

**From:** [NSW Government](#)  
**To:** [Flood Inquiry](#)  
**Subject:** Floods Inquiry  
**Date:** Monday, 20 June 2022 7:43:37 PM  
**Attachments:** [Submission Dr Aidan Ricketts.pdf](#)

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## Your details

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## Submission details

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<b>I am making this submission as</b>	A resident in a flood-affected area
<b>Submission type</b>	I am making a personal submission
<b>Consent to make submission public</b>	I give my consent for this submission to be made public

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## Share your experience or tell your story

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<b>Your story</b>	I have lived in the flood zone for over thirty years and experienced many floods, but obviously none as a severe as 2022. My own residence which is elevated to 13.3 m AHD was inundated and at the time I was engaged in rescuing my neighbours in my street. I had two houses and a vehicle flooded. Since the flood I have rebuilt a
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house I own in South Lismore using flood resilient materials. My home in North Lismore was already flood resilient and we remained in occupation as soon as floodwaters receded. My doctoral research was in relation to complexity theory, and its relevance to community organisation, consequently my submission frequently refers to adaptive and maladaptive responses to flooding as a key critical perspective.

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### **Terms of Reference (optional)**

The Inquiry welcomes submissions that address the particular matters identified in its [Terms of Reference](#)

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### **Supporting documents or images**

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#### **Attach files**

- [Submission Dr Aidan Ricketts.pdf](#)
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## Submission to NSW Independent Flood Inquiry

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Dr Aidan Ricketts LLB (hons), LLM, M Ed, PhD

North Lismore  
NSW 2480  
Ph

Professor Mary O’Kane and Mr Mick Fuller,  
Co-chairs, NSW Independent Flood Inquiry

20 June 2022

Via < <https://www.nsw.gov.au/flood-inquiry-submissions-portal> >

I wish to make the following submission to the Inquiry.

### **Re Causes of and factors in, flooding in Lismore**

**1a. the causes of, and factors contributing to, the frequency, intensity, timing and location of the 2022 catastrophic flood, incl consideration of any role of weather, climate change, and human activity;**

#### **Causes of flooding**

Weather and geography are obvious issues in relation to the causes of flooding but as these are beyond my expertise I will move on to make other observations.

#### **CLIMATE CHANGE**

There can be no doubt that climate change is a contributing cause of flooding. The Intergovernmental Panel on Climate Change (IPCC) has repeatedly warned state and national governments to expect a higher frequency of severe and extreme weather events, in its published reports. In particular, it has highlighted major changes in climate patterns, including rainfall, due to the complex interaction of global climate drivers, and the likelihood of more extreme storms due to the wet phase in global climate known as ‘La Nina’.

The severe storms and rainfall which generated the catastrophic flood of Lismore on 1 March 2022, and elsewhere in NSW, the second flood a month later, on 28 March, and major floods across south-east Queensland, occurred during the current, prolonged ‘La Nina’ period. With the last 1:100 year near record flood of Lismore occurring only five years ago in 2017 due to TC ‘Debbie’, it is clear there is pattern of increasing frequency and intensity of major floods across south east Australia which is consistent with the IPCC’s warnings of the likely local impacts of anthropogenic global climate change.

#### **HUMAN ACTIVITY – CATCHMENT DEGRADATION**

An important and often overlooked cause of the riverine flooding in Lismore, is the very high rate of run-off generated in moderate to high rainfall events by the many sub-catchments upstream which are in a degraded state due to historical over-clearing

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of native vegetation on steep slopes and lands adjacent to creek banks, to maximise the area of pasture for agricultural production. The contribution this factor - human activity degrading the catchment - makes to the flood heights in Lismore has been overlooked for years.

Due to this human activity of chronic de-forestation, many sub-catchments now have large areas of land degraded by serious sheet or gully erosion, and or mass movement including landslips on steep land and slumped creek banks. These de-vegetated lands have little capacity to retain rain before they become saturated, create immediate run-off, and routinely erode soil into the stream whenever it rains. Decades of this over-clearing and extension of pasture have reduced the land's capacity to intercept precipitation with vegetation, diminished its soils' capacity to infiltrate rain, and drastically lowered the volume of rain which can be absorbed by the land before it becomes saturated and generates run-off.

Hence, an important contributing cause of the extent and severity of the flooding was the already saturated, degraded state of the Wilson's River's catchment, due to weeks of rain, at times heavy, even before the arrival of the 'rain bomb' depression in the Wilson's / Richmond River's watershed on Saturday 26 February 2022.

### **Factors contributing to flooding**

There are a range of factors which have contributed to worsening flooding, increased the impacts of the recent catastrophic record flood in Lismore.

