AUSTRALIAN
CONSERVATION
FOUNDATION

5 April, 2007

The Secretary
Senate Rural and Regional Affairs and Transport
Parliament House
Canberra ACT 2600

Dear Senators,

INQUIRY INTO ADDITIONAL WATER SUPPLIES FOR SOUTH EAST QUEENSLAND – TRAVESTON CROSSING DAM

Please accept this submission in response to the Committee's Inquiry into the Traveston Crossing Dam and related water supply issues in South East Queensland.

The fact that more than 80 per cent of Australians are relying on a secure and sustainable urban water supply already makes the subject of this inquiry of national importance.

In the case of the proposed Traveston Crossing Dam, on the Mary River in Queensland, the national significance is also clear due to the responsibility of the Commonwealth Government to protect internationally significant, RAMSAR listed, wetlands and species listed as 'endangered' and 'vulnerable' under the *Environment Protection and Biodiversity Conservation Act.*

We would like the opportunity to discuss this matter further with the Committee by taking part in the public hearing process arranged for the Inquiry. For further information about this submission, please contact ACF on (03) 9345 1134 or by email k.noble@acfonline.org.au

Yours sincerely

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Australian Conservation Foundation

5 April 2007

Submission to the Senate Rural and Regional Affairs and Transport Committee Inquiry into Additional Water Supplies for South East Queensland: Traveston Crossing Dam

Introduction

The Australian Conservation Foundation (ACF) is committed to inspiring people to achieve a healthy environment for all Australians. For 40 years we have been a strong voice for the environment, promoting solutions through research, consultation, education and partnerships. We work with the community, business and government to protect, restore and sustain our environment. In addition to our efforts to protect Australia's natural environment, we have a dedicated focus of sustainable solutions for Australia's cities.

This submission addresses the terms of reference for the Inquiry by focussing on the environmental impacts of the Traveston Crossing Dam and the merits of the water supply options available in South East Queensland. ACF is currently conducting research into the range of solutions needed to deliver a sustainable and secure water supply for Australia's cities. We will be able to provide this research to the committee as soon as it is available.

Our comments are arranged in two parts:

1. The examination of options for additional water supplies for South East Queensland;

2. The Environmental, Social and Economic impacts of the Proposed Traveston Crossing Dam on the Mary River, Queensland.

The current drought has given us all a timely wake-up call - not only to meet our water needs today, but to start planning for how to meet our future water needs as our climate continues to change. Our dams are drying out – not only because we are getting less rain, but rainfall patterns are changing, and the rain we do get is soaking into the parched earth, rather than flowing into our dams.

Summary

For the first time in 100 years we need to *rethink* our urban water infrastructure. With increasingly less water available, we need to *reduce* the amount of water we waste, capture rainwater more effectively and *recycle* water where ever we can. Instead of building new dams, we could build a virtual dam with rainwater tanks in the gardens of our homes – using our rooftops to catch the rain that otherwise drains out to sea.

It will secure our water supply more cheaply than a dam – with none of the social and environmental damage of a new dam.

In this submission ACF outlines the merits of a number of options to address the sustainability and security of urban water supply in Australia. These include:

1: Reduce Urban Water Demand
2: Rainwater Tank Infrastructure
3: Recycle Urban Water
4: Urban – Rural Water Trading
5: Integrated Water Planning
6: Crisis Desalination (< 80 ML/day powered by renewables)
7. Why Dams are no longer a Solution

ACF is concerned that the proposed Traveston Crossing dam:

- Will destroy forever species listed as 'threatened' and 'endangered' under the Environment Protection and Biodiversity Conservation Act including the Mary River Turtle, the Mary River Cod, and the Australian (Queensland) Lungfish;

- Will impact on wetlands that are internationally recognised for their conservation values under the Ramsar treaty;

- Will not solve the water crisis in South East Queensland because if the dam fills up, it will be shallow with a large surface area and this will maximise evaporation losses;

- Will be filled with aquatic weeds that will be expensive to control;

- Will flood prime agricultural land causing significant social and economic disruption.

The Save the Mary River Co-ordinating Group and the Mary River Council of Mayors have conducted rigorous and detailed research into the environmental, economic and social impact of the proposed dam. Many of Australia's leading experts in fields of marine and freshwater ecology, social impact assessment, and engineering have contributed their knowledge in separate submissions and in the research presented by the Save the Mary River Co-ordination Group and we highly commend this research.

In addition to the concerns outlined above, we are concerned that the Queensland Government is in effect playing the role of both project proponent and project assessor.

We believe these arrangements are inadequate in their transparency and governance and we urge the Senate Committee to ensure the powers under the Environment Protection and Biodiversity Conservation Act are exercised by the Commonwealth.

Part 1: Options for additional water supplies for South East Queensland

Rethinking the value of water

The way we think about water, and the way we use it, does not reflect how precious it really is. At the most basic level we know that we literally rely on water for life. Without water there are no cities and no economic activity because every social and economic benefit relies on water.

Regardless of which technology is used to deliver it, our supply of water depends on the environment. We have learnt the hard way that if we take too much water out of rivers, we disrupt their balance. This happened in the summer of 1991/92 when low environmental flows led to toxic algal blooms over a distance of 1000 km of the Darling River. The impact was so severe that no one could drink the water or use it for agriculture and a formal state of emergency was proclaimed[1]. We are also learning the hard way that if we put too many greenhouse gas emissions into the atmosphere our rainfall patterns will change and temperatures will rise due to climate change. This will mean our dams will not fill up in the way they used to because of changing rainfall patterns and because the rain that does fall will soak into the parched earth of our water catchments rather than flow into the dam.

