# WETLANDS - PRISTINE ECOLOGY OR CATCHMENT SINKS?

Michael J. Brennan, Robert A. Patterson, Donald P. Dingsdag

Presented by Michael Brennan and Robert Patterson as an oral paper to

ICaM 2003 AWA Integrated Catchment Management Conference, held at University of Western Sydney 26th to 28th November 2003. Australian Water Association.

**Reference:** Brennan, M.J., Patterson, R.A. and Dingsdag, D.P.(2003) Wetlands – Pristine Ecology or Catchment Sinks. In Proceedings ICaM 2003 AWA Integrated Catchment Management Conference, held at University of Western Sydney 26th to 28th November 2003. Australian Water Association.



M.J. Brennan, email: teroma@bigpond.com

R.A. Patterson, email: rob@lanfaxlabs.com.au

(Page layout may vary slightly from the copy available on CD of proceedings)

# WETLANDS - PRISTINE ECOLOGY OR CATCHMENT SINKS?

Michael J. Brennan[1], Robert A. Patterson[2], Donald P. Dingsdag[3]

## Abstract

Wetlands are defined by a plethora of designations that are often vague, contradictory or designed to suit particular policy outcomes. NSW State Environmental Planning Policy No 14 (SEPP14), the first of the NSW native vegetation protection policies, is a command and control [prescriptive] type of regulation, that designates significant wetlands by a line drawn on a map rather than defining them as part of a catchment or a self-sustaining eco-system with a catchment, and SEPP26, 44 and the Native Vegetation Act have been based on the methodology pioneered by SEPP14. This paper argues that Triple Bottom Line (TBL) analysis of wetlands is a better approach than the current government policy of defining wetlands because it is based on a multi-disciplinary assessment of wetlands with science as the central core.

**Keywords:** control and command regulation, catchment management, SEPP14, Triple Bottom Line, TBL, wetland, custodial taxation (CT)

## INTRODUCTION

This position paper presents an alternative methodology for assessing wetlands; it is argued that Triple Bottom Line (TBL) is a superior analytical tool by virtue of its encompassing social, economic and scientific data. Embracing a trimorphism of data TBL provides analysts with objective and balanced information. TBL assessments contrast with present policy and assessment procedures because TBL recognises flora and fauna and also considers the holistic implications of nutrients, sediments, fluctuating water levels, irregular inflows in quality and quantity and the maintenance of wetlands.

Within the New South Wales bureaucracy there are more than eight definitions of wetlands (Brennan, 2000), selected to portray a particular viewpoint. In one instance SEPP14 designates significant wetlands by lines drawn on a map rather than portraying them correctly as part of a catchment or a system with a catchment while another state policy determines that all wetlands are ecotones. Furthermore, acknowledgement of valid reasons for protecting wetlands from adjacent human endeavours is, in many instances, employed as justification for over-zealous protection which results in the demise of many wetlands under protection designation (Brennan, 2000). On a broader scale there are instances of overall catchment dysfunction.

## APPLICABILITY OF TBL ASSESSMENT

TBL assessment is consistent with State and Federal State of the Environment [SOE] reporting and Ecological Sustainable Development [ESD]. Fundamental to TBL methodology is the amalgam of environmental, economic and social assessment determined by sound science. The applicability of TBL as a policy review [monitoring] mechanism to scientifically assess the cumulative impacts of the government's environmental policies has been demonstrated. One study, a scientific TBL assessment of the NSW State SEPP14 a decade after its implementation in the NSW north coast reveals that its implementation cost (> $20 million) exceeded estimated landholders compensation costs by more than $4 million, diminished the quality of 18% of the designated wetlands, that at least six landholders were driven to bankruptcy and two families suffered suicides (Brennan 1998; Brennan, 2000).

[1] Adjunct Fellow - TBLRI, University of Western Sydney, Hawkesbury Campus, Richmond.
[2] Executive Director, Lanfax Labs., Armidale
[3] Senior Lecturer, University of Western Sydney, Hawkesbury Campus, Richmond.

