215 Woodlands Drive
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7 October 2009

The Hon P Garrett
Minister for the Environment, Water, Heritage and the Arts
PO Box 6022
Parliament House
Canberra ACT 2600

The Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act)
Assessment of the Traveston Dam Proposal in South East Queensland

Dear Minister,

I do not live in the area affected by the Traveston Dam proposal and have no personal or property interests there; however as a private citizen I have serious concerns about the potential damage to the fragile Mary River wildlife and environment if this proposal is goes forward.

The collateral effects of projects like Traveston are irreversible. The dam cannot be 'unbuilt' if the decision later proves to be unwise. To then bemoan the loss of habitat and species after the event is pointless. The time to think about it is before any damage is done; before any approval is given, and before a point of no return is reached. Hindsight has no place in these decisions.

I realise that your powers are limited to the provisions of the EPBC Act. However, having examined publicly-available material, including environmental impact statements and the Evaluation Report by the Queensland Coordinator-General, I believe that the Traveston Crossing Dam proposal presents a high risk to threatened species and communities, and for those reasons, it should not be approved under the terms of the EPBC Act.

My reasons for this view are set out in the attached submission.

Modern science has searched without success to positively find life as we know it anywhere else in our vast universe. Our planet is unique. One does not need to be religious to observe that the mere existence of life on Earth, and its stupendous diversity, is a miracle. In an age of complex and rapid change, it is easy to lose sight of this gift unless we constantly remind ourselves of it. We have the choice to diligently preserve it, or to let its diversity continue to erode as it has done exponentially in recent decades.

I request your earnest and profound consideration of the attached submission. I have sent copies of this correspondence to a limited number of other interested persons.

Yours sincerely,

Hamilton E Newton

The Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act)

Proposal to construct a dam on the Mary River at Traveston Crossing in South East Queensland

PRIVATE SUBMISSION

Scope of this submission

This submission focuses on the fourth of the seven matters of national environmental significance that are prescribed in the EPBC Act, that is, nationally threatened species and ecological communities. However, the risk principles which I have discussed in relation to your decision on that particular matter apply equally to any of the other six matters of national environmental significance to the extent that they are relevant to the Traveston Crossing project.

Does the Traveston proposal affect listed threatened species and communities?

Sections 18 and 18A of the EPBC Act prohibit unapproved actions that have or will have a significant impact on listed threatened species. These species are listed in accordance with Division 1 of Part 13 of that Act.

Subsection 130(1) of the EPBC Act states that *'The Minister must decide whether or not to approve, for the purposes of each controlling provision for a controlled action, the taking of the action'*. Sections 18 and 18A are 'controlling provisions' for the purposes of section 130 through the operation of section 67 of the EPBC Act.

Both supporters and opponents of the dam agree that some listed threatened species exist within the area to be affected by the Traveston project. The answer to the above question is therefore 'yes'.

How significant would be the impact of the Traveston project on the listed threatened species?

There is a significant difference of opinion on the extent to which the Traveston dam proposal would affect the particular threatened species, and the effectiveness of proposed mitigation measures.

Queensland Water Infrastructure Pty Ltd (QWI) released in October 2007 a detailed Environmental Impact Statement (EIS) in relation to the project. The full EIS is available on the QWI website.

The 'Executive Summary' of this EIS alone runs to 134 pages. In this Summary, the subject of threatened species and communities is dealt with in just *one* of those 134 pages, and that is on page 60. The summary is brief almost to the point of being dismissive about each of the species mentioned.

In broad terms, the theme of the EIS is that while listed threatened species are affected by the dam proposal, these effects are not significant or where they are, mitigation measures proposed by QWI adequately address any problems.

Following the EIS was the recently-released 'Traveston Dam Supplementary Report', by the same authors. The Supplementary Report is a reply to public responses to the EIS. Predictably, the conclusions in the Supplementary Report about the impacts on listed threatened species reiterate those in the EIS, namely, that is, there are no impacts sufficiently significant that cannot be managed satisfactorily by a raft of mitigation measures.

Now most recently, on 6 October 2009, the Queensland Coordinator-General released his Evaluation Report on the EIS for final submission to you for a decision under the EPBC Act. Again predictably, there were no surprises. The Evaluation Report supports the EIS and dam proposal in glowing terms, and goes out of its way to now try to convince us that there is a greater threat to the threatened species if the dam is not built! In stark contrast to the EIS, the Evaluation Report provides chapter and verse about fauna and flora species with pages upon pages of scientific jargon.

However, independent assessments of the Traveston proposal are not as optimistic as the EIS and Supplementary Report about either the environmental effects of the project or the mitigation measures proposed to protect affected species. In particular, an environmental impact statement prepared by Professor K F Walker of the University of Adelaide[1] (the 'Walker Report') which was commissioned by the Department of Environment, Water, Heritage and the Arts, appears to draw conclusions different from those in the EIS in relation to risks posed by the Traveston project to threatened species.

The Walker Report indicates that the Traveston proposal not only poses risks for endangered and vulnerable species in the area to be affected, but also that many of the mitigation measures proposed by QWI are over-optimistic. The report does not make recommendations as to whether the project should be approved; it simply sets out risks to various threatened species if the dam is built.

The Walker Report is mentioned in various parts of the Evaluation Report but it is generally dismissed in the light of the mitigation measures for the now touted 'green dam'. However, when I read Professor Walker's report, I found it to be very specific and precise about the proposed mitigation measures, none of which have changed significantly since the release of the EIS.

