



Our Future Northern Rivers

and the

**Lismore Citizens Flood Review Group**



*Submission to*

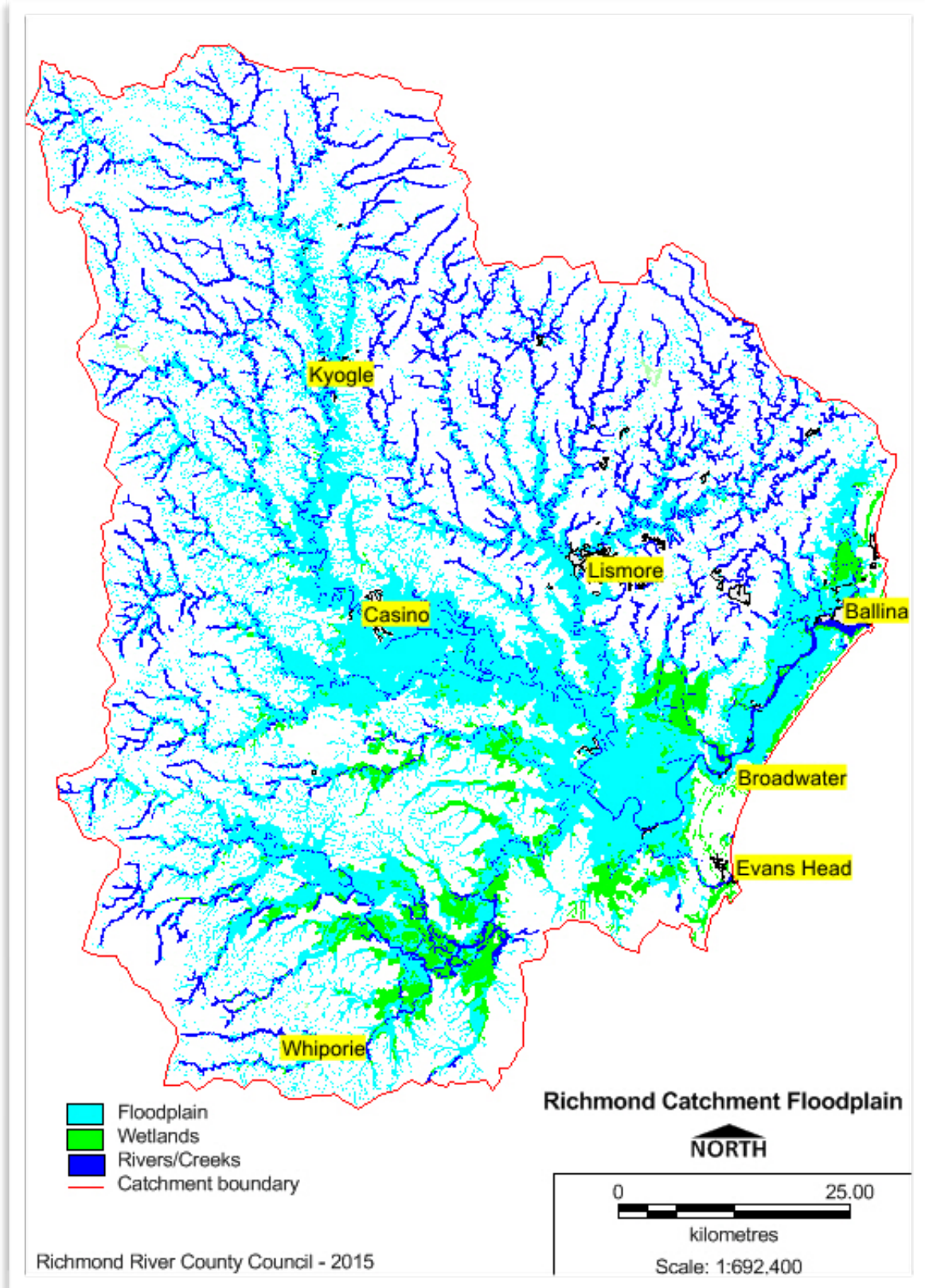
**NSW FLOOD INQUIRY**

***Northern Rivers***

**2022**



# RICHMOND CATCHMENT FLOODPLAIN



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# 1. EXECUTIVE SUMMARY

*“Water is the driving force of all nature” - Leonardo da Vinci*

On the NSW North Rivers there are seven LGAs that are regularly flood affected. This includes the LGA of Lismore 2480 which is officially the most natural disaster prone postcode and the most flood affected community in the nation having suffered 138 flooding events over the past 152 years.

As a result of the magnitude of the February 2022 flood, the Northern Rivers Reconstruction Corporation (NRRC) has been formed to rebuild critical infrastructure and develop new beginnings for our community.

This submission highlights the problems faced across the Northern Rivers and seeks to achieve future flood risk mitigation and water security incorporating all aspects of society. It further proposes to embrace existing government initiatives of integrated planning and resilient infrastructure development in a pilot program. Investment in this program will define the “Build Back Better” mantra and be a potential baseline for use across other regions of NSW enabling adaption to their specific risk factors.

The Lismore Citizens Flood Review Group and the Our Future Northern Rivers are community groups that have harnessed local knowledge and expertise to address community needs surrounding the future prosperity of the Northern Rivers Region.

This report is proposing a strategic approach to the recovery, management and future resilience pathway for the Richmond/Wilsons catchment by:

1. Addressing historic inaction and failure across stakeholder government departments in which the most financially challenged and vulnerable communities have suffered repetitive devastation from flooding events.
2. Demonstrating the consistent lack of strategic approach and absence of coordinated planning and collaborative decision making and the need to address the following flood recovery requirements:
  - a. **Built** - Require Flood Mitigation, Water Security, Housing, Roads, Services etc.

- b. **Economic Development** - Require strategic plans for driving industries, supporting existing businesses, long term growth prospects, finance & insurance etc.
  - c. **Social Development** - Require strategies to keep family nuclei together, provide opportunities to stay in the region. Support all community networks and non government agencies etc.
  - d. **Environmental Management** - Require regeneration of state significant issues, river health, riparian regeneration, floodplain restoration, fauna habitat repair etc.
3. Demonstrate the cost of inaction, through reparation payments. From 1954 - 2017 four major floods were estimated to cost over \$10 Billion. The estimated cost of the 2022 floods is at another \$10 billion. If the current approach is not changed this figure will only continue to rise with future flood disasters.

The outcome sought is the revitalisation and support for our regional communities and businesses, by driving government investment to future-proof our regional economies through building strong and resilient regional cities and towns.

### **LISMORE CITIZENS FLOOD REVIEW GROUP**

The Lismore Citizens Flood Review Group (Appendix 1) was formed in the wake of the 2017 Lismore Flood. The group comprises local citizens who have lived experience in the district, have been directly involved with the emergency management of floods, have involvement with flood mitigation engineering works, have local government experience or manage flood affected businesses.

For the past five years our team has collected and studied the regional flooding data and researched the historical reviews, investigations, inquiries and inaction by government to address flood mitigation and water security issues.

Our investigations have identified that the problem is a catchment-wide issue; therefore, we have worked collaboratively with regional entities including Regional Development Australia, Regional and local Councils and government agencies responsible for flood mitigation and water supply. Our hope has been to advocate for progress and action that addresses these complex issues in a holistic fashion with meaningful high quality outcomes in mind.

Whilst our study has focused on the Lismore Region (*due to its vulnerability, population size and business activity*), the findings and flood impacts comparatively apply to the LGAs of Kyogle, Richmond Valley, Lismore, Ballina and Byron. Water Security also applies to the same catchment, with the exception of Kyogle.

Our findings clearly show that financial commitment and leadership from State and Federal government is required to secure the subject matter expertise needed to analyse the problem holistically and realistically, and then collaboratively work on solutions for key causal factors.

### **OUR FUTURE NORTHERN RIVERS GROUP**

Our Future Northern Rivers was formed in early 2021 following the decision of Rous County Councillors to remove the Dunoon Dam project as a water security option for the region. This is part of the Rous County Council Future Water Plan 2060.

In response to the Rous Council decision (*Integrated Water Cycle Management Strategy of 2021*) (IWCM), the group organised a petition, resulting in over 11,300 of 13,729 signatories and submissions received during community consultation and engagement period rejecting the Rous IWCM Plan (ie 85%). After the public consultation results were ignored by Rous Councillors the 85% results were put to the NSW government to force a review of the situation and raise community awareness of the options being evaluated by Rous County Council. The permanent future water supply options include groundwater harvesting, desalination, and recycling wastewater. These options were categorically rejected by the regional community.

Results of the NSW Local Council elections in late 2021 saw the rebalancing of factions within Ballina and Lismore local Councils and Rous County Council, permitting the Dunoon Dam to re-emerge as a viable option for future water security.

### **OUR SHARED GOALS**

The outcome of this proposal is focused on addressing historical issues and at the same time future proofing our region due to it's particular susceptibility to climate variability. Reducing future shocks through adaptation planning in a strategic manner requires incorporating all aspects of society that are impacted. The proposal approaches regional water issues in a whole of catchment, whole of

system approach to water management that reduces the impact of flood and drought through a combined Flood Mitigation/Water Security solution.

This approach capitalises on the opportunities to reimagine our poor performing region through the reconstruction of the disaster affected communities. A Strategic Plan will evaluate, develop and implement the previously negated flood mitigation solutions and the prior need to augment existing water security infrastructure whilst addressing State significant environmental issues in this one off opportunity.

These actions will provide not only resilient infrastructure but resilient local economies. It also embraces the historical issues faced by our State and Nation in regards to climate, resilience and adaptation planning, duplication and the inherent lack of efficiencies in implementation. In addition it is hyper focused on forging opportunities connecting infrastructure to industry and creating the solid foundations to intergenerational prosperity for the regional community.

We are seeking new beginnings and in order to maximise the benefits to the community it is important to ensure that following methodology is adopted:

- That the needs and welfare of the community are paramount in all aspects of decision making, with genuine consultation.
- That coordination across the projects is an inbuilt requirement.
- That reparations are seen as an investment in the future as opposed to a cost.

## **1. STRATEGIC RECOMMENDATIONS**

**1.1 Natural Disaster Precinct** - That the NSW Northern Rivers consisting of Tweed, Richmond and Clarence river catchments be declared a natural disaster precinct

**1.2 Timeframe** - That the duration of the precinct be for at least the next 10 - 15 years, dependent on implementation of outcomes

**1.3 Project Requirements** - That during all aspects of the Reconstruction phase “priority” is assigned to every step of the future recovery and reconstruction projects

- 1.4 **Progress** - That bureaucratic issues retarding the current and future projects and planning be addressed, to avoid further delaying progress
- 1.5 **Pilot Project Status** - That all aspects of the regional recovery and reconstruction be considered as a Renewal Mission with a 'Build Back Better' focus. This project will require a broad scope to plan, develop, implement and evaluate all aspects of recovery and construction as preparation for future disasters.
- 1.6 **Structure** - That the four interconnected resilience domains of Social, Economic, Environmental and Built be applied to the project outcomes for the region, in line with the National Climate Resilience & Adaptation Strategy, Resilience NSW guidelines and local Council Emergency Recovery Action Plans.
- 1.7 **Strategic Planning** – That planning for future projects have clearly defined short, medium and long term goals.
- 1.8 **Expertise** - That CSIRO lead a catchment wide review, supported by independent national, and potentially international expertise with the task of eliciting the goals, options, assessments, responsibilities, data and investments required for the mitigation and management of natural disasters into the future



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## 2. HISTORICAL REVIEW and ANALYSIS

*“We forget that the water cycle and the life cycle are one.” — Jacques Yves Cousteau*

For the first century of this region’s European settlement history all the townships and business districts being built upon the Richmond/Wilsons Floodplains were reliant on the river for transport and commercial trade. Lismore was originally settled in the early 1840s to support harvesting of cedar timber throughout the Wilson’s catchment.

Lismore is a regional hub and major business centre with key amenities in health, education and law. The Northern Rivers region is also geographically located in the region described by the CSIRO as “the most comfortable climatic living conditions on the East Coast of Australia”. <sup>1</sup>

In 1954 and 1974 major flooding occurred in Lismore, Kyogle, Casino, Nimbin Coraki and Woodburn with over 1000 mm of rain in 3-4 days. In late February 2022 1040 mms of rain fell in 2 days in some areas of the region, creating a flooding event 2 metres higher than previously recorded causing unimaginable damage and loss of life.

For over 70 years the Richmond Catchment has faced water management challenges, specifically Flood Mitigation. With each major flooding event, the township of Lismore struggles to recover both socially and economically. Economic data shows a stagnation across all areas of region’s economy, with Lismore LGA showing negative growth rates and annualised \$62.7 million cost to Lismore’s GRP <sup>2</sup> which has produced a slow decline. Lismore is caught in a systemic degenerative cycle that is artificially propped up by ongoing financial reparation support.

In November 2021, the Department of Agriculture, Water & Environment released the National Climate Resilience and Adaptation Strategy. This strategy contained a holistic and coordinated approach to resilience and adaption, with a focus on the four pillars of social, economic, environmental and built components.

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<sup>1</sup> ABC radio report 2019

<sup>2</sup> Engeny report 2021

Building on this Strategy, it is proposed that an analysis of the Richmond / Wilson's catchment area is conducted, simultaneously incorporating each of these four pillars associated with flooding.

With the region's future water security at risk with insufficient water available to meet forecasted community consumption by 2024 it is proposed that water security and flood mitigation investigations be combined. This may be the only chance the region may have to resolve these two critical issues.

Over the past several decades many flood mitigation options have been proposed but to date the issue has only been partially resolved. Constant flooding and a failure to implement effective flood mitigation systems has created a loss of confidence within the business community of Lismore. Consequently, the regional communities and broader taxpayers continue to underwrite the significant cyclic damages to repair and re-establish townships as demonstrated again this year. After several inquiries and dozens of reviews, all with similar findings, no progressive action has been achieved.

Analysis has shown that the financial capacity of rural local government agencies, primarily reliant on grant funding from a range of different agencies has resulted in piecemeal 'band-aid' solutions with no successful outcome. Evidence to support this assertion can be found in the Productivity Commission Report into Natural Disaster Funding, of May 2015.

An outcome from the Royal Commission into National Natural Disaster Arrangements saw the Federal Government establish the National Recovery and Resilience Agency (NRRRA). In the wake of the February 2022 catastrophic floods event, the NRRRA allocated \$10.4 million to the CSIRO to undertake a Lidar model of the Far North Coast and produce a whole of catchment, whole of system investigation of the Richmond/Wilsons catchment including testing of the model with historical flood data to determine workable solutions for the future.

### **3. INTRODUCTION**

The Northern Rivers Region is equivalent to the 12th largest urban mass region in the nation with a resident population of >250,000. Lismore is the regional hub and major business centre with major government infrastructure including the Lismore Base Hospital, Southern Cross University and the District law Courts.

Due to constant flooding and a failure to implement an effective flood mitigation system there is now a complete loss of confidence in the business community, particularly in Lismore. Research shows population and economic growth are at a standstill or going backwards.

The Mid-Richmond area also floods with the Bungawalbyn catchment similar in size to the Leycester Creek catchment. During the 1954 and 1974 floods huge amounts of rain fell over this catchment from southwest of Kyogle, Mummulgum, Mongogarrie, Rappville etc. These waters entered the Richmond at either Tatham or Bungawalbyn maximising and extending the duration of the mid Richmond flood.

The impact of flooding in the Mid Richmond catchment causes flood waters flowing from Leycester Creek and the Wilsons River to be backed up at Lismore turning any major flood from a three or four day event into one lasting up to two weeks, such as in 1954 and 1974.

To improve the current situation in both flood mitigation and water security it would seem that the time is right for a wide ranging multi stage strategic solution regarding the management of water in the Far North Coast.

In the immediate aftermath of the 2017 disaster event the government was prepared to fund “shovel ready” projects. However the considerable cost in developing a feasibility study and Environmental Impact Statement is way beyond the financial capacity of some rural local government agencies. A thorough investigation involving model development and option modelling also have a timeframe of several years.

Additionally, grant funding comes from a range of different agencies, making it piecemeal, restrictive and inconsistent and adding years to the planning of a project. Given the ongoing population increase and land use changes across the region this puts an effective outcome at risk.

The previously mentioned 70 years of endeavouring to find a solution to mitigation in the catchment is typical of the defective process. Piecemeal funding produced some options in the 1960's, 1980's, 1990's and 2020 with no successful outcome.

During our research we have discovered there is considerable variation between the States on how major flood and drought mitigation projects are determined and managed. In NSW local government is supposed to initiate and fund 33.3% of costs of projects to Shovel ready stage. Most rural Local Councils are struggling financially or insolvent.

Over the years the NSW Department Planning, and Environment (DPE) has been restructured and it appears much of the work is now outsourced. The ongoing turnover of staff in all departments and sectors means there is little or no corporate knowledge and little or no consultation with the local community. Then the procedures of NSW Environmental Planning and all other sections of the Department choke the delivery of projects rather than drive them.

In tabling the Productivity Commission Report into Natural Disaster Funding released in May 2015 together with the Australian National Audit Office (ANAO) report into national recovery funding arrangements<sup>3</sup>, then Minister for Justice the Hon. Michael Keenan MP stated “the current system is flawed” with “the national focus too much on recovery at the expense of directing resources to better preparing for future disasters”.

The Minister “.... foreshadowed consultations (with the States) on the best way to address the findings of these reports .... Mitigation funding will ensure the most disaster-prone states are able to address their greatest risks. We want to work with the states to understand the scope of mitigation projects they wish to pursue, and find a way to support these projects without making dramatic cuts to recovery funding”.

In July 2021 the Federal Government established the NRRRA as an outcome of the Royal Commission into National Natural Disaster Arrangements with an aim of significantly altering the 97% recovery and 3% mitigation funding allocations.

In November 2021 members of the two groups met with the National Recovery and Resilience Agency (NRRRA) Coordinator General, The Hon. Shane Stone AO and his team to discuss the water management issue. Following ongoing consultation in February 2022, the NRRRA allocated \$10.4 million to the CSIRO to undertake mitigation modelling.

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<sup>3</sup> <https://www.anao.gov.au/work/performance-audit/administration-natural-disaster-relief-and-recovery-arrangements-emergency>

The magnitude of the February 2022 event and the damages that occurred to all facets of the urban and rural communities demonstrated the failure of so many of the systems associated with natural disaster mitigation and management.

Going forward, there needs to be a complete review of how decisions are made. This will require a change of attitude in “the way things are done”, and if the government is serious about “building back better” across all aspects of disaster management then it will require the involvement of the most experienced in the field nationally from within government and private industry to make it happen.

It is time for the focus for all decisions in the four pillars of disaster resilience to be based on the welfare of the individuals and the community instead of making community requirements fit the bureaucratic systems of government.

## **4. PROPOSAL DETAILS**

### **4.1 BACKGROUND**

The NSW Draft FNC Regional Water Strategy produced by The Department of Planning and Environment (DPE) in 2020 had a general coverage of all issues associated with water, but the specific focus was on drought and water security. Flood mitigation was not being seriously considered even though we are the most flood affected region in the nation.

In October 2021 then NSW Water Minister Melinda Pavey requested DPE to contract the CSIRO to do a desktop review of all documentation associated with water security and flood mitigation in the Far North Coast. This was undertaken with a report presented mid December 2021. To date this report has not been released.

Risk Frontiers in their article “The 2017 Lismore Flood – Insights from the field” stated *“Much bigger floods are possible in Lismore and there is much to be learned from this event. The physical and social impacts would have been far greater had the floods been only a little higher.”*

And so it came to pass in 2022 with an extra 2 metres in height. The destruction and social upheaval throughout the region is beyond imagination or description.

With climate change modelling indicating the potential for longer dry periods coupled to more intense wet periods it is time to get serious. Our proposal is to take a very strategic long term view incorporating all key issues mentioned in the draft document to provide “resilient water resources for towns and communities, Aboriginal communities, industry and the environment.” Each of these issues are associated with and relate to not only the built aspects of water security and flood mitigation, but also the social, economic and environmental aspects required for a thriving community.

