Why the T4 Coal Loader Proposal Must Be Dismissed
A Summary of its Major Ecological Problems

Work in Progress Notes
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Document Submitted To T4 Project Call for Comment

Part 1: My Case Against Approving the T4 Project

For many years I have been following development proposals in the Hunter Estuary including the recent T4 project. However, for well over a year, I have been severely troubled by a complex of health problems which have prevented any hope of my producing formal publications or submissions. Hence this submission is not presented in a formal format. However, it is critically important to me that I do make a submission.

I have chosen to deal with the issue within the framework of the sad history of precipitous environmental degradation in the Hunter Region and the over simplification of the ecological issues involved in proposals and assessment of development projects. This submission is far from complete due to the tight time constraints. For example, I have not discussed the Australian and NSW governmental obligations listed under the Ramsar Treaty. The T4 project has transgressed these obligations. However this submission contains sufficient details to expose the short sightedness of the T4 proposal, the unsatisfactory management of whole Hunter ecosystems and to make a strong case for the rejection of this project.

I have studied the submission presented by the Hunter Bird Observers Club (HBOC) and strongly support its opposition to the project.

As has become typical, the T4 proposal has been over simplified and not related to other developments. The historical information and statements supplied in my submissions reveal a much bigger picture, showing how seriously distorted processes have dishonestly failed to accept that the cumulative degradation of the Hunter Region Ecological System is pushing it towards complete system collapse, with ultimate species extinctions and social disruption. The T4 project must be dismissed, the framework of Gross Domestic Product (GDP) dependent economics must be reconstructed and the objectives of development genuinely returned to Ecological Sustainability.

Since the 1970s, there have been nation-wide repeated warnings by experts on the growth of governmental and industrial follies in development strategies for river, marine, woodland and estuarine habitat. These have been consistently ignored nation-wide in the preparation of development proposals by the industrial development and GDP dependent economic communities and by State, Federal and Local governments (supported by their political parties Labour, Liberal and National) when assessing proposals and making decisions . The governments and their relevant bureaucracies

have been progressively degrading environmental legislation, producing loopholes which allow approval of ecologically unsustainable developments. In the Hunter Region, this trend has accelerated since the late 1990s with the Austeel and related fiascos and more recently, those affecting wider habitat such as woodlands, forests and agricultural land.

The interactions, in the stampede for more coal mines and more coal loaders, are creating a contagious epidemic disease with major detrimental effects on the health of the total environment on which life depends. For example a healthy atmosphere depends on oxygen release and the withdrawal of excessive carbon dioxide produced by healthy vegetation (especially woodlands and forests) and minimal micro particles and other contaminants, a significant proportion of which are produced by the operations of coal mines. Healthy water supplies required by humans, domestic and wild animals depend on filtering provided by a combination of substantial areas of healthy woodland and forest habitat in the catchments which are currently being decimated by the coal industry.

Forest and woodland habitat, supporting what used to be flourishing populations of birds, mammals and invertebrates, is being systematically removed and the number of threatened species is growing as the population numbers dwindle towards extinction. The construction of the existing coal loaders has been a major contributor to the decline in shorebird populations in the estuary and the HBOC submission clearly demonstrates that the T4 project will make things worse, perhaps to be the straw that broke the camels' back.

As a result, there has been cumulative decay of the ecological processes essential for the health of the atmosphere, fresh and marine water, soil, vegetation and habitats supporting a biodiversity of all species (including humans) and thus increasing risk of total collapse of ecological systems and even much worse impacts affecting future generations. The situation has worsened since the document extracts below were published (note: because of the pressure to produce this document, full reference information and the maps referred to could not be included in the extracts but can be obtained by accessing the original documents). The region's capacity to cope with progressive repetition of damage to habitat such as the floodplains and woodlands, is precipitating towards total ecological and social system collapses. There are already very disturbing signs of increasing serious social unrest heading towards eventual collapse.

As early as the 1990s, significant deficiencies were recorded by UK, USA and Australian environmental scientists about the process of providing offsets for land earmarked for destruction (Maddock 2003). The hypocritical use of the supposed values of offsetting revealed in Maddock (2003 and 2008) and Walker (2009) is now well enshrined in project assessment processes.

The T4 project still ignores the deficiencies that have been reported in the literature. The very nature of the project promotes the ecological disasters being perpetrated in by the expansion of the coal industry, a chase for growth of GDP and creation of jobs with doubtful value. The construction jobs will be temporary, the supply of coal will eventually be exhausted and consequent disappearance of both mining and coal loader jobs will lead to major long-term social problems similar to those being experienced

in the Murray Darling Basin. Numerous reports over the years warning of the folly of allocating more water to unsustainable irrigation projects than ecosystems could support over the long term were ignored by Labor and Liberal-National Coalition governments, both State and National, Families and communities became dependent on the continuity of a water supply that could never be delivered along the vast length of the Basin, leading to conflict between communities, intense distress, ill health and ultimately anti social behaviour such as the 'burn the plan" demonstrations and desperate calls for the impossible retainment of the status quo.

The PWCS CEO's supposed values of the project stated in the Newcastle Herald (2012/04/20, p.9) were the following platitudes:

- ***The project provided overwhelming positives for Newcastle, including 1150 full time construction jobs and 'a considerable number' of long-term operating jobs, as well as flow-on employment.***
- ***As with any project of this magnitude there are some environmental considerations and we have detailed strategies to mitigate potential impacts.***

This is a vastly over-simplified picture which ignores the realities of the situation and resulting long-term disaster. Unfortunately many people, ignorant of the detrimental ecological complexities involved and addicted to GDP, will lap it up. The Newcastle Herald Editorial (2012/04/20, p.10) is guilty of making the same mistake, in its statement that "***Nobody doubts the economic importance of the Waratah Coal Services T4 loader".*** There is a significantly large body of well informed, scientifically literate people who are more than doubtful and are well aware of the pitfalls in GDP addiction, and the potential environmental and social disasters arising from pursuing ecologically unsustainable development at any cost. **"Detailed strategies to mitigate potential impacts"** cannot repair the historical cumulative desecration of the Hunter Estuary or the damage to Deep Pond and prevent decline further decline in migratory shore bird populations.

The T4 project is disregarding fundamental environmental principles for achieving sustainability. The analysis of the mining industry and its problems by Diamond, J. (***2005, Collapse: How societies choose to fail or survive, Allen Lane (Penguin Group) Chapter 13***) stressed the serious damage resulting from the continued unsustainable exploitation of natural resources in order to facilitate mining of non renewable minerals such as such gold and coal:

- Gold in the ground doesn't breed more gold (*my note – and neither does coal*).
- Renewable resources can be exploited indefinitely provided that they are removed at less than regeneration rates. However, if exploiting forest or topsoil, used to facilitate mining, exceeds regeneration rates, they will eventually be depleted to extinction.
- Australia is still "mining" its renewable resources as if they were mined minerals, being exploited at rates faster than renewal rates and resulting in decline.
- The Australian environment is exceptionally fragile -the most fragile of any First World (except perhaps for Iceland).

- Australia still clears more native vegetation per year than any other First World country, with clearance rates exceeded only byBrazil, Indonesia, the Congo and Bolivia.

