CLARENCE ENVIRONMENT CENTRE

29-31 Skinner Street
South Grafton 2460
Phone/ Fax: 02 6643 1863
www.cec.org.au E-mail:
cesjc@nor.com.au

30th May 2007

The Secretary
Senate Rural and Regional Affairs and Transport
Parliament House
Canberra ACT 2600
email rrat.sen@aph.gov.au

Submission to
Senate Inquiry into Additional Water Supplies for South East Queensland - Traveston Crossing Dam

As a precursor to this submission, the Clarence Environment Centre points out that the Senate hearing began as an inquiry into the proposed Traveston Dam in Queensland. It was not until 17th April 2007 that the Inquiry introduced the Clarence River into its deliberations, with the Chair announcing the Clarence River proposal would be considered: ***"because this committee has in its terms of reference alternative plans as a viable alternative"***(Senate RRA&T 23).

The following day the Inquiry Chair confirmed: ***"Just to put it on the record, you may be interested that we have agreed today to have a committee hearing on 11 May in Canberra on those options."***

Because our organisation does not have the resources to spend time monitoring Senate hearings that deal with issues outside our State, and because neither the Senate nor our local Government representatives saw fit to alert us to this development, we remained in ignorance of this process.

The May 11 Hearing heard from Mr Amir Rahim Deen, Manager, Water Services, Snowy Mountains Engineering Corporation (SMEC) (Senate RRA&T 63), the corporation responsible for the SMEC feasibility study that has caused so much concern in the Clarence Valley. Mr Deen was questioned extensively on SMEC's Clarence River study, and at the hearing conclusion a decision was made that: ***"We are calling it a day until a day in June."***

About a week later, May 19, the Senate Standing Committee advertised for submissions on the "Integrated Water Supply Options for North East New South Wales and South East Queensland", but not in Clarence Valley newspapers. It was not until Grafton's Daily Examiner newspaper alerted residents on May 28th that we learned of the Senate's inquiry into the Clarence River damming proposal.

That has allowed us just 3 days to prepare a submission relating to the SMEC desk-top report. Therefore we apologise for a lack of substance in this submission. Nevertheless we have identified a number of concerns with the SMEC report, specifically:

- Overestimation of runoff across the Clarence River catchment.
- The application of mean annual flows as a basis for determining the volumes of available water, rather than median or percentile flows.
- The misleading claim that the proposal will store flood water. The proposed dam will contain only half the water generated by a one in 25 year flood, even if the dam is totally empty at the start.

- Failure to take into consideration effects of climate change on the availability of water in the river system
- SMEC's provision of estimated cost of delivery of water to Queensland, proclaiming the project is feasible, before any dollar value has been placed on either environmental or social costs.

History of plans to divert Clarence River flows.

Because of comments by media and some politicians on the number of Sydney Harbours that flow to waste down the Clarence River in flood times, and the propensity for locals to describe the river as the "mighty Clarence", there is a widespread misconception that the river holds unlimited water. This misconception is further supported by file television news clips regularly showing the “mighty” river from various locations along the tidal estuary.

A visitor to Grafton can stand on the river bank and marvel at the expanse of water, unaware that if the river stopped flowing altogether the scene at that point would remain unchanged, because it is part of a tidal estuary that extends over 100km inland.

In reality Clarence River water is limited. In dry years its flows can be reduced to a mere trickle.

The not so "mighty Clarence River". The tidal estuary at Grafton is approximately 70km from the ocean and extends more than 100 kilometres inland, giving observers the impression of a vast body of flowing water.

Nevertheless, every time drought has hit inland NSW over the past eighty years, since Dr Bradfield first mooted the possibility in c 1930, the same strident calls are made to turn the rivers inland.

This is then followed by feasibility studies, undertaken by, or on behalf of, self-interested parties who manipulate the facts to suit their arguments. Unfortunately those studies have invariably been based on recycled information from decade to decade, until this latest SMEC proposal has once again repeated that error.

