

# RICHMOND FLOODPLAIN NEWS

A NEWSLETTER ABOUT NATURAL-RESOURCE MANAGEMENT ON THE RICHMOND FLOODPLAIN

ISSUE 19, FEBRUARY 2018

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Floodwater flows out of the Wilson River and over the levee wall at the pump station (bottom, centre) on Molesworth Street, Lismore. Picture: Rotorwing Helicopters.

## WELCOME

Welcome to the Richmond Floodplain newsletter.

This is the first newsletter to be produced since the creation of Rous County Council (RCC) through amalgamation of Richmond River County Council (RRCC), Far North Coast County Council (FNCCC) and Rous Water.

RCC (formerly trading as Rous Water) continues its function as the water-supply authority for the Ballina Shire, Byron Shire, Lismore City and Richmond Valley local government areas.

It is also the local control authority responsible for administering the Biosecurity Act 2015 for weeds in the region. Under service-level agreements with the Kyogle and Tweed shires, it also continues the functions and operations of the FNCCC in those two local government areas.

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## LEVEE GOES UNDER FOR THE FIRST TIME

Two major floods hit Lismore in quick succession early last year.

At the end of March, floodwaters overtopped Lismore's 12-year-old flood levee for the first time and inundated the central business district.

The flood, caused by the tail end of Tropical Cyclone Debbie, entered the Lismore CBD about 4.15 am on March 31 and resulted in thousands of evacuations from Lismore.

The Lismore Rowing Club gauge measured a flood peak of 11.6 metres AHD, the highest recorded since 1974 (12.2 metres AHD).

North Lismore was flooded late on the evening of March 30, while South Lismore and central Lismore were flooded in the early morning hours of March 31.

The heaviest rainfall in the Wilson

River catchment was at Terania Creek, which received 627 mm over March 30-31, 99 per cent of it in the 24 hours from 3 am on March 30.

Lismore recorded 324.8 mm of rain in 18 hours to 3 am on March 31, its wettest March day in more than 100 years. A little farther out of town, flood waters submerged the gauge at Lismore Airport, so there are no reliable figures for that site.

Just 10 weeks later, on June 13, the Richmond River catchment again braced for flooding.

An average of 227 mm of rain fell over the Richmond and Wilson river valleys during the 96 hours to 9 am on Wednesday, June 14.

The Wilson River at Lismore peaked at 5.5 metres at 1.15 am on June 14, with minor flooding.

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# PROJECT UPDATES

## FIELD DAY SHOWCASES FUTURE OF FLOODPLAIN FARMING

A field day, at Monaltrie, provided glimpses of some of the technology and principles that are shaping the future of farming on the Richmond River floodplain.

About 50 people attended the Future Farming on the Floodplain field day, run by North Coast Local Land Services (NCLLS) and Conservation Volunteers Australia (CVA) in partnership with Lismore City Council (LCC), at the River Bank Road beef property of Tony and Lindy Margan.

Participants heard about on-ground works on the property including construction of a weir to control groundwater levels, erosion control, revegetation, weed management and wet pasture management.

Aerial drone operators Chris Billing, of V2 Aerial Photography, Dorrigo, and Mark Fogarty, of Blue Horizons, Casino, gave a presentation on the use of drones for agriculture.

LCC environmental strategies officer Vanessa Tallon and Jim Tait, of Econcern, spoke about European carp control.

NCLLS senior land services officer Claire Hewitt, who organised the field day, said the organisation's Richmond Floodplain Management project was all about improving water quality, soil health and vegetation regeneration on the Richmond floodplain.

"We have installed structures on various properties to improve water flow and soil conditions and to reinstate natural wetlands, encouraging flood-tolerant pastures to grow," she said.

The small rock weir installed on the Margans' farm was an example of those structures.

As well as being part of the project, the Margans had won several grants



Tony and Lindy Margan pose with some of the riverbank restoration work on their property..

over the past five years, including one under the LCC Rural Landholder Initiative and another from Koala Connections.