The overall treatment of Professor Walker's work and other dissenting scientific opinion in the Evaluation Report is reminiscent of the immortal words of a famous former Queenslander, *'don't you worry about that!'*

The answer, then, to the question *'How significant would be the impact of the Traveston project on the listed threatened species?'* is that there is a significant and largely unresolved difference in scientific opinions. The jury is still out.

To highlight the differences in key areas, I have extracted some key comments and findings from the Traveston Dam EIS and EIS Supplementary Report on one hand, and the Executive Summary of the Walker report on the other, and set these out in a comparative table in Appendix 1 to this submission. It is not an exhaustive list but it highlights the sharp difference in scientific opinion.

I cannot weigh the merits of one scientific opinion against the other but I can comment on the risks associated with the options open to you as Minister when deciding whether or not to approve the Traveston proposal under the EPBC Act. For the remainder of this submission, I refer to the risk associated with your final decision as the 'decision risk'.

Why is an assessment of the decision risk necessary?

Environment is not an exact science. There are innumerable variables that may critically determine an environmental outcome. Any given outcome may be the result of a combination of a great number of these variables, or it may be the result of a change in just one. Often it comes down to the opinion of one expert against that of another, so in many cases decisions based on science are value judgements more than definitive findings of fact. It is therefore not

[1] Walker KF. 2008. *Environmental Impact Statement for Traveston Crossing Dam (Mary River, Queensland): A Review with regard for Species of Concern under the EPBC Act 1999*. Report to the Department of Environment, Water, Heritage and the Arts, Canberra. November 2008.

surprising that experts often disagree in such matters. However, when experts disagree, only one can be right in the end. A decision taken in reliance on a wrong opinion will itself be wrong.

A classic example of the volatility of environmental science is the discipline of weather forecasting. So many variables affect weather outcomes. Even with modern state-of-the-art technology, weather forecasting remains notoriously difficult. We can predict with some confidence the weather for the next 24 hours. The probability of an accurate weather forecast for 3 days time is a lot less, while the probability of a correct forecast for the weather in 3 weeks time is reduced to nil. The science of biodiversity is arguably more complex than weather science, with many more variables. Accordingly expert opinions and predictions need to be treated as just that – opinions, not fact.

The EPBC Act sets out a process for the assessment of 'controlled actions' (which the Traveston proposal is under the terms of the Act). Under Division 3 of Part 8 of the Act, the Minister must choose one of a number of prescribed methods to assess the relevant impacts of an action. Whichever method is chosen, the end result is a report with recommendations to the Minister prepared by the Departmental Secretary. Once this report is finalised, the Minister is then required to make his or her decision on the report within the terms of Part 9 of the Act. The time limits for the making of the Ministerial decision are set out in subsections 1A and 1B of section 130 of the EPBC Act.

Section 130 of the Act does not place an obligation on the Minister to accept the recommendations of the Secretary's report prepared under Part 8. The purpose of Part 8 is to lay down a transparent and objective process by which the Minister has sufficient information to make an informed decision about a controlled action. However the final decision is the Minister's, and is a judgement call supposedly with the best information to hand.

When facts are not conclusive; when the decision relies on expert opinions; and when there are significant variances in these opinions, there is a higher level of risk associated with the final decision.

How should the decision risk be assessed?

There is an Australian Standard on risk management, *AS 4360 Risk Management*.

AS 4360 provides a methodology for assessing risk according to two criteria: the likelihood of an event, and the consequence of that event. The Australian Government Information Management Office of the Department of Finance and Deregulation mandates the use of AS 4360 principles for conducting Threat and Risk Assessments in Public Key Infrastructure deployments.

Using the principles in AS 4360, I believe that the risks associated with a decision to approve the Traveston Crossing Dam outweigh the risks associated with not approving it.

The measures of likelihood and consequence

Table 1 in Appendix 2 contains quantitative measures for the likelihood of an event or outcome. Tables 2a and 2b assign quantitative measures of the consequences of an approval and rejection decision respectively. Table 3 combines these tables into a risk assessment matrix.

The decisions to be tested

Supporters and opponents of the Traveston dam proposal commonly agree that threatened species will be affected by the project. The sides differ on the impact of the project on those threatened species. The proponent of the dam (QWI) and now the Queensland Coordinator-General take the view that the impact can be reduced to minor or negligible by the proposed mitigation measures. The Coordinator-General would have us believe that the dam will benefit

the threatened species. Opponents say that the mitigation measures are untried and doubtful, and the risk to the threatened species remains too great.

The Minister's final decision under the EPBC Act comes down to a simple choice, to approve the project, or to reject it. The Minister makes that decision on the basis of a report from the Departmental Secretary under the prescribed assessment process.

The actual risk is that the final decision, either way, proves to be wrong. There is no risk associated with a decision that proves to be correct.

Therefore the decision risks to be tested have been reduced to the following:

- The Minister approves the controlled action relying on an expert scientific opinion that is wrong; or

- The Minister rejects the controlled action relying on a scientific opinion that is wrong.

Assessment of the likelihood of the risks

Assessment of the likelihood of the risks occurring is straightforward. Using Table 1 in Appendix 2, both are rated as 'possible', or 3. This is applying simple probability. The Minister's final decision can only be right or wrong. Certainty that his decision will be right is lessened because the supporting material on which the Minister will rely is opinion and not demonstrated fact. Scientific opinions vary significantly in this case, but only one of those opinions can in the end be right.

