Submission to the

Inquiry into Provisions of the Water Act 2007

Senate Legal and Constitutional Affairs Reference Council

From the Murray Darling Basin Water Crisis Management Committee

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RECOMMENDATIONS

Recommendation 1: The Act needs to be amended so as to recognise that water availability in the Basin is highly variable, that the Basin's climate is not "static" but subject to long dry and long wet periods caused by natural, cyclical, inter-decadal climate variations, which naturally cause major fluctuations in species numbers and biodiversity.

Recommendation 2: The *Act* should be amended to remove all references to particular international environmental agreements as they fail to describe the nature of the Murray-Darling Basins climate and ecology. Any references to biodiversity in the Basin must be qualified in the *Act* by recognising that native species experience major fluctuations across the Basin because of the extremes of natural climate variation, as described in Recommendation 1.

Recommendation 3: Section 21(2) – which states that universally across the Basin it is a "fact that the use of the Basin water resources has had, and is likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity" – be deleted from the *Act* as it appears to have confused overallocations with cyclical, naturally occurring drought as the cause of environmental degradation in the Basin.

It should also be deleted because it's factually wrong to describe human intervention on the Murray River as having had "significant adverse impacts on conservation and sustainable use of biodiversity", when it was the man-made Hume and Dartmouth dams that kept the Murray flowing continuously during the recent Big Dry, helping to maintain species numbers and biodiversity along a river that would other wise have been reduced to a dry river bed with intermittent water holes.

Recommendation 4: The *Act* be amended so that in assessing the environmental state of rivers and regions, all significant factors affecting environmental health are included, not just river flows.

Recommendation 5: The *Act* be amended to require that:

- **the MDBA conduct detailed scientific environmental studies in all catchments of the Basin;**
- **some of the $8.8 bn Federal MDB plan fund be allocated for this purpose;**
- **purchase of permanent water by federal and state governments and their authorities cease until the science of the Basin has been completed and environmental needs assessed; and**
- **such scientific studies be comprehensively reviewed by all stakeholders in the Basin in conjunction with the MDBA and state water authorities.**

Recommendation 6: The *Act* be amended to require that the science underpinning the Basin Plan be subject to comprehensive, detailed reviews involving all stakeholders in the Basin, the MDBA and state water authorities, modeled on the Barmah-Millewa Forest review process. Further, on the completion of that review, management of all key wetlands and other environmental sites be done using a "community cooperative sustainable self-management system" process.

Recommendation 7: That the *Act* be amended to give equal weighting to social, economic and environmental needs, which to be effective, requires implementation of recommendation 2, that is, repealing those clauses of the *Act* that name and invoke international environmental treaties.

Recommendation 8: The Act should be amended so as to reallocate the remaining funds from the $8.8 bn Basin fund to the construction of new dams, including environmental dams to provide new environmental flows to the Basin's river systems.

Summary and Conclusion

The *Water Act 2007* is unworkable. It requires major amendments as recommended above, if not a total rewrite.

1. Introduction

The Water Act 2007 seriously misunderstands the climate and the environmental nature of the Murray-Darling Basin. It assumes the Basin's rivers are permanent flowing rivers, like the Rhine in Europe, or the Mississippi in the USA or the Brisbane River in Queensland.

In reality, the Basin's rivers are arid to desert river systems. They experience huge variations in seasonal flows. The Basin's climate is not static, but subject to regular patterns of long dry periods lasting up to 30 years or more, and long wet periods of 30 plus years. Biodiversity declines in the long dry periods. Then when the wet periods return, the Basin explodes into life in a few months, as Australians are witnessing right now.

The *Act* is seriously misdirected. It was written towards the end of a seven-year drought, wrongly assuming that what was natural environmental decline was largely the result of overallocation and over-use of the Basin's water resources. In reality, for several years there was no water for either the environment or farmers because of the severity of the drought. Further, across various parts of the Basin, flows would have stopped far earlier in the drought had it not been for the massive system of dams, locks, weirs, irrigation channels and farm dams built over the past century. The *Act* fails to account for human interventions actually moderating the extremes of climate in the Basin.

This submission examines:

- An outline the *Act* and key assumptions that fail to grasp the climatic and environmental nature of the Basin, or fail in other respects;
- Failures in the *Act* to understand huge climate variation of the Basin and its significance for the environment, as well as for farming*;*
- Failures to account for the positive effects of dams, locks and weirs in the Basin preserving and extending some wetlands;
- The *Act's* definition of biodiversity failing to understand that extremes of long wet and long dry periods are necessary for the health and reproduction of various species;
- The *Act* confuses overallocations with drought as the main cause of environmental degradation;
- The *Act* narrowly focuses on environmental flows as the sole means of restoring and preserving river health, to the neglect of many other significant factors in river health;
- Failure of the *Act* to require comprehensive reviews of the science of the Basin by both the parliament and stakeholder before putting a Basin Plan in place;
- Failing to put in place an adequate process for ongoing community-based reviews of the science underpinning the Basin Plan and community involvement in the ongoing management of the Basin's resources; and
- Failure to balance social, economic and environmental needs in the *act.*

This submission concludes that the *Water Act 2007* is unworkable. It requires major amendments as recommended, if not a total rewriting of the *Act*.

Eight recommendations are made for either amending the *Act* or for rewriting the *Act*.

