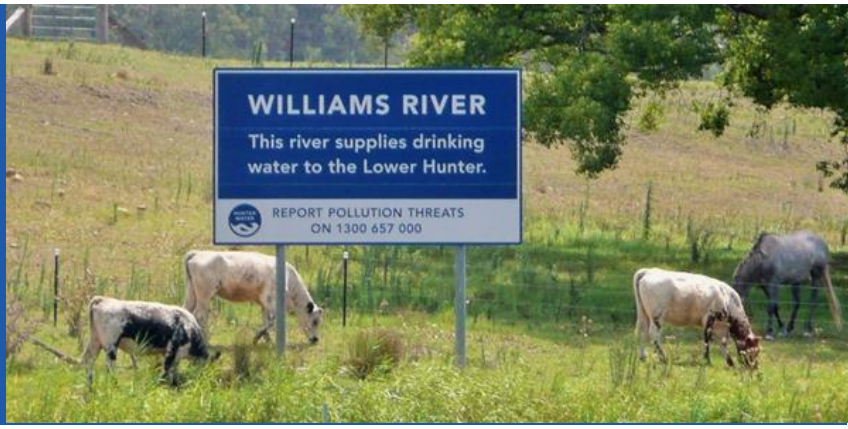
FACT SHEET OCTOBER 2022

WILLIAMS RIVER EROSION MANAGEMENT

THE WILLIAMS RIVER IS THE PRIMARY DRINKING WATER SOURCE FOR THE LOWER HUNTER REGION

MANAGING EROSION IS IMPORTANT TO MAINTAINING GOOD WATER QUALITY



The Williams River is the primary drinking water source for the population of the Lower Hunter region, contributing about 50% of the water supplied. Hunter Water harvests raw water from the river at Seaham Weir and pumps it into Grahamstown Dam. Water is then pumped from the dam to the water treatment plant for treatment to meet public health standards before being supplied to customers.

Hunter Water is required to manage the drinking water supply system in accordance with the Australian Drinking Water Guidelines. The ability to safely and reliably harvest raw water from the river is highly dependent on the water quality, which is directly related to the management of the river itself and land use activities in its catchment.

Catchment, land use and water quality

The results of long-term monitoring in the Seaham Weir Pool demonstrate a decline in water quality in the river over the past 30 years. This decline in water quality can be attributed to a number of factors, such as natural processes, land use activities adjacent to the river and in the catchment and activities on the river.

Natural processes affecting water quality particularly include wind, waves and floods. Some of these processes are exacerbated by man-made factors.

Land use activities such as clearing, land management practices and run-off from developed areas are key factors contributing to water quality. The Williams River catchment comprises forested headwaters and the towns of Dungog and Clarence Town, but beyond the headwaters it is dominated by various agricultural enterprises. Land use adjacent to the Seaham weir pool is mainly agriculture, with residential development around Clarence Town at the upstream end.

On the river, construction of the weir in the late 1960s as a source of drinking water for the Lower Hunter region resulted in the creation of a relatively static fresh water pool that is valued by adjoining landowners for agriculture and by the community for recreation. Clearing of vegetation on the riverbanks, cattle access to the river and power-boating on the river, which generates high energy waves that impact on the riverbanks, are key factors contributing to ongoing erosion of the banks along the weir pool and consequent declining water quality. The relatively narrow width of the river is a factor contributing to the impacts of waves generated by power boats on the river.

Erosion and water quality

Erosion of riverbanks has long been recognised as a key factor contributing to poor water quality in waterways. Increased amounts of soil particles in the water from erosion and run-off results in high turbidity, which also results in elevated concentrations of nutrients in the water that can cause algal blooms, and an increased number of micro-organisms that can present a risk to public health. High turbidity results in higher water temperature and reduced light penetration that impacts on the ability of aquatic plants and animals to survive. In these ways erosion results in impacts on the ecology of the river.

Erosion of riverbanks along the lower reaches of the weir pool, in particular, has long been recognised as a management issue for the health of the Williams River (Williams River Total Catchment Management Strategy (1995), Healthy Rivers Commission (1996), AWT (1997), Transport for NSW (2015)). Erosion is a major factor contributing to degraded water quality in the Seaham Weir Pool that influences both the ecology of the river and Hunter Water's ability to harvest drinking water for supply to the Lower Hunter population.

Key water quality attributes

Hunter Water undertakes routine water quality monitoring in the weir pool (and other parts of the river) and this monitoring has been undertaken continuously for approximately 30 years. Water quality monitoring results are typically complex due to the high variability in rainfall and, consequently, river flows. Following is a summary of main water quality attributes based on the results of this monitoring.

Total Suspended Solids is a measure of suspended particulate matter, mainly soil, in the water that is a direct consequence of erosion and contributes to turbidity. The results of long-term water quality monitoring show that suspended solids concentrations have been steadily increasing over time, with the trend in suspended solids showing an increase of approximately 40% over the monitoring period.

Phosphorus is one of the primary essential nutrients for growth and is closely associated with soil particles due to its chemistry. As the concentration of soil particles in the water increases, the concentration of phosphorus also increases. The trend in total phosphorus concentration reflects that of suspended solids and shows an increase in phosphorus levels of approximately 50% over the monitoring period.

Nitrogen is also one of the primary essential nutrients for growth but is not closely linked to soil particles like phosphorus is. Nitrogen has a greater tendency to be dissolved in the water due to its chemistry. Water quality results show a slight increasing trend in total nitrogen over the monitoring period, although this is not conclusive.

In addition to deterioration in the water quality itself, which impacts on drinking water quality, elevated concentrations of these factors lead to an increased risk of algal blooms in the river, which affects all water users.

Water quality improvement through erosion management

Multiple land and water-based factors are acknowledged as contributing to erosion. Improvements in water quality will be realised over the long term by reversing erosion, however the solution requires an integrated approach by implementing both land and water -based actions. Key elements in restoring riverbank resilience include protection of the banks and reducing wave energy where possible while new vegetation re-establishes. This will require the co-operation of all users of the river and the adjacent land.

Further reading

Independent Inquiry Into The Williams River. Healthy Rivers Commission of NSW, 1996

Total Catchment Management Strategy for the Williams River Valley. Hunter Catchment Management Trust, 1995

Regional Boating Plan, Port Stephens – Hunter Region. Transport for NSW, 2015

Nature and Source of Sediment in Lower Seaham Weir Pool and Grahamstown Reservoir. AWT, 1997

Hunter Water
ABN 46 228513 446
Customer enquiries 1300 657 657
enquiries@hunterwater.com.au
hunterwater.com.au