result of his assessment. The major recommendation of the report is "that the Darling River should be considered by the Australian Heritage Commission for inclusion in the Register of the National Estate

* as the most significant riverine environment in the southern part of the Australian arid zone;

* as the least disturbed representative habitat for aquatic species in the Murray-Darling system; and

* as an area that contains both representative and unusual examples of geomorphic landscapes and processes, (clay dunes and anabranches) connected with both past and present river systems."

The Trust wholly endorses this recommendation and will nominate the Darling River for inclusion in the Register of the National Estate.

The Trust will also be pursuing a number of matters arising from information provided in the report.

These relate to matters such as the need for protection of clay dunes, the preparation of a Regional Environmental Plan for the Darling River, inclusion of areas of the upper and lower Darling River within the national parks system, management of public land along the river bank, water quality monitoring, water allocation to protect aquatic habitats and waterbird breeding sites and the need to prevent salinisation of the river.

The Trust extends its appreciation to Peter Helman for undertaking the Study, and to the Australian Heritage Commission and the N.S.W. Department of Environment and Planning for providing the grant from the National Estate Program.

C.H. PRATTEN,
Environment Director
THE NATIONAL TRUST OF AUSTRALIA (NSW)

OCTOBER, 1986.

1.0 INTRODUCTION

1.1 Background

This study was initiated by the National Trust of Australia (NSW) in response to the need to develop an approach for identifying the national estate values of the western river systems in New South Wales so that these values can be incorporated into land use planning and management procedures.

This study concentrates on those values that are part of the natural environment. Values of the built environment have been studied by the National Trust (NSW) and the Australian Heritage Commission. These places are listed in Appendix 1.

Sites of archaeological importance are being studied in ongoing work by the National Parks and Wildlife Service (NSW).

1.2 Objectives

The objectives of the study were:

1. Describe and define the riverine environment of the Darling River, including anabranches and lakes between Bourke and Wentworth.

2. Develop criteria that allow identification of areas of the riverine environment with significant national estate values.

3. Broadly map these areas as set out in 1 and 2 above.

4. Identify where existing and proposed land and water uses influence national estate values.

5. Develop management strategies for the management of the land and water resources of the study area that conserve the national estate values.

6. Recommend a process for implementing such strategies (in 5 above) based on consideration of legislation and administrative arrangements.

1.3 Study Area

The area chosen was the Darling River from Bourke to Wentworth (the confluence with the Murray River). Only two main tributaries (the Warrego and Paroo Rivers) enter the river in this section. These rivers have not been examined in this study. The wetlands in this area have been studied by Goodrich (1983 and 1984).

The study area is the river flood plain including anabranches, lakes and billabongs. Some ephemeral floodouts have not been included. The study area is shown in Fig. 1.

The study area is in four shires: Bourke, Central Darling, Cobar and Wentworth. A part of the study area around Lake Tandou and the Anabranch is in the Unincorporated Area (Fig. 2).

The main towns along this section of the river are Bourke (pop. 3,326), Louth (pop. <200), Wilcannia (pop. 982), Menindee (pop. 455), Pooncarie (pop. 48) and Wentworth (pop. 1,180). Broken Hill (pop. 26,913) is 100 km west of the river.

EXECUTIVE SUMMARY

A study area along the Darling river in western New South Wales was examined to evaluate a method for describing natural values of the national estate for inland rivers.

The Darling River drains half the area of New South Wales. This catchment is increasingly being developed for more intensive agriculture. This development is altering both the landscape of the river and affecting the quality of the water.

Problems with classifying the natural values occurred. These were due to the gradually changing environments along the river that did not lend themselves to sensible division. The ephemeral influence of climatic and seasonal flooding complicated the process of evaluation.

It was considered that attempting to draw rigid boundaries for evaluation resulted in meaningless divisions. To overcome these problems, while still recognising the important natural features of the riverine system, a descriptive method of evaluation was adopted.

This approach allowed for the recognition of the riverine system at a national, state and local level by considering:

* the river in relation to its position in the semi-arid zone of Australia,
* the catchment of the river and the influences of catchment land management on riverine ecosystems, and
* the river corridor in the study area. This corridor was examined in more detail and further subdivided into four main landforms, the important natural features of which were described so that they could be considered in regional and local planning.

The study concluded that the Darling River should be placed on the register of the national estate as:

* the least disturbed river section in the Murray-Darling basin,
* the most significant river traversing the semi-arid zone in Australia, and
* as a riverine environment that has both representative and unusual examples of geomorphic features and processes, especially clay dunes and anabranch systems, of past and present river systems.

The present reserve system could be made more representative of the important natural values of the area, for example, wetlands.

It was considered more important to improve the standard of protection and management of existing public land along the river. This is especially important when tourist and recreational use of natural areas along the river have increased rapidly resulting in increased conflicts with local landholders.

Insufficient attention has been paid to declining water quality in the river and the potential exists for a rapid increase in river salinity. This situation should be the subject of increased water quality monitoring and long-term land management planning to protect the natural values of aquatic habitats.

Many of the findings of the enquiry into the Western Division by the Joint Select Committee of the New South Wales Parliament were found to be relevant to protecting national estate values.

The Darling River is now facing some of the same problems already being experienced in the Murray valley, where increasing pressures for development have resulted in a loss of natural values.

A choice needs to be made to protect the national estate qualities of the Darling River.