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**RE - SUBMISSION REGARDING THE TRAVESTON CROSSING DAM ENVIRONMENTAL
IMPACT STATEMENT**

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Introduction

I am writing to express my concerns regarding the likely impacts of the Traveston Crossing Dam (TCD) on the freshwater turtles of the Mary River. I write as the current President of the Australian Freshwater Turtle Conservation and Research Association (AFTCRA Inc.). My wife and I have seven years of practical experience diving and surveying the freshwater turtles of the Mary River and we recently commenced a three year mark-recapture survey of the six species of freshwater turtle in the upper catchment of the Mary River from Gympie to Cambroon. To date, one of our sites in the dam 'footprint' has yielded 64% juvenile Mary River Turtles (*Elusor macrurus*), which is absolutely unheard of in any other section of the river.

I have more than ten years experience in captive husbandry and breeding of the endangered Mary River Turtle and the Southern or White-throated Snapping Turtle (*Elseya albagula*). This has been

achieved in a private capacity from our own residence. I was able to release 106 of our captive bred juvenile Mary River Turtles into the wild, in 2007, in collaboration with the EPA's Turtle Conservation Project.

This document is intended to emphasise my concerns regarding the accuracy of the information provided in the Traveston Crossing Dam Environmental Impact Statement (EPBC Reference: 2006/3150) and the inability of the Federal Minister for the Environment to make an informed decision based on the information provided within the EIS. My main concerns are regarding the inaccuracies in the information provided in this EIS for the freshwater turtles of the Mary River.

My concerns specifically focus on the two species of conservation significance, the Mary River Turtle (*Elusor macrurus*) and the Southern Snapping turtle (*Elseya albagula*) which are both classed as 'specialist' species. Both of these species are recognised as species of critical and high conservation concern respectively by the Qld EPA's 'back on track prioritisation framework for conservation management of Queensland's wildlife in 2006'.

I would also like to see all references to AFTCRA Inc. regarding proposed mitigating strategies removed from the EIS. The recommendations that were put forward by our association, at the turtle mitigation workshop held by the proponent, were largely ignored and therefore we do not agree with the proposed strategies or perceived threats/impacts as outlined within the EIS. All other references to AFTCRA regarding survey work carried out by us must be followed by the word 'Inc.' as this is the official name of the association.

I have studied the relevant chapters of the EIS including the appendices and technical reports as well as many of the documents referenced in the EIS. I have outlined my areas of concern below.

Description of the Project

“4.13.5 Assessment Required if Possible Stage 2 Proceeds

4.13.5.4 Listed Threatened Species and Communities

No EPBC listed threatened communities were identified either by database search or by field survey within the area likely to be impacted by the Project.” (TCD EIS Page 4-84)

This statement may be interpreted as misleading. Is this specifically regarding flora communities or is it regarding flora and fauna? Stage 2 will impact on exactly the same aquatic species as identified for Stage 1. If Mary River Turtles are expected to occur along the periphery of the Stage 1 impoundment, then obviously they will be impacted by additional changes to their habitat as caused by Stage 2.

Aquatic Environments

“8.4.3.1 Effects of Ponding

The main effects of ponding (the area of water behind a dam or weir wall) include:

- loss of riffle-associated macrophyte vegetation;
- increased surface area available for floating macrophytes in a low velocity environment;” (TCD EIS Page 8-16)

Fortunately some key areas of concern were actually stated in the EIS but the importance of this was grossly understated. Riffle zones and the associated vegetation are key habitat areas for Mary River turtles and Queensland Lungfish alike. Loss of this habitat reduces oxygen saturation in the water and undoubtedly becomes less habitable for Mary River turtles and unsuitable for Lungfish spawning. These riffle areas are an important component of Mary River turtle habitat and are essential to macroinvertebrates which constitute a major part of juvenile Mary River turtle diet. (EES 2007; Tucker 1999; Latta C, Unpublished data) Section 8.7.2.1 (p 8-67) of the EIS confirms that riffle habitat contains the highest recorded mean taxa richness for macroinvertebrates.

Increased surface area and low velocity environment will be favourable for floating macrophytes. The three main species of floating macrophytes in the Mary River are *Azolla* (*Azolla pinnata*) a native fern, *Salvinia* (*Salvinia mollesta*) and Water Hyacinth (*Eichhornia crassipes*). The EIS and Mackay (2003), recognises that the two declared noxious weeds, *Salvinia* and Water Hyacinth, are the dominant taxa in ponded areas within the Mary River.

During our field survey in the Mary River at Gympie in May 2007, the river was choked for more than 2.5 kilometres with Water Hyacinth and *Salvinia* (Figure 1). We had to abort the survey as the weed was impassable by canoe or skin diving. According to DNRW data from the nearest water gauging station (Fisherman's Pocket) the flow of the river at that time was 25ML/day. If the environmental flow downstream of the proposed dam wall is $\leq 25\text{ML/day}$, we can reasonably expect these rafts to be common or semi-permanent and only alleviated in times of 'unseasonal' rainfall or flooding events. Additionally, if the proposed dam is expected to be overtopping the spillway only 23% of the time (EIS, Executive summary), it is also reasonable to expect these 'rafts' to be ever present within the impoundment at least 77% of the time, unless a concerted and ongoing effort is made to manually/mechanically remove excess plant material. Section 8.6.2 (p8-41) confirms this is an existing problem in the Mary River catchment. This can only be exacerbated in a ponded situation.

