TASMANIAN FISHING INDUSTRY COUNCIL

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Secretary: .....
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HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON
AGRICULTURE, FISHERIES
AND FORESTRY

3 December 2002

Dr Andrew Brien
Inquiry Secretary
House of Representatives Standing Committee on Agriculture, Fisheries and Forestry,
Parliament House
Canberra
ACT 2600

Dear Dr Brien,

Thank you for the opportunity to give a presentation on estuarine water issues at the (November 19) Longford hearing of the Standing Committee's Tasmanian tour.

The Tasmanian Fishing Industry Council (TFIC) is the peak representative body looking after the interests of all licenced commercial fishermen, seafood processors and marine farmers in Tasmania.

As discussed, I have revisited the presentation and produced a submission for the Committee. I trust that it is what you asked for.

If you have any questions, please feel free to contact me here at the TFIC office, or on mobile 0417 341 350. My email address is rmitchell_tas@yahoo.com.au.

Yours sincerely,

Ralph Mitchell
Executive Officer

Submission to The House of Representatives Standing Committee on Agriculture, Fisheries and Forestry

The need for an integrated approach to estuarine water usage...

This submission is based on the presentation made to the Standing Committee at Longford, Tasmania, on November 19, 2002. *(See Appendix 1)*

By:
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Water... The elixir of life...

Without it, life as we know it ceases to exist... Not only do we use it for survival, hygiene and sanitation, but it is also used (amongst other uses) as a military tool, a weapon, a tradable commodity, a dumping ground, and an energy source as well as for sports, tourism and recreation.

Bodies of water are exploited as a food source, including primary production from both agriculture and aquaculture. In many areas there are conflicts over competing interests for a finite amount of water.

Some countries consider water to be more valuable than oil or gold, yet others treat it as a waste product, polluting and destroying this very resource that we need for our survival. These destructive influences often lead to conflict.

The Global Situation:

This is a very contentious issue. It is not just an Australian issue... It should be considered along the lines of being a significant global issue...

Time Magazine (2 September 2002): "The Challenges We Face" describes the global situation. Despite the planet Earth being 70% water, only 2.5% of it is fresh water, and only a fraction of that water is actually accessible...

Most humans in developed nations use (on average) around 50 litres a day for personal use and basic needs... One sixth of the world's population (1.1 billion) lack access to clean drinking water and around one third (2.4 billion) lack adequate sanitation...

Water is a finite and fragile resource. It is critical to every developed nation's economic performance. Water underpins the social fabric of every community, not only for the economic activity it generates but also for its environmental, aesthetic and recreational values. Water is actually a scarce resource. There are vast resources of water on the planet, but only a small fraction is fresh water, of which only a fraction is available for use.

Much is locked up in icecaps and glaciers and a great deal held in the atmosphere... Yet some countries like Sweden have enormous water resources. There are over 100,000 fresh water lakes in Sweden, including Lake Vattern that is like a giant inland sea. You can't see the other side of it.

There are endless demands for water and choices need to be made about how the available water is allocated to maximise benefits to the community. Over-allocation of water to consumptive uses leads to environmental degradation, which the community is not prepared to accept. A growing global awareness of the importance of water management resulted in an international forum on sustainable development in Stockholm in 1972.

In 1987, the World Commission of Environment and Development published *"Our Common Future"* (known also as the *Brundtland Report*), which revealed that the needs of the environment were intrinsically linked to the economic and social well-being of the world's societies. That document triggered the negotiation and ratification of a number of international treaties and conventions regarding the environment and development issues. In 1992 at the United Nations Conference on Environment and Development (UNCED), the Rio Declaration and Agenda 21 (to both of which Australia is a signatory) were adopted as the guidelines for sustainable development throughout the 21st century.

Chapter 18 of Agenda 21 deals with protection of the quality and supply of fresh water resources, and the application of integrated approaches to the development, management and use of water resources in a sustainable manner. To paint the picture adequately we need to consider some facts and some history about water issues...

Historical Water Usage Conflict:

There has been conflict recorded for centuries over water and water rights. It has been used very effectively as a military tool. Here are some examples...

