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SUBMISSION

to

Inquiry into the impact of the Murray-Darling Basin Plan in Regional Australia

To Standing Committee on Regional Australia
ra.reps@aph.gov.au

Compiled by John Edwards
Honorary Secretary

Submission to the Inquiry into the impact of the Murray-Darling Basin Plan in Regional Australia

Introduction

The Clarence Environment Centre has maintained a shop front in Grafton for more than 20 years and has a proud record of advocacy for the environment both locally and across Australia.

Moves by the previous Coalition Government and the present Labor Government to protect environmental flows in the highly stressed Murray Darling Basin must be applauded. Everyone accepts that water from the system has been over-allocated, and that, unless steps are taken to provide those environmental flows, the entire ecology of the region is threatened with collapse.

However, as soon as moves to make the necessary cuts to water allocations, it seems that nobody is prepared to shoulder the responsibility personally, and everyone points to where they perceive the problems are created. We believe the recent deplorable behaviour of some extreme elements in the debate, who have hurled abuse at officials, and publicly burned copies of the Plan, is an exhibition of greedy self-interest.

It is with this background that the Murray Darling Association has raised the perennial call for the supposedly limitless waters of the Clarence River to be pumped over/through or around the Great Dividing Range to rejuvenate the Murray Darling system and allow the water exploitation to continue unabated.

Science, common sense, and even engineering theory are rarities when this emotive issue is raised. When Malcolm Turnbull announced a feasibility study for the transfer of water from the Clarence to South East Queensland in early 2007, the Bourke Cobar, and South Australian Alexandrina Councils immediately launched their individual bids for a million megalitres per year, and 1.3 million megalitres respectively, to be diverted from the Clarence River.

So called facts and figures, and various methods to achieve the desired ends, were bandied about by everyone who had an opinion, regardless of their qualifications. Sydney Shock Jock, Alan Jones, led the charge for three days (that's as long as any one issue catches his attention), using the usual scientific measure of water in terms of 'Sydney Harbours', "going to waste" out through the heads each day. One engineering firm claimed the entire transfer could be achieved by damming the river, and simply running the water downhill through a 20km tunnel with no pumping required.

An elderly, totally unqualified, resident of the Clarence Valley, who firmly believes that all rivers should be dammed and the water shared equally (the environment excepted of course) recently wrote to Grafton's Daily Examiner, claiming that each time he crossed the Grafton Bridge, he nearly cries to see all that wonderful water flowing to waste into the ocean. The fact that the river at that point is a tidal estuary, and there would be no visible change even if the Clarence River ceased to flow altogether, never enters his head, nor the heads of thousands of casual visitors to the region who jump to the same conclusion.

The reality

In 2005, the Clarence Environment Centre put together a comprehensive submission, which was presented to Mr Turnbull, the then Environment Minister, who was good enough to grant us an audience. We attach a copy of that document as its contents will always be relevant.

Mr Turnbull employed the Snowy Mountains Engineering Corporation to do a desk-top study for the South East Queensland proposal. They did the same as many other previous studies, referencing vital facts, such as average annual flows, to earlier studies. As a result there is now a widespread acceptance that there is an average flow through the Clarence Heads of 5 million megalitres annually.

In reality it is not possible to measure all the water that runs off the massive Clarence River floodplain into the Tidal Pool which extends inland for over 90km. The Orara River, which drains the Coffs Harbour hinterland south of Grafton, also discharges considerable amounts of water annually, directly into the tidal pool. Together it is possible that the total average annual flow could be as high as 5 million megalitres. However, the gauge at Lilydale on the Clarence River, which has been in place for 40 years, immediately above the tidal pool, measures an annual average flow of just 3,072,884ML.

A lot of water, one might say. However, this brings us to the second widespread myth, that dams will somehow stop flooding downstream. Again, the reality is that the dams must be partially or completely empty at the time of the flood to have any impact at all. If the dam is full, there will be little or no lessening of the flood problem.

The largest dam ever contemplated for the Clarence system was a monstrous 5 million megalitres on the Mann River down stream of Jackadgery. It was investigated in 1975 by the Inter-departmental Committee on Water Resources, and would have seen four major tributaries affected, with some 86kms of the Nymboida River; 33kms of the Boyd; 23kms of Cunglegung Creek, and 70kms of the Mann River inundated. This would mean that a total of 181 kms of pristine wilderness rivers would be destroyed. Add the loss of other waterways such as Chandlers, Dinner, Dobby and Boundary Creeks, and the total riparian loss would be well over 250kms, and there are literally hundreds of minor creeks a waterways that haven't been considered (see map, page 25 of the Turnbull submission).

We estimated that evaporation from this dam, had it been built, would have been greater than the inflows during 5 of the past 30 years.

The Mann River, which carries water from the Nymboida, Guy Fawkes, and Boyd Rivers, has an average annual flow of 1,472,270ML. As demonstrated, flood waters which occur perhaps once a decade, can only be captured if the dam is empty (what an awful site that would be), if not they will still flow out to sea. This leaves the 'median' flow which is all that is available for transfer inland. That median flow (available water), is a mere 870,600ML annually. And the proposal is to pump more than one million megalitres? A second year primary school student should be able to work out that that equation.

Then there is the downhill tunnel proposal. The mega dam described above had a surface level of 220 metres above sea level. To run water downhill to an inland river with an altitude of less than 220m, would require a tunnel more than 200km long, and big enough to accommodate massive pipes and machinery for maintenance work. And that would only take water from the surface of the dam, the lowest point would be 150m lower, only 70m above sea level.

Another reality is that, should a million megalitres be pumped over the Great Dividing Range, during drought when the water would be most needed, that water will have evaporated long before it reaches Broken Hill, much less the mouth of the Murray River. In the mean time, the Clarence River's ecosystems will suffer massive degradation as a result.

At the same time it should be emphasised that the Clarence River district also suffers from frequent droughts. At the time of the Turnbull proposal to divert water from the upper Clarence, water flow

at the proposed dam site near the junction with Duck Creek had all but stopped, a mere trickle less than 30cm wide was all there was. In the 2002 drought, the Orara River dried up, and the flow entering the tidal pool at Lilydale dropped to less than 50ML/day.

We recommend Committee members read the attached Turnbull document for a detailed analysis of all past diversion proposals.

We thank the Committee for this opportunity to comment, and will gladly provide more information to future hearings should you see fit.

Yours sincerely

John Edwards
Honorary Secretary.

Presentation
to
The Hon Malcolm Turnbull MP
Minister for the Environment and Water Resources

Inter-basin diversion of Clarence River water

Presented on behalf of - The Clarence Environment Centre Inc
- The Clarence Valley Conservation Coalition Inc
- National Parks Association – Clarence Valley Inc
- North Coast Environment Council Inc

August 30, 2007



Frequently referred to as The “Mighty” Clarence, this 106 kilometre tidal estuary gives the casual observer a misleading impression of unlimited potable water. In reality, should the river cease to flow, there would be no visible change in the the river at this point.

“It is apparent that any proposal to divert substantial quantities of water from the Clarence would present significant risks to the health of riverine ecosystems, and those activities and values dependent on them.”

Commissioner Peter J. Crawford, Healthy Rivers Commission:
Final Report, November 1999 (page 156).

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History of Clarence River Diversions

- **1899** - local mining engineer W.J. (Bill) Mulligan mooted the possibility of damming and diverting the largest of the Clarence tributaries, the Nymboida River, to generate hydroelectricity.
- **By 1910** - Mulligan's plans to build a power station on Goolang Creek in place. The plant to be powered by diverting water from the Nymboida River by way of a tunnel through the Layton Range at Nymboida.
- **1924** – Delayed by the 1914-18 war, the power station was completed. Generation capacity was increased over the years until today some 860 megalitres of water are removed from the river daily to run the power station. This has led to 85 years of devastating erosion downstream in Blaxlands Creek, and siltation of the Orara and Clarence Rivers.

Note: In 2005 -2007 more than a quarter of a million dollars is being spent by Country Energy and the Northern Rivers Catchment Management Authority on rehabilitation works along Blaxlands Creek. This follows ineffectual works of a similar magnitude undertaken in the 1970s, and the problem will be ongoing.