Despite the fact that water is so precious to us, it is very cheap in economic terms. This is because the external costs to the environment of our water infrastructure are not included in the calculations. If we are really going to rethink urban water, we need to include the environmental costs of greenhouse gas emissions from pumping water across cities from dams, the costs of greenhouse gas emissions from desalination and recycling plants, and the costs to future generations of degraded rivers and climate change.

Rethinking the way we use water

The way we waste water in our cities is a reflection of how much we take an abundant and cheap water supply for granted. Community concern about urban water shortages is very high, and water restrictions and education programs have encouraged water saving behaviour, delivering average household water savings of 14 per cent between 2001 – 2005[2]. This not only shows the level of public commitment to saving water, it also shows that we were being very wasteful with water in the first place. This is partly because decisions about urban planning and water infrastructure have locked us into wasteful water practices even in times of drought.

We are familiar with the slogan 'Reduce, Reuse, Recycle' when it is applied to materials waste. But our traditional water infrastructure only provides us with one use of water before it is disposed of at sea. In Australian cities, we are fortunate that our drinking water is the best quality in the world - but the fact is that we only use a tiny percentage of

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[1] Breckwoldt,R et al. (2004) *The Darling*, pub. Murray Darling Basin Commission, p.314.
[2] Australian Bureau of Statistics (2006) 4610.0 *Water Account Australia 2004-05* Table 7.8

it for drinking. The rest we waste on watering the lawn, flushing the toilet, washing roads, and in industrial processes. If all of these uses of precious drinking water were replaced by recycled water or rain-tank water, there would be sufficient water in cities which are now experiencing drought.

Rethinking water supply in the face of climate change

We need to recognise that the traditional approach to water supply and management will not deliver urban water security in the face of climate change. This is because:

1. Climate change will change the patterns of rainfall;

2. Rainfall is soaking into parched earth rather than flowing into dam catchments; and

3. We are not capturing the rain that continues to fall over the suburbs along the eastern coast of Australia.

While our dams continue to empty, the rain that does fall is lost as stormwater – and even contributes to coastal and urban stream pollution. If we had a network of rainwater tanks across our coastal cities we would capture the rain where it fell and reduce the amount of water we need to take from dams. Rainwater tanks can also reduce the amount of water lost to evaporation, the amount of energy needed to pump water across cities, and the amount of stormwater that pollutes our urban streams and bays.

Many parts of our hot, dry, continent will be getting hotter and drier in the decades ahead. The National Climate Centre has reported that the three months from August to October 2006 were easily the hottest on record for Australia[3]. In 2006, Australia is experiencing drought in the majority of our cities. The near total failure of the spring rains that much of South East Australia relies on has led to a lot of pain for our rural communities, and urgent debate about urban water shortages.

Urban water shortages are not just the result of drought. They are the result of a lack of planning and a failure to rethink water security in the context of climate change. Each city in Australia faces a different climate change future and for that reason the solutions will need to vary from city to city. Perth and Adelaide require different solutions to Melbourne, Sydney or Brisbane. Coastal cities and towns require a different response to inland cities where there may be less rainfall but more access to rural water trading.

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[3] National Climate Centre, *Statement on Drought*, 3 November 2006 www.bom.gov.au

Sustainability Framework for Urban Water Solutions

We recommend an integrated and holistic approach to infrastructure planning which considers environmental, social and economic goals and the use of the precautionary principle where there is risk of irreversible harm to the environment and the science is uncertain.

An environmentally sustainable water supply has to take both water and greenhouse gas emissions into account as well as other environmental concerns such as river health, species loss and water quality. We need to recognise that there is a limit to the amount of water that can be extracted from a river system before we risk cutting off our own supply of healthy water. This limit is the carrying capacity of the river catchment. Similarly we recognise there is a limit to the amount of greenhouse gas emissions we can put into the atmosphere. This means we cannot choose options that will continue to make climate change worse – this is particularly self defeating because the result of more greenhouse gas emissions will be less water for our cities. We need to address long term water security based on sustainability rather than address the short term symptoms of our urban water crisis. The range of environmental issues should be formally considered as part of a transparent and accountable EIS process with genuine opportunity for public comment.

The options we consider should also address public perceptions of risk, and land use changes in a way that is appropriate to our democracy. Locking out public process by declaring infrastructure 'critical' under special legislation will not lead to long term public confidence in the management of our urban water supply. If we have to make tough decisions as a community, a good public process is critical to building confidence in the decision and commitment to support it.

Lastly we need to apply the economic filter to find the most cost effective way to deliver these public and environmental goods that underwrite our continued prosperity. Because the cost of water infrastructure is dominated by long distance pipes and pumping costs there is great potential for a number of win-win solutions. This is because distributed infrastructure such as rainwater tanks and neighbourhood scale recycling projects reduce pipe and pumping costs and greenhouse gas emissions at the same time.

The calculation of operating costs for infrastructure that requires a large amount of energy should include the cost of carbon credits for the trading of greenhouse gas emissions in an international scheme[4] and recognition of the costs of climate impacts if we choose energy guzzling infrastructure.