- **1503 Italy:** Leonardo da Vinci and Machievelli planned to divert the Arno River away from Pisa during conflict between Pisa and Florence.
- **1938 China:** Chiang Kai-shek ordered the destruction of flood-control dikes of the Yellow River to flood areas threatened by the Japanese army. The flood destroyed part of the invading army and its heavy equipment was mired in thick mud. The waters flooded an area variously estimated as between 3,000 and 50,000 square kilometers, and killed *Chinese* estimated in numbers between "tens of thousands" and "one million."
- **WWII:** Both Germany and the Allied forces used water and dam destruction as a weapon...
- **1965 to 1967:** In the **Middle East** gunfire was exchanged over an "all-Arab" plan to divert the Jordan River headwaters prior to the Israeli National Water Carrier gaining access. Israel destroyed the Arab diversion works on the Jordan River headwaters.
- *During Arab-Israeli War Israel occupied Golan Heights, with the Banias tributary to the Jordan; Israel occupied West Bank.*

(Israel now plans to import water from Turkey in huge bulk-carrier ships! Turkey has flooded historically important sites to contain water for sale...)

- **1995: Ecuador and Peru** Armed skirmishes arise in part because of a disagreement over the control of the headwaters of the Cenepa River.
- **1999/2000 Namibia, Botswana, Zambia:** Sedudu/Kasikili Island, in the Zambezi/Chobe River. Dispute over border and access to water. Presented to the International Court of Justice...

Problems more close to home...

- Daily Telegraph (21 March 2001):

"Rivers run black"

- West Australian (27 March 2001):

" Estuaries are ailing: study"

- The Australian (4 April 2001):

" Irrigators to pay more for damage"

- Courier Mail (5 June 2001):

" Fertiliser and mud 'burying the Reef'"

- Sydney Morning Herald (21 Feb 2002):

" Rivers added to NSW's endangered list"

(See Appendix 2 for the full text of the newspaper articles)

A study of Australian river systems has indicated that around 20% is available for diversion for human use

These are a few recent examples of Australian river and estuarine systems that are in severe trouble due to human activity. It is worth considering these newspaper articles to see some of the contributing factors to water resource degradation and to see what sort of common thread there is... The list goes on and on, with some of the problems in some regions becoming full blown ecological disasters.

In April 2001, acid plumes with a pH as low as '3' have been detected in the Richmond and Macleay Rivers in northern New South Wales. Although recent acid flows and effects are not as great as in the 1994 floods, frequent low-level acidic discharges will continue to kill benthic organisms and affect estuarine ecosystems.

The annual loss of fish catch in New South Wales as a result of disturbed acid sulfate soils is estimated to be $1 million, and a similar figure is estimated for the oyster industry (Department of Natural Resources 1999). Coastal acid sulfate soils (CASS) disturbance has been linked to major fish kills and outbreaks of red spot disease in fish, and to the increased incidence of acid-tolerant, disease-carrying mosquitoes.

Agricultural spraying and topdressing upstream can have big impacts downstream

The majority of the eutrophic estuaries are fed by agricultural catchments. The situation for Western Australia's southwest estuaries has not improved, and except for the Peel-Harvey coastal catchment, phosphorus levels have not decreased.

The water runoff from rain events carries the nutrients and other agricultural compounds into the waterways. The products of acid leachate from soils have also been implicated in the increasingly severe *Lyngbya* blooms experienced in Deception Bay and Pumicestone Passage, Moreton Bay (although the blooms are also triggered by high phosphorus loads

The effects of eutrophication are evident Australia-wide. For example: in New South Wales, between **1997 and 1999**, two algal blooms potentially harmful to marine organisms and seven blooms potentially toxic to humans were recorded. These bloom frequencies were similar to those recorded between **1994 and 1996.**

This becomes also a food safety issue. Contaminated edible bivalves in the Ballina and Newcastle areas lead to 59 and 23 cases of gastroenteritis, respectively.

Hydro-electric power generation: Clean and Green?

Apart from producing elevated levels of methane gas from decaying detritus within the dam and also causing bank erosion with unnatural estuarine flushing, *there are other problems even here in Tasmania...*

Since the 1880s, mine water and tailings have been discharged from the Mount Lyell copper mine via the King River, resulting in an estimated 100 million cubic metres of solids containing toxic metals settling on the banks and bed of the King River and in a delta in Macquarie Harbour. Tailings are no longer discharged, but acidic water still drains into the King River. Measurements in 1998 showed an average of two tonnes of copper per day was contained in drainage from the Mt Lyell site. Despite this, tourism attracts around 200 000 visitors a year, and fish farming is an important industry.