- **Circa 1928**, Engineer Professor Bradfield, of Sydney Harbour Bridge fame, first suggested that inland diversion of coastal rivers could be achieved.
- **June 1975**, the Clarence Valley Inter-Departmental Committee on Water Resources presented a report summarising the results of assessments of the feasibility of a 3.2 million megalitre dam on the Mann River. This was taken up in December 1978 in a report by R.J. Green on behalf of the Clarence Development Corporation.
- **1981 – 1982** the then Department of Water Resources commissioned a desktop study into the potential for inland diversions, but did not undertake any field work nor detailed hydrological or geological investigations, relying solely on already available information.
- **December 1988**, under direction from the then Minister, Ian Causley, the Department hosted a Seminar in Grafton entitled “Inland Diversions – Where to from here”. That meeting considered a refined version of Bill Mulligan's damming of all major headwaters and piping water to a central storage for transfer inland.
- **November 2002**, a pipeline was completed from Nymboida to Coffs Harbour, the first inter-basin transfer of water out of the Clarence Valley.
- **2007**, Today's schemes -

Current Proposals:

As described by the SMEC (Snowy Mountains Engineering Corporation) 2007.

- 50,000 megalitres to south east Queensland to support urban water supplies, from a 90,000ML dam on the Clarence River upstream from the junction of Duck Creek.
- 100,000 megalitres to south east Queensland to support urban water supplies, from a 100,000ML dam on the Mann River upstream of Jackadgery.
- 50,000 megalitres to south east Queensland to support urban water supplies, from a weir on the Clarence River upstream of Jackadgery.

As proposed by the Bourke and Cobar Shire Councils, 2007.

- 1 million megalitres to inland NSW for irrigation, via a tunnel through the Great Dividing Range from a 100,000ML dam on the Mann River upstream of Jackadgery.

As proposed by the Alexandrina Council, South Australia, 2007.

- Up to 1.3 million megalitres to rejuvenate the Murray-Darling river system, via a tunnel through the Great Dividing Range from a 100,000ML dam on the Mann River upstream of Jackadgery.

It is important to note that freshwater flows through catchments or into the ocean are not wasted. It is an essential element of downstream ecosystems.”

The Hon Malcolm Turnbull, Minister for the Environment and Water resources, 2007.

Consequences of River Diversions

As identified by NSW Department of Water Resources (Don Geering, 1988):

- Reduced visible amenity, more prominent mud banks and river bank slippage, resulting in a reduction in the health of river bank vegetation with an increase in weeds.
- The prawn-trawling industry relies on 'freshes' in the river to trigger spawning runs. As these freshes would become less frequent, the multi-million dollar industry would be jeopardised.
- Many freshwater fish species such as the Australian Bass and the Eastern Freshwater Cod rely on large water flows to trigger spawning runs. The reduction of flows is likely to severely impact fish populations, and adversely influence recreational fishing.
- Fish diseases such as Red Spot appear to be related to poor water quality. Reduction of flows will tend to further concentrate pollution and increase these problems.
- Fish populations could be seriously affected to the detriment of commercial fisheries, tourism and recreation.
- Tidal prism. Reduced flows will result in salt water being pushed further upstream. Tidal velocities will tend to increase, with possible affects on bank stability. *
- Dams occupy land that could otherwise be productive, and serve to sterilise economically and environmentally valuable areas.
- The Mann River is a designated wilderness area, with much of its surrounding forests world heritage listed. The proposed storages will significantly affect those values and lead to substantial tourism loss.
- The Eastern Freshwater Cod ** survives only in a very limited area. The proposed dam sites contain much of the species' best remaining breeding sites.

* Recent research has indicated that some aquatic plants, critical to fish species for food and shelter, succumb to higher levels of salinity, placing those fish species at risk.

** The Eastern Freshwater Cod is an endangered species under greater threat of extinction than the Giant Panda

Additional known impacts resulting from inter-basin transfer of water:

- Changes in water temperature – impacts not known.
- Reduction of nutrient flows onto the floodplain and into the ocean.
- Interruption of sedimentary flows, also critical to fish species such as endangered Eastern Freshwater Cod.
- Destruction of threatened species and endangered ecological communities.
- Destruction of threatened species' habitat.
- Massive fragmentation of forest habitats by pipelines, power lines, and inundation of river valleys.
- Regulation of flows does away with the natural rise and ebb of water levels following each rain event.
- Potential erosion and siltation of receiving waterways, which may not be accustomed to such volumes of water.
- Potential transfer of species, vertebrates and invertebrates, into waterways in which the species may not exist, the impacts of which are not known.
- Potential transfer of aquatic weeds into rivers that may not currently have those problems.
- Potential transfer of diseases such as the fungal root rot pathogen *Phytophthora cinnamomi*, a listed key threatening process under both State and Federal legislation, now known to occur in an Orara River tributary and known to be transferred over large distances in storm water.
- Potential increased flooding in the receiving river system.
- Climate change implications through loss of carbon-storing forests and construction emissions.
- Many of the above impacts are not restricted to the construction phase (dam, pipelines, power lines etc). Consideration should be given to the increase in greenhouse gas emissions resulting from operating such a system (this fact has already been identified by the Minister, see page 8).

Impacts on Wilderness and National Parks

The Mann River carries between 65% and 75% of the total Clarence River flow, and drains largely uninhabited rugged wilderness by way of hundreds of kilometres of wild and scenic rivers within the Nymboida and Gibraltar Range National Parks.

According to the management plan, The Nymboida National Park *“encompasses some of the most diverse and least disturbed forested country in New South Wales. The Parks contain a stunning landscape of granite boulders, expansive rainforests, tall trees, steep gorges, clear waters and magnificent scenery over wilderness forests”* (2005, pii).

The valleys are narrow, winding, and relatively unspoiled, but the impact of dam building would be huge. The 1975 Clarence Valley Inter-Departmental Committee on Water Resources' proposal called for a 3.2 million megalitre capacity dam. That dam would have inundated over 180 kilometres of the Mann Boyd and Nymboida River. Even the more modest 100,000ML storages currently proposed would inundate extensive stretches of these wild rivers.

Following the construction of a dam, and prior to filling, the entire inundation area would be cleared of vegetation, and the ongoing regular filling and emptying of the storage would see those scenic valleys reduced to kilometres of dead, barren, mud-encrusted, weed-infested river flats.

“...we move beyond last century's solutions. Building a dam... would be an expensive, ineffective response - it would take years to build and even longer to fill, not to mention the damage done to the surrounding farmland and natural areas.”

Late Premier of NSW, the Hon Bob Carr:

Climate Change and Other Related Impacts

Climate change implications

An important issue that apparently fell outside the SMEC terms of reference was that of climate change. This omission has perplexed many contributors to the recent Senate Committee hearings into potential water supplies for South East Queensland, given that the Department of Environment and Heritage has previously released CSIRO findings that the eastern seaboard of Australia is likely to experience hotter, drier weather as a result of climate change.

In fact the CSIRO has informed the NSW Government that climate change impacts have already occurred, with a steady decline in rainfall across the region during the past fifty years.

The CSIRO has also spelled out the equation – a 10% to 15% drop in rainfall, equates to a 50% drop in runoff into our rivers.

Proof of this downward trend is contained in the Clarence Environment Centre's submission to the Senate hearing. By plotting the Nymboida River's average daily flows over the past 100 years, we have shown a decline during two periods of each year, ie end of the usual dry season (September) and the end of the recognised wet season (March). The Nymboida River was chosen as it is the greatest contributor of water to the Clarence system, and because records of its flows date back further than any other in the system (see CEC submission, Table, p18).

Plantation Forestry

Governments, State and Federal, have encouraged development of plantation forestry as a means to combat climate change, to reverse land clearing and provide a carbon sink through the rapid growth of plantation trees.

Enormous areas have been planted to hardwood plantations in the Northern Rivers region of NSW, with the upper Clarence Valley receiving a giant share.

The majority of these enterprises are corporate or privately owned, and their purpose is to clear-fell the plantation after 15 to 20 years, some selling wood-chip, while others intend to harvest annually for the bio-fuels industry.