This sustainability framework is a broad guide to water infrastructure priorities. In planning for climate change we need to ensure that the most sustainable options are

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[4] The feasibility study for powering the Kurnell desalination plant in Sydney from renewable energy has assumed $ 37.18 per tonne CO_2 while the Tugan desalination plant has not included renewable energy at this stage.

delivered before more drastic options come into play. Of course, the most appropriate response will have to depend on the impacts on a particular city's water supply.

The test of sound leadership on urban water is whether governments can implement a comprehensive program of demand reduction and recycling and avoid the drastic knee-jerk responses of unnecessary desalination plants and dams.

Solution 1: Reduce Urban Water Demand

Australians are using a lot more water than we need for a healthy lifestyle.
On average each person uses 282 L of water each day, and even more in some states such as Queensland where each person used an average of 340 L each day when water restrictions are not in place.[5] Compared to water use in many countries, such as the UK where average water use is only 151 L per person per day[6], we are using an awful lot of water.

While wasteful behaviour is one of the factors in our over consumption of water, the systemic waste that is built into our water supply system, our very inefficient buildings and the planning of our suburbs also needs to be addressed.

Less than 10 per cent of household water is taken for 'potable uses' such as drinking and food preparation. In fact, most water is used outdoors (30-50 percent) and a lot of it is used to flush the toilet (14 -19 %), to wash clothes (10%) and the rest is used in the bathroom (20%). This means there is huge potential to save literally billions of litres of water by designing smarter plumbing for our houses that replaces drinking water with water from rainwater tanks.

One of the few positive things about wasting so much water in our cities is that because of this, there is an abundance of wasted water that can be returned to the water balance sheet with a few simple measures. Not only is reducing water demand the most cost effective way of freeing up our water supply, it also reduces greenhouse gas emissions by reducing the amount of water than needs to be pumped (using energy) across our cities.

	Sydney	Brisbane (SEQ)	ACT	Adelaide	Melbourne	Perth	Australian Average
Household Water Use ABS 2004-5[7]	219 kL/yr	323 kL/yr	248 kL/yr	244kL/yr	209kL/yr	468kL/yr	268kL/yr
Per person water use (ABS 2004-5)	84kL /yr	124kL/yr	95kL/yr	94kL/yr	81kL/yr	180kL/yr	103kL/yr

[5] Derived from Australian Bureau of Statistics (2006) 4610.0 *Water Account Australia*
[6] OFWAT (2006) *Security of Supply, Leakage and Water Efficiency2005-06 Report* p.53

Water restrictions

Public education and water restrictions are the first steps in encouraging the water saving behaviour that we should be following to secure our water resources whether we have a drought or not. Water restrictions and savings programs in 2001-2005 have already delivered savings of around 15 per cent[8]. This is significant when compared with the proposed Kurnell desalination plant which will deliver 10 per cent of Sydney's water supply.

Level 4 water restrictions in South East Queensland have reduced water use down to 180 L per person per day[9] from an average of 340L per person per day in 2004. The smart use of restrictions in times of drought can replace the need for additional infrastructure. The Institute for Sustainable Futures recently reported that a small change in the frequency of water restrictions from an average of 3% of the time to 5 % of the time in Sydney would save 50 billion litres of water every year.[10] By reducing wasteful behaviour such as letting hoses run unattended, washing footpaths and cars with hoses, and watering gardens in a wasteful way we can return a lot of water for other uses. Public education programs promote water saving tips such as taking shorter showers, installing water saving fittings, and water sensitive gardens around the home.

These are important but they are just the tip of the iceberg in unlocking the water savings in Australian cities. The point is, even with strong public commitment to saving water, we lack the infrastructure and urban planning that would deliver the large savings.

Barriers to Water Saving

Unfortunately, there is little economic incentive for householders or industry to save water because it costs so little. And even if water cost a lot more, there are other barriers to saving water such as different incentives of the developer who wants to sell houses and the householder who would save money on water bills if water saving features were installed. While water pricing therefore has a role to play, it will not remove the barriers to demand reduction alone.

Because of this most states have now introduced requirements for new homes to achieve a certain level of water efficiency, and some states, such as NSW have extended these requirements to major renovations. Others have implemented retrofitting programs and rebates for water saving shower heads, taps, flow reduction devices and rainwater tanks. Sydney Water's *Water Fix* program is one of the best designed retrofitting initiatives because householders can access relevant water saving devices and have them installed in their home with one phone call. This overcomes both the cost and convenience barriers

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[7] Australian Bureau of Statistics (2006), *Water Account Australia 2004-2005*
[8] Australian Bureau of Statistics (2006) 4610.0 *Water Account Australia* table 7.8
[9] http://www.qwc.qld.gov.au/ accessed 3 April 2007.
[10] Turner,A; Hausler,G; Carrard,N; Kazaglis,A; White,S; Hughes,A and Johnson,T (2007) Review of Water Supply-Demand Options for South-East Queensland, Institute for Sustainable Futures, Sydney and Cardno, Brisbane, February.