Diving was undertaken below the previously mentioned hyacinth raft perimeter at the downstream end and the area beneath could best be described as a 'dead zone' (Latta C, pers. obs.). Even though the water depth was ideal, and was previously considered suitable turtle habitat, the lack of submerged macrophytes, reduced dissolved oxygen levels and increased nutrient levels left the area with little or no signs of life. The area was undesirable to most aquatic fauna and the resulting 'fish kill' can be seen in Figure 2. The fish kill was determined to be caused by rotting Hyacinth and *Salvinia* contributing to excessive quantities of detritus in the water, low dissolved oxygen levels and increased toxin levels in the water (MRCCC unpublished data).

"8.8.2.3 Impacts downstream of the inundation area.

.....The potential for fish kills is discussed above. This is a low probability event and most likely to occur in the first filling phase." (TCD EIS Page 8-91 Downloadable Version)

(Refer Fig.2) There were several references made to fish kills in the EIS. How can this problem be of 'low probability' if this problem is currently recognised as an existing impact on the fish community within the Mary River? The likelihood of increased invasive floating macrophytes by impounding the river and decreasing environmental flows downstream, and the potential for this to lead to fish kills, including species of high conservation significance like the Mary River Cod (*Maccullochella peelii mariensis*), has been grossly understated.

“8.9 Existing Environment – Freshwater Turtles**8.9.1 Turtles within the Study Area**

Five turtle species were recorded during EIS surveys. This represents the full known complement of turtle species from the Mary River.” (TCD EIS Page 8-91)

This is incorrect! There are six species known to occur in the Mary River catchment. The sixth species is the Eastern Snake-necked turtle (*Chelodina longicollis*) and was not identified during the fifteen day EIS ‘snapshot’ of data collection. This species is considered common and widespread and its preferred habitat was not sampled for the purpose of this EIS. Two specimens have been recorded in the main body of the upper catchment of the Mary River in the past seven years and they are commonly encountered crossing land in the proposed inundation zone (Latta, C. pers. obs.).

“8.9.1On the basis of the diving survey results, the Southern Snapping Turtle, Kreffts Turtle and Mary River Turtle are far more abundant and widespread than the Broad-shelled Turtle and Saw-shelled Turtle.” (TCD EIS Page 8-91)

This is by no means a true measure of abundance but rather an indication that the areas sampled, (main body and larger tributaries of the Mary River) provide ideal habitat for the two ‘river specialist’ species, the Mary River and Southern Snapping Turtles. The Krefft’s turtle is by far the most abundant species within the region and is an ecological generalist which allows it to be present in large numbers in all aquatic habitat types, including areas that have been greatly disturbed or altered by human activity. This information is reinforced in Table 8.26 (p 8-92) of the EIS but it has not given enough consideration to the ecology of the river and the ecological niches occupied by particular species.

The Krefft’s turtle population is likely to increase within the impoundment due to its ability to adapt to sudden changes within its environment. In contrast, Mary River and Southern Snapping turtle numbers are likely to decrease within the impoundment as their specialised nature makes their adaptation to change incredibly stressful and likely to predispose the animals to disease.

Impacts of impoundments on specialist species are discussed in detail in Tucker 1999. Of particular interest and importance is:

1) “Reductions in biodiversity after impoundment came from losses of river turtles that are ecological specialists (...*Elusor macrurus*, *Elseya* sp.....) while an ecological generalist (*Emydura krefftii*) persists in lacustrine habitats.”

and

2) “...life history factors shared by *Elseya* sp. and *Elusor* suggest that they are detrimentally affected by impoundments via a loss of riffle habitats and the disappearance of specific foods associated with flowing waters.”

“8.9.3.1 Mary River Turtle**Current Distribution**

The Mary River Turtle is endemic to the Mary River in SEQ. It occurs from Kenilworth (262.8 km AMTD), to the Mary River Tidal Barrage (59.3 km AMTD) (Cogger, *et al*, 1993; Cann & Legler, 1994; Cann, 1998; Flakus, 2002.). Populations are also known to occur in major tributaries

including Yabba and Tinana Creeks (Hauser *et al*, 1992; Flakus, 2002)." (TCD EIS Page 8-93)

The EIS is flawed with respect to the stated current distribution of the Mary River Turtle *Elusor macrurus*. This section also makes **no** reference to the **Ecotone Environmental Services Terrestrial Fauna and Freshwater Turtle Report (EES, 2007)** regarding the turtle's confirmed distribution for the upper catchment to include Obi Obi Creek and the confluence of Little Yabba Creek. Nor does it include current Mary River turtle distribution as discussed in Latta & Latta (2006).