Mrs Margan said the property consisted of 60 acres on the river flat with a two-kilometre natural river boundary and 30 acres of hillside.

"We have cleared the riverbank of coral trees, lantana and privet and we replanted with native species including koala food trees," she said.

"We also wanted to stabilise the riverbank and create wildlife corridors. The river was looking very neglected and we hoped we could improve the water quality.

"We did a lot of the work ourselves, but we also employed bush regeneration teams to maintain the area and we have received grant funding."

Mr Margan said they returned the property to cattle after losing two soybean crops and a barley crop to floods.

"We still have a lot to learn about this floodplain country," he said.

"We top slash two or three times a year to control weeds. We haven't used any synthetic fertilisers at all. We introduced dung beetles just over two years ago and we are just starting to see the difference they make."

Mr Margan said they had fenced the

cattle off from the river to prevent the expensive loss of calves, which fell into the river and could not get out.

"Also, we are losing a lot of country through riverbank slumping, so if we don't try to plant trees to hold the river bank where it is, we are going to keep losing country," he said.

Mr Margan said they applied lime at the rate of a tonne to the acre for three years on the hill and they were starting to see its benefits. It would be a couple of years before applications at the same concentration on the river flat land would show a result.

Mr Billing summarised the possible agricultural applications for aerial drones and the regulations covering their use. He outlined how he used a drone to map the Margans' property.

"Aerial photography and video is the first port of call for any drone," he said.

Drones also could be useful for mustering and stock inspections.

Other uses included plant counting for cropping, volume measurement for dams, area measurement, elevation measurement and aerial spraying of weeds.

Funding for the field day came from the National Landcare Programme and Catchment Action NSW.



# NEWS FLOWS



## LEVEE GOES UNDER FOR THE FIRST TIME

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Debris from the March flood damaged the two Browns Creek basin flood pumps and both pumps had to be removed for extensive repairs.

One pump was left completely out of action and the other only partially operational following the March flood. Lismore City Council (LCC) had to call on Fire and Rescue NSW to transport a pump from Sydney during the June flooding.

The CBD levee was conceived after the 1989 flood and was completed in time for the 2005 flood when it kept water out of the CBD.

The levee is set at the same level as the South Lismore levee and protects the CBD from floods up to a 1-in-10-year event.

Last year's March flood overtopped the levee by about 600 mm at the controlled overflows.

The levee is designed to stop small floods and it protected the CBD from them in 2005, 2009, 2013 and 2015. It increases the time available for people in the CBD to pack up and leave.

Without the levee, city streets such as Keen Street would have been flooded by midnight on March 30.



At Spinks Park, Lismore, the levee overflows in a controlled manner which minimises flood damage. Picture: Alex Clarke.

Because the levee limited the amount of water that could flow into the CBD, Keen Street was not flooded until about lunchtime on March 31.

The levee provided an extra 12 hours for CBD businesses to pack up equipment and stock.

The levee worked just as it was designed to operate, coming out of

the water in the same condition as before the flood.

Lower sections of the Browns Creek designated floodway experienced significant scouring.

Because there was significantly less water flowing through the city, there was much less physical damage to buildings and fences than was the case in past major floods (such as in 1989 and 1974).

Council has now marked peak flood levels across the city and is including this information in the computerised flood model with the aim of examining future flood mitigation options.

A fish kill followed the March flood, with dead fish and eels sighted at Swan Bay, Woodburn, Wardell and Ballina.

## AMALGAMATION BOOSTS COUNCIL

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RCC has also taken over from RRCC powers and duties under the Local Government Act 1993 for flood mitigation and related natural resource management.

The NSW minister for local government, Paul Toole, approved the amalgamation in 2016 after

the member councils and county councils in the region unanimously agreed to the changes.

By proclamation under the Local Government Act 1993, FNCCC and RRCC were dissolved, effective from July 1, 2016 (NSW Government Gazette No 52, of 22 June 2016, pages 1517–1520).