## **4.2 BUILT**

### **4.2.1 FLOOD MITIGATION**

Rous County Council is responsible for the construction and replacement of flood mitigation infrastructure including the routine maintenance of various canals and floodgates. This includes:

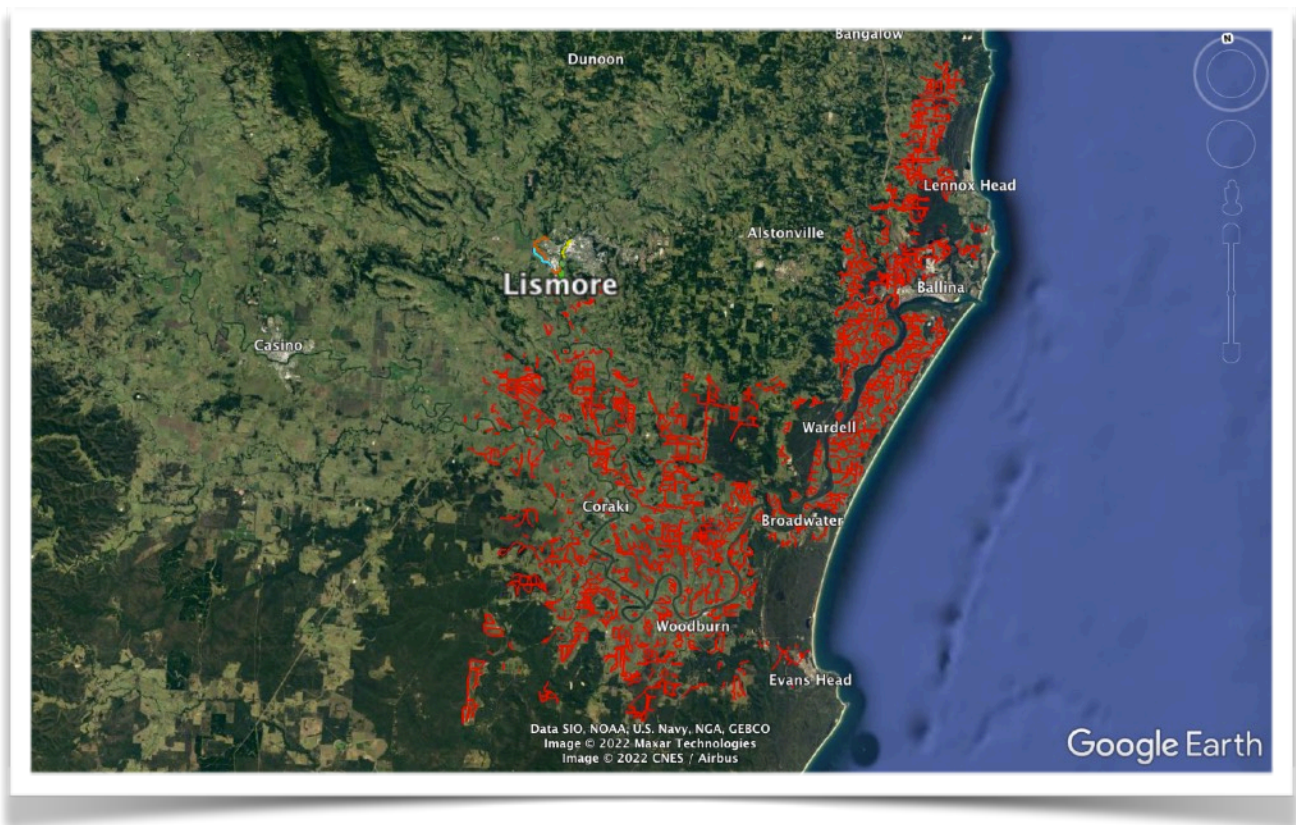
- 111 drainage canals totalling 198km in length.
- 772 flood control structures such as floodgates and culverts.
- 64 levees totalling 73km in length.
- 6 pump stations used to reduce flooding in Lismore (located at Browns, Hollingsworth and Gasworks Creeks).
- A temporary concrete barrage to restrict the flow of salt water from Evans River. (This barrage is located in Tuckombil Canal 1km south of Woodburn on the Pacific Highway).
- South Lismore levee totalling 5.5km in length - designed to protect South Lismore in the event of a 1 in 10 year flood.
- The Lismore CBD Levee totals 2km in length and is designed to protect the Lismore Central Business District in the event of a 1 in 10 year flood.

Rous Rural Asset Maintenance Map

While Lismore City Council is responsible for the operation and maintenance of the Levee, Rous County Council does coordinate applications for grants on behalf of Lismore City Council to repair damage from flooding or in order to undertake major upgrades of Levee infrastructure.

## **HISTORY**

The Richmond River rises in the Great Dividing range, and is joined by twelve tributaries, including the Wilsons River, before reaching its mouth at Ballina. High



rainfall intensity and multiple converging systems across 7000 sq.kms means there is no simple low-cost mitigation solution. The Richmond catchment population of 150,000 resides in over 80 towns and villages throughout the Richmond and Wilsons River catchments most of which suffer damaging consequences during floods.

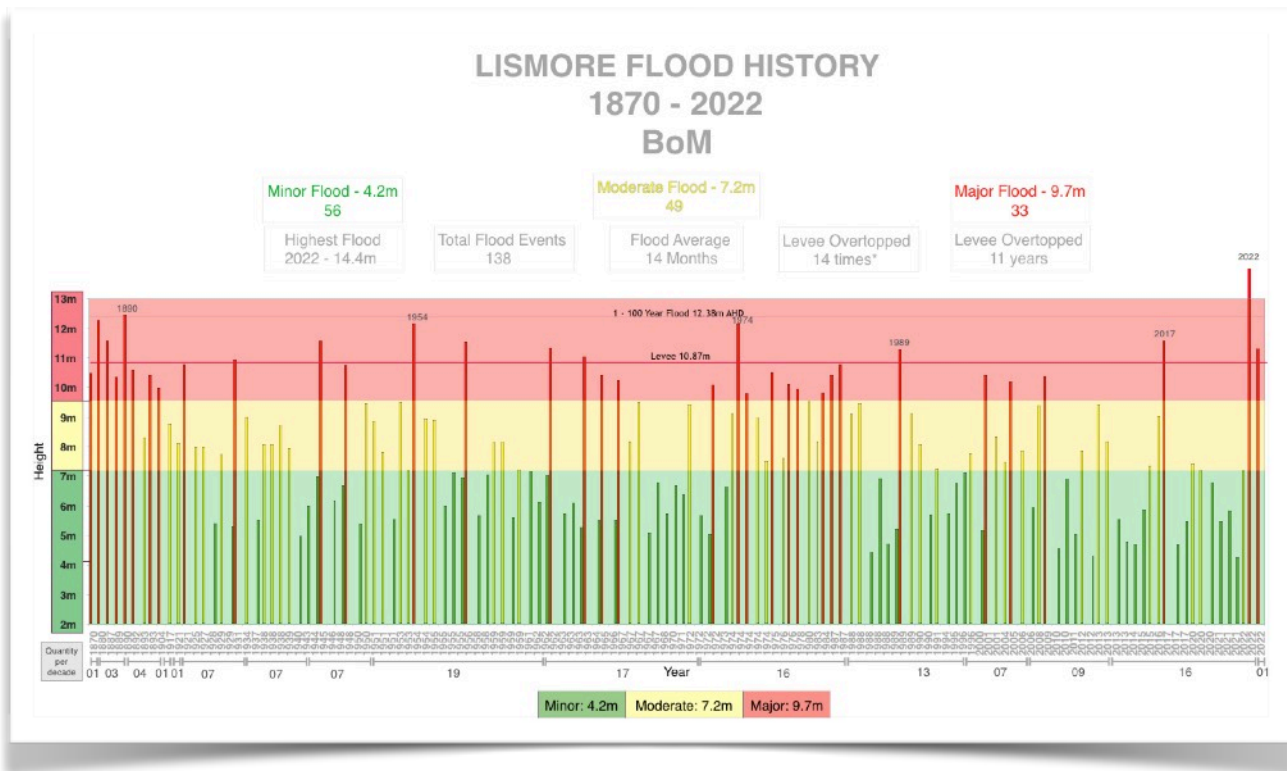
Risk Frontiers describes the Lismore area as the most at risk community for flooding in Australia. There have been more than 138 floods recorded in 152 years<sup>4</sup> - fourteen floods would have overtopped the 1:10 year flood levee which was finalised in 2005.

For the four biggest floods in the last 70 years, 1954, 1974, 1989 and 2017 alone, research by Macquarie University Risk Frontiers and SGS Economics/Deloitte reported more than \$10 billion (today's \$s) in reparations and recovery costs to taxpayers, businesses and residents.<sup>5</sup> Between 1954 - 2017 there have been an additional 89 major, moderate and minor floods with recovery and reparation costs to be added to the \$10 billion.

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<sup>4</sup> Bureau of Meteorology measure greater than 4 metres AHD

<sup>5</sup> Economic Recovery After Disaster Strikes May 2019



Over the past 70 years there have been many plans and options put forward but to date there has not been a successful outcome. In the 1950s local Civil Engineering firm owner and resident Dayal Singh offered to create a flood channel west of the airport to carry water from Leycester Creek.

In 1980, another local resident Dr Florian Volpato (who had migrated to Australia after WW II and settled in Lismore) paid for a top team of Italian urban hydrologists to come to Lismore to research and evaluate all possible hydraulic, territorial and socio-economic consequences of flooding in the Richmond catchment. Their multi stage proposal was received in May 1981. (see Concept Plan Appendix 3)

During the 1980's despite many submissions to state and federal governments no funding was forthcoming. Following the devastating 1989 flood local members of the Lismore Chamber of Commerce including Dr Volpato donated \$138,000 (today \$275,000) to have the Lismore catchment modelled by Sinclair Knight and Partners.

A total of 22 options were presented by Sinclair Knight. These were reduced to 18, then to 9 (Appendix 4). The options examined at this time predominately related to levees within Lismore City and projects ranging from levees to combinations of levees and minor to major diversion channels including from Leycester Creek west



of the airport. The consultants appeared confident of the modelling and this modelling underpinned the Levee construction. Funding was received in 2000.

The levee was constructed on the eastern side of the Wilsons river in order to protect the CBD up to a 1 in 10 year flood and completed in 2005. The CBD levee had successfully performed its tasks through numerous small and moderate floods paying for itself many times over until it was breached for the first time in 2017 with disastrous consequences due to NSW State Emergency Services based management failures. It was again breached in on February 28 2022 and again a month later on March 30th.

In the February 2022 flood there was extensive damage sustained throughout the entire region with total inundation of the smaller communities of Coraki, Woodburn, Wardell, Broadwater and Cabbage Tree Island to mention just a few. It will be of great interest to see the Risk Management and Insurance Company economic formulas suggestion as to what the true cost of the 2022 flood event to be.

Until the completion of the CSIRO catchment and systemwide model and testing of mitigation solutions through historical floods, no detailed large infrastructure planning can be done regarding Flood Mitigation solutions. However it is envisaged that other relevant documentation that will be required to fulfil a meaningful outcome in the future can be commenced and progressed as the situation allows.

Following the 2017 flood a Three Stage Joint Funding Submission (Appendix 5) for flood mitigation was prepared by Rous Water and Lismore City Council at the request of local State and Federal politicians and presented for funding. Stage I at \$8.2 million has been funded but was calculated to have only a 3 cm - 10 cm mitigation effect in a 11.6 metre flood. Stage II which contains removal of floodplain impediments such as the unused railway embankment remains unfunded. The Stage III comprehensive whole of catchment modelling has recently been funded by the NRRRA.

For both Lismore and the wider catchment through Lismore, Ballina, Byron, Richmond Valley and Kyogle Councils and Rous County Council there are other smaller but important unfunded mitigation projects that could commence planning etc. and worked on whilst waiting for the final CSIRO catchment wide

outcome. With the region responsibility for Flood Mitigation, the GM and technical staff of Rous Water could expand on this.

### **FLOOD MITIGATION BENEFITS**

- Offer Insurance Premiums to our most vulnerable
- Reduce existing insurance costs
- Unlock essential financial services to underpin economic development
- Reduce the social, economic and environmental impact of floods
- Avoid property losses
- Avoid business & education interruption
- Avoid loss of critical infrastructure
- Revitalise neighbourhoods
- Improve public spaces
- Enhance public safety
- Increase business and lifestyle security
- Improve investment

### **HYDROLOGIC MODELLING**

Catchment wide hydrologic modelling of the highest calibre is the only way to answer the water security and flood mitigation question. This is central to all the affected towns and villages in the catchment realising their full potential and reversing the damage and restrictions of the past. The answer to Lismore's flooding may very well be a mitigation strategy upstream of Lismore or further down the river system in the mid Richmond.

Various hydrologic models from across the years exist in the Lismore, Kyogle, Richmond River, Ballina and Byron LGAs but these are localised and of various modelling generations and quality. This patchwork of models are insufficient to confront the mitigation tasks at hand.

Following the 2017 flood historical information was collected. Perusal of a box file on the flooding issue in Lismore collected by the late Florian Volpato between the early 80 and 90s read almost like we are reinventing the wheel.

Whilst the file is incomplete, the first priority now would seem to be to carry out a desk top review of all the work carried out to date and seriously evaluate the ten most obvious recommendations for modelling evaluation.

Rous County Council had access to two models developed by Patterson Britten and BMT WBM in the 1990's neither being absolutely operationally complete. Both were improved and upgraded for the construction of the Lismore levee in 2005.

In 2012 at the Floodplain Management Australia conference a presentation entitled "Towards a Catchment Based Model after Two Decades of Modelling in the Richmond" was given by Caddis et al<sup>6</sup>. (Appendix 6). It was reported that there had been over 13 flood models built in 20 years for different areas of the catchment using various software and various schemes (1d, quasi-2d, 1d/2d).

Ten years after this presentation the current model limitations remain:

- Antiquated technology: 1D, 1 & 2D models from 20-30 years old that do not talk to each other or join for consistent and reliable data
- Outdated: Urban and Rural development has surpassed the outdated models
- Inadequate coverage of rural areas
- Poor synchronisation of flood risk management plans
- Discrepancies at model interfaces; Models are unstable with multiple anomalies
- Multiple proprietary software programs that do not interact
- Inadequate use of flood information for flood response
- Inadequate high resolution Digital Elevation Model covering the entire area
- Project assessments are not valid for the model types being used
- Not enough data and scenarios to make reliable decisions
- Modelling & Data is dispersed and or lost amongst previous organisations who undertook studies (Worley Parsons, WBM BMT, Engeny, Sinclair Knight/Jacobs)
- Limited and varied data sets on Climate Change/Variability scenarios

In November 2021, the newly formed National Recovery and Resilience Agency commenced discussions with our groups regarding this issue and in March 2022 the Federal Minister for Emergency Services The Hon. Bridget McKenzie announced \$10.4 million funding to the CSIRO to develop a model of the entire Richmond/Wilsons catchment covering urban and rural areas..

This will enable progress in the area of flood mitigation, water attenuation, water security and effective emergency management of floods.

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<sup>6</sup> "Towards A Catchment Based Model After Two Decades Of Modelling In The Richmond" Caddis et al

The combined water proposal is a large scale water management and infrastructure proposal that is capable of benefiting the entire Richmond/Wilsons catchment and beyond. This will occur by reducing the impact of floods in the many towns and villages on the floodplain, ensuring water security for an increasing population of up to 150,000 on the Rous water grid through to 2060 and securing environmental, social and economic benefits for the future.

The Northern Rivers annually receives the highest rainfall in NSW ie 2800 - 3300 mm (Appendix 7) and it is not uncommon to find 16 of the 20 wettest places in NSW in the Northern Rivers Catchment area (Appendix 8). The combination of these two projects will ensure benefits across the full spectrum of social, environmental and economic issues and develop infrastructure with the correct approach.

High quality modelling is required for both the investigation of flood mitigation options and the siting and other hydrological investigations associated with the construction of the proposed 50 gigaliter dam at Dunoon. Through this modelling all options can be assessed to ensure there are no unintended consequences.

### **HYDROLOGIC MODELLING BENEFITS**

Development of a model of the entire Richmond catchment and modelling of the 10 most effective options will:

- Provide an up to date assessment of the State of Catchment
- Determine whether there are any flood mitigation possibilities
- Provide the best option to directly benefit homes and businesses on the floodplain including the Lismore urban areas, Kyogle, Richmond Valley and Ballina Shire as well as flood effects on rural properties
- provide modelling results that may keep the flood peaks below the current Lismore CBD and South Lismore Levees
- provide a valuable catchment-wide data validation tool
- provide information for the emergency management of floods
- provide the capability of considering differences in climate and physical properties when transposing the calibration made at a key gauging station
- maximise the potential of limited available flow data within the catchment
- provide improved basin representation compared to traditional lumped modelling approaches.
- identify potential deficiencies in the reference flow data across the catchment.

- help deliver improved modelling results in situations where gauged flow data are of variable quality.
- identify potential issues with other input datasets
- help to improve the accuracy and reliability of water resource assessment in the long term.
- reduce uncertainty by taking into account spatial consistency, leading to more robust predictions.

In addition the modelling cost can be amortised and is also required for the following agencies:

- Private Investment Opportunities
- Long term Water Security Strategies
- Rous Projects
- Local government Projects for Lismore, Richmond Valley, Kyogle, Ballina and Byron LGAs
- Emergency Services Flood Management
- Digital Emergency Services Communication Systems
- Insurance Company Requirements
- SCU Water and Engineering projects
- Lismore City Chamber of Commerce and Industry portal
- LCC dashboard
- Northern Rivers Watershed Initiative etc

#### **4.2.1 FLOOD MITIGATION RECOMMENDATIONS:**

- 4.2.1. That full support across all NSW government departments be given to the CSIRO in their endeavours to seek solutions to Far North Coast flooding.
- 4.2.2 That flood mitigation solutions address historic flooding records to ensure that there are no unintended consequences within the catchment.
- 4.2.3 That final approved solutions are funded and fast tracked to mitigate flooding in the catchment without delay.
- 4.2.4 That the current smaller unfunded Far North Coast local government and Rous County Council infrastructure projects be appropriately planned and funded without delay.

### **4.2.3 WATER SECURITY BACKGROUND**

The history of the Rocky Creek Water Supply Scheme can be traced to the 1880s and in 1891 the area was proclaimed a water reserve. In 1935 approval was obtained for investigations to be carried out into the catchment area, dam site, pipe lines and reservoir sites

In 1948 further investigations were carried out and it soon became evident that a very satisfactory water supply could be economically given to Lismore, Byron Bay, Bangalow and also Evans Head, Woodburn, Broadwater and Coraki. Designs were prepared to supply water in bulk to Lismore City, Byron Shire and Woodburn Shire who were then to construct their own reservoirs and instal their own distribution systems

Rocky Creek Dam was pioneered in the district and for the most part built by local contractors. Construction of the dam began in 1949 and was completed in April 1953. The village of Bangalow was the first town to receive water from the dam in November 1953.

The dam was constructed across Rocky Creek to store water during dry years. The lake behind the dam is >200 ha and holds 14 gigalitres which was about 5 years supply for the population in the 1950's. The serviced population at that time was 25,000 and is currently 110,000 with an additional 6 million domestic and international tourist over night stays within the area annually. The two key drivers for additional water sources are population growth and climate variability.

The dam is the principal source of water for the Rous Regional Supply and is supplemented by Emigrant Creek Dam, the Wilsons River Source and several bore sites on the Alstonville Plateau and Woodburn. These additional sources are brought on-line as the security level in Rocky Creek Dam drops to help secure our water supply and avoid water restrictions.

However, in 2003 the water level at the dam dropped below 20% and the region was subject to severe water restrictions. Because of this it was decided by Rous County Council to augment the Rocky Creek Dam supply by developing another source on the Wilsons River near Lismore treating it at an upgraded Nightcap Water Treatment plant at Rocky Creek Dam. The emergency Wilsons River source was completed in

2003 and the fully developed Wilsons River source and upgrade of the Nightcap Water Treatment Plant was completed in 2008.