To continuously maintain stable, ecologically healthy environments essential for the survival on the planet, such as atmosphere, fresh and marine water, soil and vegetation, there must be enough renewable natural resources for the human species to exploit **only a fair share.** So that a reliable economy can be sustained, other species essential for maintaining the environment must also be allowed to exploit **their fair share** to maintain themselves as well as defending themselves against excessive human demands. Unfortunately, we ***Homo sapiens*** are by far the most noxious, invasive and destructive feral animal pest species on the planet, with a long history of causing the extinction of other species and forcing the collapse of numerous human civilisations. We are reproducing at a plague proportion rate and destroying natural resources on which survival depends much faster than natural processes can replace. Ultimately this will result in collapse and extinction. An author I read some years ago, (but unfortunately failed to record name and publisher) stated that ***"the one thing that distinguishes the human animal from all other animal species on the planet is its incredible stupidity. It is the only species that deliberately fouls its own nest".***

A Newcastle Herald (2012/03/30) letter on using the approval of Ellalong Reserve as compensation for the environmental impact of proposed T4 coal loader entitled ***"Thanks for nothing"*** described the decision as ***"nothing short of farcical'.*** It was, in fact, far worse than farcical – it was a classical example of current fraudulent bribing being used to gain approval for the unsustainable T4 project. Ellalong Lagoon has a vastly different freshwater ecosystem, 40 kilometres from the estuary in the Upper Hunter Valley and can play no possible part in replacing lost habitat and displaced fauna. It dodges responsibility for achieving the fundamental objective of ***NO LOSS OF ECOLOGICAL FUNCTION*** of Deep Pond habitat and its closely associated habitats. The strategy used was as bad, or even worse, than the use of trinkets, mirrors and beads employed by our forebears world-wide when stealing land from legitimate indigenous owners.

Part 2: Extracts From Scientific Publications Demonstrating Fundamental Underlying Ecological Failures of the T4 Proposal

Walker S, Brower, A.L, Theo Stephens, R.T, & Lee, W.G. 2009. Why bartering biodiversity fails. *Conservation Letters* 2 (2009) 149–157 Copyright and Photocopying: _c 2009 Wiley Periodicals, Inc.

Regulatory biodiversity trading (or biodiversity "offsets") is increasingly promoted as a way to enable both conservation and development while achieving "no net loss" or even "net gain" in biodiversity, but to date has facilitated development while perpetuating biodiversity loss. (p.1).

Political theory predicts that (1) biodiversity protection interests will fail to counter motivations for officials to resist and relax safeguards to facilitate exchanges and resource development at cost to biodiversity, and (2) trading is more vulnerable than pure administrative mechanisms to institutional dynamics that undermine environmental protection. Delivery of no net loss or net gain through biodiversity trading is thus administratively improbable and technically unrealistic. Their proliferation without credible solutions suggests biodiversity offset programs are successful "symbolic policies," potentially obscuring biodiversity loss and dissipating impetus for action. (p.1)

Viable biodiversity barter and meaningful biodiversity protection seem mutually exclusive. We can achieve one or the other, but not both. Although compensation and no net loss are laudable ideals, ecological and political problems appear intractable, and mean that bartering is likely to accomplish more harm than good for biodiversity (p. 155).

We further conclude that inequalities, divergence, and coincidence among interests in biodiversity barter
mean that improved biodiversity measures and exchange restrictions recommended by ecologists will rarely be
adopted. (p. 155).

In sum, while compensation and no net loss are worthy goals, and bartering biodiversity might appear more promising than simple and weakly enforced prohibitions, this article suggests policies that enable biodiversity trading may perversely yield worse biodiversity outcomes. All theoretical predictions point to further biodiversity loss paving the way for development in any biodiversity trading program, while a no net loss tag-line defuses potential opposition and impetus for change.(p. 155).

Maddock, M (2003). An analysis of environmental issues and international treaty obligations concerning development proposals within and adjacent to the Ramsar listed Kooragang Nature Reserve. Protecting Our Environment: 3 Shortland The Wetlands Centre, Australia pp.36-41.

COMPENSATION FOR LOSS OF WETLAND HABITAT

It has become very fashionable to propose development or rehabilitation of new wetlands as compensation for the loss of wetlands incurred by development proposals. The Ramsar Convention (Davis 1994), the NSW Wetlands Management Policy (Department of Land and Water Conservation 1996) and the Biodiversity Protection and Conservation Act 1999 (Environment Australia 2000) all specify a requirement for provision of compensatory wetlands in the case of developments being approved which will have detrimental impacts on the ecological character of wetlands.

Unfortunately, it is well documented that such compensation projects have a lamentably high rate of failure in fulfilling the aims of compensation (for example, Race and Fonesca 1996, Streever 1999, National Research Council 2001, Chapman and Underwood 2000). Adam (1995), in his introduction to the forum "Reversing the trend – restoration rehabilitation and re-creation of wetlands", organised by the Coast and Wetlands Society and the Environment Institute of Australia (NSW Division) at Concord in 1994, stated that ***"mitigation could become an easy excuse for destroying natural wetlands"***. He added that not enough is known about mitigation, which for the present, is a gamble, and it is clearly impossible to guarantee like for like replacement. Race and Fonesca (1996, p. 94) regarded the practice of compensatory mitigation as a matter of serious concern because "***it is a bartering scheme that trades permission to damage a known quantity of wetland area for the promise of some kind of replacement, sometimes at locations away from the impacted area".*** They further add that, based on over a decade of survey results ***"the cumulative record of past mitigation projects remains undeniably poor overall."*** (p. 97)

In Australia ***"much money and resources are wasted in on-the-ground projects that are poorly designed and seldom evaluated"*** (Chapman and Underwood 2000, p.28) and ***"there are so few quantitative data available that there is a very flimsy basis for predicting the results of various management regimes"*** (Adam 1995, p. 3). Although some Australian government policies encourage rehabilitation, none go so far as requiring no-net loss (Streever 1999).

Although USA regulations require no-net-loss, the failure rate is high. The USA National Research Council (2001) carried out an exhaustive audit of the situation regarding compensatory mitigation, restoration, creation, enhancement and in exceptional cases, in preservation of other wetlands, as compensation for impacts to natural wetlands. The council reviewed available literature on replacement of wetland functions, considered restoration and creation projects, inspected numerous sites and evaluated ecological performance of the projects.