"8.9.3.1 Mary River Turtle

Ecology

...Hamman *et.al* (2004) and Limpus (2007) more recently report that cloacal ventilating species can live and breed in some impoundments and EPA (2007) confirm this for the Mary River barrage and Imbil Weir." (TCD EIS Page 8-93)

This requires further investigation to confirm the accuracy of this statement. Mary River turtles may breed in the vicinity of the tidal barrage but the breeding grounds are in the upper section of that impoundment. This is due to the location of some of the 'ancestral' nesting banks and, to my knowledge, the turtles are not present in this area in the non-breeding season. There is no data to confirm the survival of the juveniles in this area either and recruitment is still considered zero or minimal.

Imbil Weir (Figure 3) is a very small impoundment and does actually provide some suitable habitat for Mary River turtles. Firstly, there is regular flow, even in times of mild drought, due to the release of environmental flow water from Borumba Dam further upstream. Secondly, it is very small, ~ 1m wall height, and water level fluctuation is minimal < 1m. This has allowed for riparian and emergent vegetation to establish around the periphery and has in some ways provided more usable (up to 6m deep) habitat. It should be noted that only one specimen (a male) has been located upstream of Imbil Weir during EES and AFTCRA inc. field surveys (EES 2007 & Latta C, pers. obs.) Additionally, these same field surveys have not yielded any potential nesting banks within this impoundment. The nearest potential nest bank is located approximately 3km's upstream of the weir wall (Burgess pers. comm.) and this is inconsistent with the known distances travelled by females during radio telemetry studies (Flakus 2002).

Anyone who states that Mary River turtles breed in these two relatively small impoundments and therefore they will breed in Traveston Crossing Dam is speculating and overly optimistic. How can a one metre weir be compared to a forty-five metre mega-dam wall? Stating that the species 'can' breed in impoundments does not mean conclusively that they do, or will! Further extensive investigation is needed.

"8.9.3.1 Mary River Turtle

"Populations within the area affected by the proposed action

The Mary River Turtle has been surveyed extensively....." (TCD EIS Page 8-94)

Prior to 2007, no research work has been undertaken on Mary River turtle populations upstream from Gympie to Moy Pocket (not including tributaries), which includes the area to be inundated by the dam. A total of fifteen days was allocated to record a basic 'cross-section' of turtles in the inundation area from Gympie to Kenilworth and included one day at Yabba Creek, Cambroon and Obi Obi Creek, as well as two days downstream of the proposed Traveston Crossing dam near Gundiah and Tiaro. This left a total of twelve days to investigate forty six kilometers. **I would personally not describe**

this as extensive surveying of the Mary River turtle by any means for such a large stretch of the river!

“A total of 179 individuals were recorded during the Ecotone turtle field surveys. Juveniles accounted for 42% of the overall number of individuals recorded compared to 32% adult females and 26% adult males.” (TCD EIS Page 8-94)

This is also incorrect! The EIS compilers have referred to the **WRONG** table in EES 2007. According to EES 2007, there were a total of 296 Mary River turtles sampled. Of which 44% were juvenile, 27% were adult female and 29% were adult male. It should also be noted that the distinction between adult and juvenile was based on visual examination only and therefore there could be no distinction made between juvenile/adult and pubescent/prepubescent.

“The failure in hatching success is well documented for the lower Mary River (Tiara and District Landcare Group 2006, 2005, 2004, 2003, 2002) and is attributed to intense predation of eggs on nesting banks by a range of introduced predators (particularly Dogs and Foxes) and native (Goannas and Water Rats). The paucity of juvenile individuals in the lower Mary River population below Gympie was confirmed by EIS survey results which indicate very low incidence of juveniles. No juveniles were recorded in the three survey reaches at or below Gympie, and this clearly supports the observation of low numbers of juveniles in the lower Mary River.” (TCD EIS Page 8-96)

This reinforces my previous comments regarding juvenile recruitment for the lower catchment but makes **no mention of the breeding success and high recruitment within the proposed inundation area!**

“It is concluded that this severe egg predation has prevented the recovery of the species in the lower Mary River, and that continued suppression of recruitment to the population resulting from predation of eggs is now the critical threat to the persistence of the species, particularly within the lower Mary and potentially throughout the catchment.” (TCD EIS Page 8-96)

Firstly, why is the EIS only referring to the lower catchment when the dam is to be placed in the upper catchment which provides ideal habitat and clearly demonstrates high breeding success for Mary River turtle and Southern snapping turtle? Habitat loss and habitat degradation are currently recognised as the key threatening factors for freshwater turtles, world wide! (Klemens 2004). Interestingly, this did not even get a mention in the EIS. Klemmens states: –

“The reasons for the precipitous decline in so many riverine species are linked to human activity in almost every case. The problems may result directly from exploitation by humans, indirectly from habitat modification, or from a combination of both.”

If nest predation is the only real threat attributed to this failure of hatchling success and recruitment (as suggested in this EIS), one could reasonably expect to find juveniles from 1 to 6 years of age in the lower section of the river, after such concerted effort has been made by Tiara and District Landcare to protect nests. This is not the case! Zero juveniles have been identified in the lower section of the river in the past 3 years, during our preliminary survey efforts (Latta C, pers.obs.).