Forests NSW has recently exhibited their “Ecologically Sustainable Forest Management Plan” for plantation development. This plan identifies these vigorous, fast-growing young forests as high water consumers, leading to an ongoing reduction in available water for streams and rivers because they “*act as water pumps*” (page 11 of the Plan), and use more water than mature forests.

The mere fact of cyclical clear-felling and replanting, means the region is locked into this thirsty growth period indefinitely, further reducing river flows into the future.

The Minister's View

We acknowledge that our concerns may be unfounded, following our reading of comments from the Minister's website from 1 March 2007, seven weeks prior to the release of his already commissioned SMEC report. Those comments included:

“Water diversions will primarily interfere with existing environmental flows. It is often flippantly stated that any drop of water which passes through the system unused is a wasted drop. It is important to note that freshwater flows through catchments or into the ocean are not wasted. It is an essential element of downstream ecosystems.”

Any infrastructure decision would have a significant impact on the plants and animals in the system and is likely to compound existing environmental problems. Hundreds of square kms of vegetation would be either cleared or disturbed. The mating and migratory patterns of numerous native animals could be fundamentally altered. Consideration should also be given to the increased emission of greenhouse gas as a result of operating such a system.

Altered flow regimes could also have significant social impacts on communities near the river by affecting primary production, industry activities, and recreation existing in the area.

Conclusion

The wide ranging economic, environmental and social implications of diverting rivers and piping water make such projects prohibitively expensive, and socially and environmentally disruptive.”

The Clarence River Option (upstream from Duck Creek)

The SMEC proposal for a dam on the Clarence River, upstream from Tabulam, and upstream of the Duck Creek junction, calls for the construction of a 90,000ML storage, to provide Queensland with 100,000 megalitres annually (Table, page 2).

The readings of river flows to support this proposal come from the Tabulam gauge, located a considerable distance downstream of the proposed dam site, hence those flow measurements would include a number of inflowing tributaries between the gauge and the proposed dam site, including Duck and Emu Creeks (SMEC reports readings from the Capeen gauge, which operated for 15 years between 1970 and 1985, showing Duck Creek alone contributed an average 74,000ML annually to the Tabulam reading (page 19).

Authors of the SMEC Report are happy to ignore evidence provided by the CSIRO that river flows have been in decline for the past 50 years, and instead use Tabulam's 98 year record to boost the average annual flow to 756,000ML.

However, in the past 40 years the average annual flow has been 665,000ML, with the last 15 years seeing a dramatic drop in average to 375,00ML (see Table 2. below). This is consistent with the CSIRO predictions on climate change.

We must stress that, with a plan to transfer 100,000ML annually to Queensland, and with the ability to store 100,000ML at most, any annual flow in excess of that total 200,000ML will flow on through the system, unable to be captured.

The reality equation, had a dam been in place for the past 15 years:

Six years out of the past fifteen have seen annual flows in excess of the usable 200,000ML, amounting to over 3.5 million megalitres that could not have been stored or transferred. This would have reduced the total 'available' water (at Tabulam, which measures a significantly greater volume of water than the upstream dam site) to 2,110,000ML, an annual average of 140,000ML. This would have meant that, if the 100,000ML quota had been taken, flows at Tabulam would have been reduced to an annual average of 40,000ML for 9 out of the past 15 years, with the river drying up entirely on regular occasions in between, including all of 2003.

Tabulam River flows 1965 - 2007

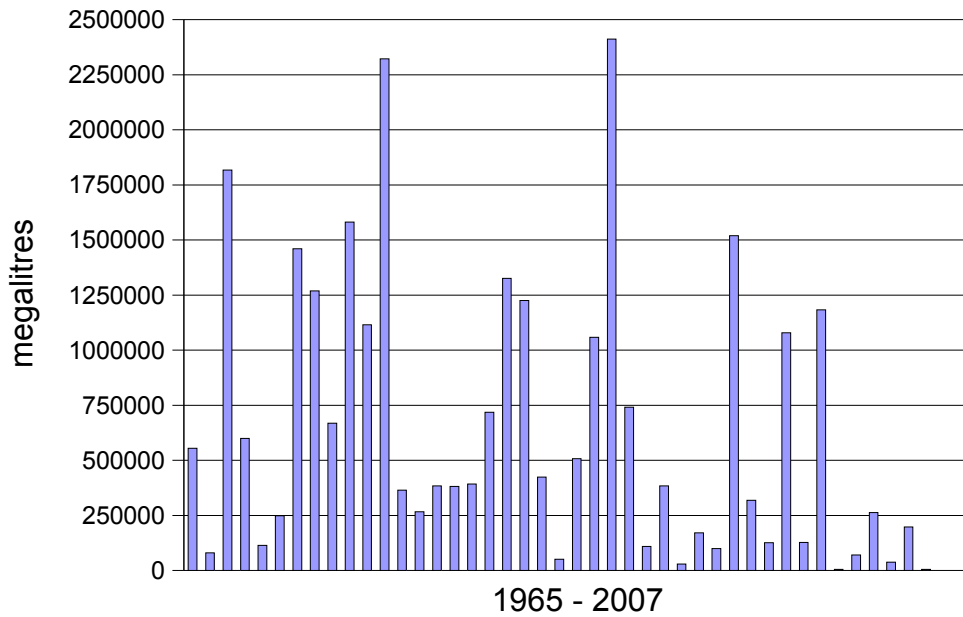


Table 2. Clarence River flows measured at Tabulam.

Clarence River total flows at Tabulam for 41 years to 2006 =	27,262,638ML
Minumum Annual Flow	5,658ML
Maximum Annual Flow	2,412,000ML
Mean Annual Flow	664,943ML
Median Annual Flow	384,400ML



The Clarence River near the junction of Duck Creek. The green banks showing it was photographed during a relatively good rainfall period.

Current Myths

There are numerous myths being presented and perpetuated by self interest groups. These include:

- **A dam will ameliorate the impacts of flooding on downstream communities.**
- **Water will be captured during periods of high flow, and used during drought.**
- **The Clarence River has an average annual flow of 5,000,000ML.**
- **There will be safeguards put in place to guarantee protection of environmental flows.**

A dam will ameliorate the impacts of flooding on downstream communities.

1978: R.J. Green, for The Clarence Development Corporation, made the following opening statement: *“Local government authorities, and farmers and residents of the Clarence Valley have long expressed a demand for an upper Clarence dam to control the floods in the valley”*.

1988: Jack Hedderman, Engineer Strategic Projects, Dept of Water Resources, in addressing the *“Inland Diversions, where to from here”* seminar, devoted a paragraph to the subject, starting, *“There is little doubt that a major diversion storage would have some mitigating effect on flooding in the lower valley.”*

2007: SMEC Report, contains a section on Flood Mitigation (Section 3.3.1) stating: *“Dams provide some level of mitigation for the minor to moderate floods.”* While SMEC gives little support for any real level of mitigation, the average citizen still holds the belief that flooding will be reduced by the dam.

May 2007 – Clarence Valley Mayor Ian Tiley’s mayoral minute on the Bourke and J. Division proposal to divert one million megalitres of water to the inland, reported: *“...the diversion of surplus flows would have demonstrated benefits for controlling flood flows in the Clarence River Valley...,”*

This myth appears to have its origins in a report generated for the NSW government (1968), when the Premier approved the formation of the Inter Departmental Committee on Water Reserves, comprising *“... representatives from the Water Conservation and Irrigation Commission, Department of Public Works, and the Electricity Commission.”* The committee's express purpose was *“To inquire into the control, development and use of the total water resources of the Clarence Valley, and report to the government.”* (The Jackadgery Multi-purpose Dam Project, June 1975, p1)

Three of ten terms of reference in that report specifically aimed at strategies to address flooding. Having reported (p 6) peak daily flood flows of 1,700,000ML on the Clarence River at Lilydale, the Committee offered two proposals for dams on the Mann River (one upstream, the other downstream from Jackadgery), which would hold 3.2 and 5.6 million megalitres respectively.

However, all current proposals call for a maximum 100,000ML capacity dam, which, had it been in place on the Mann River when the last flood event occurred (March 2001), would have been filled midway through the first day.

The flow in the Clarence River during that flood, measured at Lilydale just above the tidal pool, was 416,095ML on the first day, with a peak of 1,113,323ML on the second. Even an empty dam could have captured only 6% of that first two day's flow.