They found that:

- **the goal of no net loss of wetlands is not being met for wetland functions, despite progress in the last 20 years;**
- **required mitigation had frequently not been carried out or had failed to meet conditions;**
- **the more degraded a site and the watershed, the less likely it is to support a high-quality project;**
- **performance expectations have often been unclear, compliance often not assured or attained;**
- **there was inadequate data to determine the status of a required compensation.**

The study also identified a number of key factors needed for successful compensation projects:

- **wetland functions must be understood within a watershed framework;**
- **hydrological equivalence is necessary for wetland sustainability;**
- **landscape position, hydrological variability, species richness, biological dynamics and hydrological regime are all important factors that affect wetland restoration and mitigation of loss;**
- **long term management is important because wetland restoration and creation sites seldom achieve functional equivalency with reference sites within 5 years and up to 20 years may be needed;**
- **establishment of appropriate hydrology is fundamental to wetlands mitigation through either restoration or creation;**
- **the attainment of no net loss requires that performance requirements for individual sites must be clearly stated and the stated requirements will be met.** (National Research Council 2001)

The National Research Council Report (2001) stressed that the concept of no net loss of wetlands refers to both the ***"wetland acres and wetland function":***

> ***When setting compensatory mitigation goals, the functions of a wetland proposed for fill need to be precisely characterized and, if possible, quantified, as should the functions of the proposed compensatory mitigation project.*** (Pp. 128-129)

Ambrose (2000) recorded that recent surveys show that mitigation policies have reduced the rate of wetland losses **BUT THEY HAVE NOT ACHIEVED THE GOAL OF NO NET LOSS:**

- **areas proposed for mitigation often do not meet the area impacted;**
- **few mitigation projects are in compliance with all the required conditions;**
- **the situation is worse in regard to the ability of the restored wetlands to replace natural wetland functions;**
- **most such wetlands are of moderate quality and some are of very low quality;**
- **often different types of wetlands are provided in compensation for those lost;**
- **some early studies confused compliance success with ecological (functional) success.**

For example, an evaluation of riparian mitigation projects required by the Corps of Engineers in Orange County, California, found that none of the projects were successful from a functional perspective. Evaluation of two projects in San Diego, California found that 5 years after construction, a mitigation marsh had not reached the level of the natural reference site in 10 of the 11 ecosystem functions (Ambrose 2000).

Ambrose (2000) also emphasized the need for long-term monitoring because of the extensive period of time required to even approximately achieve the desired standard – long-term achievement of functionality and sustainability may not be apparent until 10-40 years after project completion. The absence of explicit provisions for remediation if ecological functions are not replaced, the simple non-function requirements and the short time frame (usually 3-5 years) required of projects means that little confidence can be placed that natural wetland functions will be achieved and sustained (Ambrose 2000). Not-withstanding all this, Ambrose (2000) stated that **even carefully designed projects aimed at replacing natural functions do not succeed because there is still so much that we don't know.**

The immediate corollary to the uncertainty of the time factor and the uncertainty as to eventual success is that a compensatory project that is intended to provide replacement habitat for critical populations of important species must be started early enough, given time to work and be evaluated for their success **before the impact on the site being developed begins. If this is not done, the use of a promise to provide compensation as an excuse to start a development is singularly dishonest and environmentally irresponsible.**

In situations where dredged materials, placement of fill and excavation of waters (including wetlands) have taken place, the Clean Water Act in the USA has recognized that:

> ***Although an individual discharge may, in itself, constitute a minor change, the cumulative effect of numerous piecemeal changes can result in major impairment of water (or wetlands) resources and interfere with the productivity and water quality of aquatic ecosystems***. (Stein and Ambrose 1998, p. 393)

The USA requires the collection of information re accumulative impacts and the results be taken into account in decision making processes:

- **disturbances which occur so close in time that the system cannot recover;**
- **disturbances which are so closely spaced that their effects are not dissipated;**
- **interaction of disturbances that produce effects different from the individual disturbances which produce effects by small incremental changes;**
- **disturbances which cause effects remote in time or space from the original.** (Stein and Ambrose 1998).

Stein and Ambrose (1998) demonstrated the falseness of a previous assumption that if 100% of functional capacity of an area is lost, one hectare of mitigation fully compensates for one hectare of loss. Less than one percent of affected areas studied

resulted in any positive impact scores for any criterion and 74% resulted in adverse or substantial adverse impacts.

Assessment of cumulative impacts must address a range of issues in addition to gross area. Evaluation criteria must include:

- **endangered species habitat;**
- **structural diversity of habitats;**
- **spacial diversity and interspersion of habitats;**
- **undeveloped open space habitat;**
- **adjacent habitats (floodplain land use);**
- **linear contiguity of habitats**. (Stein and Ambrose 1998)

The Stein and Ambrose (1998) findings on channel engineering are particularly relevant to the proposed dredging project in the context of the century-long series of ill-considered degradation projects which have taken place within the Hunter estuary:

- **Channelisation of a 0.5 hectare tributary of a system may have a more severe impact than temporary clearing of a 3 hectare tributary;**
- **Channels with steep sides and slopes isolate the channel from adjacent uplands, limiting the dynamic riparian processes such as over bank seed dispersal, and restricting free movements of organisms between upland and riparian habitats;**
- **Projects such as channelisation often result in permanent loss of aquatic resources and/or preclude further habitat from establishing**.

Chapman and Underwood (2000) documented the weaknesses in Australian attempts to carry out restoration projects. They point out that the process is a branch of ecology and should be considered a scientific discipline, but that scientific method and ecological knowledge are missing from many projects. Even acknowledging this, the extent of the necessary ecological understanding available is extremely limited, as pointed out by Streever (1999) who spent a number of years working for the University of Newcastle and the Kooragang Wetlands Rehabilitation Project in "on-the-ground" projects on Ash Island. He stated that **knowledge of wetland systems and rehabilitation strategies is far too limited to guarantee success in any but the simplest cases** and was particularly critical of the situation in USA:

> ***No-net-loss legislation spawned dozens of companies that claim expertise in wetland rehabilitation, but in fact the companies rely on seat-of-the-pants judgment and the bottom line: Surprisingly little science or even serious reflection has accompanied the restoration of thousands of wetlands in the United States.*** (p. 5)

Chapman and Underwood (2000) further stressed that qualitative descriptions of restoration projects are common, that many published accounts include a mix of theory, activities, assessment, or often data collected which, even worse, do not address the stated objectives of a project. They are critical of the largely political motives underlying the Homebush Bay Project and state that the desire to please everyone has the strong probability of achieving none of the aims and pleasing no-one. They emphasise that most studies have:

- ***no clearly-stated hypotheses;***
- ***are simply descriptive comparisons among restored and natural habitat, (often unreplicated), with poor sampling design, little replication and few or no analyses nor data that can adequately assess restoration.*** (p. 30)

West (1995) provided a good example of the length of time needed by compensation projects to even remotely achieve some level of equivalence to the reference site which it is compensating. In a NSW Fisheries mangrove transplanting project on the Hawkesbury, even after 12 years, the transplanted mangroves had not reached the height, density or complexity of the surrounding mangrove forest. West states that **the first step should be to prevent further destruction of the existing wetland system.**

It would be completely dishonest to claim that restoration or creation projects of any kind could ever compensate for further degradation of the Hunter estuary. As Bowen et al. (1995) pointed out, an estimated 60% of coastal wetland resources in NSW have already been lost or destroyed through such impacts as draining, filling, and clearing for urban or industrial uses, the Kingsford and Ferster Levy (1997) historical analysis of the more than 100 years of destruction of the Hunter estuary showed that the estuary and Kooragang Nature Reserve are fragile remains of a once robust system, and the Healthy Rivers Commission (2002) report points out that *the estuary's ecosystem has lost flexibility to respond to further disturbances and that continuous loss of ecological integrity represents a serious threat to the catchment's sustainability.*

Maddock, M. 2008. **Ecological Degradation and Biodiversity Loss in the Hunter Estuary NSW. Declining Ecology in the Lower Hunter Wetlands NSW: No. 2 Hunter Wetlands Centre Australia**

