

“Any river is really the summation of the whole valley. To think of it as nothing but water is to ignore the greater part”  
Hal Borland,  
This Hill, This Valley.

Wallis  
Myall  
Karuah

# Waterway & Catchment REPORT CARD 2016

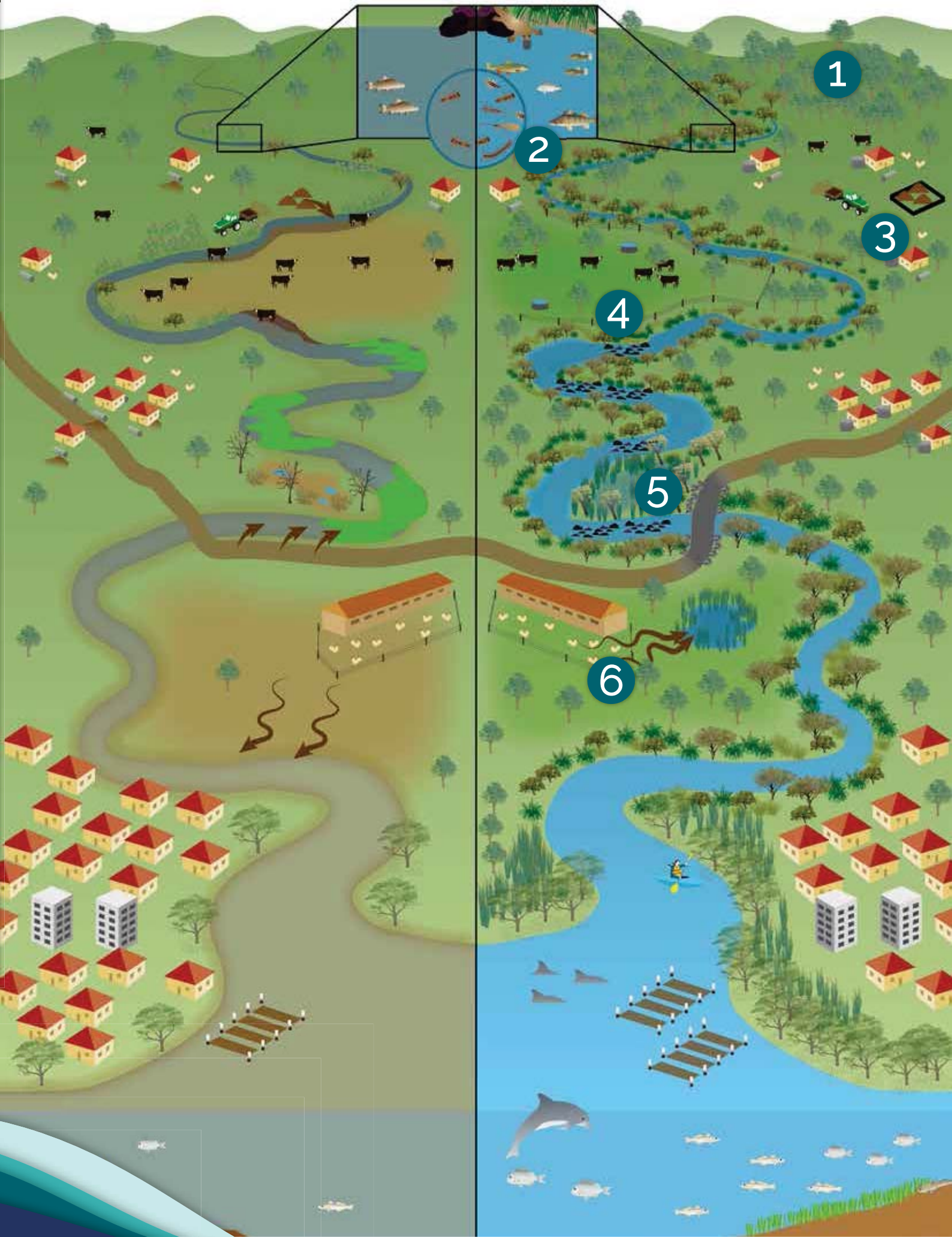
MidCoast Council

 Office of  
Environment  
& Heritage

 Local Land  
Services  
Hunter



# Where would you rather be?





# Enhance farm profitability and cattle health while improving waterway health

## *Features of a healthy catchment*

- 1** Vegetation on steep slopes reduces erosion
- 2** River life is abundant and diverse
- 3** Fertilizer is applied and stored away from waterways
- 4** Stock is out of waterways and wetlands
- 5** River vegetation is healthy
- 6** Productive pastures with high ground cover

## Did you know?

- Stock can lose up to ½ kg/day when drinking muddy water
- Nitrogen not taken up by the plant 0-14 days after application is lost to the environment and to your 'back pocket'
- To promote optimal plant uptake and growth, when using nitrogen fertilisers, apply them the day you move stock out of the paddock.
- Even without planting, fencing off streams can reduce faecal coliforms by 35%
- Nutrients applied in excess of plant needs, achieves minimal additional pasture yield
- Wetlands are like the kidneys of the landscape; they clean our water, slow the flow of water and reduce flood peaks.
- Small amounts of fertiliser applied more regularly will yield greater pasture productivity than a single large annual application.



