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Water Proofing the Murray-Darling Basin

To: The Standing Committee of Regional Australia ra.reps@aph.gov.au

Introduction:

The Murray Darling Basin Authority (MDBA) has been blinkered, often by green enthusiasm, into the hypothesis that reducing the water available to the irrigators will solve the problem. It won't. A broader, open minded approach, with a touch of realism thrown in needs to be evaluated.

The first unchangeable rule for the Murray and the Darling Rivers is that, no matter how their water is distributed there will be times when there is insufficient for environmental, urban and agricultural users. There will always be floods and droughts.

The problem to be addressed is how to best provide and allocate water supplies that will help level out the water roller coaster, particularly during the dry times.

This submission is divided into two parts:

The first gives some background into my personal association with the Murray along with suggested ways to better provide and distribute water in Murray Basin.

Build environmental dams:

Improve Irrigation Efficiency:

Evaluating Water Storage Areas. The Hard Decisions: (Mainly converting the lower lakes back to an estuarine environment.)

The second part is about getting additional water in the Darling Basin using, as an example, the diversion of Northern NSWs Clarence River as the source of the water. There is significant local resistance (**Not One Drop**) even though 99% of the basin's water goes out to sea. It is a new twist to the NIMBY syndrome, being the NFromMBY mindset. The proposed plan is quite different from previous ones like the one advanced by late Professor Lance Endersbee. If built it would provide many benefits to the people of the Clarence Valley as well as supplying water to the Darling.

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Part I - The Murray

When I was born, Finley's water was carted from the Murray River, 13 miles away. I was told that it used to cost more than beer, which seemed believable judging from the patronage of the three pubs across the road from my parents' newsagency. Once the Mulwala canal was operational it supplied town water as well as a place to swim. With Mulwala water the town went from a dusty, "why the hell would you live here" to a pleasant green and prosperous town.

Once when swimming in the Murray I was chased across it by a red-bellied black or maybe a brown. I didn't wait to confirm its true identity. During that swim I had medal prospects. At ten, I had an accident while fishing from a tree on Billabong Creek, the longest creek in NSW and a tributary of the Murray. It kept me in and out of hospital for a year. As a teenager I floated the 27miles (43km) down the river from the Hume Weir to Albury on a log. Definitely not the smartest thing to do. I've water skied and fished on the Goulburn River's Lake Eildon and enjoyed a wedding on an Echuca paddle-wheeler. I've photographed the Point Malcolm lighthouse at the Narrung Narrows between Lake Albert and Lake Alexandrina for my lighthouse books. Does this make me an expert on the Murray River? It doesn't but my past, and the lower Murray wines I consume, may explain my interest in it.

The Murray is not in the same extreme league as Alice Spring's Todd River (dry 99% of the time) or NSW's Clarence River (never dry). In wet times the Murray flows; in dry times it trickles. In the 1890's, 1911-1914, 1915, and 1923 it stopped flowing. There are photographs of a family having Christmas dinner in the middle of the Murray at Echuca in 1911 and a politician (?) straddling the river in 1923. And the Darling is likely to have longer, drier spells than the Murray.

Once the Hume Reservoir was built in 1936 a flow has been maintained throughout the length of the Murray at all times. This included several severe drought periods in 1938–39, 1944–45, 1967–68, 1982–83 and 1997–98. The Lake Eildon dam on the Goulburn River originally built in 1927 and enlarged twice since, and the Dartmouth dam on the Mitta Mitta River built in 1979, has also contributed to the Murray having water in it, even during the 2001-10 drought.

Although the main reservoirs and the numerous downstream weirs were primarily built to meet irrigation requirements, they have also provided environmental water to the Murray River during dry periods. Without them the Murray during a drought like the one we've just endured, would have been bone dry years ago. Environmentalists should keep this in mind when they object to the construction of dams. If they want to use irrigation dam water for environmental purposes then they need to promote the building of new dams. In Australia's wet-dry climate it is environmentally prudent to catch and store water when it rains so that it can be used when it doesn't.