It follows that each scientific opinion has an equal probability of being right or wrong.

For these reasons, both risks are equally 'possible' and are assigned a 'likelihood' rating of 3.

Assessment of the impact of the risks

Each risk will be assigned a value for its consequences or impact based on Tables 2a or 2b in Appendix 2, with supporting reasons and comments.

Comments on the risk associated with the Minister's approving the controlled action (an 'approval decision')

Using Table 2a, the consequences of this outcome are considered to be 'major', with a rating of 4.

If the Traveston Crossing dam is approved under the EPBC Act, and the environmental mitigation measures as not effective as the EIS and Coordinator-General Evaluation Report would have us believe, the consequences for endangered and vulnerable species[2] are potentially disastrous, leading to the possible extinction of some.

The EIS and its Supplementary Report acknowledge that the dam would fragment the populations of these species but confidently assert that the effects of fragmentation will be minimised by their mitigation strategies.

This confidence flies in the face of other scientific opinions about the effects of fragmentation. For example, a fact sheet published by the Australian Museum, titled *'Habitat Fragmentation, its Effect on Biodiversity'*, states that:

> *Small fragments of habitat can only support small populations of fauna and small populations of fauna are more vulnerable to extinction. Fragments of habitat that are separated from each other are unlikely to be recolonised.*

[2] This is a reference to species listed as 'Endangered' or 'Vulnerable' under the EPBC Act.

The Walker Report earlier-mentioned also casts doubt on the EIS opinion, as well as on the strategies that are proposed to negate or mitigate the effects of fragmentation. On this and other issues, Appendix 1 highlights the difference of Professor Walker's opinion with that of the authors of the EIS and Supplementary Report. In Appendix 1, I have not attempted to include comparisons of opinion on every species of fauna and flora that is a threatened species. I have limited these comparisons to three internationally-recognised and iconic species, namely, the Queensland Lungfish, the Mary River Cod, and the Mary River Turtle.

The fact that the EIS and Coordinator-General's Evaluation Report place heavy reliance on mitigation strategies is itself of concern. The success of these strategies is highly dependent on the will of future State governments to sufficiently fund and support their continued operation. Governments of all political persuasions are obsessed with cutting budgets, and when they do, they do it indiscriminately. Good programs are cut along with wasteful ones. Any future cuts in funding - even moderate cuts - to an institution like the Freshwater Species Conservation Centre (FSCC) and upon which the EIS and the Coordinator-General place so much reliance to maintain the biodiversity of the three species mentioned, would just result in its operations being scaled back. Promises that this won't happen are hollow and unreliable.

There are too many unanswered questions and absences of guarantees in relation to the effects of the Traveston dam on the environment, to rate this decision risk as less than 'major' insofar as it threatens the existence of the three threatened species mentioned (refer to Table 2a in Appendix 2).

Further, there is a significant international reputation risk to Australia if we fail to ensure the viability of an iconic species such as the lungfish. This species existed before the age of the dinosaurs. The Mary River is one of the last natural habitats of this species. The EIS endorsed by the Coordinator-General Evaluation Report dismissively asserts that under strategies such as 'catch and carry', some of these fish can be translocated to other parts of the Mary River or to other streams. So what? There is nothing that conclusively demonstrates that they will successfully breed or survive long-term once translocated. The theory is speculative.

The theory appears to be that these creatures will swim in to a fish trap located below the dam wall and that by means of a 'fish lift', the trap containing the fish will be lifted 30 or so metres up and over the wall and deposit them into the main reservoir, an environment totally different to the one from which they just came. After this experience the fish will just get on with life and breed! This is still in the realms of theory. A similar device on the Paradise Dam so far has not demonstrated to any practical extent that such devices are effective.

If the fish don't swim into the trap and 'take the lift', or if they do but don't breed due to the drastic change in their environment, there is the real possibility that the species over time could diminish to the point where its listing under the EPBC Act moves from 'vulnerable' to 'endangered', or worse still, 'extinct'.

Australia is currently struggling to improve its environmental credentials in the eyes of the world. It has a notorious and unenviable reputation when it comes to species loss. Since European settlement, more than 50 species of Australian animals and over 60 species of Australian plants are known to have become extinct. We don't need to add to this number, particularly if it is avoidable.

The Traveston Crossing proposal poses a real risk for the three mentioned species as well as our international standing on environmental matters. For this reason its impact is considered to be 'major' if this project is approved under the wrong assumptions.

It would be more tragic in this case because, as I will point out in the next section, there is no compelling 'greater community need' argument in favour of the proposal. The Traveston Crossing dam will not drought-proof South East Queensland, and is unlikely even to make a significant contribution to its water supplies.

Comments on the risk associated with the Minister's rejection of the controlled action (a rejection decision)

If the dam is not approved, the environmental status quo is maintained.

The Queensland Coordinator-General in the Evaluation Report has attempted to advance an argument that the Traveston Crossing Dam will in fact guarantee the future of the threatened species, and that their future is more at threat if the dam is not built.

With respect to the Coordinator-General, this seems like an attempt to defend the indefensible. This line of argument has only surfaced now, and not even the EIS attempted to maintain that the dam would positively benefit threatened species. All the EIS ever maintained was that the risks to the species could be minimised by a raft of mitigation strategies. I haven't had the time to research it, but it would have to be almost a world first where a major construction project involving wholesale disruption to the natural environment results in measurable positive environmental outcomes. It certainly is not the normal outcome of human activity; usually the environment and wildlife are the casualties or 'collateral damage'.