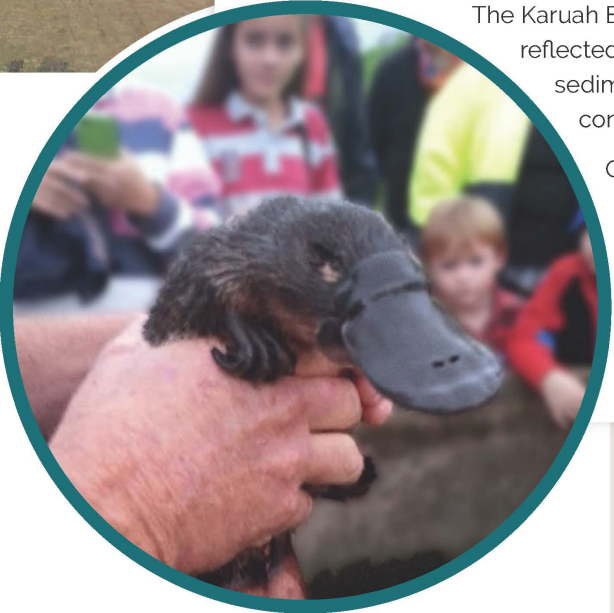
## Karuah Catchment

In the upper Karuah Catchment stressors from nutrient inputs, salinity and sediment were low to very low resulting in low algal levels and good scores for river bugs.

Higher levels of nutrients and sediments and a decrease in the condition of the vegetation along the river corresponded with intensification of land use in the middle reaches of the Karuah. There was an increase in algal levels; however, river bug communities remained in good condition.

The Karuah Estuary results were only 'fair' this was reflected by the higher levels of nutrients, sediments and deteriorating vegetation condition in the Mid Karuah Catchment.

Overall condition in the Branch was poor, considerably worse than the Mid Karuah. Ecological health in the Branch Estuary appears to be better than the Branch Catchment; however, this is a reflection of dilution from other sources rather than an 'actual' improvement.



Many of the activities in our catchments are having unintended negative consequences for water quality and ecological condition of our waterways.



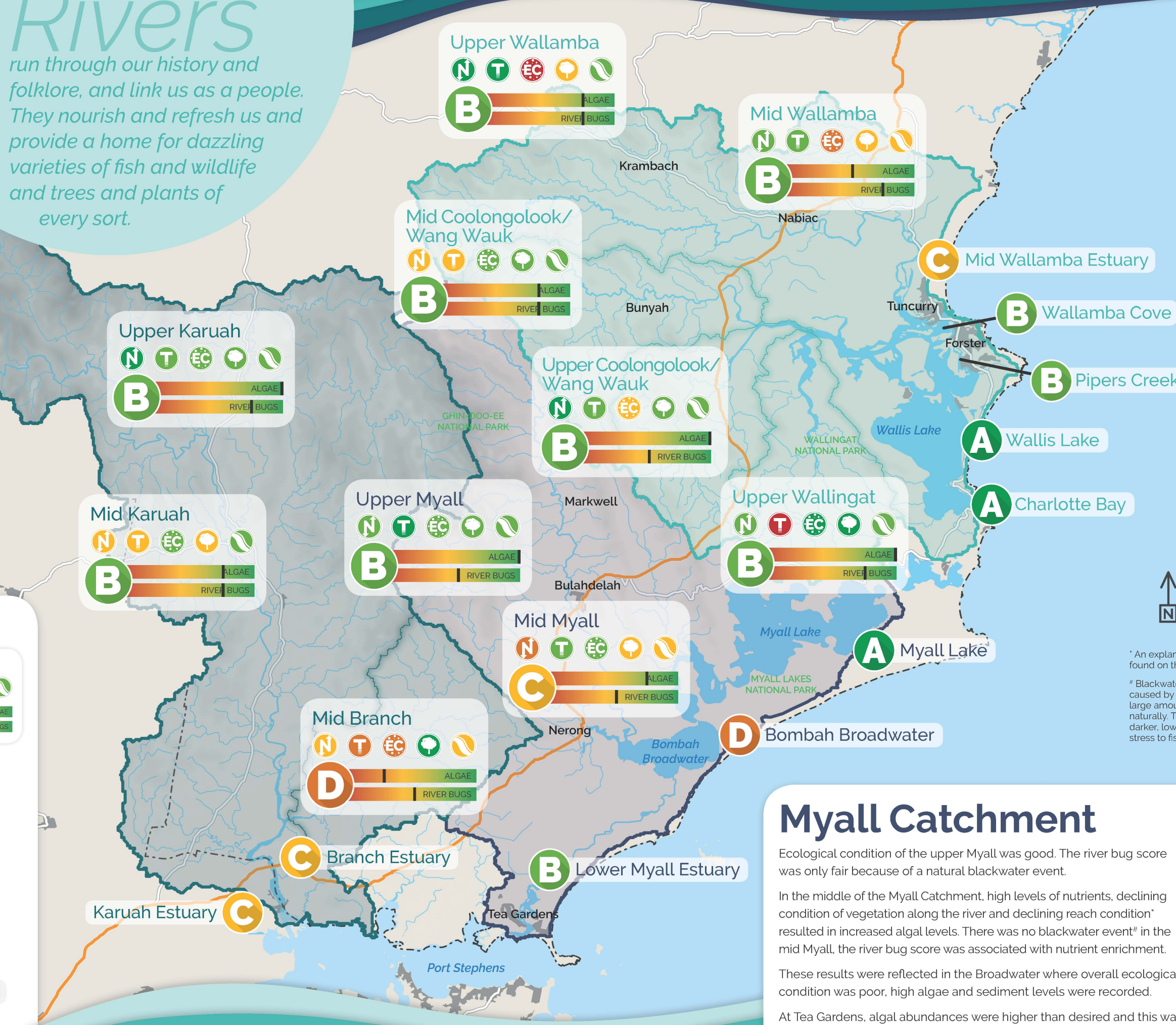
The bugs collected from sites with poor water quality had a high proportion of pollution tolerant species showing they are being impacted by water quality stressors



