Mole & Soverign Water Users Association Inc.

Submission on Border Rivers Draft Regional Water Strategy.

Priority1

Action 1.1 **Improve public access to climate information and water availability forecasts**	**This is ongoing and should be continued and enhanced.**
Action 1.2 **Develop ongoing arrangements for participation of local Aboriginal people in water management**	**Agree**
Action 1.3 **Improve understanding of river flows, water use and water quality at priority locations in the Border Rivers**	**This is particularly important for flood events. There is an urgent need for a gauging station on the lower Bluff River. All gauges need to be updated in real time during Floods.**
Action 1.4 **Invest in continuous improvement in water modelling in the Border Rivers region**	**This is ongoing and should be continued and enhanced**

Priority 2

Action 2.1 **Support adoption of on-farm water use efficiency measures**	**This is ongoing and should be continued and enhanced**
Action 2.2 **Coordinate the management of irrigation water releases and water for the environment to improve ecological outcomes**	**Agree provided this does not affect delivery and reliability of Irrigation water**
Action 2.3 **Identify and address physical barriers to the delivery of water for the environment**	**Agree**
Action 2.4 **Provide clarity and certainty for environmental needs during drought operations**	**Agree provided this does not affect delivery and reliability of Irrigation water.**

Priority 3

Action 3.1
Increase the availability of high security water licences s

Strongly disagree. Without more water in the system increasing reliability for one class of water reduces security for all other classes. There would need to be a massive o compensation payout.

Action 3.2
Ensure the water management framework can support sustainable economic diversification

This should be managed by normal commercial practises.

Action 3.3
Support place-based initiatives to deliver cultural outcomes for Aboriginal people

Agree provided this does not affect delivery and reliability of Irrigation water.

Action 3.4
Support Aboriginal business opportunities in the Border Rivers region

Agree

Action 3.5
Mitigate the impact of infrastructure on native fish

Agree Diversion screens on pumps would have to be affordable.

Action 3.6
Fully implement the NSW Floodplain Harvesting Policy

Agree. This is number 1 priority.

Action 3.7
Remediate unapproved floodplain structures

Agree

Action 3.8
Identify regionally significant riparian, wetland or floodplain reaches to protect or rehabilitate

Agree provided this does not affect delivery and reliability of Irrigation water.

Priority 4

Action 4.1
Map critical drought refugia

Agree

Action 4.2
Support towns to understand if groundwater can provide a reliable water

Agree

supply when surface water availability is limited	
Action 4.3 **Investigate innovative water projects to support bushfire efforts**	**Agree**
Action 4.4 **Investigate sustainable levels of groundwater extraction in the Border Rivers Alluvium and the Great Artesian Basin aquifers**	**Agree**
Action 4.5 **Investigate ways to improve connectivity with the Barwon–Darling on a multi-valley scale**	**Agree**

Special Request

Find below an extract (page 4) from a South African research paper on the effect of trees on water flow in creeks and rivers.

We believe the effect described is typical of the way the Mole River and other tributaries flow has declined with the massive increase in riparian tree numbers over the last 40 years.

Biological Control of Alien, Invasive Pine Trees (*Pinus* species) in South Africa

experiments can be likened to invasion by alien trees where the end result is the same - the replacement of a low shrubland or grassland with a tall woodland or forest. Typical examples of the results obtained include an 82% reduction in streamflow (reductions of 115 and 640 mm per year in two small grassland catchments) in the KwaZulu-Natal Drakensberg 20 years after planting with pines (Bosch 1979); a 55% reduction in streamflow (from 600 to 270 mm) in fynbos catchments in the Western Cape 23 years after planting with pines (van Wyk 1987); and the total drying up of streams 6 –12 years after completely replacing grassland catchments with pines and eucalypts in the Mpumalanga Province (van Lill *et al.* 1980).

These results are from small catchments that were heavily afforested, and the impact of alien invading trees on streamflow in larger areas will depend on how much the catchment is actually invaded. Thus, in many cases, the impacts will not be as dramatic. There are nonetheless two important facts to consider here. Firstly, most of the streamflow in South Africa is generated from upper catchments (van der Zel 1981) and these are the areas that are most at risk from invasion. Secondly, it is probable that these areas will become fully invaded if they are not managed – there are many examples of where this has occurred already.

