

Boyter's Lane Wetland Design and Construction

This project has involved the design and construction of two artificial wetlands by Council, to treat potentially contaminated runoff resulting from the construction and function of the proposed playing fields at Boyter's Lane, South West Rocks.

The wetlands have been designed to play a major role in capturing and filtering potential contaminants (including nutrients) to reduce impacts on the water quality of nearby sensitive saltmarsh and freshwater to brackish water communities of Teal Lagoon and associated estuary system.

Vegetation buffers have also been included between the proposed sporting fields and the artificial wetlands, which will provide enhanced habitat value for local fauna. In partnership with community groups, local schools and environmental volunteers, over 3,000 endemic rainforest trees, 3,300 small wetland plants, and 1,500 drought tolerant bushes will have been planted.

Initiated by the Rotary Club of South West Rocks, the aim to protect water quality has attracted funding of \$40,000 from the Australian Government Community Water Grants scheme. The effectiveness of the artificial wetlands in acting as a biofilter will be monitored by the Rotary Club. The results can be seen on www.waterwatch.nsw.gov.au and www.bugsurvey.nsw.gov.au

What can you do to help improve water quality in your community?

- ✓ Prevent pollutants including soil, leaves, detergents, and litter from washing into stormwater drains.
- ✓ Protect trees and other vegetation along local waterways (and plant more).
- ✓ Encourage the protection of local wetlands as these act as natural filters for pollutants, as well as providing habitat for birds and aquatic life.
- ✓ Use less water at home and at work as the less water we use, the less pressure our waterways are placed under.
- ✓ Try to wash your car on a grassy area to minimise runoff.
- ✓ If taking your dog for a walk, pick up any dog droppings to prevent them entering the stormwater system and eventually our waterways.
- ✓ Become involved in a water quality monitoring program or waterway rehabilitation project.

References & Further Reading

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What is water quality?

Water is essential to human life and to the health of the environment. It is a valuable natural resource, encompassing marine, estuarine, freshwater (river and lakes) and groundwater environments, across coastal and inland areas. Water resources are crucial for sustaining communities, agriculture, industry and the natural environment.

Water quality is commonly defined by its physical, chemical, biological and aesthetic (appearance and smell) characteristics. A healthy environment is one in which the water quality supports a rich and varied community of organisms and protects public health.

Why is water quality important?

Our water resources are of major environmental, social and economic value to the Kempsey Shire and if water quality becomes degraded this resource will lose its value.



Water quality is important not only to protect public health, water provides ecosystem habitats, is used for farming, fishing and mining, and contributes to recreation and tourism.

If water quality is not maintained, it is not just the environment that will suffer, the commercial and recreational value of our water resources will also diminish.

What affects the quality of our water?

Water quality is closely linked to the surrounding environment and land use. Other than in its vapour form, water is never pure and is affected by its interaction with the surrounding soils and geology as well as community uses such as agriculture, urban and industrial use, and recreation. The modification of natural stream flows by dams and weirs can also affect water quality.

Rivers and streams frequently act as a distribution pathway for pollutants by collecting and carrying wastewater from catchments and, ultimately, discharging it into the ocean. Stormwater, which can also be rich in nutrients, organic matter and pollutants, finds its way into rivers and oceans mostly via the stormwater drain network.



Source: NSW EPA (2007)

How is water quality measured?

The characteristics of water, the presence of contaminants and presence or absence of aquatic life can be used to indicate the quality of water. These water quality indicators can be categorised as:

- **Physical:** temperature, turbidity and clarity, colour, salinity, suspended solids, dissolved solids.
- **Chemical:** pH, dissolved oxygen, biological oxygen demand, nutrients (including nitrogen and phosphorus), organic and inorganic compounds (including toxicants).
- **Biological:** bacteria, algae, macrophytes, invertebrate and vertebrate species.
- **Aesthetic:** odours, taints, colour, floating matter.

Measurements of these indicators can be used to determine and monitor changes in water quality and also determine whether the quality of the water is suitable for the health of the natural environment and the uses for which the water is required.

CASE STUDY: WETLANDS AND THEIR ROLE IN WATER QUALITY MANAGEMENT

Wetlands are complex ecosystems where land and water environments meet. They can be permanent or temporary bodies of water, including swamps, marshes, billabongs, lakes, saltmarshes, mudflats and mangroves. Wetlands can be natural or artificial, and water within these areas can be static or flowing, fresh, brackish or saline.

Why are wetlands important?

Wetlands are ecologically, economically and socially important. They provide important habitat for a diverse range of animals and plants, sites for bird watching, canoeing, fishing and other recreational pursuits and are sources of water during droughts, which if managed, sustainably provide an important resource for agricultural activities.

One of the key services wetlands also provide is the filtering of water. As water passes through the wetland it slows down, allowing sediment to settle. Many nutrients and other pollutants in the water or attached to the sediment, are removed as the water passes through the wetland. By removing pollutants, such as nutrients, wetlands decrease the likelihood of water quality problems forming further downstream.

How does water quality affect aquatic ecosystems?

An ecosystem is a community of organisms - plants, animals, fungi and bacteria - interacting with one another and with the environment in which they live. Aquatic ecosystem health is a much broader concept than just water characteristics and chemistry, but rather aims at assessing the number and diversity of organisms inhabiting the water body. Generally, if the water body supports a variety of different organisms then the water body is likely to be free of harmful contaminants.

Protecting aquatic ecosystems is in many ways as important as maintaining water quality, for the following reasons:

- Aquatic ecosystems are an integral part of our environment. They need to be maintained if the environment is to continue to support human populations.
- Aquatic ecosystems play an important role in maintaining water quality and are a valuable indicator of water quality and the suitability of the water for other uses.
- Aquatic ecosystems are valuable resources. Aquatic life is a major source of protein for humans. In most countries, including Australia, commercial and sport fishing is economically important.

What is being done to monitor and improve the quality of water in our waterways?

Council is committed to working with other government agencies and community groups to ensure a desired level of water quality monitoring is undertaken and projects initiated to improve water quality within the waterways of the Kempsey Shire. Some examples of recently completed projects are outlined below.

Installation of Gross Pollutant Traps

In accordance with Council's Stormwater Management Plan, a number of gross pollutant traps (GPTs) have been installed at high priority locations, including Crescent Head and South West Rocks, with funding provided from the NSW Stormwater Trust Grants and Council's Environmental Levy. The GPTs are designed to limit the amount of litter and sediment discharging from the stormwater drain network into nearby waterways and also aid in the reduction of bacteria numbers entering the receiving water body.