

Our Ref: D22/9953

24 May 2022

2022 Independent NSW Flood Inquiry

Submitted online at

[www.nsw.gov.au/nsw-government/projects-and-initiatives/floodinquiry](http://www.nsw.gov.au/nsw-government/projects-and-initiatives/floodinquiry)

Dear Sir/Madam

## **Independent expert inquiry into the preparation for, causes of, response to and recovery from the 2022 catastrophic flood event across the state of NSW**

Rous County Council (Rous) provides bulk water supply, flood mitigation and weed biosecurity services to the local general purpose councils in the Northern Rivers. It is one of only nine county councils in NSW, the only county council to provide multiple services. County councils were historically more common across the state; however, as local councils amalgamated, the functions of county councils have been increasingly incorporated into these larger organisations.

Rous is the appointed flood mitigation authority for the Richmond Valley, Lismore and Ballina Local Government Areas. Rous is also the regional water supply authority supplying bulk water to Richmond Valley, Lismore, Ballina and Byron Local Government Areas. Additionally, weed biosecurity services are also provided to these Local Government Areas as well as to Kyogle and Tweed.

Given the role of Rous, particularly in bulk water supply and flood mitigation, our organisation was involved with the response to the catastrophic flooding that occurred along the Richmond and Wilsons Rivers in February and March 2022. Rous also had our main office damaged in Lismore, depots in Lismore and Woodburn inundated, water supply and flood mitigation assets damaged and staff personally impacted by the flood. Our submission provides details on our experience with and understanding of the flood events, the challenges we faced, along with our suggestions on improvements that could be made. Our submission covers both strategic and operational matters and reflects the breadth of work that our unique organisation carries out on behalf of the community.

### **1. Causes and contributing factors**

#### **a) The catchment above Lismore has been extensively altered in order to shed surface water and runoff quickly**

Compared to other catchments in the region, the catchment above Lismore is highly altered. The catchment is intensively used for horticulture and the rural landscape is densely settled. The land use and associated land management practices for both horticulture and rural residential areas upstream of Lismore, increase and concentrate runoff and reduce upstream retention of rainfall. Throughout the catchment, land has been modified resulting in the shedding of surface water and runoff more quickly and exacerbating flooding downstream.

Given this, we suggest that the NSW State Government provides clear planning advice and the relevant mechanisms to local councils to ensure that the upper catchment land use and land management practices do not continue to exacerbate flooding downstream, including mechanisms to effect change on existing agricultural land. A whole of catchment approach is required in response to the floods, which means focusing on land uses in the upper catchment areas and examining how they contribute to flooding, along with measures for the worst impacted areas like North and South Lismore, the Lismore CBD, Coraki, Woodburn and Broadwater.

b) The Richmond/Wilsons Catchment is extremely degraded and has one of the worst Ecohealth rankings in the State

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. It involves an assessment of water quality, riparian vegetation, geomorphic condition, macroinvertebrates, fish and plankton. An Ecohealth assessment of the Richmond River completed in 2014 found the river to be a D (i.e. in a 'poor condition') and one of the worst in NSW.

A degraded catchment is less able to cope with and buffer the impact of major flooding. Before the catastrophic flood in February 2022, the Wilsons River already had missing or degraded riparian vegetation, eroded riverbanks, drained and degraded wetlands and highly erodible soil from unsustainable agricultural practices. These have limited the catchment's natural ability to reduce the impact of flooding downstream.

Our suggestion is for the NSW State Government to fund the implementation of the *Northern Rivers Watershed Initiative* (Feb 2019) which has been endorsed by Ballina Shire Council, Byron Shire Council, Kyogle Council, Lismore City Council, Richmond Valley Council, Rous County Council and Tweed Shire Council. The Watershed Initiative is a holistic approach to the management of water within the catchment. It proposes to use modern, best practice approaches in catchment modelling and natural flood mitigation to target improvements in stream bank condition and river health that also contribute to reduced flood risk within the catchments. Further information on the Initiative is provided on page 7 of this submission.

c) Climate change

Rous is seeing the impact of climate change in increased weed infestations, sea level rises affecting the performance of our flood mitigation assets, and more extreme flood and drought events. Advice for the Northern Rivers is that climate change will make our wet periods wetter, and our dry periods drier and increase the frequency and magnitude of extreme weather events.