#### **HUMAN ACTIVITY – LEVEE CONSTRUCTION**

There can be no doubt that the human activity of building the flood levee in Lismore has had a dramatic and deleterious effect on the timing of flooding in Lismore. Due to its limited height, the presence of the levee delays the entry of riverine flood waters into the Lismore basin from 10m AHD, until a flood height of nearly 11m AHD is reached. Hence it is only effective mitigating flooding in the CBD in minor or moderate floods.

However, once the levee is overtopped, the presence of the levee, greatly increases the speed of the inundation of the basin, because of the increased head between the levels of the river and the basin. This increased speed of the flood waters as they overtop the levee is a primary cause of the substantial structural damage to buildings immediately downstream of the levee eg The Terrace Bar of the Richmond Hotel.

Hence it is apparent that the presence of the levee and the increased speed and hence force of floodwaters when the levee was overtopped, created far more damage to adjacent buildings than would have been caused if no levee had been built.

If no levee had been built and floodwaters entered the basin gradually, the onset of a flood in the basin would be more gradual, slower and less structurally damaging.

The uncertainty in ascertaining whether, and when the levee will be over-topped, and the increased speed of flooding in the basin once it is overtopped, reduces the time available and the capacity of residents in the basin to prepare for flooding.

#### **HUMAN ACTIVITY – LOSS OF FLOOD CULTURE**

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It is asserted that one of the factors contributing to the severity of *the impacts of the March 2022 flood* was the loss of local flood culture: the knowledge, skills, resources and operational capacity of the community in Lismore, to anticipate, prepare for, respond to and recover from, floods.

This loss of flood wisdom has happened in part because of the ‘false sense of security’ created by the construction of the flood levee and the (false) claim that its construction would “floodproof” Lismore. It is also partly due to the absence of major floods for an extended period due to a protracted drought across south-east Australia since 2000, and the turnover of residents since the last major flood. Consequently, many Lismore residents have had little experience of floods and were at a loss to know what to do before, during or after this major flood.

### HUMAN ACTIVITY – CONTRACTION OF NSW GOVERNMENT SERVICES

It is submitted that the Liberal National Coalition Government’s ideological fixation on reducing the size of the public sector, the number of state government agencies and employees and cutting back government services - to achieve the ideological goal of ‘smaller government’ and deliver a pre-determined economic outcome for the state budget - has seriously undercut the capacity of the NSW Government to provide an adequate level of basic government services during an emergency.

This ideological fixation on small government, and reductions government agency staff has meant that there is no ‘surge capacity’ in the NSW Government to handle increased demand for government services in times of an emergency.

## Re Recommendations on 2e. land use planning and management and building standards...

Comments on existing and *future* development on **flood prone** lands are given below.

### **i. instruments, policies and programs applying to existing development in flood prone locations across NSW;**

The making of recommendations on the instruments, policies and programs, applying to existing development in flood prone locations in the Inquiry’s report is supported.

These recommendations should include:

- no mandatory evacuation, forced relocation, or unnecessary dislocation of flood-affected residents by NSW Government, local councils or insurance companies;
- creating opportunities for flood-affected residents to choose from multiple flood recovery paths (rather than only one or two) which should include options to:
  - \*rebuild / modify/ adapt existing houses at current floor level, to be ‘flood tolerant’;
  - \*modify / adapt interiors of existing houses, to be ‘flood tolerant’ eg no cavity walls;
  - \*raise the floor level of existing residences to above flood height (>16m AHD);
  - \*explore the use of pontoons or other buoyancy devices to enable houses to ‘float’ when inundated by floodwaters (like floating docks do);

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- \*accept a voluntary NSW Government buy-out of their residence, on 'just terms';
- \*agree to an exchange of land titles with NSW government (land swap) to enable existing dwellings to be relocated to another allotment on a flood-free site.
  
- amending the building code to create a 'within flood impact zone' classification, to:
  - \*support all residences in the flood zone to install a permanent means of accessing the roof cavity: eg staircase or fixed ladder;
  - \*support all residences in the flood zone to install a way of accessing the external roof from within the roof cavity: eg dormer window, hatch or openable skylight;
  - \*identify unsuitable building materials and promote the use of building materials that are suitable for use in renovation or rebuilding of structures subject to inundation;
  - \*discourage the use of Gyprock, or other plaster-board building products, in any locations in residences where they are likely to be affected by floodwaters;
  - \*encourage the use of hardwood or metal sheet or other submersible building products in locations where they may be affected by floodwaters, when rebuilding;
  - \*discourage the use of absorbent insulation materials, in internal cavity walls;
  - \*discontinue requirement for dual cladding of internal walls (ie no cavities)
  - \*allow single surface cladding of internal walls and covered external walls;
  