2. The Act in summary

This section summarises areas of the Act where key assumptions fail to grasp the climatic and environmental nature of the Basin, or fail in other respects. Emphasis is given to key concepts examined in this submission.

The overarching objective of the *Water Act 2007* is to invoke the treaty implementations aspect of the external affairs power of the Commonwealth Constitution to give effect to particular international environmental wetland agreements. This allows the Federal government greater powers to undertake integrated management of the Murray-Darling Basin, which is otherwise the constitutional domain of the states.

In order to give effect to several treaties, like The Convention on Biological Biodiversity and The Ramsar Convention, the *Act* says that special measures are required to manage the use of the Basin's water resources to conserve biodiversity because of

> "the fact that the use of the Basin water resources has had, and is likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity."[1]

To "protect, restore and provide for the ecological values and ecosystem services," the Basin Plan must determine "environmentally sustainable levels of extraction of water resources that are overallocated or overused".[2]

There are to be "long-term average sustainable diversion limits"[3] according to the "principles of ecologically sustainable development", which is broadly defined as being "the conservation of biodiversity and ecological integrity".[4]

The environmental conventions invoked by the *Act* further define what constitutes the "sustainable" use of water in the Basin.

- The Convention on Biological Diversity defines "sustainable use" as "the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations."[5]

- The Ramsar Agreement calls on signatory states to observe "the wise use" of wetlands (defined in S 4(1) of the *Act*). Although "wise use" is not defined by the Convention, the most recent definition by the Parties to the Convention takes it to mean "the maintenance of … [the] ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development."[6] For the purposes of the definition, "ecological character" means the "the combination of ecosystem components, processes, and benefits/services that characterise the wetland at a given point in time."[7]

The *Act* says that this process of determining "sustainable diversion limits" should be informed by the best available scientific knowledge and socio-economic analysis.

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[1] Water Act, Section 21(2).
[2] Water Act, s 3(d)(i) and (ii).
[3] Water Act, items 6 and 8 of s 22(1), and s 23.
[4] Water Act, S 4.2(d).
[5] The Convention on Biological Diversity, Art 2.
[6] Ninth Meeting of the Conference of Parties to the Ramsar Convention (2005), Res IX.1 Annex A, *A Conceptual Framework for the wise use of wetlands and the maintenance of their ecological character*, para 22.
[7] Ibid, para 15.

However, it's inferred that due to current environmental degradation, there is an urgency to determine sustainable diversion limits.

> "[I]f there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."[8]

The *Act* also requires that the MDBA and the Minister decide on allocations based on the best available scientific knowledge and socio-economic analysis.[9]

In terms of the use and management of the Basin water resources, the Act says that maximizing the net economic returns to the Australian community is subject to the previous provisions relating to environmentally sustainable levels of extraction for overallocated and overused resources and protecting, restoring and providing for ecological values and ecosystem services.[10]

3. Failure to understand natural, inter-decadal climate variations in the Basin

The *Act* says that permanent environmental degradation of the Basin is the result of a permanent human-induced drought caused by "overallocation and overuse" of the Basin's water. The only solution is diverting about 30 per cent of farm allocations to the environment.

The *Act* fails to recognise that the Murray-Darling Basin is an arid region. It *requires* big wets and big dry periods to stimulate various life cycles of its flora and fauna. Droughts bring bushfires that are necessary for the regeneration of its native forests. Wet periods flood the river systems, stimulating aquatic and land animals to reproduce rapidly.

A fundamental problem with the *Water Act 2007* is that it implicitly treats the Murray-Darling Basin rivers as permanently flowing river systems, like the Rhine River in Europe or the Mississippi River in the USA. The latter have relatively constant flows. They have low maximum-to-minimum flows from year to year.

Table 1 shows that such continental rivers around the world have low maximum-to-minimum flows.

> "At the continental scale, maximum-to-minimum runoff ratios vary between 2:1 and 10:1, with individual rivers experiencing ratios far higher, such as in snowmelt-dominated basins or episodically flooded arid and semiarid river systems," according to Shiklomanov and Rodda 2003.[11]

In the permanent rivers, relatively constant long-term average annual flows provide a basis for reasonably determining "long-term average sustainable diversion limits".

[8] Water Act, S 4.2(b).
[9] Water Act, s 21(4)(b).
[10] Water Act, s 3(d)(iii).
[11] Shiklomanov, I.A. and J. Rodda, 2003: World Water Resources at the Beginning of the 21st Century, UNESCO, Paris, France.

But in Australia's Darling River, which has a 5,000:1 maximum-to-minimum flow ratio, calculating "long-term average flows" as a guide to determining "long-term average sustainable diversions," as required by the *Act*, is an inadequate and inappropriate tool for effective policy making.

Policy makers need to understand the inter-decadal, long wet and long dry periods that can stretch for 30 years, or more, as demonstrated in Diagram 1 below.

