BRIEF BACKGROUND on history of Menindee Storages.
1920- 30- 40s Broken Hill suffered from water famines, not shortages, but famines.
Hundreds died from typhoid and diphtheria as a result of poor water etc.
Industry could not operate efficiently or plan expansion.
The community has two water storages but unfortunately rainfall runoff is not sufficient to maintain an adequate level of water and only fill to capacity about once a decade. When they do fill to capacity evaporation and seepage can see them empty within 18 / 24 months.
Useless building larger reservoirs if can't fill existing storages.

The community came together as one to force State Government to build a reliable water supply for industry and town.
The agreement reached was, the State would build at Menindee an unfailing supply from which to pump and the community had to finance and build their own pumping stations and 100 mile pipeline to supply the city.

Approx 1945 / 46 work was about to commence at Menindee on a storage when the Snowy Mountains Scheme was proposed. TOM PLAYFORD the Premier of S.A bitterly opposed the scheme believing that S.A would suffer because of reduced water flows down Murray effecting S.A.
The compromise was roughly, enlarge the works proposed at Menindee to what we see today (some works never done) with all water above 480,000ML to be owned jointly by NSW and VIC. This water to be used to secure supply to S.A. entitlement and in times of high demand below Barmah Choke or when Hume Reservoir at low level or under stress. If this failed the deficit to come from Murrumbidgee.

HARMONY AGREEMENT. ????
Murray River management consists of Dartmouth – Hume – Murray River – Menindee Lakes – Lake Victoria.
Briefly, system managed in most efficient way, inefficient water drained off first, when Dartmouth and Hume at low levels and demand below Barmah Choke high, Menindee water is used to meet S.A entitlement.

To achieve maximum savings D.R.W.S.P proposal is to dump or rapidly draw down most water stored in the Menindee System particularly Lake Menindee and Cawndilla. If this does happen then greater pressure will be put on Murrumbidgee or Northern River systems such as Moonie, Weir, McIntyre, Namoi, Peel and Gwydir storages to meet Lower Murray demand and S.As entitlement when Murray under stress.

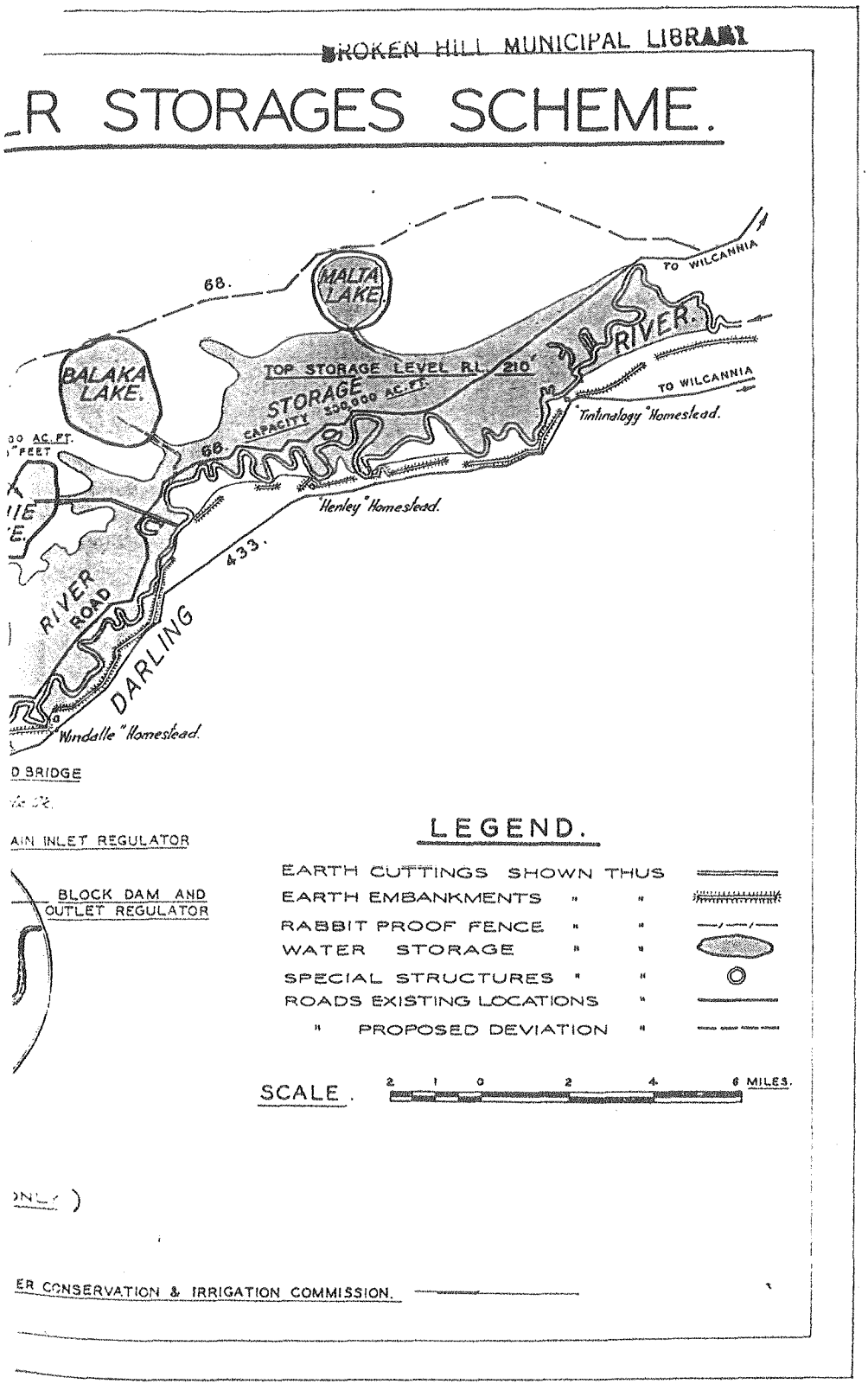
Suggest Committee talk to David Harriss who has great expertise on Murray Management.