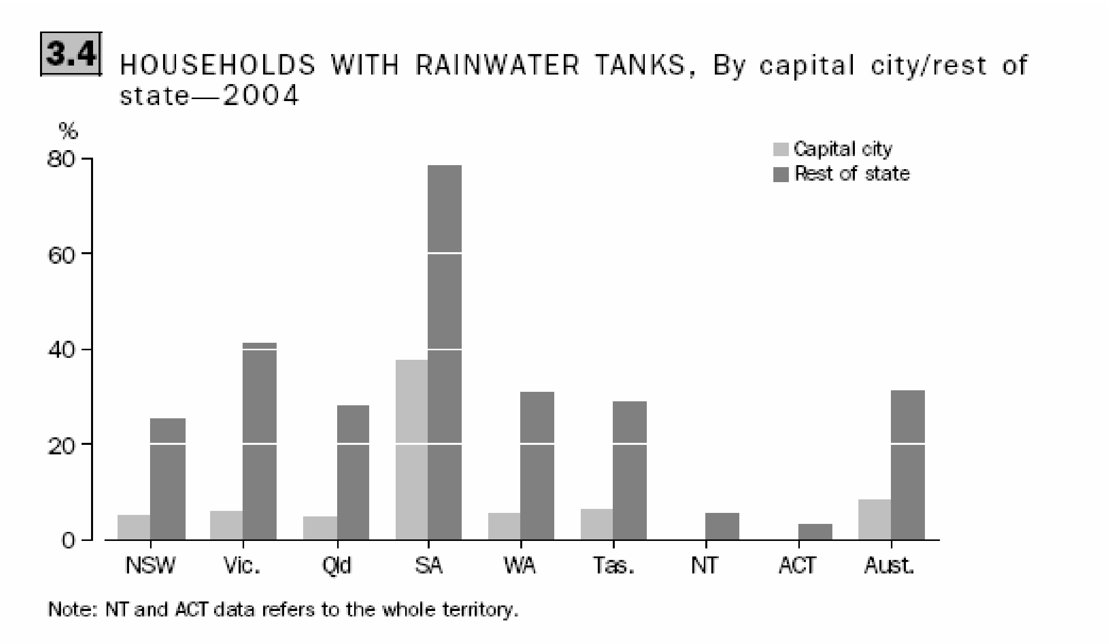
to water saving. However many retrofitting and rebate programs are not adequately funded or promoted to achieve the high level of uptake needed to transform Australian homes in a major way.

ACF has recommended that a major retrofitting initiative be funded to roll-out water saving devices and rainwater tanks across Australian cities.

Solution 2 Rainwater Tank Infrastructure

Only 9 per cent of households have rainwater tanks in our capital cities – with the highest proportion in Adelaide (38 per cent). This has changed very little over recent years with rebate programs in Sydney, Melbourne and Brisbane only delivering improvements of 1-2 per cent[11].

Figure: Proportion of Households with Rainwater Tanks by City ABS 2004[12]



Unfortunately, most governments have not seriously considered rainwater tanks as the water saving infrastructure that it could be. Rather than rolling out rainwater tanks across our cities, most governments have chosen poorly targeted, and in most cases poorly funded, rebates that have delivered rainwater tanks to less than 1 per cent of households in our major cities. They have also underestimated the water savings available from rainwater tank infrastructure, while at the same time overestimated the costs of rolling out rainwater tanks across Australian suburbs. This has led to an underestimation of the water savings available, and an overestimation of water supply needs to accommodate future urban growth.

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[11] ABS (2006) Water Account Australia.
[12] ABS 2004 Environmental Issues: People's Views and Practices pub 4602.0 Figure 3.1

The Department of Environment and Heritage recently commissioned GHD to determine the water savings potential of Australian buildings[13]. They found that households can save 50 - 60 per cent of the mains water they use in Sydney and Melbourne and up to 70 per cent in South East Queensland by installing rainwater tanks connected to the toilet, laundry and garden, in combination with water efficient appliances including front-loading washing machines. These water savings are determined by calculating monthly regional rainfall, average roof size, optimum tank size (2000 – 5000 L), and typical usage patterns for toilets and laundries.

The Australian Bureau of Statistics surveyed community attitude towards rainwater tanks in 2004. They found that the most significant factors preventing a rainwater tanks from being installed were cost (41%) and the time involved in organising purchase and installation (25%)[14]. These factors need to be taken into account when designing policies to encourage the uptake of rainwater tanks.

Cost is usually the factor that governments cite as the reason for limiting their role in the broader package of urban water solutions. However the calculated costs of rainwater tanks compared to dams or desalination plants, often do not include running costs of desalination plants, deferred pipe infrastructure savings from using tanks, nor environmental externalities such as the greenhouse gas emissions produced by desalination plants and pumping water long distances from dams, and other environmental damage for example to rivers.

For most of our larger cities along the east coast of Australia, and in other areas where rain continues to fall, rainwater tanks should have a prominent role in securing our water future. They need to be delivered as part of a targeted sustainable infrastructure program.

Solution 3: Recycle Urban Water

It makes sense to use water more than once to get the most out of it. Water recycling can be installed at the scale of individual houses, individual industrial plants, neighbourhoods, regions and whole cities. Like other forms of infrastructure we need to apply an environmental, social and economic assessment of the proposed solutions.

Climate change and greenhouse gas emissions need to be considered in the recycling technology and the pumping required to deliver recycled water to its destination.
One of the legacies of our traditional water infrastructure is that dams tend to be located in the higher ground so that engineering can take advantage of gravity as water flows through the city and then to sewage treatment plants located near the sea. Unfortunately this means that if we were to recycle water using the same infrastructure, water would have to be pumped uphill back to the city and this adds significantly to costs of pipes and pumping as well as greenhouse gas emissions.