1. Overestimation of runoff across the Clarence River Catchment.

The SMEC report states (page 4) that: *"The Clarence River catchment with an area of 22 700 square kilometres* ***and a mean annual runoff of around 5,000,000 ML per annum has been the subject of a number of diversion proposals over the last fifty years.*** *The most recent public proposal involved the construction of a 900,000 ML storage on the Mann River (a tributary of the Clarence River) and involved the transfer of 950,000 ML per annum to the Border Rivers basins."*

The estimated mean annual runoff of 5,000,000ML per annum comes directly from that "most recent public proposal"; the "Inland Diversions, Where to from here?" forum, presented in 1988 by the then Department of Water Resources. In turn, the Inland Diversions report claims to have sourced its flow information (Section B, page 1) from extensive studies undertaken six years earlier, claiming that: *"Over the years numerous proposals have been reviewed, with the widest ranging one occurring in 1981/82. At that time the Department engaged consultants to carry out preliminary investigations...* ***The consultant's desktop exercise relied heavily on available information...".***

And so the myth is perpetuated. The Clarence Environment Centre has not had time to research earlier reports to find the true origin, the when, how, or by whom the 5,000,000 ML mean annual flow was first determined, and we consider it is high time a proper analysis of river flows be made.

The Centre's own analysis has been undertaken using the official Department of Natural Resources data from the Lilydale gauge west of Grafton. Lilydale is situated on the Clarence just above the tidal pool and measures the combined flows of all tributaries, with the exception of the relatively small Orara River which disgorges into the tidal pool at Ramornie.

The real Clarence River at Lilydale during an average rainfall season (April 2007). No further rivers join the system before reaching the tidal estuary at Copmanhurst. Therefore, the gauge reading at this point provides the most accurate measure of total flows in the Clarence River.

Our findings show that over the past 10 years (1997 – 2006) just 19,476,442 megalitres have flowed past the gauge, less than two million megalitres per year on average, and only 40% of the mythical mean average that has been perpetuated by SMEC. During that 10 year period the Clarence experienced a 1 in 25 year flood event (2001). Total flows measured by the Lilydale gauge for that year was 6,730,374 megalitres, just 1.7 million megalitres above the supposed average. It is interesting to note that the flood peaked at 1,113,323ML in one day, and over a one week period saw 2,550,834 ML flow through. However, within a month flows had again returned to four figure totals.

Our observations appear to be in line with those of Mr Roger Michael Currie, Water Resources Policy Officer, Wide Bay-Burnett, Conservation Council Inc. who was questioned in depth at the Inquiry. When asked whether he thought 5% of the Clarence River flows should be transferred to Queensland his response was (**RRA&T 54 Senate Friday, 11 May 2007):**

"No. I do not want to see any of our eastern rivers overextracted. The Queensland government modelled the Mary River flows on dodgy data to get what they wanted and the New South Wales government could model the Clarence on dodgy data to show that there are 150,000 megalitres a year—it is easily done. It would be a very brave public servant who sticks their neck out and says, 'I am sorry, Mr Premier, I am going to have to tell the people that that data is flawed and wrong.' That is what we are up against." Mr Currie's conclusion mirrors that arrived at by the Clarence Environment Centre. The 5% figure is incorrect, something we have pointed out in this submission, and earlier to the Minister himself.