Table 1: Comparison of ratios of maximum-to-minimum river flows

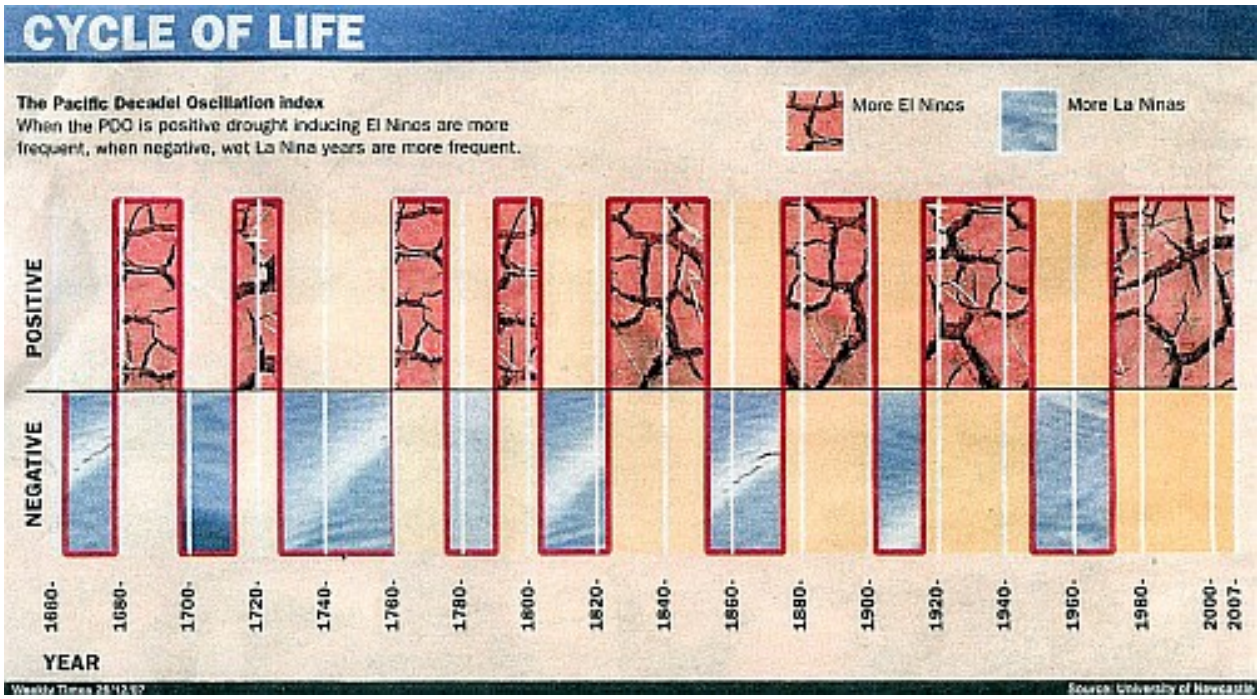
Other Continents	Ratio
Runoff of most major continental rivers[1]	2:1 to 10:1
Australia	
Murray River[2]	15:1
Darling River, NSW[2]	5,000:1

1. Shiklomanov, I.A. and J. Rodda, "World Water Resources at the Beginning of the 21st Century," UNESCO 2003, Paris, France.
2. A.G. Brown, Editor, *Water for irrigated agriculture and the environment: Finding a flow for all,* Record of a conference conducted by the ATSE Crawford Fund Parliament House, Canberra,16 August 2006.

Diagram 1 graphically shows the extended wet and dry periods in the Murray-Darling Basin between 1660 and 2007, based broadly on the El Nino (dry) and La Nina (wet), inter-decadal climate variations experienced in eastern Australia. These long wet and dry periods can range from about 12 to 30 plus years. The long dry periods typically end in sever droughts that can last for years, followed suddenly by extreme wet events.

This graph is based on internationally recognised research by Dr Anthony Kiem et. al. on natural climate variation in south eastern Australia.

Figure 1: Climate variation: wet and dry periods in the Murray-Darling Basin 1660-1970.



Source: University of Newcastle, NSW (see Weekly Times, December 26, 2007).

Dr Kiem is a hydroclimatologist and lecturer in the Environmental and Climate Change Research Group (ECCRG) within the Faculty of Science at the University of Newcastle. His major research focus is on understanding the drivers and impacts of climate variability and change in the Asia-Pacific region. He has extensive experience in characterising impacts of climate variability and change, seasonal/interannual forecasting, extreme event (e.g. flood, drought, bushfire etc.) risk analysis, hydrological modelling, stochastic modelling, and water resources management.

Kiem's data shows that relying only on averages in trying to calculate water availability in the Basin is woefully poor science. He points out in a paper on flood risks in NSW that "traditional flood [and by implication, drought] risk where the climate is effectively assumed static is inadequate."[12]

In a later paper on the causes of protracted droughts in south east Australia, Kiem et. al. show that droughts are caused by "different climatic teleconnections with the Pacific, Indian and Southern Oceans."

He says that there are four main climate phenomena in this region, technically known as the ENSO, IPO, IOD and SAM. These have interacted differently each time to create the major Federation drought (~1895-1902), the WWII drought (1937-45) and the recent Big Dry (~1997-2009). [13]

In addition, these factors explain the short, sever droughts 1914-1915, 1965-68, 1982-83.[14]

This understanding of the Basin indicates why our forefathers built the extensive system of dams, locks, weirs and irrigations channels in the Basin, to store water from the big wet periods to supply human needs and the environment in long dry periods.

Arguably, one of the reasons for the current concerns over water allocations in the Basin, including claims that water has been "overallocated", is that anticipated flows that underpinned the current entitlements to agriculture and to the environment were based on <u>averages</u> determined during the long wet period between the mid-1940s to the mid-1970s.

Politicians and Basin planners have mistakenly presumed that the Basin has a "static" climate, with regular rain and river flows. Kiem shows that this view is wrong. He shows that the Basin is subject to 12-30 year, naturally occurring, inter-decadal, climate fluctuations with average river flows in a wet 12-30 year period considerably higher than in an equally long dry period.