SAVINGS & EFFECIENCIES.
The Menindee System can be developed "as originally proposed" and give the nation the Rolls Royce Darling River storage catering for all events including one of original uses FLOOD MITTIGATION:
Climate Change (possible), large floods, medium flows, small flows, trickles, protect local environment and social requirements amenities, Anabranch flows and Tandou requirements simply by:
Cleaning out both Pamamaroo and Menindee drainage channels.
Build a regulator between Lake Menindee and Cawndilla.
Build a regulator and channel from the bottom of Cawndilla to the Darling River enabling residual water to be accessed from bottom of both Menindee and Cawndilla and creating greater efficiently as this would be discharging from the system below the Weir Pool.

A Cawndilla Outlet Channel would also enable management to move water around within the system, discharge from the most inefficient lake first and reduce evaporation achieving savings, I believe in the vicinity of 125,000ML depending on structures, river flow etc.
This outlet would reduce the need to enlarge the Lake Menindee Outlet Regulator as water could be discharged from Cawndilla on odd occasions needed.

The proposed enlarging of Menindee Outlet could be controversial as it may have to go through an ancient burial ground whereas a new outlet from the bottom of Cawndilla could avoid a possible protracted dispute.

15/12/10



opened. As the water in Pamamaroo neared top water level, and provided reports from upriver indicated that sufficient water would be available, Menindee Lake would receive water through the interconnecting channel from Pamamaroo. If upriver reports showed that additional water would be available for storage, the connecting channel between Cawndilla and Menindee Lakes would be opened as the water in the latter approached top level.

USE OF THE STORAGES

The main purpose of the Menindee storages will be to supply water to South Australia which, otherwise, must be supplied from the Murrumbidgee storages and from this State's share of Murray waters. Under the River Murray Agreement, South Australia is entitled, in a normal year, to a flow of 1,254,000 acre-feet, measured below Lake Victoria. The contributions to make up this flow are to be sufficient to fill Lake Victoria storage (between Wentworth and Renmark) once in each year and, with the assistance of the regulated discharge from that storage, to maintain the agreed flow month by month into South Australia.

The Menindee Lakes storage will therefore allow greater irrigation development of the important areas on the Murray and its tributaries, where less restrictions on the use of water will be necessary during dry periods.

Other important uses to which the stored water will be put include:

- Provision of an unfailing supply for the pumping scheme to supply the domestic and industrial needs of Broken Hill.
- A continuous small flow to be released to supply the river-bank requirements of landholders between Menindee and Wentworth. A number of settlers in the vicinity of Menindee now irrigate orchards and gardens by pumping from the river, and it might be expected that the number of irrigators along the river will increase. The pool above Lock 10 at Wentworth, from which water is drawn for Curlwaa, Coomealla and Pomona irrigation areas, could be replenished from the Menindee storages.
- Development, if found desirable, of intensive irrigation schemes adjacent to the lower Darling. After meeting the requirements of river-bank landholders along the river downstream of Menindee, providing for an annual flow down the Great Ana Branch for stock purposes, and the needs of landholders authorised to irrigate under licence, there would be a surplus of water sufficient to irrigate some of the high-class lands along the lower Darling which could be served by pumping.

* * *

The procedure to be adopted in discharging water from the storages would depend on various circumstances but, as a general rule, after lowering the river storage, that lake which had the greatest surface area in relation to volume of contained water would be emptied first, in order that losses by evaporation would be minimised.

This is reprinted from a 1957 Water Conservation and Irrigation Commission release.