## COMMUNITY GROUP AIMS TO RESCUE RICHMOND RIVERS

Community members concerned about the health of the Richmond River and its catchment have formed an action group to tackle the problem.

Richmond Rivers Rescue Inc (RRR) is a community-based action group focused on improving the health of NSW's most degraded coastal river catchment.

RRR aims to raise community awareness about the plight of our rivers and educate people on how they can make a difference.

It plans to demonstrate to governments there is a groundswell of community support for incentives to help clean and restore our rivers.

It pledges to lobby the state government and federal government

for more funding to support existing local groups, including Landcare and councils, to do more. It promises to put together a comprehensive plan to improve the health of the rivers, drawing on existing studies, with set goals and timeframes.

Telephone: 6621 2463. Email: [richmondriverrescue@gmail.com](mailto:richmondriverrescue@gmail.com). Web: <https://richmondriverrescue.org.au/>



# PROJECT UPDATES

## IMPROVED SOIL HEALTH DELIVERS MAJOR BENEFITS

Bexhill dairy farmer David Wilson reports that work done to improve biological health, including soil biodiversity, on his family's property has delivered major benefits.

Mr Wilson was speaking at the first in a series of highly successful field days which were part of the Lismore City Council's Rural Landholder Initiative.

The field day drew about 40 participants to the property to see presentations on camphor laurel control, bush regeneration, soil health assessment, farm biological health improvement, initiative education kits and tree planting.

Mr Wilson said the improvements had allowed him to cut pasture inputs (fertiliser) to one third of previous levels and to almost completely stop pesticide use while maintaining production levels.

Lismore mayor Jenny Dowell said this was the first of 12 field days organised as part of the council's Rural Landholder Initiative (RLI).

"We were overwhelmed at council when we put out expressions of interest for people to be part of this initiative and it was very difficult being on the selection committee when it came to selecting what I believe was originally going to be a smaller number," Cr Dowell said.

"One of the things we wanted to do was to make sure we had a geographical spread of landholders and also a spread of land uses including hobby farms and, of course, today we are on a dairy farm."

Cr Dowell said that studies for the initiative showed that landholders knew what they wanted.

"They wanted help with labour, hands-on stuff, and they wanted



Dairy farmer David Wilson.

help with information, particularly on soil health," she said.

"They were the things that it highlighted to me. There were lots of other things there too."

Cr Dowell said the state government had provided \$100,000 of the funding for the initiative and council contributed another \$50,000. There was a lot of in-kind support, making it a true partnership.

Mr Wilson said improving the 250-acre property, its soil health and biodiversity was going to be a big job.

"I have about six kilometres of creek frontage to Coopers Creek," he said.

"We've done some little bits and pieces of that. The majority of it is in good shape, some of it fair, some of it is really bad. So that's going to be a generational thing, I think, something we won't be able to get done in the next couple of years.

"This farm is prone to flooding badly, which is part of nature. We just work around it.

"We milk about 100 cows at present, but that has been up around 130.

"One of the big issues about farming this way is that you have to feed not only the cows but also treat the soil right, so there has to be a trade-

off there and that's something we have to come to terms with.

"The only way I see of that becoming successful is to have a lot of soil food to overcome that problem and that's an added cost. The way we do this farming now, we have reduced our costs a lot. The use of artificial fertilisers is minimal and that's made a big difference. We don't spray, except around fence lines and buildings, that sort of thing."

Mr Wilson said that when he first started investigating the property's soil health, the ground was so hard he could not get fence posts to go in.

"One of the first things I noticed was that I had no legumes," he said.

"I had virtually hit a wall. The advice to me at the time was 'just keep doing what you are doing with maybe a bit more lime'. It was no good adding more lime or fertiliser. I had to do something different."

Mr Wilson said a book, 'The Biological Farmer', by Gary Zimmer, made a big impact on him.

"I needed to change to this new way of farming," he said.