For 25 years Rous County Council water security plans had been moving forward to secure a permanent water supply for the community. In December 2020 the Dunoon Dam was suddenly removed as an option by a majority of council members. Community consultation with the newly proposed Integrated Water Cycle Management strategy that reduced our permanent water supply to recycled water, desalination or groundwater was carried out. The community made it very clear they wanted the dam back as an option for investigation.

Dams provide a range of economic, environmental, and social benefits, including flood control, water supply, hydroelectric power, wildlife habitat and recreation.

### **SERVICE NEED**

Rous County Council reports that over the next 50 years, changes to climate and rainfall patterns are expected to reduce the reliability of rainfall for the region. At the same time, water use is forecast to increase as population grows. Based on these predictions, by around 2024, demand for water will match what current sources can reliably supply.

By 2060, expected dry year demand would exceed reliable supply by up to 5.6 gigalitres per year, or approximately 40% of our current consumption levels. To meet the shortfall, a combination of improved water conservation and new water sources are proposed over the next 10 years. Requirements are likely to include:

- Ongoing demand management education programs
- Groundwater Solutions
- Additional water treatment plants
- Drought Contingency options
- Construction of a dam at Dunoon
- Additional Dam freeboard to be used for flood mitigation.
- Multiple Water Attenuation Devices (WAD's) across suitable valleys in the catchment area

### **WATER SECURITY BENEFITS**

- Adding vulnerable regional communities to the Rous grid

- Drought Resilience through increased stored reserves
- Secure Yield through to the year 2115
- Additional Water Attenuation Devices add to improved flood mitigation
- Renewable energy production
- Commercial and Agribusiness opportunities
- Regional Economic Resilience
- A destination for regional hiking trails, fishing, camping, bushwalking, birdwatching
- A range of recreational activities and water sports
- Rainforest regeneration area
- Regional Aboriginal Information Centre
- Guided visitor education heritage tours
- Visitor information centre
- Guided visitor education eco tours
- Arts Center
- Koala corridors and food tree regeneration
- Agri-Business Regional Value Adding Food Hub
- Eco Tourism

#### **4.2.3 WATER SECURITY RECOMMENDATIONS**

- 4.2.1 That the water security solution addresses climate change variability in order to deliver sufficient water for domestic, agricultural and industrial use.
- 4.2.2 That the water security and flood mitigation projects be coordinated and progressed concurrently.
- 4.2.3 That priority funding be allocated to reduce the timeframe for implementation.

### **4.3. SOCIAL IMPACT**

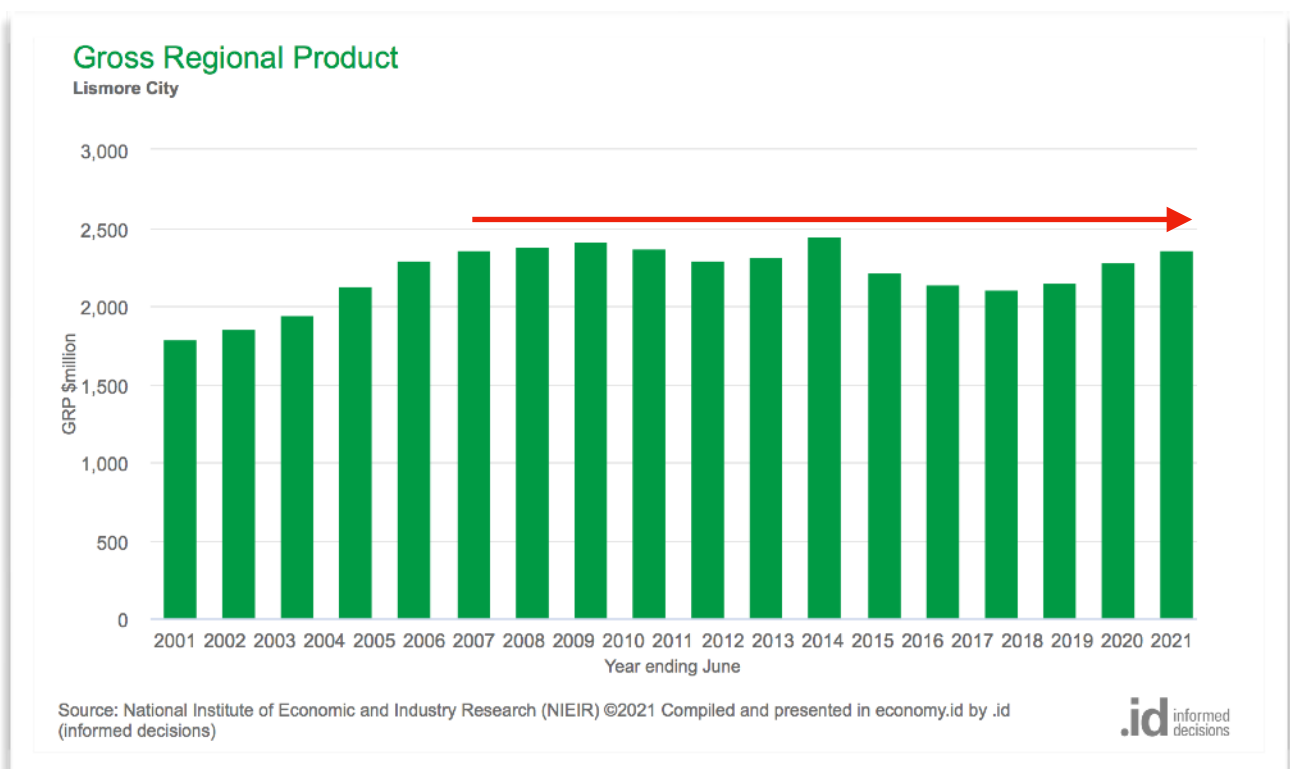
Although recognised as the centre and regional hub of the Northern Rivers, over time Lismore has been reduced to the minimum of its potential by a number of significant factors. This fragile reality has been exacerbated by constant flooding. Being known across the nation as “the city that floods” has resulted in becoming an undesirable private investment location an which has resulted in no growth since the 2012 local council elections.

Poor management and local government issues have led to a downturn in fortunes where Lismore’s position as the regional hub has been continuously eroded. This has led to the loss of an entire generation of the City’s most productive citizens and young families being forced to leave the area.



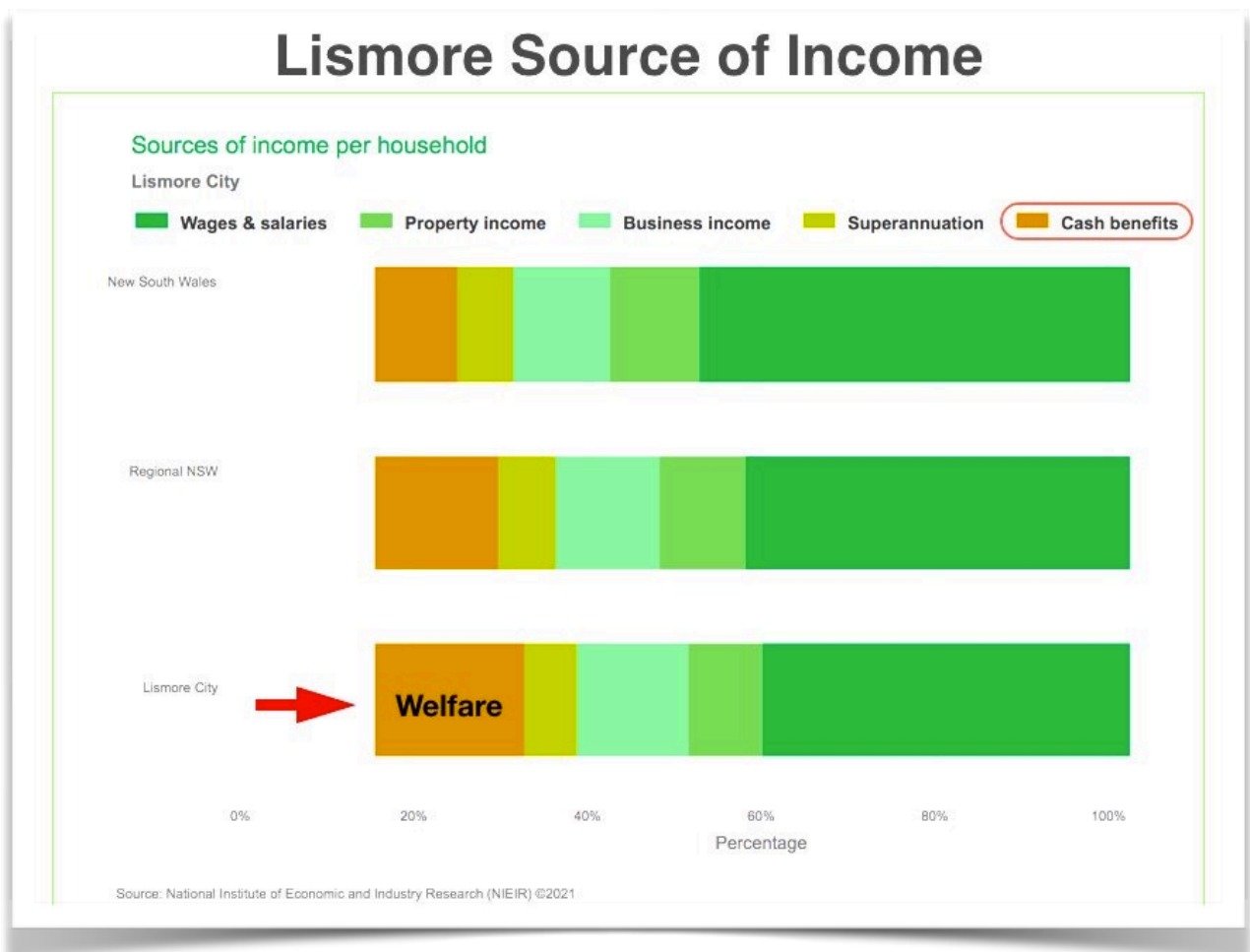
An influx of lone citizens has replaced the departed family units and consequently changed the housing requirements and expenditure across vital sectors of the business community. This in turn has left the LGA with an older demographic, significantly lower wages and higher costs of living pressures with negative pre-Covid population predictions as far out as State government go to the year 2041.

The resultant employment issues and loss of output in the private enterprise has transitioned jobs out of the private sector and into the public sector forcing the expansion of part time employment and the resultant employment insecurity that comes with it. In the last decade unemployment has been high and pre-covid remained above the national average; between the 2017 and 2022 floods confidence in the private sector was low and welfare much higher in Lismore than its regional NSW counterparts.



All of this has diminished the standing of Lismore in the region and consequently virtually the entire set of social outcomes. This has to change going forward otherwise the long term social prospects of this Community are less than desirable and far less than our potential. Including for our rural population who are often forgotten.

There are many social factors that become evident within the community following a major flood that affects a large residential and business area, particularly if there have been fatalities or serious injuries. There is an increase in mental health issues, alcohol misuse and ill health resulting in family violence and relationship breakdown. The closing of businesses creates short-term and long-term unemployment and impacts the hiring and retention of qualified staff resulting in people leaving the areas and considerable community dislocation.



Following the 2017 flood the University Centre for Rural Health produced a paper entitled “Northern Rivers community recovery after the flood”.<sup>7</sup> The document states:

*“Populations living in the Lismore Town Centre flood footprint exhibited significantly higher levels of social vulnerability over a range of factors; in particular, almost 82% resided in the most disadvantaged socio-economic quintile neighbourhoods.*

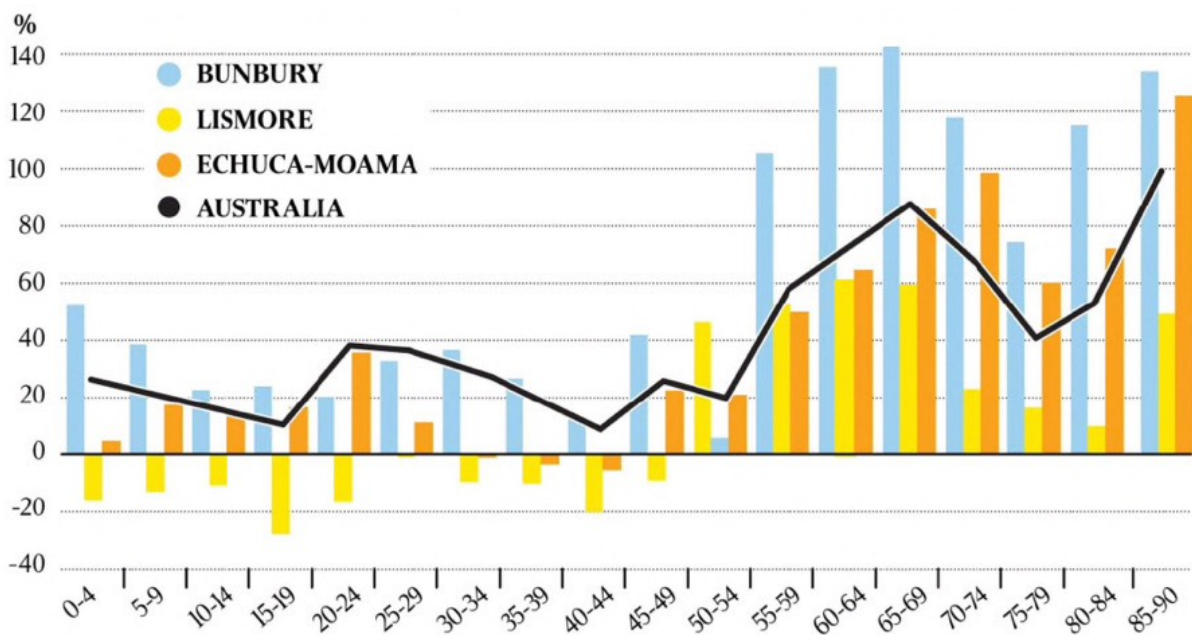
<sup>7</sup> <https://ucr.edu.au/after-the-flood/>

*“The flood-affected areas of Murwillumbah and Lismore regions included 47% and 60% of residents in the most disadvantaged quintile neighbourhoods compared to 27% for whole region and 16% for Sydney. This pattern of increased vulnerability was also apparent from the 45 and Up study; participants residing in the Lismore Town Centre flood footprint had significantly higher rates of riskier lifestyle-related behaviours (smoking, alcohol consumption), pre-existing mental health conditions (depression and anxiety) and poorer health.*

*“This detailed case study demonstrates extreme local vulnerability of flood-exposed populations, over and above the already highly vulnerable regional rural populations. This information is important to inform disaster planning and response and also reinforces the importance of having a detailed understanding of affected populations.”*

Lismore is currently a test case for extreme national mobility especially in the 18 - 24 age bracket.<sup>8</sup> The FNC region has significant pockets with low socio economic profiles including entrenched welfare and in the recent past (2015) had 11.5%

## NATIONAL CHANGE IN POPULATION BY AGE GROUP



<sup>8</sup> Lismore Demographics: Bernard Salt/The Australian Newspaper Article

unemployment. This was 2.5 times the nation's average and well above the regional NSW average. Wages are low, with low meaningful job prospects resulting in population flight and brain drain. Since the February 2022 event unemployment has risen to over 15% and many jobless young families are packing up and leaving the district.

Notwithstanding the longest running and largest real estate bubble in our nations history until the 2020 pandemic the long term increase in house prices for Lismore was barely inline with CPI. Through the 2010-2020 decade real estate prices remained around 20% lower than regional NSW. With the onset of leverage and a credit fuelled national lifestyle Lismore citizens household equity ratios remained comparably low and as the entire financial system shifted underneath foot gradually Lismore residents have been left behind.

Between Covid lockdowns, the desire to move into the regions, zero interest rates and readily available finance have impacted exploding house prices, in some instances almost doubling in the past two years. Population decline was briefly reversed as Lismore became an attractive option for some who could not afford the coastal lifestyle. With the February and March 2022 events in many instances those values have now decreased and with the whole world now operating on equity ratios and borrowing capacity this does not auger well for the future unless an effective flood mitigation option is implemented.

Additionally with the number of houses that have been seriously damaged or destroyed adding to the severe shortage of housing stock to rent this causes additional trauma to those families who have been displaced.

There is a serious social gap appearing between the haves and the have nots. This also must be priority in the Reconstruction Corporations objectives otherwise the long term prospects of this Community remain challenging at best.

### **4.3 SOCIAL IMPACT RECOMMENDATIONS**

4.3.1 That the issue of housing be dealt with as a priority

4.3.2 That a region wide social impact assessment be carried out as soon as possible by a nationally recognised skilled team in order to generate data from which effective decisions can be made

- 4.3.3 That this region wide social study include a particular focus on Lismore’s homeless and flood displaced community members
- 4.3.4 That the study include economic development pathways to underpin future private and public investment opportunities in the region
- 4.3.5 That this study identify metrics of acceptable standards across the full array of social issues and that these metrics be built into the Reconstruction Corporations objectives
- 4.3.6 That monitoring of the social impact in affected communities be continued including assets, capabilities and the ability to recover across different socio economic groups

## **4.4 ENVIRONMENTAL IMPACT**

Ocean Watch Australia has stated “Floods are a natural occurrence that can provide negative and positive important environmental impacts. They help spread organic material, nutrients, and sediments which enrich floodplain soils. They also replenish water resources and trigger life processes such as bird breeding events, migration, and seed dispersal in flora and fauna adapted to these cycles, while good soil moisture can allow crops and pastures to be established.

*“Time is a major factor to consider with deciding upon flood impacts. In the short term an individual flood event may appear to be an ecological disaster, with unsightly sediment and debris smothering beaches and natural areas. However, in the long term, flood events that are part of the natural cycle will ensure plants and animals adapted to flood-prone environments and the functioning of those ecosystems.*

*“The speed of flooding is another major factor, flood waters that rise slowly allow animals to escape immediate effects. However the impact of fast flowing water, particularly on small or burrowing animals would have been more serious usually resulting in death.*

*“Food and habitat shortages also present longer-term impacts on those that survived, and certain endangered species can be at risk after flooding events.*

*“The major impacts on marine environments can be sedimentation and turbidity; litter and human-built waste deposited from the land; toxins, nutrients and mineral*

*deposition. These impacts can affect the health of the seagrass and coral communities along the coast, and those species on which they depend.*

*Only time will tell and when the flood waters recede we will begin to understand the full impact of this environmental cycle”.<sup>9</sup>*

Some locally experienced impacts are:

#### **4.6.1 FISH KILL**

Acid sulphate issues and the de-oxygenation of stagnant drain waters results in the ongoing problem of fish kills in the lower Richmond River. In the days preceding the 2017 flood, after a couple of weeks of saturating rains, a major fish kill event occurred.

This was small in comparison to the 2008 event where 50 tons of sea life was collected and taken to the Ballina waste facility with an estimated additional 450 tons of sea life washed out to sea. This resulted in a prolonged recreational and commercial fishing ban which had huge knock on effects across a number of industries to the downstream communities.

Fish kills have been recorded as far back as the 1800's in the Richmond River where decaying vegetation in the drainage channels and acidic topsoil settle in the drainage channels eventually making their way into the estuaries and river systems.

As a result of contrasting land use, historical environmental issues of State significance on the juncture of three local government areas this part of the Richmond Catchment has been the source of many problems. Currently a long list of government and Non Government Agencies operate in the region with limited outcomes. These Agencies include:

- National Parks and Wildlife Services
- NSW Department of Planning and Environment
- Local Land Services
- Jali Local Aboriginal Land Council,
- NSW Department of Primary Industries – Fisheries
- Rous County Council
- Ballina Shire Council

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<sup>9</sup> Excerpt from Oceanwatch Australia “What are the negative and positive impacts of flooding on the environment?” following Cyclone Debbie

- Lismore City Council
- The Nature Conservancy
- OzFish Unlimited

A co-ordinated investigation of relevant issues with clear pathways beyond the current impasse is required. Final prioritisation and designation of responsibilities with relevant service agreements are essential going forward. This project would include opportunities related to combined infrastructure solution in the Tuckean Swamp area that is long overdue. High quality modelling would facilitate the following projects in the evaluation phase including:

- a water attenuation device to store flooding rains and run off from the Alstonville Plateau and
- the continual release of water through the Bagotville drainage system.