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[13] GHD (2006) *Water Efficiency of Buildings Scoping Study*, Draft Report conducted for the Department of Environment and Heritage..

[14] Australian Bureau of Statistics (2006) 4602.0 *Water Account Australia 2004-05* Table 3.35

Taking these costs and greenhouse gas emissions into account it makes sense to choose industrial and neighbourhood scale water recycling options before metropolitan and regional scale recycling.

Industrial recycling

Industrial plants that use a large amount of water in their operations could reduce the pressure on our water supply significantly if they replaced drinking water with recycled water. It is encouraging that the Queensland and Victorian governments have already announced programs to save significant amounts of water in power stations that serve Melbourne and South East Queensland. This demonstrates the significant water saving opportunity of recycled water in the industrial sector.

In many cases the distance that water has to travel from an industrial or manufacturing plant can be minimised by recycling water on site. For some cities, industrial zones are already located close to water treatment facilities and are well positioned to take advantage of recycled water.

The Commonwealth Government recently required large companies to conduct an Energy Efficiency Opportunity Assessment to identify greenhouse gas reductions. A similar approach should be taken with large agricultural, commercial and industrial water users such as mining operations. Water saving plans should be required of these users to implement water efficiency and use of recycled water.

Municipal water recycling

There is a broader question about the energy and water required to maintain green lawns and English style gardens in naturally dry landscapes, and tropical gardens in temperate or subtropical zones. There are good aesthetic and cultural reasons for wanting to maintain these gardens. However we need to recognise that they are not naturally adapted to our climate and if we want to keep them we should at least try to minimise the water we use on them.

It makes little sense to use drinking water to wash roads and water lawns in parks and golf courses when recycled water could fulfil these tasks. Some local governments have already taken the lead in using recycled water for these uses along with more efficient watering practices such as sub-surface irrigation. On the other hand, golf courses have recently been exempt from water restrictions in Victoria and this makes little sense.

Neighbourhood Scale dual-pipe recycling

The optimum scale for the cost of water recycling projects is 10 000 – 100 000 households. Water recycling for less than 1000 households is more expensive due to treatment costs, while the cost of supplying recycled water greater than 100 000 households requires significant transportation and pumping costs. Reduced transportation distance also means less energy needed to pump water which means less greenhouse gas emissions.

The expense of the recycling technology also varies considerably depending on the standard of water required. Dual pipe neighbourhoods that separate potable from non-potable uses do not need technology that delivers water to drinking water standard and so reverse osmosis which requires large amounts of energy can be replaced with other treatment processes. It would be a waste of energy to treat all water to drinking water standard if all of it were not used for drinking purposes.

Several states now have urban developments that are using this technology already. The Rouse Hill development in the North-West of Sydney is probably the most well known (see case study 1) The advantage of these neighbourhoods is that recycled water can be provided to gardens etc. saving large amounts of drinking water.

Metropolitan Scale Dual Pipe Recycling

Metropolitan scale recycling takes advantage of the large amounts of waste water that is treated each year and disposed in ocean outfalls. In Sydney as much as 450 GL of fresh water ends up in ocean outfalls with minimal use along the way.

The only difficulty with the current location of water treatment facilities is that pumping and piping costs can be high depending on the distance water has to travel back to the suburbs and the gradient of the journey. Dual pipe recycling also requires new piping infrastructure separate from current water supply and sewage pipes and this is expensive to retrofit. In areas where new suburbs are sprawling out toward treatment facilities such as Melbourne, all new suburbs should be supplied with dual pipe recycling.

One of the benefits of keeping water in a separate pipe is that the water doesn't need to be treated to a very high standard for a large number of uses – particularly lawn watering and toilet flushing. This reduces the amount of energy and therefore greenhouse gas emissions from the treatment process itself.

Drinking Recycled Water

Drinking recycled water has been proposed via a process called 'indirect potable reuse'. This is where high quality recycled water is put back into the dam or river to supplement drinking water supplies. This proposal was recently the subject of a referendum in Toowoomba and has now been proposed by the Queensland Government as one solution to water shortages in South East Queensland.

There is no doubt that as climate change takes hold there will be a need for informed debate and public participation in decisions about our urban water supply. As with other options, the greenhouse gas implications of treatment technology and pumping distances should be a formal part of our calculation. Given the large number of demand reduction and recycling alternatives available to us, drinking recycled water may not be needed.

We support further research into the chemistry of recycling household and industrial waste so that hazard and risk assessments can be properly conducted. We recognise that it is not as simple as applying monitoring regimes that are designed to assess water quality standards for water from natural catchments, to recycled water from household and industrial sources.

We encourage governments who are considering the Drinking Recycled Water option to seek the formal advice of well qualified experts in eco-toxicology, membrane science, environmental risk assessment and public health to establish operational and regulatory guidelines, including effective monitoring regimes.

Case Study: Rouse Hill Water Recycling Scheme, Sydney[15]

In the north western suburbs of Rouse Hill, Stanhope Gardens, Glenwood and Kellyville 10.5 million litres of recycled water is provided to more than 16 000 homes everyday for toilet flushing, gardens and washing cars. The water is delivered through separate clearly labelled pipes to differentiate them from drinking water supply. Eventually there will be 35 000 houses with recycled water.