4.2 Problems with Compensatory Mitigation Requirements

In 2001, major international review studies of programs of restoration or creation of habitat as compensation for loss of wetland habitat through development (National Research Council 2001, Atkinson *et al.* 2001) showed that there was a high rate of failure for such projects, the science of habitat creation and restoration is poorly understood, a vast majority of such projects failed to address loss of wetland functions, design and monitoring procedure, and the time frames for such projects have been inadequate**.** The National Research Council (2001) exhaustive audit in USA found that:

- *Wetlands are complex ecosystems.*
- *The goal of no net loss is not being met for wetland functions, despite progress for the last 20 years.*
- *Required mitigation had frequently not been carried out or had failed to meet conditions.*
- *The more degraded the site and the watershed, the less likely it is to support a high-quality project.*
- *Performance expectations have often been unclear, compliance often not assured or attained.*
- *There is inadequate data to determine the status of a required compensation.*

- *Long-term management is important because wetland restoration and creation sites seldom achieve functional equivalency with reference sites within 5 years and up to 20 years may be needed.*

The Atkinson *et al.* (2001, p. 93) review in the UK supported the findings of the USA audit, describing it as the *"recent damning review of 20 years mitigation in replacing wetlands in the United States"* and it highlighted that:

> *where and when possible, habitats designated to be of high value to society should not be destroyed with the assumption that they can be readily replaced.*

It further stated:

- *One of the greatest threats facing waterbirds is loss or degradation of coastal habitats through development or, in the medium to long term, loss of habitat due to climate change and sea level rise.*
- *When restoring habitats it is necessary to take an approach based around restoring ecological functions rather than concentrating upon individual attributes.*
- *It is wise to demand that habitat lost is recreated in advance of that loss.* (pp. 1-3)
- *The science of coastal habitat creation and restoration is poorly understood.*
- *Many features of marshes and mudflats are very difficult, if at all possible, to replicate.* (p. 75)
- *Mudflats and saltmarsh can be created. Physical stability is achievable. Equivalence with natural areas cannot be guaranteed.* (p. 89)
- *We need a greater ability to predict the success of mitigation schemes or new habitat must be created and judged to be an acceptable substitute before development takes place.* (p. 92*)*

In a review of the literature, Maddock (2003a) found that there was significant evidence of the unreliability and absence of credibility of such effort in Australia. Some examples from these reviews are given below:

- Adam (1995) stated that *"mitigation could become an easy excuse for destroying natural wetlands"*, not enough is known about mitigation, which for the present is a gamble, and it is clearly impossible to guarantee like-for-like replacement.
- Race and Fonesca (1996) regarded the practice of compensatory mitigation as a matter of concern because *"it is a bartering scheme that trades permission to damage a known quantity of wetland area for the promise of some kind of replacement, sometimes at locations away from the impact area"* (p. 64) and based on over a decade of survey results *"the cumulative record of past mitigation projects remains undeniably poor overall"* (p 97).
- Streever (1999) stated that *knowledge of wetland systems and rehabilitation strategies is far too limited to guarantee success in any but the simplest of cases.*
- Chapman and Underwood (2000, pp. 28-30) stated that in Australia *"much money and resources are wasted in on-the-ground projects that are poorly designed and seldom evaluated*", and documented the weaknesses in Australian attempts to carry out restoration projects:
  - *The process is a branch of ecology and should be considered a scientific discipline, but scientific method and ecological knowledge are missing from many projects.*
  - *Qualitative descriptions of restoration are common.*
- The Straw (1999) Hunter Estuary wader habitat investigation report to NSW NPWS stressed that *although construction of artificial habitat for loss due to development is "technically feasible" success of such ventures in providing habitat that will*

completely compensate for loss cannot be assured and the few successes reported were the result of accident, rather than design.

- Ambrose (2000) stated that, based on his surveys*:*
  - *Mitigation policies have not achieved the goal of no net loss.*
  - *Areas proposed for mitigation do not meet the area impacted.*
  - *The situation is worse in regard to the ability of the restored wetlands to replace natural wetland functions.*
  - *Most such wetlands are of moderate quality and some are of very low quality.*
  - *Many published accounts include a mix of theory, activities, assessment, or often data collected, which, even worse, do not address the objectives of the project.*
  - *Most studies have no clear hypotheses, and are simply descriptive comparisons among restored and natural habitat, with poor sampling design, little replication and few or no analyses, nor data that can adequately assess restoration.*
  - *Often different types of wetlands are provided in compensation for those lost.*
  - *Some early studies confused compliance success with ecological (functional) success.*
  - *There is a need for long-term monitoring, because long-term functionality may not be apparent until 10-40 years after project completion.*
  - *The short-term time frame, usually 3-5 years, means that little confidence can be placed that natural wetland functions will be achieved and sustained.*
  - *Even carefully designed projects do not succeed because there is still so much that we do not know.*
  - *A compensatory project intended to provide replacement habitat for critical populations of important species must be started early enough, given time to work, and be evaluated for their success before the impact on the site being developed begins. If this is not done, the use of a promise to provide compensation as an excuse to start a development is singularly dishonest and environmentally irresponsible.*
- West (1995) provided a good example of the length of time needed to even remotely achieve some level of equivalence to the reference site which it is compensating, in a NSW Fisheries mangrove transplanting project on the Hawkesbury. Even after 12 years, the transplanted mangroves had not achieved the height, density or complexity of the surrounding mangrove forest. He stated that *"the first step should be to prevent further destruction of the existing wetland system"*.

The previous discussion concerning the wetlands in the Hunter Estuary provides significant evidence that the fundamental underlying principle of no net loss of ecological function, and other essential criteria, are not being met by offsets provided or proposed for development projects in the estuary.

4.3 Management Issues and Conservation Lands

During 2001-03 an independent Healthy Rivers Commission appointed by the NSW Government studied ecological health issues affecting a number of the state's river systems, including the Hunter. The report on the Hunter River System (Healthy Rivers Commission 2001, p. 9) stressed that government policies on economic development, the environment and ecologically sustainable development (ESD) underpinned the inquiry. It defined the tenets of ESD as:

- *the precautionary principle;*
- *inter-generational equity;*
- *conservation of biodiversity and ecological integrity;*
- *improved valuation, pricing and incentive mechanisms.*

It further stated that:

Current river management must be assessed against these principles. In particular, ESD requires that priority be given to modifying actions which cause permanent long-term adverse changes to rivers and catchments via, for example, erosion, some forms of channel change, modifications to aquifers or loss of species (p.9).

The theme that permeated the Commission's assessment of current river management, as a fundamental principle underlying its criticisms and recommendations**, was** the importance of whole ecosystem management, a principle first raised by Moss (1983) and subsequently ignored. Five years after the release of the Commission's Final Report, these requirements are still not being met in decision making for estuary management. It appears to have become one of the *"glossy reports gathering dust on shelves"*, as citizens had stated in their submissions (Healthy Rivers Commission 2003, p. 12).

The Commission's reports were highly critical of shortcomings affecting the ecological health of these rivers:

- *Ecologically Sustainable Development remains an ideal rather than a reality of the Hunter River and its Catchment.*
- *Government and Community Goals for ecological sustainability are not being met.*

The Healthy Rivers Commission (2003, Principle 2, p. 6) final report put forward a plan for the management of the estuary to be reformed in favour of an integrated approach, which has still not been acknowledged or accepted (pp. 6-8).

