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The Committee Secretary
House of Representatives Standing Committee on Regional Australia
PO Box 6021
Parliament House
CANBERRA ACT 2600

Dear Secretary

INQUIRY INTO THE IMPACT OF THE MURRAY-DARLING BASIN PLAN IN REGIONAL AUSTRALIA

Submissions on the Guide to the Proposed Basin Plan

I thank you for the opportunity to provide input into the "Guide to the Proposed Basin Plan", (2010) M-DBA, Canberra and into the inquiry of the Basin Plan in Regional Australia.

I am employed in natural resource management and the future of our natural resources for future generations is particularly close to my major concerns.

The attached document is a copy of the submission that I have submitted to the Murray-Darling Basin Authority on the ***Guide to the proposed Basin Plan***. I have received notification from the Murray-Darling Basin Authority that my submission will be considered in the formulation of the Basin Plan.

Should you require additional information I can be contacted

Yours sincerely,

David Read

<u>PUBLIC SUBMISSION TO:</u>

<u>GUIDE TO THE PROPOSED BASIN PLAN</u>

<u>PREPARED BY THE MURRAY-DARLING BASIN AUTHORITY</u>
<u>(2010)</u>

Submission prepared by Dr David G. Read

November 2010.

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Throughout my submission I shall refer to the above document as the "Guide".

<u>Specific Details:</u>

1. In all legislative issues pertaining to natural resource management it is of paramount importance that the legislation is constrained by the physical and biological capabilities of the natural resources and NOT the situation where the legislation demands that the natural resources conform to human value judgments. Critical to the debate on the use of water resources in the Murray-Darling basin is the *Water Act 2007* (Commonwealth), and particularly Sections 22 and 23 that specify the use of a "…long-term average sustainable diversion limits…". With due respect to the legislators involved, the wording of the Act is, in fact, demanding that the water resources conform to human expectations. This unfortunate oversight in the legislation has misdirected the Murray-Darling Basin Authority into adopting a methodology that cannot adapt to climatic changes in annual and seasonal rainfall. The predicted annual rainfall over the next 40 to 50 years will be inadequate to fulfil the objectives detailed in the Guide. As a consequence the Guide will fail to deliver the ecological, biological, social and economic requirements that are intended by the *Water Act 2007* (Commonwealth).

2. Data and information in the public domain show that rainfall over the past 200 years across the Murray-Darling basin, particularly in New South Wales, has followed a 100-y cycle of about 50 years with annual rainfall below the long-term average followed by about 50 years with annual rainfall above the long-term average. Papers containing data on this 100-y cycle date from 1953 and also see "Climate Influence on Shallow Fractured-rock Groundwater Systems in the Murray-Darling Basin, NSW", A. Rančić *et al*. 2009, Department of Environment and Climate Change NSW.

The ecological and biological significance of this information is the sudden and substantial changes in rainfall, not only over a 50-year period but also the underlying cycles of 5-7-y, 11-y and about 20-years. A basin Plan must incorporate this variability so that it can deliver the objectives of *Water Act 2007* (Commonwealth) and, most importantly, have built into it the flexibility that can adapt and incorporate climatic changes in rainfall. The use of "…long-term average sustainable diversion limits…" as described in the Guide does not capture this variability.

3. There are data and information that show that from the first European contact the rivers in the Murray-Darling basin had very low flows in some years and in places were too salty for stock to drink. The Murray-Darling Basin Authority has apparently not taken this historical information in to consideration during the drafting of the Guide.

Flora and fauna elements of the river ecosystems have evolved to these low flow and/or saline conditions and depend on such conditions for their continued survival. Maintaining a minimal "long-term average sustainable diversion limits" disadvantages those organisms that have evolved to suit very low flows of perhaps saline and hypoxic water. The proposed long-term average flows will become barriers between "islands" of these organisms and consequently prevent genetic interchange between these groups. Rather than enhance biodiversity preservation the implementation of the "average long-term flows" will in fact create loss of species, particularly in the soil microflora and fauna.

4. The Guide has apparently failed to address the critical issue of cold-water pollution and the proposed average long-term flows will continue to exacerbate its significant detrimental impact on aquatic biological diversity.

5. Results of the hydrologic modelling as presented in Chapter 5 of the Guide present a very static perspective of river flows and have failed to capitalise on the power and capabilities of the water modelling tools that are referenced in the text. Table 5.2 (pages 51-52) fails to show the variability in stream flows both seasonally and on an annual basis. In order to generate a basin water management plan that provides for preservation of biological diversity and sustainable water use, it is essential that variability in rainfall and in stream flows is incorporated into the management strategy. A management strategy that omits this variability will ultimately fail because it would not reflect the processes that are actually in progress.