## ESTIMATES OF ECONOMIC IMPACTS

TBL is a burgeoning set of functions/procedures capable of comparative and sensitivity analysis of social, economic and environmental values for all activities impacting on the environment. Scodari [1990:7] states that '… economic valuation of wetland depends, and [are] limited by, the state of the art in three fields: science, economics and politics'. Whilst economic assessment methods are the more highly developed, economic methodology still has not been comprehensively applied to all aspects of wetlands. Accordingly, for government to posit that wetlands are beyond value may reflect certain individual held values, it does not reflect the opinion of society generally.

During the 1990s community willingness to pay surveys [WTPS] concluded that the range of contribution over a five-year period ranged from $30 to $160 [CPI adjusted], and that less than 30% of the community was prepared to make such a contribution. By contrast a landholder survey indicated that SEPP14 represented a loss of more than 10% of productive agricultural lands from 1985 onwards (Sappideen, 1992; Streever, 1996; Brennan and Dingsdag, 1999). Survey work undertaken by Brennan in 1996 also indicated that more than 80% of those willing to pay for wetlands were from the lower socio-economic scale, with nearly 30% of this group not having the financial means to honour the commitment. At the other extreme, the higher socio-economic groups were either ambivalent or opposed to paying for wetland conservation. About 5% of this group were willing to pay to contest the imposition of a wetland protection levy, with this intention being supported by financial means significantly greater than those willing to pay. However, interpretations of WTPS is that the entire population is willing to pay between $30-$160 on a perpetual basis – a total misrepresentation of the facts by government during the SEPP14 debates in the 1980s and the 1990s.

Using Valuer General Department data it is identified that SEPP14 has resulted in land value declines, in some instances by more than 1000% [Brennan, 2000]. Other SEPP14 impacts include refusal of loan applications, increased production costs and limitations and diminished disposable income. The imposts falling upon landholders to meet the requirements of wetland policy are akin to paying taxation, only that the burden is not shared in an equitable manner; this economic impost is referred to as 'custodial taxation' [Brennan, 1998], while the community enjoying the benefits of the wetland policies are 'free riders'. This inequitable imbalance between the few that 'pay' and the majority that 'gain' is known as micro-decoupling and is a valuable measure of potential misallocation of economic resources. Extrapolating these costs to the broader community, there are two direct impacts (a) the direct loss of agricultural income and (b) the cost of administrating wetland policies falling directly on local government - more than $250,000 for the north coast region in 1996. Each of these costs is exacerbated by associated multiplier affects. At the State government level, more than $20million has been spent on legal cases arising from development applications, appeals and prosecutions. It is argued that the legal funds would be better used in scientific research into wetland recovery programs.

## SOCIAL VALUES

Most SEPP14 wetlands on freehold land have been conserved [in contrast to preserved] by generations of landholders, yet this custodianship has been 'rewarded' by command and control legislation [Brennan 2000, Brennan and Dingsdag, 1999]. Consequently, current government policies not only remove any incentive for landowners to maintain wetlands, but financially penalised them for doing so; more than 18% of SEPP14 wetlands have degenerated since 1985 with subsequent impact on social values (Brennan 2000). More than 25% of landholders within SEPP14 designations incurred a diminished standard of living, while less than 5% gained in social wellbeing.

At the community level, there have been notable declines in services provided by local governments

due to the general imposts of funding the administration of and associated policing of environmental policies. These imposts have been exacerbated by the State government policy of rate-pegging increases to the Consumer Price Index, rather than to the increased levels of responsibilities. Politically, SEPP14 and other rural land environmental policies have greater impact in National Party electorates, while the Labor Party enjoys the favour of the 'Green Vote' in city electorates, particularly where votes in marginal Liberal seats [as seen in the 2003 NSW elections] have no direct contact with the social costs of a protectionist and exclusion wetlands policy.

## JUDICIAL ASSESSMENT OF COMMUNITY VALUES

In the 10-year period 1987-1997 there were 13 major NSW Land & Environment Court [LEC] hearings in relation to SEPP14 matters. In each instance a number of parties made representations on a raft of matters. In all cases examined parties could be classified as being pro, anti or neutral wetlands. However, the mix of parties on any one matter altered, with some parties being joined on some matters and opposing on others. The matrix of conflicts representing various community values within a specific LEC hearing is summarised in Table 1.