- assisting flood-affected residents with the financial costs of recovering from the catastrophic floods, such as:
  - \*expediting the processing of applications for Government for flood relief grants;
  - \*the waiver by the NSW Government (for 12 months min.) of all NSW Government fees and charges on government services accessed by flood-affected residents; eg land tax, drivers licence fees, motor vehicle and boat registration fees;
  - \*underwriting by the NSW Government of the waiver by local councils (for 12 months min.) of all Council fees and charges on council services accessed by flood-affected residents; eg rates, tip disposal charges;
  - \*increasing the government subsidy to landowners to raise houses above the new record flood height, by upping NSW Government subsidy to 45% and obtaining an additional matching subsidy of 45% from the federal government;
  - \*rescinding the arbitrary limit on the no. of flood-affected houses which can be approved each year for the subsidies to raise their house above the new flood line;
  
- providing relevant public information to the public, about floods in Lismore;
  - \*'flood markers' be installed by the NSW Government on power poles, public buildings and other structures, to alert visitors and current and future landowners, of the peak flood height in that location in March 2022. (This would be an update of the blue and white 1974 flood markers)

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- \*a sign be installed by the NSW Government on all flood-affected residential streets stating the flood height (in mAHD) at which the road is inundated, and a map showing the 'last road out'; with priority to streets with a single entry exit road;
  - \*a flood 'ruler' ie a graduated scale indicating flood height, be installed by the NSW Government on all flood-affected residential streets to allow real time, on-site monitoring of local flood heights during floods; heights to be rectified to mAHD;
  - \*a new system of intelligent telemetric flood gauges be installed across the Wilsons River catchment to provide real time data on flood heights, rate of rise, velocity of flow and turbidity to the BoM 'Rainfall and River Conditions' web-page so that the same information is immediately accessible by the public and public authorities;
  - \*the provision of an inflatable life-boat or raft for all dwellings located on flood prone land, to enable residents to self-evacuate if they become inundated; the cost of which could be co-funded by the NSW Government and insurance companies;
  - \*the flood model for the Wilson's River be revised / redeveloped to use updated data on floodwaters upstream, to improve flood forecasting ability and develop a capacity to accurately predict likely height and time of the flood peak in Lismore;
- **improving the navigability of floodwaters, to allow 'safer' rescues and resupply of flood-bound residents, including:**
- Designate particular streets to serve as floodtime navigation channels for boats. For example: Terrania st, Bridge st and Union street, Casino st and Wilsons st and Elliot Rd in north and south Lismore are all important flood navigation routes.
  - Implement specific measures to keep flood navigation channels clear of submerged obstacles, particularly mid-street signage such as give-way and roundabout signs.
- \*remove barriers to navigation from defunct infrastructure within the floodplain: eg remove railway overpasses on Union Street and Terania Street, modify (open sections of) railway embankment in North and South Lismore to allow navigation by boats across the existing rail embankment. Lower the level crossing on Wilson st south Lismore.
- \*provide high level signage (ie >16mAHD) indicating location, depth, route;
- \*provide signage indicating road names at high level for navigation channels
- \*designate, create and maintain areas clear of vegetation along the river banks adjacent to Lismore to allow vessels to pass into, and across, the Wilson's River. For example riverside clear passage is required to allow boats to access the Hindmarsh/High st 'boat ramp' from the river . This location is a key location used by residents and authorities in accessing north Lismore in particular. It is a vital drop off point for rescue and resupply as it has access to the higher land that includes the hospital and the university.
- \*identify feasible launch and landing points for flood rescue and resupply vessels; and provide some mooring facilities for overnight mooring

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- maintain floating buoys attached to various obstacles that won't be removed such as goal posts in sports fields, signage in fields, and other obstacles unsuitable for removal from designated flood passageways.

### ii. the instruments, policies and programs applying to *proposed future developments* in flood prone locations across NSW;

The Inquiry's recommendations on instruments, policies and programs, for *proposed future developments* in flood prone locations, are encouraged.

These recommendations should include:

- no new development in areas of high velocity flood flows (floodways);
- all new development of land within the flood zone, ie on the floodplain <16mAHD, whether for residential or industrial uses, to be designed and constructed to meet the 'flood tolerant' standards in the revised Building Code, recommended above;.

### Re Recommendations on

#### 2f. appropriate action to adapt to future flood risks to communities and ecosystems;

The Inquiry's terms of reference authorise the Co-chairs to make recommendations on "2f. appropriate action to adapt to future flood risks to communities and ecosystems;"

It is anticipated that what is intended as the focus of the Inquiry's recommendations are actions which adapt communities and ecosystems to future flood risks, and on that basis that the following comments are provided.

The making of recommendations by the Inquiry on appropriate action to adapt communities and eco-systems to future flood risks is appropriate and welcomed. Suggestions for relevant recommendations are made below.