In the past five years, Rous has experienced these predicted swings in extreme weather. In 2017 the Wilsons River experienced what was then the third highest flood on record. This flood inundated our depot and office in Lismore and damaged our flood and water infrastructure. In 2019 the rainforest and National Park that surrounds Rocky Creek Dam and the Nightcap Water Treatment Plant was on fire, threatening infrastructure that supplies water to more than 100,000 residents. At the same time, bushfires in other parts of the area threatened our flood mitigation infrastructure when wetlands caught alight. This year, in 2022, we have experienced a catastrophic flood two meters higher than the highest flood on record, followed by another flood a month later, which was the sixth highest on record.

This quick succession of extreme weather events puts our organisation and infrastructure under pressure. Rous needs to plan for and respond to climate change impacts both to our infrastructure and the environment. In order to do so, we need clear advice, policy and guidance from State Government on how to respond to the changing climate and reduce any further impacts along with appropriate funding to take the necessary steps.

## **2. Preparation and planning**

### a) Unreliable and inaccurate advice from the Bureau of Meteorology (BOM) during extended wet periods influenced by La Nina

Rous uses BOM issued flood watch and warnings to operate our flood mitigation infrastructure. Rous has observed that during the past two La Nina influenced Summers, the BOM has been unable to predict flooding in an accurate and timely fashion.

Staff have observed that flood watches in some instances have not been given, and flood warnings often come too late for staff to make the necessary changes to flood mitigation infrastructure. As a result, Rous staff have begun to monitor river gauges and rainfall figures themselves to set triggers independent of BOM warnings for operating flood mitigation infrastructure.

The flood that occurred in both the Wilsons and Richmond Rivers on the 28 February 2022 wasn't predicted in an accurate and timely manner, with significant consequences resulting. Moving forward, the BOM must provide clear advice to the community and agencies, on the accuracy of their predictions and the difficulty of modelling how intense, unpredictable rain events behave on catchments that are already saturated.

Advice from the BOM must incorporate assessment of local prevailing conditions, in conjunction with predicted or potential rain events. This advice should be provided by the controlling agency, either the SES, or in a fully funded model, the flood mitigation authority.

We suggest that the NSW State Government also reviews existing river gauges to ensure that they all report data in a consistent manner and use the same measurements (meters AHD) to assist with interpretation. Further river gauges are also needed to provide good coverage across the catchment, such as further gauges within the Bungawalbyn Creek catchment.

## **3. Response to floods**

### a) Emergency warnings to residents downstream of Rocky Creek Dam were not delivered in a timely fashion

Rous is responsible for Rocky Creek Dam, a 14 gigalitre dam that is located in the upper catchment of the Wilsons River. Rocky Creek Dam is the primary source of drinking water in the area. A Dam Safety Emergency Plan has been prepared for Rocky Creek Dam, which identifies measures and warnings that advise residents downstream of the possible risks. Issuing evacuation warnings and orders to residents downstream of the Dam is the primary responsibility of the NSW SES during floods. However, during the flood that occurred on the 28 February 2022 these warnings weren't being delivered quickly enough. The delay meant that when the next warning needed to be issued, the previous warning hadn't been provided to residents. This led to Rous providing the warnings themselves to downstream residents.

In the future, the SES needs to be more aware of their role during Dam Safety events and have better clarity on how and when they will issue communication alerts.

b) Inability to access drinking water infrastructure essential in maintaining supply during and after the floods

To maintain drinking water supply to the region, Rous needs to access its principal water treatment plant at Rocky Creek Dam, as well as the many pipelines, reservoirs and valves that distribute water throughout the region. During the flood on the 28 February 2022, local roads were flooded and damaged and meant that it was dangerous or impossible for staff to access this infrastructure.

Many times, during the floods, Rous staff gained access to critical sites through their own personal contacts. Without so, flood impacted locations like Coraki and Broadwater would not have had water supply. Where access couldn't be organised, Rous relied on members of the public voluntarily investigating and reporting back on the condition of our assets. The lack of access to our infrastructure also impacted on Rous receiving critical deliveries, threatening the continuing operation of the water treatment plant.

We suggest that the NSW State Government provides funding, in consultation with Rous, to general purpose councils within the region to provide flood free access to critical water infrastructure. Rous operational staff need to have reliable and safe access to a number of sites across Richmond Valley, Lismore (in particular the water treatment plant located at Rocky Creek Dam), Ballina and Byron Local Government Areas, which are critical in maintaining the supply of safe drinking water to more than 100,000 people.

c) Rous, as the Flood Mitigation Authority, was not involved with responding to the flooding

Rous has management responsibility for flood mitigation infrastructure across Richmond Valley, Lismore and Ballina Local Government Areas, including 80km of levees, 750 individual floodgates and 180km of drains. During the flood events in February and March 2022, Rous was never contacted by the SES about the condition or role of our flood mitigation infrastructure, including critical levees that protect residential dwellings and the village of Woodburn.