There is also the impression, cultivated by the environmentalists and governments, that the irrigators have selfishly kept using their full water allocations during the current drought. Nothing is further from the truth. When full the main upper Murray dams hold ten Gigalitres (Gl) of water. For irrigation, reserves are held back to cater for two dry years. If the dry lasts for longer there are drastic cuts (up to 90%) to water allocations. In driving back through Finley over the last few years I have seen it change from a green lush environment to brown dusty paddocks, reminiscent of my memories from the forties. The last time I crossed the Mulwala canal it was empty. And what is even more galling is the fact that the farmers still have to pay for the water, even if they don't receive it. For a farmer friend in Finley one year this was $100,000 for no water. Farmers should not have to pay for water they don't receive.

The green illogic continues implying that, seeing the farmers survived during these lean years then they should be able to always make do with less water. Firstly many haven't survived, some quite literally, when the high suicide rates for farmers is taken into account. For the others they adapted and put in dry tolerant, lower value crops, sold off their livestock and borrowed heavily to get by. Once the dry ends they, like the rivers, need to replenish. They need to pay off their loans, fix their fences, re-establish their soils, restock and replace aging equipment. Maybe even take a holiday. To

do this they need to go back to producing the high value commodities such as rice or cotton, fruit, vegetables and wine.

And it is not as though the irrigators are water wasters. Most have invested heavily, often 100's of thousands of dollars, in making the best use of their water. Around Finley, where a channel bank is considered a mountain the fields, which maybe hundreds of hectares in size, are sculptured using laser technology until they are flatter than a billiard table. Definitely more precise than when I plodded around the paddocks as a surveyor's chainman. They can water rice with just a few centimetres. And then they collect any runoff and move it into the next field. It's the equivalent of city slickers taking a one minute shower.

So what can be done to help preserve the Murray-Darling environment and ensure that the farmers and towns survive and prosper during the inevitable future dry periods?

- **Build environmental dams:** These would be filled during the cyclical wet years, (such as occurred in 2010) with the water only being released for purely environmental flows during dry periods. An example would be to pipe water from say the Macalister River above Licola, on the south side of the range, into a new dam at the headwaters of the Goulburn River or an enlarged Lake Eildon. This would need to be done in conjunction with piping water from the Mitchell River to the Glenmaggie Dam. It could also be piped on to the Thompson Dam, to augment Melbourne's water supplies and eventually be pumped up the Goulburn-Melbourne pipeline into the Goulburn River.

- **Improve Irrigation Efficiency:** Buying back water entitlements, which often result in the farmers walking off their land to the detriment of the whole community, are a destructive solution. Instead have the government use the buy-back amount for improving the water usage efficiency in return for a lower entitlement. This would encourage farmers to continue working their farms and producing food and fibre, as well as still contributing to their local community.

- **Evaluating Water Storage Areas. The Hard Decisions:** Along the Murray and the Darling there are large shallow lakes or lagoons. The questions have to be asked "Is it realistic to keep these lakes full? How deep are they? What is their evaporation rate?" If they are less than 3m deep and have an evaporation rate of 1m or more a year, is it better to let them survive based on what nature provides; the occasional filling after major floods? This has been the cycle for millennia and they have survived ok; they bounce back when they do fill as we have seen in 2010.

The importance of Australian Rivers flowing into the sea is over-hyped because most do not reach the sea as fresh water. Look at nearly every river along the Australian coastline. They either empty into estuarine lakes or are tidal for many kilometres up stream. Unlike the Amazon, having fresh water at the mouth of Australia's rivers is but a pipe dream. And this includes the Murray.

The most environmentally sensible, quickest and cheapest project would be to "end" the Murray between Wellington East and Pomana Island on the NE arm of Lake Alexandrina, unless there is a problem with appropriate foundations in the area, in which case the weir may need to be built on the granite near Swanport. The weir would stop all the Murray water from going into the lake, except what was necessary to keep the river flowing or during floods. As well as the weir it would involve the opening up of Lake Alexandrina and Lake Albert to the sea, possibly in a number of locations.