In contrast, this section of the EIS fails to recognise the breeding success and high recruitment that is currently occurring in the upper catchment, particularly in the inundation area. This should have been discussed in great detail and effort should have been made to reference documents that support these

findings such as EES 2007. EES 2007 identified that juvenile recruitment was at its highest for the entire catchment between the confluence of Belli Creek and approximately 2.5 kilometres downstream of Traveston Crossing.

Exhaustive, long-term investigation is required to understand the threats to juveniles within the lower catchment with regard to survivorship and recruitment. There could be dire consequences for this species in the upper catchment if the conclusions realised in these future studies indicate that recruitment is failing due to food availability, lack of suitable habitat and low dissolved oxygen levels! It should be considered imperative that these answers are conclusively provided before any major alterations are made to existing successful habitat.

Matters of National Environmental Significance (MNES)

“9.4.3 Listed Threatened Aquatic Fauna and Freshwater Turtles

There are three species of fish and one reptile that are protected under the EPBC Act that are listed as possibly occurring in the Mary catchment. These species are:

- Mary River cod (*Maccullochella peelii mariensis*) - endangered;
- Lungfish (*Neoceratodus forsteri*) - vulnerable;
- Oxleyan pygmy perch (*Nannoperca oxleyana*) – endangered; and
- Mary River Turtle (*Elusor macrurus*) – endangered.” (TCD EIS Page 9-22)

This statement is misleading. The word ‘possibly’ **must** be removed from the text!

“9.5.3.5 Mary River Turtle (Tortoise) (*Elusor macrurus*)

Current Distribution” (TCD EIS Page 9-49)

All references to the word ‘tortoise’ are misleading and from outdated texts. All Australian Chelids are turtles, there are no tortoises naturally occurring in Australia. There are many distinctions between the two groups of which are too complicated to explain for the purpose of this submission.

As mentioned previously, this paragraph needs to include Obi Obi Creek and the confluence of Little Yabba Creek, near Cambroon (EES 2007, Latta & Latta 2006).

“Ecology

..... The species can occur in depths ranging from less than a metre to more than 5 m (S. Flakus pers. comm. 2003) and EIS studies showed it tended to prefer deeper water.” (TCD EIS Page 9-49)

This could be misinterpreted...deeper water being what, twenty four metres? Specifically, most individuals were located at depths between <1m and 6 metres and this **is** considered optimal. (EES 2007; Latta C, pers. obs.)

“The projected age at maturity of the Mary River Turtle is around 25 years for females and 30 years for males (Tucker *et al.*, 1998; Tucker 2000).” (TCD EIS Page 9-49)

Further investigation is required to accurately determine age at sexual maturity. Regardless, late maturation poses many problems for species management with regards to conservation techniques such as captive breeding. Klemens 2004 explains –

“Few existing conservation programs have been operating sufficiently long, or have been monitored adequately, to make definitive conclusions about which combination of [conservation] techniques is most effective. Among the problems of evaluating techniques is the 10-30 years large river turtles may require to mature. Hence, a program must operate at least that long to see even preliminary results.”

This suggests to me that this kind of conservation program should be initiated 10-30 years before the results are required to conclusively understand the efficacy and/or success of the program. After this time it might be appropriate to make a decision that adversely affects the majority of the known habitat for a species, but not before. It would be catastrophic if the program fails and the habitat has already been irreversibly destroyed.

Klemens also makes reference to a combination of in-situ (habitat protection) and ex-situ (e.g. in a hatchery or zoo) conservation techniques being ideal in extreme situations.

“They dig nests in sparsely vegetated sandy banks, between 1.95 m and 51 m away from the water's edge and on both steep and shallow slopes, either protected or unprotected by vegetation.... Natural incubation periods are around 50 days (van Kampen *et al.*, 2003). Hatchlings emerge throughout December and until February.” (TCD EIS Page 9-49)

Further investigation is required to understand nest site selection by females. Fluctuating water levels within the impoundment will have severe impacts on nest site selection and nest survival. Females may lay 51m from the water in times of expected high rainfall so the nest is closer to the water (but not drowned) at the time of hatching. Breeding season and incubation period should be directly cross-referenced to times of heavy rainfall and proposed ‘draw down’ periods within the impoundment. It will be increasingly difficult for females to select a suitable nest site that will still be in a safe position at the time of hatching, 50-60 days later, if the dam is to proceed. Neonates/juveniles are most vulnerable to predation from the time they emerge from the nest to the time they find refuge within the water. If juveniles are expected to traverse banks >50 m to the water, this will increase the chances of predation.

“Populations within the study area affected by the proposed action

The Mary River Turtle has been surveyed extensively within and adjacent to the inundation area by Ecotone, the Environmental Protection Agency (EPA) Turtle Group and the Australian Freshwater Turtle Conservation and Research Association (AFTCRA Inc.).” (TCD EIS Page 9-50)

The word ‘extensively’ **should** be replaced with the word ‘preliminarily’.