Unfortunately, alerts issued by the SES for Woodburn for the flood in March incorrectly named a local levee and didn't consider the damage it had sustained in the previous flood in February. By not contacting Rous, the SES was not working with the best available information to determine the risk to residents and communities. In future events the SES should consult Rous to ensure that they are working with the best available information.

d) Evacuation information was poorly delivered

During the floods Rous observed that evacuation information was poorly delivered to local residents. Poor decisions were also made on giving evacuation and all clear notices, that didn't incorporate local knowledge, local assessment and a precautionary approach.

Examples of that advice include:

- giving the all clear to re-enter the Lismore CBD in the early evening rather than taking a cautious approach and waiting for the morning.
- giving the all clear to return to Woodburn when the flood was still coming.
- sending people to evacuation centres that they were physically cut off from (e.g. Woodburn residents being sent to Lennox Head when the highway was cut by flooding).

Risk assessments for providing the all clear to return must include an assessment of the safety of evacuating again if the situation changes, and the risk of it changing. Local information and advice along with the previous notices must be investigated before issuing all clears and evacuation orders (e.g. check local road conditions, and river levels). Finally, decisions on all clears and evacuation orders need to be checked by someone on the ground.

e) Communications from all agencies using flood terminology incorrectly

During the floods the region's lack of awareness of terms used in flood advice and warnings was apparent. Understanding these terms ensures that the community and stakeholders accurately understand what is occurring and the relevant risks. Examples of misunderstood terms during the floods include:

- telling residents of Lismore that the CBD levee had breached when it had overtopped.
- downstream residents and general community being told that Rocky Creek Dam wall had broken, when the dam was only spilling over the spillway as it was designed to do.

We suggest in the future there is a need for coordinated communications that respond quickly to misunderstandings. Stakeholder education (both within agencies and the wider community) on what evacuation triggers mean, and the difference between terms such as breach, overtop and spill is required.

#### **4. Other matters**

a) The importance and challenge of bulk water supply to the community by Rous is not recognised, especially during an emergency

The role of Rous and the need to maintain the function of water treatment plants and the distribution system during the floods was overlooked and not prioritised, despite servicing 100,000 residents, as well as essential service providers, such as hospitals. Water supply is reliant on managing water quality and quantity production through treatment plants. The only water treatment plant that can meet regional demands is located at Rocky Creek Dam, which is a remote site, reliant on access through rural and regional roads, that are severely impacted by flash flooding and stormwater runoff, as well as fallen trees and debris. It also requires Rous to have access to key distribution infrastructure, such as reservoirs and isolation valves, at short notice. The NSW State Government must provide funding assistance to local Councils in our operating footprint to carry out improvement works to roads that provide access to key infrastructure.

b) Lack of understanding of the consequence of losing bulk water supply and treatment

If Rous had of been unable to maintain the treatment plant and the integrity of the distribution network, there were two main risks, one was losing water supply altogether, and the other was contamination, resulting in poor water quality. Water supply is important for public health (i.e. sanitation), as well as post-flood clean up. Managing the water quality, especially during an extreme event, is critical due to the impact on the health system from the potential of having a large proportion of the community sick due to drinking contaminated water. The communication issues made this even more critical, as there was limited opportunity to be able to advise the community if there had been a water quality issue (e.g. to issue boil water notices or do not drink orders). Power failures across the region would have prevented people from being able to boil water if required.

During the February 2022 flood event, a large volume of treated water was lost in flooded areas, particularly Lismore, due to broken services and hot water systems. At the same time, the flooding caused very high turbidity in our source water, making it difficult to operate the water treatment plant. Nightcap Water Treatment Plant was being run at maximum capacity during and immediately after the event, and we came very close to running out of water in critical regional reservoirs. This could have resulted in significant loss of pressure which would have resulted in a cascading chain of events of failures in our network that we would not have been able to respond to. The role of Rous in emergency events needs to be given more due consideration by decision-making agencies.