- *A river catchment is an easily identified landscape unit, the key elements and processes of which are interconnected to form one natural system.*
- *Attempts to resolve local problems or manage a specific element of the system **will** generally fail to improve the health of the river as a whole.*
- *There is ample evidence that attempts to manage the whole by management of each part in isolation are almost certainly to fail to improve the health of the river as a whole.*
- *For long-term and sustainable results, river management must focus on the needs of the whole system even when specific issues are the subject of review or action.*
- *It is now clear that the properties of natural systems, along with a lot of human and social systems, are different from the sum of the properties of their constituent parts.*
- *The systemic nature of rivers has become better understood in the past couple of decades. Many experts, inside and outside government, have concluded that natural systems need to be managed as whole entities. Yet prevailing institutional arrangements have continued to encourage a compartmentalised approach. As a consequence, there is often a failure to perceive that the whole river system may be deteriorating, even though a selected part might be showing some improvement. Such 'improvements' are subsequently proven to be temporary or illusory.*
- *Analysis of each river must not be fettered by existing commitments or programs, nor influenced by a particular operation of technical bias. Success or failure should then be measured in terms of system outcomes, including the securing of critical value, and not just results of implementing narrowly defined strategies to deal with local symptoms.*
- *Where integrated or system management does not occur, the cumulative impacts of actions are seldom assessed or acknowledged to the detriment of the river.*
- *The longer term protection of river health requires that land use planning consider not only land capability but also the capability of the river to withstand the impacts of inappropriately developed or poorly managed land. A focus on managing rivers as*

whole systems forces recognition of those elements within a system that are most stressed and/or those which are the least capable of withstanding. System based approaches can assist the community to recognise and accept the very real limits to which both land and rivers can be pushed.

- *For effective integrated management, it is important that the most appropriate 'system boundary' is identified for the particular issue under investigation.*

The problems outlined above in this section and throughout this report, have been, and are still, being mirrored throughout the whole of the estuary. It is in a state of ecological crisis, and increasingly resembles a canal system (Herbert 2007b, p. 38). Maddock (2004b, p. 3) stated that the cumulative effect of developments for Honeysuckle, Kooragang Island, the South Arm Channel and proposed port, the infrastructure corridor across Ash Island/North Arm Channel, and the Tomago lands would produce a "gigantic, ecologically destructive canal estate on the banks of an ecologically sterile drain". The Healthy Rivers Commission Final Report (2003, p. 6) also expressed similar sentiments when it stated that**,** *"in a river that has been converted into a channel and used as a drain, it is quite possible to improve water quality but ecosystems cannot be sustained in the absence of adequate habitat"*.

In the NSW Legislative Council (2003) Hansard recorded that in reply to a raft of 38 questions on the problems of the Hunter Estuary put to the Minister for the Hunter in October 2003, the Minister chose to answer only one:

What recommendation of the Healthy Rivers Commission, Hunter River, Final Report has the government accepted, and what funding has been allocated to carry out these recommendations? (NSW Legislative Council 2003) (Part 34).

His answer was *"the Government is still considering the report"*.

There is still no evidence that the Healthy Rivers Commission report has been considered or adopted. The following assessment strongly indicates that the management approach to the estuary is still fragmented and has failed to implement the key findings and adequately apply ESD principles.

When SEPP 74 was gazetted, administration of three parcels of land in the estuary (the former BHP Slag Dump on Kooragang Island, the Kooragang Island industrial area and the Tomago Buffer Lands including the proposed Austeel site) were put under control of the Regional Land Management Corporation. The Robson (2003) article on the Opinions page of the Herald described the Corporation's role in the estuary as a **"guiding hand for development",** managing day to day activities such as leasing arrangements, EIS processes, remediation and associated matters.

These sites are adjacent to, or very close to, the Estuary Ramsar site and any developments would potentially impact negatively on it. However, as pointed out in Maddock (2004b, p. 29), no representatives from conservation interests with expertise in wetlands, migratory waders or the Ramsar Convention, had been appointed to the RLMC Board.

The Robson (2005) article, entitled "Post BHP challenge is a matter of balance", presented a diagram described in the article as showing *"the major port-side sites the RLMC is managing, including about 1380 hectares of land on Kooragang Island***".** It further stated:

Given its location, Kooragang is an extremely significant industrial area. It also has recognised environmental value including internationally recognised wetlands, and development needs to be sensitive to this environment. With the rezoning in 2003 of almost

800 hectares of RLMC-managed land to environment protection status, about two-thirds of Kooragang is now protected.

The article and its diagram raised significant consternation in the conservation community with knowledge of the estuary and an understanding of the major issues at stake, and also revealed that the approaches adopted by RLMC were far from "sensitive to this environment". For example, the land identified as under RLMC control showed a section of the Ramsar site near Stockton Bridge as proposed in the Newcastle Port Environs Concept Proposal (KBR 2003) for excision for industrial purposes. Appendix 4, Figure 4 shows an aerial photo view of the location of that section proposed for excision. Figure 7 shows the diagram published in the article, with my annotations added to identify the position of the Ramsar land earmarked in KBR (2003) for excision and other key wetland sites which would be impacted negatively by any developments within the area.

An earlier report in the Herald (Wendt 2004, p. 16) announced a call for proposals for industrial developments on RLMC land described as *"millions of dollars worth of prime vacant industrial land at Kooragang Island and Tomago"* released on the international market including:

- *350 ha on Kooragang with deepwater frontage and access to the Port of Newcastle;*
- *400 ha at Tomago which had been earmarked for the former Austeel development.*

In a letter to RLMC, Fraser (2005) raised HBOC concerns about the misleading information presented to a wide public audience by the published diagram, as well as questions concerning the future of Long Pond and Deep Pond, implied in the call for proposals referred to in Wendt (2004). The reply from the Corporation (Foot 2005) stated that the intention of the article was to give an overview of potential development within the Newcastle Port and in particular that associated with land and processes managed by RLMC:

The principal aim of the figure accompanying the article was to provide a broad illustration of the development potential on Kooragang Island and Mayfield and not any revision of boundaries or zoning on Kooragang Island and was not intended to foreshadow any change in land use particularly associated with the Kooragang Nature Reserve.

It is acknowledged that the diagram was schematic, as are many maps of the estuary. However, including nationally and internationally important Ramsar-listed land in error, in a publicly released document, clearly represented as RLMC industrial land, was a matter of significant concern.

The reply indicated that Expressions of Interest proposals being considered further were in the early stages of design development, however:

none necessitate the destruction of those wetlands described as the "Long Pond" and the "Deep Pond". Nonetheless, if these proposals, or any other potential further proposals, were to lead to a loss of habitat, this would be considered specifically for the individual development and assessed under the relevant legislated environmental approval processes. Such processes would be expected to involve community consultation, and any compensatory habitat requirements, including ongoing maintenance obligations, would be considered and developed at this stage.

