

Monitoring Wetland Changes and Developing Strategies for Protection and Compensation

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Introduction

The middle decades of the last century were a time of both rapid development for Lake Macquarie and rapid destruction of many of the important wetlands in the area. Wetlands or swamps were considered to be waste land and something that humans should “improve” by draining or infilling to make sporting fields or the like.

Deteriorating lake water quality led an investigation to acknowledge the contribution that the loss of wetlands had made to this problem. More recently monitoring has been undertaken of some priority wetlands to assess the current rate of loss. These findings also prompted the introduction of a range of activities to protect and rehabilitate natural wetlands as well as strategies to compensate for wetland loss.

Background

Lake Macquarie is a very large estuary located on the Central Coast of New South Wales, Australia, approximately 110 kilometres North of Sydney. It has a surface area of 110km² with an average water depth of 8 metres. The connection to the ocean is through a narrow constricted channel approximately 5km long, resulting in only a 1% exchange of water with each tide.

The catchment area is 605km², confined to the coastal zone with three (3) major creek systems contributing significantly to the total catchment runoff. It was estimated in the 1995 Estuary Process Study that 360 tonnes of nitrogen, 23 tonnes of phosphorous and 57,000 tonnes of sediment wash into the lake annually. The estimate of natural sedimentation rates prior to European development was 6,600 tonnes per annum. The catchment currently supports a population of approximately 190,000 people and has undergone very rapid development over the last 50 years.

In 1983, following widespread community concern over the deteriorating health of Lake Macquarie, the State Government requested the then State Pollution Control Commission to conduct an investigation. The completed report known as the Environmental Audit of Lake Macquarie indicated that the lake was “in the early phase of stimulated algal growth (incipient eutrophication)”, and the decreasing water clarity was suspected to have been caused by increased densities of phytoplankton. As well as identifying the main cause of the problem as sedimentation and nutrient enrichment through catchment runoff, the report also highlighted the contributing factor to the decline in water quality, as the destruction of 35% of wetlands within the catchment.

Community attitudes in the first three quarters of the last century were certainly against wetlands or swamps. These were considered areas to be avoided and as wasteland to be drained or filled in and made “productive” for the construction of ovals, playing fields and the like.

Wetland Monitoring

It was not until 1985 in NSW that significant wetlands were given some protection with State Environmental Planning Policy Number 14 being introduced. This began a slow change in attitudes and in 1998 Lake Macquarie City Council arranged through a developer contribution for Shortland Wetlands Consultancy to undertake a major investigation into the status and health of Lake Macquarie wetlands. This involved a replicable assessment of 58 wetlands included mapping; photographic records; identification of flora and fauna; impacting issues as well as some general rehabilitation strategies.

In 1999 the Office of Lake Macquarie & City Catchment was established as a joint initiative of Lake Macquarie City Council, Wyong Shire Council and the State Government to address the declining health of the lake. A task force established by the NSW Premier had developed an integrated estuary and catchment management action plan which included a large number of activities over a number of years, but primarily physical works, community engagement/ education and monitoring programs. Whilst the early stages were very busy with a prioritised work schedule, it was recommended that in the second three (3) year term that monitoring of wetlands be undertaken.

Banksia Environmental Consultancy was engaged in 2002/2003 to undertake an assessment of the wetlands and replicate the previous study initiated by Council in 1998 and to identify any changes and trends. It was fortunate that the principal researcher for this engagement had also been the leading researcher for the earlier engagement. All 58 wetlands from the previous study were required to be assessed initially through air photo interpretation and then 30 of the priority wetlands to be further assessed by field investigations.

The changes in area from the previous survey for each wetland vegetation community or cover type were established for each of the 30 priority wetlands. Whilst some occasional vegetation communities of the 20 used showed some slight improvements with regard to a percentage change, disappointingly there was a substantial loss overall. Almost 67% of the wetlands surveyed had reduced and this amounted to a 2% or 12.5ha loss of wetland vegetation over a 5 year period between the two surveys.

The most obvious changes were identified as areas previously mapped but had since been cleared for development. The more subtle changes were where the vegetation had been incrementally changed due to direct and indirect methods including vandalism, fires, altered hydrology, lopping, clearing for views, mowing, dumping of garden refuse and trampling by both pedestrians and vehicles.

Another concern was both the abundance and variety of weed species infesting the wetlands generally and particularly at six of the wetlands. A total of 130 weed species were identified as being present within the 30 wetlands. Some of the more common and abundant weeds included Lantana, Pennywort, Bitou Bush and the introduced grasses Kikuyu and Buffalo.

The report identified the extremely dry conditions and “extreme fire danger” conditions that existed during the survey period. There was little or no standing open water in wetlands that would normally have areas of open water. The Southern Oscillation Index, which greatly influences our climatic conditions, was found to be negative for most of 2002. It is unclear as to precisely what impact these conditions had on the changes to the wetland vegetation areas and communities.

Strategies

The construction of wetlands to treat stormwater was well entrenched into the works program of the Lake Macquarie Improvement Project before the survey results were received. This approach was extended to include vegetated swales, vegetated riffle ponds and even to cutting strips in the base of a concrete channel drain and planting beds of macrophytes. To date some 44 structures of this type have been installed.

At the time of receipt of the wetlands monitoring report a decision had already been made to budget \$240,000 during the Stage 2 program on rehabilitation activities for thirteen (13) priority wetlands. Based on the broad general management recommendations within the monitoring report, detailed work plans and specifications were prepared so that quotations could be called to have the works implemented. These works consisted mainly of weeding and planting of endemic species with the works required to be carried out by qualified bush regenerators. At some wetlands, rubbish was also removed and fencing erected to prevent vehicle access. It is pleasing to report that a number of community service groups in conjunction with Landcare, are actually funding and continuing this type of work at some of the wetlands.

Under the Stage 3 budget, further funding of \$186,000 is currently available to rehabilitate three (3) wetlands as well as preparing work specifications for a further three (3) wetlands. With some of these wetlands approval is being sort to reinstate natural hydraulic regimes, that will also assist in controlling weed species.

Education and community awareness has also been a major part of the strategy. Signs were erected at the wetlands that have been included in the rehabilitation program explaining the value, importance and functioning of wetland systems. A range of paid advertisements (and free editorial articles) were placed in the local newspapers. A number of articles on wetlands have also been included in our own six (6) monthly newsletter which is distributed to 74,000 homes.

Conclusion

There is no doubt that the community awareness, activities to date have had an anthropocentric approach, describing wetlands as the “kidneys” for filtering sediments and nutrients from our stormwater system. This was a deliberate approach to change core community attitudes and there is now emerging evidence that wetlands are being recognised and accepted by the community for their intrinsic values.

The construction of wetlands to treat stormwater runoff as well as the rehabilitation and preservation of natural wetlands has been an important part of the overall program that is showing good signs of improvement in lake water quality. These improvements include water clarity, reduced phosphorous, improved dissolved oxygen as well as a 41% increase in the area of seagrass beds since the Year 2000.

A recent statistically based survey was conducted to monitor attitudes and changes regarding Lake Macquarie and its catchment. It is pleasing to report that when asked on the importance of treating stormwater with wetlands and the like, some 78.7% of respondents gave this a score of between 8-10 out of a ranking system between 1 to 10. The same survey found that 53.3% of the community believe the health of the lake has improved over the last 5 years.

Whilst the future looks good and people are more readily accepting more natural solutions to our environmental problems the real test for the preservation of natural wetlands will come in 2008 when the next round of monitoring is to be conducted.

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