**Table 1. Conflict-Matrix: NSW Land and Environment Court, 1996**

| CONFLICT ISSUES | STAKEHOLDERS (a) | | | | | |
|---|---|---|---|---|---|---|
| | Resource Users | Consent Authority (b) | Interest Groups | | | Lobbyists |
| | Tagget (Defendant) | Developer (c) | Council | Conservation groups | NSWFA | Members of Parliament |
| *1. Bund Wall* | | | | | | |
| remove | s | o | o | o | s | x |
| raise height | o | s | s | s | o | x |
| Lower height | o | o | s (d) | o | s | x |
| *2. SEPP14* | | | | | | |
| Livestock | s | x | o | o | s | s |
| Drainage | s | x | o | o | s | s |
| Horticulture | s | x | o | o | s | s |
| Development | - | s | x | o | s | s |
| Conservation | o | o | s | s | o | s |
| *3. Existing use rights* | | | | | | |
| Drainage | s | x | o | o | s | x |
| Livestock | s | x | s | o | s | x |
| Cropping | s | x | o | o | s | x |
| *4. Classification Methods* | | | | | | |
| Use of Aerial Photography | o | x | s | s | o | (e) |
| Soils categorisation | o | x | s | s | o | x |
| Flora significance | o | x | s | s | o | x |
| *5. EPA Act* | | | | | | |
| Devel. without consent | o | - | s | s | o | x |
| Upgrade BLM drain | o | - | s | s | o | x |

s= support; o = objection; - no opinion or opinion not expressed, but is interested party; x = not an interest party. (a) the court is considered a stakeholder in all issues; (b) with the concurrence of the Minister; (c) Krekelberg quay development and bund wall development; (d) Council altered its position (TSC 1994); (e) investigation requested by the Minister. Data Sources: Bannon, J. (1992); Tagget (various documents); Frank, R. (1994); Parker, (1993a); Mobbs, M. (1992); Brennan and Patterson (1993).

More recently this pattern of counter argument continued to dominate a particular LEC contest (LEC 10982 of 2000). During this hearing considerable contradictory argument was put by the developer, the council, the state planning body and other government agencies over the exact location of SEPP 14:83a. The developer argued for the current wetland boundary defined by vegetation, the council required consistency with its 7(a) boundaries, while the planners stood firm on the line drawn on the SEPP14 map, even though that line was inconsistent with either of the other two areas. It seems the argument was not about how to conserve the wetland, but rather whose definition was correct. The outcome was that the Court upheld the SEPP 14 lines on a map thereby ignoring arguments concerning water, location in the landscape, inflow or discharges, quality of vegetation or likely future needs of the

wetland for maintenance and associated matters.

## OUTCOMES OF CURRENT ASSESSMENT METHODS

Accepting that the LEC is the only formal forum for the presentation of argument relating to environmental valuation, it is evident that while economics is the most advanced discipline of the three aspects of TBL, it is the most disregarded by the judiciary. Social matters, while receiving greater priority than economics, are of relatively minor significance to the time and resource devoted to environmental matters. It is conjectured that this current priority of argument before the LEC is due to a complex mixture of factors including the fact that the environmental values are the most difficult to measure, conjure the greatest emotive responses and politically the most predominant. But, as the LEC decision making is based on law and rarely on good science, the very aspects of the environment to be protected can be placed at risk; the remainder of this section examines this proposition.

Literature is rich with debate as to the ecological elements that constitute a wetland, and as such remain an enigma to scientists (Mitsch and Gosselink, 1999:15). However, there is broad consensus that wetlands are natural sinks within the landscape, have evolved, sometimes over short time scales to collect, isolate, and slowly leak nutrients back into a larger landscape. While communities of flora and fauna may establish themselves in this "soup" of nutrients, organics and minerals the essential ingredients are the water and nutrients that maintain the ecosystem, rather than the inhabitants. Yet too often only the flora and fauna are measured quantitatively and qualitatively and the complex wetland composition is totally ignored. To reduce the chemical inputs to a wetland or to change the natural ratio of water to dissolved and suspended material may be more detrimental to the sustainability of the wetland than over-zealous protection. Catchment protection must also consider the natural role of wetlands in the landscape. The authors acknowledge the need to prevent detrimental inflows but to consider that all inflows must be of a high quality water (that is low nutrients) is a recipe for debilitation of valuable wetlands resources. It is argued that the current legal definition of pollution (POEOAct 1997) is impossible to apply to wetlands because putting cleaner water into a wetland constitutes pollution, as does dirtier water. What water can be added that does not change the "chemical, physical or biological condition"? Therein lies a conundrum!

