



**Southern Cross  
University**

# **Research Submission to the New South Wales Independent Flood Inquiry**

**20 May 2022**

**Southern Cross University**

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Co-Chairs, New South Wales Independent Flood Inquiry**

Submission via email: [inquiry@floodinginquiry.nsw.gov.au](mailto:inquiry@floodinginquiry.nsw.gov.au)

20 May 2022

Dear Co-Chairs,

**RE: SOUTHERN CROSS UNIVERSITY - RESEARCH SUBMISSION**

Southern Cross University is pleased to make a further submission to the Inquiry focussed on the critical role of research in the recovery of the Northern Rivers region. Not only can lessons be learnt from previous disasters overseas and in Australia, but research and our researchers have a critical role to inform and support the recovery through knowledge transfer, as key collaborative partners in programs designed to support the local community, and in piloting new and innovative approaches to complex issues requiring attention to ensure the renewal and long-term sustainability of the region.

This submission highlights the distinctive and vital role that Southern Cross University can play as a local knowledge “broker” to national and global research collaborations. Our response is informed by key lessons learnt in the USA following Hurricane Katrina, as research on the response to this crisis has some poignant lessons for the Australian context.

As is now well-known, the Northern Rivers has been subject to repeated flooding disasters over the last century. The frequency and intensity of such events demands new ways to address complex problems grounded in an understanding of place.

As a regional university with its main campus in Lismore, our researchers are embedded in the community, with long term relationships of trust built through decades of engagement. A number of these researchers were directly impacted by the floods or were involved in the rescues. As engaged community members, many are actively involved in disaster preparedness, resilience and local recovery activities. Our distinctive experience of natural disasters gives our researchers unique insight into these events, exceptional local knowledge of place and community, thus enabling them to be well-informed to navigate the on-going complex challenges.

The University is uniquely positioned to act as a broker and conduit to support other researchers and government in the local environment to support the recovery process. We have already mobilised a network of willing researchers, many of whom are now engaged in mitigation and recovery projects.

**Lessons from overseas**

A key lesson apparent from all the research available on the aftermath of Hurricane Katrina is that new and agile modes of collaboration in complex multi-stakeholder contexts is essential for effective recovery. A list of post Hurricane Katrina initiatives is set out in Appendix 2. With much material available in the USA and Australia on post-disaster recovery, targeted research could support and inform the development of a new blueprint for multi-agency and multi-stakeholder collaboration, and create a critical guide for future responses in the Northern Rivers, and other regional and urban centres.

Arising from the experience in the United States is the Studio Model. Not common in Australia, the Studio Model has the following elements:

- (i) Enabling new models of integrated research and design applications;
- (ii) Developing design thinking with a systems approach using performance-based methodologies;
- (iii) A studio space that fosters collaboration and engagement with the community;
- (iv) Close partnership with community stakeholders; and
- (v) Research and practise in support of local, state and federal government initiatives.



A good example of this is in action is the Louisiana Coastal Sustainability Studio (<https://css.lsu.edu/>) established after Hurricane Katrina. The Studio Model envisages an accessible physical shopfront that acts as an interface, and focal point for research-driven recovery projects, whilst importantly improving the visibility and access to research expertise. In Louisiana, the Coastal Sustainability Studio was true to the model – it is a government-industry-university collaboration playing a significant role in influencing planning and managing many significant recovery projects. In this process, it also increased the regional capability and regional profile in disaster recovery.

The establishment of a Studio Model facility in Lismore could meet critical research needs of key recovery agencies, including the Northern Rivers Reconstruction Corporation, Resilience NSW and Local Councils in the Northern Rivers.

Interestingly, and critically, the Louisiana Coastal Sustainability Studio was created and led by colleagues who have moved to our partner institution, the University of Technology Sydney (UTS). Southern Cross University would be keen to work with UTS to stand-up a Studio dedicated to supporting the flood recovery. While the principal partnership would be with UTS, we envisage that other universities, both domestic and international, would collaborate on projects.