The outcomes are designed to continually move stagnant drain waters into the river and dramatically reduce the de-oxygenation issue. Together with changes to the areas existing layout and the Bagotville Barrage these stored waters could additionally be used for agricultural use in drier times may offer a more balanced way forward.

An efficient, multifunctional, use of downstream infrastructure to elevate these two long standing issues with the same hardware could be a start to significantly reducing the impact of these expensive and historical problems at hand. This would go a long way to eliminating the reoccurring devastation to the coastal communities that rely on a healthy river and sea life for their livelihoods.

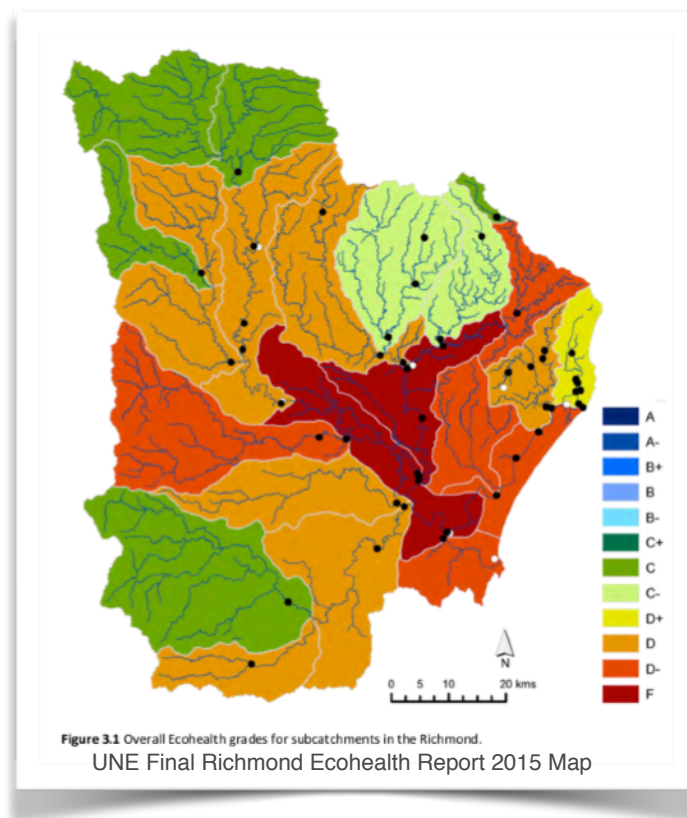
#### **4.6.2 NATURAL SOLUTIONS**

Any flood mitigation solution changing the landscape **across the broader Northern Rivers region** may need water speed to be adjusted. Using natural solutions is an efficient way to do this. Filling the valley with tea tree or hardy resilient crops on an annual harvesting rotation may be part of a combined solution between man-made and natural solutions.

**Upstream of Lismore** represents more opportunities with natural solutions and water attenuation devices; constraining water prior to it arriving in the Lismore area. Catchment-wide modelling will facilitate the location and dimension of these water attenuation devices. These options require modelling as part of a combined water security and food mitigation solution.

### 4.6.3 RIVER HEALTH

In a study of NSW River Systems the Richmond River Catchment Health Report results came in amongst the lowest in the State. The Richmond and Wilsons River Systems have a very poor rating in the key metrics of Water Quality, Riverbank Health, River Vegetation and Water animal life.



Rous County Council has developed The Northern Rivers Watershed initiative and involves large scale investment in catchment areas to restore natural hydrologic function that deliver both improvements in stream bank conditions and river health that also contribute to reduced flood risk within the catchment.

## 4.4 ENVIRONMENT RECOMMENDATIONS

- 4.4.1 That water quality and river health are incorporated into the recovery phase to assist in protection associated ecosystems
- 4.4.2 That the recommendations of the Northern Rivers Watershed Initiative be considered within the environmental framework of reconstruction.
- 4.4.3 That the Northern Rivers Reconstruction Corporation be tasked to finally address the dysfunctionality occurring in and around the Tuckean Swamp area.



- 4.4.4 That as a result of the NRRC a feasible structure is implemented involving the dozen or so Government and NGO organisations currently operating in the area.
- 4.4.5 That clearly defined objectives and responsibilities are given to these entities so that long standing issues may finally be addressed'
- 4.4.6 That adequate funding is forwarded to begin the first steps in rehabilitating this area.

## **4.5 ECONOMIC IMPACT**

In 2012 the Independent Local Government Review Panel investigated grouping options for Northern Rivers Councils consisting of Tweed, Byron, Ballina, Lismore, Richmond Valley and Kyogle.<sup>10</sup> The five councils in the catchment grouping were assessed with a moderate to weak sustainability rating due to operating deficits, with a deteriorating financial position anticipated to continue over the next three years.

No council in the group was able to achieve the required Treasury Corporation benchmark by reducing operating deficits and returning a surplus, or to demonstrate the ability to service any additional debt, creating substantial and growing infrastructure challenges particularly for the Byron, Kyogle, Lismore and Richmond Valley councils.

As predicted, the financial situation has continued to deteriorate over the following years (eg. In 2020 it was stated that Lismore City Council had a \$6 million deficit and prior to the flood this had not been significantly reduced). Ongoing budgetary restraints plus the devastating impact of the 2017 flood in all council operations has made the maintenance of existing assets extremely difficult and the construction of new infrastructure impossible. The situation is desperate.

In "Counting the cost and facing the future " a Report on the 31 March 2017 natural disaster for the Lismore Business Flood Recovery Taskforce<sup>11</sup> states *"Extent of disaster relief for the city and LGA Lismore City Council has estimated up to \$20M will be required for Roads Emergency and Restoration Works, and the window available to Council to have these funds fully expended is usually 2 years.*

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<sup>10</sup> Independent Local Government Review Panel, Northern Rivers Regional Grouping Options 2012

<sup>11</sup> "Counting the cost and facing the future " a Report on the 31 March 2017 natural disaster for the Lismore Business Flood Recovery Taskforce

*Council's insurance claims for damage to its insured properties will be in the vicinity of \$3.5million to \$5million, with \$1 million of this likely total already advanced in good faith by Council's insurers. The amount of flood damage to NSW Public Works infrastructure has not been assessed at this stage, but it is possible to estimate that the total of disaster relief available for Lismore will not exceed \$26 million.*

*Restoration and repair works have to go through a tender process. This could see local companies winning contracts on merit and subsequent financial benefits to the city (and by extension the CBD) through wages and purchases. There is no 'silver bullet' for the CBD specifically in terms of a single disaster relief payment. The CBD is going to have to trade its way out of the current situation. This makes the post-flood marketing campaign a critical tool, but it can't do the job of reinvigorating the city centre on its own. The revitalisation of the CBD is of equal importance: – in other words, 'getting the product right'.*

There are a considerable number of factors involved in determining the economic impact following a major flood; whether insured or uninsured, amount of damage to the home or business and the time required for building repair or to find alternative accommodation. More than 90% of residents and small businesses in the catchment cannot afford the high cost of insurance premiums so are uninsured.

Damage to commercial property and loss of stock in the 2022 floods has amounted to many millions of dollars and the agricultural production lost and livestock destroyed has been considerable.

On the Northern Rivers a large amount of sugar cane is grown on the lower floodplain. It is a two year rotational crop and often farmers lose three years of production in one flood. The Macadamia growers are progressively moving onto the floodplain. Similarly, if cattle owners do not get early warning of impending floodwaters, they do not get sufficient time to move their stock to higher and safer ground (as occurred in 2017 and 2022) and as a result the stock losses for some farmers were devastating.

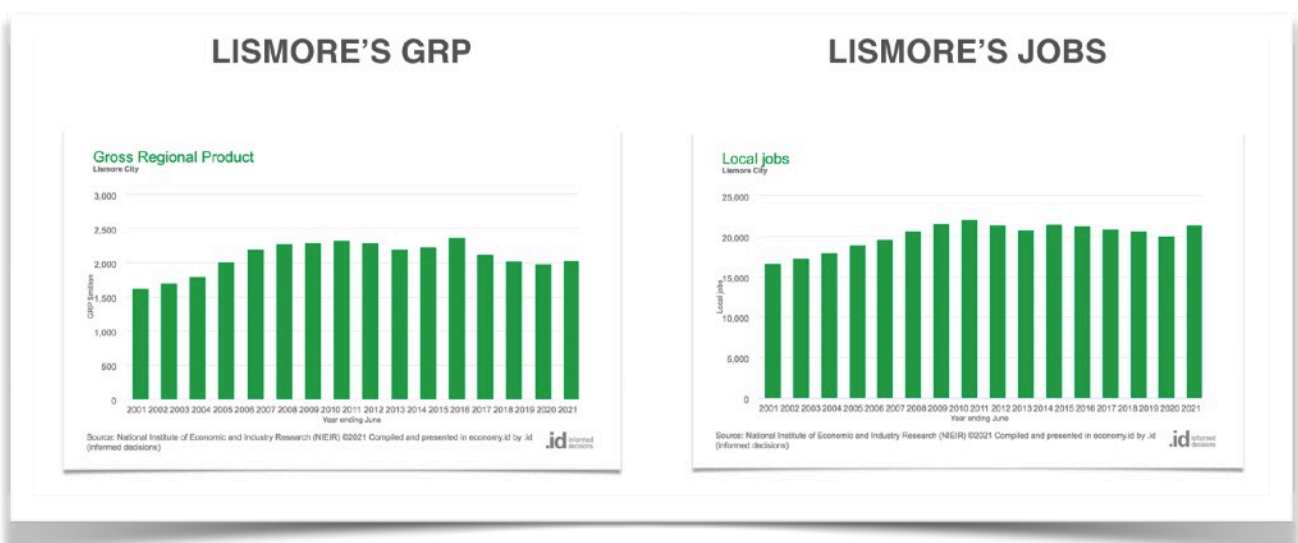
Following a flood the immediate costs can usually be calculated however the longer term impacts are more difficult to quantify. There are usually years of weak economic conditions and decrease in value of homes and businesses. In 2017 many small businesses have gone to the wall as the losses were so great that re-

establishing is not possible. Many had mortgaged their home against their business and were consequently bankrupted and lost their homes as well. Across the region the double flood in 2022 will no doubt destroy many more of businesses and the result does not auger well for the future unless there is a concerted effort to support the business sector to start again.

Maintaining broader economic momentum is difficult in those towns whose main business area is close to the river. In Lismore, in the recovery period, shop owners in the CBD reported a 40% drop in trade in the first financial year and three and a half years on have not reached pre 2017 flood trade. The number of businesses that ceased operating and left empty shops and the consequent reduction in foot traffic added to the challenges of those businesses that remained.

The catastrophic event of February 2022 and the follow up major flood some four weeks later in March of 2022 has decimated urban businesses in Lismore and all surrounding towns and villages across the entire catchment floodplain. This includes to a lesser degree in Ballina where many businesses were inundated.

For the farming community, whether it be livestock, macadamias, sugar cane, mushrooms, avocados or fruit etc., if the fodder and crops were not extensively damaged or wiped out by the floodwaters, the ongoing rain has caused the ground to be so wet that property and weather conditions are so severe that general field work, maintenance and low quality fruit have resulted in crop damage and inability to be harvested.



With the reputation throughout the country as “the place that floods” it is extremely difficult to encourage meaningful economic development opportunities and private investors to consider Lismore a viable option. Such developments underpin confidence and ensure that families stay in the region and businesses reopen.

Given the experience of regular flooding and prior to Covid has seen 10 or more years of population, real estate values and economic growth flatlining. This is not a short term issue and unless the economic viability of Lismore is researched and leading industries are identified and built into the Reconstruction Corporations objectives there is no reason to force any substantial change in this Communities prospects.

#### **4.7 ECONOMIC RECOMMENDATIONS**

- 4.7.1. That a post disaster economic impact study be carried out
- 4.7.2. That the study, economic modelling and recovery planning process be carried out by the CSIRO or an independent nationally recognised agency
- 4.7.3. That economic stakeholders are directly involved in creating the plan with strategies
- 4.7.4. That the economic plan is coordinated with all NRRC activities

### **5. GOVERNANCE**

#### **COLLABORATIVE GOVERNANCE MODEL**

The devastation of the February 2022 event is such that there are few issues and areas of the Far North Coast that have not been impacted. In order to successfully coordinate the social, economic, environmental and built pillars of the regional Reconstruction phase a collective decision-making process that is formal, consensus-oriented, and deliberative is required. Desired outcomes will need to be generated together, as many could not be accomplished separately.

Collaborative governance is based on three key interactive components of which lead to collaborative actions to implement a shared purpose.

1. Principled engagement
2. Shared motivation, and
3. Capacity for joint action

Throughout the future decision making processes there will need to be cross-boundary arrangements between all three levels of government, public agencies

and community stakeholders. In order to meet the needs of the community collective decision-making processes may even require changes to public policy or programs.

Collaborative governance will facilitate the engagement of many government and non government representatives in cooperative activities and enhance the capacity of groups and individuals to achieve the best possible outcomes for our FNC community in all areas.

The inclusion and diversity of the governance team will come from multiple perspectives with different interests and requirements. This incorporates a broader understanding of who will gain or be harmed by a decision or action.

It will also enable the identification of important actions that can be worked on collaboratively, with the opportunity to create strategic opportunities and attract investment.

## **FUNDING**

Given the involvement of both State and Federal governments in financially supporting the Reconstruction Corporation it is envisaged that the Collaborative Governance leaders would be the National Recovery and Resilience Agency and NSW Treasury. The Collaborative Governance Committee would be made up of key state and national departments and representative community stakeholders directly involved in the key decision making level.

## **5. GOVERNANCE RECOMMENDATIONS**

- 5.1 That the Reconstruction Corporation operate under a Collaborative Governance Model to be established between ? NRRA & NSW Treasury overseen by a Collaborative Governance Committee made up of NSW & Federal government agencies and community stakeholders
- 5.2 That the input and allocation of funding from the involved agencies be determined by the Collaborative Governance committee

## 6. PLANNING

### 6.1 DECISION MAKING

The Department of Planning and Environment's (DPE) was restructured in December 2021. The website states *"The Department of Planning and Environment brings together specialists in urban and regional planning, natural resources, industry, environment, heritage, Aboriginal and social housing, and Crown lands and water."*

There are four ministers in the cluster, namely Planning and Homes; Lands and Water; Hospitality and Racing; Environment and Heritage; and Local Government.

It would appear that within the Department the following sections have some involvement in Flood Mitigation decision making.

- Strategy and Reform
- Environment, Energy and Science
- Aboriginal Strategy and Outcomes
- Place, Design and Public Spaces
- Planning and Assessment
- Water
- Planning Delivery Unit

Within the Environment, Energy and Science group there is the Biodiversity and Conservation Division. This group has the responsibility relating to biodiversity, Aboriginal cultural heritage, National Parks and Wildlife Services, climate change, sustainability, flooding coastal and estuary matters most of which are associated with Flood Mitigation.

Water and Flood Mitigation also appears to come under the umbrella of 6 different NSW government ministries. So the political cycle and election requirements are also part of the decision making framework.

Given there has not been an effective solution to the Northern Rivers flood issues put forward in over 70 years it is evident that the planning, design, development and implementation of a complicated NR Catchment-wide Flood Mitigation project is way beyond the capacity of the DPE due to the sheer number of disparate departments within the cluster and Ministries directly involved in making a decision.... and the

system is only getting worse. Coordination is not evident and no one making these important decisions has “skin in the game”.

Additionally, the lack of corporate knowledge in every sector and the 15 - 20 years involved in bringing a project of this magnitude to fruition means that those that are directly involved in the initial decision making are not likely to be in place for many of the development years of the project.

## 6.2 LOCAL GOVERNMENT

### 6.2.1 DEVELOPING A FLOOD RISK MANAGEMENT PLAN

Within the State level Emergency Risk Management Framework it is a requirement that Local Government update their Floodplain Risk Management Plan every 5 years or after a major flood.

Local councils in rural areas, particularly on the NSW North Coast have for many years been struggling across many areas as reported by the Independent Local Government Review Panel (2014). <https://ballina.nsw.gov.au/files/Northern%20Rivers%20regional%20group%20options.pdf> The financial situation for Northern Rivers Councils in 2014 was documented as follows:

Financial sustainability Results presented within these tables are derived from the 2012 TCorp analysis of NSW councils. ■ Meets benchmark ■ Below benchmark

	Ballina	Byron	Kyogle	Lismore	Richmond Valley	Tweed
Sustainability Rating	Moderate	Weak	Weak	Moderate	Weak	Moderate
Outlook	Neutral	Negative	Negative	Negative	Negative	Neutral

The document goes on to report:

*“Regional outlook*

*The outlook for councils within this grouping is challenging. All councils (with the exception of Tweed) are running substantial operating deficits. Most are also underspending on asset maintenance and facing increasing infrastructure backlogs. Based on TCorp’s assessments, most councils within the grouping will see a deterioration in their financial position over the next three years, with three ultimately being rated as “very weak”. This means these councils will have limited capacity to deal with economic downturns or unforeseen events and may need to cut services to survive. .... “*

In the past decade the Northern Rivers NSW suffered “unforeseen events” in the form of 11 moderate and major floods, bushfires in several LGAs and then the COVID 19 pandemic. The impact of the 2017 flood on Lismore was devastating enough but the decimation of the businesses and community in the 2022 floods has been beyond comprehension with 3100 of the 4000 registered businesses damaged.

For most of the last decade the Lismore City Council (LCC) was bordering on insolvency. It is our understanding that the maximum amount of funds have been borrowed from T Corp (NSW govt finance agency) and LCC has been told for a number of years to not take any additional assets on to their balance sheets that require renewal and maintenance. As a result many projects in the LCC 2022/23 budget will now had to be deferred or cancelled.

The latest Lismore Floodplain Risk Management Plan was produced in 2014. There were no funds available to update the plan following the 2017 flood, it was deferred in the 2019/20 budget, the 2020/21 budget and again in the 2021/22 budget. The 2022/23 budget has yet to be handed down. Preliminary studies for flood mitigation are currently being undertaken but the LCC has no funding to take these studies further. They are totally reliant on the DPE grant process described below which will take years to come to fruition.

Since the announcement of the CSIRO Flood modelling project the Floodplain Risk Management Committee is updating the Terms of Reference and considering how best to integrate their plans with the CSIRO modelling project.

Similarly, it is understood that the Kyogle, Richmond Valley and Ballina councils have not updated their Flood Risk Management Plans since 2009, 2010 and 2014 respectively. Byron Shire as recently updated theirs. Local rural councils do not have the qualified personal or capability to produce their own plans and the cost of having it done professionally is mostly beyond their financial capability.

Unless it has been changed since the Ministerial restructure, the process to fulfil the requirement of developing and implementing the required Floodplain Risk Management Plan is as follows:



1. By April in any year a submission for a grant is made to the NSW Department of Planning, Infrastructure and Environment (DPE) for funding to contract an agency to develop the Flood Risk Management Plan.
2. In November - January the council is notified by DPE as to the success or otherwise of the grant submission.
3. If the grant application is unsuccessful then the process is repeated by April the following year
4. If the grant is successful council is given 12-18 months to organise the production of the plan and at this time is required to supply 33.3% of the cost.
5. Whenever the plan is finalised it then moves to a study development stage (but only if Council has the 33.3% of the costs available). Once again by April a submission for a grant is made to DPE for funding to progress the Flood Risk Management Study to the next stage.
6. In November - January the Council is notified by DPE as to the success or otherwise of their study development submission.
7. If the study development submission is unsuccessful then it is resubmitted by April the following year
8. If a grant request is successful the next step is for council to progress the study to become a project. The project is to be worked up and developed in greater detail (such as modelling, EIS etc) and completed in 12 - 18 months. The Council is required to pay 33.3% of the cost of this documentation which can be several million dollars.
9. With no capacity to pay the council 33.3% share of project development it cannot proceed and thus remains dormant.