"I needed to get a legume in and I needed to increase soil biodiversity. My carbon levels had dropped below two and my pH was 4.7-4.8. I put lime on and nothing happened. I got a response, but it didn't change the pH one little bit.

"Since I've changed, the green matter (carbon) has gone from two percent to four percent and that's in the past six to eight years. That's made a big difference. Now I concentrate on building organic matter. That's my main focus.

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# PROJECT UPDATES



## FIELD DAY PARTICIPANTS SEE THE RESULTS

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"Farming has to cut its ties with the chemical industry and the fossil fuel industry.

"Once you understand the carbon cycle, I think that makes the world of difference. There are three properties of soil. The old farming model I was using only concentrated on the chemical. It didn't look at the physical or the biological."

Lismore City Council environmental strategies coordinator Theresa Adams said that every little bit of work that was done on each property was actually helping to provide cleaner waterways throughout the catchment.

She introduced the RLI Healthy Landscapes and Waterways booklet, available from Lismore City Council.

"This is the first in a series of booklets which are self-assessment tools," she said. "It has lots of different land-management practices and you can actually walk out on to your farm and see whether what you are doing, or what your land looks like now is 'dated', 'common', 'best practice', 'aspirational' or 'innovative'.

"It's a way that you can see where you sit and how you can step up the ladder in terms of getting the most out of your land and also to develop your own property plan.

"There are four of these booklets. The first applies to all landholders and others are specific to various industries – beef grazing and dairy-ing, macadamia and orchardists, and floodplain cropping."

The first booklet also includes sections on biodiversity in the Lismore region, a history of settlement and



Field day participants pitch in.

early farming, management practices for healthy landscapes and waterways, a planting guide and a weeds list.

Former Rous Water catchment manager and now Rous County Council natural resource management planning coordinator Anthony Acret detailed the planning by the water supply authority to ensure the quality of water in the Wilson River catchment.

"It's really important that we are making incremental steps towards a long-term vision, Mr Acret said. "Every piece of on-ground work is making a difference.

"When planning the catchment water source with community groups, farming groups and industry groups, we recognised that we need to work together to make properties as profitable as possible in a way that produces clean water through a healthy environment.

"This initiative is an excellent way of showing how we can work together to achieve that."

He said the authority had been monitoring water quality in the Wilson catchment for about 10 years.

"Key water quality threats are pathogens, nutrients, sediments and chemicals," he said.

"We have done a lot of monitoring.

Water quality threats show a strong correlation to flooding."

Dave Forrest, of Wollongbar TAFE and Soilcare, introduced the Northern Rivers Soil Health Card, its associated instruction sheets and a kit of simple, easy-to-make test equipment. The soil health card and instructions for its use can be downloaded from [www.soilcare.org.au](http://www.soilcare.org.au), [www.tuckombillandcare.org.au](http://www.tuckombillandcare.org.au) and [www.richmondlandcare.org](http://www.richmondlandcare.org).

The kit includes a home-made wire quadrant, home-made penetrometer, home-made infiltrometer, clipboard and pencil, one soil health card results sheet for each set of tests planned, a spade, heavy duty plastic sheet about one metre x one metre, soil pH kit (available from rural stores), 500 ml measure, container of water (one litre per sample point) and a watch with a second display.

Mr Forrest demonstrated how to use each item in the kit and how to record the results of each test.

"We wanted something that was really low cost but valid," he said. "The other thing that was important to farmers was to have all the bits and pieces already in the shed."

Jesse Vandenbosch, of Big Scrub Regen ecological restoration service, spoke about how to achieve successful ecological restoration.

He demonstrated weed-control methods by stem injecting a camphor laurel tree and gave advice on revegetation techniques including species selection.

Field day participants pitched in to plant trees and ground-cover plants on a small section of riparian land being revegetated.





# PROJECT UPDATES

## RESEARCHERS MEASURE CSG BASELINES FOR RIVER

Southern Cross University (SCU) researchers have established baseline coal seam gas (CSG) datasets for the Richmond River catchment.