Hence, in anticipating future flows using rivers averages from one inter-decadal wet cycle will be no predictor of flows in a subsequent dry cycle, and vice versa.

Nor does calculating a 100-year long average flow provide an adequate guide for making "long-term <u>average</u> sustainable diversion limit" decisions, because again it assumes the Basin's climate is "static". It's not.

Equally, it would deficient and misleading to determine "long-term average sustainable diversion limits"[15] based on some 20-year, 30-year or 50-year "average" river flow calculation.

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[12] Anthony S. Kiem, Stewart W. Franks, and George Kuczera, "Multi-decadal variability of flood risk," *Geophysical Research Letters, Vol.* 30, No. 2, 2003.
[13] Anthony S. Kiem, and Danielle C. Verdon-Kidd, "Nature and causes of protracted droughts in southeast Australia: Comparison between the Federation, WWII, and Big Dry droughts", *Geophysical Research Letters, Vol* 36, No. 2009.
[14] Ibid.

The NSW irrigation entitlements and allocations system has already taken these climatic fluctuations into account, as discussed in detail in section 6 below. In short, water is proportionally allocated between farm use and the environment according to the availability of water in any one season.

In Victoria, to supply permanent plantings like fruit trees and vines, requires water from dams with high reliability of being able to supply more than about 95-99 years out of 100.

Summary

This research indicates three important conclusions:

First, Australia has long droughts and long dry periods, with multiple-climate phenomena interacting to create these extremes of inter-decadal climate variations.

Have we forgotten that Australia is the land of drought and flooding rain?

Second, trying to plan "long-term average sustainable diversion limits" based on average rainfall and average river flows, as defined in the *Act* is grossly inadequate, demonstrating a serious failure to understand the climatic nature of the Basin.

Recommendation 1: The Act needs to be amended so as to recognise that water availability in the Basin is highly variable, that the Basin's climate is not "static" but subject to long dry and long wet periods caused by natural, cyclical, inter-decadal climate variations, which naturally cause major fluctuations in species numbers and biodiversity.

4. Failure to account for the positive effects of dams, locks and weirs in the Basin preserving and extending wetlands

The *Act* appears to automatically assume that the only environmental outcome of human interventions in the Basin has been environmental degradation. The *Act* says that the special provisions of the *Water Act* are required to manage the use of the Basin water resources to conserve biodiversity because of

> "the fact that the use of the Basin water resources has had, and is likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity."[16]

The *Act* nowhere considered the possibility that human intervention may have actually preserved and/or extended biodiversity in the Basin.

These two contrasting photos, taken from the same spot in Swan Hill in the 2003 (top) and 1914 (bottom) droughts, illustrate this problem.

Photo 1 shows the Murray River at Swan Hill, looking at the bridge connecting Victoria and NSW. It was taken in the middle of the 2003 drought, when the river levels were high, as the huge Hume and Dartmouth Dams supplied water from the top end of the river near Albury, down through 14 locks and weirs to Lakes Alexandrina and Albert in South Australia.

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[15] Water Act, items 6 and 8 of s 22(1), and s 23.
[16] Water Act, Section 21(2).

Photo 2 shows the same scene at Swan Hill taken in the middle of the 1914 drought, before human intervention to build dams, locks and weirs. It shows the Murray River degraded to a dry river bed interspersed by water holes where river steamers float. At such times, wildlife suffered huge die offs with aquatic and land animal life being restricted to isolated water holes and their surrounds.

Question 1: Under which conditions did the Murray River support more biodiverse wildlife and flora – in it's natural pristine state, largely empty of water in a drought (photo 2); or with human intervention to provide dams, locks and weirs to keep the Murray full of water in the middle of a sever drought (photo 1)?

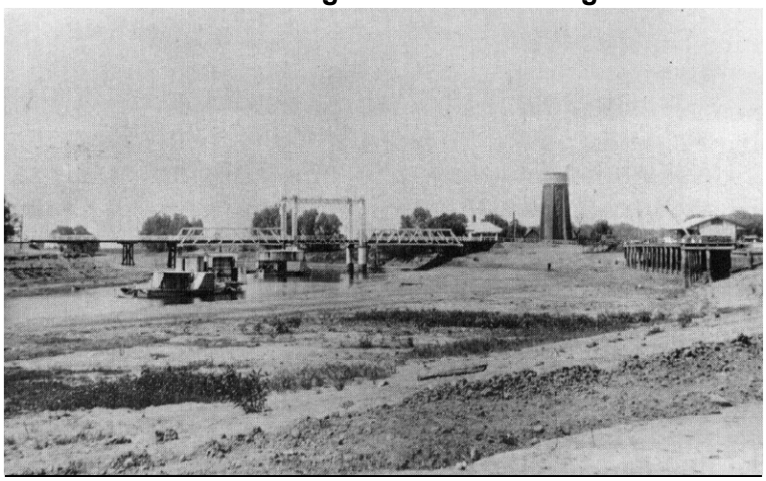
In addition, the Basin has most of Australia's 17,700 km of irrigation channels[17] and approximately 500,000 farm dams[18] supplying water to once arid-to-desert lands. The dams, irrigation channels, farm dams and irrigated land all constitute new wetlands, providing water and habitat to a wide range of birds, land animals, aquatic life and fauna that were once restricted to rivers, creeks and wetlands … when they had water. These man made wetlands help maintain and possibly expand biodiversity in the Basin.