The waste water going into the recycling plant does not contain water from any large industrial facilities and this eliminates the problem of many potentially hazardous chemicals that are difficult to treat. The treatment process involves a number of steps, with the highest level being continuous micro-filtration which does require energy, however not as much as reverse osmosis.

This recycling scheme saves 1.7 billion litres of drinking water every year by replacing it with recycled water. It also reduces the impact on the Hawkesbury-Nepean River system by reducing water demand in the Rouse Hill area by 35 per cent.

Solution 4: Urban – Rural Water Trading

While households only use 11 per cent of total water use across Australia, agriculture accounts for 65 per cent of water use[16]. This means there may be opportunities for cities and towns to buy some rural water without greatly affecting agricultural production. This is especially the case for Australia's inland cities and towns that have a more limited range of water supply options. There is some potential for all major cities except Sydney to buy water from irrigators without the need for significant new infrastructure. In fact urban-rural water trading has already taken place around Perth where the water utility invested in rural water efficiency and the savings went to the city. Adelaide is another example where the government directly bought water entitlements from dairy farmers around the Lower Murray River catchment.

Inland cities and towns have a more limited range of water supply options. The climate in these parts of Australia is likely to dry significantly even after the current drought.

[15] www.sydneywater.com.au/SavingWater/RecyclingandReuse
[16] ABS (2006) Water Account Australia 2004-05

However, urban-rural water trading does not mean we can continue to afford to waste water in our cities and towns. Many of the rivers that supply water for rural irrigation are already stressed due to overextraction of water and they require more water to supply the environment's share. The environment's share should be secured first so that our rivers are capable of providing clean and healthy water into the future. River health is crucial to maintaining water supply to our cities and it would be misguided to reduce environmental flows to provide more water to cities – even if they were traded from rural allocations.

There may be opportunities for 'win-win' arrangements for cities and rivers where a certain amount of any water that urban water utilities buy is allocated to the environment. This arrangement would be consistent with the agreed principle of water sharing and trading that water should go to it's most valuable use and cities are where the greatest proportion of the country's economic value is generated

Solution 5: Integrated Water Planning

Water Sensitive Urban Design

Integrated water planning where garden and suburb design are integrated with water infrastructure and stormwater planning is new to Australia. Most planners have recognised that expanses of green lawn, and traditional water infrastructure are a thing of the past. The current drought has given us the opportunity to transform our green spaces into drought tolerant gardens and to build water infrastructure that is far more efficient (such as sub-surface irrigation), and takes advantage of recycled water and stormwater harvesting. By planning our suburbs this way and transforming our gardens, we will be able to free ourselves from wasteful water habits.

Unfortunately, much of our metropolitan planning that is guiding current development is based on out of date thinking from a decade ago. We need to short circuit the lag time between master planning and development to ensure that the suburbs going in now can take advantage of sustainable water options.

The Principle of No New Water

At the heart of the concept of ecologically sustainable development is the acknowledgement that we are overstepping the environmental constraints – or carrying capacity – of our natural systems. In many parts of Australia, this means that development as usual cannot continue to assume that supply of natural resources, including water, is unlimited. The principle of 'No New Water' means that proposals for urban growth need to be accompanied by a plan for delivering adequate water to that community from within the natural capacity. This puts the onus on proponents of urban growth to deliver concurrent water saving projects such as water recycling plants, water sensitive urban design, and rainwater tanks without contributing to climate change or further urban water shortages.

Solution 6: Crisis Desalination (< 80 ML/day powered by renewables)

Marine Impacts

There are potentially a range of impacts of desalinisation on marine life.
Desalination discharges hyper-saline water that could also include other chemicals used in the desalination process: chemicals used during defouling of plant equipment and pre-treatment of water, and toxic metals. The water may also be of higher temperature. These could all impact on marine life in vicinity of discharge point, mostly benthic organisms dug in the sandy bottom, but also plankton.

Entrainment (sucking in) or impingement (sucked up against screens at the intake area) of marine life: molluscs, weeds, algae, fish, fish eggs, larvae and juveniles as well as plankton are especially susceptible to entrainment. Impinged organisms, typically juvenile or adult fish, usually die or suffer injury as a result of starvation, exhaustion, descaling by screen wash sprays, or asphyxiation.

To reduce the marine impacts of desalination plants it is essential that the plant is limited to the scale that can draw in water through seabed filtration. This approach is considered impractical for plants above 80ML/day. Detailed environmental impact assessment needs to be conducted for any proposed plant to establish the sensitivity of the marine environment.

Climate impacts

The proposed Perth Desalination Plant at Kwinana is designed to produce approximately 30,000 ML of water per year, using 30 Megawatt (MW) of power. Essentially 1 MW of power produces around 1500 ML of water and between 1-1.2 tonnes of greenhouse gas emissions if this process is powered by fossil fuels. For this reason the Perth plant will be powered by 100 % renewable energy from wind farms. Perth is experiencing the worst case scenario of rainfall loss due to climate change and for this reason drastic measures have become more prominent solutions.

This scenario is not the same for the Gold Coast, Sydney, Wyong, or Melbourne where desalination plants have also been proposed. Even if these plants were powered by 100 per cent renewable energy they are not the right choice for these regions because renewable energy needs to be used to reduce our greenhouse gas emissions rather than offset new energy guzzling projects. In addition, the concerns about significant marine impacts remain.