In the process the team found no large methane seeps in water as have been observed near active CSG fields in Queensland.

The detailed water quality and carbon datasets, which focused on the Richmond River and its tributaries upstream of Casino and Kyogle, are published in two international papers.

The studies describe the seasonal drivers of water quality in the mid-Richmond River, and are part of Ms Marnie Atkins' doctoral thesis. The research builds on recent baseline groundwater and atmospheric chemistry investigations published in 2015.

The first paper, 'Assessing groundwater-surface water connectivity using radon and major ions prior to coal seam gas development', revealed that groundwater seepage drives the Richmond River flow most of the time. It also identified river segments where groundwater seepage is most prevalent.

The second paper, 'Seasonal exports and drivers of dissolved inorganic and organic carbon, carbon dioxide, methane and  $\delta^{13}\text{C}$  signatures in a subtropical river network', describes the carbon chemistry and how groundwater seepage releases greenhouse gases, including methane, to the river.

The studies were part of a collaborative project funded jointly by the Northern Rivers Regional Organisation of Councils (NOROC) and Southern Cross University.

Ms Atkins, who recently concluded her PhD research, is the lead author on both papers.



Lead author Marnie Atkins and a team member in the field.

"Our research has taught us several lessons on how to perform baseline investigations in Australian rivers and groundwater," Ms Atkins said.

"We need to use methane as a key indicator of coal seam gas impacts on groundwater, rivers, and air.

"Our catchment-scale mapping of river water using novel isotopic techniques identified areas where groundwater is connected to the river. These techniques can be applied anywhere. Areas where groundwater connects to river waters should be avoided for CSG development."

Another of the studies' authors, Professor Isaac Santos, from the SCU National Marine Science Centre, has been investigating methane sources for several years using mobile technology.

"CSG exploration has been suspended in the Northern Rivers region, but the resource remains in the ground," Prof Santos said.

"Having quality baseline data is key to assessing long-term impacts of any development.

"Methane seeps that look like a spa bath have been observed in the Condamine River, in Queensland, after CSG development. Because no data on methane was available prior to CSG development around the Condamine River, it remains nearly impossible to define whether those seeps are related to mining or not."

The researchers found no methane seeps along the Richmond River.

"While methane is high in some parts of the Richmond River, we found no methane seeps similar to the ones in Queensland," Prof Santos said.

"All methane in the Richmond River appeared to be from natural sources. We will be in a strong position to assess impacts on water quality if CSG activity comes to our region in the future."

At a 2014 forum, hosted by the former Richmond River County Council (RRCC), Prof Santos said methane was the major component of CSG and because it moved rapidly through the environment it was an ideal early indicator of changes to groundwater and underlying strata.

Co-author Dr Damien Maher, from the SCU School of Environment, Science and Engineering, said the Richmond River had long been a focal point of the team's research.

"We now have one of the most comprehensive water quality and carbon datasets of any Australian river," Dr Maher said.

"Site specific baseline observations are essential to plan for long-term monitoring. We need to understand those natural cycles, including methane, before we are able to interpret any changes that CSG, or any other development, may cause into the future."

# WHAT'S WHAT

## ON THE RICHMOND FLOODPLAIN

There are many groups involved in the natural resource management in the floodplain. The following is a list designed to help you improve your floodplain networks. If you know of other groups that should be included, or if any of the details appearing below need updating, please contact: **The General Manager (02) 6623 3800** or email [council@rous.nsw.gov.au](mailto:council@rous.nsw.gov.au).

### BALLINA FISHING CO-OPERATIVE

Regulates the sale of professional fishers' catch.  
*Contact:* General manager  
Ballina Fishermen's Co-operative

*phone:* (02) 6686 2533

### BUNGAWALBYN LANDCARE

Works in partnerships with others in the community to protect, manage and enhance natural resources in the Bungawalbyn catchment.