Stressors like high levels of nutrients and sediments are our early warning signs. While river bugs are hanging in there for now, these stressors are a major concern.

# Rivers

run through our history and folklore, and link us as a people. They nourish and refresh us and provide a home for dazzling varieties of fish and wildlife and trees and plants of every sort.



### Catchment score key

**Stressors:** Changes to the environment that can lead to ecological harm.

**Overall grade:** Ecological condition, a combination of river bug and algae scores.

- |                     |  |
|---------------------|--|
| <b>Score Legend</b> | <b>Stressor measures</b>               |
| ● Very good         | N Nutrients                            |
| ● Good              | T Turbidity                            |
| ● Moderate          | EC Electrical conductivity (saltiness) |
| ● Poor              | R Riparian condition                   |
| ● Very poor         | Reach condition                        |

### Estuary score key

**Overall grade:** Ecological condition, a combination of algae and water clarity scores.

For more details see Waterway and Catchment Technical Report 2016

## Wallis Lake Catchment

### Wallamba Catchment

The upper Wallamba was in good ecological condition corresponding with very low nutrient and sediment levels. The condition of vegetation along the river was also only 'fair' indicating there is some stress being placed on the river. Salinity was much higher than expected; further work is needed to see if this is a result of the local geology or from human activity.

The overall ecological condition in the middle reaches of the Wallamba remained the same as the upper Wallamba; however, algal levels increased and instream reach condition declined. Nutrients and sediment levels increased placing additional stress on the system. High levels of algae were recorded in the Wallamba Estuary strongly influencing the overall grade. Increasing levels of nutrients and sediment recorded in the Mid Wallamba Catchment would have influenced the algae results.

### Coolongolook/Wang Wauk Catchment

In the upper parts of the Coolongolook/Wang Wauk Catchment, algal levels were low. River bug scores were only fair; but this was due to a natural "blackwater" event not pollution. These results corresponded with very low nutrients and sediments.

Nutrient and sediment scores were only fair in the middle reaches of the Coolongolook/Wang Wauk, algal levels and the river bug scores were good.

### Wallingat Catchment

One site was sampled in the upper Wallingat Catchment and it had very low levels of algae and good river bug communities. Extremely high sediment levels were recorded were thought to be a factor of the particular sampling site which receives runoff from unsealed roads and had very low flow.



Algae blooms occur in pools and slow flowing reaches. In faster flowing waters the impacts show up downstream in our lakes and estuaries.

The headwaters are typically preserved in excellent condition where there are large areas of conservation and intact riparian zones. As land use intensifies, pressures on the system increase and ecological health and water quality decline.

Excessive sediment in waterways has multiple impacts. It smothers habitat, reduces plant growth, clogs the gills of fish and macroinvertebrates and reduces the ability for animals to detect predators and prey.