As outlined in this paper there is an extensive range of demand reduction and recycling options that should be delivered before drastic options like desalination become reasonable. The test of government leadership in addressing our urban water crisis is avoiding drastic measures such as desalination plants and dams in favour of well planned sustainable solutions.

7. Dams are no longer a Solution

Dams and irrigation schemes decrease river health by:

- altering natural water cycles;
- destroying the migration and breeding cycles of native fish species;
- creating salinity problems;
- increasing susceptibility to poisonous blue-green algae outbreaks;
- degrading water quality which impacts on ecosystems and communities downstream.

Dams flood a large area of land destroying native animals' homes. The destruction of native animals' habitat leads the way open for the invasion of exotic species, such as carp and trout. Carp eggs stand a much better chance of hatching when laid on reeds in weir pools where river levels are stable than in a naturally turbulent flow conducive to native species.

When water is released for irrigation it is often released from the bottom of the dam, where the water is low in oxygen and cold, usually several degrees lower (10-13^{o}C) than the natural breeding water temperature (around 20^{o}C). This can upset the lifecycle of many cold-blooded animals such as invertebrates and fish. If the water is too cold adults fail to emerge at the right time, while water that is too warm leads to the premature emergence of adult insects. Rapid changes in temperature disrupt fish spawning and kill eggs.

Dams prevent flooding of rivers, reducing the amount of underwater habitat available for species to breed and the amount of food in which to feed young with.

Dams create a barrier and disrupts ecological continuity, cutting the river into two parts, upstream and downstream. Downstream, rivers are starved of water reducing migration upstream of juvenile fish in large numbers, sometimes when triggered by relatively small rises in river level (more than 50 cm). Less water for upstream migration lowers breeding success, decreases the amount of suitable habitat, places isolated populations in danger of inbreeding, and increases their vulnerability to threats such as pesticide contamination.

Rivers are able to get rid of damaging chemicals, toxins and contaminants by flowing and flushing them out to the ocean but dams are still bodies of water and unable to do that. This build-up of pollutants can cause blue-green algae blooms and the death of wildlife not just living in the dam but also animals that rely on it for water, including humans.

Dams can become overloaded with nutrients such as nitrogen and phosphorous which causes the loss of important habitats, a decline in water quality, significant losses of wild life, including large fish kills and produces a foul smell.

An increased water supply from dams allows for more grazing animals, such as sheep and cattle to live in the surrounding area, leading to overgrazing of the natural habitat.

This reduces the area underwater available for aquatic species' breeding, food sources and increases erosion.

As well as these damaging impacts on the natural environment, dams are not a secure option for water supply into the future because we do not know to what extent our rainfall patterns will change from when it is built to when we expect it to fill up. To predict the effectiveness of the dam we would have to predict how rainfall patterns will change over the next 50 years as climate change takes hold and early trends already indicate drier conditions. Dams are also vulnerable to large evaporation losses and these will increase as our climate becomes hotter and drier. Greenhouse gas emissions from dams are also significant as flooded land can no longer sequester carbon and instead may contribute greenhouse gas emissions from rotting vegetation that is not cleared from the reservoir before it fills. We also need to take into account the greenhouse gas emissions from pumping costs as we do with other water infrastructure.

Part 1: Environmental, Social and Economic impacts of the Proposed Traveston Crossing Dam

The proposed Traveston Crossing Dam on the Mary River in South East Queensland is a poorly considered water infrastructure project on environmental, social and economic grounds.

ACF is concerned that the proposed dam:

- Will destroy forever species listed as 'threatened' and 'endangered' under the Environment Protection and Biodiversity Conservation Act including the Mary River Turtle, the Mary River Cod, and the Australian (Queensland) Lungfish;

- Will impact on wetlands that are internationally recognised for their conservation values under the Ramsar treaty;

- Will not solve the water crisis in South East Queensland because if the dam fills up, it will be shallow with a large surface area and this will maximise evaporation losses;

- Will be filled with aquatic weeds that will be expensive to control;

- Will flood prime agricultural land causing significant social and economic disruption.

The Save the Mary River Co-ordinating Group and the Mary River Council of Mayors have conducted rigorous and detailed research into the environmental, economic and social impact of the proposed dam. Many of Australia's leading experts in fields of marine and freshwater ecology, social impact assessment, and engineering have contributed their knowledge in separate submissions and in the research presented by the

Save the Mary River Co-ordination Group. We commend this detailed research to the Committee.