“The reach of the Mary River where the highest densities of Mary River Turtles were recorded is the stretch of river between the Vic Olson Bridge near Carter’s Ridge, and Traveston Crossing.” (TCD EIS Page 9-50)

Why is this? EES 2007 concludes -

“The Mary River within the proposed inundation area, together with the contiguous reach below Traveston Crossing contains substantially greater habitat values specific to Mary River Turtle than all other localities surveyed, based on the abundance of individuals in this area. The reaches downstream from Vic Olsen Bridge (within the inundation area) to approximately 5 km’s past

Traveston Crossing [downstream] not only yielded the highest densities of individuals but contained a mosaic of habitat structure not replicated anywhere else within the survey area making this locality the most valuable habitat area for the species.”

“A total of 179 individuals were recorded during the Ecotone turtle field surveys. Juveniles accounted for 42% of the overall number of individuals recorded compared to 32% adult females and 26% adult males.” (TCD EIS Page 9-50)

This is the same incorrect information that was presented in Chapter 8, under the same heading. Please correct accordingly. Once again, the **WRONG** table has been referred to!

“Current pressures on the species

The Mary River Turtle is susceptible to threatening processes due to its restricted distribution and low population size. The key pressure on the Mary River Turtle is the illegal taking of eggs and predation of nests by foxes, goannas and pigs, as well as trampling of nests by stock and people. Flooding also causes damage to nests, leading to the loss of eggs. Other pressures arise from a decline in water quality in the streams it inhabits as well as clearing and heavy grazing on parts of the Mary River catchment. On these reaches of the river, the turtle is vulnerable to the effects of increased runoff, siltation and pollution.” (TCD EIS Pages 9-50 & 9-51)

The EIS should have more emphasis on habitat loss and degradation and less emphasis on illegal taking of eggs and nest predation. Understating the threats to the Mary River turtle is nothing short of scandalous. I expect that the egg ‘poaching’ activities have all but ceased with current environmental protection legislature and egg predation does not appear to be a major problem in the upper catchment (Latta C, pers. obs). In all of our preliminary surveys and the EES survey, there have been no predated or trampled nests detected within the inundation area, either on known or potential nest banks. These surveys were always conducted during Mary River turtle or Southern Snapping turtle breeding seasons.

“Removal of riparian trees prevents recruitment of logs into the instream environment. Emergent logs and log jams may be important elements of the Mary River turtle’s microhabitat.” (TCD EIS Page 9-51)

The words ‘**may be**’ should be replaced with the word ‘**are**’! This is supported by EES 2007. This is a critical element of the habitat that would be lost during the construction and operation of a large impoundment. Emergent logs would most likely be completely submerged or ‘high and dry’ with the water level fluctuations associated with such large impoundments.

**“Table 9.18 Mary River Turtle Page 9-80
Will the proposed works...Mary River turtle (Endangered)**

Will the proposed works...	Mary River turtle (Endangered)
1. lead to a long-term decrease in the size of a population?	The population of the Mary River turtle is poorly known. Results of field work undertaken for the Project indicates that the population within the footprint could range between 900 and 3500, however this estimate is very preliminary. From the field surveys, it was found that the reach of the Mary River to be inundated by the Project between Moy Pocket and below Traveston Crossing had high densities of individuals, including juveniles. The Mary River turtle occurs predominantly in the Mary River and in some reaches of larger tributaries, such as Tinana and Yabba Creek. It prefers habitat that provides protection from predation such in deep holes within the river, around logs and macrophyte beds. It is known to live and breed in water storages so is expected to do so in the dam. Major recognised threats to the species relate to egg predation or damage in nesting banks. Mitigation strategies have been designed specifically to address this issue. It is not expected that the Project will lead to a long term decrease in the size of the population.
2. reduce the area of occupancy of the species?	The Project will not reduce the area occupied by the Mary River turtle. It will continue to be found in the Mary River catchment following the construction of the dam and is likely to live on the periphery of the dam, particularly around tributary entry points.
3. fragment an existing population into two or more populations?	Inundation and the barrier effect caused by the dam will fragment the area occupied by the Mary River turtle. The inclusion of a fish lock, specific turtle ramp 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.
4. adversely affect habitat critical to the survival of a species?	Good quality foraging and nesting habitat of the Mary River turtle has been located within the inundation area of the dam. Other areas exist within the catchment. It is unknown if the survey results suggested less predation of eggs in this reach or better quality habitat. Foraging habitat within the dam is expected to be suitable. Critical nesting banks will be relocated and placed in suitable locations, including on refuge islands, within the dam area.
5. disrupt the breeding cycle of a population?	The loss of sandy beaches and banks used by the species for nesting will have an impact on the breeding cycle. This impact will be mitigated by the relocation of beaches and protection of nesting sites.
6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	The inundation area of the dam will affect areas of Mary River turtle habitat and nesting sites. The nesting sites and habitat within the inundation area of the dam support a large population of turtles and filling of the dam will reduce the availability of habitat to the species. Mitigation measures are directed at this issue and are expected to be successful.
7. result in invasive species that are harmful to a species becoming established in the species' habitat?	The Project will not result in the introduction of invasive species to the Mary River catchment. Consequently, invasive species will not reduce the habitat available to the Mary River Turtle.
8. introduce disease that may cause the species to decline?	The Project will not result in the introduction of a disease to the Mary River catchment. Consequently, diseases will not lead to a decline in the species.
9. interfere with the recovery of the species?	Through the fencing of nesting sites and management of predation on eggs by foxes, goannas and pigs, the recovery of the species will be assisted. The dam will also generate additional habitat on the periphery of the dam, particularly around tributary entry points, which will further add to the habitat available to the species.