Any suggestion that this dam will have a significant mitigating effect on flood impacts has to be discarded as pure fantasy.

2. Water will be captured during periods of high flow, and used during drought.

May 2007 – Clarence Valley Mayor, Ian Tiley's mayoral minute on the Bourke and J. Division proposal (1,000,000ML of water to the inland) proposes: *“a diversion scheme of the Clarence River, whereby the diversion of surplus flows would have demonstrated benefits for significantly augmenting the flows to the Murray Darling system”*.

The 2007 SMEC Report states (p 25) that: *“The supplies from NSW would be limited to periods of high flow...”*. Then (p 44): *“Run-of-river scheme option limiting Queensland access to NSW water to only high flow periods.”*

There are actually two myths here:

- (a) the perception that all flood water can be captured, and**
- (b) that only high flow water will be transferred.**

(a) The implication that these flood waters can all be captured is skillfully employed by special interest groups to manipulate figures to suit their purpose. The use of average flow data, which includes flood waters that there is no hope of capturing, gives a biased perception of the amount of available water.

To illustrate this we give the example of the most recent flood event on the Clarence River. 6,730,374ML were recorded at Lilydale during 2001. 6,123,684ML of that total flowed down the river in just three months.

There is simply no way to capture flood water of that magnitude, and any amount over and above the proposed storage capacity (in this case 100,000ML) should never be included in calculations of average available water. In 2001, at least 6,000,000ML of flood water was clearly unavailable.

The high 2001 flows contributed to the raising of the average annual flow in the Clarence over the past ten years to 1,946,544ML. If we discount the 6,000,000ML of flood water that cannot be captured and stored, the ten year average of 'available' water would be reduced to 1,346,544, (one million of which the Bourke/Cobar Councils would like to see irrigating cotton!)

Hydrologists assert that, in determining the amount of available water, average flows are misleading, therefore they recommend the use of median, or percentile flows.

The misleading effect of using averages is summed up by the following table:

Mann River total flows for 43 years to 2006	=	63,307,600ML
Annual Average flow	=	1,472,270ML
Annual Median flow	=	870,600ML

(b) Implying that only high flow water will be transferred is a commonly used ploy. With the ability to store just six week's supply of water for the inland diversion schemes, and only one year's supply for SMEC's south east Queensland proposal, once that stored flood water is used up, water will then have to be taken from the rivers during medium and low flow periods if the supply is to be maintained.

A local example of the reality is the Coffs Clarence Regional Water Supply. That scheme has always been promoted as one that would take water from the Nymboida River during 'high flows', and draw from the off-stream storage at Shannon Creek during low flow periods. That erroneous claim is repeated as recently as July 2007, in the Clarence Valley Council's submission to the Senate Traveston Dam hearing, claiming in relation to flow protection that: *“This will be achieved by the provision of a 30,000 ML off stream storage facility that is filled from the Nymboida river during times of high flow and used to meet consumer demands in low flow periods”*

River flow levels are officially divided into 5 categories – Very High; High; Medium; Low, and Very Low. The reality is that water for the Coffs-Clarence supply will be taken from the river while ever flows exceed 225ML/day, the 95th percentile. **225ML/day is categorised as 'Very Low Flow', not 'High Flow'**

It should be noted that the Nymboida River, upstream of its junction with the Mann, is already subjected to high levels of extraction. It is classified by the NSW Stressed Rivers Assessment as having high hydrological stress. Furthermore, in 1999 the NSW Healthy Rivers Commission identified that there was a *“pressing need to contain further growth in water extractions (under most flow conditions) from the Nymboida River, both to protect the river itself and to protect those existing users who have already made investments in water using activities.”* As the Nymboida River provides more than half the flow in the Mann, that assessment must also extend downstream to the Mann River.

Since 2000 when environmental flow protection came into effect, flows in the Nymboida River, below the extraction point, have run at the official 'Low' and 'Very Low' levels for close to 50% of the time. That percentage is likely to increase after the Shannon Creek dam is completed, to replace losses through evaporation, transpiration and seepage from the storage.

For the Bourke/Cobar diversion scheme, to irrigate 130,000 hectares, irrigators would expect some guarantee of supply in advance of the planting season. As weather conditions can change from flood to drought with remarkable rapidity, this guarantee cannot be given if there is only six weeks water in storage,

For example, following the maximum flood peak of 1,113,323ML (March 12, 2001), flows in the Clarence River fell to 380ML/day just 8 months later.

It is clear from the above figures that the Mann River cannot provide for the one million megalitre plus needs of inland NSW and South Australia (see Table 3 below).

3. The Clarence River has an average annual flow of 5,000,000ML.

SMEC reports (p4) finds: *“The Clarence River catchment with an area of 22,700 square kilometres and a mean annual runoff of around 5,000,000ML has been the subject of a number of diversion proposals over the last fifty years.”*

That level of flow is at serious odds with the reality, measured by the Lilydale gauge on the edge of the tidal pool near Copmanhurst. So where does the figure come from? SMEC's desktop study claims to draw on a previous study, the NSW Water Resources Commission's *"Possibilities for Inland Diversion of NSW Coastal Streams"* (Rankine & Hill 1981). That report also led to the 1988 *"Inland Diversions – Where to from here"* investigation by the then NSW Department of Water Resources.

The report on that seminar also makes the 5 million megalitre claim, but also reveals that the Rankine and Hill report was *“a preliminary investigation”, and that: “The, Consultant's desk-top exercise relied on readily available information...”*

Undoubtedly one of the sources of that 'readily available information' that has perpetuated the myth was a report presented by the Clarence Valley Inter-departmental Committee on Water Resources (June 1975).

The CEC obtained a copy of that report (*The Jackadgery Multi-purpose Dam Project*), which again made the claim (p 6) that the Clarence *“has a long-term average annual runoff of some 5 million megalitres.”* Unfortunately the 37 page report does not provide a single reference document, so the origin of the 5 million megalitre myth may never be known.

The reality is that during the past 35 years Clarence River flows, as measured through the Lilydale gauge, have averaged just 3,072,884ML per year, and in the last ten years the average has dropped to under 2 million megalitres (see Table 1, below).

We acknowledge other inflows into the tidal pool below the Lilydale gauge, including the Orara River, but these would not account for any significant addition to the overall total. However, it is significant that the NSW Government has now released a 2007 CSIRO report, which claims a more realistic figure, (p 3): *“The Clarence River alone discharges approximately 3.7 million megalitres each year.”* **This is a far cry from the 5 million megalitres other self-interest groups are attempting to perpetuate.**

Annual Flows, Clarence River at Lilydale

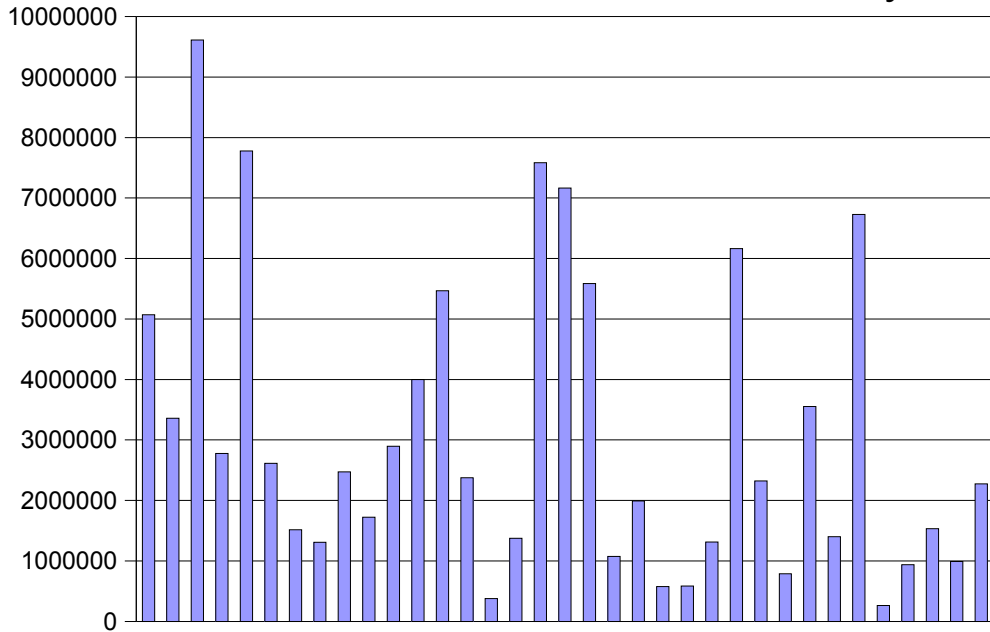


Table 1. Annual flows of the combined river flows in the Clarence River measured at Lilydale between 1970 and 2006