*email:* [bungawalbynlandcare@gmail.com](mailto:bungawalbynlandcare@gmail.com)

### DRAIN WATCH

Drain watch groups are being set up by the sugar industry to monitor water quality. This is an outcome of the sugar industry's three-year program developing best management practices for improving water quality in drains.

*Contact:* Broadwater Sugar Mill  
*phone:* 6620 8200

### ENVIRONMENTAL TRAINING AND EDUCATION INC (ENVITE)

Provides training and education to unemployed young people. Engages in environmental works around the catchment.

*Contact:* General manager  
*phone:* 6621 9588  
*email:* [envite@bigpond.net.au](mailto:envite@bigpond.net.au)

### NORTH COAST LOCAL LAND SERVICES

North Coast Local Land Services is a part of the NSW Department of Industry and Investment. It provides catchment management, natural-resource management, biosecurity, agricultural production advice and emergency management. Its strategies are consistent with ecologically sustainable development and total catchment management..

*phone:* 6623 3900  
*email:* [admin.northcoast@lls.nsw.gov.au](mailto:admin.northcoast@lls.nsw.gov.au)

### NSW DEPARTMENT OF PRIMARY INDUSTRIES (AGRICULTURE AND FISHERIES)

**Agriculture:** Soil and water investigations, acid-sulfate soil research, best management practices for backswamps.

*phone:* (02) 6626 1200  
*email:* [nsw.agriculture@dpi.nsw.gov.au](mailto:nsw.agriculture@dpi.nsw.gov.au)

**Fisheries:** Protect and enhance aquatic habitat in natural waterways within the estuarine reaches of the floodplain.

*phone:* 6626 1200  
*email:* [information-advisory@dpi.nsw.gov.au](mailto:information-advisory@dpi.nsw.gov.au)

**Floodplain and Acid Sulfate Soils Network:** Provides an avenue for flood mitigation authorities, research bodies, government organisations to exchange ideas and information.

*email:* [information-advisory@dpi.nsw.gov.au](mailto:information-advisory@dpi.nsw.gov.au)

# WHAT'S WHAT ON THE RICHMOND FLOODPLAIN

## **NSW SUGAR MILLING CO-OPERATIVE, BROADWATER**

Regulates and processes sugar cane production on the Far North Coast.

*phone:* 6620 8200

## **OFFICE OF ENVIRONMENT AND HERITAGE**

Responsible for environment and heritage matters involving estuary health and flooding throughout Northern NSW.

*phone:* (02) 8289 6301

*email:* northernrivers.region@environment.nsw.gov.au

## **RICHMOND LANDCARE INC.**

Supports and represents local Landcare groups and works in partnerships with others in the community to protect, manage and enhance natural resources in the Richmond River catchment.

*phone:* 02 6619 1582

*email:* info@richmondlandcare.org

## **RICHMOND RIVER CANE GROWERS ASSOCIATION**

Body representing cane growers on the Richmond River.

*phone:* 6683 4205

*email:* richmondcane@gmail.com

## **RICHMOND RIVERS RESCUE (RRR)**

Richmond Rivers Rescue Inc (RRR) is a community-based action group focused on improving the health of NSW's most degraded coastal river catchment.

*phone:* 6621 2463

*email:* richmondridersrescue@gmail.com.

## **ROUS COUNTY COUNCIL (RCC)**

Responsible for flood mitigation, drain maintenance, weed control, water quality and water supply in the Ballina, Lismore, Kyogle and Richmond Valley areas.

*Contact:* General Manager

*phone:* 6623 3800

*email:* council@rous.nsw.gov.au

## **WILSON'S RIVER LANDCARE GROUP**

The main focus of the group is river bank restoration and enhancing riparian vegetation at sites along the Wilson River at Lismore.

*phone:* 6624 7979 or 6624 5500

*email:* eco\_nsw@bigpond.net.au



## MORE INFO

ROUS COUNTY COUNCIL WEBSITE

[www.rous.nsw.gov.au](http://www.rous.nsw.gov.au)