In any impact that it has on risk assessment, the Coordinator-General's 'green dam' argument has to be taken as speculative and tenuous. The Coordinator-General's opinion is just that – an opinion. It is impossible to demonstrate his 'green dam' argument in any concrete way, and the equally credible opinion of Professor Walker refutes that argument. Professor Walker's opinion is quite clear - there is a significant, and in some cases unacceptable, risk that the construction of the dam will result in only negative outcomes for threatened species, in particular the iconic lung fish. He also casts serious doubt on the mitigation measures that have been proposed to minimise these outcomes.

Under the status quo, the species are with us. If the dam is not built, there is at least the opportunity to watch and wait to determine what if anything needs to be done in the future if their prospects in the natural environment seem compromised. However if the dam is approved and built and the Coordinator-General's green arguments fail to materialise, the damage that results cannot be undone.

For the above reasons, I believe that the risk attached to an approval decision significantly outweighs the risk attached to a rejection decision. Using Table 2b I have therefore rated the consequences of a rejection decision as 'Minor' or 2.

This impact might warrant a rating higher than 'minor' if the region's water supply capacity was critically inadequate, and building the Traveston Crossing dam would significantly boost the region's water reserves and prevent another water crisis. However, neither is the case. For this reason, the consequences are still no more than 'minor', or 2.

In relation to adequacy of supply, the water crisis in South East Queensland that began in 2004 and lasted until this year was largely of the Queensland Government's own making. The region's principal water supply is Lake Wivenhoe, a very large dam with a full-supply volume two-and-a-half times that of Sydney Harbour. Lake Wivenhoe last overflowed its spillway in 2000. The years following that year were particularly dry, and significant summer rain events failed to materialise as a result of a prolonged El Nino event. However, the Queensland Government failed to introduce meaningful water restrictions until around 2004 by which time the levels of Lake Wivenhoe and other regional dams had fallen to catastrophically low levels. By the time the restrictions came in, the capacity of Lake Wivenhoe was down to about 25%. Water restrictions should have been in place long before they were introduced.

The drought situation persisted and the Queensland Government had to face an election in 2006. By this time water management had become an election liability, so in a pre-election flurry the government announced the 'water grid' and two new dams, one of which was Traveston Crossing. The haste with which the decision on Traveston Crossing was made had the hallmarks of hindsight, knee-jerk reaction, and desperation politics, not a well-considered decision.

Adding to the pressure on regional water supply is the Queensland Government's aggressive promotion of development in South East Queensland. Hectares of bush land anywhere from Gympie to the NSW border are being levelled to make way for housing estates owned by large development companies. If local councils get in the way, the government will override them. Many of these new homes have several bathrooms and toilets, with spas and swimming pools. The government's attitude on development seems to be that we can have our cake and eat it too, and that we just keep on building new dams to meet the insatiable water demands associated with rapid development.

If another water crisis is to be avoided in South East Queensland, effective water management is urgently needed before making decisions on more dams. There also needs to be a permanent change of public attitude in relation to water consumption. Since water restrictions have been in place, the majority of people have diligently abided by them and practiced responsible water use.

However, there is not yet a permanent change of culture. A recent Queensland Government source stated that the present population of the region is expected to double in the next 20 years. If true this represents a growth rate of approximately 3.5 % per annum. The government needs to start *now* to convey the message that growth like this comes at a cost. As the number of consumers of water (a finite resource no matter how many dams are built) increases, it follows that individual water demand must be reduced to compensate, and the days of the 30-minute shower, and hosing down the car and the driveway, are things of the past.

This is a convenient point to turn to the other question of the degree that the Traveston Crossing dam will contribute to future South East Queensland water supplies. The EIS and Coordinator-General Evaluation Report maintain that the Traveston Crossing proposal is the 'stand-out' option for assuring the future water supplies of the region.

However, some claims made in the EIS Supplementary Report have to be viewed with scepticism. For example, early in Chapter 2 it is stated that:

> *The site for the dam is situated in a coastal rainfall catchment (Upper Mary Valley) of some 2,100 m2 in area. The Upper Mary Valley is a hydrologically efficient catchment which receives up to 55% more rain on average per year than the Wivenhoe Dam catchment. Investigations indicate the dam will be full or near full more than 80% of the time and will have lower evaporation rates than both Wivenhoe Dam and Borumba Dam. (Page 2.1)*
> *…*
> *When completed in 2011, the dam will deliver an additional 70,000 ML/a of water to SEQ. The dam has a proposed Full Supply Level (FSL) of EL 71.0 m Australian Height Datum (AHD). At this FSL, the dam will provide storage capacity of approximately 153,000 ML and will inundate some 3039 ha. The main channel of the Mary River will be inundated for a length of some 36.5 km. (Page 2.2)*

Both of these claims are assumptions based on statistics and so-called 'modelling', not real life. The claim that the dam will be full 80% of the time is a leap of faith. The EIS and Supplementary Report would have us believe that the Mary River continues to flow long after other rivers in the region have stopped. Local people from the Mary Valley region will tell you otherwise. They will confirm that during the recent dry years, the rate-of-flow of the Mary River was like that of any other river in South East Queensland; it was low to non-existent for extended periods.