Clarence River total flows at Lilydale for 35 years to 2006 = 107,550,940ML

Minumum Annual Flow = 264,730ML

Maximum Annual Flow = 9,611,602ML

Mean Annual Flow = 3,072,884ML

Median Annual Flow = 2,374,645ML



The Clarence River at Lilydale, showing a normal flow

4. There will be safeguards in place to guarantee protection of environmental flows.

The south east Queensland diversion proposal, should it come to fruition, will encourage further urban and rural residential expansion in that state, which has never slowed in the past even in the face of serious water shortages. This type of unsustainable and irresponsible expansion will then continue into the future, placing further upward pressure on water demand.

History has shown that legislated protection of environmental flows counts for nothing when human communities run short of water. Eg, in 2002-2003 a state of emergency was declared, allowing the remaining water in a rapidly drying Nymboida River to be taken to fill Coffs Harbour's Karangi reservoir before the river dried up. This move was taken despite the river running at less than 50% of the 225ML/day gazetted environmental flow. Light rainfall on the 5th February 2003 rescued the situation, by which time flows in the Nymboida River had been reduced to less than 20ML/day.

On the same day that the water from the Nymboida River began flowing into the Karangi dam (November 2002), and with the region experiencing the worst drought in history, the development embargo, which had been in place in Coffs Harbour for several years, was lifted. Development in that city has continued at full steam ever since, despite the Shannon Creek dam, which is being constructed as part of the regional water supply, not expected to come on line until late 2010 at the earliest.

We foresee a similar scenario if any dams are built on the Clarence River system, to provide water to support urban expansion elsewhere in Australia.

In environmental terms, the no dam option would be highly desirable and beneficial

Recommendation of the World Commission on Dams

Nymboida Flow Trends

<u>15 year period</u>	<u>Total flows in megalitres</u> $\sqrt{15} =$	<u>Average daily flow Sept. 31</u>
1909 – 1923	10,623	708
1924 – 1938	13,253	883
1939 – 1953	10,327	688
1954 – 1968	11,891	793
1969 – 1983	8,099	560
1984 – 1998	7,824	521
1992 – 2006	8,032	535 *

These September figures show a disturbing trend, indicating that spring flows (Sept 30) have fallen considerably since 1968, and that while 20% of years in the 60 years to 1968 had September 30 flows above 1,000 megalitres, this has dropped to 5% in the last 40 years (twice only). * One of those years (1999) saw the largest flow ever for 30th September, 3,451ML. Despite this exceptionally high rainfall occurrence the 15 year average remained the second lowest on record.

The September 30 flows in the 15 years (1992 – 2006) in megalitres are as follows:

1992 – 271;	1993 – 306;	1994 – 92;	1995 – 229;	1996 – 489;
1997 – 303;	1998 – 908;	1999 – 3451;	2000 – 309;	2001 – 345;
2002 – 141;	2003 – 151;	2004 – 128;	2005 – 509;	2006 – 400.

Clearly there needs to be greater analysis of the figures. However, there are clear indications of a downward trend, particularly over the past 40 years, while the past 15 years have seen record low flows in the Nymboida River. This trend is presumably mirrored by other rivers in the system. This supports the CSIRO's assertion that *“Since 1950, annual rainfall has declined on the eastern seaboard and in the south of the continent”*, and that climate change is already occurring and having a significant impact.

* * *

Annual flows since 2000, to show the relative contribution of the Mann and Upper Clarence Rivers (Tabulam) to the Clarence River total at Lilydale.

Comparative Annual flows in Megalitres

<u>Year</u>	<u>Mann</u>	<u>Tabulam</u>	<u>Lilydale</u>
2000	776,000	128,000	1,402,195
2001	4,603,000	1,183,000	6,727,931
2002	203,100	5,658	264,337
2003	540,800	70,640	938,422
2004	756,400	263,300	1,534,058
2005	593,800	38,590	990,748
2006	1,181,000	197,700	2,272,783

Note: The Mann system has already lost 200,000ML per year on average through extractions at Nymboida before reaching the Mann River gauge. That figure is expected to rise by a further 15,000 ML per year when the Shannon Creek dam is completed and required to be filled, after 2009.

Past mega-dam, and inland diversion proposals

Having demonstrated the inability of the currently proposed storages to capture and store sufficient water for the inland diversion schemes, we are fearful that the Minister may be persuaded to enter into an agreement in principle to divert water inland. The next progression may then be to return to the mega-dam concept.

In environmental terms the impacts of such a proposal would be untenable. The Mann River catchment is pure wilderness, a rugged landscape featuring narrow winding valleys and towering hillsides. Some 80 km of the lower reaches of the inundation area of those original proposed dams lies within the Nymboida National Park, and is a popular adventure tourist draw-card. However most of these stretches of river would be impacted by even the relatively small dam currently under review.

Four major tributaries would be affected by a mega-scheme, as investigated in 1975 by the Inter-departmental Committee on Water Resources. Such a proposal would see the inundation of some 86kms of the Nymboida River; 33kms of the Boyd; 23kms of Cungleung Creek, and between 39 and 70kms of the Mann River, depending on which option was chosen. This would mean that a total of 181kms of pristine wilderness rivers would be destroyed. Add the loss of other waterways such as Chandlers, Dinner, Dobby and Boundary Creeks, and the total riparian loss would be well over 250kms (see attached maps).

A major disadvantage of the mega-dam proposals is the fact that the Layton Range, which forms a barrier to the northerly flow of the Nymboida River, has a low point referred to as the Nymboida Saddle, standing at between 190m and 200m above sea level. To prevent water flowing across this saddle, it was identified that another dam would need to be built at that point, measuring up to 30m high and at least 2 kilometres long.

By this scheme the entire village of Nymboida would also be inundated, while at least 8km of the main Grafton to Armidale road would need to be relocated, adding possibly over thirty kilometres to the journey. At the same time approximately 32 km of the Old Glen Innes road would go under water, with a recommendation that this road be “abandoned” (page 14, Jackadgery Multi-purpose Dam report), as rebuilding would present major engineering challenges.

If this larger dam was to be built, an additional 25 to 30km of the Gwydir Highway would also be inundated, requiring construction of a significantly lengthy detour.

An interesting point with the Jackadgery Multi-purpose Dam report is that despite Term of Reference #4 requesting a report on: *“The practicability, desirability and economics of inland diversion of portion of the waters of the Clarence Valley by gravitation or pumping”*, no recommendations were forthcoming. In fact inland diversions is never mentioned at any time in the entire document. Could it be that the proposal was deemed completely impractical?