So would returning the lakes to being estuarine be worthwhile from both an environmental and water usage point of view? Definitely.

- Opening up the lakes to the sea would revert the lakes to what they had been for millions of years, prior to the construction of the barrages, which were completed in 1941, to keep salt water out of the lower Murray. Even the early explorers found that the lake water was salty and undrinkable and that the mouth of the Murray was closed. To offset the opening fresh water supplies would have to be provided to lakeside communities, and irrigated properties, around the lakes and up to the new weir.

- "Oh no, we can't do that!" will be the environmental cry. "It will destroy the environment of the lakes and the Coorong." But this is nonsense. The environmentalists should be ecstatic about going back to estuarine environment because this is returning the lakes to their natural state and restoring the health of the Coorong.

- It would open up the lakes to profitable marine fish farming (instead of the current carp crap), as well as making their tourist potential drought resistant.

- It also provides the opportunity to open up water flows through the Coorong, which would correct the man-made hyper-salinity that currently exists. Apart from the opening of the barrages this would include an opening from the SE corner of Lake Albert into the Coorong and opening the Coorong to the ocean at its eastern end. These openings, and the actual mouth of the river should have sand control walls built to ensure that they remain open.

- The conservation of fresh water would be significant. When full Lake Alexandrina has a surface area of 700 sq km and Lake Albert 140 sq km. They are also very shallow, being less than 3m deep. They have an evaporation rate of more than 1m per year, which has to be replaced with 1,000GL of new water, in addition to local rainfall, just to keep the lakes full. No wonder they dry up during extended droughts. Then to keep the mouth open would require an at least an additional 2,500GL. The total is the equivalent of sending the Hume Dam's total capacity through the lakes every year. (It is also about six times the 600GL of buy-back water that the government has purchased to date.)

- As well as more water for irrigation it allows more environmental water to be allocated to inland lakes, wetlands and marshes, such as the Barmah-Millewa Forest and the Macquarie Marshes, which don't have the salt water option.

The three major reservoirs feeding the upper Murray, (the Dartmouth, Hume and Lake Eildon), hold 10,200Gl when full. The amount of dam water used for irrigation in northern Victoria and southern NSW from these dams is around 4,000Gls (hence the dams' ability, if full, to supply dam irrigation water for three years). By returning the river mouth lakes and the Coorong to their natural estuarine state saves the equivalent of most of the dam water being used for irrigation along the Murray!

The cost of doing this would not be excessive. It involves building one new weir, opening up the barrages, building two connection channels and providing fresh water from above the new weir. In terms of the cost per Ml of water retained by the Murray, it would be very cost effective.

It is a project that is worth doing and which overall, will benefit all Australians.

Figure 1 Showing the Changes to be made at the mouth of the Murray River

Part II - The Murray-Darling Clarence Connection

The Darling and its tributaries are effectively Desert Rivers, flowing across mostly flat country, where deep storage locations are few and far between. They are filled irregularly by the monsoons and cyclones that sweep across northern Australia and from westward flowing rivers, which tend to be in the rain shadow of the Great Dividing Range. Whether they receive water is dependent on the whims of the monsoons, ocean currents, the La Nina El Nino cycle, solar conditions, wind and the wandering storm paths. The total flow of the Darling and its tributaries is only a small percentage of the water carried by the Murray and its tributaries. To keep it flowing and productive, the only real solution is to add water from outside the catchment areas. This water can come from two sources; the monsoonal rivers flowing into the Timor, Arafura and Coral seas, and rivers flowing east from the Great Dividing Range. The following discusses the ability to pipe water from the Clarence River in northern NSW, over the Great Divide, to tributaries of the Darling, although other rivers should also be considered.

Three years ago I bought a home in the Clarence Valley in northern NSW. Unlike a sea change or a green change this was a water change. The chances of this area having long and severe droughts are minimal. There are two main reasons for this.