It is extremely important that the Inquiry, and the NSW Government, understand that the catastrophic floods of March 2022 made many hundreds of rental and owner-occupied residences uninhabitable, some temporarily while repairs and rebuilds are done, and others permanently. This displacement of thousands of people from their usual residences has created an acute housing crisis in Lismore, and in many other flood-affected communities, **at present**.

#### ADAPTIVE ACTION – URGENTLY INCREASE HOUSING AVAILABILITY

With no foreseeable improvement in the supply of housing in sight, at the scale needed to address the extent of the demand created by the flood evacuations, it is proposed that significant NSW Government led interventions are made urgently in the supply of both residential land and housing, across the northern rivers region, to enable flood-affected residents to recover, and potentially relocate out of the flood zone.

Hence the making of recommendations by the Inquiry on actions by the NSW Government, to expedite the provision of a range of residential accommodation, to underpin flood-affected communities' recovery, is highly recommended.



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Suggested recommendations for adaptive actions to address this urgent flood recovery need are provided in the following section. The actions needed include;

- an urgent increase in the release for sale of allotments of flood-free land approved for residential use, adjacent to Lismore, and other flood affected communities on the northern rivers, to allow flood affected residents with the capital to do so to choose 'voluntary retreat'. Several thousand allotments are needed immediately, thousands more will be required in the medium term.
- where appropriate, new allotments to be designed and able to be approved for dual occupancy (eg granny flat) either initially or later with only BA required;

As well as the private sector marketing land for sale, the NSW Government should:

- make a substantial contribution to increase the availability of residential land by investing public funds on suitable Crown land, and or acquiring suitable private land, to sub-divide and develop for new Crown residential estates;

Allotments in such new Crown estates could be offered for private sale via the market or exchanged for flood affected land titles, in a 'land swap' with the NSW Government, to enable an existing building to be relocated to the site.

Creating new Crown estates would also allow of flood-affected residents to be relocated as a neighbourhood or community, to a new flood-free site, if they wished.

- make a major investment of public funds in building state-owned public housing estates that provide rental accommodation that is genuinely 'affordable' for low income earners, eg single parents, pensioners, which caters for the range of housing needs, to meet rental housing demand for short, medium and long term tenancies.
- Invest in a range of low and medium density residential housing types, in multiple facilities, situated in a range of locations in, or adjacent to, flood affected communities across the northern rivers region, not just in one town;
- use of planning codes and development consent conditions to require all new public housing facilities are designed and constructed to ensure access for tenants with a disability, and use best practice in design and technology eg solar passive orientation, solar PV + HWS, energy efficiency eg insulation; water capture/re-use, use of recycled materials, and broadband internet connectivity.

### **ADAPTIVE ACTIONS FOR COMMUNITIES**

The focus of the Inquiry on actions to adapt communities to future flood risks is welcomed since actions to maintain community identity and well-being, make and strengthen community connections and develop community preparedness and operational capacity in an emergency might properly be considered.

However, it is important for the Inquiry to recognise that it was not one community in Lismore which was adversely affected by the catastrophic March floods, but rather many communities across the Lismore council area, and the lgas of Tweed, Byron, Ballina and Richmond Valley. Some of these communities are urban and some rural, and they have been adversely affected in many different ways and extents.

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These recommendations should include:

- funding to restore the network of flood damaged local roads across the region;
- establishing robust local emergency radio communications networks, which are independent of phones and mains electricity, for every flood affected community;
- developing and adopting appropriate protocols for the training of the community and local SES in its operation in a flood emergency;
- reviewing the adequacy and effectiveness of existing local 'flood wardens' networks;
- establishing a robust regional network of local emergency radio communications networks, to connect flood affected communities during times of a flood emergency;
- the holding of an annual 'flood readiness' practice day, akin to a 'fire drill', for all flood-affected communities. This would be a day on which all elements of the local flood response by state government, local council and community organisations are assembled and rehearsed, the adequacy of staffing and resources are checked, technical capabilities and operational procedures are reviewed and refreshed and inter-agency – community liaison, & public communication messages are practised; (This would be a key plank in redeveloping each community's local 'flood culture');

### **ADAPTIVE ACTIONS – RECONSIDER THE ROLE OF THE S.E.S.**

The role and effectiveness of the local SES came starkly into the spotlight during the flood on March 1, 2022. It was soon apparent on the morning of Monday March 1 that the SES were under-resourced with not enough suitable boats and staff / volunteers and were unprepared for the number of flood rescues urgently required.

Consequently, a post on social media called all available local boat owners to Lismore to rescue hundreds of people stranded on their roofs. More than twenty skippers responded immediately and launched their boats or jet-skis into the floodwaters.

However, a debacle was soon encountered. Local SES attempted to assert 'control' and directed local boat owners that they were not authorised to carry out flood rescues, despite their own evident incapacity to make the rescues urgently needed.