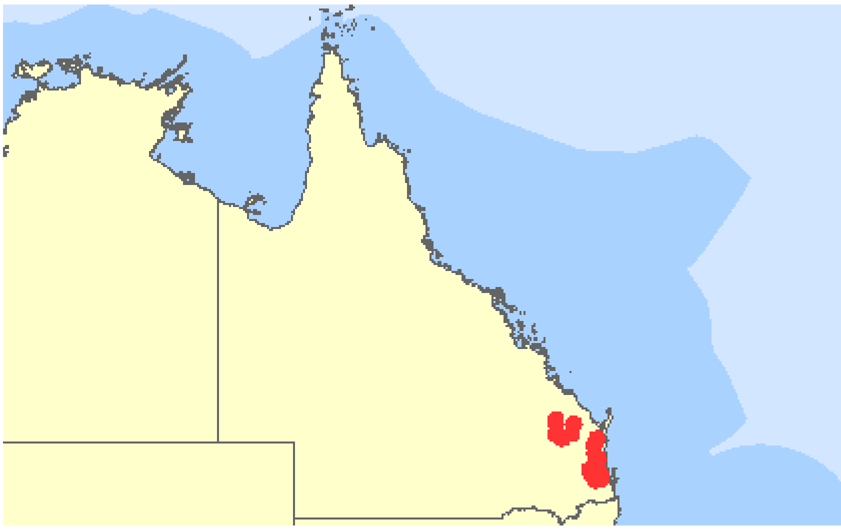
Impacts on Biodiversity

The proposed Traveston Crossing Dam will cause serious and irreversible harm to a river of national and international environmental significance, related RAMSAR listed wetlands, World Heritage Areas and endangering several species with extinction forever. By its nature, a dam changes the ecological conditions of a river dramatically and irreversibly. Efforts to mitigate such damage have never compensated for the fundamental fact of habitat destruction that unavoidably accompanies a dam.

The impact of the dam on species listed as 'threatened' or 'vulnerable' under the EPBC Act can be clearly illustrated by the habitat range for the Australian (Queensland) Lungfish. The map below shows that the lungfish only lives in two rivers in South East Queensland.

One of these rivers has already been dammed with unsuccessful measures to mitigate the environmental impacts of the dam. Only 7 individual lungfish were found to use the extraordinary device called a 'fish ladder' designed to allow movement of the fish upstream.

Habitat Range for the Australian (Queensland) Lungfish *[Neoceratodus forsteri]*



Approvals Process

We are concerned that the approvals process for the proposed Traveston Crossing Dam is flawed, because the proposal should be assessed in its entirety rather than as an artificially split referral. The Terms of Reference should include the full project details and environmental impacts relating to all stages of the proposed dam.

We are also concerned that the Queensland Government is both the project proponent, under the name of Queensland Water Infrastructure Pty Ltd, and the project assessor, under the name of SEQ Infrastructure (Water) – part of the Co-ordinator General's Office. These arrangements may be perceived as a conflict of interest and do not ensure public transparency, accountability and independence in fulfilling the aims of the Environment Protection and Biodiversity Conservation Act. We urge the Queensland Government to request the Federal Government to assess the merits of the proposed Traveston Crossing Dam on this occasion.

The terms of reference for the Environmental Impact Statement have not yet been finalised. We believe it should include the following:

- An independent analysis of the environmental, social and economic impacts of the Paradise Dam in the evaluation of the project proponent's ability to deliver effective environmental management.

- A <u>detailed</u> Project Description of all stages of the proposed dam including all aspects of engineering, land use planning, environmental and social impacts, including impacts on towns in the inundation area, the river downstream, and the impact of related infrastructure such as roads and pipelines.

- The Project Rationale should describe the project in the context of the full range of water security options in South East Queensland.

- The Need for the Project should clearly justify why the proposed dam meets the water security needs of South East Queensland with better environmental, social, and economic outcomes than any other option or combination of options.

- The Costs and Benefits of the project should include a detailed outline of the budget for the proposed project so that capital and related pipeline and road infrastructure works are clearly delineated from the ongoing operational costs.

- Environmental externalities such as the costs of abating greenhouse gas emissions from the dam and water distribution infrastructure, the costs to regional fisheries and tourism relying on the health of the Mary River, as well as ongoing operational costs such as the management of aquatic weeds. These costs should not be heavily discounted into the future, but rather, take into account the increasing costs of abating greenhouse gas emissions in a future carbon market.

- Alternatives to the project including the latest research into demand reduction techniques, and the combination of options that could provide water security to SEQ in place of the proposed dam. The assumptions used as the basis for the Queensland Government policy, *A Long Term Solution* have been discredited.

- The Environmental Impact Assessment Process needs to include adequate baseline research on the ecology of the Mary River, the inundation zone, related downstream and upstream areas, estuarine zones including the RAMSAR listed wetlands, and the ecological communities that are likely to be impacted by related infrastructure such as dams and pipelines. This baseline data needs to be made available for independent scientific and public scrutiny.

- For the Environmental Impact Assessment to be credible, it needs to countenance the possibility that the proposed project may need to be refused on environmental grounds. The burden of proof that environmental impacts *can* be mitigated *at all* needs to be on the project proponent.

We believe that the conflict of interest between the project proponent and the project assessor – in this case, two parts of the Queensland Government, will impair the perceived credibility of the assessment. Further, if the Queensland assessment is seen as not accomplishing the goals of the Environment Protection and Biodiversity Conservation Act, there is a possibility that the project will remain open to legal challenge notwithstanding any federal approval: see Brown v Forestry Tasmania (No 4) [2006] FCA 1729 (19 December 2006).

Conclusion

In our submission we have outlined the merits of the range of options for delivering secure and sustainable water supply to South East Queensland and the environmental, social, and economic impacts of the proposed Traveston Crossing Dam on the Mary River.

We regard this as an issue of national importance because the Commonwealth Government has a responsibility under the Environment Protection and Biodiversity Conservation Act to protect the environment of the Mary River. It is also a national issue because most Australians are dependant on a secure and sustainable water supply to our cities.

We are grateful for the opportunity to provide these comments to the Senate Committee and hope we have the opportunity to discuss them in more detail as part of the public inquiry process.

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