This process clearly shows why for more than 70 years an effective flood mitigation solution to flooding of the Lismore CBD in particular has not been suitably investigated let alone achieved. With an estimated \$10 billion in government and

community reparation costs it could be said that the current system does not work and the ongoing costs are unsustainable.

It is evident the system is not only flawed but broken. Systemic change is required in the manner in which decisions for mitigation projects across all natural disasters are progressed and funded. The current system that *“local governments ensure accountability for, and compliance with, land-use planning or hazard management obligations designed to mitigate and increase resilience to natural hazard risks”* is not working for either financially constrained local councils, the suffering community or the taxpayer.

## **6.2 PLANNING RECOMMENDATIONS - LOCAL GOVERNMENT**

- 6.2.1 That the NSW government initiate a policy for regional councils whereby any major infrastructure project over \$5 million becomes the responsibility of the Department of Planning and Environment to develop and implement
- 6.2.2 That a local knowledge hub made up of government, non government and community representatives be incorporated as part of the planning process
- 6.2.3 That economies of scale and efficiencies across the Far North Coast Councils be further investigated
- 6.2.4 That the benefits of amalgamation of this group of Councils be re looked at.

## **7. COST BENEFIT ANALYSIS**

The issue of Lismore Floods has traditionally been seen as too large and complex to attempt to find a solution. Documentation and development costs are deemed too expensive for the Local Council to confront within the bottom up NSW Government (DPE) funding system.

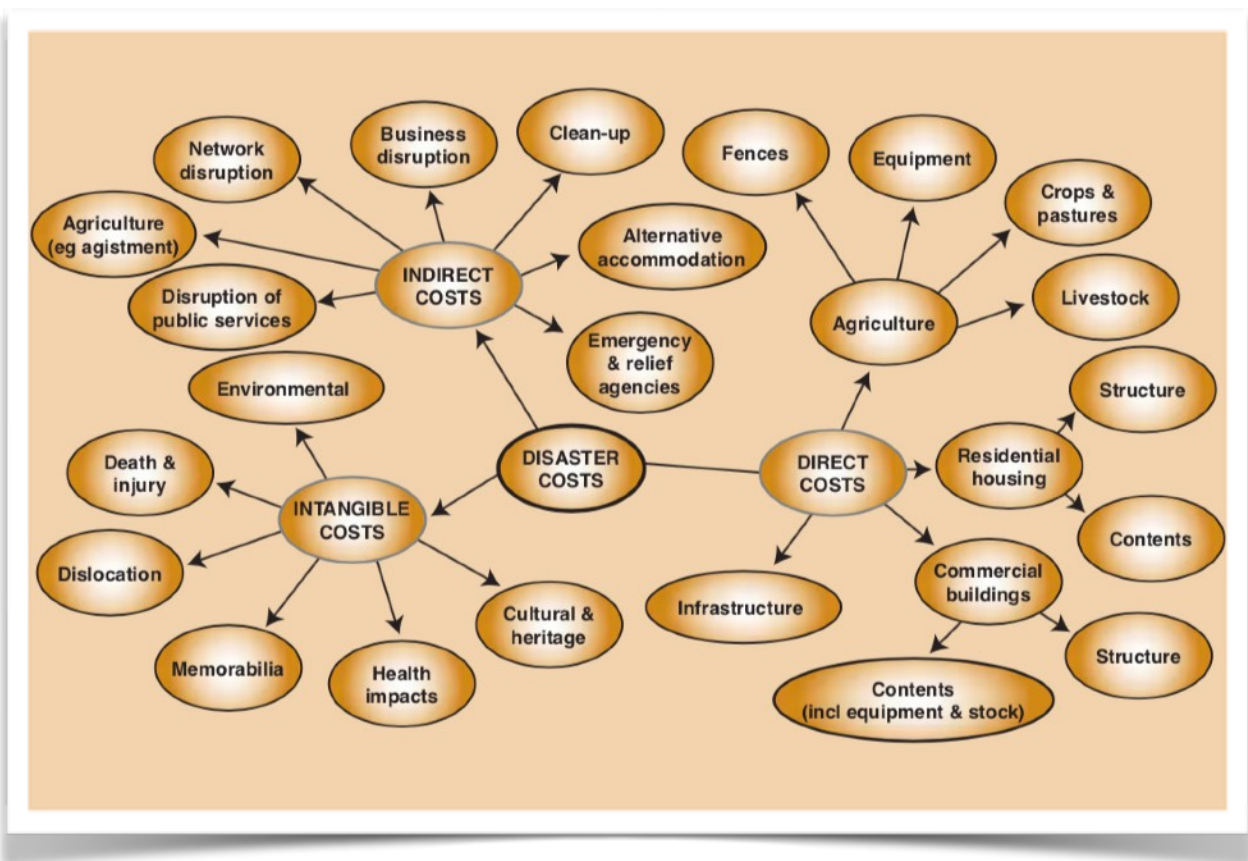
As a result of these preliminary project development costs Flood Mitigation is not on the agenda of the LCC or Rous Water. Very few natural disaster affected Local Government Agencies waste financial resources on this issue that requires them to incur 33 1/3rd of the project development costs when they don't have the funds ... Only the most superficial attempts are made in order to appease statutory requirements as this NSW system is seen to be a road to nowhere and futile waste of time.

In and amongst all of the other combination of proposed solutions, there is no impetus from DPE or Council to address the biggest single issue in this jurisdiction.

The single most costly impact to the community both socially and financially is not given the appropriate weight in any flood related conversations that are so urgently required. Lack of urgency prevails and personal on every side of the system lean out and let go of any out come given the futility of the status quo. All of this in the most flood affected community in the nation surrounded by LGA's that each suffer the consequences of flooding.

To be realistic the Cost Benefit Analysis of the 2022 floods must include all direct and indirect costs and social, economic and environmental impacts. At some point the opportunity costs associated with this calculation must also be considered as well. With such devastation to the Community and such a long road ahead it is incumbent on all levels of government to acknowledge to full cost to Society.

A prime example of this is the reference to local flood damages in the DPE FNC Draft Regional Water Strategy documentation that dramatically underestimates the total damages of the 2017 flood and makes no reference to the ongoing historical costs. This significantly distorts the Cost/Benefit analysis of any Water Strategy decision making process going forward. This dated but comprehensive Bureau of



Transport Disaster Costs chart shows an example of all the direct and indirect costs to be included in a Cost/Benefit analysis. This incorporates far more costs than the \$89 million mentioned in the Draft DPE FNC Water Strategy Documentation. This amount is only quoting the estimated government damages and the estimated agribusiness losses. There are no private sector losses, insured or the uninsured, tangible and intangible losses included.

In 2019 the Insurance Council of Australia (ICA) informed us that the March 2017 flood in Lismore resulted in three hundred and fifteen million dollars of total insured losses (TIL) being paid out in the private sector alone. But only a select few businesses have any flood specific insurance and that is mainly through national blanket policies. Everyone else is on their own or “self insured”.

The majority of the 4000 local businesses are sole traders or small and family owned. Due to the astronomical cost of flood specific insurance, the no growth business environment, the losses incurred in perpetual flooding amongst many of the other more well known prolonged challenges like the pandemic, the business community simply does not have the financial capacity to afford the high premiums. Some insurance companies won't even offer insurance. A meaningful flood mitigation solution coupled to removing the NSW taxes on Lismore and other flood affected communities will compress insurance costs significantly.

In 2019 SGS Economics documentation Economic Recovery after Disaster Strikes - A Report for Suncorp <sup>12</sup> quotes the Dept. of Transport and the Deloitte Research method to calculate the true cost of an event based on a 10 - 22 times the total insured loss (TIL). This includes the direct and indirect costs across the normal 5 to 6 year recovery period. Based on the minimum calculation (10 x \$315m) the cost to this catchment in 2017 was greater than \$3 billion.

This \$3 billion cost amount is similar to that calculated for the Richmond Catchment by Roche et al in a research article “The Australian Great Flood of 1954: Estimating the Cost of a Similar Event in 2011”<sup>13</sup>. Interestingly, the financial outcome was almost the same even though a different methodology was used. There were no insured losses included in the methodology of this flood event as it is understood that insured loss records only commenced in 1967.

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<sup>12</sup> SGS Economics documentation Economic Recovery after Disaster Strikes - A Report for Suncorp

<sup>13</sup> The Australian Great Flood of 1954: Estimating the Cost of a Similar Event in 2011; Roche et al

Additionally, these ongoing floods cause much greater losses to the budgets of Local, State and Federal governments. Due to the effects of regular flooding the government funded recovery and reparation costs as well as the welfare costs are never ending and continue to grow.

In 2003 and again in 2018/19 Lismore experienced drought conditions with severe water restrictions. In that 15 year period between 2003 and 2018 Lismore also experienced 3 major floods (2005, 2009 and 2017) plus 17 minor and moderate floods all with a cost impact as mentioned above. Some floods occurred before the 5/6 years major recovery period was completed and each flood incurs an annual ongoing cost to the local economy.

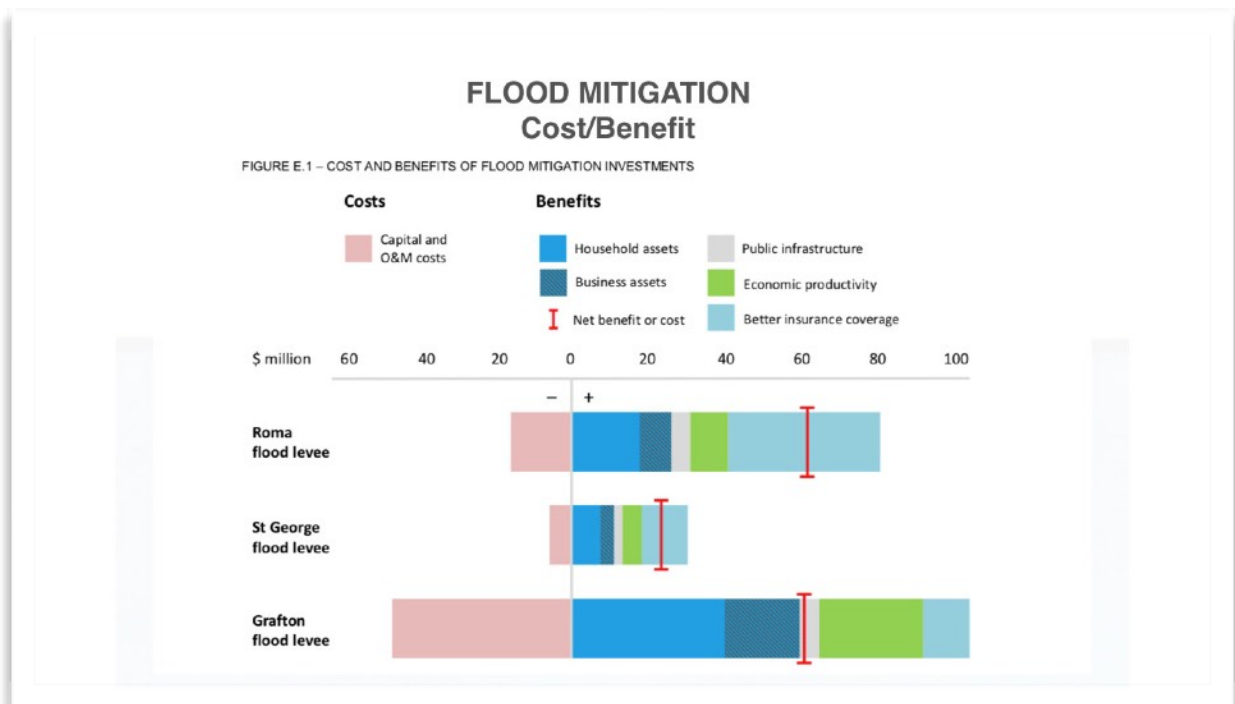
In 2020 the Lismore City Council Floodplain Committee was handed the findings of the 2020 Flood Modelling study by Engeny Water Management based in Brisbane. This study concluded the annual recurring cost of floods on the local economy was \$63m. This represents approximately 3% of our Gross Regional Product. Five of the last ten years Lismore's economy has retracted and has not grown since 2008. With this ongoing reality, how is it possible for this City to ever reach its potential?

In January 2022, almost five years after the 2017 flood, a walk around the CBD indicated there were still a considerable number of vacant shops post 2017 flood. During those intervening years it was shocking to everyone who knows Lismore to see whole arcades and dozens of empty shop fronts.

In March 2022 a walk around the CBD showed that the CBD had been decimated by the flood event. There was no electricity into the area for some six weeks, three months on from the flood there are just a few of the 400 CBD businesses operating and the devastation of the 2022 floods will no doubt take many years for the CBD to recover and be vibrant again. With only a few CBD businesses indicating that they will reopen, the foot traffic in the area will be considerably reduced making it even more challenging to make a profit for those who are having another go.

As the regional centre to the 12th largest population centre in Australia it is inconceivable that Lismore has no significant NSW Regional Economic Development Strategy (REDS) plans, there is no mention at all of the City in the NSW 20 Year Economic Development Plan and Lismore does not comply with any of the 6 NSW Special Activation Precinct project criteria or NSW Regional Jobs

Precinct projects. There have literally been no plans for Lismore for so long that it is evident the State Government gave up on this Local Government Area long ago.



The FNC Regional Water Strategy Project is the only platform that has the potential to incorporate Water Security and Flood Mitigation as an efficient solution to a costly and serious set of problems that do not go away by not addressing them. The compliance and infrastructure build timelines of a Flood Mitigation and Water Security Strategy are similar, and the outcome of this project will positively reshape the future prospects of this City and all the towns and villages throughout the catchment.

If Flood Mitigation solutions presented by the CSIRO are not capitalised upon with the required funding then there is no reason to think the future will be any different to what has been experienced over the last several generations.

A dam Water Security solution is a cost recovery project over a period of some 40 years. When combined, a Water Security/Flood Mitigation solution provides the lowest cost long term secure water supply on one side with all of the upsides that go associated with it in addition to the dramatic reduction of flood impact on the other.

The Productivity Commission Report into Natural Disaster Funding released in May 2015 stated “Analysis highlights that flood mitigation assets have the potential to provide economic payoffs which exceed \$2.2 benefit for each dollar spent”. On this basis it has been calculated that the Lismore 1: 10 year levee construction in 2005 has kept 12 moderate and major floods out of the CBD with estimates that it has paid for its \$21 million construction cost twice over through reduced flood damages. More needs to be done.

The proposed combined water security and flood mitigation infrastructure investment is a platform to develop a myriad of nature based and environmentally conscious solutions as well as the social and economic benefits that result. It simultaneously takes real steps to support and foster meaningful opportunities for our most aspirational and vulnerable members of the community; particularly those with no voice.....including many in the indigenous community as well as those living in illegal dwellings on the floodplain.

Indicative analysis of flood mitigation benefits

TABLE E.1

	ROMA	ST GEORGE	GRAFTON
<b>Impacts (NPV, \$ millions)</b>			
<b>Costs</b>			
Total capital costs (including O&M)	\$16.4	\$5.9	\$49
<b>Protective benefits (avoided costs)</b>			
Household assets	\$18.4	\$7.6	\$41.6
Business assets and stock	\$7.6	\$3.8	\$20.8
Public infrastructure	\$4.5	\$2.3	\$5.3
Economic productivity	\$10.9	\$5.4	\$29
Better insurance coverage	\$39.7	\$12.6	\$11.4
<b>Total benefits</b>	<b>\$81.1</b>	<b>\$31.6</b>	<b>\$108.2</b>
<b>Net benefit</b>	<b>\$64.7</b>	<b>\$25.7</b>	<b>\$59.2</b>
<b>Benefit cost ratio</b>	<b>4.9</b>	<b>5.4</b>	<b>2.2</b>

Note: Columns may not total precisely due to rounding.  
Source: Urbis estimates

## **7. COST BENEFIT RECOMMENDATIONS**

- 7.1 That Reparations are seen as an Investment in the Future as opposed to a Cost
- 7.2 That the issue of Insurance be thoroughly investigated with the Insurance Council of Australia to determine what is required to resolve the non availability for householders and businesses
- 7.3 That discussions be held with the Banking sector to determine what is required for future financing of businesses in the area

## **8. PUBLIC INTEREST CONSIDERATIONS**

The change in employment status to fixed term contracts in government agencies has introduced an additional challenge in developing major infrastructure projects particularly in rural areas.

In all three levels of government departments in particular key issues are:

- 1 Revolving door of senior key decision makers in all departments
- 2 Lack of local and corporate knowledge in decision making
- 3 Lack of continuity
- 4 Decision makers with “no skin in the game”
- 5 Number of government departments involved
- 6 Lack of coordination

In order to ensure that local knowledge is included it is recommended that throughout the planning, design, development and implementation stage of all projects that directly impact the community there is input from local Knowledge Hubs made up of technical and community representatives from business, local related agencies and the community who meet specific criteria. In this proposal relating to the Richmond/Wilsons catchment it would include a broad range of government and non government agencies, as well as community, business and farming stakeholders.

In order to guarantee the Knowledge Hub consultative committee has local knowledge and technical expertise in each planning sector, definitive criteria for community participation should demonstrate long term involvement in the region. This is to ensure understanding of the needs of the local community, eg on the issue of floods; multiple flood experience, historical knowledge and on the ground understanding of the variation in water behaviour ie. no two floods are the same.



However, it is recognised that for many years this has not been a cohesive community. There are disparate voices with a noisy minority overriding the silent majority. As a result it is important that a specialist team such as the CSIRO Enabling Resilient Infrastructure team be utilised to ensure that the voices from all sections of the community are heard.

Following a devastating disaster it needs to be recognised that the trauma in the community has different impacts on individuals and businesses who are trying to get their lives back together and support will be required, both emotionally and financially if they are to participate in having their voices heard during the planning stages.

The impact of floods on the residents and businesses is felt for very many years. We live with the consequences and there are social, emotional, economic, financial and environmental outcomes that remain hidden once the first flush of support is over.

