

**Riparian vegetation** is important for maintaining good water quality, stabilising riverbanks and providing habitat for animals including macroinvertebrates and fish. Ecohealth looks at the occurrence of weeds, structure of riparian vegetation, habitat (e.g. fallen logs) and current management (e.g. fencing).

**Geomorphic condition** assesses bank condition (e.g. slope, bank failure, smothering of the bed substrate by high loads of fine sediment), and trampling by stock.

**Macroinvertebrates** are waterbugs such as worms, beetles, mayflies and shrimps that are sensitive to changes in aquatic habitat, pollution and poor water quality. Ecohealth looks at the types of waterbugs occurring at different freshwater sites in our rivers. Waterbugs are not assessed in estuarine sites.

**Fish** provide a longer-term measure of river condition as they are highly mobile, require good habitat to breed, are long-lived and occur at the top of the food chain. Ecohealth samples the type and number of freshwater fish occurring in our rivers.

**Water Quality** provides an understanding of how changes in land use practices within the catchment are affecting the health of our rivers and estuaries. Ecohealth measures oxygen level, salinity, acidity, murkiness (turbidity) and nutrients in our waterways.

Ecohealth is an aquatic ecosystem monitoring program that measures the health of our rivers and estuaries for the plants and animals that live in them.

This information enables natural resource managers to determine where our rivers are under stress and where to invest in environmental management activities. It also helps Councils and State Government agencies to meet local and state monitoring, evaluation and reporting requirements.

Ecohealth does not comprehensively assess human health issues in the rivers such as drinking water quality, if it's safe for swimming, heavy metal contamination, disease, viruses or our ability to harvest shellfish or fish.

## Ecohealth indicators

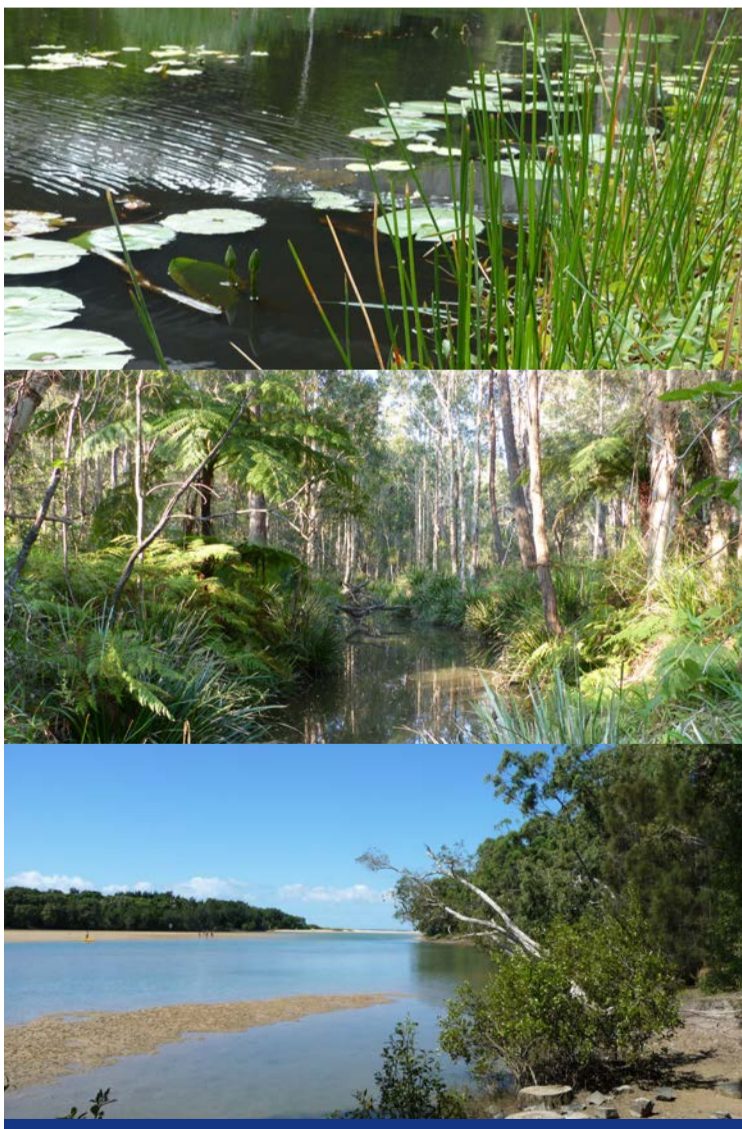
Scientists and natural resource managers use the health of particular components of an ecosystem to indicate if there are stresses to the habitat as a whole. The Ecohealth team has ensured that the selection of indicators used in the Ecohealth program have been subject to a scientific review process.