After the closure of the mine and cessation of alkaline tailings addition to the river, the levels of copper and acidity have increased due to remobilisation of the metals from the sediments in the river and the estuary. The increased flushing of this region during peak power production for Basslink will have the potential to exacerbate this problem.

The bottom sediments of Macquarie Harbour contain very high concentrations of copper, lead, iron and manganese. In some surface sediments the metals exceed the binding capacity, so these are a source of metals to the water column. This secondary contamination is gradually spreading further south.

See Appendix 3 for 'peripheral incidents'. (Ocean Trout problems; Gas Bubble disease)

There are many competing interests for water, all with different needs and requirements, all placing a different value on the resource.

Policy makers have now in their infinite wisdom recognised that the environment is a *legitimate* user of water resources...

So how can you place a realistic $ value on water?

Globally, the water sector has been subject to a range of significant micro-economic reforms. In the future, water utilities will become increasingly driven by commercial objectives, within a framework of regulation (including environmental and economic regulation) provided by government.

How do you define 'Value'

"Value", in any sense of the word, has meaning only in relation to scarcity. Uniqueness, rarity, replaceability, usefulness, abundance are all related to it.

The "economy" is primarily a vector of producers and consumers of goods and services, including services of the natural environment. Economic valuation considers the various ways in which the economy of region is likely to face change, caused by a particular policy, on-going economic development or initiatives.

Unlike many resources, e.g. labour or materials (such as building materials), the use of water for one purpose does not necessarily preclude its use for another. To make a realistic estimate when valuing the quantity and quality water at any given point in time and location, it is necessary to know whether the proposed use is *competitive, complementary or independent* of another.

Environmental economists have demonstrated that the depletion of natural resources in pursuit of economic growth is very much like living off the capital rather than income gained from that capital. These economists have defined *sustainable* development as the maximum economic development that can be achieved without using up the capital and without over-spending on associated mitigative costs, such as pollution control. It is now widely accepted that the resource base now encompasses man-made capital, natural capital, human capital and moral/ethical capital.

The Costanza Report:
A realistic evaluation of ecosystems:

"The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth's life-support system. They contribute to human welfare, both directly and indirectly, and therefore represent part of the total economic value of the planet." (Robert Costanza et. al., 1997)

"The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth's life-support system. They contribute to human welfare, both directly and indirectly, and therefore represent part of the total economic value of the planet.

Costanza tells us that *"We have estimated the current economic value of 17 ecosystem services for 16 biomes, based upon published studies and a few original calculations.*

For the entire biosphere, the value (most of which is outside the market) is estimated to be in the range of US$16 - 54 trillion (1012) per year, with an average of US$33 trillion per year. Because of the nature of the uncertainties, this must be considered a minimum estimate. Global gross national product total is around US$18 trillion per year." (Robert Costanza et. al., 1997) (1994 US dollar values).

To bring this whole issue into a local perspective and to illustrate clearly that it is not always bad news, we can use the Little Swanport estuary on the East Coast of Tasmania as a good example. There are still ongoing problems to be sorted out, especially when considering the subject of upstream storage dams, both in-stream and off-stream.

Past policy makers have been know to consider that if one drop of water makes it to the ocean, then that is one drop too much! But the management philosophy has changed from maximum exploitation to sustainable holistic use...

This estuary is fast becoming a Tasmanian exemplar that could give some good lessons to other managers...

Little Swanport Estuary:

This estuary is supplied by a significant catchment area including some of the Tasmanian midlands and the state's eastern agricultural sector. It empties into Great Oyster Bay, looking directly across the bay at the Freycinet Peninsular and Schouten Island.

This is an estuarine ecosystem that is now being exploited in a more environmentally sustainable way. There is a growing consciousness of the fragility of the system and the difference that seasonal variations can bring to it. One of the introduced species in this estuary was rice grass. It was also introduced into the Tamar River where it remains, choking the banks and ecosystems along the edge of the river.

Local oyster farmer Colin Dyke was instrumental in initiating a program that was able to effectively eradicate the rice grass without other flora and fauna species being adversely affected. This technology was a world first and the project won a prestigious national award in 2001...

For over 4500 years, probably a lot longer, humans have harvested seafood from the waters of the Little Swanport estuary.