c) Responsibility for flood mitigation in the Richmond Catchment is not clear

Despite Rous being designated by the State Government as the Flood Mitigation Authority, there is still a lack of clarity on who is the lead organisation. Flood mitigation activities are also undertaken by Richmond Valley, Lismore City and Ballina Shire Councils. This shared responsibility has eventuated over many years, since a Flood Mitigation Authority was first established in the area in 1959. Current financial and legislative limits on Rous, prevents our organisation from taking a whole of catchment perspective. Over time the role of Rous has defaulted to managing some but not all flood mitigation infrastructure and reducing their associated impact on the environment. Currently, Richmond Valley, Lismore City and Ballina Shire Councils have responsibility for development controls on flood prone land, undertaking flood studies and preparing risk management plans as well as undertaking flood education and emergency responses. These councils generally also have responsibility for flood mitigation infrastructure in their urban and CBD areas of their own Local Government Areas.

The NSW State Government must work with local governments in the region to clarify and establish how flood mitigation will be undertaken in the Wilsons and Richmond Rivers, identifying the role of the Flood Mitigation Authority and general-purpose councils. A model is needed that best addresses whole of catchment flooding, and it must be clear, formalised and appropriately funded. Rous and our constituent councils have separately provided a submission on this matter.

d) There is no long-term strategic plan for the future of existing flood mitigation infrastructure

As the Flood Mitigation Authority, Rous has inherited a large asset base of aging flood mitigation infrastructure from the State Government with no understanding of what different structures do, whether they are still required and no consistent and agreed level of service that they are expected to provide to the community. This infrastructure is difficult to maintain and can have a significant impact on the environment but is important to the communities who live and work in these areas.

This flood mitigation infrastructure was constructed and funded by successive federal, state and local governments, with many constructed through the NSW State Government Public Works program that continued locally until the mid-1970s.

The NSW State Government must provide a clear long-term strategy for existing rural flood mitigation assets. The strategy must identify the need for this existing infrastructure and the value it provides. Challenges such as sea level rise and reducing the infrastructure's environmental impact must be included.

e) The maintenance and operation of existing flood mitigation infrastructure is not adequately funded

The current level of funding from the State Government is inadequate to meet current service levels of existing flood mitigation infrastructure. Funding from the NSW Government to Rous for maintaining existing flood mitigation infrastructure has not increased since 1985. Without adequate funding, our current level of resourcing limits our role and restricts our activities to maintaining infrastructure. This infrastructure has a declining level of service to the community as climate impacts such as sea level rise begin to make our assets more vulnerable, and the cost of maintaining infrastructure increases.

The NSW State Government must provide adequate funding to maintain rural flood mitigation infrastructure that Rous is responsible for. State Government funding to Rous for maintaining its existing rural flood mitigation infrastructure has not increased beyond \$84,600 in 37 years and has not kept pace with the cost of keeping this infrastructure operational.

f) The floods have caused catastrophic environmental damage to the Richmond/Wilsons catchment

The catastrophic flood events within the Northern Rivers during February and March 2022 have caused significant landslides and erosion events, particularly in upper catchment areas that have the potential to provide an ongoing source of sediment (and associated impacts) for many years to come.

Catchment inspections have observed the following:

- large-scale landslides (up to 350 m across slopes) that have mobilised millions of tonnes of sediment from upper catchment areas straight into stream channels;
- massive sediment deposition in downstream environments (including within floodplain and in-channel areas); and
- catastrophic stripping of streambeds, banks and valley floors.

Associated impacts include the following:

- destruction of private and public road infrastructure.
- water quality and aquatic habitat reduced from increased sediment loads.
- erosion/sediment deposition damaging agricultural resources and other infrastructure, including water mains.

The area requires a large-scale, systematic and catchment-wide assessment and coordinated response, or the river system is facing compromised triple bottom line outcomes for years to come.

g) Future flood mitigation investment should include natural flood management programs that will also assist with improving catchment health

Natural flood management takes a catchment-wide approach to reducing flood flows by restoring the natural hydraulic function of rivers and their floodplains and has been successfully undertaken in several countries over several decades. A key aspect of natural flood management is that whilst actively seeking to manage flood risks by undertaking action in catchment areas, these same measures will address river health issues, allowing multiple objectives to be met.

The proposed *Northern Rivers Watershed Initiative* is a holistic approach to the management of water within the catchments. The Watershed Initiative will utilise modern, best practice approaches in catchment modelling and natural flood mitigation to improve stream bank condition and river health that also contributes to reduced flood risk within the catchments. The Watershed Initiative has been specifically devised for the Northern Rivers Joint Organisation footprint to address ecosystem health, water security and flood risk issues across the Tweed, Brunswick, Richmond and Evans River systems in an integrated fashion.