Ecohealth reports on the condition of key environmental indicators including water quality, riparian (riverbank) vegetation, geomorphology (channel shape), and fish and macroinvertebrate (waterbug) communities.

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## About Ecohealth



# Coffs Coastal Catchments REPORT CARD 2016

## Interpreting the results

Condition Score	Grade	Result
91-100	A	Excellent
76-90	B	Good
61-75	C	Fair
46-60	D	Poor
0-45	F	Very Poor

Information about each of the indicators was collected from 31 sites across the Coffs Harbour catchments over the course of 15 months. These were used to calculate scores for each indicator at each site, based on how often the measured values satisfied regional and national guidelines for healthy rivers. The condition scores were then given a corresponding grade (see below).

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 'F'. Secondary grades of + and - are included to provide greater resolution within a grade, and to help show improvements over time.

## Ecohealth scoring and grading

### How can you be involved?

- Join your local Landcare group if you would like to be involved in regeneration works
- Please don't litter – take all rubbish with you
- Remove weeds and plant native trees along the riverbank – Landcare can advise you on what to plant
- Do not trample or remove vegetation from riverbanks unless it is a weed
- Report any rubbish dumping to Council – dumping of garden waste spreads weeds
- Fence off the riverbank to protect it from trampling or damage

### Further information

To access the 2016 Coffs Ecohealth Technical Report or for more information about the Ecohealth program, go to [www.aerlabcomau.ipage.com](http://www.aerlabcomau.ipage.com) and click on Coastal Projects. Follow us on Twitter @Water\_UNE.

To see the improvements happening in your local area, go to the environment section on your local council's website.

### Project partners

The diagram to the right shows the Ecohealth grading system, where a grade is given for water quality, riparian condition, geomorphic condition, aquatic macroinvertebrates and fish. Based on the average of these grades, an overall grade is awarded to the site. Overall grades are then also awarded for each river system, subcatchment, and for all freshwater and estuarine sites.

Aquatic macroinvertebrate condition was very poor throughout the Coffs catchments. This reflects poor water quality and habitat condition in freshwater reaches. Macroinvertebrate communities improved from 2011 to 2015 in the Bonville/Pine and Coffs Creeks, but declined in all other catchments.

Freshwater fish communities were in good condition overall. The proportion of native to exotic species was excellent in Woolgoolga, Coffs and Bonville Creeks. However, there was only moderate recruitment of native species.

Riparian condition was moderate across freshwater reaches with only Coffs Creek recording a grade of D. Saltwater and Moonee Creeks and Hearnes Lake had good riparian condition and Arrawarra Creek had excellent riparian condition. The main issues were dominance of invasive weeds, vegetation clearing that has reduced riparian connectivity and isolated riparian vegetation from large patches of remnant vegetation, and damage from livestock or high human traffic.

Water quality was fair across the Coffs catchments, with an overall grade of C. Water quality declined from 2011 to 2015 in the Corindi River, and Saltwater, Coffs, Newports and Pine Creeks. Despite lower concentrations of nitrogen and phosphorus, the very low river flows led to poor flushing of estuaries and higher algal counts. The poorest water quality was found at tidal limits, where freshwater and estuarine contaminants are deposited. Water quality improved from 2011 to 2015 in Hearnes Lake, and Darkum, Boambee and Bonville Creeks.

A total of 31 sites in 14 waterways were used to calculate an overall condition of C- for the Coffs Harbour catchments (see overleaf).