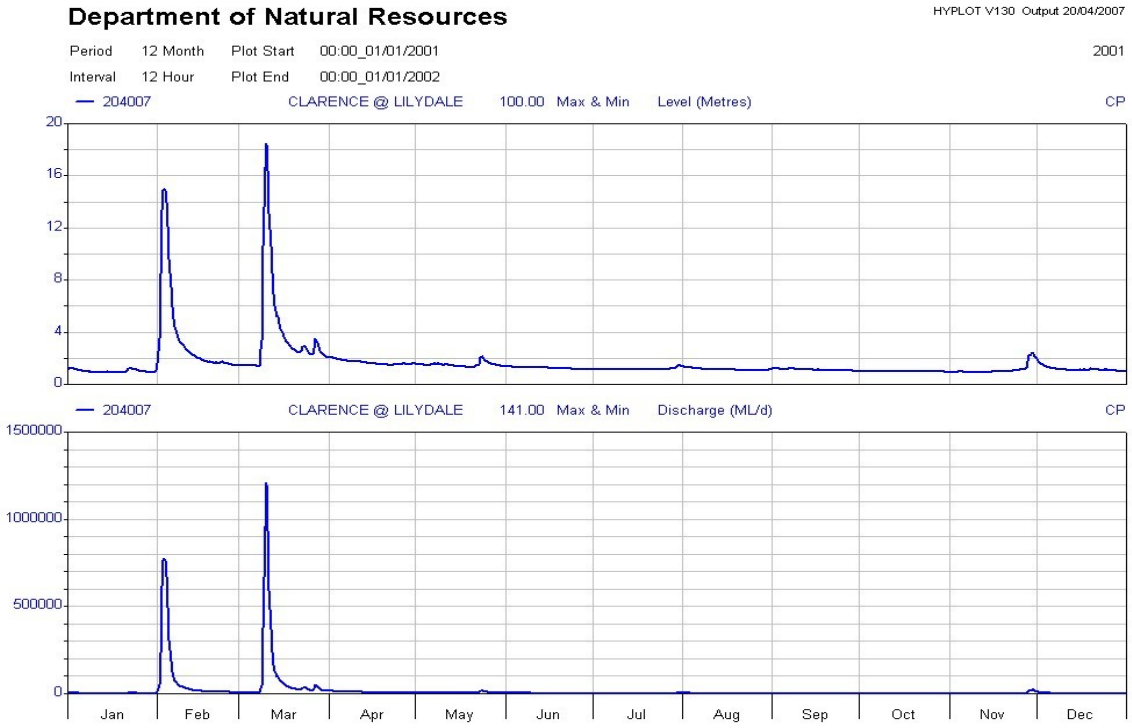
In conclusion: The Clarence Environment Centre suggests that recent reports have overestimated run-off into the Clarence River by in excess of 100%. As a result all calculated percentages to be transferred must be at least doubled. I.e. SMEC's claim of 3% of mean annual flow becomes 6% etc.

2. The application of mean annual flows as a basis for determining the volumes of available water, rather that median or percentile flows.

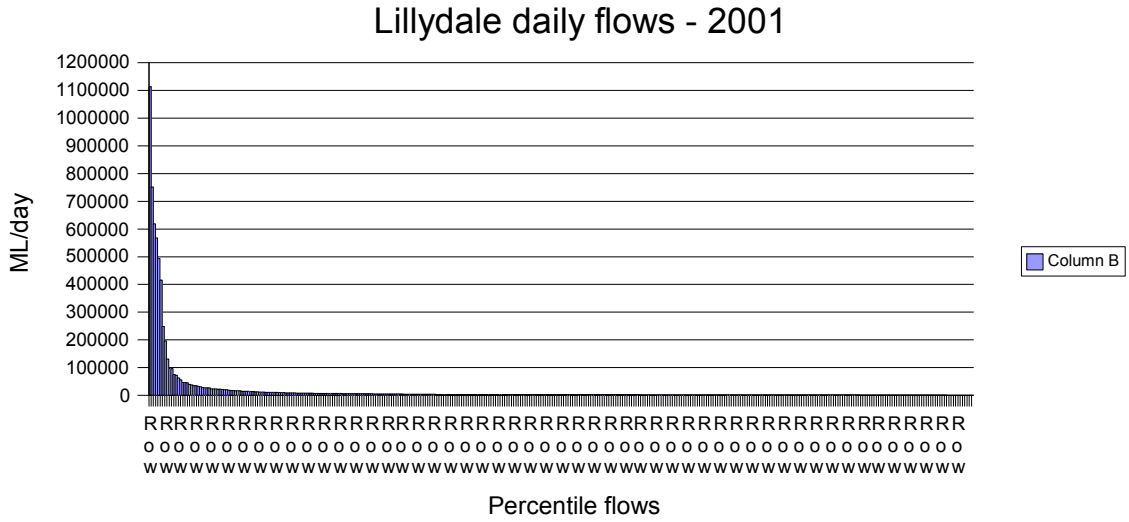
Dry years in the Clarence valley see river levels reduced to a trickle. This fact is clearly overlooked by the SMEC report which based its findings on mean annual flows, which we have already found to be highly questionable (see part 1 above). Use of mean annual flows to calculate available water is highly misleading and, we suspect, deliberate. There are significant differences in the definition, and consequently in the results of calculations between mean, and median flows.