## **8. PUBLIC INTEREST RECOMMENDATIONS**

- 8.1 That local technical and community Knowledge Hubs be initiated as soon as possible incorporating interested parties in each of the four pillar areas.
- 8.2 That community Knowledge Hub representation be included throughout all key aspects of the planning, design, development and implementation of the Recovery and Rebuild project.
- 8.3 That the CSIRO Enabling Resilience Investment (ERI) team be available to support the community Knowledge Hubs through all aspects of the decision making process
- 8.4 That financial assistance be given to participants who are leaving their place of work in order to participate in the decision making process in order to maximise participation

## **9. ABORIGINAL CONSIDERATIONS**

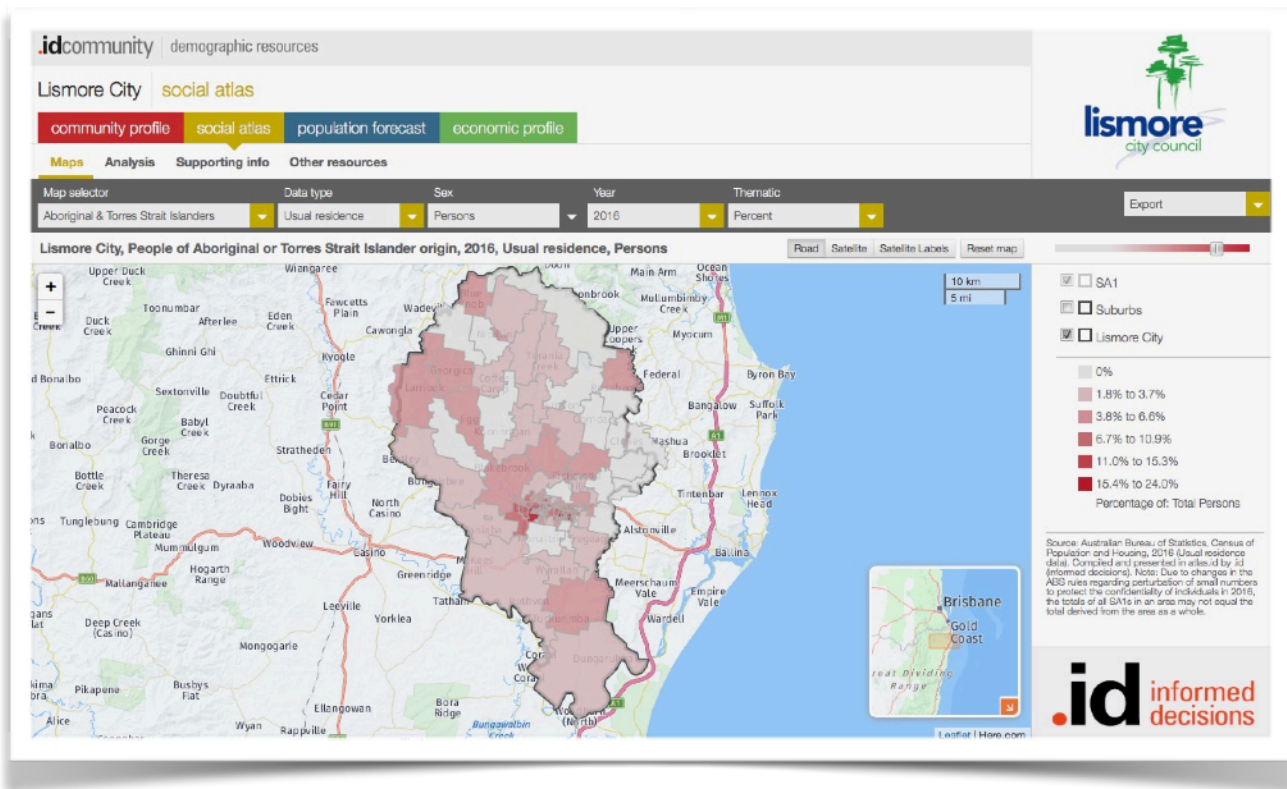
Serious consideration of issues that are so important to Aboriginal peoples are required. The issues and benefits have been clearly documented.

November 2020 marked 150 years of flood records in Lismore. The highest recorded flood was 12.46 metres in 1890... some 80 centimetres above the 2017 flood height. Over the years Aboriginal elders have reported flood heights

around the area greater than those recorded in the past 150 years. This important information must also be taken into consideration.

In support of the Aboriginal elders information, following the 2017 flood the senior intelligence officer at the Lismore City SES Unit with over 50 years local flood experience calculated that had the same amount of water fallen just 5 kms to the east on the Wilsons River catchment that fell on the Leycester Creek catchment in the same period of time the river height in Lismore would have been some 2.6 metres higher bringing it to over 14 metres.

The February 2022 flood reached 14.37 metres and the results for everyone including a large proportion of the Aboriginal community have been devastating.



Currently more than 50% of local ATSI population live on the Richmond/Wilsons floodplains. Consequently, the following flood issues related to Aboriginal peoples should be seriously considered within this submission:

- every time there is a moderate or major flood they are seriously impacted
- with the number of floods currently experienced and predicted to be larger and more frequent due to climate change, the impact on this already struggling community is going to be even greater
- most in the ATSI community struggle in the lower socio economic stream
- the unemployment rate is high at 19%

- without flood mitigation and further regional development the local ATSI community will continue to be impacted physically, financially, socially and emotionally

An effective flood mitigation solution will reduce the impact of floods, alleviate a perennial problem and greatly improve the quality of life for the the majority of the ATSI community residing in the catchment.

## **9. ABORIGINAL RECOMMENDATIONS**

- 9.1 That an Aboriginal partnership approach is applied to all decision making
- 9.2 That there be diverse Aboriginal representation in all Knowledge Hubs

## **10. NATIONAL AND STATE FRAMEWORKS**

### **10.1 NATIONAL**

Australia is a signatory to the International Sendai Agreement Disaster Risk Reduction which refers to actions that will reduce the impact of hazardous events. Examples include implementing infrastructure measures to “*divert flood water*” and “*increase water storage capacity in order to maintain water supply in times of drought*”. Our Combined Flood Mitigation and Water Security proposal fits this criteria.

In November 2022 the Federal Department of Agriculture, Water and Environment released the National Climate Resilience and Adaptation Strategy which incorporates resilience and adaption of the four pillars of social, economic, natural and Built in a coordinated adaptive manner. This holistic approach is required for the reconstruction of our devastated FNC area.

The Australian Government also has a National Strategy for Disaster Resilience. Under this banner is the Infrastructure Australia Priority List which has “*Ensuring towns and cities have safe and secure water supplies*” as a requirement. The proposed new Dunoon Dam meets this requirement. The Flood Mitigation proposal also meets the “*Protecting coastal regions from inundation*” requirement.

In order to deal with major natural disaster issues at the national level there should be a group consisting of representatives at least from Insurance Council of Australia, Risk Frontiers, Australian Institute of Disaster Resilience, Federal and State

Departments of Infrastructure and Regional Development etc. who meet annually to list and evaluate the nation's greatest mitigation threats and needs.

It would be community expectation that the group could draw up a list of recognised disaster prone regions around the nation which would have mitigation projects developed and funded in priority order by the Federal government and relevant State.

In discussion with the Head of Risk and Operations of the Insurance Council of Australia (ICA) in 2019 we were informed that Lismore was one of 12 mitigation case studies to be discussed with Treasurer the Hon. Josh Frydenberg MP and then Minister for Regional Development and Infrastructure the Hon. David Littleproud MP some two days following our discussion. Ballina was also listed just outside the 12 nominated cases.

At the federal level the top 20 electorates by number of land parcels exposed is listed. Page electorate which covers much of the Far North Coast is No. 1 electorate in NSW and No. 6 nationally behind only the vast expanses of the Northern Queensland electorates.

NRMA Insurance and Suncorp in Choice Magazine 2017 <sup>14</sup> states *“Coordination of data between local, state and federal government and insurers is required so government can mitigate the impact of natural disasters such as flood on the community, and so consumers can make informed decisions about the potential impact of home insurance premiums on their budget and their home values.*

*As it stands, the insurance industry thinks governments should do more to prevent natural disasters from destroying or damaging homes through improved mitigation infrastructure, such as dams and levees.*

*Governments in disaster-prone areas want insurance companies to find a way to make home insurance more affordable. Home owners just want to be able to protect their most critical asset at reasonable rates. Meanwhile, they continue to face steep premium increases, often with inadequate explanations of how the higher costs relate to risk’.*

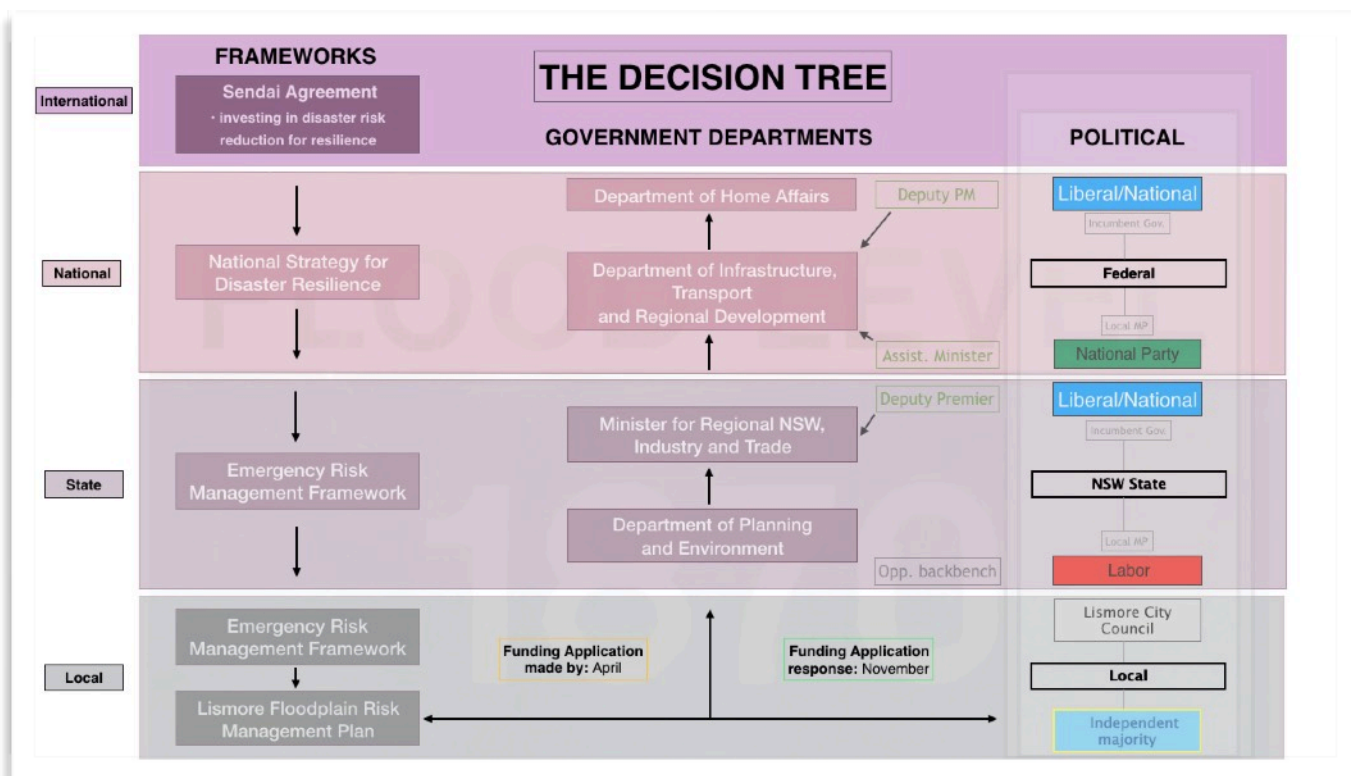
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<sup>14</sup> <https://www.choice.com.au/money/insurance/home-and-contents/articles/flood-cover>

## 10.2 STATE

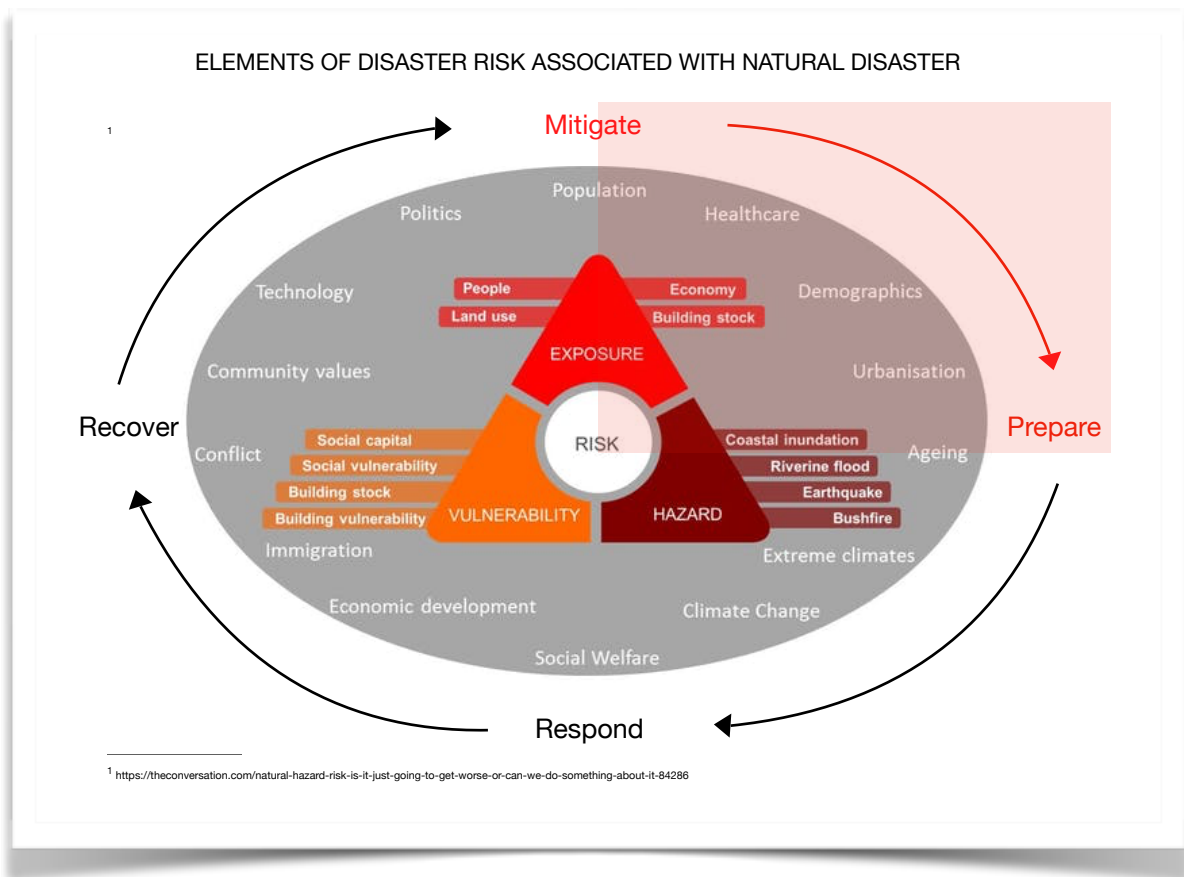
The NSW State Government is bound by the Emergency Risk Management Framework. Under this requirement the DPE has developed the Far North Coast Regional Water Strategy “which is to be completed in 2021 and will consider challenges and identify options to deliver healthy and resilient water resources for the region”. The focus of this document is mainly on drought.

The NSW Department of Industry *Extreme Events Policy* also focuses entirely on drought and mainly in relation to the Murray Darling Basin. It states “The definition of an extreme event in this context does not include flood events..... Flood emergency planning is done under a separate process consistent with the State Emergency and Rescue Management Act 1989”



Herein is a demonstration of the problem faced by the Northern Rivers. We have been unable to find Flood mitigation a priority in any of the many government departments with water responsibilities despite being the most disaster prone and flood impacted town in the nation. Even with over \$10 billion in reparation and recovery costs in the last 70 years there is no effective flood mitigation infrastructure mechanism available so the catchment continues to suffer and the taxpayer continues to pay.

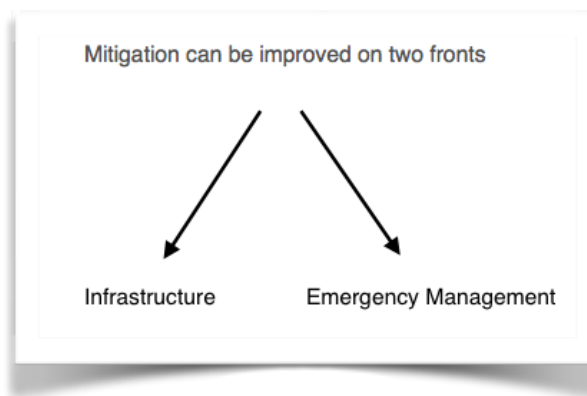
The Royal Commission into National Natural Disaster Arrangements Report incorporated the following diagram showing the management of Natural Disaster Risk.



The Royal Commission report states: *“A narrow focus on response and recovery will leave Australia vulnerable”*.

What is the definition of MITIGATE?

- make (something bad) less severe, serious, or painful
- to make something less harmful
- lessen the gravity of a situation



### **10.3 LOCAL GOVERNMENT**

There has never been a flood mitigation proposal encompassing the entire Richmond/Wilsons River catchment. The Richmond/Wilsons River catchment is made up of 6 Local Government Areas with only 4 being included in the Rous County Council remit. Rous County Council is charged with Bulk Water Supply but also Flood Mitigation through a convoluted Proclamation and service agreement between constituent councils. Each LGA is responsible for producing it's own Flood Risk Management Plan so there is no coordination or combined approach.

The NSW Emergency Risk Management Framework requires local government to produce a Floodplain Risk Management Plan every five years or after a major flood event. The plan is the foundation of any application for funding and includes concepts for investigation to develop and resolve mitigation issues. The most recent Floodplain Risk Management Plan was developed by LCC in 2014.

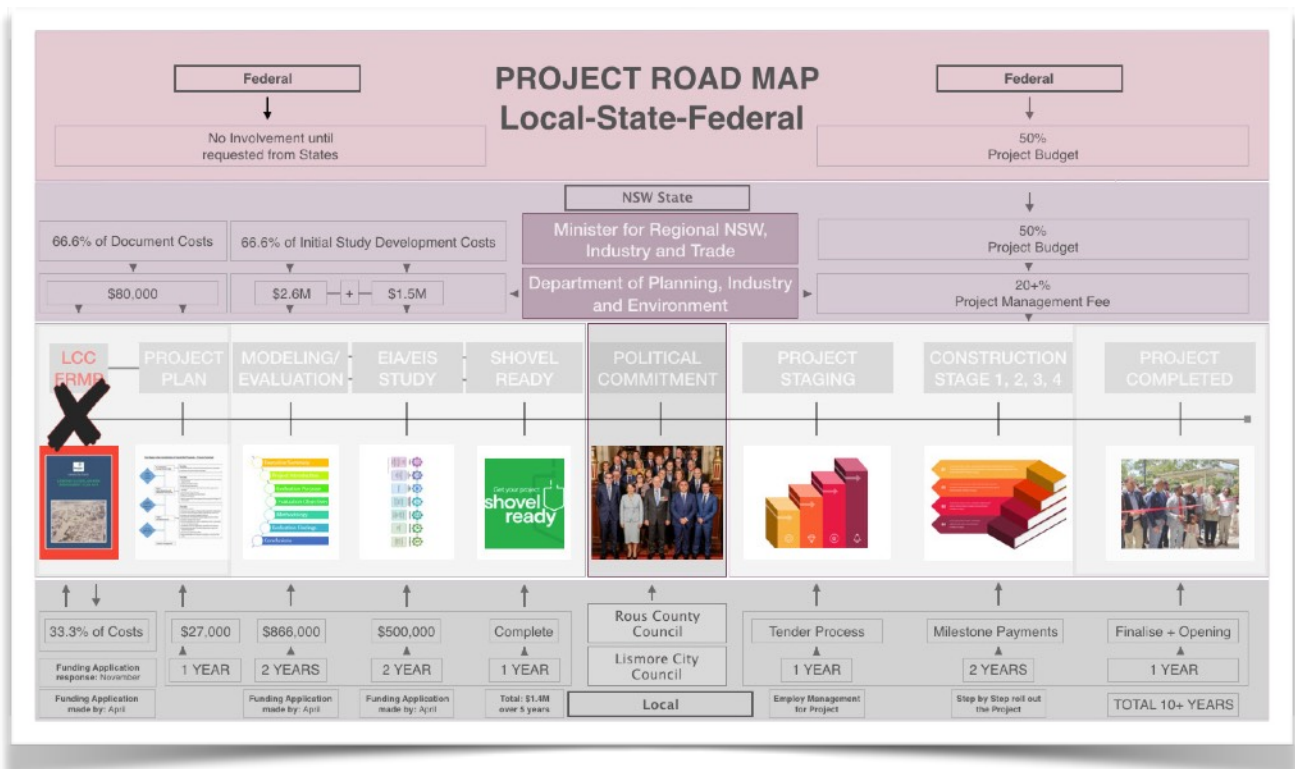
To achieve government funding for major mitigation/infrastructure projects they must be Shovel Ready. To reach this stage involves considerable cost such as developing models, evaluating modelling options, contracting EIS studies and other specific requirements. These preparatory investigation costs run into \$millions and are way beyond the financial capacity of most rural local councils and rural water authorities.

Following the destructive major flood in March 2017 with no mitigation requests forthcoming from Lismore City Council, in December 2017 local politicians requested a definitive project from the Lismore Floodplain Committee and gave \$80,000 towards developing a suitable proposal.