The Watershed Initiative aims to apply three main natural flood management strategies to manage flood risk in rural catchments:

- Increasing infiltration (changing agricultural practices to reduce soil compaction, improve soil quality and promote absorption of water).
- Storing water (restoring functioning floodplains and wetlands).
- Slowing flows (restoring natural processes and landforms to the river corridor, riparian buffer strips, coarse woody debris).

Whilst being endorsed by all Northern Rivers Joint Organisation Councils and the Northern Rivers Joint Organisation itself, the *Northern Rivers Watershed Initiative* has received no support from the NSW Government. We suggest the NSW State Government endorse and fund the Watershed Initiative so it can be delivered successfully.

Further, Rous has developed a research proposal in partnership with researchers at Southern Cross University and the University of New South Wales to identify and assess the most appropriate natural flood mitigation options for the Richmond River catchment through a modelling and field-based process. The proposal “Engineering nature-based solutions into human landscapes” has been submitted to the Australian Research Council (in December 2021) for funding and we await the outcome of this.

h) Lack of a coordinated approach to the management of natural resource management issues in the Richmond River – opportunity to consolidate the Richmond River Catchment Governance process

To respond to specific natural resource impacts following the floods, the NSW Government has established a series of separate initiatives that are focussing on shoreline clean-up, riverbank erosion, soil contamination and landslips. While these are positive and necessary programs, Rous is concerned at the State Government’s lack of recognition or coordination of a systematic assessment and remediation of the catchment following the floods.

There has been widespread devastation across the catchment including significant landslips across upper catchment areas, stripping out of riparian zones and valley floors in mid-upper catchment areas, major issues of bank instability and erosion through the mid-Richmond, as well as instability and massive sedimentation in and adjacent to waterways that will provide an ongoing sediment source for years to come. Our concern is that there is no state government agency coordinating or taking responsibility for these system-wide matters – all the respective programs mentioned above are operating in isolation, and when complete, we will be no closer as a catchment community to having a shared approach to these issues.

In recent years the Department of Planning and Environment, in partnership with catchment councils has aimed to establish a collaborative approach to governance within the Richmond River catchment. This initiative, despite being developed for this type of purposes, has not been utilised by the NSW Government in the roll-out of all of these responses following the



flood. While various state government departments have been tasked with addressing different priorities, it is apparent that there is no systematic approach to these issues and no coordination at a catchment level from State Government to the bigger catchment and river health issues that have presented.

i) There needs to be a structured system-wide LIDAR survey and assessment process to understand the scale of impacts in the Richmond River catchment

Any structured approach to understanding and responding to the impact of the floods on the landscape needs to be underpinned by updated survey information throughout the catchments, so that the location, extent and severity of issues can be understood, and the likely system response and management options considered. It is recommended that a system-wide LIDAR survey be conducted throughout all of the impacted catchment and floodplain areas.

It is critical that we attempt to understand the magnitude and extent of this impact and put in place a monitoring approach that can track recovery over time and guide the prioritisation of ongoing management intervention where required. Comparing LIDAR data collected before and after a catastrophic event like the 2022 North Rivers floods can provide quantitative data on the distribution and magnitude of landslides in the region, as well as the extent of channel erosion and deposition, riparian vegetation stripping (critical knowledge for calibrating updated flood models) and other infrastructure damage.

LIDAR data will also be critical for use in the recovery as follows:

- Understanding impacts to and assisting in the design of new improved road infrastructure.
- Developing improved (based on new catchment roughness and characteristics) digital elevation models for integrated catchment modelling.
- Understanding landslide risk.
- Identification of priority actions for recovery that may range from highlighting areas requiring streambank stabilisation/channel repair; through to the identification of priority reaches for rehabilitation.

It is understood that there is some targeted LIDAR and videography work being completed to assist with some localised understanding of flood-impact. However again this is a somewhat fragmented approach – to effectively respond to catchment condition, a systematic survey across the whole of the catchment is required which would then be picked up by a structured assessment and planning process. It is critical that the NSW Government develop a response framework as outlined above, and immediately commence plans to capture post-event LIDAR data capture to guide this response.

We trust that the above information is useful in your review of major flooding in our area. We are prepared to provide further information on any of the matters discussed and give approval for this submission to be published.

Yours faithfully



Phillip Rudd  
General Manager