The claim that the evaporation rate of Traveston will be less than that of Wivenhoe is also dubious. It is a lot shallower than Wivenhoe. The *average* depth of Traveston will be just 5 metres, being built across a wide valley that could almost be called a flood plain. Its average depth in the river channel is 12 metres, so, to average out to 5 metres, it follows that its depth in many other places is less than 5 metres. Surely shallow depths over a large surface area favour more evaporation, not less.

The idyllic assumption about the dam being full 80% of the time seems to be the basis of the next claim – that the dam will deliver 70,000 mega litres of water a year. 70,000 mega litres is almost half of the dam's total storage capacity of 153,000 ML! It might achieve that in a year of high rainfall, with the river constantly in flood and refilling the dam. However, this is pie-in-the-sky. In dryer times, it is very doubtful. Moreover, in prolonged dry periods, the shallow reservoir may be prone to toxic algal blooms and poor quality, which could further compromise the dam's capacity to contribute significantly to regional water supply[3].

For these reasons, the contribution of the Traveston Crossing dam to the regional water supply of South East Queensland is more likely to be marginal, and certainly less than the optimistic claims made in the EIS Supplementary Report and the Evaluation Report. My concern is that in prolonged dry periods as experienced from 2001 to 2006, the Traveston reservoir will be an ugly mud pan dotted with stagnant ponds.

If the Traveston dam is not built, there are other options open to the Queensland Government which it does not seem to want to consider. However, first and foremost, it comes back to proper water management, and this means close monitoring of regional supplies and timely introduction of appropriate restrictions to ensure that we don't get into the parlous situation we found ourselves in 2004.

The Queensland Government always plays down the region's major water source, Lake Wivenhoe on the Upper Brisbane River. One of its astounding claims was that the Traveston Crossing is needed because Wivenhoe was 'built in the wrong place'. This is nonsense. I clearly remember the building of Wivenhoe. Certainly, one of its touted benefits was flood mitigation for the city of Brisbane. However, this was a spin-off, not its major purpose.

Wivenhoe's major purpose was always water supply. The upper Brisbane River, where Wivenhoe is situated, rarely ran dry in the past. Climate change may be affecting that now, but if it is affecting the Brisbane River, it is also affecting other rivers including the Mary.

When Wivenhoe was commissioned in 1985, the population of South East Queensland was far less than now, about half in fact. With a water volume two-and-a-half times that of Sydney Harbour, it didn't matter then how wanton people were with water use, it was almost impossible to deplete it. Dry periods would come and the dam's water levels would recede but slowly enough to ride out the dry until another major rain event. It was at full supply as recently as 2000.

An interesting statistic - each ***metre*** of water supply added to the Wivenhoe reservoir in the recent rains captured 200,000 mega litres. This is more than the entire capacity of the proposed Traveston dam (153,000 mega litres) - in just *one metre*. This year 2009 saw good rains over the Wivenhoe catchment, and if the dam had not been allowed to run down to such catastrophic levels, would have been sufficient to fill it. It takes a long time to fill a large dam from near-empty, a lot longer than it takes to fill from half-full. The fact that it got so low is primarily the result of mismanagement and a stupendous lack of planning.

Summary of the relative consequence assessments

For the above reasons it is difficult to rate the impact of a rejection decision more than 'minor'. A rejection decision maintains the status quo, a big factor because the decision is not a point-of-no-return, and it enables other options to be explored while effective management of current supplies are put into practice and other viable supply options considered. Further it does not jeopardise future South East Queensland water supplies as the contribution of Traveston to total regional supply is marginal.

The Queensland Government needs to demonstrate that it has instituted the best practices in water management. To date there is little evidence of this. In recent times it has set up a Water Commission to oversee regional supply and restrictions, but time is needed to assess

[3] The Walker Report supports this contention – See its Executive Summary, p v.

the effects of these measures and to determine the true demands for water under proper management *before* any hastily-conceived decisions on new dams are approved.

In contrast, the impact of a decision to approve the dam is 'major'. In contrast with a rejection decision, it is a point-of-no-return. It is *not* reversible if its effects are later found detrimental to threatened species and the environment. Moreover, it involves major environmental upheaval, the effect of which is highly uncertain and open to serious debate. Experts disagree about both the possible effects of the proposal and the effectiveness of proposed mitigation strategies.

The final assessment of the risks

Using the AS 4360 method, the risks associated with approval of the project outweigh the risks of rejecting it.

Using Table 3 in Appendix 2:

- The risk associated with an approval decision has a likelihood rating of 3 (possible) and a consequence (or impact) rating of 4 (major). **The final risk rating is therefore 12** (3 x 4); and

- The risk associated with a rejection decision has a likelihood rating of 3 (possible) and a consequence (impact) rating of 2 (minor). **The final risk rating is therefore 6** (3 x 2).

Even if the impact rating of the rejection decision using Table 2b is conceded to be 'moderate' (3) instead of 'minor' (2), the risk associated with approval is still greater. Either way it demonstrates that a lot more is at stake in approving it.

Is there a 'greater community need' argument?

Such a need could exist only if no other options are open to the government and the current need for the dam is of such extreme urgency that any delay could lead to a catastrophic failure of regional water supply.

Neither of these is the case. In earlier arguments, it is demonstrated that the proposed dam will make at best a marginal contribution to regional water supply, and possibly yield nothing in extended dry periods, all the while constituting a serious possible threat to threatened species. The Queensland Government first needs to demonstrate that it is its managing current water resources wisely and effectively.

