

Richmond Ecohealth Project 2014

This information is a summary only of the more detailed Richmond Ecohealth Project 2014 Report.

The findings and recommendations below are presented in indicator categories for easy reference to the full report. It is important to understand that indicator categories, whilst they are reported separately, are interlinked in their contribution to a healthy waterway. For example, a riverbank that is steep and has eroded over time is less able to support native vegetation establishing on its own. Runoff from nearby land can then travel faster and erode the bank further. Sediment and nutrients are carried into waterways smothering gravel and cobble beds and reducing habitat for fish. A lack of riparian (or riverbank) vegetation means higher temperatures in the water, less food for macroinvertebrates and again, less habitat for fish.

What did the Richmond Ecohealth 2014 Report recommend?

- For **Geomorphic Condition** (which is the stability and integrity of the bed and banks), the main priority is active restoration and native revegetation of the riparian zone across all creeks and rivers, and particularly in the mid Richmond and the estuary.
- For **Riparian Condition**, the restoration and regeneration of native vegetation of the riparian zone is, of course, identified as a priority. Native vegetation directly provides habitat for both land- and water-based animals but also those who access water. It connects remnants of native vegetation, protects the banks, reduces movement of sediment and nutrients into the river and reduces water temperature especially in the higher catchment locations. It provides dead wood (over time) for fish and insect habitat and enhances the number and diversity of sensitive macroinvertebrates.
- For **Water Quality**, again, restoring native vegetation has lasting benefits for many reasons. However, extra attention paid to reducing the movement of sediment from adjacent rural uses and urban land use (usually stormwater) provides benefits both to the river and the landholders. Sediment carries extra nutrients and other possible pollutants into the creek and river. Actions include managing drainage on adjacent lands to reduce erosion, and reducing stock access to creekbanks among others.
- Finally, to enhance the habitat for **Aquatic Macroinvertebrates** (insects, beetles, snails) targeting habitat restoration is key. Restoring native vegetation to riverbanks and protecting existing vegetation are the single biggest actions to enhance their populations. Use of woody debris (resnagging some rivers), improving water quality and controlling erosion to reduce sediment deposition, particularly in gravel and cobble beds, is important. Water quality is also an important factor for the health of macroinvertebrate population.

What were the findings of the Ecohealth Report 2014

A. Geomorphic Condition (Bed and Bank stability)

- Upper freshwater reaches are mainly fair (C) or good; estuarine reaches are mostly poor or very poor and they show evidence of active erosion.
- Those in the poorest condition occur where the riparian zone has been completely cleared to the top of bank causing extensive and locally severe bank slumping, high bank slopes and exposed tree roots. In freshwater reaches, cattle grazing on banks and accessing the river for drinking water are also factors.

B. Riparian Condition (Vegetation)

- Riparian condition is poor throughout all parts of the Richmond River catchment, with 10 of the 17 river systems recording a score of D (poor) or worse (F - very poor).
- A lack of vegetation, livestock access or invasion/dominance of Invasive weeds were the main reasons for these poor scores.

C. Water Quality

- Poor water quality is a problem throughout the Richmond and Wilsons catchments and estuary. Sediment from nearby land which also carries nutrients and other pollutants result in poor water quality most of the time within most creeks and within the main river channels, which continue to impact water quality in the upper and lower estuary.
- Moderate to large rainfall events export large sediment loads which can last up to weeks after the event is finished. Some of this sediment flows out to sea. Some also deposits within the river channel, smothering riverine habitats for fish and insects. It is then 'reworked' during the next event.
- These larger events often also result in export of acid (groundwater that is low in pH due to oxidation of acid sulfate soils) and 'blackwater'. Blackwater is water that is low in dissolved oxygen. When large areas of the river are draining blackwater, this can cause very large fishkills.
- Both acid and blackwater can occur locally as chronic conditions, negatively impacting fish and insect habitat.
- These chronic (sediment) and episodic (pH and blackwater) issues are interlinked and all need to be addressed to improve water quality in the Richmond River catchment.

D. Aquatic Macroinvertebrates

These are aquatic animals without backbones, including insect larvae, beetles and snails, that are visible to the naked eye and live at least part of their life in freshwater. Macroinvertebrates are useful for measuring impacts on ecosystems over time because individual species and populations are sensitive to changes in habitat and water quality condition. They usually live off leaves and detritus that falls from riparian (riverbank) vegetation, and they provide an important food source for fish and birds.

- Measurement of macroinvertebrates based on their sensitivity to pollution (SIGNAL2) produced low scores in all freshwater sites sampled. This is consistent with long-term degradation of water quality and instream habitat. The dominance of macroinvertebrates which are very tolerant of poor conditions at most other sites also contributed to lower scores.
- Animal diversity was 6 times higher in upper Terania and Iron Pot Creeks compared to lower Terania and Bungawalbin Creeks. The number of individuals ranged from very low in Bungawalbin Creek (14) to high in the upper Richmond River (784).

Report citation: Ryder, D., Mika, S., Richardson, M., Schmidt, J. and Fitzgibbon, B. (2015). Richmond Ecohealth Project 2014: Assessment of River and Estuarine Condition. Final Technical Report. University of New England, Armidale.