Riparian zones are of special concern. Because more water is available in riparian zones, and because fast-growing alien trees use water whenever it is available, water use by trees in these zones tends to be almost double that of the same trees when they grow away from the rivers (Scott and Lesch 1995, 1996; Scott in press). Riparian zones are not planted by formal forestry for this reason, but often become invaded, by plantation trees, and have to be constantly cleared to prevent these impacts.

While planting trees in catchments reduces streamflow, the reverse is also true – clearing the trees results in equivalent increases. For example, clearing a dense stand of pines and wattles from river banks in Mpumalanga Province resulted in a 120% increase in streamflow (the clearing of a 500 m length of a river increased yield by 30.5 m3 per day) within a short period after clearing (Dye and Poulter 1995); and clearing pines 30 m on either side of a stream (10% of the catchment) in the Western Cape resulted in a 44% increase in streamflow (over 11 000 m3 per cleared hectare in the first year) (Scott in press). There are many other observations of this kind where clearing has resulted in streams flowing again, often for the first time in decades. Indigenous riparian vegetation which may eventually replace the invading aliens tends to have smaller leaf areas and has been shown, in at least one experiment (Scott and Lesch 1996) to use less water than vigorous alien trees.

The average changes to streamflow quoted above can be misleading. The effect of alien trees on the amount of water in rivers is more critical in the dry season and in drought years. Because the consequences are more severe at these times, the impact of alien plants on low flows tends to be more important than the average reduction.

The way in which trees use water is reasonably well understood (Dye 1988, 1996; Dye *et al.* 1995). However, there are differences between species. While water use by pines and eucalypts (and to some extent poplars and wattles) has been well measured in South Africa, no data on any other species are available. In addition, the figures for water use by individual trees need to be used carefully. The figure of a eucalypt tree using several hundred litres of water in a single day is often quoted in the popular literature, but this was for an isolated large tree in a riparian zone on a hot day. A more realistic figure would probably be closer to 40 – 50 litres per tree per day on average sites (P. Dye, pers. comm).

Following up on the research from South Africa regarding the effect of over populated trees on water sources, my daughter and I have counted trees in several locations in our local catchment to highlight the extent of the problem in the Darling River catchment.

In order to achieve a random sample, we only counted trees in the riparian zone in the 500 meters above local bridges. We then doubled the numbers in order to list the result as trees per kilometre.

In estimating the age of trees, we referred to many old photographs from the 1950's, and located trees that were young in the photo and used their size and general appearance to estimate the age of current trees. We acknowledge this is an unscientific, crude method but believe it to be reasonably accurate as this exercise is not a scientific study and is only designed to highlight the extent of the problem and emphasise the need for a local research project.

Location	Number of Trees per Kilometre					
	Total Number	Pre 1950's trees	% of Total	Post 1950's new trees	% of Total	Fold Increase
Upstream Mole River Bridge, Bruxner Way	**1,184**	38	3.2%	1,146	96.2%	30
Upstream Hynes Bridge, Dumaresq River	**1,932**	50	2.6%	1,882	97%	37
Upstream Seven River Bridge, Mingoola Station Rd	**1,386**	12	.86%	1,374	99%	114
Upstream Reedy Creek Bridge, Bruxner Way	**846**	28	3%	818	97%	29

These figures only apply to the riparian zone. The South African study also highlighted small streams having a reduced flow or ceasing to flow altogether caused by increased trees in the wider catchment. This has been observed in our local area (the western part of the Tenterfield shire) in all small and micro water courses. As an example, Stone Wall Creek (possibly a local name) with a catchment of only 600 hectares at Mingoola was a permanent flowing creek up until the 1970's. It now only flows for 2 to 3 days after a major rain event and completely dries up in a dry period. Since the decline in rabbit numbers in the 1950's the native tree, predominantly Cyprus Pine, numbers have increased an estimated 50 to 100 fold.

We request a research project be initiated to establish the number of trees, their age and their water use. This information could then be used in the river modelling to determine the effect this tree invasion is having on the river flow.

If our observations are proved correct this could go a long way to explaining the decline of the Darling River.

Please don't ignore this even if in the first instance you send someone out to check we are not exaggerating the situation.

For more information or a copy of the full South African research paper Contact [redacted] or [redacted]

Thank you

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