Conclusion

The arguments in this matter clearly point to the adoption of the 'precautionary principle' in relation to the Traveston project. The precautionary principle is a legal requirement in some European Union countries. Even if not a legal requirement here, we would do well to adopt it voluntarily in important decisions on environment under the EPBC Act.

A definition of the precautionary principle set out in *Wikipedia* succinctly summarises my sentiments on the whole Traveston issue:

> *The precautionary principle is a moral and political principle which states that if an action or policy might cause severe or irreversible harm to the public or to the environment, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action …*

The Queensland Coordinator-General discusses the precautionary principle in section 4.6 of the Evaluation Report at page 207. With respect again to the Coordinator-General, this section could well be mistaken for a passage from the script of the sitcom 'Yes Minister', to be

spoken by Sir Humphrey Appleby. There is an array of vague but impressive management words and phrases like ‘implementation framework’ and ‘benchmarks’, but little real substance. He is suggesting that large-scale human intervention involving major environmental disruption will somehow do a better job than Nature left to itself.

The Coordinator-General concluded that he considered the precautionary principle and has ‘taken a conservative, cautious approach in the evaluation of impacts and the imposition of conditions on the Project’. However, he has decided to support the proposal on the basis that it is somehow a ‘greener’ solution than not proceeding with it.

This is a leap of faith on his part. The ‘science’ that underpins the proposed ‘green’ measures and mitigation strategies appears to be based significantly throughout the EIS on computer modelling, as there is often no demonstrated science to really rely on. This is fraught with potential error. Computer modelling is only as good as the inputs to the modelling process, with a wide variance of results possible depending on which inputs are selected and how they might be combined. The Coordinator-General somehow believes that in relying on these results from modelling, he discharges the burden of proof deeply inherent in the precautionary principle.

I submit that the Queensland Government and QWI have not discharged that burden of proof. I sincerely request that you, as our Federal Environment Minister, apply the precautionary principle yourself to your final decision and exercise your discretion under the EPBC Act and decline approval of the Traveston Crossing dam.

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7 October 2009

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Issue	Extracts: Traveston Dam EIS Executive Summary and EIS Supplementary Report	Extracts: Environmental Impact Statement for Traveston Crossing Dam, by Prof. K F Walker
On the EIS itself	The methodology used to prepare the EIS accords with up to date and current standard procedures for the undertaking of an EIS. A bilateral agreement between the Australian and Queensland Governments accredits environmental assessments under Queensland legislation as meeting the standards required to assess the relevant impacts of the Project for the purposes of the approval required under the EPBC Act. (Supplementary Report, paragraph 5.3.2, pp 5-5 to 5-3)	In many cases, the EIS makes assumptions on the basis of scant evidence and draws conclusions about impacts with little or no justification. Most of the impact assessments suggest that the dam would have no significant impact or, if there were an impact, it would be compensated by mitigation and offset 'strategies' that are often ill-defined and individually have significant risks of failure. The EIS offsets these claims by indicating that the project includes a number of sustainability 'strategies', the principal one being a Freshwater Species Conservation Centre (FSCC). The EIS does not view issues in a wider context … the Mary River harbours flora and fauna that are nationally endangered, vulnerable or rare, and the Australian lungfish and Mary River turtle particularly are internationally significant. There is substantial literature on the ecology of reservoirs and the environmental effects of dams on rivers, and a substantial part is of Australian origin. Most of this has been overlooked. (Executive Summary, p iii)
On the Mary River Turtle	The existing turtle habitat is that which will be most impacted by the Project however, the turtle is the species that will most benefit from the mitigation measures built into the Project. The turtle is currently subject to critical levels of predation of its eggs and young. Measures include translocation of existing nests, creation of protected habitat including island refuges, protection and relocation of turtles, inclusion of a turtle ramp, design aspects to protect turtles from harm during operation of the dam, and beneficial outcomes from the research Centre. (EIS Executive Summary, p 2.27) The population of the Mary River turtle is poorly known … The Mary River turtle is known to live and breed in water storages so is expected to do so in the shallow margins and near the flowing entry points to Traveston Crossing Dam … It is not expected that the Project will lead to a long term decrease in the size of the population	The turtle by-pass channel is a speculative design, as there appears to be no comparable facility elsewhere. It is not known whether turtles in the Mary River (in particular, the Mary River turtle) are able to use such a facility. Again, there are assurances that, if one this species could not use the channel effectively, the catch-and-carry strategy would be employed. (Executive Summary, p vii) There appears to be no precedent for this strategy as a means to offset population fragmentation, although the EIS points out that the Australian lungfish, the Mary River cod Mary River turtle (or their eggs) have been captured and transported in the past. It clearly is possible to transport small numbers of individuals, but the issue here is the need to maintain connectivity and genetic mixing between sub-populations. (Executive Summary, p vii)