Photo 1: Swan Hill Murray River bridge and water tower in the huge 2003 drought.

(Photo taken by Patrick J Byrne, Swan Hill, 2003.)

Question 2: Why did the *Water Act* give no recognition to the much larger expanse of land and water ways capable of sustaining biodiversity across the Basin thanks to the building of dams, locks weirs, irrigation channels, farm dams and irrigated agricultural lands? Why did the *Act* restrict considerations of biodiversity only to wetlands and other areas defined in international environmental agreements, like the Ramsar agreement?

Photo 2: Swan Hill Murray River bridge and water tower in 1914 during the 1914-15 drought



(Photo courtesy of the Pioneer Settlement Museum, Swan Hill)

Question 3: Why does the *Act* blame irrigation allocations for degrading the environment of

[17] "Construction and Refurbishment of Earthen Channel Banks," Land and Water Resources Research & Development Corporation, 2001. Pg. 8.2.

[18] "Mapping the growth, location, surface area and age of man made water bodies, including farm dams, in the Murray-Darling Basin," Murray–Darling Basin Commission/Geoscience Australia, 2008. Pg. 3.

the Basin, when, under natural conditions the recent ~13 year drought would have seen the Murray River stop flowing and no inflows into the lower lakes? Why did the *Act* not recognize that it was only due to the human-made storages like the Hume and Dartmouth Dams (14 Sydney Harbours between them) that the Murray River continued flowing (see photo 1), preserving biodiversity that would otherwise have been severely degraded?

Summary

The *Act* is seriously short sighted in failing to understand that the building of dams, locks, weirs has extended the availability of water in the Murray system long into major droughts, helping to preserve species biodiversity when otherwise there would have been a major collapse in many species of land animals, fish and birds.

Also, the *Act* fails to grasp the fact that the extensive system of irrigation channels, farm dams as well as irrigated farm lands, all constitute vast new wetlands in areas that once were dry, arid areas with no regular water supply.

5. The Act's narrow understanding of biodiversity

The object of the *Act* is to put in place a new management regime to overcome environmental degradation caused by overallocation and over use of water, by reallocating water in the Basin to preserve biodiversity. The *Act* s 4. says:

> ***"biodiversity*** means the variability among living organisms from all sources (including terrestrial, marine and aquatic ecosystems and the ecological complexes of which they are a part) and includes:
>
> (a) diversity within species and between species; and
>
> (b) diversity of ecosystems."

Prevalence of any particular species can vary enormously due to the huge variability of rainfall in the Basin.

The nature of the ecosystems in the Basin is that they need to experience both long wet and long dry periods that can go for several decades, causing huge variations in species number.

Much of the environmental science of the Basin has been undertake by scientists since the 1970s. Many have documented major declines in species numbers over that period.

However, is this because the Basin has been degraded by human intervention or because the Basin has been experiencing a long drying out period, culminating in the ~1997-2009 Big Dry?

Most of these scientists have never seen the Basin during a long wet period.

In 2010-11 following the Big Dry, the Basin has experienced one of its wettest periods on record, resulting in an explosion of life across the Basin.

As Figure 1 indicates, this may well be the start another long wet period of up to 30 years or more, as experienced in the post-WWII period up to the mid 1970s. That was the time when the Snowy Mountains Scheme was implemented, leading to the major expansion of irrigation farming in the Basin.

The nature of the Basin is to have species numbers vary enormously, depending on interdecadal variations in the climate of the Basin.

Therefore, how is the requirement under the Convention on Biological Biodiversity to be understood, when it says that "sustainable use" requires that "the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity"?[19]

Further, the Ramsar Agreement calls for "the wise use" of wetlands (defined in S 4(1) of the *Act*) to maintain the "ecological character" of wetlands. This is taken to mean "the combination of ecosystem components, processes, and benefits/services that characterise the wetland at a given point in time"[20]

What "point in time" is supposed to represent the true "ecological character" of a wetland – the middle of a big wet year or in a drought at the end of a long 30 year dry period when species numbers have crashed? Even picking an average between the two extremes does not represent the true "ecological character" of these wetlands, because wetlands require both wet and dry periods to maintain their biological health.

Recommendation 2: The *Act* should be amended to remove all references to particular international environmental agreements as they fail to describe the nature of the Murray-Darling Basins climate and ecology. Any references to biodiversity in the Basin must be qualified in the *Act* by recognising that native species experience major fluctuations across the Basin because of the extremes of natural climate variation, as described in Recommendation 1.

6. Confusing overallocation and over use of water with drought

The *Act* says that special measures are required to manage the use of the Basin's water resources to conserve biodiversity because of

> "the fact that the use of the Basin water resources has had, and is likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity."[21]

The *Act* further states that to "protect, restore and provide for the ecological values and ecosystem services" the Basin Plan must determine "environmentally sustainable levels of extraction of water resources that are overallocated or overused" in the Basin.[22]

First, it should be recognised that, in the water sharing plans, crucial human needs (for cities and towns), for stock and domestic use and for the environment takes precedence over allocations for irrigation farming.

Second, in understanding water allocations, it's vitally important to understand the fundamental difference between a farmer's *entitlement* (the amount he is entitled to receive in times when plenty of water is available) and his *allocation* of water in a particularly season, which may be zero in a major drought when there is little or no water flowing in the system.