Middens:

Middens in the lower reaches of the Little Swanport Estuary are extremely important archeological sites, with carbon dating indicating that they date back to 2500BC (*Holocene* period). It is interesting to note here that the vast majority of shells still evident in the remaining middens are those of large, mature oysters - a clear indication that the Aboriginals consciously practiced sustainable harvest methods, leaving the

immature stock in the water to grow to maturity and breed. A clear respect for sustainable harvesting techniques.

Lime works...

The lime works were established on a commercial level in 1896/1897, sourcing the shells from middens covering some 80 acres up to 8 feet deep, on the property "Seaford". The lime works operated (with some interruptions) for many years until 1942 when the kilns were used for charcoal production during the Second World War.

During the 1800's wild oysters were harvested in large numbers. Early records show that 5,235,000 (436,250 dozen) oysters were harvested and brought to market from Little Swanport in one of the best harvest years. Unfortunately, by the early 1880's, the fishery (Tasmania wide) had become unsustainable and declined. The Report of the Royal Commission (1882) suggested that this decline was due to overfishing, mussel encroachment, disease and inclement weather. Indications were that the colonisation and clearing of the land for settlement and agriculture also led to increased silt loads in the rivers and bays which is said to have killed many beds.

A clear and demonstrated *lack of respect* for sustainable harvesting practices from a supposedly more developed exploitation regime. Quite obviously living off the capital, not the income.

The evaluation of ecosystems:

The following are the biomes associated with the Little Swanport Catchment, and the value per hectare per annum of their ecosystem services.

• Open ocean	$ 252
• Estuaries	$22,832
• Seagrass/algae beds	$19,004
• Continental shelf	$ 1,610
• Temperate forests	$ 302
• Grass/rangelands	$ 232
• Tidal marshes/mangroves	$ 9,990
• Swamps and floodplains	$19,580
• Lakes and rivers	$ 8,498
• Cropland	$ 92

(Dollar values are in US$ at 1994 value.)

These figures speak for themselves... The estuarine value outclasses the rest by a significant amount (especially cropland) by a significant amount! This looks at the eco-system as a whole, valuing everything individually and then comparing in a holistic way.

The estuary at Little Swanport is no exception. Here there are not only oyster farms, but an oyster hatchery that supplies around 74% of the oysters to growers of Pacific oysters in southern Australia... The value of this is 'multi-millions' of dollars...

70% of Australian commercial/recreational fisheries and aquaculture production are estuary dependent. Approximately one third of the *value* of Australia's fishery production is derived from aquaculture

$ value from Little Swanport Primary Production

Oyster production in the Little Swanport catchment area is worth $31,500 per hectare per annum. For a comparative example, poppy production returns $4,000 per hectare per annum, but the land can't sustain that every year...

Oyster farms and the natural environment are the *end users* of the water resources available to this estuary.

The water quality is determined by conditions in the catchment area.

These conditions can be seriously affected by the factors that are mentioned above. (Perhaps not all of them, perhaps sometimes very few of them). However, there is a conflict between agricultural interests and aquacultural interests for water allocation and the subsequent *quality* of the water once it has been used (if it actually makes its way back into the estuary).

Vast percentages of agricultural irrigation are wasted due to evaporation, and excess runoff brings with it the fertilisers, pesticides, herbicides etc that are used in the region. It also brings bacteria such as *E Coli* from both agricultural and wild animal excreta, something that can cause major problems for water quality... And that *always* equates into problems for shellfish quality downstream when levels become excessive.

Dams:

At present there is a proposal for three upstream dams to be constructed in the Little Swanport catchment area. These will hold 1280 megalitres. The townships of Orford, Triabunna, Swansea, Coles Bay and Bicheno use a total of 911 megalitres annually...

These dams will create <1 job but actually threaten 18 jobs if water flows through the high value oyster farms are reduced. This puts at risk an ecosystem that supports a $25.5 million industry

Dams can create some very real threats to the estuarine ecosystem. One effect not immediately obvious is the total waste of fresh water through...

- Reduction of flows to unsustainably low levels
- Evaporation at the storage site
- Salinity

- Low pH during storage
- Reduction of flows to unsustainably low levels
- Evaporation at the storage site
- Salinity
- Low pH during storage

Low flow rates can seriously impact on the breeding cycles of various aquatic animals vital for the food chain.