Fortunately, these volunteer skippers ignored, or disobeyed this direction and continued to find and rescue the hundreds of people stranded on roof tops or trapped in their roof cavity. Later ABC Radio advised of SES's modified 'policy' to 'not authorise, but not object to' flood rescues by community volunteers. Many tinny skippers and their crew made repeated rescues, over many hours, with some evacuating ten, 15 or more than 20 people, each (as later reported by local, state and national media).

It is submitted that characterising the SES's role as being 'in command' or 'control' in a flood emergency is highly inappropriate. SES cannot control the flood, nor can they realistically assume 'responsibility' for, or over, thousands of people with whom they have no effective way to communicate except via ABC radio.

The idea that the local SES staff / volunteers have, or should have, powers to direct or 'command' local residents – many of whom have local knowledge and experience with flooding - to not rescue people or take other actions to respond to floods, is deeply problematic. Similarly, attempts by local SES to 'coerce' local residents to evacuate their homes when the residents are prepared to stay and wait it out, are maladaptive actions which create distress for residents and distrust of SES.

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It is agreed that alerts or recommendations by SES to residents to evacuate are appropriate, but attempts to compel residents to leave their homes, or 'orders' to evacuate, based on an exaggerated generic assessment by SES staff / volunteers of the risks an 'average' resident may face, is a maladaptive practice. Many flood-wise residents know the risks well, and can make their own informed decisions.

Forced evacuations deepen the emergency when they dislocate residents unnecessarily, increase the need for emergency housing and food supply, create avoidable distress and additional trauma, and slows the commencement of immediate recovery response – salvage and clean up - as floodwaters recede.

Consequently, recommendations by the Inquiry on the role, nature, training and resourcing of local SES units would be highly appropriate. It is suggested that they include recommendations to:

- carry out a review of the local SES units' role, structure, staffing, training, resources and operational capacity, and the appropriateness of SES's quasi-military orientation, with a view to revising and refreshing SES's role in responding to flood emergencies;
- consider reorienting SES's role to become more of a provider of emergency services and coordinator of flood responses by local and state government agencies and community organisations, rather than lead, authorise or control local flood responses.
- task the local SES units with responsibility for coordinating planning and preparations for the holding of local 'flood readiness' days in flood-affected communities, (as proposed above) in co-operation with local and state government agencies and community organisations;

### DEALING WITH MALADAPTIVE ACTIONS

The ideology of safety that is appropriate in normal times in workplaces across the country, becomes maladaptive and counterproductive when applied to a disaster setting. Natural disasters present a terrain of risk and require response to risk not resort to an imaginary gold standard of safety by authorities, service providers and insurers.

Many residents have experienced additional trauma and distress post-flood because of elements of the flood recovery response. Agents of both insurance companies and essential service providers have taken unnecessary and precipitate actions which have incurred extra costs and prevented, impeded and set back flood recovery.

The justification of 'make safe' has been used by agents of insurance companies to deny owners access to their homes and to take actions without the landowner's consent which have further damaged property which had survived the flood.

Exaggerated assessments of 'risk' have been made by such agents, who as non-local people, know next to nothing about the building, overriding the owner's local knowledge of their home and its risks, significantly increasing impacts and losses.

In some case owners who returned and re-occupied their homes were effectively forcibly dispossessed by agents of the insurer who insisted that all the residents

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vacate the premises with little or no warning, rendering the residents homeless. In some cases houses were rendered unnecessarily uninhabitable by 'make safe' crews deployed by insurers, who ripped out wooden walls that can withstand flooding, destroyed plumbing and electricity infrastructure then left the resident with no home and no timely plan for reconstruction.

In other cases there was a total failure by agents of the insurer to communicate, or work with the owners who made a claim against their insurance policy. Some owners who were not been notified or present later discovered agents of their insurer had removed and trashed all furniture and possessions from their home, and then gutted its interior, giving the residents no opportunity to return and salvage anything.

Agents of energy suppliers also used exaggerated and generic assessments of 'risk' to justify their disabling of still functioning fuse box /meter-boards post-flood, without the owner's consent, allegedly to make them 'safe'. In many cases fuse boxes that had not been submerged at all were vandalised by essential energy in the name of 'safety'.

As well as the days of delay, extra inconvenience and complications this maladaptive action created, it also increased the costs of recovery since it was then necessary to employ a licensed electrician to do the repair work made necessary by the supply authority's deliberate disabling of it, and re-certify the meter-board as functional.

Hence, other recommendations by the Inquiry should be made to reduce the physical, financial and psychological impacts of post flood actions by Insurance companies and essential service providers, on flood-affected residents.