[19] The Convention on Biological Diversity, Art 2.
[20] Ibid, para 15.
[21] Water Act, Section 21(2).
[22] Water Act, s 3(d)(i) and (ii).

In each catchment, the water allocation rules allow for environmental and consumptive allocations according to the availability of water. When there is a big wet, there can be a full allocation for irrigation farming and full allocations, or more, to the environment.

However, in years of low river flows, allocations for farm use is reduced. What proportion of an individual farmer's *entitlement* is actually *allocated* (delivered to his farm) depends on the number of farmers with entitlements in that system. So, if more farmers have received *entitlements*, the *allocations* to all farmers is reduced while the environment still receives it's calculated allocation.

The amount of water a farmer is likely to receive depends on the number of other farmers with entitlements and the amount of water available, and together these determine the farmer's *reliability* of supply. Hence, in a drought, a farmer's *reliability* of supply may be 50%, or 25% or 10% of his entitlement. Or in a major drought, he may have zero allocation.

In some systems during the recent Big Dry period, there were consecutive years when many farmers received very low, or no, allocations. In some years the environment receive low or no allocations also, for the simple reason that there was little rain and no water runoff to allocate in the system.

Yet the *Act* appears to have confused drought with overallocation, blaming perceived degradation on over allocations instead of understanding that environmental degradation occurs naturally in a drought. It's part of the natural, cyclical, inter-decadal climate variation in the Basin.

Three, water flowed continuously in the Murray system during the Big Dry only because of the Hume and Dartmouth storages, which held water in reserve for such drought periods.

How can the Murray River be described as suffering from "overallocation and overuse" in the recent Big Dry? It ran continuously because of the water supplied by dams, whereas in its natural state prior to human intervention, the Murray would have been reduced to a dry river bed with intermittent water holes, as shown in Photo 2 (above) during the 1914 drought?

Recommendation 3: Section 21(2) – which states that universally across the Basin it is a "fact that the use of the Basin water resources has had, and is likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity" – be deleted from the *Act* as it appears to have confused overallocations with cyclical, naturally occurring drought as the cause of environmental degradation in the Basin.

It should also be deleted because it's factually wrong to describe human intervention on the Murray River as having had "significant adverse impacts on conservation and sustainable use of biodiversity", when it was the man-made Hume and Dartmouth dams that kept the Murray flowing continuously during the recent Big Dry, helping to maintain species numbers and biodiversity along a river that would other wise have been reduced to a dry river bed with intermittent water holes.

7. The Act narrowly focuses on environmental flows in attempting to preserve river health

In claiming there is a need to restore river health, the *Act* focuses on environmental flows almost exclusively as the only means of measuring environmental health. However, there are about 22 issues in river health, many of which are more important that river flows in determining the health of the Basin's rivers.

These include:

- instream habitat: the logs, water plants, water turbidity and temperature that affect river life;
- riparian zone health, relating to stream bank stability, land and vegetation adjoining the river like wet lands and billabongs, and flood effects on the regeneration of the flora and fauna;
- instream structures: the siting and management of locks, dams and weirs which affect river flow, irrigation use and riparian zone flooding;
- seasonality of flows: the natural regeneration cycle is in July-September (coinciding with the periodic, traditional snow melt leading to river flooding), whereas main flow timing is November-February when farmers irrigate;
- salinity management, catchment area by catchment area;
- control of pest species;
- losses of water in the distribution channels and impoundments;
- volume of water flows down the rivers in the Basin.

Recommendation 4: The *Act* be amended so that in assessing the environmental state of rivers and regions, all significant factors affecting environmental health are included, not just river flows.

8. Failure to do the science of the Basin

The *Act* says that the process of determining "sustainable diversion limits" should be informed by the best available scientific knowledge and socio-economic analysis.

The only Federal inquiry yet to scrutinize and evaluate the available science of the Basin's health was the 2004 House of Representatives Standing Committee on Agriculture, Fisheries and Forestry. In its interim report, the committee expressed major concern, indeed shock, at the poor science behind the Living Murray plan, for which the Federal government had allocated $500 million to take around 1,500 gigalitres (1,500,000 Olympic-sized swimming pools) of water from farmers for river flows over ten years.

The committee's interim report made an urgent call to postpone the plans to take the 500 gigalitres of water for environmental flows in the Murray River until:

- a comprehensive program of data collection and monitoring by independent scientists is completed;
- other alternatives to river management strategies, rather than just river flows, are considered and reported upon more thoroughly; and
- a full and comprehensive audit – focused specifically on the Murray-Darling Basin's water resources – including all new data, is conducted.

The Committee also recommended that sufficient funds be made available from the $500 million allocated to the Murray River by COAG to the achievement of these tasks, before there was any

move to increase river flows.

These important recommendations from this inquiry were not implement.

- Data collection to fill in the "gaps in the science" has yet to be done.

- There is yet to be any "full and comprehensive audit" of the science, i.e. the science behind the Basin Plan is yet to be scrutinized, debated and substantiated, by stakeholders across the Basin to determine if the science s practical, if it matches local knowledge and if it justifies the taking of water equivalent to Hume and Dartmouth dams annually out of productive agriculture and away form the irrigation channels, farm dams and farm wetlands that also sustain biodiversity.

- There is yet to be any close scrutiny of the science behind the Basin Plan by the Parliament.

- There is yet to be any considerations to "alternatives to river management strategies, rather than just river flows."