Mann River annual flows

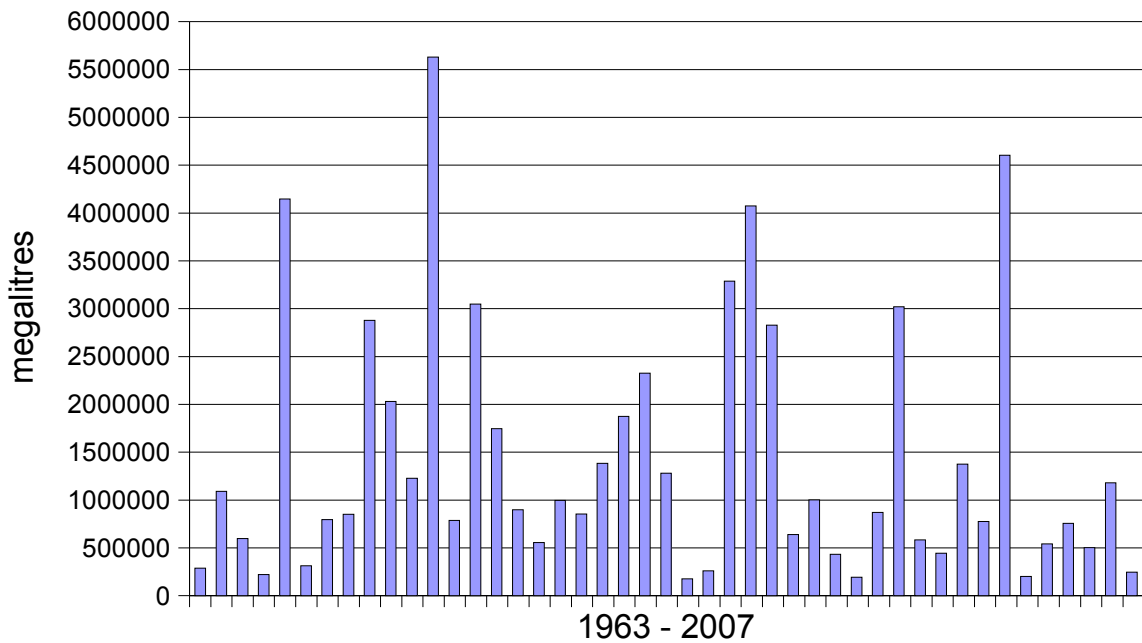


Table 3. Mann River flows measured downstream from the Nymboida River junction.

Mann River total flows for 43 years to 2006	=	63,307,600ML
Minimum Annual Flow	=	178,300ML
Maximum Annual Flow	=	5,631,000ML
Mean Annual Flow	=	1,472,270ML
Median Annual Flow	=	870,600ML



The Mann River with median flows. The slow flow and ponding nature of the river results in little observable change as flows drop during drought

Summary

The Clarence Environment Centre, Clarence Valley Conservation Coalition, the North Coast Environment Council, and the Clarence Valley branch of the National Parks Association, are fundamentally opposed to any damming of river systems. This is a view gaining world -wide recognition as the environmental and social costs that accompany such ventures become evident.

Over more than a century, numerous studies and investigations have been carried out to determine the viability and desirability of diverting water from the Clarence River for a variety of purposes. All have been shown to be inviable.

Our concern, and that of a number of other submitters to the recent Senate hearings into the provision of water to south east Queensland, is that the current proposals are based on flawed information. Much of the data being presented has been passed down for decades as each successive desk-top study has been undertaken.

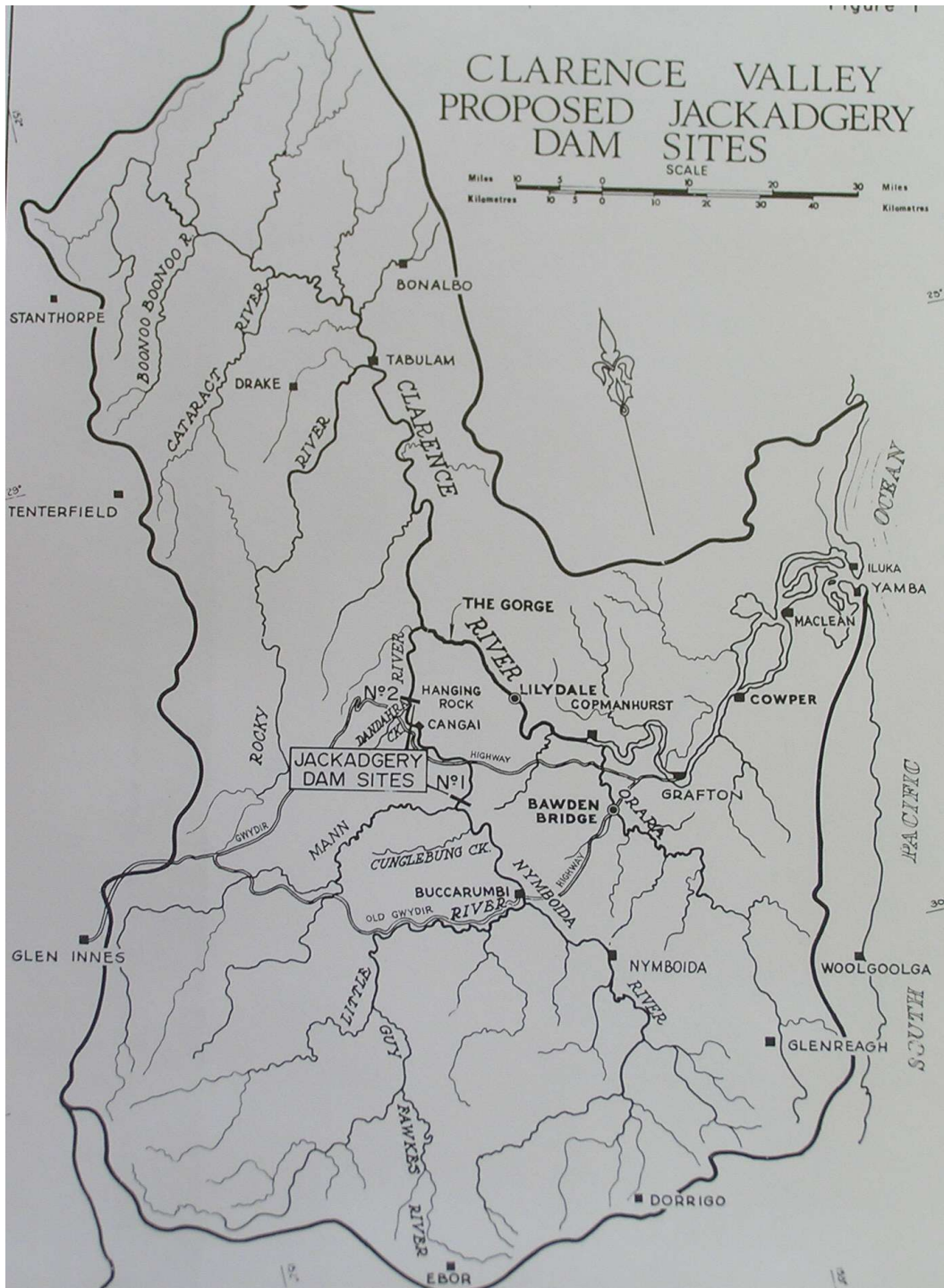
The onset of climate change, and the uncertain future this phenomenon presents, makes consideration of the precautionary principle an imperative.

Already the CSIRO modelling provides evidence of a fifty year decline in rainfall across the region, evidence that SMEC and others have ignored. There is no longer a five million megalitre annual average flow in the Clarence River, and likely there never was.