Some 15 months after the flood LCC and Rous (the regional Flood Mitigation Infrastructure Authority) jointly presented a 3 Stage project based on EIS and other Shovel Ready documentation acquired in 2004 and a DA approved in 2006. This documentation had remained dormant since 2006 as there had been insufficient council funds available to move the project forward since that time.

In November 2018 in the lead up to the NSW March 2019 election, the Deputy Premier the Hon. John Barilaro MP announced \$8.2 million NSW funding for Stage 1 of the Joint project. (In this instance LCC was not required to produce 33.3% toward the cost). Stage 1 was ostensibly the movement of 410,000 cubic metres of

soil to develop additional saleable land for the LCC industrial estate in order to assist their financial position. From a mitigation point of view according to LCC reports this will result in an improvement of only 30 mm up to 100 mm in an 10.6 metre flood. Unfortunately the 2022 flood inundated this new industrial land.



No funding has been requested by LCC or allocated by DPE for Stage II and III which in broad terms included modelling of the Richmond catchment and the removal of impediments in the floodplain. Rous Water anticipates that impediment removal could have mitigating benefits for the catchment of up to a depth of 600mm in a 10.6 metre flood. With sufficient funding of \$4.2 million (both these stages could be carried out concurrently and provide the required documentation at least to Shovel Ready stage but due to the near insolvency state of Lismore City Council the project will remain dormant.

Given that local councils and Rous are required to fund 33.3% of the cost for all requests to the NSW DPE up to Shovel Ready stage it is understandable that many local government councils have no capacity to even commence the very first stage of developing a Flood Risk Management Plan.

Despite being officially the most natural disaster prone and flood affected community in the nation Lismore and associated councils struggle to even get to the



very first step on the funding ladder to find a solution ... so the community continues to suffer and the taxpayer continues to pay.

The process clearly shows why for more than 70 years an effective flood mitigation solution to flooding of the Lismore CBD in particular has not been suitably investigated let alone achieved. With an estimated \$10 billion in government and community reparation costs for major floods prior to the 2022 event it could be said that the current system does not work and the ongoing costs are unsustainable.

In an attempt to break the cycle and move the issue forward in November 2021 our group met with the National Recovery and Resilience Agency and gave a presentation and outline on the combined water security flood mitigation proposal and demonstrated solutions to be investigated.

Following ongoing negotiations over the Christmas period, immediately following the February flood the Federal government announced \$10.4 million funding to the CSIRO to produce a Lidar model of the Northern Rivers and a state of the art model of the Richmond/Wilsons catchment. Once developed, historical floods will be tested and solutions given on how mitigation strategies could be composed for flooding throughout the catchment.

## **10.2 NATIONAL AND STATE FRAMEWORK RECOMMENDATIONS**

At the Northern Rivers level in LOCAL GOVERNMENT

- 10.2.1 That the Proclamation by which Rous County Council and local constituent councils operate is reviewed and improved
- 10.2.2 That consideration be given to the development of a new structure
- 10.2.3 That a strategic plan for the long term catchment wide management of water for the future be included in the Reconstruction phase

## **11. INSURANCE**

Insurance and mitigation are inextricably linked. Flood risks to the community in Lismore are very high and the existing flood defences so inadequate that they are barely considered for underwriting purposes by some insurers. Insurance premiums for flood exposed properties are consequently expensive. The median normalised premium in Lismore where flood risks exist is \$1750 compared to \$812 where floods do not occur.

With the implementation of a suitable flood mitigation solution the Insurance Council of Australia has indicated that Lismore’s floodplain business and residential community would receive a 40% reduction in insurance premium costs<sup>15</sup>. Together with Rockhampton, this would be the highest reduction in premium costs anywhere in the nation.

An example of the benefits of mitigation can be seen with the actions taken in Bundaberg following the floods of 2013 when the Region was devastated with an insured loss of \$987 million, the majority of which was centred on Bundaberg.

- 2400 properties were destroyed or damaged
- 7000 people were evacuated
- 600 businesses were damaged.

As a result of this devastation, the Queensland Government determined to develop a 10-year action plan for major flood mitigation in Bundaberg. The project is expected to reduce the risk and impact of flood events and mitigate flooding for over 600 buildings and increase flood protection, mitigate damage, and protect the Bundaberg East area from a 100-year average recurrence interval design flood event.

The plan includes permanent mitigation works to protect targeted areas in the catchment. In the 2021 Federal Budget \$42.5m was contributed to Bundaberg’s \$85m levee project. This has removed an average of 27% high flood risk premium costs for residents.

Five years after the 2017 flood Lismore has achieved no mitigation progress. Following the Northern Rivers events of 2022 the risk appetite for coverage from the insurance companies regarding Lismore in particular will have changed.

## **11. INSURANCE RECOMMENDATIONS**

- 11.1 That discussions are held with the ICA regarding acceptable flood mitigation requirements to gain affordable flood insurance
- 11.2 That a complete Flood Mitigation solution for Lismore is implemented
- 11.3 That a complete floor height study is made of the flood affected area of Lismore

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<sup>15</sup> ICA Mitigation Priorities Analysis 2020 - Lismore

11.4 That high-risk policyholders are exempt from paying duties and levies to compress insurance costs for the vulnerable.

11.5 That a national buildings dataset be established

## **12. CONCLUSION**

The natural disaster events of February and March 2022 have brought into focus all the issues associated with flooding throughout the Tweed, Richmond/Wilsons and Clarence River catchments on the NSW Northern Rivers.

Within the framework of NSW government documents this proposal covers a water risk assessment for the Richmond/Wilsons Catchment with a growing population which faces the double challenge of too much water resulting in floods and insufficient water to provide water security in times of drought.

It is evident that for many decades proposed solutions have been and continue to be impeded by piecemeal funding and bureaucratic red tape through political cycles and the process requirements of multiple agencies at the local, state and federal levels of government.

Within the scope of work required to successfully Reconstruct this region is the opportunity to make productive changes to the service agreements, management and maintenance arrangements of critical infrastructure that has been dysfunctional or outright neglected for far too long.

To date the Draft FNC Water Strategy Project has been the only platform that potentially incorporates Water Security and Flood Mitigation as an efficient solution to a costly and serious set of problems this region faces. These issues do not go away by simply not addressing them. The compliance and infrastructure build timelines of a Flood Mitigation and Water Security Strategy are similar, and the outcome of this project will positively reshape the future prospects of this City and all the towns and villages throughout the catchment.

The report and recommendations of the CSIRO DPE RWS Desktop Review carried out in November/December 2021 has yet to be released and will be critical in developing future planning for the catchment going forward. It is hoped that given the recent devastation throughout the catchment that once available, solutions for both flood mitigation and water security will be “fast-tracked” .

The preliminary short term suggestions from the CSIRO hydrologist regarding mitigation options are eagerly awaited; the medium and long term options will be produced with the three year timeframe.

It is envisaged that decisions made by the Insurance Council of Australia and the Australian Banking Association regarding finance and insurance will have considerable ramifications on the future of those with homes and businesses on the floodplain. This will impact decisions and solutions at the local state and federal government level going forward.

Planning and action for the economic revival of the region must be a priority as is housing and monitoring and assistance of the social impact on the community. The resultant environmental damage will no doubt be felt for many years and it is beholden for all levels of government to maximise coordination and work closely with the local community to get the region “back on its feet” as soon as possible.

Without priority action in response to the recommendations of this NSW Flood Inquiry there is no reason to think the future will be any different to what has been experienced over the last several generations.

- > \$10 billion has been spent on flood reparations in the last 70 years
- > \$10 billion is estimated to be the insured and uninsured costs of the 2022 Northern Rivers events

**This ongoing level of reparation and recovery cost is unsustainable**

**This Resilience and Adaptation proposal for the Far North Coast covers all the issues associated with our blessing and our curse.**

**Water.**

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## **13. APPENDIX**

1. Lismore Citizens Flood Review Group
2. Recommendations
3. Volpato Concept Plan
4. Sinclair Knight Flood Mitigation Options
5. Rous & Lismore City Council Joint Funding Submission
6. Towards a Catchment Based Model
7. Far North Coast Annual Rainfall
8. 20 Wettest Places in NSW

**LISMORE CITIZENS FLOOD REVIEW GROUP**

Keith Alcock	Joined Civic Defence (later SES) in 1962; Appointed Division Controller of Richmond Tweed SES in 1968; Officer in charge of the SES during the record 1974 flood and thereafter in Emergency Operations Management until retirement in 1995
Graham Askey	South Lismore Resident; 32 year representative on the Lismore City Council Floodplain Management Committee
Ed Bennett	Retired high school teacher, 56 years Lismore City SES Unit - Flood intelligence officer and Richmond River Historical Society Flood historian, North Lismore representative on the Floodplain Management Committee
Austin Curtin	3rd generation Farmer
Bill Moorhouse	Retired Engineer Rous County Council 2004 - 2019 Lismore City Councillor 2012 - 2020
Peter Thorpe	Engineer/Planner Tintenbar & Ballina Shires 1967-82; Managing Director Hepburn & Thorpe Pty Ltd 1982-2010; Constructed Stage 3 of the Lismore Levee including the Gasworks Pump Station
Beth Trevan	CBD Family business 1910 - 2005; South Lismore business 2005 - present; Health Educator, Health Service Director and Consultant 1974- 2010;
Richard Trevan	Problem resolution and distressed business consultant

## RECOMMENDATIONS

### 1. STRATEGIC RECOMMENDATIONS

- 1.1 **Natural Disaster Precinct** - That the NSW Northern Rivers consisting of Tweed, Richmond and Clarence river catchments be declared a natural disaster precinct
- 1.2 **Timeframe** - That the duration of the precinct be for at least the next 10 - 15 years, dependent on implementation of outcomes
- 1.3 **Project Requirements** - That during all aspects of the Reconstruction phase “priority” is assigned to every step of the future recovery and reconstruction projects
- 1.4 **Progress** - That bureaucratic issues retarding the current and future projects and planning be addressed, to avoid further delaying progress
- 1.5 **Pilot Project Status** - That all aspects of the regional recovery and reconstruction be considered as a Renewal Mission with a ‘Build Back Better’ focus. This project will require a broad scope to plan, develop, implement and evaluate all aspects of recovery and construction as preparation for future disasters.
- 1.6 **Structure** - That the four interconnected resilience domains of Social, Economic, Environmental and Built be applied to the project outcomes for the region, in line with the National Climate Resilience & Adaptation Strategy, Resilience NSW guidelines and local Council Emergency Recovery Action Plans.
- 1.7 **Strategic Planning** – That planning for future projects have clearly defined short, medium and long term goals.
- 1.8 **Expertise** - That CSIRO lead a catchment wide review, supported by independent national, and potentially international expertise with the task of eliciting the goals, options, assessments, responsibilities, data and investments required for the mitigation and management of natural disasters into the future

#### **4.2.1 FLOOD MITIGATION RECOMMENDATIONS:**

- 4.2.1. That full support across all NSW government departments be given to the CSIRO in their endeavours to seek solutions to Far North Coast flooding.
- 4.2.2 That flood mitigation solutions address historic flooding records to ensure that there are no unintended consequences within the catchment.
- 4.2.3 That final approved solutions are funded and fast tracked to mitigate flooding in the catchment without delay.
- 4.2.4 That the current smaller unfunded Far North Coast local government and Rous County Council infrastructure projects be appropriately planned and funded without delay.

#### **4.2.3 WATER SECURITY RECOMMENDATIONS**

- 4.2.1 That the water security solution addresses climate change variability in order to deliver sufficient water for domestic, agricultural and industrial use.
- 4.2.2 That the water security and flood mitigation projects be coordinated and progressed concurrently.
- 4.2.3 That priority funding be allocated to reduce the timeframe for implementation.

#### **4.3 SOCIAL IMPACT RECOMMENDATIONS**

- 4.3.1 That the issue of housing be dealt with as a priority
- 4.3.2 That a region wide social impact assessment be carried out as soon as possible by a nationally recognised skilled team in order to generate data from which effective decisions can be made
- 4.3.3 That this region wide social study include a particular focus on Lismore's homeless and flood displaced community members
- 4.3.4 That the study include economic development pathways to underpin future private and public investment opportunities in the region
- 4.3.5 That this study identify metrics of acceptable standards across the full array of social issues and that these metrics be built into the Reconstruction Corporations objectives
- 4.3.6 That monitoring of the social impact in affected communities be continued including assets, capabilities and the ability to recover across different socio economic groups

#### **4.4 ENVIRONMENT RECOMMENDATIONS**

- 4.4.1 That water quality and river health are incorporated into the recovery phase to assist in protection associated ecosystems



- 4.4.2 That the recommendations of the Northern Rivers Watershed Initiative be considered within the environmental framework of reconstruction.
- 4.4.3 That the Northern Rivers Reconstruction Corporation be tasked to finally address the dysfunctionality occurring in and around the Tuckean Swamp area.
- 4.4.4 That as a result of the NRRC a feasible structure is implemented involving the dozen or so Government and NGO organisations currently operating in the area.
- 4.4.5 That clearly defined objectives and responsibilities are given to these entities so that long standing issues may finally be addressed'
- 4.4.6 That adequate funding is forwarded to begin the first steps in rehabilitating this area.

#### **4.7 ECONOMIC RECOMMENDATIONS**

- 4.7.1. That a post disaster economic impact study be carried out
- 4.7.2. That the study, economic modelling and recovery planning process be carried out by the CSIRO or an independent nationally recognised agency
- 4.7.3. That economic stakeholders are directly involved in creating the plan with strategies
- 4.7.4. That the economic plan is coordinated with all NRRC activities

#### **5. GOVERNANCE RECOMMENDATIONS**

- 5.1 That the Reconstruction Corporation operate under a Collaborative Governance Model to be established between ? NRRA & NSW Treasury overseen by a Collaborative Governance Committee made up of NSW & Federal government agencies and community stakeholders
- 5.2 That the input and allocation of funding from the involved agencies be determined by the Collaborative Governance committee

#### **6.2 PLANNING RECOMMENDATIONS - LOCAL GOVERNMENT**

- 6.2.1 That the NSW government initiate a policy for regional councils whereby any major infrastructure project over \$5 million becomes the responsibility of the Department of Planning and Environment to develop and implement
- 6.2.2 That a local knowledge hub made up of government, non government and community representatives be incorporated as part of the planning process
- 6.2.3 That economies of scale and efficiencies across the Far North Coast Councils be further investigated

6.2.4 That the benefits of amalgamation of this group of Councils be re looked at.

## **7. COST BENEFIT RECOMMENDATIONS**

- 7.1 That Reparations are seen as an Investment in the Future as opposed to a Cost
- 7.2 That the issue of Insurance be thoroughly investigated with the Insurance Council of Australia to determine what is required to resolve the non availability for householders and businesses
- 7.3 That discussions be held with the Banking sector to determine what is required for future financing of businesses in the area

## **8. PUBLIC INTEREST RECOMMENDATIONS**

- 8.1 That local technical and community Knowledge Hubs be initiated as soon as possible incorporating interested parties in each of the four pillar areas.
- 8.2 That community Knowledge Hub representation be included throughout all key aspects of the planning, design, development and implementation of the Recovery and Rebuild project.
- 8.3 That the CSIRO Enabling Resilience Investment (ERI) team be available to support the community Knowledge Hubs through all aspects of the decision making process
- 8.4 That financial assistance be given to participants who are leaving their place of work in order to participate in the decision making process in order to maximise participation

## **9. ABORIGINAL RECOMMENDATIONS**

- 9.1 That an Aboriginal partnership approach is applied to all decision making
- 9.2 That there be diverse Aboriginal representation in all Knowledge Hubs

## **10.2 NATIONAL AND STATE FRAMEWORK RECOMMENDATIONS**

At the Northern Rivers level in LOCAL GOVERNMENT

- 10.2.1 That the Proclamation by which Rous County Council and local constituent councils operate is reviewed and improved
- 10.2.2 That consideration be given to the development of a new structure
- 10.2.3 That a strategic plan for the long term catchment wide management of water for the future be included in the reconstruction phase

## **11. INSURANCE RECOMMENDATIONS**

- 11.1 That discussions are held with the ICA regarding acceptable flood mitigation requirements to gain affordable flood insurance
- 11.2 That a complete Flood Mitigation solution for Lismore is implemented
- 11.3 That a complete floor height study is made of the flood affected area of Lismore
- 11.4 That high-risk policyholders are exempt from paying duties and levies to compress insurance costs for the vulnerable.
- 11.5 That a national buildings dataset be established

Lismore, 25/10/90

Attachment 3

PROPOSED CONCEPT PLANT

FOR A POSSIBLE SOLUTION TO THE

LISMORE FLOOD PROBLEM

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Submitted to:

The Hon. John KERIN M.P.

Minister for Primary Industries and Energy

By:

Florian VOLPATO

a member of

The Lismore and Richmond River

FLOOD MITIGATION SCHEME Committee

THE CITY OF LISMORE NSW, population approximately 40,000, is the regional commercial, industrial, educational and administrative centre of the Far North Coast and caters for the needs of over one hundred thousand people living within a radius of 50 Kms.

At the centre of one of the most rapidly growing and densely populated rural areas in Australia, with sub-tropical climate and proximity to the Pacific Coast and unspoiled rainforests of unique beauty, Lismore attracts an increasing number of tourists and new residents.

But recurrent floods are seriously hampering the social, economic, commercial and industrial development.

\* \* \*

#### WHAT FLOODS MEAN TO LISMORE AND THE LOWER RIVER

- . Heavy financial losses to the business and general community of the City Centre, North Lismore and South Lismore ( valued at over \$5 million per year );
- . Depressed value of all properties, particularly in flood-prone areas;
- . Loss of investments, developments, employment opportunities, etc. ( over an extended period of time could be estimated in the region of billions of Dollars ); such loss is also translated into a continuous revenue loss for the three tiers of Government ( Council Rates, Land Tax, Income Tax etc.);

- . Stress and anxiety for the general community;
- . Loss of tourist activities;
- . A high welfare expenditure on flood relief - \$2.8 million in the 1988 flood;
- . A degenerative effect on the agricultural sector.

#### WHY IS IT HAPPENING?

Because the Leycester Creek is allowed to merge with the Wilson River right in the centre of the City, causing a bottleneck effect in periods of exceptional heavy rain.

The Leycester Creek carries approximately two thirds of the total catchment area waters and is allowed to revert back to Lismore from the area of Caniaba, instead of flowing straight down stream on the western side of South Lismore.

The flow in such a direction is being blocked by man made artificial levee banks such as roads and the Railway Line.

\* \* \*

#### WHAT CAN BE DONE

##### First Stage

1. By building a levee bank on the City side of the Wilson River from the Police Station to Bernstein Street, the City centre would be flood-free.

( Such levee bank could be constructed very economically and in a short period of time ).

Because the amount of flood-water entering the city centre is negligible, compared with the total amount, no aggravating effect would be felt in North Lismore, South Lismore or further downstream, particularly keeping in mind that the bulk of flood-waters would be diverted beyond North and South Lismore with the proposed measures in item 1;

2. By facilitating the flow of flood-waters of the Leycester Creek downstream before they revert back to the City, excavating an opening under the road and railway line and constructing a levee bank on the western side of South Lismore, the bulk of flood-waters would not reach the City, North Lismore and South Lismore.

PLEASE SEE ATTACHMENT NO. 2

#### Stage Two

. A canal of suitable dimension can be excavated as a continuation of the works proposed in item 1. of the First Stage and extended, between the western side of the Airport and the hills, to reach a bend of the Wilson River downstream past the Bruxner Highway.

. After that the Leycester Creek can be blocked completely on the eastern side of the Boorie Creek junction where the levee bank proposed in item 1 of First Stage starts.

At the junction of the new canal with the Wilson River downstream a sluice gate can be built to regulate the level of the water of the new canal.

Lower River hydraulic measures to facilitate discharge to the Ocean downstream.

- Specially 1. The Tuckean Diversion Canal
2. The Boundary Creek-Ocean Canal.

The Diversion Canal from the Wilsons River to The Broadwater.