These recommendations should include:

- a direction to essential service providers that they not disable still functioning power supply connections to residences post-flood, on the basis of a generic and exaggerated risk assessment, without the owner's consent;
- tasking the NSW Insurance Council to develop and adopt a Code of Conduct for the agents employed by Insurance companies in post-flood recovery which requires prior communication and co-operation with landowners / claimants re access, salvaging possessions, and planning post-flood recovery;

### **ADAPTIVE ACTIONS FOR ECOSYSTEMS**

The Inquiry's terms of reference authorises the Co-chairs to make recommendations on "2f. appropriate action to adapt to future flood risks to ... **eco-systems**."

It is anticipated that what is intended as the focus of the Inquiry's recommendations are actions which adapt ... ecosystems to future flood risks, and it on the basis of this interpretation of the phrase that the following comments are provided.

This topic is an especially important element of the Terms of Reference, and two principal requests are made for the Inquiry to consider. They are:

- to recommend no new "flood" levee or other engineering works on the floodplain for flood mitigation purposes; and

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- to recommend a thorough investigation of the feasibility of using 'nature-based solutions' such as large scale reforestation of the Richmond / Wilson's River catchment, to reduce the volume and velocity of run-off, lower flood peaks and mitigate flood impacts on all downstream communities, in the public interest.

The basis for these requests for crucial recommendations are explained below.

### **AVOID MALADAPTIVE ACTIONS - NO NEW LEVEES OR ENGINEERING WORKS**

There are many reasons to reject any proposal for more, bigger flood levees.

As explained above, the existing flood levee in Lismore has proven a catastrophic failure. It did not "floodproof" Lismore as its proponents claimed and it has not protected CBD business owners or BASIN residents in moderate or major floods.

Its overtopping by rapidly rising floodwaters has created a new and serious hazard, a torrent of fast moving spill-over floodwater, able to structurally damage buildings, which drastically decreases the time residents have to prepare, or evacuate, before they are inundated. This destructive fast-flowing current of floodwater was never a feature of flooding in the Lismore CBD or basin before the levee's construction.

Moreover, the presence of the levee actually increases the flood level elsewhere on the floodplain, by displacing the floodwaters which would enter the basin at 10AHD, into South Lismore, and downstream to Wyrallah and Coraki. So it is clear that building the levee was a maladaptive action and must not be repeated.

Building the levee, dredging of the river bed and other engineering works to modify the floodplain eg bypass channels, have had NO effect whatever in reducing the volume of floodwaters generated by the catchment during heavy rainfall. All these works have had the simple goal of "getting the water away quickly", a narrow hard engineering approach which sees the River as a drain, to be manipulated to maximum hydraulic efficiency, not as a complex living eco-system that has an ancient identity.

The total costs to the public purse to build and repair the levee have not been publicly disclosed but it is apparent that million\$ of dollar\$ of public funding spent on engineering works by state and federal government have been wasted. The 'works' did not work, could not work, and it is asserted that more-of-the-same cannot work: it would be insanity to expect otherwise. To allocate more public funding on failed technical engineering solutions, would be to 'throw good money after bad'.

Moreover, after they have had the benefit of millions of dollars of public funding already, there are real inequities in million\$ more of public spending for the primary benefit of business owners in the CBD, while other residents adversely affected by the flood would receive little or no benefit, and face a worsened flood risk for their residences.

Hypothetically, to 'protect the CBD' from a flood equal of 14.4mAHD the levee would need to extend to 15m AHD, ie 4m higher than the current levee height of 11mAHD, and 5 or 6 metres higher to withstand a probable maximum flood of 16+mAHD. Consequently, any new levee would need to be a massive structure.

However, building such a structure on the Wilson's River eastern bank would certainly increase flood heights in South Lismore and downstream communities.

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There are no detailed proposed designs, geotechnical reports, environmental impact assessments, economic costings, risk assessments, justifications against the principles of ESD, or other substantive documentation which could form a credible basis for a recommendation to build more or a bigger flood levee in Lismore.

On the contrary, there is serious doubt that the riverbank at Lismore is geotechnically stable enough to support the massive foundations an upgraded levee would need.

Hence Inquiry is invited to regard with great caution and incredulity any claims that the technical or economic feasibility of building new higher levees in Lismore to supplement or replace the existing one, has already been established.

Such claims cannot, and should not, be asserted until and unless there clear credible evidence that support such claims is in the public domain and available for critical review. Indeed, it is a failure of logic by Lismore City Council to propose to “protect the CBD” when the possibility of building a massive new levee has not been established, and is seriously doubted.

It is particularly important that the Inquiry NOT recommend fast-tracking of any levee proposal and refers any proposal to the usual processes for properly assessing technical feasibility, social and environmental impacts, and all relevant costs and benefits to the public interest. Indeed the Inquiry might usefully recommend that.

It is asserted that clamouring for a fast-track approval for more levees is the same failed engineering approach, and its advocates have learnt nothing from the March 1 flood.

