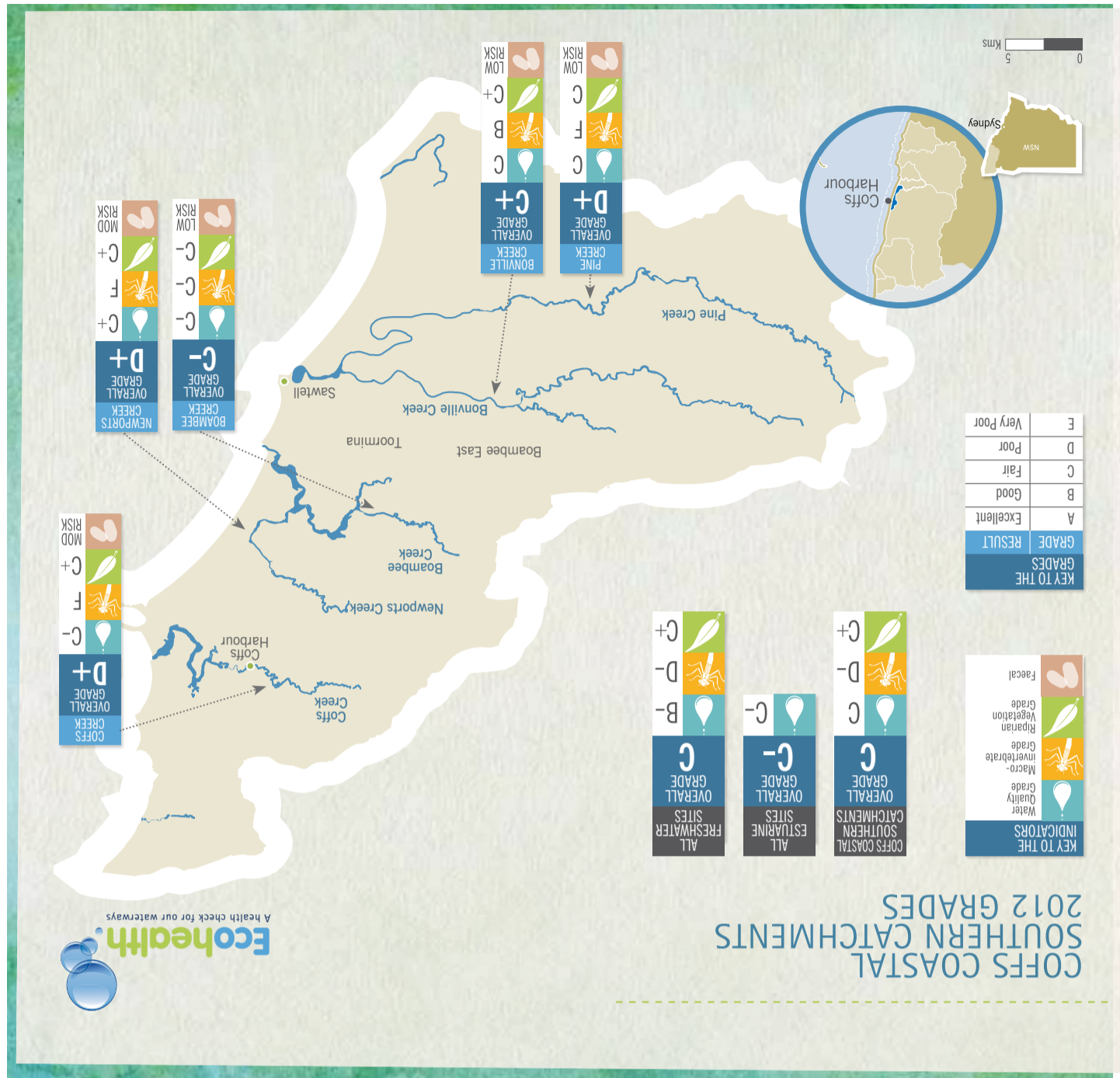


Ecohealth is an aquatic ecosystem monitoring program that measures how healthy our rivers and estuaries are for the plants and animals that live in them. Ecohealth assesses key indicators of aquatic health such as water quality, riparian (riverbank) vegetation, fish (distribution and population size), and macroinvertebrates (waterbugs) and reports on their condition. This information enables natural resource managers to determine where rivers are under stress and where investment in environmental management activities should be made. It also helps councils and State government agencies meet local and State monitoring, evaluation and reporting requirements by providing scientifically valid and consistent data about our river systems across the Northern Rivers region.

## KEY INDICATORS OF ECOSYSTEM HEALTH

The Ecohealth team has selected several indicators of aquatic health which when measured and assessed against national guidelines for healthy rivers indicates how healthy our waterways are. The Ecohealth team has ensured that the selection of indicators used in the Ecohealth program have been subject to a scientific review process. Not all indicators are used at all locations.