1. A preliminary examination indicates that a diversion canal from the Wilsons River near South Ruthven to The Broadwater to mitigate damaging flooding on the middle Richmond River, would be justified on economic grounds alone and more so on economic and social grounds.
2. The principal bases for this conclusion are:
  - 2.1 The value of agricultural production in the areas affected by a canal was \$7.0m in 1986-87 with a total direct and indirect production value of \$14.0m, applying a multiplier of 2.
  - 2.2 The average persisting detrimental effect of flooding is 33%, that is the additional income from existing enterprises with the canal in place would be of the order of \$4.6m p.a.
  - 2.3 Additions to the industrial base (agricultural and other) with the canal in place in the medium term, and increasing, would generate new incomes of the order of \$3.0m p.a.
  - 2.4 The total additional income in the affected area of \$7.6m p.a. would cull at least 40% of additional direct and indirect taxes, say, \$3.0m p.q.



2.5 These taxes, applying a long term interest rate of 12% would service the interest on \$25.0m.

No attempt has been made to quantity the costs of repairing damage to roads and other services that would be avoided. The heavy social toll in damaged morale and the effects of stress due to lost income, wasted efforts and sheer frustration wreaks its own kind of damage, mostly incalculable, although much would show up in a proportion of health and social service costs that could be avoided.

4. There is nothing new in this proposal - it was planned to be carried out in 1968 twenty years ago, to complete the necessary works in the middle Richmond area. Its non-completion has meant that large areas, particularly off the right bank, have been steadily degenerating, in every sense. This is iniquitous and should be redressed with the proposed works. Such a canal, properly conceived, would be an enhancement to the area industrially and aesthetically as rural areas are confidently redeveloped. Property handled, it should also be an enhancement environmentally. Imagination and a positive approach will quickly demonstrate its worth. It has to be done and is justified now. A major consequence would be an increased production base providing greater income and more work for the increasing regional population.

PLEASE SEE ATTACHMENTS NOS. 3 & 4

#### THE COST

The total cost for Stage One is difficult to assess because it varies with the method adopted to allow the flow of waters under the railway line ( raising it or excavating under it ) and the extent of the area. The cost of the levee banks can be assessed with reasonable

- 6 -

At present it is estimated that the total cost of the measures proposed for the First Stage should not exceed \$6 million.

\* \* \*

#### COMPLETION OF THE FIRST STAGE

The First Stage could be completed within a period of two years.

\* \* \*

#### THE BENEFITS

1. Elimination of all financial losses for the business and general community;
2. Elimination of the "Flood Stigma" with consequent increase in value of all properties;
3. With new developments, investments and job opportunities a new era of prosperity will be generated;
4. Substantial increased revenue for the Local Government ( Council Rates ), State Government ( Land Tax ), Federal Government ( Income Tax, Employment etc );
5. Creation of a great amount of new wealth by turning worthless flood-prone land into valuable residential, commercial and industrial land;
6. Elimination of social stress and anxiety for the general community.

benefits will extend indefinitely into the future and repay  
thousands times over the cost.

\* \* \*

After completion of Stage One and Two a new horizon of development and progress will open up for the whole Region.

The local government and private enterprise could combine in new developments to foster tourism and attract new residents by the creation of thousands of reasonably priced residential, commercial, industrial blocks of land and sporting and tourist facilities. The canal could be turned into an attractive lake with numerous marinas.

The rivers, that now are an ugly menace, could become the best asset of the City by landscaping them with suitable tropical vegetation and making them suitable for spectator water sports.

The rich agricultural land of the flood plain would be able to carry higher stock levels, develop a range of economically viable other crops and provide a more stable agricultural sector for the region.

CITY OF LISMORE  
SCHEDULE OF FLOOD MITIGATION OPTIONS  
SINCLAIR KNIGHT CIRCA 1991

OPTION DESCRIPTION	SUMMARY OF COMMENTS RELATING TO CHANGES IN LEVELS FOR 1% FLOOD
Option 1: C.B.D. Levee	Increase in levels: North Lismore (0.08-0.14,); South Lismore (0.06-0.10m) No increase at Wyrallah
Option 2: C.B.D. Levee + Raise South Lismore Levee + New Levee at Wilson St.	Generally produces flood levels which are higher than C.B.D. levee on its own.
Option 3: C.B.D. Levee + Realignment of South Lismore Levee + Remove old rubbish dump + Extend railway culverts	Reduces the water level increases in North Lisore caused by C.B.D. levee back to 0.10m but increases levels in Hollingsworth Creek area by 0.15. Note: Further exploration as to why this happens may be required.
Option 4: Combination of Options (2) and (3)	Increases generally higher than for C.B.D. levee on its own due to Hollingsworth floodway being blocked by raising of levee south of railway
Option 5: Large diversion Channel in Airport Floodway	} } } } } Major decreases in flood levels up to } 1.2m at Tuncester and 0.65m at Railway } Bridge and 0.4m to 0.65m upstream of } } Ballina Street Bridge. } } } } }
Option 6: Large Diversion Channel in Airport Floodway + Airport Levee.	
Option 7: Large Diversion Channel in Airport Floodway + Airport Levee + Large Bridge over Loftville Creek	
OPTION 8: C.B.D. Levee + Small diversion Channel in Airport Floodway	
Option 9: C.B.D. Levee + Small Diversion Channel from Leycester Creek to Three Chain Road	Generally slight increase in levels but not to same extent as Option (1).



Our ref: PR/NS: 2627/18 (50064)

12 June 2018

Hon Thomas George, MP  
Member for Lismore  
PO Box 52  
LISMORE NSW 2480

Dear Thomas

**Joint grant funding submission to improve Lismore's flood resilience**

Given your strong advocacy for flood mitigation initiatives across the Northern Rivers region, Lismore City and Rous County Councils are pleased to present the enclosed submission for Federal and State government grant funding to help build greater flood resilience in Lismore.

As you are aware, over a year has passed since a major flood devastated Lismore. There has never been a more critical time than now for effective and decisive action to safeguard this community from the future impacts of severe flooding.

In close collaboration with the Lismore City Council Floodplain Management Committee and Lismore Citizens Review Group, we have recently finished investigating several potential flood mitigation options.

As a result, a series of strong, cost-effective initiatives have been identified to undertake flooding issues now and into the future.

Most importantly, with funding support from both the Federal Government and NSW Government, three key actions could be completed within a 12 to 15-month period that would result in a significant reduction to peak flood levels.

Our highest priority at this stage is the excavation of the airport floodway in South Lismore, which already has the necessary approvals and is 'shovel ready'.

To implement these vital, short-term actions as soon as possible, we are seeking up to \$12.4 million in funding assistance from both levels of government.

Further details (including estimated costs) about these three projects as well as a number of complementary medium-term and long-term actions are provided in the enclosed joint submission.

On behalf of Lismore City and Rous County Councils, we sincerely thank you for your tireless efforts to provide improved flood relief for the community and look forward to working closely with you to deliver more beneficial flood mitigation outcomes for the people of Lismore.

We would also like to take this opportunity to recognise the tremendous dedication of all the Lismore City Council Floodplain Management Committee and Lismore Citizens Review Group members to protecting the area against major floods.

Yours faithfully



Phillip Rudd  
General Manager  
*Rous County Council*



Scott Turner  
Acting General Manager  
*Lismore City Council*

Attachment: Submission

c.c. Kevin Hogan MP, Federal Member for Page

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## Submission to improve Lismore's flood resilience

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### Background

Rous County Council (RCC) and Lismore City Council (LCC) has been investigating the Leycester floodway proposal and the removal of the railway embankment as proposed by the Citizens Review recommendations. The initial modelling shows that this floodway has hydraulic benefit in Leycester Creek dominated floods. However, it is clear that a diversion of the Leycester Creek will not prevent flooding to Lismore as the City Centre levee is still overtopped during a 5% annual exceedance probability equivalent flooding event. This is potentially due to a tailwater / backwater effect from the Wilsons River downstream at a pinch point in the floodplain near Wyrallah.

RCC has completed a flood assessment for a number of potential flood mitigation options for the South Lismore and Airport Area. The preferred flood mitigation options, as determined by the Lismore Flood Management Committee, are; summarised below

These works, if funded, have a common goal of greater flood resilience for the Lismore area.

### Lismore Flood Management Committee Agreed Priority Actions

#### Commence excavation of the airport floodway South Lismore

These works have development consent for the removal of 410,000 cubic metres of excavated material from the airport floodway. This area is located within the Leycester floodway proposal and these works would be required if this option was undertaken at a future date.

LCC owns all of the land associated with this proposal. LCC also has obtained development consent for the filling of adjacent Council land inside the levee. This will provide much needed flood free industrial land in South Lismore.

It is proposed that any increase in the developed lands value will be reinvested into future mitigation works. These potential flood mitigation works are list in following sections of the submission. (eg Other priority projects)

**Approximate total cost: \$8.2M** (can be completed in stages if needed).

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### Removal of railway viaducts and embankment adjacent to Kyogle Road.

#### Part 1 Removal of Railway viaducts

Historically, floodwaters overflowed in a southerly direction towards Hollingsworth Creek and the Lismore Regional Airport.

In the 1860s a three-metre rail embankment was constructed that stopped water flowing south and directed all the overland flow paths through South Lismore.

The railway ceased operations in the 2000s and after the recent flood the contractor working for the rail authority commenced the removal of the rail viaduct, however, these works have now stopped apparently due to a lack of further funding commitments.

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This proposal is to continue the removal of viaducts as soon as an agreement can be reached with the railway authority/corridor manager.

It is understood that both rail authority/contractors want to remove the viaducts for both maintenance and public safety reasons.

The removal of the viaducts would be a win-win for both the Lismore community and the NSW Rail Authority as these works would be required for any rail trail project to proceed.

**Cost to remove viaducts: \$800,000.**

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## **Part 2 Removal of rail embankment**

The removal of this embankment will be carried out at the same time as the proposed excavation in the airport floodway. The embankment will need to be assessed for contaminated material given its historical use. These waste materials will require disposal at a licenced and approved waste facility.

It is recommended that 1.5 km of embankment be removed.

Excavated material can be used to raise the nearby industrial land subject to material assessments or re-profile the existing South Lismore levee.

**Approximate total cost: \$1.4M.**

**Total cost to remove railway viaducts and embankment: \$2.2M.**

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## **Upgrade the Brown's Creek floodway**

The proposal is to remove the current obstacles to the clean overland flow path through Brown Creek's floodway. This will ensure that flood waters will no longer be diverted down Woodlark Street where significant damage was sustained in 2017.

The proposal will require the relocation of businesses affected and converting the floodway into additional car parking, which is greatly needed adjacent to the CBD.

**Approximate total cost: \$2M.**

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## **Other priority projects**

As previously mentioned, at meetings with the representatives of the Lismore Citizens Review, the Lismore floodplain is considerably complex and detail investigations are required to progress other options that have been identified by either the community, Councils or key stakeholders.



# Towards a Catchment Based Model after Two Decades of Modelling in the Richmond

## Issues with Current Approach

- Inadequate coverage of rural areas
- Poor synchronisation of FRMPs
- Discrepancies at model interfaces
- Inconsistent modelling and mapping approaches
- Inadequate use of flood information for flood response

<https://www.floodplainconference.com/presentations2012/Ben%20Caddis.pdf>

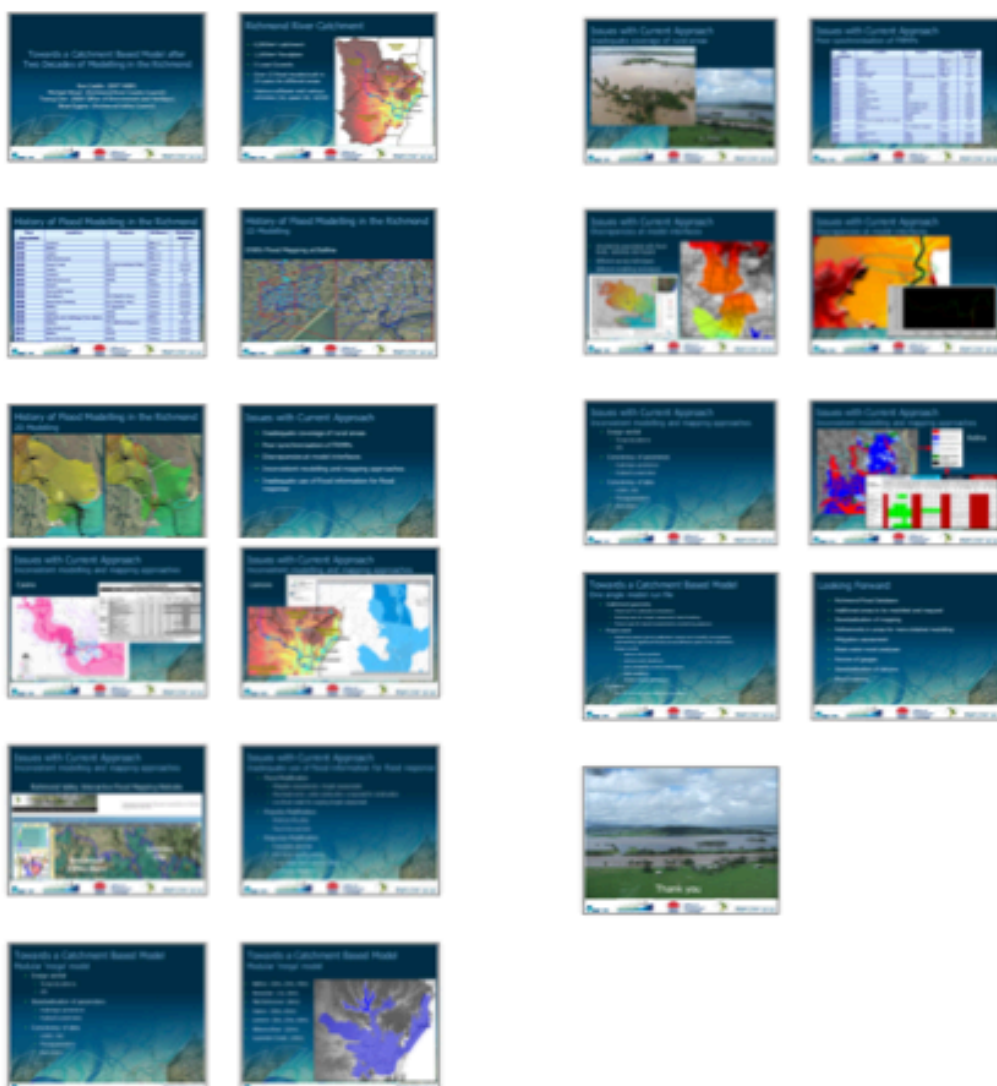
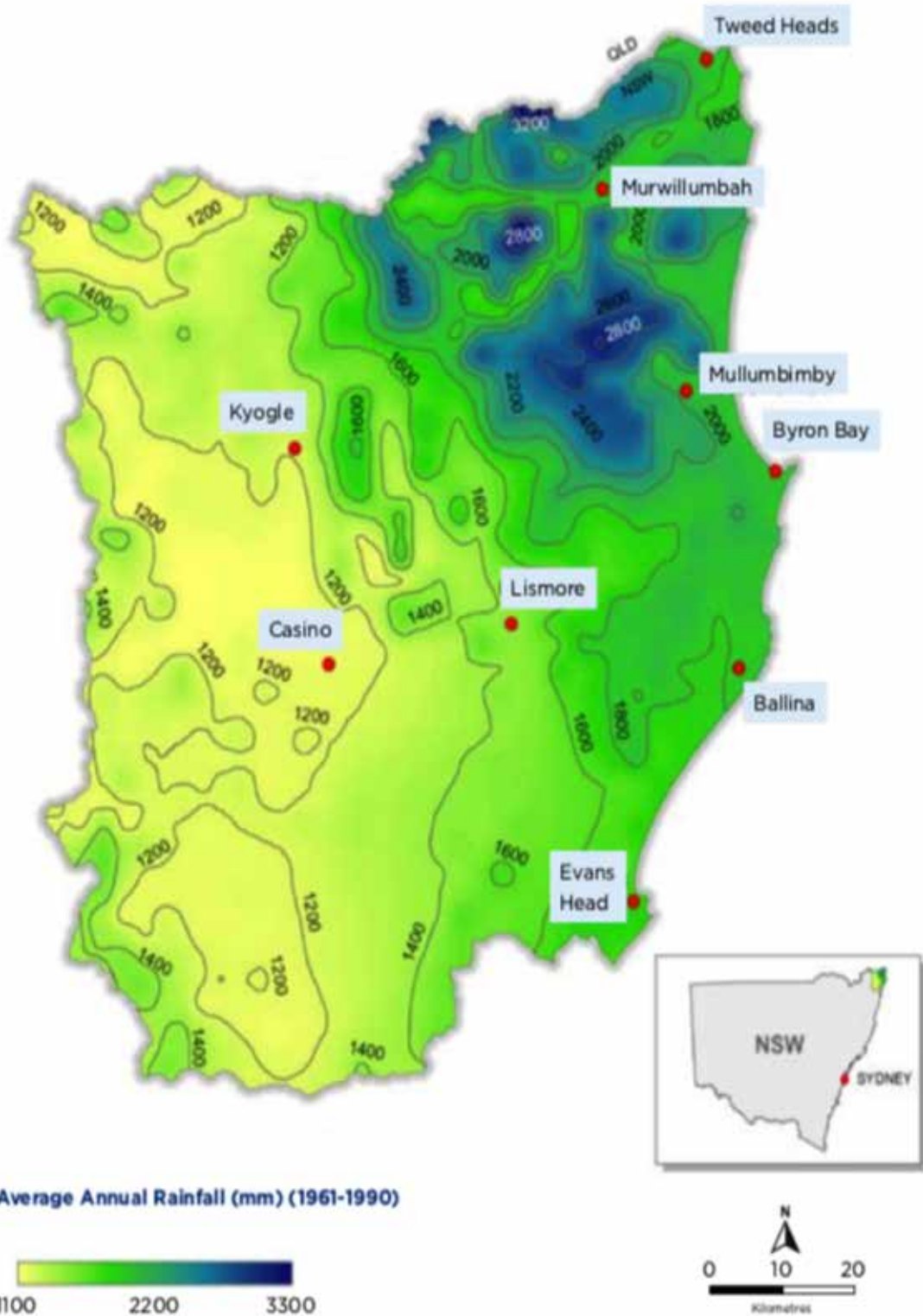


Figure 7. Observed average annual rainfall in the Far North Coast region



## 20 Wettest places in NSW

Ranking	Place Name	Annual Mean Rainfall (mm)	
1	<a href="#">Mullumbimby</a> , NSW	2330 mm	★
2	<a href="#">Nimbin</a> , NSW	2330 mm	★
3	<a href="#">Dunoon</a> , NSW	2330 mm	★
4	<a href="#">Modanville</a> , NSW	2330 mm	★
5	<a href="#">Perisher Village</a> , NSW	1950 mm	
6	<a href="#">Jindabyne</a> , NSW	1950 mm	
7	<a href="#">Lakewood Estate</a> , NSW	1950 mm	
8	<a href="#">Clunes</a> , NSW	1860 mm	★
9	<a href="#">Lismore</a> , NSW	1860 mm	★
10	<a href="#">Wollongbar</a> , NSW	1860 mm	★
11	<a href="#">Alstonville</a> , NSW	1860 mm	★
12	<a href="#">Wardell</a> , NSW	1860 mm	★
13	<a href="#">Coraki</a> , NSW	1860 mm	★
14	<a href="#">Broadwater</a> , NSW	1860 mm	★
15	<a href="#">Woodburn</a> , NSW	1860 mm	★
16	<a href="#">Evans Head</a> , NSW	1860 mm	★
17	<a href="#">Thredbo Village</a> , NSW	1790 mm	
18	<a href="#">Ocean Shores</a> , NSW	1710 mm	★
19	<a href="#">Brunswick Heads</a> , NSW	1710 mm	★
20	<a href="#">Byron Bay</a> , NSW	1710 mm	★

**16/20 in this catchment area**