## THE SCIENCE OF WETLANDS

It would be counter-productive to suggest that the multi-disciplinary science of wetlands is misunderstood. Unfortunately, the current regulatory policies at State level and the contradictory objectives of catchment management, stormwater controls, vegetation protection, bushfire regulations, fisheries interests, coastal protection and environmental flows are often mutually exclusive rather than complementary. Environment Australia (2002) states that "reduced stormwater discharge means less stress on creeks and rivers, resulting from reduced erosion, sedimentation and flooding". This statement is at odds with the need for environmental flows, frequently suggested by (well-meaning, but uninformed) environmentalists who provide no scientific evidence for such pronouncements.

The concentration on defining wetland flora rather than a scientific approach to the "whole of wetland" analysis is almost certainly the most used classification tool. In the north coast SEPP 14:79, there was no difficulty for the second author to source a vegetation classification for this small wetland. However, there were no local data on water quality inputs, discharges or even the fluctuating water levels despite the wetland being a deposition zone for stormwater from the main street of town. Without even a gross pollutant trap, the community had been using this wetland as a stormwater collection point; it would be improper to call it a stormwater treatment system. So where is the science if only part of the system is understood? Where is the outcry from the "environmentally conscious" community? We suggest that

there is no outcry because the wetland has adapted well to the contaminated stormwater and there are no obvious (botanical) consequences of these actions. Any change would incur a community cost (by those who benefit), whereas conservation costs (and rates) are borne by the current landowners and their inability to do anything with the wetland is a negative consequence of current policy.

If as stated by the NSW Wetland Management Policy Action Plan, '… wetlands contribute to the condition of water quality by removing nutrients and sediments and recycling chemical and organic matter (NSW State Wetland Action Group, 2000), then monitoring of these wetland components is as important as counting trees. For TBL to work and for the environment to be fully assessed, we need to assess the three full components fundamental to the environment; i.e., the environmental, economic and social values (based on scientific principles), not just a small portion of the environmental component. The modern ESD of stormwater management treats stormwater as a resource that requires capture, treatment and reuse (Environment Australia, 2002). This objective may not be consistent with wetland management. A wetland relies upon nutrients and storm flows, and natural wetlands are not seen as a treatment resource, although constructed wetlands are designed to 'clean up' the water, rather than benefit a wetland. If the two uses are not compatible, then the aim of ESD (to develop an integrated approach) cannot be realised.

The Australian Guidelines for Urban Stormwater Management (ARMCANZ & ANZECC, 2000) state that 'many substances present in water that are often called "pollutants" are essential to the function of aquatic ecosystems' including suspended solids and nutrients. The guidelines provide a range of typical pollutant concentrations in stormwater (p.54) indicating urban dry weather flows may have 0.1 – 11.6 mg N/L while wet weather flows may have 0.6-8.6 mg N/L. Does it follow that this stormwater would not harm a wetland that had previously shown that such flows were not detrimental to its functioning? Wetlands typically have greater transformation and nitrogen gas loss rates than ponds (Wong *et al.*, 1999), yet by pre-treating water prior to its entry to a wetland, we may be forcing the wetland towards its demise.

## CONCLUSION

This paper proposes that wetlands are defined by designations that are often vague, contradictory or designed to suit particular government policy. The paper also argues that in many instances even the inherent function and raison d'etre of wetlands is not grasped. The resulting lack of understanding of how wetlands function often has deleterious outcomes ranging from under protection to over protection. Even though these approaches may be based on a genuine desire to protect wetlands, frequently they are not premised on thorough science or in some instances no science at all. However, good science alone is not sufficient: Whereas it is the basis for understanding the functions and purposes of wetlands, in order to assess wetlands completely it is also necessary to examine their economic and social attributes. This paper argues that TBL is a methodology which by virtue of its social, economic and scientific dimensions offers a more balanced and holistic assessment of wetlands (and other ecosystems as well) than under current assessment policies. In addition, TBL assessments contrast with present policy and assessment procedures because TBL not only assesses flora and fauna, but it also incorporates the holistic implications of nutrients, sediments, fluctuating water levels, irregular inflows in quality and quantity and the maintenance requirements of wetlands. Without taking account of these attributes significant assessments of wetlands cannot be obtained.