On the basis of the stark evidence of the March 1 flood, this narrow hard engineering approach has been unsuccessful, and it should be abandoned as a proven failure.

It is apparent that a complete change of approach and a significant shift in thinking about flood mitigation is necessary and long overdue.

### **ADAPTIVE ACTION – CATCHMENT RESTORATION**

Since the Wilson’s River is a living natural eco-system, a ‘total catchment management’ (TCM) approach to flood mitigation is needed, which employs best practice in natural resource management to retain water in the catchment and reduce the volume and velocity of runoff after heavy rainfall, which produces flooding downstream.

As reported above, many steep lands in the catchment upstream of Lismore were over-cleared historically, and are now in a degraded state, with minimal vegetation cover limiting their capacity to retain rainfall on-site, increasing their susceptibility to saturation and landslip, and increasing rates of runoff during severe storms.

Only by reducing the run-off from upstream sub-catchments can the volume and velocity of floodwaters be reduced, the arrival of flood peaks be delayed, and flood peak heights be lowered in Lismore and elsewhere downstream.

Three simple actions, multiplied many times, can achieve these outcomes:

- the planting of tens of millions of trees, of appropriate species and provenance, in priority areas at key locations across the whole Richmond River catchment;
- expanding existing rainwater capture capacity by adding new tanks and storage, and

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- minor site works to slow runoff, reverse its concentration into drains, and divert overland flows across the contour, to prevent soil erosion and aid on-site infiltration.

Such a strategic task – retaining more water in the catchment’s upper and middle reaches - will take time to achieve its full effect, once implemented.

While reducing run-off in the short term is possible, by expanding storage capacity and diverting stormwater flows, the full benefits of a strategic total catchment management approach and greatest effectiveness of restoring vegetation cover in the catchment in mitigating floods, would likely kick in 30 years after establishment.

This growth in the effectiveness of catchment revegetation for flood mitigation over time is important to recognise, because it is apparent that the incidence of severe storms and extreme rainfall, and hence major floods, will also increase over time as the effects of global warming become more pronounced.

It is also very important to recognise that increasing vegetation cover by planting millions of trees would substantially contribute to other urgent public interest goals:

- reducing atmospheric carbon by its sequestration in vegetation, and increasing the areas of shade lowering site temperatures, mitigating global warming; and
- connecting existing areas of habitat with revegetated corridors, to create new habitat for species at risk of extinction eg koalas, and allow movement of species adversely affected by changes to habitat due to global warming.

Further, a major catchment revegetation program would create a sustainable new industry for the region: in seed collection, propagation, tree planting and ongoing site maintenance, and producing and harvesting of ethical high value timber products. This on-ground industry could be supplemented by further research into catchment hydrology in high rainfall areas and best practice in site management.

A strategic, region wide, whole of catchment management plan, which had robust governance arrangements and best practice site operations, could attract significant investment from superannuation companies and other institutional investors seeking ethical, ecologically sustainable long-term investments, with foreseeable yields. The use of carbon credits and or carbon rights through accredited schemes to establish trees could provide landowners and or the catchment authority with access to significant private sector funds and potentially a secure stream of revenue.

That the nature and extent of vegetation cover of the catchment affects the volume of water retained on-site before soils become saturated and generate run-off, has been established in catchment hydrology literature since Chow’s seminal work in 1962. Together with soil porosity and evapo-transpiration rates, extent of vegetation cover are key elements in the equations used to compute the average run-off ‘co-efficient’ for a specified catchment, and it is very important in estimating the rates of run-off generated in high rainfall events.

There should be no doubt that the revegetation of key parts of the catchment, can reduce the volume of run-off, and mitigate flooding because there are well advanced research projects reported in the international literature which confirm its feasibility.

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One published study of catchments in Wales, UK reported a reduction in run-off from heavy rain of between 10% and 49% where the whole catchment was revegetated.

(For the sake of clarity, what is proposed in restoring the Richmond and Wilson's Rivers' catchments is not the total reforestation of the entire area, excluding agriculture and grazing altogether, but rather the strategic revegetation of areas identified as priorities to achieve flood mitigation and other public interest objectives. To be frank, this will require a reduction in the area of pasture in the catchment, especially on steep land and within 20m of the banks of streams, but it is not proposed to replant all pasture, or discontinue all grazing.)

Hence both findings by the Inquiry that the management of the catchment for the mitigation of flooding is a feasible option which should be urgently pursued, and recommendations by the Inquiry to expedite the initiation of a total catchment management approach to flood mitigation are strongly encouraged.