For example: The <u>average annual</u> flows over the past 10 years are 1,946,438ML. Median flow is less than half, only 965,894ML.

The <u>average daily</u> flows during the 2001 flood year was a massive 13,000ML, however the median flow (50th percentile) was just 2,032.



DNR 2001 graph of Clarence River flows (in height in metres and in megalitres). The graph shows the dramatic spikes resulting from heavy rainfall events, and clearly emphasises how the subsequent average daily flow for 2001 bears no relation to the median flow.



The Dep't of Natural Resources figures depicting percentile flows at Lilydale during the 2001 flood year.

In conclusion: The SMEC report's use of mean flows results in readings that are double the realistic flow levels portrayed by median or 50th percentile flows, the relevant figure to determine available water. Taking the daily figures from 2001, where the flood peaked at Lilydale at over 1.1 million megalitres, tailing off to a daily low of 381 megalitres, the 50th percentile was 2,032 megalitres per day, a far cry from the unrealistic <u>average</u> figure of 13,000 megalitres per day.

Therefore, we cannot accept average or mean daily flows as a basis for determining the amount of available water. The fact that the planned dams cannot capture all flood waters (they are too small, even if empty when the flood occurred, see below), means the entire proposal is flawed.

3. The claim that the proposal will store flood water is misleading. The proposed dams will contain only half the water from a one in 25 year flood, even if the dam is totally empty at the start.

The Clarence river at Duck Creek (May 2007), near one of SMEC's proposed dam sites. Clearly this site might have trouble collecting enough water to fill a large dam.

The largest proposed dam, the Clarence River upstream of Duck Creek (Table 3.3, SMEC Report), has a storage capacity of just 250,000ML (2.5 years' supply, although there is a footnote that suggests this may be too small). The Mann River storage capacity is 100,000, (1 year's supply). With flood peaks on the Mann River estimated to reach 750,000ML in a single day, and 1.5 million megalitres in a week, even when empty

the dam can trap just one fifteenth of that water, while the remaining 1.4 million megalitres will flow on out to sea.

In conclusion: If there is no way of collecting and storing flood water, that water should be discounted from any calculation of available flow.

4. SMEC's failure to take into consideration the effects of climate change on the availability of water in the river system

The May hearing by the Senate Select Committee heard evidence from Mr Amir Rahim Deen, Manager, Water Services, Snowy Mountains Engineering Corporation (SMEC), who claimed that climate change considerations were outside the SMEC terms of reference (Senate RRA&T 63).

Lack of any reference to climate change and its possible effects on either rainfall, river flows or water demand, was a major concern to the Clarence Environment Centre. The fact also did not escape the attention of the Senators at the Inquiry. The Senate hearing transcript records:

Senator SIEWERT—"*I have a number of questions. When you answered the question on greenhouse, were you referring only to the impact of transmitting the water, or did you include the impact of climate change on rainfall in your calculations?"*

Mr Deen—*"No, we did not include the effect of climate change in a broad sense. We have factored in the variability that has been recorded in the past into the analysis of flows. No, we did not."*

Senator SIEWERT—*"Can I ask why not?"*

Mr Deen—*"With climate change impacts, there is no definitive scientific basis for assessing those changes."*

Senator SIEWERT—*"I am gobsmacked that you come out with a report—with all the IPCC reports and everything else, and the impact on the Murray-Darling—and you have not included climate change."*

Mr Deen—*"None of those reports deals on a day-to-day basis with the impact of changes in flows arising from climate change."*

The Clarence Environment Centre has undertaken some research into flow trends in the Clarence River system. However because of time restrictions brought about by our not being advised of the need to present submissions until the 11th hour, some more in-depth research needs to be done. It is hoped this will be undertaken by government agencies charged with that responsibility..