Issue	Extracts: Traveston Dam EIS Executive Summary and EIS Supplementary Report	Extracts: Environmental Impact Statement for Traveston Crossing Dam, by Prof. K F Walker
	… The inclusion of a fish transfer device, specific bio-pass structure and commitment to catch and carry if need be, will allow turtles to access habitat both upstream and downstream of the dam. The dam has several tributaries of different sizes and attributes so movement to and from the dam is expected. (Supplementary Report, Ch 20, Table 20-10, pp 20-68 to 20-69)	The size of the Mary River turtle population is uncertain, but preliminary estimates suggest 900-3500 within the inundation area. It is likely that this part of the population would decline, and may be lost. In general, there is so little critical knowledge of the ecology and biology of the species that the only responsible conclusion can be that the dam would represent a substantial risk to the integrity of the present population, and the species as a whole. (Executive Summary p xii)
On the Freshwater Species Conservation Centre (FSCC)	The prime goal of the centre is the development and implementation of actions that ensure the survival and improve the status of Lungfish, Mary River Cod and Mary River Turtle. The former goal (ensure the survival) is the minimum target while the latter (improve the status) is the ultimate goal … This whole of species approach adopted for the FSCC is a sound and practical approach and recognises the basic principle of connectivity of land areas and therefore habitats from the Mary Valley through to other catchment areas where this species or similar species exist. As mentioned above, QWI is seeking to implement a range of best practice mitigation and recovery measures designed to minimize potential impacts and enhance the long term survival of the species. In order to optimize these measures, QWI recognises the need to invest in improving the existing level of knowledge of the biology of these species in such a way that the continued survival of EVR species and other similar species is assured … The primary purpose of the FSCC will be to conduct targeted research in order to determine how any potential threat from all sources, including climate change, to these species can be ameliorated. (Supplementary Report, pp 20-96 and 20-97)	The main role of the FSCC would be to address problems related to impacts on iconic species in critical habitats … The need for the Centre is a reflection of how little is known of the biology and ecology of the iconic species. This information should be available before a project on the scale of Traveston Crossing Dam is contemplated. (Executive Summary, p4)
On the Mary River Cod	The Project will modify the area of cod habitat but will not affect known critical habitat areas. With mitigation measures including snag habitat, artificial surfaces (rocks, pipes), fishway, back up catch and carry strategy and the outcomes of the research and	The combined area of inundation, the dam and the tailwater together represent a physical barrier that would fragment the area occupied by Mary River cod, and it would be necessary to ensure connectivity. Adults are territorial, but may move more than 30 km

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	development conducted at the Freshwater Species Conservation Centre, it is likely a beneficial outcome for recovery of the species will result. (EIS Executive Summary, p2.27) Any fish species with small populations, such as Mary River Cod, could eventually be affected by possible isolation effects. Population maintenance and negating the possibility for genetic isolation could be achieved through provision of an efficient fish transfer mechanism on the dam, physical translocation of specimens of the species of interest, or restocking of juveniles derived from brood stock from a different location." At present there is no data relating to the abilities or otherwise of Mary River Cod to utilise fishways of any type, including that proposed for this Project. There is also limited information for lungfish. For EPBC listed species, in the absence of data confirming usage of fishways, it is a precautionary approach to also adopt alternative strategies. The QWI approach to all aspects of critical species protection is to establish primary, secondary and tertiary approaches to ensure the sustainability of populations. With respect to movement criteria these are: •a state-of-the-art fish transfer device designed in conjunction with leading experts; •a bypass system; and •a commitment to use catch and carry in circumstances when the primary and secondary alternatives are non-operational or are not achieving the targeted outcome. Captive breeding and re-stocking was supported as a mechanism to address genetic isolation of populations upstream of the dam and this strategy is already included within the Recovery Plan for Cod and has been acted upon. Both Mary River cod and lungfish are known to be able to be captured and transported successfully so catch and carry of sexually mature adults is a viable option but as captive breeding and restocking is a current program in the case of	up or down-stream during high flows, but there are no data to describe the ability of the cod to utilise the proposed fish-transfer device. The inundation area, dam and tailwater will modify areas of Mary River cod habitat. These areas may provide 'poor' quality habitat where cod can survive, but there is no evidence to suggest that they could harbour breeding populations. The reservoir will have little resemblance to the riverine pool-riffle habitats preferred by the cod. Existing pool-riffle habitats in the dam tailwater will be modified by flow changes and consequent erosion and siltation. It is not possible to state unequivocally that the local Mary River cod population would undergo a long-term decline as a result of dam operations. The size of the population is not known with confidence, and there are few data on recruitment and other basic features of biology and ecology. In the reviewer's opinion, the uncertain status of the cod population and changes to breeding habitat-availability, hence recruitment, and to the scope for free-range movements present an unacceptable risk that the local cod population would decline. (Executive Summary, p x)