### **The role of a Studio**

The Studio would bring regional capacity through education, training and community engagement, as well as undertaking projects and research in support of community recovery and other government priorities.

#### *Complex projects*

A major research priority of the recent floods is the issue of housing availability and the unprecedented design and rebuilding of Lismore and surrounds. No one institution, agency or university can address the enormity of the housing and rebuilding crisis in the Northern Rivers. The Studio Model could support the collaborative approach necessary for understanding, addressing, solving and managing the complexities of the issues of this scale.

For example, in the wake of Hurricane Katrina the *CityBuild Consortium*<sup>1</sup> was created. Academic experts from Architecture, Landscape Architecture, Urban Design, Planning and Policy, Real Estate Development, Historic Preservation, and Environmental Studies came together to form the Consortium, which was hosted by a local university, Tulane University. The University connected members of the Consortium to the community to help address immediate and long-term needs and support the multi-disciplinary collaborative approach to achieve the best outcomes in the design, planning and re-building stages.

#### *Clearinghouse for co-ordination of all recovery research*

In post-disaster environments, access to reliable information and data is a crucial problem for all stakeholders: community, government, industry and researchers. As a trusted regional institution with long standing relationships with the community and local industry, the University could play a clearing house function for all research and data on the floods and recovery, and could be used to safely secure regional data for use by government, researchers and communities undertaking recovery work in the region.

Creating a clearing house function would involve a team based in Lismore triaging and advising on requests for information, proposed research projects and visitors from government departments and NGOs requiring help and support, essentially formalising and resourcing a role the University is already informally undertaking. Disaster-impacted environments are often overwhelmed by well-meaning researchers proposing to undertake recovery projects, and even much-needed projects can be stymied by a lack of effective local knowledge. Such co-ordination would avoid serious risk of duplication of effort and research fatigue in the community.

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<sup>1</sup> <https://small.tulane.edu/project/citybuild-consortium-of-schools/> By the end of 2006, CITYbuild had involved 30 national and international design-based programs (representing 60 faculty and more than 600 students) partnering with 20 local, community-based organisations. The results of these partnerships include approximately 16 structures built or rehabilitated, from urban furniture to housing, and more than 200 design and project proposals.

Such intervention is important so that research undertaken on the Northern Rivers becomes a resource for the community and for all regional resilience projects. Such co-ordination could also lead to significantly better outcomes, by creating the possibility of bringing disparate research groups who could form multi-disciplinary collaborations, so that every effort might be exponentially increased to meet the scale of need.

#### *Digital Portal to collect and store all flood related data*

Critical to the success of the Clearinghouse would be the establishment of a Digital Portal where there is a single source of truth for technical data, up-to-date information and reports, plans and relevant research outputs. Similar models have been successfully adopted post-Katrina (see <https://guttertogulf.com>) and would support the work of the Northern Rivers Reconstruction Corporation. The portal would house an on-going archive to document the narratives of disaster experience and outcomes across the region. This collection would capture important data, stories and images of people's lives both pre-and post-flood, serving an important community building function, at a time when Lismore's cultural institutions have been irreparably damaged and the future of the region's cultural life uncertain. It will also ensure that important insights derived through the lived experience of locals is captured, valued and accessible. While initially this portal would function as a key organising tool to assist with recovery, in time it would become a significant archive, which can be expanded and would lend itself to community partnership and cultural renewal.

The retelling, recording and collection of such stories builds individual and community resilience, as well as providing a living archive for future historians, geographers and forensic architects. The archive would ensure that such significant narratives are not forgotten as time passes and the opportunity to learn from such experiences is not lost. Such a time-capsule function is also critical to the reconstruction efforts providing important data sources that could inform the rebuild and reduce the time between disaster and recovery, now and in the future. Southern Cross University has the software and a number of researchers and librarians who are interested in developing this portal project, and the Centre for Public History at UTS has offered to partner on this project. However, for this to be successful, further resourcing would be required.