Nevertheless, the research we have completed shows some startling preliminary results that need to be pursued further.

Our research was undertaken on flows in the Nymboida River, chosen because there is some 97 years' data available to work with. The Nymboida is the largest and most reliable of all the tributaries of the Clarence, and results here would be representative of the whole system.

We attempted to find if there was any statistical trend in Nymboida River flows, particularly to determine if the last 30 years shows any indication of climate change. This was because renowned climatologist, Julia Cole (see page 84, "The Weather Makers", Tim Flannery) claims that global warming changes climate in jerks, suggesting our planet has seen two such events in recent times, 1976 and 1998.

We began by plotting the flows as of the 15th May each year, the end of the traditional wet season, separating them into seven 15 yearly blocks. The flows for each block were as follows:

15 year period	Total flows on May 15 in megalitres	Average May 15 flow
1909 – 1923	120,343	8,023 *
1924 – 1938	33,917	2,194
1939 – 1953	17,295	1,153
1954 – 1968	38,766	2,584
1969 – 1983	27,470	1,831
1984 – 1998	28,949	1,929
1992 – 2006	19,716	1,314

* The 1909 - 1923 figure is biased, because of a flood in 1921 when the May 15 flow measured 103,098 megalitres. However these numbers indicate a downward trend over the 97 years, with average daily flows on 15th May over the last 15 years (1992 – 2006) being 454 megalitres below average, approximately 25% lower.

The only anomaly is the period between 1939 – 1953, when recorded flows are lower than the 1992 – 2006 period. However, the flow records from these years must be viewed with caution. It appears that readings were not taken daily until the 1960s, with frequent periods of up to 12 days having readings that are identical to 3 decimal points. This practice appears to worsen during the 1939 – 1953 period, possibly related to wartime manpower shortages.

We then undertook the same exercise, this time looking at the flows at the end of the traditional dry season - 30th September each year. The results were as follows.

15 year period	Total flows in megalitres √ 15 =	Average daily flow Sept. 31
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 (30th September) have dropped considerably since1968 (Cole's trigger point 1976), and while 20% of years in the 60 years to 1968 had September 30th flows above 1,000 megalitres, this has dropped to 5% in the last 40 years (2 times only). * One of those years (1999) saw the largest flow ever for 30th September, 3,451 megalitres. Despite this exceptionally high rainfall occurrence the 15 year average remained the second lowest on record.

The 30th September flows in the last 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 much greater analysis of the figures. However, indications are that the past 15 years have seen record low flows in the Nymboida River, a trend that presumably has been mirrored by other rivers in the Clarence system, although few long term records are available for other streams. This could well be an indication that climate change is already occurring and having a significant impact.

In conclusion: Climate change is recognised as the greatest environmental challenge the world has faced since man arrived on earth. In about 2004 the then Department of Environment and Heritage (the Minister for Water's own department) specifically sought CSIRO's advice on climate change impacts. That advice identified lower rainfall, higher temperatures and rates of evaporation in southern Australia as being some of the expected consequences of global warming. The CSIRO also identified the fact that a 10 – 15% drop in rainfall equated to a 50% drop in runoff.

Despite this clear evidence, supported by scientists world-wide, climate change effects were not included in the SMEC terms of reference. We have to ask, why not?

5. SMEC's provision of estimated cost of delivery of water to Queensland, proclaiming the project is feasible, before any dollar value has been placed on either environmental or social costs.