These recommendations to the NSW Government should include

- NSW Government to take leadership position on flood mitigation in regional NSW and issue a strategic state planning policy on catchment management for flood mitigation, which require local authorities to update their policies and instruments, and co-ordinate their actions to develop and implement a catchment management plan to mitigate flooding and achieve other public policy objectives;
- reconstitute a management authority for the whole of the Richmond River catchment area to develop and oversee the implementation of a catchment management plan, and co-ordinate the work of local authorities, businesses and communities;
- provide adequate funding to establish the catchment management authority and develop a strategic whole of catchment plan and then vastly scale up funding from NSW Government for the Plan's effective and timely implementation;
- recognition that urgent action is needed, given the 'Code Red' for humanity issued by the Secretary general of the UN in response to the latest report of the Intergovernmental Panel on Climate Change;
- use the Map and process for Native Vegetation Clearance Approval, to encourage and reward applications by landowners to re-establish native vegetation on priority areas of steep and riparian lands;
- repeal the current governments policy of "protecting" 'traditional industries' from landuse controls since it is contrary to the standards of proper governance requiring the state's laws to apply equally across the state, and stipulating public interests, not vested private interests, as the proper focus of public policy, and since it has led to the significant degradation of the catchment, and the exacerbation of flood hazard from excessive run-off from rural lands during severe or extreme rain;



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- confront the now degraded condition of many rural lands and challenge as wholly inappropriate the 'olde world' view of some farmers and the Nationals that modern environmental laws should not (be allowed to) apply to rural lands;
- reassert the dominance of the public interest in State government's public policy over private property rights; and restate the legitimacy of environmental planning controls being applied to privately -owned rural lands;
- commissioning an urgent assessment of and report on the 'state of the catchment' Richmond River catchment, especially its % vegetation cover on riparian lands, steep lands >18° and areas subject to mass movement, to identify areas requiring urgent rehabilitation actions;
- Lismore City, and other local councils in the Richmond River catchment (Kyogle, Richmond Valley, Ballina, Byron) to amend their Local Environment Plans to:

\*address flood hazard generated for settlements on floodplain, by excessive run-off from rural lands upstream through land use and management controls;

\*apply environmental protection zones to privately owned rural lands to achieve wider public interest benefits, whether the landowners consent to the application of the zone or not;

\*create 'positive covenants' under s 88E Conveyancing Act 1919 over privately owned land in the catchment area to establish native vegetation cover over priority areas of steep and riparian lands, to achieve a range of wider community benefits, including:

- ~ flood mitigation, by reducing run-off;
- ~ carbon sequestration for climate change mitigation, and
- ~ connecting habitats of native species at risk of extinction eg koalas;

\*encourage landowners to voluntarily agree to the creation of a s88E easement over their private land by providing 'adequate compensation for any loss or other disadvantage' through relief from local government rates, and or other financial benefits or incentives.

\*where necessary, use applications to the Land and Environment Court under s 88K *Conveyancing Act 1919* (NSW) to impose mandatory easements for flood mitigation and other public purposes, over privately owned rural lands, where the landowner does not consent, via an application made under s 88K(2);

\*increase the percentage of vegetation cover on land in sub-catchments through active revegetation / reforestation; especially on riparian lands within 20m of stream banks and on steep lands >18° slope;

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To reduce the frequency of floods, and severe storms, urgent action is needed to reduce CHG emissions, mitigate global warming and prevent temperature increase >2°C. A major program of tree planting across the wider Richmond River catchment can make a very substantial contribution towards achieving these objectives.

### CONCLUSION

Thankyou for considering this submission. Key points of this submission include:

- Recognition of the role of climate change in the increasing scale and frequency of natural disaster
- The importance of respecting the knowledge skills and experience of local communities in responding to flood
- Rejection of the notion that government or SES or any agency should 'take control' of localities and population during a disaster, instead they should provide assistance as required
- Recognition that government lacks the surge capacity to respond to large scale disasters and that communities will instead be required to utilise their more adaptive and granular capacities at some times, and provide both moral, political and financial support for all aspects of community self help from rescue through the rebuild
- Rejection of forced evacuation as a maladaptive practice that increases dislocation and displacement and actually worsens the impacts of flooding upon affected properties
- Rejection of the application of 'safety ideology' to a risk terrain presented by natural disasters as ill conceived, maladaptive and in many cases oppressive. Instead supporting the community's own efforts at urgent response to risk .
- Recognising that flooding will continue and will likely become more frequent and severe and support efforts to build and rebuild in more resilient materials
- Ensure a humane approach to any planned retreat from the flood zone to ensure that it is not accomplished in a way that further drives existing residents into poverty
- Recognise the fact that at times our streets are boat navigation channels and maintain safe passage practices in those channels as specified in this submission
- Recognise the role of improved catchment management in reducing the intensity of floods and implement total catchment planning and revegetation
- Eschew engineering solutions such as levees that merely relocate and worsen impacts both physically and temporally.

Yours sincerely

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