Recommendations:

1. In order to develop a Basin Plan the Murray-Darling Basin Authority must abandon the concept of "long-term average sustainable diversion limits" and instead adopt a strategy that incorporates the annual, decadal and geographical variation and variability that can accommodate unpredictability over time and deliver preservation of the ecosystems, biodiversity, social and economic survival.

2. Plot the historical, before regulation with dam construction, distribution of river flow regimes but leave floods as outliers. This distribution will demonstrate the "natural" flows without interference from human engineering enterprises and show what types of water flow regimes under which the flora and fauna have evolved. I suspect that this distribution will be leptokurtic with the bias in the region of low flows. It is also instructive to identify the periods and frequency of high flows.

3. For the different geographical regions across the basin establish diversion flows that reflect rainfall patterns and can respond to the vagaries of weather and change in climate. I suggest these geographical regions within the basin:

i) Southern Queensland rivers; ii) the Namoi and border rivers of New South Wales; iii) the Macquarie, Bogan and associated streams; iv) the Lachlan River; v) the Murrumbidgee River; and vi) the Murray River with inclusion of the Victorian rivers and South Australia.

For each of these regions perform the following steps:

a) Select a period of 12 consecutive months that reflects the growing season for that region. These may be: Southern Queensland, June to the following May; Namoi and border rivers, May to April; Macquarie, Bogan and associated streams, May to April; Lachlan River, April to March; Murrumbidgee River, March to February; and Murray, Victorian and South Australia, February to January. I refer to these periods as “growth years”.
b) Referring to the 100-year cycle select a 20-year period that shows the maximum average annual rainfall – let it equal *R*mm. A year in this context refers to the 12-month growth year determined above. This figure identifies the maximum annual water resource capacity for that region. In most regions this 20-year period would be between about 1950 and about 1990. Rainfall data used in this calculation would come from locations that are mostly upstream from dams and weirs but would also include sites across the region and an overall mean value determined.
c) For the same selected 20-year period on which the maximum water capacity was calculated, determine the average annual diversion for that region, based on actual records – let it equal *D*GL.
d) Determine the annual diversion ration per the maximum water capacity, i.e. the ratio of *D*:*R* – let this ratio equal *H* (GL/mm). This ratio is critical for sustainable water management because it directly links the available water diversion to annual rainfall.
e) The amount of water available for diversion, in any particular year is calculated as a composite of annual rainfall in previous growth years. The suggested formula is as follows:
   - 15% mean of previous 19 year rainfall
   - 20% mean of previous 11 year rainfall
   - 25% mean of previous 5 year rainfall
   - 30% mean of previous 3 year rainfall
   - 10% of rainfall in the year just finished

   This composite figure for annual rainfall is multiplied by *H* to determine the total diversion for that region for the coming growth year. A new diversion figure is calculated at the start of each growth year.

This method of calculating diversion quantities has many advantages. First, it ensures that there will always be some environmental flow in the rivers. Second, it allows water managers a predictable framework to plan and make business decisions. Third, in years of increasing rainfall it allows proportionally greater quantities for environmental flows. Fourth, in years of declining rainfall there would be gradual declines in diversions and this would avoid the sudden and critical shortages of water that were experienced in the recent prolonged drought.

4. The Basin Plan should devise strategies that would shift tree plantations, particularly *Pinus* species, out of the basin to coastal catchments. This shift in land use would increase the base ground water inflows to streams and rivers.

5. The Basin Plan needs to advocate the breeding of dwarf varieties of rice. As a rice crop grows and the seed head develops the depth of water in the rice field is increased to keep pace with the growing plant so that the water level is maintained just below the developing ear. This practice uses the thermal inertia of the water to maintain high night-time air temperatures in the microclimate about the rice seed head. These high night-time temperatures contribute to the high per hectare rice yields obtained by Australian farmers. If rice farmers sowed dwarf varieties with shorter stems then the high yields could still be obtained but with shallower water in the field and consequently less water would be used per tonne of rice harvested.

6. Strategies that will mitigate the adverse impacts of cold water pollution are an essential component of a Basin Plan that will deliver a sustainable environment across the basin. To achieve this, investment has to be made in controlling flows through the various anastomoses and anabranches between the rivers, particularly between the Murrumbidgee and Murray Rivers. High and low flows along these creeks would be asynchronous between them, both spatially and temporally, and managed to mimic the biological requirements of aquatic flora and fauna.

7. Water for human consumption needs to be rationed on a daily and per capita basis. The rationed volume can be varied to reflect rainfall and availability and adjusted to meet individual household special needs. All of the necessary technology is available and in use in other applications. It is simply a matter of bringing it all together and it can be fitted to existing and new homes alike.

David Read

24th November 2010