

# Estuary Management: Maintaining The Ecological Balance



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## Introduction

The state of the Lake is a combination of the natural system and humans. Even without human influence, Lake Macquarie would eventually be completely filled with sediment.

Human activity accelerates this process and places the marine system under considerable stress. If Lake Macquarie is to remain as a valuable resource in the long term, the community must accept active management of the ecosystem.

## History

"Beautiful in its natural condition... Waters teeming with fish, and large stocks of good timber awaited exploitation." (N.M Clout, The Child of Bahtahbah: A Brief History of Belmont, Lake Macquarie, New South Wales)

The effective management of Lake Macquarie has long been a hotly debated topic in the local community and at various levels of government. In recent times, we have realised that the abuse and exploitation inflicted by our forefathers is unworkable if we want to enjoy the Lake as a natural resource in the long term.



The exploitation of the Lake environment places its long term future at risk.

Without planning or regeneration mechanisms in place to redress the balance, the exploitation of natural resources like Lake Macquarie will eventually mean that the original appeal of the area will be destroyed.

A lack of coordination between various levels of government have meant that until recently, no uniform strategy for estuary management has ever been adopted.

## The State Of Play

### 1. The Ocean and Channel

The construction of "training" walls in the last century has given the open ocean a greater role in influencing the channel and the Lake itself. Direct wave action from the sea and dredging to create deeper water, has increased the flow and velocity of tidal movement. The entrance and channel responds to these changes in an attempt to maintain the dynamic state of balance that it once enjoyed.

The first step in natural readjustment is for the channel to attempt to widen itself to cause the water to move more slowly. This results in the erosion of the channel foreshore. The ocean breakwaters and consequent exposure to ocean waves has also resulted in damaging erosion to Salts Bay.

### 2. The Lake

#### Sediments

Sediment from the catchment is a major problem for the Lake. Since the beginning of European settlement, sediment loads to the Lake have increased by approximately ten times.

The deposition of sediment leads to bays and inlets becoming shallower, resulting in poor water quality. It can also make navigation difficult for boating and cause other problems for residents, such as exposed mudflats and odours.

#### Nutrients

The influx of nutrients is one of the major concerns for the Lake. Excessive nutrients can result in the growth of algal blooms. These may cause direct and indirect health problems in the Lake, as well as odour, visual impacts and the loss of oxygen in the water. This in turn can change the chemistry of the sediments and cause the release of more nutrients into the water and the process continues to degenerate the ecosystem.



This accelerated injection of nutrients is a cumulative effect of many minor factors throughout the catchment. While no one source is solely responsible, urban areas, excessive use of household detergents and garden fertilisers, dust build up from household roofs and driveways and run-off from unsettled land are some of the factors which contribute to the problem.

### **Pollutants**

There has long been concern over the levels of heavy metal contaminants in the Lake. Water contamination from industry, boat maintenance and fuels can also accumulate in seagrass and the sediments on the bottom of the Lake. This can harm organisms like oysters and mussels. Stricter pollution controls in more recent times have greatly reduced the level of discharges by heavy industry.

### **Lake Fauna and the Foodchain**

An indicator of the health of the Lake is its ability to support marine life in general, but fisheries in particular. Within the Lake, aquatic vegetation provides safety and food for over 200 species of fish. The foodchain is compromised by pollution of the Lake and could severely affect its value as a recreational resource, creating further economic and lifestyle issues for the area.

## Responses and Future Directions

We must be prepared to review our behaviour and practices that fail to balance our aesthetic desires with the needs of the environment. Future directions will place greater emphasis on soft engineering solutions which make use of the current understanding of natural processes.



The natural benefits of Lake Macquarie have contributed to the development of important social and economic infrastructure in the area so that it is now a region of national significance. The current environmental stress and risks of further degradation to the Lake will have negative effects on socio-economic trends unless the estuary and catchment are managed effectively.

It must be remembered that human intervention cannot always deliver predictable outcomes on what is a dynamic and evolving system.

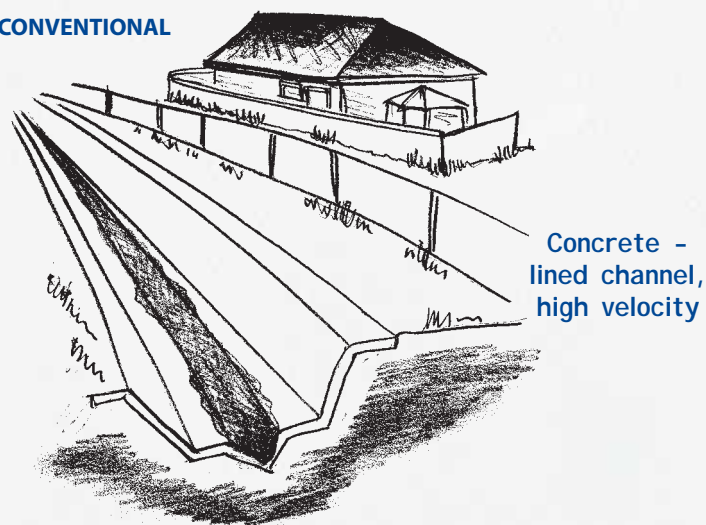
## Community Awareness

Recent research suggests that over one-third of all residents within the catchment do not recognise the impact of their domestic lifestyle on the Lake environment. This major impact is the result of the cumulative effects of mostly minor actions, multiplied by the estimated 190,000 residents living in the area.

We can contribute to the maintenance of ecological balance through awareness of the key issues:

-  The most important issues facing the future health of the Lake and its ecosystem values are the level of urbanisation, industrialisation and agriculture and the controls on such development within the catchment. Almost all of the major issues identified are the direct result of human impact. This is a warning that we need to find ways to have less impact on the natural balance of the ecosystem.
-  With approximately 40% of vegetation in the area already cleared, the protection of remnant vegetation, particularly along the Lake foreshore, creeks and streams is crucial to the further reduction in the passage of sedimentation into the Lake. Enforcement of existing controls and community compliance to prevent erosion when land is disturbed for housing, roads and industry are crucial to stopping the flow of sediment.

### **CONVENTIONAL**



**Shallow, broad meandering stream, low velocity**

### **WATER SENSITIVE**

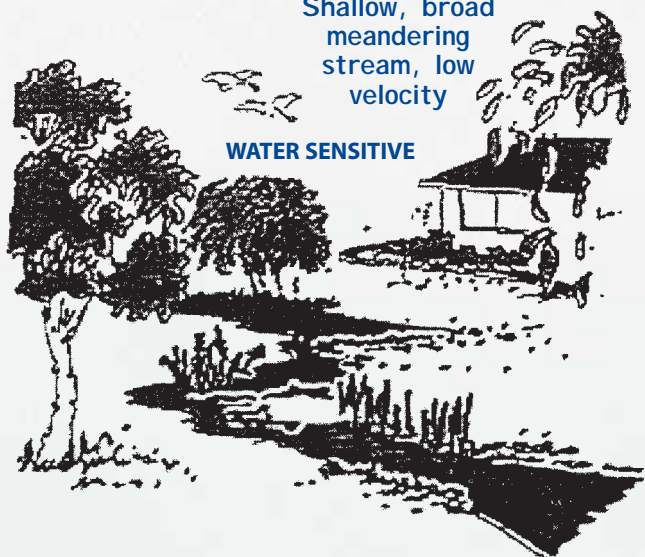


Photo courtesy of Ric Woods

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