## ABOUT THE ECOHEALTH PROGRAM



## THE COFFS HARBOUR ECOHEALTH PROJECT

Coffs Harbour City Council is the third local government area to participate in the Northern Rivers Region Ecohealth program developed by the Northern Rivers Catchment Management Authority and partner agencies.

The Ecohealth program provides a standard way of monitoring the health of our river systems and is designed to be replicated across the region. Over time, the Ecohealth Program will provide a complete picture of the long-term health of our waterways.

In partnership with the University of New England, NSW OEH and the Northern Rivers Catchment Management Authority, Coffs Harbour City Council has undertaken an assessment of all major coastal waterways in the Coffs Harbour Local Government Area. This report card presents a summary of results for the southern catchments (Bonville-Pine, Boambee-Newport and Coffs Creeks) and reflects the average health of these river systems over a 12 month sampling period in 2011-12.



Bonville Creek



### Further information

For more information about the Ecohealth program or to access the Coffs Harbour Ecohealth Technical Report and other information about the results of this report card, visit:

[www.northern.cma.nsw.gov.au](http://www.northern.cma.nsw.gov.au)  
or contact Coffs Harbour City Council:

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The Coffs Harbour catchments Ecohealth Project was funded by Coffs Harbour City Council through the NSW Office of Environment and Heritage Estuary Management Program and the Northern Rivers CMA through "Catchment Action New South Wales" and the Australian Government "Caring For Our Country" programs.

This Report Card is intended as a community educational resource only. It does not necessarily represent the opinion of the NSW or Australian Government or its agencies. The Report Card provides a guide to where future investment in natural resource management activities may be needed in the Coffs Harbour catchments to restore and maintain aquatic ecosystem health. The content of this report card may be reproduced, providing its source is acknowledged.

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### Project Partners:



# REPORT CARD 2012

AN AQUATIC ECOSYSTEM HEALTH CHECK FOR THE  
**COFFS COASTAL CATCHMENTS - SOUTHERN**



Ecohealth indicators used in this report include:



**Water quality** – oxygen level, salinity, acidity, murkiness (turbidity) and nutrients - which provides an understanding of how changes in land-use practices within the catchment are affecting the health of our waterways.



**Riparian vegetation** – occurrence of weeds, habitat (e.g. fallen logs) and bank condition (slope, exposed tree roots and erosion) in freshwater reaches, and mangrove and seagrass cover in estuary reaches - which is important for maintaining good water quality, stabilising riverbanks and providing habitat for waterbugs and fish.



**Macroinvertebrates** – diversity of aquatic worms, beetles, mayflies, shrimps and other types of waterbugs – these organisms are sensitive to changes in aquatic habitat, pollution and poor water quality in freshwater areas and are a good indicator of ecosystem health.



**Faecal coliforms** – occurrence of two bacteria groups, coliforms and faecal streptococci – used as indicators of possible sewage contamination as they are commonly found in human and animal faeces. Although they are generally not harmful themselves, they indicate possible presence of pathogenic (disease-causing) bacteria, viruses, and protozoans that also live in human and animal digestive systems.

As part of the Coffs Ecohealth Project estuarine macrophytes (aquatic plants including seagrass, mangroves and saltmarsh) and the health of near-shore marine reefs were also assessed as a measurement of the aquatic health of our catchments. Separate reports on these indicators are available from [www.northern.cma.nsw.gov.au/projects/ecohealth](http://www.northern.cma.nsw.gov.au/projects/ecohealth).

## ECOHEALTH SCORING AND GRADING

Information about each of the Ecohealth indicators is collected from sampling sites over the course of a year and analysed to provide an assessment of aquatic health. Condition scores are calculated for each indicator at each site based on how often the measured values satisfy national guidelines for healthy rivers. The condition scores are then given a corresponding grade and result (see below).

CONDITION SCORE	GRADE	RESULT
95/100	A	Excellent
85/100	B	Good
70/100	C	Fair
55/100	D	Poor
<45/100	E	Very Poor

This scoring and grading system is based on the traditional format of a school report card, with ratings ranging from a high of 'A', through intermediate ratings of 'B', 'C' and 'D', to the lowest possible score of an 'E'. Secondary grades of + and - are included to provide greater resolution within a grade, and to better help show improvements over time.



This diagram shows an example of the Ecohealth grading system, where a grade has been given for water quality, macroinvertebrates and riparian vegetation. Based on the average of these grades, an overall grade is awarded to the site. Overall grades are also awarded for all freshwater and all estuarine sites within a river system and for the river system itself.

## SOUTHERN COFFS CATCHMENT RESULTS

### Overall grades

The rivers in this region recorded river health scores ranging from very poor to fair, with an overall grade for each river ranging from D+ to a C+. River health grades for each river system decreased from south to north, with Bonville-Pine Creeks combined graded as C, and Boambee-Newports Creeks combined and Coffs Creek graded as D+.