The answer to all of the questions “Will the proposed works” is most certainly, YES

The construction of a mega-dam on the Mary River will negatively impact viable populations of Mary River turtles both upstream and downstream of the dam wall.

The EPBC Act 1999 clearly states the criteria for Matters of National Environmental Significance and sadly, all nine are relevant to the Mary River turtle.

The dam will fragment populations as well as decrease food availability due to the loss of riparian zones through clearing and flooding, as well as the loss of macrophytes from siltation and turbidity.

Water depth greater than six metres is unlikely to be utilised by any turtle species in the Mary River.

Decreased flows below the dam wall and in the dam footprint will result in a reduced area of occupancy of the species. Juvenile Mary River turtles have been proven to aggregate near riffle zones and forage for food. The loss of riffle zones directly reduces ideal habitat for juvenile Mary River turtles as well as Southern snapping turtles.

The dam wall will fragment populations upstream from those below. An untested ‘turtle way’ constructed on the right side, parallel with the spillway will not guarantee safe passage for turtles. Nor will it guarantee that they will use it. Firstly, they will have to swim across depths up to twenty four metres to get to the turtleway entrance. The velocity of the water in the turtleway is going to be too strong with the proposed 1:4 gradient suggested. Having the turtleway entering the spillway will more than likely result in traumatic injuries and losses through fatality and impaired reproductive activity.

As far as disease is concerned, the EIS states -

“The Project will not result in the introduction of a disease to the Mary River catchment. Consequently, diseases will not lead to a decline in the species.” (TCD EIS Table 9.18 Page 9-80)

The project may not ‘introduce’ disease into the population but in the case of extreme stress and sub-standard living conditions, any species eventually becomes immunocompromised. This suppression of the animal’s immune system can lead to disease by organisms that aren’t typically pathogenic. Limpus *et al* 2006 found a ‘shell-rot’ outbreak in a section of Fairbairn Dam –

“The majority of the freshwater turtles captured in Lake Maraboon were of very good body condition with the exception of turtles captured in Site 7. Of the turtles captured in Site 7, 21.6% had shell rot or evidence of healed shell rot. This disease was not noticeable in the other sites of Lake Maraboon. This disease has been recorded at high incidence with freshwater turtle populations at other impoundments (Tucker, 1999; Tucker et al., 2002). This disease is thought to be bacteria related and its causes and impacts on freshwater turtles have yet to be determined.”

Shell-rot is caused by one or more anaerobic bacterium that can consume flesh and bone. These bacteria require an anoxic environment and naturally occur in large numbers in places like the hypolimnion of a lake. In times of windy weather, the hypolimnion can be mixed with the warmer epilimnion, bringing these bacteria to the surface layer with other suspended sediments and dangerous compounds like hydrogen sulphide. This mixing usually occurs in the cooler months as the air temperatures cool the epilimnion and this process is known as turn-over. Another unfortunate aspect is that turtles are poikilotherms/ectotherms which means their body temperatures are dependant on environmental temperatures, hence basking behaviour to increase body temperature. When reptiles acquire a disease, their ability to fight the disease is further compromised by cooler temperatures. This could explain why there are shell-rot outbreaks in impoundments. Shell-rot can eventually lead to other complications including peritonitis, septicaemia and death (Latta, C. unpublished data)

For further information on turn-over see (Fesling and Glencross 2004)

As for ‘introduction’ of disease, constructing a water grid that transports water from water storage area (A) to water storage area (B) may carry water-borne diseases into areas that these pathogens are not currently present, potentially introducing disease into a region or the project area. One example might

be Chitrid Fungus which causes *Chitridiomycosis* in frogs and had been considered responsible for declines and even extinctions, in Australia and worldwide!

As evidenced previously in this document there are innumerable references concluding the negative impacts of impoundments on freshwater turtles. Tucker 1999 states –

“Over 13161 specimens were marked and examined at 28 reference sites and 26 water storages ranging in capacity from 50 to 1301000 ML.”

And concluded that

“Large impoundments had a greater impact on turtle biodiversity than small impoundments but even small impoundments had a detectable decline in biodiversity.....Water impoundments created loss of microhabitats used by turtles. Fluctuating water levels in water storages prevented the establishment of aquatic plants at the water margin. Loss of aquatic macrophytes resulted in decreased food and shelter for juvenile turtles. Riparian zones were also affected by a loss of trees that provided windfall fruits and whose root structures provide shelter.....Water impoundments imposed changes in the aquatic habitat that were reflected in turtle dietary ecology. In impoundments, aquatic macrophytes disappeared and windfall fruits became limited. Some of the aquatic invertebrates that are important prey for juvenile turtles disappeared. Dietary changes associated with impoundments were documented in herbivorous, carnivorous and omnivorous species, which suggests that the food webs of turtles are fundamentally different in lakes than in rivers.”

