

Lake Macquarie Water Quality Report Card

Lake

Lake Middle

- very low nutrients
- good light penetration
- excellent surface dissolved oxygen
- some oxygen depletion at depth
- decreasing phosphorus in response to management efforts
- low algae
- very low bacteria



Good

Lake Entrance

- low nutrients
- good light penetration
- excellent surface dissolved oxygen
- low algae
- low bacteria



Good

Southern Lake Margin

- depressed light penetration
- excellent dissolved oxygen
- small periodic increases in nutrients
- high bacteria
- more effort required to further reduce sediment and nutrient loads



Marginal

Central Lake Margin

- depressed light penetration
- excellent dissolved oxygen
- small periodic increases in nutrients
- periodically elevated algae
- elevated bacteria
- more effort required to further reduce sediment and nutrient loads



Marginal

Northern Lake Margin

- highly urbanised catchment
- periodically elevated nutrients
- increasing suspended sediment
- good, but decreasing dissolved oxygen
- low light penetration
- periodically very high bacteria
- periodically elevated algae
- more effort required to further reduce sediment and nutrient loads



Poor



Creeks

Dora Creek

- low nutrients and suspended sediments
- low dissolved oxygen
- low bacteria
- large increase in bacteria during wet
- very low algae



Marginal

Pourmalong Creek

- low nutrients and suspended sediments
- low dissolved oxygen
- low bacteria
- large increase in bacteria during wet
- very low algae



Marginal

Kilaben Creek

- very low dissolved oxygen
- very low light penetration
- slightly elevated nutrients
- slightly elevated bacteria concentrations
- low algae
- more effort required to further reduce sediment and nutrient loads



Poor

South Creek

- elevated nutrients and suspended sediments
- increasing suspended sediment
- slightly depressed dissolved oxygen
- decreasing dissolved oxygen
- low light penetration
- very high bacteria
- some algae
- more effort required to further reduce sediment and nutrient loads



Poor

Cackle Creek

- elevated nutrients and suspended sediments
- increasing suspended sediment
- very high bacteria concentrations
- slightly depressed dissolved oxygen
- decreasing dissolved oxygen
- low light penetration
- some algae
- more effort required to further reduce sediment and nutrient loads



Poor



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Lake Water Quality Report Card Commentary

Monitoring of key environmental indicators is important to measure the success of initiatives of the Living Lake Macquarie project, from physical works and stormwater management strategies, to more indirect things like community education. The Centre for Coastal Biochemistry, based at Southern Cross University, was engaged by the Office of the Lake Macquarie & Catchment Coordinator to provide a comprehensive review of water quality data.

The University was asked to interpret raw data obtained between 1994 and 2001 to provide an overview of water quality in the Lake. This interpretation was considered important to evaluating the current conditions against recent strategies to improve things like sedimentation and nutrient enrichment, which are key contributors to poor water quality.

The report highlights areas which are deserving of more attention to improve water quality, even in an environment of sustained population growth and urban development.

To help refine the report, The University separated the Lake into distinct zones. It's over simplistic to say

the 'Lake is healthy' or the 'Lake is sick'. In truth, some areas are quite healthy while others need special attention.

The report card looks at different areas of the Lake, including deep water areas and near shore, shallower locations (margins). It also examines tributaries such as creeks. The quality of the water coming from these areas is important on the overall water quality in the Lake.

The University analysis shows that water quality in the main body of the Lake is generally good. The main body of the Lake includes locations like the channel entrance and the middle of the Lake. In these areas where the water is deeper, nutrient levels and the presence of algae and bacteria are low. Good light penetration is another indication that the heart of the Lake is in a healthy state.

Water quality around the shoreline areas leaves more room for improvement. Unfortunately, these near shore areas are the most visible to the casual observer. Less water volume and the impacts from urban development, means that these areas provide more concentrated sites for flashpoints like algal blooms and unsightly black ooze present in some locations around the Lake.

The Lake's major tributaries are also generally in a poor state of health. Of the creeks included in the report card the best grading was 'marginal'.

These areas tend to be more volatile than deeper water areas. With less water volume the tributaries are more dramatically effected by events like periods of large rainfall. However, the Lake's tributaries often bare the brunt of urban run-off, so poor results at these sites are a warning that we still need to improve stormwater management higher up in the catchment. The study found that these creeks experienced high sediment loads and elevated nutrient levels, which cause things like algal blooms that hinder the growth of aquatic plants and effect water quality. Strategies to reduce these problems, such as sediment traps, vegetation buffers around foreshore areas, improvements in stormwater management and constructed wetlands are the best way to achieve long-term improvements in water quality. These actions are of limited use in isolation. They need to be complemented by behavioural changes to lessen human impacts.

We can see that the current strategies are already working. The maintenance of sediment and nutrient loads during the current trends of sustained popula-

tion growth and urban development is a considerable achievement in itself.

But for the long-term future of the Lake, it is clearly not enough. We need to adopt more aggressive strategies throughout the catchment to manage problems of future urban growth is through the use of Water Sensitive Urban Design principles and responsible management by individuals.

This process requires time. Water quality monitoring shows that the improvement of test results is not possible overnight. In context, serious urban development has increased over more than two-hundred years to the current levels. To achieve a complete reversal, even within the seven years assessed by this report card, is an unreasonable expectation.

The community needs to be involved in the restoration process, so that responsible environmental management becomes as much a part of community culture as population growth and economic development.

This commentary was compiled on behalf of The Office of the Lake Macquarie & Catchment Coordinator.