\* An explanation of reach condition can be found on the back page  
 \* Blackwater is oxygen-depleted water caused by the decay of organic matter such as large amounts of leaf litter. Blackwater occurs naturally. The decay process makes the water darker, low levels of dissolved oxygen cause stress to fish and water bugs.

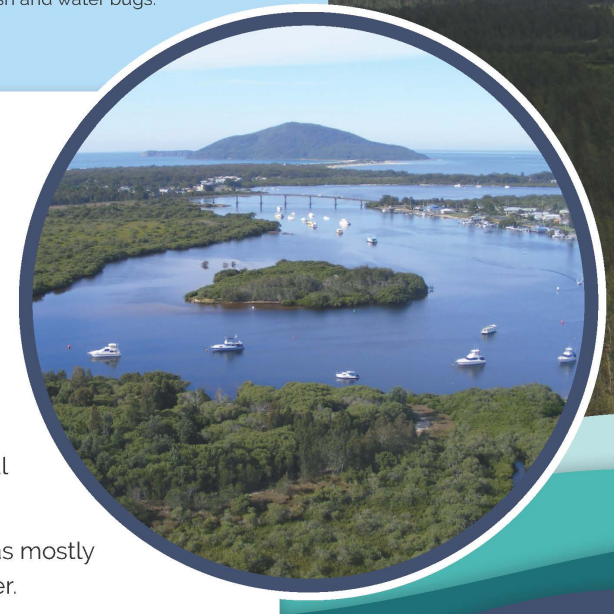
## Myall Catchment

Ecological condition of the upper Myall was good. The river bug score was only fair because of a natural blackwater event.

In the middle of the Myall Catchment, high levels of nutrients, declining condition of vegetation along the river and declining reach condition\* resulted in increased algal levels. There was no blackwater event\* in the mid Myall, the river bug score was associated with nutrient enrichment.

These results were reflected in the Broadwater where overall ecological condition was poor, high algae and sediment levels were recorded.

At Tea Gardens, algal abundances were higher than desired and this was mostly a consequence of algae being carried downstream from the Broadwater.



Some stressors have immediate impacts on stream ecological health, but others can be transported downstream all the way to the estuary, where they accumulate and change estuary condition.



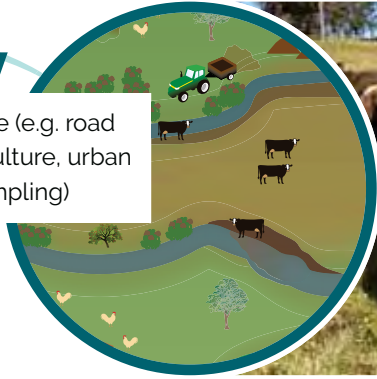
# Learning from the science

This year the report card moves the focus from the estuaries alone, to the rivers in the catchments that flow into them. This requires us to measure a wider range of indicators. Indicators are selected to show pathways of impact. Catchment results will be presented in a report card every 5-10 years

## Pathways of impact

### Activity

is the fundamental cause (e.g. road building, intensive agriculture, urban development, stock trampling)



### Stressors

are changes to the environment that result from the activity and can lead to ecological harm.

These measures are focused on likely inputs from known activities and may be affecting instream and downstream ecological condition.



- N** Nutrients - all forms of nitrogen and phosphorus in the waters
- T** Turbidity - sediments in the water and loss of clarity
- EC** Electrical conductivity - increasing saltiness of freshwaters
- R** Riparian condition - the type and condition of vegetation on stream banks
- Re** Reach condition - the condition of banks and variety of instream habitats

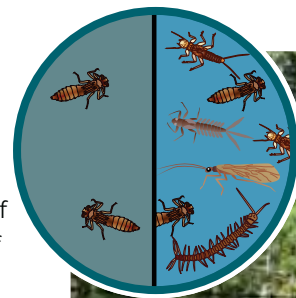


## Ecological impacts

Ecological condition grades are a combination of river bug and algae scores

### River bugs

or macroinvertebrates are the basis of river food chains and are effective indicators of changes to river health. Different types of bugs respond to different stressors (e.g water quality, density and condition of vegetation along the rivers, bank condition, instream habitat) and can help us understand how stressed our catchments are.



### Algae

(also known as chlorophyll) can grow excessively with high levels of nutrient inputs. The way this is expressed in rivers is mostly determined by flow. In pools and slow flowing reaches, microscopic algae can bloom and can be measured as chlorophyll in the water. In faster flowing waters the microscopic algae are washed away and rarely show up in water samples, instead we tend to see growth of visible algal scums on rocks, timber and other hard surfaces.