It appears to me incredibly optimistic to assume that this mega-dam will not have significant detrimental effects, based on these conclusions. Thomson *et al* 2006b also states –

“The Mary River and Southern Snapping Turtles are river turtles and like many species of river turtles rely on a suite of river characteristics such as riffle zones, rapids and flowing rivers that are not impounded. They also rely on the constant remodelling of the river banks that take place in seasonal fluctuations on the river. Both species are omnivores but at different stages of life the percentage of plant and animal food changes. As adults they largely eat vegetation and fruit. Hence, it is important that their habitat has healthy growth of riparian vegetation that produces fruits they can eat, for example native figs.”

It will be incredibly difficult to mitigate for all of these MNES criteria. Many of the suggested mitigation strategies will be prone to failure due to the ecological requirements outlined previously, especially due to sudden water level fluctuations.

“9.7.2 MNES Aquatic Fauna Mitigation Measures

9.7.2.1 Freshwater Species Conservation Centre

QWI proposes the establishment of a Freshwater Species Research Centre to be constructed by QWI and to be operated by the University of Queensland for an initial period of ten years.” (TCD EIS Pages 9-88)

As mentioned previously, ten years is not even long enough to obtain conclusive preliminary results.

“9.7.2.3 Mary River Turtle

The following mitigation strategies are recommended for the Mary River Turtle:

“• retention of vegetation (i.e. areas within 1.5 m elevation of FSL in riparian areas);” (TCD EIS Page 9-92)

As would be expected for an impoundment for human requirements, the huge, sudden water level fluctuations combined with seasonal losses through evaporation will not permit the establishment of riparian or emergent vegetation.

“• when this vegetation dies, it will allowed to stand and offer habitat;” (TCD EIS Page 9-92)

Unless this vegetation is established and aged it will not provide the same habitat values as existing riparian habitat which provides food and shelter etc.

“• re-vegetating targeted fringing margins of the dam, particularly riparian zones upstream from FSL, with species native to the area that are tolerant of periodic inundation, such as *Melaleuca quinquenervia*, *Waterhousea*;” (TCD EIS Page 9-92)

This is extremely optimistic and likely to fail as the species that tolerate periodic inundation do not usually tolerate complete drying out of the root systems. If Traveston Dam behaves like Wivenhoe, Somerset and Paradise, these trees will most likely die in the first dry season.

Why does any habitat have to be altered upstream of Full Supply Level?

“• artificially introducing snag habitat to the impoundment, drawn initially from trees removed prior to inundation;” (TCD EIS Page 9-92)

Trees that are cleared from the inundation area are likely to be fresh/green and contain compounds that will leech out of the timber into the water. Has there been any research into ‘safe’ species given that the number of trees would be far greater than can ever be expected in a natural flood situation. I would expect the concentrations of any compound to be far greater, per litre, than under natural circumstances.

“• introducing artificial surfaces that may act as suitable shelter and basking habitat (this may include rocks or concrete pipes);” (TCD EIS Page 9-92)

If large quantities of concrete are used the water chemistry will have to be monitored very closely. Concrete typically increases pH and water hardness.

“• create turtle habitat and nesting sites on islands formed by the filling of the dam and near tributary entry points;” (TCD EIS Page 9-92)

As mentioned previously, there is no data that concludes why particular nest sites are chosen. What we do know is that highly successful nest banks are located adjacent to riffle zones. If there aren’t any riffles near the islands the females are not likely to use these banks. Aspect, temperature, substrate composition etc all need to be investigated to determine to likely success of this initiative, before the habitat is irreversibly destroyed.

“• control access to nesting sites by grazing and feral animals (such as cattle, foxes, dogs) to reduce the damage or taking of turtle eggs;” (TCD EIS Page 9-92)

There has been no proof of success at ‘Paradise Dam’ as far as feral pest control initiatives are concerned.

“• regular monitoring of the efficacy of the fish lock and turtle ramp and if they are not achieving a target success rate, adjust operation, if still not achieving the target, instigate catch and carry techniques or use release of hatchery bred stock;” (TCD EIS Page 9-92)

More specific detail should be made available in the EIS regarding this ‘world-first’ device. The success of this strategy should be pivotal to the approval or disapproval of this project. Put another way, ‘world first’ simply means that this has never been tested and there is no data to conclude the likelihood of success. This appears to be a desperate measure to convince the general public and see the project approved.

The current design of the turtle ramp is highly likely to fail with my current understanding of Mary River turtle ecology. I cannot imagine an elusive and secretive species (that prefers depths of up to 6m) swimming in open water up to twenty four metres deep along a sheer rock face to enter a ramp that is close to the noisy mechanism of the spillway and fish lift! Mary River turtles are not likely to utilise the sub-optimal habitat that is provided leading into the spillway/turtle ramp area as it would be impossible to provide the macrophyte cover and log entanglements that afford appropriate shelter during natural upstream and downstream movements.