Instead, incredibly, the Basin authority has been instructed by the *Water Act 2007* not to wait for the science to be done and clarified. Rather, the *Act* states that

> **"if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."[23]**

How can such judgments about "threats" to the environment be made when there is yet to be a comprehensive review of the science?

Furthermore, how can such judgments about "threats" be made when the Act itself:

- **has ignored the extreme, inter-decadal climate variations in the Basin that cause it's environment to naturally degrade then restore?**

- **has primarily focused on environmental flows as the solution to the Basin's needs almost to the exclusion of many other significant issues that determine river health?**

- **there is yet to be any comprehensive parliamentary and stakeholders scrutiny of science underpinning the Basin Plan?**

Summary

The Act has failed to grasp the range of environmental issues determining river health, focusing almost exclusively on sustaining "average" environmental flows as the panacea to all environmental issues in the Basin.

Given that the recommendations of the Parliament's only inquiry into the science of the Basin have not been implemented, it begs the question, was the *Water Act 2007* written in willful ignorance of the science of the Basin?

Indeed, doesn't the failure to comprehensively scrutinise the science undermine the requirement in section 21(4)(b) of the *Act* that the MDBA and the Minister act on the best available scientific knowledge and socio-economic analysis?

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[23] Water Act, S 4.2(b).

Recommendation 5: The *Act* be amended to require that:
- **the MDBA conduct detailed scientific environmental studies in all catchments of the Basin;**
- **some of the $8.8 bn Federal MDB plan fund be allocated for this purpose;**
- **purchase of permanent water by federal and state governments and their authorities cease until the science of the Basin has been completed and environmental needs assessed; and**
- **such scientific studies be comprehensively reviewed by all stakeholders in the Basin in conjunction with the MDBA and state water authorities.**

9. Failing to put in place a process for community-based review of the science and the Basin Plan

Historically, the Murray-Darling Basin Commission had a good track record of close consultation with all stakeholders in community to resolve environmental issues across the Basin. In comparison, the recent MDBA consultations on the Basin Plan were an affront to regional communities, designed more to impose the demands of the *Water Act* on the regions than to be serious consultations.

The complexity and variability of the Basin requires that there be full and comprehensive consultations between federal and state authorities and all stakeholders in each region of the Basin.

An example of successful consultation processes was the MDBA's handling of the determination of a watering regime for the Barmah-Millewa Forest in the 1990s. Indeed, the process adopted was a ground-breaking model for solving a range of environmental conflicts. The Barmah-Millewa Forest area is an important ecological wetland and forest on the Murray River between Cobram and Deniliquin.

A meeting between the Murray-Darling Basin Commission (MDBC) and local communities bought together a balance of farm irrigators, representatives of the departments of water resources, environmental groups, local councils, river recreational-users' groups, the aboriginal community and local councils. Special recognition was given to the groups that financially supported the management of the system.

The purpose was to find ways to flood the area periodically to regenerate the forest and wildlife, and to improve river health.

When it started, few believed the process could work, because of the antipathy between the many diverse groups forming the committee. Yet, after a difficult three-year process, a watering regime was unanimously agreed to.

An agreement was struck to periodically add 50 gigalitres of water to the flood flows through the region when the Ovens River flood came through that reach of the Murray. It would require the building of several regulators so that different areas of the forest would be flooded in different years. River gums need periodic, but not annual, floods for regeneration.

This process could be described as a "community cooperative sustainable self-management system." It was:

- a "cooperative" process rooted in the community, so all sides received a full hearing of their concerns.

- based on “community-agreed” science, not partisan science from on section of the community, providing a common understanding of the needs of this wetlands system.

- "sustainable" in that it was designed to preserve the resources of the region and to manage their use sustainably.

- "self-managed" not government-dictated, in that the management of the process was done by the whole community.

The community cooperative sustainable self-management system process worked because it led to even the most diametrically opposed groups coming to appreciate each other's concerns and the scientifically determined environmental needs of this wetland.

Most importantly, once the committee process started, no one group could make outlandish, overstated claims for their pet issues, without losing credibility in the committee process. Conservationists could not overstate their case. Farmer irrigators could not overstate their needs compared to that of the wetlands system.

Contrast this "co-operative" approach to resolving an environmental dispute with the cumbersome way government departments and their statutory authorities try to settle such disputes.

That process ends up with aggrieved parties, themselves lacking comprehensive knowledge of the real issues, venting their anger at opposing stakeholders and governments. The result is that governments can then be left captive to one interest group, regardless of whether that group has sound science to solve the problems.

The cooperative process should be applied to MDB issues. Environmental issues vary from site to site, and require a large amount of detailed science and comprehensive local historical knowledge.

A "one policy for all seasons" environmental policy won't work. The government's aim should be to get the process right, to set up regional committees with all stakeholders involved, modelled on the Barmah-Millewa forest process.

Summary

The complexity and variability of the Basin requires that there be full and comprehensive consultations between federal and state authorities and all stakeholders in each region of the Basin. This needs to be written into the *Act*.

Recommendation 6: The *Act* be amended to require that the science underpinning the Basin Plan be subject to comprehensive, detailed reviews involving all stakeholders in the Basin, the MDBA and state water authorities, modeled on the Barmah-Millewa Forest review process. Further, on the completion of that review, management of all key wetlands and other environmental sites be done using a “community cooperative sustainable self-management system” process.