The reply stated further:

There has been no consideration given to compensatory habitat, as a development proposal leading to the destruction of "Long Pond" and "Deep Pond" habitats has not

arisen. However, we are aware of compensatory measures within the Lower Hunter Estuary currently being progressed by NPWS to offset the effects of nominated industrial developments on Kooragang Island, and these would act as a guide for any future compensatory habitat requirements.

Since this correspondence in 2005, SEPP 74 has been repealed but the infrastructure corridor across Ash Island has been included in SEPP (Major Projects) 2007. The land concerned (Appendix 4, Figure 6) came under the control of the Hunter Development Corporation. New developments have been processed for both Tomago and Kooragang lands, and the points of issue resulting in ecologically unsatisfactory compensatory proposals and implementation, already dealt with in some detail above, are summarised below:

- The whole process of environmental offsets has been discredited by international and Australian studies.
- The compensatory measures *"progressed by NPWS to offset nominated developments on Kooragang Island"* were examples of **"double dipping"** as they had been originally recommended and planned to compensate for historical past habitat destruction, and not for new projects unidentified when the original plans were being developed.
- Three of four projects **"***progressed"* failed, and therefore did not satisfy the fundamental test of no loss of ecological function.
- A fifth project (compensatory habitat for destruction of Big Pond, originally planned for the failed Protech Steel Project) had funds transferred to other unrelated projects, and no compensation for the pond ever eventuated.
- The planning and approval processes for the two new projects on RLMC land (Redlake at Tomago, and the NCIG Coal Loader in the Kooragang Industrial Area which will be built over the destroyed Big Pond) exemplify the processes heavily criticised by international and Australian literature on the subject.
- The Newcastle Port Environs Concept Proposal (KBR 2003, p. 62) for the Kooragang Island infrastructure corridor across Ash Island, to connect the South Arm of the Hunter River to Tomago, proposed planting zones between services, under or overpasses or a nature strip to enable fauna to cross. These proposals were completely irrelevant to the major important role of Ash Island in the total estuarine ecosystem for migratory waders, and showed no understanding of the complexity and inter-relatedness of ecological processes linking the island with other critical sites.

There are still major unsolved problems with issues concerning conservation lands. The statement in the article by Robson (2005) that *"the rezoning in 2003 of almost 800 ha of RLMC-managed land to environmental protection status, about two-thirds of Kooragang is now protected"* did not identify the location of the 800 ha, nor its specific environmental values as conservation land, and unless the land transferred was soundly based on the ecological needs of both Kooragang Nature Reserve and the total estuary ecosystem, it would have been a meaningless exercise.

Kooragang Island consists of an artificial remnant, left over after cumulative drastic changes made to the ecological nature of a multi-island shallow estuarine delta, wrought by development from white settlement until the 1970s. It still supports a substantial, but steadily declining population of migratory shorebirds protected under international treaties, and a variety of other waterbirds including threatened species under Australian legislation. However, it has lost flexible capacity to respond to external disturbances and therefore has become "*more susceptible to impairment"*, as indicated in warnings by the Healthy Rivers Commission (2001) report.

Two thirds "protected" as conservation land by drawing an artificial boundary does not necessarily mean that the land has the qualities required to maintain adequate ecological functioning of the specific site, nor does it provide adequate interactive capacity for the proper functioning of the whole estuarine ecosystem. The location of the 800ha was not disclosed in the article, but it is clear that it did not include the important Ash Island wetlands, known to play an important role in the wider ecosystem.

The Department of Environment and Conservation (2006b) announced that the State Government had developed a 25 year strategy ***"****to guide where development occurs and ensure protection of the Hunter's natural environment"* and a "*regional conservation plan which sets out the region's nature conservation priorities for the next 25 years"*. The plan announced that:

- *it would deliver significant additions to the national parks and reserves system in the region;*
- *20000 ha of government land with "high conservation value" would be reserved in perpetuity to form the backbone of a new conservation corridor;*
- *the reserves would include a new Green Corridor (approximately 14600 ha) stretching from Watagan Ranges through Hexham Swamp to Port Stephens;*
- *the new reserves would provide enhanced protection of Kooragang Island and the Northern Arm of the Hunter River, listed under the Ramsar international wetland protection treaty and which have international conservation values;*
- *the reserves would also provide important habitat protection for migratory species protected under the China-Australia Migratory Bird Agreement (CAMBA) and the Japan-Australia Migratory Bird Agreement (JAMBA).*
- *Legislation for reservation of government land transfers had been introduced for commencement in 2007.*

After the demise of the Austeel project and the rescinding of SEPP 74, the Tomago Buffer land was divided and rezoned into a north-western component zoned General Industries, and a south-eastern component zoned Environmental Conservation. A part of the land zoned for industries has been allocated to the Redlake project, referred to earlier in this report, land which has to be substantially filled to above flood level. The remaining land was also originally earmarked for industrial purposes, but is more low-lying, and hence would have required much more substantial filling to exceed flood level, in order to make it suitable for use as industrial sites.

Both areas were originally part of a saltmarsh area, historically a major night roosting site for migratory waders. Although this land has now been zoned Environmental Conservation, and is immediately adjacent to the KNR Ramsar site, it has not been transferred into the reserve. It has also been excluded from the project for restoration of tidal flushing aimed at stimulating regeneration of saltmarsh habitat, commenced in the Tomago Wetland section of KNR in 2008.

Hexham Swamp and Kooragang Nature Reserves have been renamed as the Hunter Wetlands National Park. However renaming has made no impact on providing enhanced protection of Kooragang Nature Reserve and the North Arm, on providing important habitat protection for CAMBA and JAMBA migratory species, nor in enhancing whole system management.

There is still a major gap in protection due to the exclusion of the very important Area E and the major negative effects from the infrastructure corridor shown in the Tomago zoning map (Appendix 4, Figure 6). The undefined additions to the reserves system have not yet been announced nor the transfers implemented. The exclusion of Area E and Deep Pond, and the failure to implement the environmental protection zoning for the Tank Paddock passed by

Newcastle City Council in 2006, had rendered the Green Corridor incomplete. This has significantly reduced its effectiveness in enhancing the ecological functioning of the total system and thus its capacity to ensure *"protection of the Hunter's natural environment"*.

The key to ensuring *"protection of the Hunter's natural environment"* is to base choices of land of *"high conservation value"* to *"reserve in perpetuity***",** on very sound ecological grounds to ensure that it plays a major role in maintaining ecological functioning within the site boundaries as well as in the total ecosystem, rather than the perfunctory drawing of a boundary around a piece of land and declaring it a conservation protection zone.

4.4 Ecosystem health and cumulative negative impacts

Throughout this report, the issue of consistent failure to recognise the need to undertake assessment of cumulative impacts over time has been raised as the major problem underlying the declining health of the estuary. The Healthy Rivers Commission (2001 and 2003) recognised the issue as important and raised the linkage of four issues concerning a lack of assessment of cumulative impacts in decision making for the Hunter Estuary:

- *Sustainability requires that an ecosystem possess 'ecological integrity' (inherent functional stability) and resilience (a capacity to absorb disturbance without significant change in system behaviour). These features are dependent upon maintenance of the ecosystem's natural diversity and complexity throughout time.*
- *As human impacts directly or indirectly simplify ecosystems (for example by reducing habitat diversity or eliminating species) the systems adapt and become less flexible in their response to external disturbances and, therefore, more susceptible to significant impairment. Thus, not only fauna and flora may be lost, but also benefits or services to the wider community and human activity* (Healthy Rivers Commission 2001, Appendix 2, p. 64)
- *Where integrated or system management does not occur, the cumulative impacts are seldom assessed or acknowledged to the detriment of the river* (Healthy Rivers Commission 2003, p. 7).