Menindee Lakes might transpose to increased flows downstream under the "**rules based**" approach used in the modelling.

Table 1 Outline of evaporation savings and change in river flows

Location	Water Savings or increase in flow	
	Optimistic scheme	More likely scheme
Menindee	250 GL/year reduced evaporation	140 GL/year reduced evaporation
Weir 32 (major flow site downstream of Menindee)	300 GL/year increased flow*	170 GL/year increased flow
Burtundy + Anabranch (outflow from Darling system)	170 GL/year increased flow	90 GL/year increased flow
South Australia border	150 GL/year increased flow	70 GL/year increased flow

*reflects additional flow sourced from reduced evaporation as well as reduced releases through the existing Cawndilla outlet.

If we look at flows to South Australia, then we may see marked differences from the reduced evaporation, mainly because there may be overbank 'losses' or flows which end up in the Darling Anabranch. The nature of these so called 'losses' is a function of the operating strategy and the resulting pattern of flows which created the savings. However, it is clear that the change in downstream flows is dependent on the location where these flows are observed, and there is potentially a water conveyance 'cost' for delivery of an entitlement created through savings to any particular location. Hence, a discount may be required to an entitlement volume (or security) to reflect use of a particular entitlement a considerable distance downstream. This is why the quotation of water savings in TLM analysis is quoted "at source", i.e. where the savings are created.

In the case of Menindee Lakes, the so called losses may have achieved environmental watering either through overbank flows or outflows to the Anabranch along the Lower Darling. However, these 'losses' may be unavoidable, in the pattern of releases that create the savings. If the pattern of releases were to change to reflect greater priority of environmental watering to other locations, then by their very nature, the evaporation savings would probably reduce. Hence, the value of a created entitlement would also have to change to reflect the evaporation achieved through the altered pattern of releases.

In summary how the potential water savings from reduced evaporation are applied to environmental outcomes varies depending on the "**rules based**" or "**entitlement based**" approach used to manage environmental outcomes. The following summarises the indicative outcomes from the various approaches.

S. Wilder · 19/2/10

- We have not established that circulatory flows of a couple of ML/day is sufficient to keep Copi Hollow fresh. OK in theory, but the details have not been explored. Current proposed configuration would not address stratification. Caution required.
- Caution required on overall hydrology modelling outputs. Following extensive review (and initial disbelief), the outputs seem reasonable that no entitlement holder is substantially disadvantaged if both Menindee and Cawndilla are excised. We are therefore supportive of the results but wider consultation with water user peak bodies is strongly recommended before we can say we are very confident in the outputs.
- The project has modelled entitlement holder impacts, but overlooked riparian access. We need to confirm no/minimal impact on Lower Darling pastoralists and Pooncarie (this is under-way).
- The committee previously agreed that the report must address (in detail) the benefits of a Kinchega Channel and the disbenefits before ruling it out. The benefits include >20GL average water savings. Note that the hydrology modelling limited discharge to 6,000 ML/day discharge, although peak discharge will be higher than this. It also had circulatory benefits, cheaper than the alternative Penelco route (assuming 6,000ML/day output on both), avoided impacts on Tandou Creek, avoided construction impacts on Kinchega National Park along the existing Cawndilla outlet channel route, ensured that the NSW drought reserve was located in the upper lakes and avoided dissecting the active floodplain. The substantial disbenefits (KNP impacts, cost-benefit, cultural heritage importance of the lunette) are well known. The community supporters of this option know the benefits of the proposal, thus the report appears unbalanced if they are not listed.
- The report implies extensive Aboriginal consultation, which is true for works options and the cultural heritage survey, but incorrect regarding the wide-ranging options for operational change. Appendix 1 infers that <u>never</u> letting water into Lakes Menindee and Cawndilla has been discussed in some detail with the Aboriginal community. This is inappropriate.
- There is confusion/substitution between Lakes Spectacle and Lake Speculation. Both these environmentally significant lakes are within the Menindee/Cawndilla complex.
- Limited referencing in the document.
- The report should clearly state early on that the quoted savings are contingent on the entitlement being "rules based".
- MAR should have indicative environmental risks listed rather than none at all. There will definitely be some cultural heritage and habitat impacts over (a yet unknown) length of pipeline. Some of this will be riverine environment, especially if bank filtration is used. There is also the risk of clogging the aquifer and high energy cost.
- The alternative Menindee outlet route is a late inclusion. The report is unclear as to whether there will be duplication of works (retain existing structure) or build one new large structure. Comments that a fishway is not considered necessary is inconsistent with planning rules.
- I am not sure that the Little Menindee Creek option contains less cultural heritage significance. We know there is a large ceremonial site within Lake Menindee at the current regulator. However the downstream section of Little Menindee Creek was not surveyed by the cultural heritage survey. Premature to claim less significance at the alternative site.

S/W