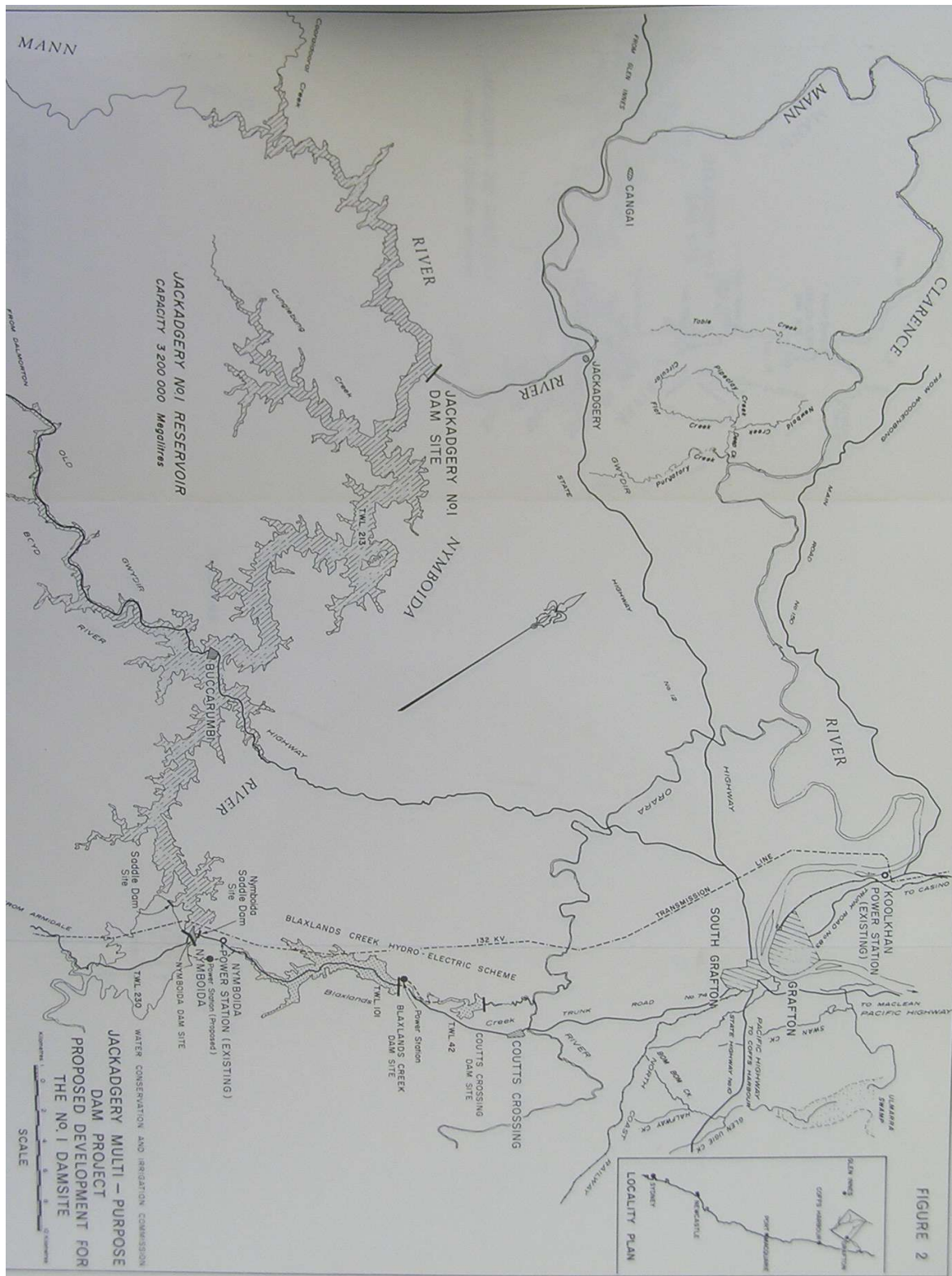
Nor can it be claimed that damming the Upper Clarence or Mann tributaries will exacerbate flooding in the Lower Clarence, and likewise, the proposed schemes cannot lay claim to protecting environmental flows by only planning to take the excess water from high flows.

Current plans by the Minister for further investigations into possible integrated water supply schemes appears to be a poor use of tax-payer's money. It has all been done before, and none of those studies found in favour of damming these rivers. The latest, and possibly the most extensive study, was undertaken in 1999 by the Healthy Rivers Commission, which found (page 156): ***“It is apparent that any proposal to divert substantial quantities of water from the Clarence would present significant risks to the health of riverine ecosystems, and those activities and values dependent on them.”*** .

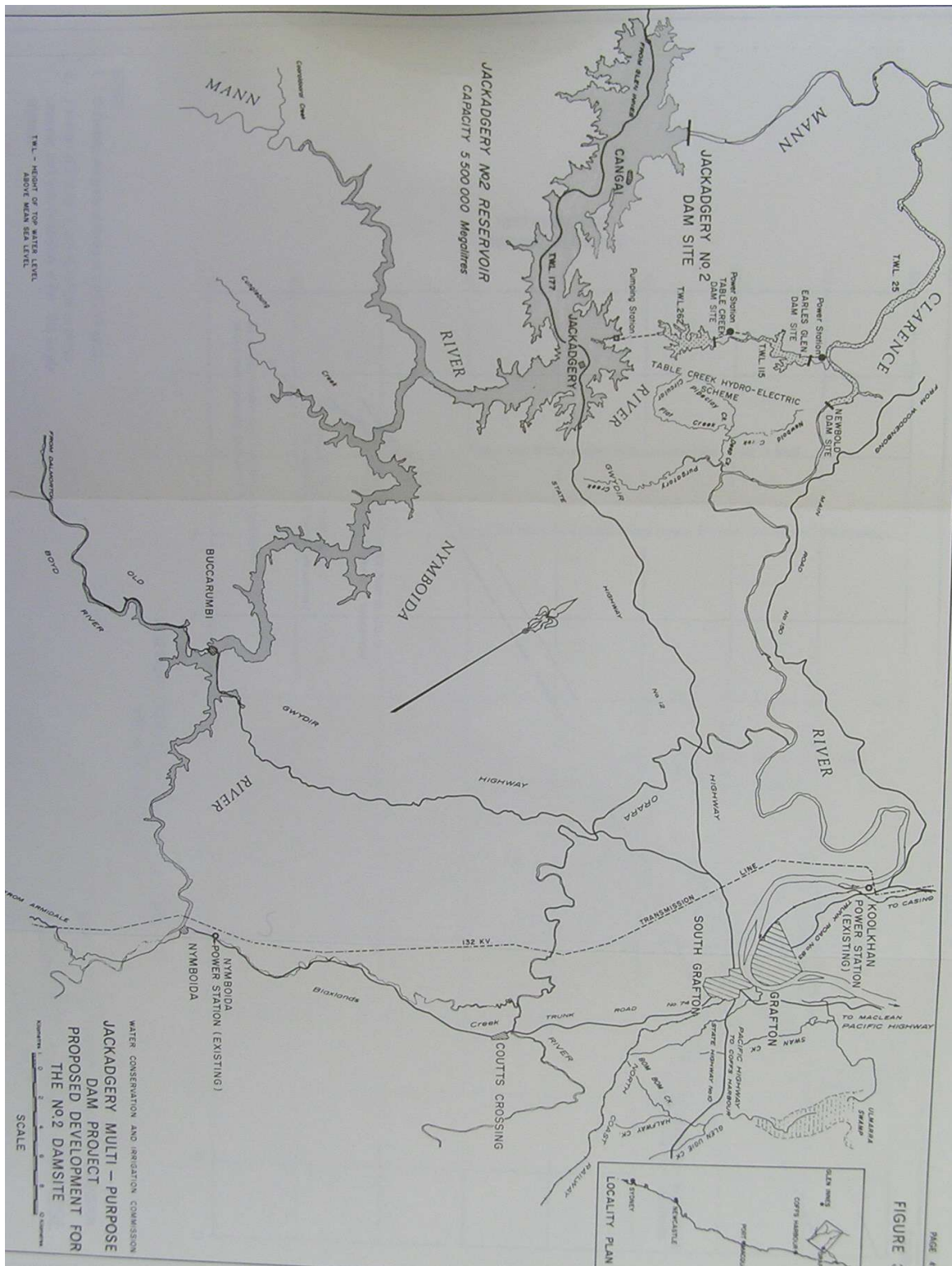
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The Clarence River Catchment, showing the proposed sites for mega-dams proposed in 1975. The tidal estuary extends inland past Copmanhurst.



The Jackadgery No. 1 mega-dam site proposed in 1075. The proposed dam was situated at New Zealand Falls, the site around which the current proposals have been proposed.



The Jackadgery No. 2 mega-dam proposal in 1975. This dam, storing over 5 million megalitres, would have inundated over 200km of the Mann, Boyd and Nymboida Rivers. Had it been built, the evaporation would have been greater than the inflows during the 5 driest years out of the past 30.

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* * *

**Outcomes of the Clarence Environment Centre meeting with the
Federal Minister for the Environment and Water Resources,
the Hon Malcolm Turnbull (30th August 2007).**

John Edwards
2nd September 2007

Following an invitation to the Hon Malcolm Turnbull, Federal Minister for the Environment and Water Resources, to visit Grafton, the Clarence Environment Centre (CEC) was invited to meet with the Minister in Sydney on 30th August 2007.

I represented CEC, and the North Coast Environment Council and was accompanied by Leonie Blain, Secretary of the Clarence Valley Conservation Coalition (CVCC), and also empowered to represent the National Parks Association (Clarence Valley branch). The 45 minute meeting, which included Anna Heaney, adviser to Mr Turnbull; and Mr. Steve Costello, General Manager, Water Programs Group, for the National Water Commission (NWC), began without the Minister who was tied up with media interviews, but who managed to attend the final 20 minutes.