The first is that the NSW north coast is in a position where it can benefit from both the northern summer rains and the southern winter rains, although July-September are drier than the other nine months. In Gulmarrad where I live the long term average is 1,300mm (52”). During the last two years of the inland drought (’08 & ’09) it had 1500mm (60”) and 1870mm (75”) respectively. To mid-November in 2010, 1430mm (57”) has already fallen. And there was a major flood in ’09.

The second reason is the width of the coastal plain. Brisbane and Sydney get most of their rain from offshore storms. Because the escarpment is so close to the coast in these areas, there is no way to capture the falling rain, after it hits the escarpment and before it rushes out to sea. As a result their storage dams on the western side of the escarpment miss out. The Northern Rivers coastal plain is wide enough for the rain dumping on the eastern side of the escarpment to end up in streams that can be managed. Oops! Managing rivers and diverting their water to other places doesn’t seem to be a popular idea, as highlighted by the “The Mighty Clarence - Not A Drop” campaign. Even the building of the drought proofing Shannon Creek Dam, which is filled with piped water from the Nymboida River, suffered from strong and apparently destructive opposition. But moving right along…

There have been a number of plans for collecting the Clarence Valley waters and sending them westward. Probably the best known is the plan put forward by the late Professor Lance Endersbee, who was also involved in the design of the Snowy Mountains scheme and the Tasmanian Hydroelectric schemes. His plan included six dams and multiple pipelines. It looks like a mini-Snowy Mountains scheme. When you are on a good thing, stick to it! A scheme of this magnitude is not needed. The fallacy of his scheme was that lots of water needed to be stored. It doesn’t. It needs only one dam on the eastern side of the range with a capacity to hold (say) a few months supply of pumpable water, while maintaining downstream river flows. If it doesn’t rain just wait a week or three.

The dam would be built after the major tributaries, such as the Timbarra and the Nymboida/Mann flowed into the Clarence. It would appear that the best site for the dam would be above the Clarence River Gorge. The dam could also be built with additional capacity to control downstream flooding. The Clarence Dam would be 3.0km upstream from the Clarence Gorge or 1.5km below the confluence with the Mann. It would be built to the height of the 100m contour giving a wall height of 50 metres. Following the 100m contour the lake would extend about 20km up the

Clarence and 25km up the Mann River. The wall could be lower, say up to the 80m contour, which would reduce the size of the reservoir.

From the dam the water would be pumped to the top, and maybe in parts through, the Great Divide, on a route generally paralleling the Gwydir Highway, to a small holding dam on Kneipps Creek. The pipeline would follow the Coombagh Creek to its headwaters. From there it could follow the Gwyder Highway or Tincan Creek into the Oakey Creek valley and then through the Timbarra River and Elgin Creek valleys to the continental divide (at 1,100m), finishing in a small reservoir on Kneipps Creek. As the water flowed from this reservoir it could produce hydro power before flowing into the Severn River and on to the existing Pindari Dam, the Macintyre-Dumaresq-Barwon rivers and finally into the Darling (See Figure 2).

Most of the pumping could be done overnight using the excess capacity, which thermal power stations produce. The hydropower from the Kneipps Creek dam, and from power produced from the outflow from the Clarence Gorge dam, could be used for daytime pumping or as peak load power.

Is this feasible? From a pipeline perspective it is relatively straight forward. A 1.2m diameter pipeline could carry over 300ML per day. It would be appropriate to have two or more pipes to allow for a wider range for scheduling throughput (more at night or during high water and less during drier periods or high power demands). The pipeline from the dam to the Severn River would be 75km long (as the crow flies) and its highest point would be 1,100m (3,600').

To put the achievability of this project into perspective: In the mid-1970's I worked on the Trans Alaska Pipeline, which carries crude oil from Prudhoe Bay to Valdez. The 48" (1.22m) pipeline can transport over 2 million barrels (320ML) of heavy crude oil per day along the 800 mile (1,300km) long pipe and through 12 pump stations. It was built on harsh terrain and over three 4,400' (1350m) plus, mountain ranges. The pipe line is buried for half its length, (so the wildlife can walk over it) with the balance being supported by 78,000 vertical support members (VSMs). Outside operating temperatures can vary from 30°C in the short summer down to -60°C in the long winter. It was also designed to provide maximum protection to the environment and the local wildlife. After 30 years it is still operating.

