

Lake Macquarie's History of Constant Change

Living

LAKE MACQUARIE



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Introduction

Lake Macquarie has been a feature of life in the region throughout history. Just as our economy and lifestyle have changed, so too has the Lake's environmental character.

Natural changes to the environment are constantly taking place, often so subtly and slowly that we do not notice them at the time. In contrast, some of the changes imposed on the Lake by humans are dramatic and destructive to the environmental balance of the ecosystem.

Since European settlement we have placed increasing stress on the Lake environment through excessive sedimentation and ineffective stormwater management strategies, like the introduction of concrete drainage channels.

This stress gradually speeds up the natural process of change to a point where the Lake can no longer cope, resulting in 'flashpoints' like algal blooms. These danger signs are often most obvious in small enclosed bays and inlets, where confined areas are more reactive to changing conditions and changes are more noticeable to the local community.

The Birth of Lake Macquarie

Scientists estimate that it took nearly 20 million years for Lake Macquarie to evolve. As sea levels rose and fell over time, the coastal land in eastern Australia was uplifted to form the Great Dividing Range.

Following the last major glacial peak, sea levels began to rise and fall more reliably, at a rate of around one metre every 100 years. The deep valleys which had been formed by rivers flowing from the Great Dividing Range were filled with water. The result was the formation of coastal features such as Sydney Harbour, Broken Bay and Lake Macquarie.

Studies conclude that the Lake Macquarie environment began a period of relative stability about 6,000 years ago.

Awaba and The 'Dream-time'

Stories of such dramatic changes in the landscape are supported by Aboriginal 'dream-time' stories. The Aboriginal people of Awaba (Lake Macquarie) have been present in the Hunter region for at least 30,000 years and the Awabakal would have been eye-witnesses to many of the changes along the way to the Lake Macquarie we have today.

Environmental Stability

Think of a concrete swimming pool. This is the way many people think of Lake Macquarie – as a constant, stable environment. But this is not true.

Water quality in a swimming pool is regulated chemically and physically by filtering. In an estuary environment, this regulation is carried out by a variety of interacting life forms and natural processes. While we are only just beginning to understand the complex nature of relationships between these elements, we know that by upsetting the balance of the ecosystem we indirectly cause problems such as algal blooms and decreases in water quality, seagrasses and bio-diversity.



Cockle Creek 1901 (above) and Cockle Creek as it is in 2001. Note the stump in the foreground (below), a support for the original footbridge which provided access between Five Islands. Human and natural changes have led to a dramatic loss of shoreline through erosion.

The Interactive Lake System

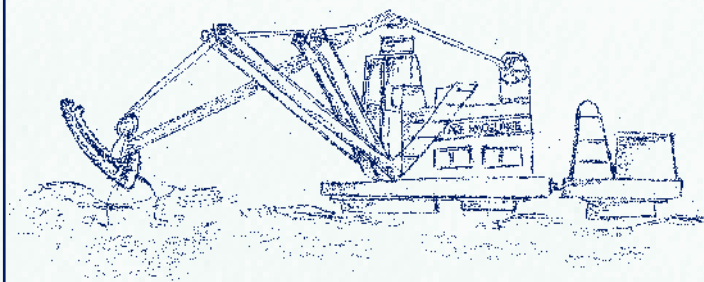
Lake Macquarie is made up of many independent physical parts including the upper catchment area of the Wattagan Mountains, the catchment, wetlands, creeks, the channel and ocean and the Lake itself. We can see how changes to one individual part of this system can dramatically effect other areas by looking at the history of the ocean entrance to Lake Macquarie.

Case Study: Natural Systems and Engineering Solutions

Lake Macquarie is defined as a 'barrier lagoon'. A typical characteristic of this type of estuary is that it will shoal up from time to time. Studies and history show that this is the case with Lake Macquarie.

The construction of training walls in the last century and the dredging of the channel to maintain navigable waters into the Lake has had repercussions on other features within the estuary.

It can be argued that by training the entrance and dredging to



increase water depth, the speed (velocity) of tidal and flood water moving through the channel has also increased. This has increased the rate of erosion of the channel and foreshore.

Salts Bay and Black Neds Bay also suffer. Sediment and sand from the Salts Bay shoreline is transported upstream and shoals at other locations, such as the mouth of the Black Neds Bay wetlands. Increased movement of sand also creates further build-up on the 'drop-over' at the head of the channel, creating navigation problems all over again.

While we can see clearly how the solution actually recreates problems for navigation, ongoing dredging of the channel to maintain safety at the entrance has been carried out since the 1950s.

Healthy environments typically have high levels of bio-diversity. This means that many different species of plants and animals thrive in the one ecosystem. Marine organisms like fish are often used as a key indicator to measure the health of Lake Macquarie. The loss of many fish species and the high pollution levels recorded in monitoring and catch are proof that the acceleration of natural processes has stressed the Lake environment.

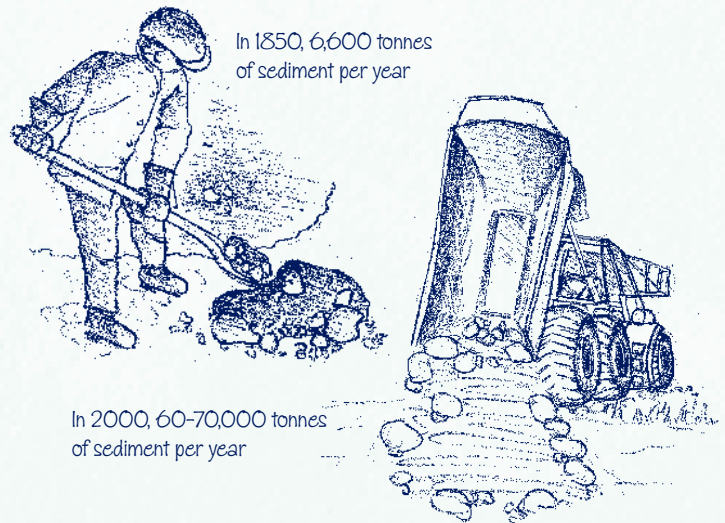
The Future

Natural changes in the local environment are not the issue. These changes have been occurring for 20 million years. But since European colonisation just 200 years ago, the problem has been the acceleration of this change.

The Lake would eventually fill in through natural processes. But, the former Soil Conservation Service of NSW estimated that if the rate of sedimentation continued at annual levels reported in the early 1990s, Lake Macquarie would be completely silted up in approximately 1,000 years.

Before European settlement, the flow of sedimentation into Lake Macquarie was at a rate of approximately 6,000 tonnes a year. Today, the Lake deals with approximately 60,000 tonnes per year.

The way to balance our economic and social values with the needs of the Lake is to become aware of the **treatment chain**. This term refers to the combination of people's actions in their domestic surroundings, vegetated drainage lines and where necessary, the installation of external treatment devices such as constructed wetlands. For the treatment chain to function properly, each of these three elements must play its role effectively.



Slowing Down for a Brighter Future

As the rate of change and the impact of humans increases, we have a responsibility to seek out more information about what we are doing to the environment.

Our generation has the chance to arrest the decline in the Lake's environmental health because we now have the knowledge to appreciate how natural systems work. Where once we thought concrete drainage lines and hard engineering was the only solution, we now have the ability to develop and remediate land without destroying these systems.

As ordinary citizens, we can help create a more harmonious relationship between man and the environment in many ways. Elderly citizens who have observed the many changes over time can contribute to the education of current generations who may not know what the past was like. The involvement of indigenous people can also help illustrate many aspects of the Lake and its history.