10. Failure to balance social, economic and environmental use of the Basin's water

When the *Act* was being advocated, Australians were promised that there would be equal weighting given to social, economic and environmental factors in any reallocation of water resources in the Basin Plan.

However, even the Australian Government Solicitor, Robert Orr QC, in his assessment for the Federal Water Minister, Tony Burke, of how these three factors are to be balanced in the Basin Plan, said that in

> "maximizing the net economic returns to the Australian community from the use and management of the Basin water resources … [t]his object is subject to the previous provisions relating to environmentally sustainable levels of extraction for overallocated and overused resources and protecting, restoring and providing for ecological values and ecosystem services."[24]

In short, the *Act* gives overwhelming priority to environmental needs, well above social and economic uses of water in the Basin. The social and economic balancing only takes place after the environmental needs and allocations have been determined.

Recommendation 7: That the *Act* be amended to give equal weighting to social, economic and environmental needs, which to be effective, requires implementation of recommendation 2, that is, repealing those clauses of the *Act* that name and invoke international environmental treaties.

11. The Act misses what is critical to managing an arid-to-desert rivers system

In river systems with very large maximum-to-minimum flows, to smooth over the huge variations in flows, dam storages are constructed to save water in the times of large flows for times when flows are low.

Yet, the Act requires only one solution to the perceived need for more environmental flows in the Basin – buying water from irrigation farming for environmental flows.

Under the current Basin Plan, this will effectively take away from agricultural production the equivalent of all the water stored in the Hume and Dartmouth dams and reallocate this water additional environmental flows.

Currently, the Federal government has $3 billion allocated for buying irrigation water, which is $3 billion to shut down rural industry.

It has another $5.8 billion of federal water infrastructure upgrades to make water savings. However, the Productivity Commission report *Market Mechanisms for Recovering Water in the Murray-Darling Basin* (2010) says new investments cannot produce any more significant water savings in the basin, because all the major savings have already been cherry picked.[25]

[24] Water Act, s 3(d)(iii).
[25] Productivity Commission report, *Market Mechanisms for Recovering Water in the Murray-Darling Basin,* 2010

The Federal government would do far better reallocating the remainder of this $8.8billion to building new reservoirs. These could include environmental dams from which water can be allocated to the environment.

Such projects could help increase environmental flows, drought proof the Basin's irrigation industry and aid in flood mitigation.

Governments would make significant future savings from the reduced need for drought relief and flood relief.

Recommendation 8: The Act should be amended so as to reallocate the remaining funds from the $8.8 bn Basin fund to the construction of new dams, including environmental dams to provide new environmental flows to the Basin's river systems.

12. Conclusion

The fact is that the *Act* is fatally flawed.

- It's prescriptions are at serious odds with the reality of the highly variable extreme, natural, cyclical, inter-decadal climatic fluctuations in the Basin, which in turn determines the ecology of the Basin.
- The Parliament failed to evaluate the science on which the *Act* was based before the *Act* was passed.
- Since then, the science underpinning the Basin Plan, based on the *Act's* prescriptions, has not been tested, reviewed and evaluated by either the Parliament or the stakeholders in the Basin.

Further, governments have failed to grasp that the Basin's climate is not "static" but highly variable, that prescribing "average" flows as a basis for determining "long-term average sustainable diversion limits,"[26] is at fundamental odds with the requirements of the ecology of the Basin wetlands and rivers – they require long wet periods and long dry periods.

The *Act* has sought to condense the complex issue of determining sustainable water diversions into a formula based on "average" flows, a concept that fails to reflect extreme, natural climate variations in the Basin.

Attempting to determine diversions limits and environmental needs on the assumption of a static climate delivering regular river flows, is flawed concept that Kiem says, "is inadequate".[27] Indeed, to say it is merely "inadequate" understates the case.

The problem is reinforced by invoking the Convention on Biological Diversity's concept of maintaining long-term biological diversity. The Convention fails to grasp that in the long-term, Australia's Murray-Darling Basin needs cycles of degraded and restored environmental states for the health of the Basin's diverse flora and fauna. That is the nature of the system.

[26] Water Act, items 6 and 8 of s 22(1), and s 23.
[27] Anthony S. Kiem, Stewart W. Franks, and George Kuczera, "Multi-decadal variability of flood risk," *Geophysical Research Letters, Vol.* 30, No. 2, 2003.

Further, what does it mean to measure the "ecological character" of wetlands "at a given point in time", as required in the Ramsar Agreement? At what "point in time" is the "ecological character" of a wetland to be made: at the end of the recent Big Dry when the Basin is in a degraded state, or at the high level of ecological diversity in the middle of a major wet period? This requirement leaves the *Act* open to almost any interpretation.

If some "average" environmental flow plan is to be maintained, why? How would this be better for the Basin than its natural extreme cycles? How is an average to be maintained at the end of a long drought when for many rivers there would be no natural water flows even if there were no human demands on the system? Is the Federal government proposing to build new environmental dams to store more water in order to supply "average" flows to the environment in long droughts?

The current *Act* is open to almost any interpretation. It provides no basis for building a serious plan for the environment of the Basin, or for balancing social, economic and environmental needs.

Attempting to resolve such matters before the courts would lead to protracted legal battles that would tie up governments and communities for decades. It would lead to uncertainty and loss of investment in the Basin's rural and regional communities.

Summary and Conclusion

The *Water Act 2007* is unworkable. It requires major amendments as recommended above, if not a total rewrite.