## What we found

### What action is happening?

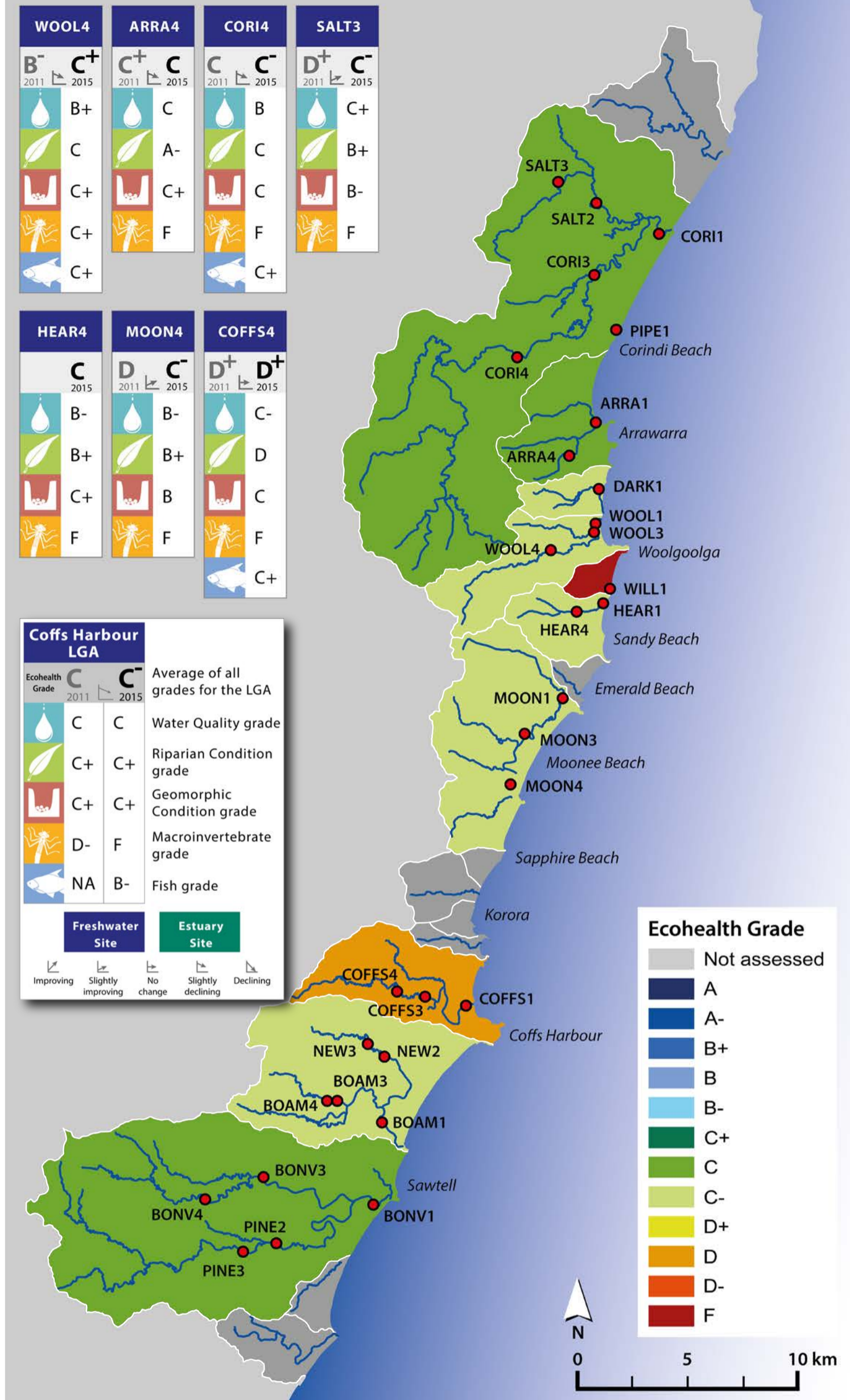
Coastal Zone Management Plans (CZMP) have now been completed for the Coffs Harbour Coastal Zone, Coffs Creek, Hearnes Lake, Moonee Creek, Pipeclay Lake, Boambee/Newports Creeks, Woolgoolga Lake, Willis Creek and Darkum Creek. The CZMP for Arrawarra Creek has commenced and a funding application has been submitted for the Bonville/Pine Creek CZMP. CZMP for all estuaries within the Coffs Harbour LGA will be completed by June 2018.

Coffs Harbour City Council has been actively removing large stands of Camphor Laurel and other environmental weeds and revegetating cleared or degraded creek banks throughout Council reserves and crown lands over the last 18 years. Regeneration and revegetation works have been undertaken in Coffs, Boambee, Bonville and Moonee Creeks and Woolgoolga Lake. Council also supports a number of environmental projects including the Jaliigirr project that rehabilitates degraded riparian areas in the coastal zone on both public and private land. The Friends of Coffs Creek Landcare group have been actively working on estuarine areas for over 20 years. Works include track construction, bush regeneration, revegetation and rubbish collection. Other local Landcare groups work at a number of other estuarine sites including Woolgoolga Lake and Moonee Creek.