Mr Deen, for SMEC, told the Senate select Committee that: *"We did a number of investigations into the environmental and economic issues, and I thought I would mention some of the environmental issues that we considered.* ***We insisted that there be no more than 15 per cent of the water extracted.*** *By and large, for most options we were looking at about three to five per cent. We decided that for the options we investigated we should pipe the water into the dam rather than releasing the water downstream in creeks".*

This insistence of no more than 15% extraction, and the subsequent supposedly feasible options put forward in the SMEC report, have been based on an apparent false assumption that there is an average annual flow of 5 million megalitres in the Clarence River. We have shown that this figure is highly questionable, and not supported by any evidence provided by SMEC.

The other major issue of concern to the Clarence Environment Centre is that SMEC has determined the options presented in their report are feasible, and therefore economically viable, having calculated the cost per kilolitre to transfer water to various parts of south east Queensland. They have, however, calculated this cost without undertaking any environmental or social assessments, so failing to add a single likely environmental and social cost in dollar terms.

Any proposal for the construction of a dam inevitably comes with the glossy coloured artist's impression of a final product – a wide expanse of clear blue water surrounded on all sides by a lush growth of pristine forests growing to the water's edge.

The ugly reality is very different. The 100,000ML capacity dam proposed for the Mann River would inundate huge distances of riverine and riparian habitat. This would include large tracts of national park, containing threatened species and endangered communities, with all vegetation bulldozed prior to filling to retain water quality. The dam will then only ever be filled during flood events, and will fall progressively as water is transferred during drier years, leaving a wide expanse of mud-caked, weed infested foreshores for years on end.

The magnitude of the environmental impacts that will occur may not be determined for decades after the scheme is up and running, but some known impacts of interrupting and reducing water flows include the following sourced, not from some "extreme green" handbook, but from data provided 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.

- Like prawns, many freshwater fish species such as the Australian Bass and the endangered 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. (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).

- Dams occupy land that could otherwise be productive, and serve to sterilise economically and environmentally valuable areas.

- The Mann River has been designated as a wilderness area, and much of the surrounding forests are now world heritage listed. The proposed storages are likely to significantly affect these values, leading to substantial tourism loss.

- The Eastern Freshwater Cod (endangered species under greater threat of extinction than the Giant Panda) only survives in a very limited area. The proposed dam sites contain much of its best remaining breeding sites.

Added to the impacts identified by the Department of Water Resources, are other known problems such as changes in water temperature; reduction of nutrient flows onto the floodplain and into the ocean; interruption of sedimentary flows, also critical to fish species such as Eastern Freshwater Cod, and regulation of flows which does away with the natural rise and ebb of water levels which follow each rain event.

Also there are the potential impacts on the receiving waterways, which may not be used to these volumes of water. There is the potential to:

- Cause erosion and siltation of the receiving waterway.

- Transfer of species, vertebrates and invertebrates, into waterways that may not have those species, the potential impacts of which are not known.

- Transfer of aquatic weeds into rivers that may not currently have those problems.

- Transfer of diseases such as *Phytophthora cinnamomi* root rot, now known in an Orara River tributary and known to be transferred over large distances in storm water.

- Potential increased flooding in the receiving river system.

In conclusion: Despite this raft of environmental consequences, and identified impacts that these proposals would have on the quality of life of the Clarence Valley, its potential to adversely impact on the economic development of the area; the potential loss of a multi-million dollar fishing industry with a loss of similar magnitude to the tourist industry; and the potential to bring about profound detrimental changes to the ecology of both the Clarence River system and those of receiving rivers, SMEC completely ignores the enormous costs associated with these issues when presenting figures for the delivery of water to Queensland: Figures that ultimately determined these proposals to be feasible.

The social and environmental considerations have been completely ignored, apparently because they were outside SMEC's terms of reference. Again the CEC has to ask: Why?

Yours sincerely

John Edwards
Hon Secretary