The Species Management Plan for *Elseya albagula* included construction and testing of a suitable turtle way. This should have been constructed and trialled at Paradise Dam as per recommendation: ‘Details of recommended action C.3’ **Part A. Management plan for the conservation of Elseya sp. [Burnett River]: Burnett River Catchment. Pilot phase 2005 to 2010.** (Hamman *et.al*, 2004). Because this has not happened as recommended, we will be depending on an untested measure to ensure turtle passage up and downstream. The mitigation strategy for an endangered species, the Mary River turtle, which is regarded as an animal of extremely high National Environmental Significance will be used as a ‘lab rat’ to test this untrials ‘turtleway’.

What is the target success rate?

“Catch and carry” is a non-sensical notion. Mary River turtles do not enter traps and therefore are not likely to enter mechanised devices to be trapped and carried elsewhere. Diving for Mary River turtles requires great skill and optimal visibility of at least one metre. I do not believe the visibility will ever be greater than one metre upstream or downstream of the impoundment as the increased turbidity, increased plant material, increased siltation and increased depth will all contribute to decreased visibility. ‘Muddling’ may have limited success but greater staff numbers would be required.

‘Hatchery bred’ stock, is this actually eggs incubated from wild caught females? True captive breeding would not be possible without harvesting juveniles or adults from the wild first. How is the viability of the brood stock going to be determined and how can anyone be sure that maladaptation or stress related illness will not add to the mortality rates experienced by this species? There is nothing in the EIS that explains to me the construction materials and ‘turtle friendly’ design principles adopted for this ramp. I have to assume that the materials will be concrete or stone with a solid, unforgiving footing that may lead to serious traumatic injury, infection or death. The proposed gradient is too steep for turtles to traverse safely and comfortably.

It is paramount that all details be provided before any decision can be reached regarding the prospect of success and impact amelioration.

“• enhance captive breeding knowledge and capacity through support of the Freshwater Species Conservation Centre;” (TCD EIS Page 9-92)

This Freshwater Species Conservation Centre is a nice concept for the general public and media but all of the objectives relating to research outcomes should be thoroughly investigated before the habitat is irreversibly destroyed! These outcomes should be concluded even prior to this project being approved. Failure to do so could have dire consequences for all the listed freshwater MNES species. Experimental design and methodology can't even be determined with our current level of understanding of the ecology of these species. Population Viability Analysis and Population Habitat Viability Assessment should have been a priority for all MNES species involved in this project and are considered world 'best-practice' assessment tools in cases like this.

'Acoustic or electrical barriers', as mentioned in the Executive Summary, are another attempt to mitigate a situation that is little understood. Trials should be conducted and concluded before these ideas are even considered as a mitigatory measure for a project of this magnitude.

The best place for future generations to see these incredible creatures is in their natural, unmodified habitat, not in a '\$35m museum'.

Conclusion

My key areas of apprehension relate to stated distribution, habitat requirements, abundance, threatening factors and the perceived impacts of the dam that are often concluded from speculation and are very misleading in the EIS. Also, the ability of the strategies suggested to minimise impacts on the turtles are predominantly overestimated and extremely optimistic. Suggesting untested and untried strategies that could possibly fail will not mitigate any of the expected impacts that would face the turtles.

Additionally, there are numerous items of valuable literature that offer a strong case to support the overwhelming number of negative impacts impoundments have on freshwater turtles. These appear to have been ignored or accidentally omitted from the EIS assessment process. It is obvious, by the quality of information provided in the EIS that the conclusions made are primarily derived from 'snapshot' sampling and does not allow for an informed decision by the Federal Minister for the Environment. Therefore the Minister is urged to invoke the Precautionary Principle until further information is provided.

The EIS doesn't recognise or forgets to mention the significance of the largest proportion of juveniles to adults and the highest level of recruitment is within the proposed inundation area and that the proposed impoundment area contains the '**most valuable**' Mary River Turtle habitat.

Lastly, I would appreciate if all references to AFTCRA Inc. regarding the mitigating strategies within the EIS be removed as consultation with our association was conducted but all the suggestions made by our representative regarding the mitigating strategies for turtles were largely ignored.

Approval for construction of this project should only be given if –

- 1) All available data for and against water impoundments are thoroughly assessed and all likely impacts are realistically considered, weighted and stated within the EIS.
- 2) Areas requiring further investigation have been examined and at the very least preliminary results are available for assessment and consideration.
- 3) Research has been conclusively conducted to determine the success or failure of all of the proposed mitigating strategies.
- 4) The EIS can demonstrate an understanding of the ‘ecological’ effects that the proposal will have on a holistic level.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Craig Latta". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Craig Latta
President – AFTCRA Inc.

Figures



**Figure 1. Upstream end of the 2.5 km Hyacinth and Salvinia infestation.
Note: Hyacinth mat in background.**



Figure 2. Fish kill on Mary River at Widgee Crossing looking downstream, August 2007.



Figure 3. Imbil Weir – No comparison should be made between proposed 45 metre mega-dam wall & Imbil Weir

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