We made it clear that all groups were fundamentally opposed to any damming or diversion of water from coastal rivers, particularly the Clarence, and explained that our main purpose was to highlight issues such as the misinformation that had accompanied these diversion schemes (see submission).

At the outset, Mr. Costello mentioned that his NWC had prepared the terms of reference for the Snowy Mountains Engineering Corporation's (SMEC) feasibility study into the viability of transferring water from Northern NSW to South East Queensland. This naturally led to the question: "Why was consideration of climate change impacts not included in those terms of reference?"

This elicited a defensive response from Mr. Costello who appeared to suggest that the SMEC study was never intended to be that wide-ranging in its approach. I must admit that I could not understand some of the technical aspects of his explanation, which may well have been valid from an engineering viewpoint, but nevertheless would never satisfy an environmentalist.

Issues that received comment during the CEC presentation included the following:

- In response to our acknowledgment that the term "proposals" (relating to the SMEC report) was not accepted by the Minister, we were told they were 'investigations'! Mr Turnbull asserted that he has been badly misrepresented on that issue with a public perception that he had bulldozers lined up on the banks of the Clarence River awaiting his command to get to work. He explained that the Federal Government had ordered the investigation to force serious debate on the issue of water provision, considering all possible options, in response to decades of State Government inaction to address looming chronic water shortages, and their resorting to knee-jerk solutions on an ad hoc basis, with no real long-term plan in place.
- On the issue of Climate Change, it appeared that the NWC were not aware of CSIRO findings (released recently by the NSW Government - "Climate Change in the Northern Rivers Catchment", 2007)(page 1) that: "*Since 1950, rainfall has declined on the eastern seaboard...*". We made strong reference to the fact that SMEC's desk-top study had used long-term average river flow figures presented by a previous study which, after CEC had investigated, was found to have also relied on "existing available data", thus perpetuating the myth that the Clarence River still has an annual average flow of 5 million megalitres.

We found that flow figures have been 'handed down' from study to study for at least 40 years, which resulted in the recent downward trends being overlooked. Fortunately, the CSIRO has now linked this trend to climate change, a fact we were able to impress on the NWC representative.

- Another issue raised that will have a significant effect on future river flows, particularly in the upper Clarence, is the current upsurge in plantation development.

CEC identified the fact that this government promoted approach to combating carbon emissions is likely to have serious negative impacts on river flows.

It was apparent that the NWC is aware of the problem, even acknowledging that legislation is being enacted in some areas requiring plantation developers to apply for a water licence even if irrigation is not being proposed. This acknowledges the fact that young, vigorous growing, plantations, using specially selected, often species specifically developed for their rapid growth, do remove large amounts of ground water to sustain that growth, to the detriment of river flows.

CEC also identified the fact that the majority of local plantations are commercial ventures where the trees will be clear-felled on a 15 year rotational basis, locking into place this high-use water cycle indefinitely. This point appeared to be accepted by Mr Costello as highly significant.

- When we explained the myth relating to claims that dams would ameliorate the impacts of downstream flooding, something that all proponents of river diversions have included as a positive consequence of damming rivers, it appears we were preaching to the converted. Mr Costello and Mr Turnbull both agreed that there would be little, if any, reduction in flood impacts through the damming of the rivers.
- There was also a seeming agreement from Mr Costello with our assertion that SMEC had erred (I used the term 'naughty', claiming they would have known better) when using 'average' flows rather than 'percentile' or 'median' flows to determine the amount of available water in the river.
- On the issue of available water, there appeared to be an acceptance of our claim that use of the Tabulam flow data to determine the viability of building a dam on the Clarence upstream of the Duck Creek junction, was flawed. The reason being that the Tabulam readings include inflows from a number of creeks downstream from the dam site, including Duck Creek, that add considerably to the total flows at Tabulam, but would not be captured by the dam.
- There also appeared to be an acceptance of our argument that proponents cannot claim that only surplus flows would be taken for transfer to south east Queensland. Given that the proposed dam sizes have the capacity to hold only one year's supply (100,000 megalitres), it was acknowledged that after several consecutive years of below average flows, the proponent would be forced to remove water from medium and low flows if supply to Queensland was to be maintained.
- There appeared to be less willingness to accept our assertion that low flow protection would be ignored in an emergency, ie extreme drought, Mr Costello pointing to State Macro Water plans. However, our expressed concern that providing water to Queensland would simply accelerate the ongoing inappropriate urban and rural residential development that is occurring there, appeared to strike a chord with Mr Turnbull. He did express the belief that the Queensland Government had been highly irresponsible over the matter of water provision for decades, and was unable to resist the opportunity to implicate Kevin Rudd and State Labor with that failure.

Oddly, he included “the building of dams, pipelines, and desalination plants here there and everywhere” as knee-jerk responses to a crisis that should have been properly addressed and planned for decades ago. He even related the approach he had received from a Queensland politician proposing the building of a pipeline from Cape York.

- One very positive response received, was in relation to inland diversions as proposed by Bourke and Cobar Councils. Both Mr Costello and the Minister separately assured us that such schemes will never happen. Mr Turnbull asserted that a successful inland diversion would require the turning round of the entire river, and was in full agreement with our assertion that the proposed amounts of water transfer (one million megalitres) would evaporate before reaching Wilcannia.

- In discussion following our presentation, Leonie Blain asked if there was a chance that Mr Turnbull would visit the Clarence Valley, and he expressed a desire to do so when time allowed, with the joking proviso that “the locals don't lynch me, but I know you'll look after me”! Following that he commented that, while acknowledging that Clarence Valley residents were in total opposition to any transfer of water, he had received guarded support, or at least not open opposition, from Councils further to the north on the Tweed River. He hinted that this cooperative disposition may be linked to the possibility of gaining local infrastructure funded by the Queensland Government.

He reported that there was already an unused, cross-border, pipeline in place, and that far north coast residents showed less opposition to sharing cross-border assets. This seemed to suggest that he believed inter-state animosity and parochialism is at the source of Clarence Valley opposition.

Mr Turnbull's view is that discussion must be generated as a matter of urgency on how we address water needs across the country. Whether that be through water tanks, reuse, or desalination, and even (jokingly) the towing of icebergs from the Antarctic, or shipping of water from northern Australia in giant ocean tankers, as have been proposed, that is something that has to be determined before communities run out of water altogether. He went on to say that we could provide all our water needs by desalination if we wanted to, “It would cost a lot of money, but we could do it”.

When asked if there had been any serious consideration of solar desalination, we gathered it (the technology) was known, but for one reason or another (none identified) that option was not a serious consideration at this point.

- In responding to Leonie Blain's specific question, are there any plans for ongoing investigations into other possible integrated water schemes? We received a less than convincing answer from Mr Costello when he claimed, “we have not commissioned any further studies into other possible schemes”. We place that response in the same “SMEC investigations are not proposals” category; – essentially they have not actually commissioned further studies – **yet**.
- When questioned about the possibility of population capping, Mr Turnbull clearly felt that was not a serious consideration, asking, “how can you stop people moving there”. That can, of course, be easily achieved by ceasing to approve further development, and has been implemented on Lord Howe Island, however, it appeared that such action was not on the Minister's radar.

In conclusion, we found the Minister very approachable and receptive of our concerns. He appears to have a very good grasp of the environmental impacts of dams and river diversions, as was shown by his article (reprinted, page 9 of our submission). Having said that we acknowledge that the job of Environment Minister in a Government obsessed with economic growth, is unenviable to say the least. Nevertheless we were appreciative of the fact that he found time to meet with us at a time when he is under an extremely heavy workload due to the upcoming election, APEC's climate change agenda, Tasmania's pulp mill, and more.

I for one, came away from the meeting with a positive feeling that we had managed to get our message across, and if any further investigation of water transfer occurs, the environmental impacts will probably figure more prominently in any ultimate decision-making as a result of our meeting.

John Edwards

Hon. Secretary – Clarence Environment Centre
Hon. Treasurer – North Coast Environment Council

Leonie Blain

Hon Secretary – Clarence Valley Conservation Coalition
- National Parks Association (Clarence Valley Branch)