Marine water will encroach much higher into the estuarine waterways than previously, displacing other species and disrupting the nature of the eco-system. Dams have significant evaporation (and sometimes seepage) problems where the atmosphere gains the water as a gas. This is a waste of around 30%. The total take is much more than the storage as the dams are continually needing to be topped up. A 1 megalitre dam actually uses 1.3 megalitres.

Evaporation removes water but leaves the solids and dissolved minerals. Over time there is a buildup of salinity in the remaining water and the dam can become increasingly salty to a point where it is unfit for agricultural use. Organic matter and salinity can combine to lower the pH level to a point where it can't sustain freshwater life. Disposal of this water can create problems. Irresponsible disposal into the estuarine environment can have a devastating effect on the ecosystem.

A constructive and proven alternative? Aquifer storage and recovery

Just one alternative is the Aquifer Storage and Recovery Method. There are more aquifers than good dams sites in Australia. There are many benefits.

- Water from an aquifer is ONLY recharged from rainfall.
- Aquifers have no evaporation.
- Much rainfall runs off and is wasted.
- Why not use the aquifer as a supply AND storage system?

One is that poorer quality runoff water often has E Coli and other bacterial nasties in it. The water is purged of disease-causing organisms, killing them off in less than six weeks. You can even store fresh water in a salt water aquifer! This creates a bubble of fresh water within the salt water. If the aquifer has a low rate of flow, then mixing is very slow, allowing the fresh water to be retrieved when needed.

Dams in the Little Swanport catchment area:

- Water Management authorities say that there are 18 dams in the catchment area, with another 11 proposed.

- Examination of 1:25,000 maps (to 1992) show 1158 dams in the catchment area.

- A recent helicopter survey within 7 km radius of Little Swanport estuary found another 56 dams constructed since the maps were published...

Part of the decision-making process for water allocation has to take into account dam numbers, types and volume.

How can the value of the water be accurately assessed and allocations made when there is absolutely no way of knowing how much water is being retained and drained off illegally upstream?

The area has a noticeable decline in trees that can't be attributable to forestry... Salt scalds are evidence of salinity problems, and in the last 25 years these are becoming more apparent in the area. There are NO management controls or licence conditions over the use of fresh water once it has been taken. What about the high value industry that employs a number of people downstream? What is the common good from this?

The way forward:

- Integrated Catchment Management
- **Provision for the environment**
- Established principles of management

Members of the Little Swanport community formed the 'Little Swanport Catchment Committee. This committee formulated a management plan based on environmental AND economic values, looking to manage the area for the best common good.

Little Swanport Catchment Management:

This plan is a significant example of a proactive community approach to the management and water allocation issues. The committee composition is representative of the relevant stakeholder groups in the region including:

- farmers,
- forestry,
- aquaculture/fishing,
- recreation and tourism,
- local government,
- small landholders/residents,
- the Army
- Bush/Landcare members.

Significant issues have been identified and prioritised, such as:

- water quantity and quality,
- vegetation, (including weeds),
- soil,
- fauna,
- forestry,
- heritage values,
- future development
- tourism

Proposed Protected Environmental Values and principles have been defined for development, including such things as:

- stream bank erosion and the role of vegetation,
- livestock and alternative watering regimes,
- riperian buffers,
- sediment runoff from roads and development
- water values for the ecosystems,
- water consumption issues,
- aesthetic values
- values within the estuarine environment.

See Appendix 3 for excerpts from the draft community management plan.

Conclusion:
The issues involved with water resource usage are many and varied, especially considering the fact that it can be used a number of times before exiting the estuarine system. Add in the complexities involved in satisfying the requirements of all competing users while trying to establish the *best common good* from the water usage in the region. Factor in the environmental, socio-economic and aesthetic values and there is a complex equation that will have different values for each catchment area.

The critical issue immediately apparent is water quantity and the allocation of the resource on a fair and equitable basis. That is fair enough to begin with, but the critical issue for the end user is not only quantity, but also quality. The end user may be the environment. It may be that (as in Little Swanport) the end user is an oyster-grower using what is left over for the environment after all other users have had the first use of the water.

When considering a multi-million dollar business such as this, the best common good for the area must especially factor water quality into the equation, particularly once the water nears the end of its course from the land to the sea. The philosophy must be holistic. To consider this scarce resource in any other way is neither sound management or sustainable.