Technically the Clarence diversion is straightforward. From a community point of view there is loud resistance although many of the locals I have talked to are in favour of it. The politicians and the press tend to express the attitude "But this is OUR River, and NOT A DROP is going over the mountains." This seems to be a new twist on the NIMBY syndrome, being NFromMBY.

Some of the factors making this a more palatable/realistic solution are:

- According to NSW government figures less than 1% of the water from the Clarence Valley Rivers is being used by communities and agriculture with the other 99% going out to sea. And the new Shannon Creek dam can ensure our water supplies when there is a dry spell like the one in 1999.
- The proposed plan does not have any major impact on the Clarence River tributaries. Hence there would not any impact on the water that goes into the Shannon Creek reservoir from the Nymboida River or on the environmental characteristics of any tributaries.
- The only portion of the Clarence to be affected, apart from the reservoir, would be the last 30km between the dam downstream from the confluence of the Clarence and the Mann Rivers and the point where the Clarence becomes estuarine.
- The dam's height would affect how far back up the Clarence and Mann rivers the lake would go. A wall height of 30m would suffice, but a higher 50m, wall would be better for providing flood mitigation for the lower Clarence.

- The lake could become a fresh water recreational area, including water sports, boating, fishing, picnicking, camping and bushwalking.
- The quantity pumped could be controlled through legislation, to ensure that the quality of the estuarine portion of the river is maintained.
- Costing at this point is obviously a guesstimate but $400-600 million would be in the ballpark.