The Commission found, in its example of failure to examine cumulative effects in the Shoalhaven's Kangaroo Valley, that:

> *"cumulative impacts of the current level of development were receiving inadequate consideration, and that they were in total, taking an unacceptable toll of the riverine environment"* (Healthy Rivers Commission 2003, p. 7).

The criticism of the management of Kangaroo Valley and its outcomes can be directly applied to the case of degradation and habitat destruction in the Hunter Estuary. One of the most crucial examples is the negative impacts resulting from the widespread tentacles closely associated with projects for Newcastle Harbour.

The HBOC (2004, pp. 3-4) submission to the proposed extension of shipping channels vigorously objected to the approaches adopted in the Environmental Impact Statement (EIS) (GHD 2003). Following a table summarising the inadequate attention given to five categories of cumulative impact issues omitted by the EIS, the submission stated:

- the authors of the EIS recognised that **"***there are significant negative cumulative impacts through the loss of both terrestrial and aquatic habitat on and around Kooragang Island as a result of the proposed development and the other related aspects of the Austeel project";*

- there was *"no attempt to quantify this negative cumulative impact nor any direction from the DIPNR for the proponent, the contractor or any other agency to undertake such an assessment, or to consider it as part of the project approval process;*
- no recognition was afforded to the fact that *"the estuary has suffered significant degradation and habitat loss due to development for more than 200 years resulting in major negative impacts on flora and fauna";*
- there was *"no recognition of the possibility that the estuary has lost its capacity to cope with the further degradation of its 'ecological integrity', as clearly predicted in the report of the Healthy Rivers Commission (2001)".*
- there was an historically demonstrated probability ***"****that a series of "stand-alone" environmental impact statement processes will conclude that the impacts of the individual projects are "not significant" while an assessment of the cumulative impact of all aspects of the Austeel proposal would determine otherwise. It is noted that the NPWS has nominated its concern for incremental loss of wetland habitat in its requirements for the EIS. The Healthy Rivers Commission Final Report (2003, p. 14) points out that its own inquiries "clearly demonstrate that doing "small things" in many places will not resolve big problems".*
- it is the view of the HBOC that *"a single, impact assessment process that considers the integrated effects of all developments associated with the Austeel Project should have been conducted to enable a single all-encompassing analysis of the cumulative impact to be made. A decision on whether the dredging and port works development can proceed cannot be validly made on the results of this EIS alone.*

For example, Long Pond (see location Appendix 4, Figure 6) was put under threat of destruction under the original Austeel - Ash Island Infrastructure Corridor - Hunter South Arm Dredging suite of proposals, but the site-specific EISs and project evaluation procedures failed to deal with cumulative effects on the estuary. As a result, false assumptions were made about the total impact of destruction of the ecological contribution of small sites and the availability of alternative sites for species displaced by the destruction.

5.0 CONCLUSIONS

In its Final Report on the Hunter River System, the Healthy Rivers Commission (2002, p. i) found that government and community goals for ecologically sustainable development (ESD) had not being fully addressed, let alone achieved. In 2008, the only change that can be reported is that the situation is far worse - the goal is even further from being addressed than it was in 2002. There is still no integrated whole of system approach as recommended by Moss (1983), ownership and management of sites are still fragmented, environmental assessment processes are still site specific in their approaches, and ecology has come a distant last in the push for economic growth measured purely in dollar terms.

To adequately understand ecological trends over time, and to have any chance of achieving government and community goals for ESD, it is critical to recognise that:

- *Ecological systems are not site specific. They are involved with a highly complex web of physical, chemical and biological processes that are not constrained within any artificially drawn boundaries prescribed by the whims of humans.*
- *All wetland components within the total Hexham – Kooragang - Hunter Estuary ecological system, have been degrading under continuous pressure from human activity for more than 200 years.*
- *These component wetlands are influenced by, and extend influence to, wider state, national and international systems.*

- *Their viability as healthy ecological entities operating within the wider system requires not only sound management within each site itself, but sound management of the total ecosystem beyond their boundaries.*
- *Cumulative fragmentation and degradation within the wider system induce negative impacts on all components, with ultimately total collapse.*

Another omission from this report is an analysis of potential economic and social outcomes that will arise, depending on which mix of complex interactions between ecological, social, and type of economic growth, prevails. For example, serious loss of woodland habitat in the estuary catchments, linked through the current economic model of dependence on increasing coal mining for economic growth at any price, is resulting in increased damage to the ecological and social values of the estuary, at the same time as increasingly damaging greenhouse gas emissions will reduce the planet's capacity to provide life support as we know it.

The current economic and social model places economic growth in dollar terms and the creation of jobs at any price, as the major priority. It makes the unwarranted assumptions that human well-being will grow automatically with it and that any sort of job is good for the economy. Lip service is given to ecological issues under the pretext that a "balance" can be achieved between environmental protection and the "economy", and financial and socially destructive outcomes can be patched up with illusory "mirrors and beads" compensatory projects.

The model does not distinguish between the real costs of needs versus wants, nor does it factor in the long-term, intergenerational equity, dollar and social costs that result from the long-term degradation that is the inevitable result of such a model. It is too vast an issue to try and deal with here but it must be recognised that these complex issues interact with the complex ecological issues and cannot be solved by focussing specifically on only one dimension. There is a substantial body of literature that tries to come to grips with this complexity. Below are just a few examples as a wake-up call for those who oversimplify the narrow economic "growth at any price" model, and ignore the inevitable serious cumulatively negative impacts.

Heines (1990):

> *A degraded land inevitably produces a degraded people.*
> *It is ourselves we are destroying:*
> *All the while we preserve a few wretched specimens of this and that in a zoo, controlled park or reservation or as a collection of images on film, part of an ever growing catalogue of fossil life.*

Healthy Rivers Commission (2001):

> *The economic indicator GDP (Gross Domestic Product) values environmental assets poorly, because it is a measure of economic activity, and does not differentiate between transactions that improve environmental or human well being, and those which diminish them. Thus resource depletion contributes to GDP without recognition that the asset ("natural capital") has been depreciated* (p. 66).

Suzuki (2003):

> *It is the ecosystem that is the fundamental "capital" on which life depends. Financial leaders manipulate the monetary system for immediate profit with little regard for environmental or human consequences.*

We offer money to the dispossessed as if cash can compensate for things that are unique and irreplaceable (p.95).
We rip up the Earth's productivity in order to keep on growing, even when this conflicts with the most fundamental rule of economics – you don't spend all your capital if you want to avoid bankruptcy (p.101*).*
Fiscal responsibility dictates that we live on our interest and not touch capital (p.128).

Flannery (2005):

1986 marks the year that humans reached earth's carrying capacity. Ever since we have been running the environmental equivalent of a deficit budget, which is only sustained by plundering our capital base (pp. 78-79).