**References:**

ARMCANZ & ANZECC 2000 *Australian Guidelines for Urban Stormwater Management*. National Water Quality Management Strategy. Agriculture and Resource Management Council of Aust. & New Zealand and Aust. & New Zealand Environment and Conservation Council

Bannon, J., (Coram). 1992. Tweed Council -v- Neil Tagget and ANOR: Judgement: No. 40187 of 1990, in the Land and Environment Court, 22 May 1992 (unpublished).

Brennan, M. J. 1998. A Valuation of Private and Public Coastal Wetland Property Rights. Second World Conference International Society of Ecological Economics. Geneva. March 1998,

Brennan, M. J. 2000. Private and Public Economic Impacts of Coastal Wetland Preservation: An Ecological Economic Review of State Environmental Planning Policy No 14, New South Wales North Coast. PhD Thesis, Southern Cross University. (unpublished)

Brennan, M. J. and Dingsdag D. P. 1999. A Comparison of Private and Public Economic Implication of NSW Coastal Wetland Conservation Policies. Environmental Institute of Australia, Nat. Conference. December.

Environment Australia. 2002. *Introduction to Urban Stormwater Management in Australia*. Department of the Environment and Heritage.

Environment Australia. 2003. Triple Bottom Line Reporting in Australia: A Guide to Reporting Against Environmental Indicators. Department of the Environment and Heritage. www.ea.gov.au/industry/finance/

Frank, R., (1994a), Tagget Matter: Discussion meeting with Tweed Shire Council Officers, 19th February 1994, report by NSW Farmers Area Manager to Head Office (unpublished).

Hairston, A. J. [Ed]. 1993. Wetlands: An Approach to Improving Decision Making in Wetland Restoration and Creation. Office of Wetlands, USEPA. Island Press.

Jones, M. and Brennan, M. J. 1997. Planning for Sustainable Development. Australian Planner. Vol 34:3.

Land and Environment Court (2001) Byron Shire vs EcoSound Residential Developments Pty Ltd. Land and Environment Court No. 10982 of 2000.

Land and Environment Court Appeal No 10982 of 2000. Eco-Sound Residential Developments Pty Ltd vs Byron Shire Council.

NSW State Wetland Action Group, *2000 Wetland Action Plan 2000/2003 NSW Wetlands Management Policy*. Department of Land and Water Conservation.

New South Wales Government, Protection of the Environment Operations Act 1997 No 156.

Mitsch, W. and Gosselink, J. G. 1999. Wetlands. 2nd Edition. van Nostrand Reinhold.

Mobbs, M. 1992. Tagget -v- Tweed Shire Council Here is the Court's Decision, Solicitors and Environmental Law and Policy Consultants, advice to NSW Farmers Association, Sydney (unpublished).

Scodari, P. F. 1990. Wetlands Protections: The Role of Economics. Environmental Law Institute. Washington.

Streever, W.J., Callaghan Perry, M., Searles, A., Stevens, T. and Svoboda, P.,(1996), Public Attitudes and Values of Wetland Conservation in New South Wales, University of Newcastle

Sappideen, B. (1992), Valuing the Recreation Benefits of Sale Wetlands using Contingent Valuation, in Lockwood, M. and DeLacy, T. (eds). Valuing Natural Areas: Applications and Problems of the Contingent Valuation Method. Johnstone Centre of Parks, Recreation and Heritage, Charles Sturt University, Albury.

Tagget, N. 1994. Discussion points with Tweed Shire Council, 19th January, 1994 (unpublished)

TSC. 1994. Development Control: Perspective Agreement - Pottsville Waters Pty Ltd - Caldera Environment Centre, State Minister for Planning and State Department of Planning, report of a confidential meeting and associated resolutions from Council's Minutes, subject No 140, 1994.

Wong, T.H.F., Breen, P.F. and Somes, N.L.G. (1999) Ponds *vs* Wetlands – Performance Considerations in Stormwater Quality Management, proceedings in the 1st South Pacific Conference in *Comprehensive Stormwater and Aquatic Ecosystem Management*, Auckland NZ, 22-26 Feb 1999, Vol 2, pp.223-231.