The rivers in the southern Coffs Harbour region received an overall grade of C-. River health scores identified local areas with good water quality, riparian condition and waterbug diversity (such as upper Bonville Creek) through to creeks with very poor condition such as mid-Coffs Creek.

All freshwater sites in this region received a combined grade of C-, driven by good scores for water quality and riparian condition, but reduced scores for waterbug diversity.

All estuary sites in this region received a combined grade of C-, with reduced water quality near the tidal limit of each estuary lowering the overall grade.

Five major river systems were sampled across the southern Coffs Harbour catchment. Bonville Creek recorded the highest grade of C+ with very good waterbug and riparian condition and good water quality. At the other end of the scale, Pine, Newports and Coffs Creek all received a grade of D+ driven by poor water quality and very poor waterbug diversity.

### Indicator results

Water quality was graded as 'fair' throughout the creeks in the region, with freshwater reaches having consistently better water quality compared to estuary reaches.

However, sites at the mouth of the rivers close to the ocean scored higher than all other estuary sites, highlighting the water quality issues are focussed in the mid-reaches of creeks near the tidal limit. Elevated levels of nutrients were found in all creeks, but this did not always result in excessive algae in the water suggesting the Creeks are resilient to low-level nutrient enrichment. The exceptions were in the mid-reaches of Boambee and Coffs Creeks where nutrient and algae levels were consistently high. The pH (measure of acidity) of the water also reduced scores with all sites exceeding the guidelines at some point in the study.

The average score for waterbugs across all creeks was a D-. Only the freshwater sites in Bonville Creek recorded a positive grade of B, with all other creeks graded D+ or lower. As waterbugs live their whole life in water, the poor result highlights the persistent impacts on creek systems in this region. Creeks that received poor grades often had less than half the number of waterbug species of the healthier sites, and were dominated by species that are very tolerant to water pollution and habitat loss where vegetation clearing and changed land use have impacted waterbugs.

Riparian condition was graded as 'fair' in the upper reaches of all creeks. Many sites were dominated by native Flooded Gum forests resulting in positive grades for vegetation. In contrast, freshwater sites in Boambee and Coffs Creeks were dominated by introduced Camphor laurel. Infestations from understory weed species such as lantana and privet were also evident at most sites. Very good bank condition and wildlife habitat scores were recorded at most sites (except Bonville Creek), highlighting the important role of the riparian vegetation in reducing erosion.

## WHAT ACTION IS REQUIRED?

Improving the condition of the riparian vegetation, stabilising river banks where needed and managing catchment-use issues that impact on our rivers is important for maintaining water quality and habitat for aquatic animals. Without action to protect and restore these important areas, it is likely that we would see a gradual decline in the health of our waterways through reduced water quality, the loss of riparian vegetation for birds and wildlife, and the smothering of macroinvertebrates, native fish and seagrass habitats from sediments washed into the river from eroding riverbanks.

## WHAT ACTION IS HAPPENING?

Coastal Zone Management Plans have been prepared for Hearn Lake, Moonee Creek, Pipe Clay Lake, Boambee Newports Creeks, Woolgoolga Lake, Willis Creek and Darkum Creeks.

The primary purpose of these CZMP's is to describe proposed actions to be implemented by Coffs Harbour City Council, other public authorities and the private sector to address priority management issues for the estuaries.

These management issues relate to:

- risks to public safety and built assets;
- pressures on estuary health; and
- community uses of the estuary.

## ABOUT OUR RIVER SYSTEMS

Coffs Harbour City is located on the Mid North Coast of New South Wales, about 540 kilometres north of Sydney and 440 kilometres south of Brisbane. Located with the traditional lands of the Gumbaynggirr people, it has a population of around 70,000 and a total area of 1,175 square kilometres with 79km of coastline. Coffs Harbour area extends from Pine Creek at Bundagen in the south to Station Creek in the north. The Great Dividing Range forms a well defined escarpment that has characteristically steep hills and passes very close to the coast, resulting in the coastal plain having no major river systems, but there are numerous small creek systems. Overall there are 4 major inland waterways and 14 coastal catchments of the Corindi River, Arrawarra Creek, Darkum Creek, Woolgoolga Lake, Willis Creek, Hearn Lake, Moonee Creek, Pine Brush Creek, Jordans Creek, Coffs Creek, Boambee Creek and Bonville Creek.

Coffs Harbour experiences a moderate climate, which has been classified as humid sub-tropical, characterised by warm to hot summers and mild winters. The area experiences a high average annual rainfall, averaging 1700mm, with most rain falling in late summer and early autumn. The cooler months receive much less rainfall, and dry spells are not uncommon from April to October. Landform has a strong influence on rainfall within the area, with higher rainfall occurring east of the coastal range leading to high intensity storms. These coastal systems experience regular flooding due to the steep catchments that are relatively small in area and subject to high rainfall intensities.