A healthy intact riparian zone in Coffs Creek estuary. Photo © Coffs Harbour City Council.





<b>CORI1</b> 2011: B+ 2015: C+ Water Quality: C+ Riparian: C Geomorphic: C+ Macroinvertebrate: C+ Fish: C+	<b>CORI3</b> 2011: C 2015: C Water Quality: C Riparian: C Geomorphic: C Macroinvertebrate: C Fish: C	<b>SALT2</b> 2011: C+ 2015: D- Water Quality: D- Riparian: C Geomorphic: C Macroinvertebrate: F Fish: C+	<b>PIPE1</b> 2011: C- 2015: C- Water Quality: C- Riparian: C Geomorphic: C Macroinvertebrate: F Fish: C+
<b>ARRA1</b> 2011: C 2015: C+ Water Quality: C+ Riparian: A- Geomorphic: C+ Macroinvertebrate: F Fish: C+	<b>DARK1</b> 2011: D+ 2015: C- Water Quality: C- Riparian: B+ Geomorphic: C Macroinvertebrate: F Fish: C+	<b>WOOL1</b> 2011: C+ 2015: D+ Water Quality: D+ Riparian: C Geomorphic: C Macroinvertebrate: F Fish: C+	<b>WOOL3</b> 2011: D 2015: C- Water Quality: C- Riparian: C Geomorphic: C Macroinvertebrate: F Fish: C+
<b>WILL1</b> 2011: F 2015: F Water Quality: F Riparian: B+ Geomorphic: C+ Macroinvertebrate: F Fish: C+	<b>HEAR1</b> 2011: C- 2015: C- Water Quality: C- Riparian: B+ Geomorphic: C Macroinvertebrate: F Fish: C+	<b>MOON1</b> 2011: C 2015: C Water Quality: C Riparian: C Geomorphic: C Macroinvertebrate: F Fish: C+	<b>MOON3</b> 2011: D 2015: D+ Water Quality: D+ Riparian: C Geomorphic: C Macroinvertebrate: F Fish: C+
<b>COFFS1</b> 2011: B- 2015: C- Water Quality: C- Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>COFFS3</b> 2011: D- 2015: F Water Quality: F Riparian: C+ Geomorphic: C+ Macroinvertebrate: F Fish: NA	<b>BOAM1</b> 2011: C 2015: B Water Quality: B Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>BOAM3</b> 2011: D+ 2015: D Water Quality: D Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA
<b>NEW2</b> 2011: C+ 2015: D- Water Quality: D- Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>BONV1</b> 2011: B- 2015: B+ Water Quality: B+ Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>BONV3</b> 2011: C 2015: D+ Water Quality: D+ Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>PINE2</b> 2011: B- 2015: D+ Water Quality: D+ Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA
<b>BOAM4</b> 2011: D+ 2015: C+ Water Quality: C+ Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>NEW3</b> 2011: D+ 2015: D+ Water Quality: D+ Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>BONV4</b> 2011: C+ 2015: B- Water Quality: B- Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA	<b>PINE3</b> 2011: C- 2015: C Water Quality: C Riparian: C+ Geomorphic: C+ Macroinvertebrate: D- Fish: NA



Overall 2015 Ecohealth grades for catchments in the Coffs Harbour Local Government Area. Site grades show the indicator grades for each site in 2015 and the change in the overall site grade between 2011 and 2015. © 2016 Aquatic Ecology and Restoration Research Group, UNE.

**What can you do?**

- Conserve and maintain well-vegetated riparian (riverbank) areas, particularly deep-rooted native species that help stabilise streambanks.
- Revegetate streambanks that have been cleared or depleted of vegetation using a range of suitable, local native plant species.
- Identify and manage weeds appropriately.
- Leave woody debris and natural rock formations in waterbodies.
- Reduce water consumption.
- Reduce nutrient and pollutant runoff into streams (e.g. fertilisers, chemicals or cleaning products).
- Control and manage stock access to streams by fencing riparian areas and providing off-stream stock watering points and shade areas.
- Keep to designated paths beside waterways and through sand dunes to minimise soil erosion and compaction and to avoid trampling native vegetation.
- Obtain advice and necessary approvals from local or state governments before undertaking any infrastructure works near or in streams (e.g. modifying a stream crossing).



Riparian revegetation. Photo © C. Stehn.