Hamilton and Deniss (2005):

"Affluenza" is defined as:
The bloated, sluggish and unfulfilled feeling that results from efforts to keep up with the Joneses.
An epidemic of stress, overwork, waste and indebtedness caused by dogged pursuit of the Australian dream.
An unsustainable addiction to economic growth (p. 3).

Australians are three times richer than their parents and grandparents were in the 1950s, but they are not happier. Despite the evidence of a decline in national well being, governments continue to put the economy first. Our obsession with economic growth and money means that the things that could improve our wellbeing are being sacrificed. The challenge of our age is to build a new politics that is committed above all to improving our wellbeing (p. 217).

A healthy, diverse natural environment is valuable in itself, it is essential to our well being. But Government and business tell us we cannot afford too much protection, that it is bad for GDP. We know, though, that well being of further generations will be severely affected if we fail to resolutely tackle climate change, loss of biodiversity, pollution and waste (p. 223).

Suzuki (2005):

These days we are bombarded by media stories and headlines crying that the economy is the bottom line and should dictate the way we behave, our priorities, and our sacrifices. That never made sense to me – we know we are biological creatures that if we don't have clean air, water, soil and energy, we cannot live healthy, productive lives (p. 232).

Diamond (2005):

There are many reasons that are commonly advanced to dismiss the importance of environmental problems and these, in my opinion, are not well informed.
These objections are often posed in the form of simplistic one liners. "The environment has to be balanced against the economy".
This quote portrays environmental concerns as a luxury, views measured to solve environmental problems incurring a net cost, and considers leaving environmental problems unsolved to be a money saving device. This one liner puts the truth exactly backward.
Caring for the health of our surroundings, just as of our bodies, is cheaper to avoid getting sick than trying to cure the illnesses after they have developed (p. 503).

It may be too late to save the estuary already, but adopting a new economic model may prevent what little of it is left from getting worse.

Hamilton, C. and Deniss, R. 2005. Affluenza: When too much is never enough. Allen and Unwin, NSW.

(Note: another quote from these authors which was not included in Maddock 2008)

> *Economic growth is treated as the panacea for all our social ills. But growth in GDP has almost no connection with improvement in national well being. GDP takes no account of how increases in income are distributed or of the damage to the natural environment that economic activity can cause.*
>
> *We need a set of national wellbeing accounts so that we can monitor our progress. These accounts should report on the quality of work, the state of our communities, our health, the strength of our relationships and the state of the environment. Governments should be judged by how much or wellbeing improves – not by how much the economy expands. (p. 219)*

Part 3: Author's Credentials for Presenting This Submission

Wide and flexible background qualifications, intensive research into the ecology of the Lower Hunter Region habitat flora and fauna and their associated problems and travel throughout most of Australia and to equivalent sites in New Zealand, Southeast Asia, Africa, UK, Mainland Europe and USA for comparison, my participation in development of wetland policies at State and Federal level and investigations into development proposals, provide me with confidence to present a submission in response to the T4 call for comment:

- My academic record extending from 1948 to 1971 was grounded on two disciplines, both of which provided information and skills for assessing projects which involve social and science –based problems.
  - My science degrees were broad based, with major emphasis on biology and geology and significant inputs of field work;
  - The education discipline had significant inputs of science, sociology, psychology and anthropology also with practical field work experience.
- I have a wide portfolio of both disciplines of peer reviewed publications in Australia and internationally extending from the 1960s until 2011. It included two publications as a contributing author on Herons and Egrets in the Australian major ornithological book (HANZAB, Marchant and Higgins 1990, Oxford University Press) and as a member of the international (IUCN Heron Specialist Group) team which produced Kushlan and Hafner 2000 (Eds.) Heron Conservation.
- In the 1960s two years were spent in USA, during which involved studies of wetlands and reserves in Florida.
- Long-term work on the ecology of Lower Hunter Wetlands, their waterbirds and the impacts of development on them from 1974 to 2012, included:
  - long-term records of counts and photographic records of declining habitat health and numbers of bird species of numerous wetlands (including environmental reserves). in the Hunter and Williams River systems and the Hunter Estuary;
  - formal research studies of the ecology, breeding biology and migration of egrets, the pattern of ibis species numbers using several night roost sites in the region and the use of Wallbridge Reserve for day roosting by Nankeen Night Herons;
  - continuous searches of published literature on these issues and analyses of their contents;
  - Frequent reviewing of state and federal legislation on development, environmental impact statements as well as referrals of development projects made under the Federal EPBC Act.
- From the 1980s to the present, I have produced numerous technical reports, publications and submissions on a range of research progress and environmental issues, as well as articles in newsletters (especially as editor of and contributor to the Wetlands Centre's ***Hunter Wetlands Trust Newsletter*** and its successor ***The Wetlander*** 1983-1997, and as a contributor to the latter 1998-2009).
- Over the same period, I have also made numerous presentations on similar topics to both professional and community organisations locally, nationally and overseas.

- I have been an invited participant in both State and Federal wetland development policy workshops and closely involved with Australia's participation in the Ramsar Convention at both government and non-governmental levels.

- I have played a role in Australia's involvement in the Ramsar Convention Treaty on Wetlands of International Importance:
    - In 1990, I was a member of the Australian Government Delegation to the 4th Conference of Contracting Parties to the Ramsar Convention in Switzerland.
    - In 1996, I was member of the Australian Wetlands Alliance delegation to the 6th Conference in Brisbane and was a foundation member of the Australian Wetlands Alliance and its Executive Reference Group. The Alliance consisted of more than 30 non-government conservation organisations working intensively on Ramsar wetland issues leading up to the Conference.
- In the early 2000s I was a member of the Hunter Region Ramsar Committee which worked for the Wetlands Centre to become a Ramsar site and to oversee Ramsar Treaty obligations in the Hunter Estuary.
- From geology studies for my undergraduate degree in Tasmania to the present, I have maintained an interest and gained a degree of insight into the impacts of mining on the environment and people.
    - The studies under Prof Warren Carey included information and field work on the role of geology in mining, accompanied by fieldwork in disused mines.
    - In 1948 I was chosen, with another student, under the supervision of the Senior Lecturer of the faculty, to spend January travelling from Melbourne to Sydney visiting key geological sites and going underground in mines gathering information and rock samples on behalf of the faculty. In 1950 I completed my geology studies under Prof Carey, with more field experience with disused mines and a working underground mine.
    - In the period 1951- 1957 I taught Geology to higher school certificate students, included field experience at mines and also took opportunities whenever possible to personally visit Tasmanian underground mines and key geological sites.
    - In that period I was also chosen by the national Mining and Metallurgy society to represent Tasmanian science teachers as a guest participant with teachers from other states at a several weeks travelling conference involving field visits and discussion of issues, held at a range of key Queensland mines and industrial sites.
    - After returning to Australia after 9 years in PNG and 2 years in USA, I travelled widely in Australia at intervals and took opportunities to investigate mines and mining communities wherever possible, especially looking at the issues of rehabilitation.
    - Five years were served representing environmental interests in land and water management in the Hunter Region as a Trustee on the Board of the Hunter Catchment Management Trust, which stirred a particular interest in rehabilitation of open cut mine sites.
    - In recent years, I have been following the complex issues revealed

in documentation produced by mining interests, mining decision making and compensatory offsetting.