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	Cod, no new program is necessary. To ensure the continued success of this program QWI will be funding ($600,000) towards upgrading the hatchery facilities. (Supplementary Report, p 20-80)	
On the lungfish	The Project will not reduce the area occupied by the lungfish and regulated flows regimes are known to favour lungfish. The species is known to occupy and live healthily in dams. Mitigation measures similar for the cod are likely to provide a beneficial outcome for the maintenance of the species. (EIS Executive Summary, p 2.27) The total footprint of impact is approximately 4% of the available habitat and lungfish will be able to use the storage area. Breeding is likely to be less successful in the dam but improved in the reach downstream. Therefore a long term decrease in the size of an important population is not expected. (Supplementary Report, Table 20-13, p 20-92) The barrier effect caused by the dam will fragment the area occupied by the lungfish in the Mary river catchment. The inclusion of multi-tiered transfer strategies will allow lungfish to access habitat both upstream and downstream of the dam and ensure genetic mixing. Lungfish have been shown to move out of dams into upstream habitat. The dam has several tributaries of different sizes and attributes so upstream movement, to a degree, is expected. Fragmentation over a long period has apparently not impacted the population in the Brisbane River as the barriers on that system have no fish transfer devices. (Supplementary Report, Table 20-13, pp20-92 to 20-93)	The Australian lungfish is the world's most primitive survivor of a 400-million year old lineage, and is internationally renowned. … Lungfish are reasonably common in the Mary channel, including the inundation area, and several tributary streams. The species' vulnerable status reflects its small geographic range and threats to habitat and recruitment rather than its population size. The EIS points to the Brisbane River, where lungfish have been translocated and now live above and below Wivenhoe Dam, as evidence that the species can live in regulated-flow environments. Comparisons are deceptive, however, because daily flows below Wivenhoe Dam are 5-10 fold greater than those likely to prevail downstream of Traveston Crossing Dam. There will not be equivalent habitats in the Mary below the dam … (Executive Summary, p xiv) In the absence of detailed knowledge about lungfish in critical areas, the prudent course is to be conservative. It is possible that the lungfish population is already in decline, due to failed recruitment, and in that respect the new dam presents an unacceptable risk that the population would be severely impacted. Traveston Crossing Dam would mean that 26% of core lungfish habitat in the Mary River is impounded and, at the very least, the dam would reduce the quality of habitat for the species. This offers little security for a vulnerable species, under the EPBC Act, and conceivably could be sufficient to have the species nominated for consideration as an endangered species. (Executive Summary, p xvi)

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On introduction of invasive species	The Project in itself will not introduce invasive species to the Mary River catchment. Consequently, invasive species will not reduce the habitat available to the lungfish. (Supplementary Report, Table 20-13, p 20-93)	Establishment of a reservoir encourages a shift away from riverine fish toward lacustrine species, and creates a high potential for invasions by alien species. Native fish would be likely to be stocked in the reservoir for recreational fisheries. Several alien species are already established in the Mary River, and the Traveston reservoir would be a favourable habitat for some, including gambusia and common carp. The Mozambique tilapia, a declared noxious fish that occurs in nearby reservoirs, could also represent a threat. It would be indefensible to introduce alien or exotic fish to a river that supports nationally□threatened aquatic species. (Executive Summary, p v)
On algal blooms and water quality	The implementation of … mitigation measures are expected to enhance water quality conditions and significantly reduce the probability of eutrophication. (Supplementary Report, paragraph 16-1-2, p16-3)	There is a high likelihood of algal blooms in the reservoir, encouraged by warm temperatures and high nutrient inputs. This would affect water quality, with implications for the flora and fauna in the reservoir and the river downstream, and for human consumption. Although the reservoir would stratify thermally, QWI has declined to 'model' stratification or to indicate how the multi-offtake tower would be operated. In a stratified, eutrophic reservoir, prone to develop dense populations of algae and water plants, the deeper water is likely to become anoxic (without oxygen). This makes the deeper water uninhabitable by fish and most other animals, draws heavy metals into solution and releases hydrogen sulphide. Chemical changes in the bottom water may have adverse consequences for the lake fauna and flora at times of seasonal mixing, when anoxic water is returned to the general circulation. (Executive Summary, p v)

Appendix 2

Risk Assessment Method based on AS 4360

Table 1 - Risk Likelihood

Rating		Likelihood or Occurrence
Almost Certain	5	The event **is expected to occur**
Likely	4	The event is **likely** to occur
Possible	3	The event **may** occur
Unlikely	2	The event **could occur at some time**
Rare	1	The event **may occur in exceptional circumstances**

Table 2a - Risk Consequences or Impacts for an Approval Decision

Rating		Suggested Consequence*
Catastrophic	5	Major environment damage with species loss, attracting unfavourable international attention and harm to Australia's reputation
Major	4	An environmental outcome that might lead to one or more threatened species having their listings under the EPBC Act upgraded to Endangered, Critically Endangered, or Extinct
Moderate	3	An environmental outcome that will jeopardise one or more threatened species but with proven safeguards guaranteed to prevent an upgrade of their listings under the EPBC Act.
Minor	2	An environmental outcome that will affect threatened species in some ways but not jeopardise them in a way that would cause their status under the EPBC Act to be upgraded
Insignificant	1	An environmental outcome that will have negligible effects on threatened species.

*These are my suggestions, based on the categories for the listing of threatened species under the EPBC Act.

Table 2b – Risk Consequences or Impacts for a Refusal Decision

Rating		Suggested Consequence*
Catastrophic	5	Prevention of the action will in the short term lead to infrastructure failure and hardship to a large section of the population
Major	4	Prevention of the action will delay construction of major infrastructure identified as an urgent immediate need and critically essential in the very short term
Moderate	3	Prevention of the action will delay plans for infrastructure identified as needed now but not critically essential in the short term
Minor	2	Prevention of the action will delay plans for infrastructure identified as needed in the short to medium term
Insignificant	1	Prevention of the action has negligible implications for infrastructure development in the short or medium term.

* These are my suggestions based on sustainable development.

Appendix 2

Table 3 - Risk Assessment Matrix

	Likelihood				
Impact	Rare (1)	Unlikely (2)	Possible (3)	Likely (4)	Almost Certain (5)
Catastrophic (5)	5	10	15	20	25
Major (4)	4	8	12	16	20
Moderate (3)	3	6	9	12	15
Minor (2)	2	4	6	8	10
Insignificant (1)	1	2	3	4	5