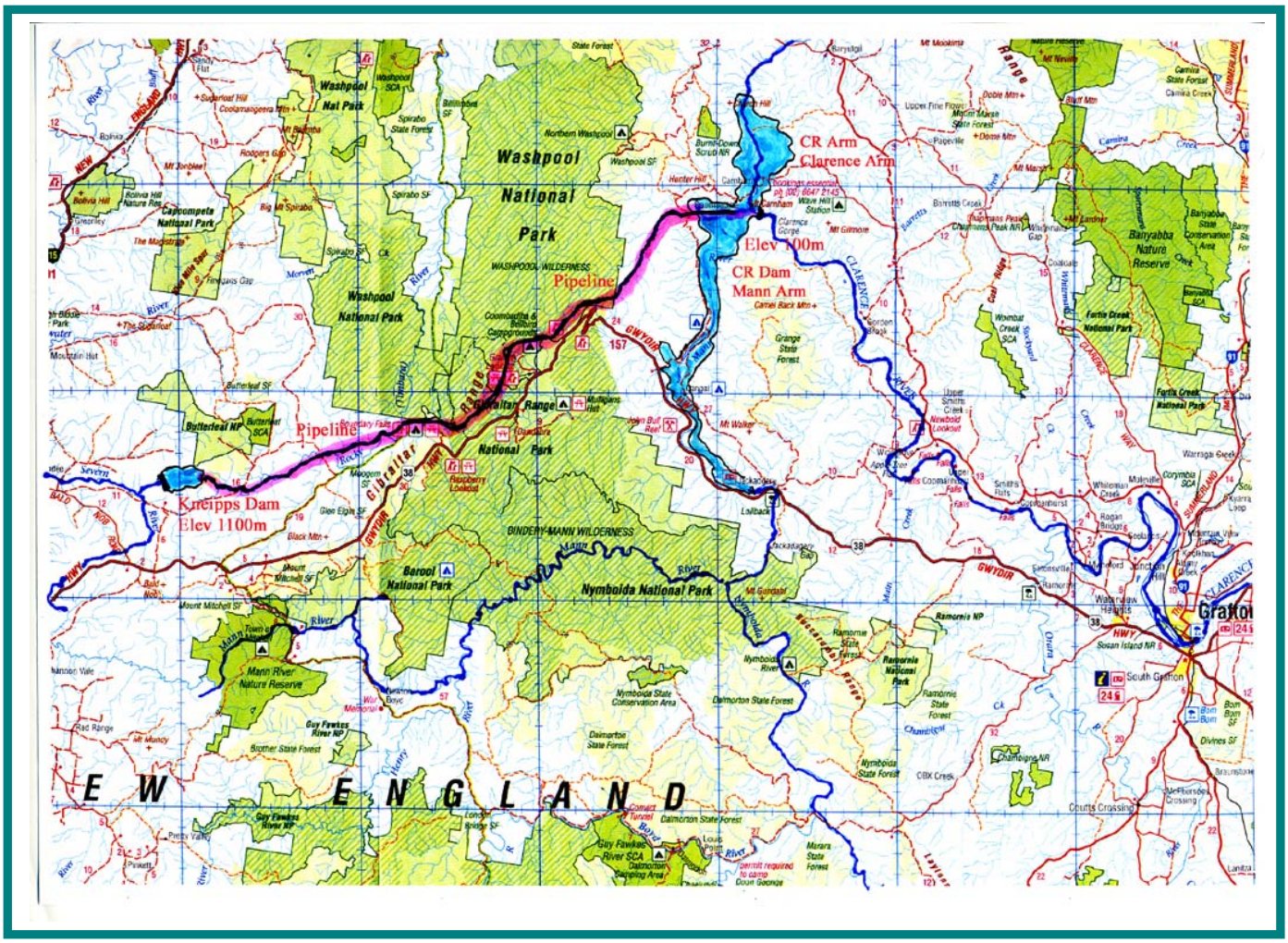

Figure 2 General overview of the Clarence-Severn Dams and Pipeline
(The Pipeline routing has been done in more detail on topographic maps to confirm its viability.)

And to the people of the Clarence Valley, who automatically say "No", possibly without considering all the pluses and minuses that this project can provide:

As you sit down at dinner after reading this, proud of the "Not A Drop - The Mighty Clarence" bumper sticker you have on your car, have a look at what you are eating. The curried lamb shanks and rice, the wheat bread, the vegetables on your plate, the fruit in the bowl and the wonderful wine you are scoffing down quite likely all came from the Murray Darling Basin. The chilled water probably came from our own (I'm all right Jack), Shannon Creek dam. Actually the bumper sticker is a contradiction. Is the Mighty Clarence so "shallow" that it won't give a drink – Not A Drop, to its thirsty neighbours? Are we so parochial and short sighted that we won't share the 99% of the water we don't use? Have we considered the benefits of having a fresh water recreation area? Have we considered …?

Do we really believe that Tasmania and China can replace the Murray Darling? (China is already having water quality problems; 80% of stored water is no longer fit for human consumption and some is not even fit for agricultural use; would you like Chinese lettuce in your salad?) The world needs more and more food. The population is growing; living standards are improving; a huge amount of food is being siphoned off for biofuels. The Murray-Darling must be kept vibrant.

Supporting this diversion will be beneficial for all Australians, including those of us living in Clarence Valley. This diversion would not destroy the Clarence or its hinterland. We need a new bumper sticker here that says “The Mighty Clarence – It CAN Help!”

Conclusion:

The suggestions outlined in the above paper are meant to help people start thing outside the narrow parameters of current proposals. Obviously they are only a start of a lot of realistic, doable projects that would assist maintain the Murray-Darling Basin as a vibrant producer of food and fibre for longer, even in drier times. The cost, for the detailed projects discussed would be within reason (just a couple of the new submarines), provided a non-government implementation body (like the Snowy Mountain Authority) was established to manage the projects.

And just because there is currently too much water available across the basin, the wet is only part of a recurring cycle, in which dry periods are longer than the wet ones. If new or enlarged dams already existed then some of the flood waters could have been stored. Too late for these floods but this is not the time to put the water proofing projects aside; it is time to get them done in preparation for the next, inevitable big dry.

I would be pleased to discuss or answer any questions that arise from this proposal.

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06-12-2010