#### *Harnessing our research strengths and making them available*

The Southern Cross University's research contribution towards the recovery effort is underway, yet would be enhanced through the Studio Model described above. The potential contribution spans the social, environmental, agricultural, health and engineering dimensions of the challenge. The University's flagship analytical research laboratory capability, across two key laboratories, is uniquely positioned to support researchers in their work with Local Councils and the Environmental Protection Agency to monitor and analyse leachate for real time management of flood effected local landfill sites.

We have world-leading researchers with expertise in hydrology, biogeochemistry, geochemistry, ecohydrology and catchment management. These researchers have been studying flooding effects and the factors that contribute to the frequency, intensity, timing and location of floods, flood mitigation and managing catchment health after flooding in the region for decades, see Appendix 1 for an overview.

Relevant projects currently being undertaken include the legacy impacts of catchment disturbance to help develop management options, create detailed, and user-friendly water quality models to guide management, and to provide a detailed understanding of how climate extremes and climate change more broadly impact the coastal zone to help guide future management decisions. A number of these projects are funded by prestigious ARC Discovery grants and Linkages and are formed in partnership with government departments and agencies such as the DPI, DPIE and Sydney Water.

We have met with CSIRO in relation to their project, funded under the 2022 Federal Budget, to identify options and opportunities for mitigating risk and building resilience in the Northern Rivers region. We have, and can share data and research infrastructure with the CSIRO and other universities. We also have considerable research expertise in forestry, plant, soil and agricultural science, and labs dedicated to the analysis of soil and natural products. Scaling up our activities is possible with clear direction on where the greatest assistance would be to aid the recovery process.

Further, we are internationally recognised for our research and practise around community-based resilience solutions, especially in the areas of youth and mental health. We have developed ground-breaking programs such as Stormbirds, created in partnership with the McKillop Institute, an evidence-informed education program that supports children and young people adapt to the impact of disasters such as the Christchurch Earthquake and the recent Bushfires. In the days following the first flood event, the University convened all school systems present in the region to form a joint approach to addressing the significant concerns relating to child and adolescent trauma. With funding support from the NSW Government, this program could be expanded to include all 7250 young people across 175 schools in the Northern Rivers region. This proposal is currently with the Minister for Regional Youth.

#### *Seed funding collaborative recovery projects*

Informed by the experience in the USA above, we understand the critical importance of connecting researchers with community to facilitate recovery. Therefore, we have established the Vice Chancellor's Flood Recovery Scheme to seed fund collaborative recovery projects, led by researchers, and involving community or industry groups based on the Northern Rivers. As well as scholarly outputs, the project must deliver positive outcomes for the community. Projects will be judged by leaders within the University and communities in the Northern Rivers. Preference will be given to projects led by staff who have direct experience of the disaster, as changing the narrative is important, as we are not only discipline experts but part of the community with lived experience of these disasters. The opportunity exists that once these projects are seeded and collaborations cemented, that an extension funding scheme could be created from sources such as Resilience NSW, other government agencies or philanthropic organisations.

This initiative will get underway shortly, but we are aware that the process for starting and managing this program would have been easier and enhanced with a Studio dedicated to supporting and managing multi-disciplinary multi-stakeholder projects.

#### **Partnership with Government**

Southern Cross University is deeply committed to partnering with government to support the recovery, as we emphasised in the submission by the Vice Chancellor and supported by this submission. We recognise the leadership role of Government in leading the disaster management and recovery. We seek to be effective on-the-ground partners, providing our own expertise and harnessing local and international expertise to benefit the long term, sustainable recovery of the Northern Rivers region.

As stated by the Vice Chancellor, Professor Tyrone Carlin in his submission, we would welcome the opportunity to discuss any aspect of the two submissions from Southern Cross University.

Sincerely,



Professor Mary Spongberg  
Deputy Vice Chancellor (Research)

## Appendix 1 Current Projects which can assist Flood Recovery

### Faculty of Science and Engineering

Leading researcher	Collaborative project details
Professor Scott Johnston	<ul style="list-style-type: none"> <li>• Collaboration with Rous County Council to co-design and create of video presentations summarising blackwater (deoxygenation) events (drivers, dynamics, potential solutions) in lay-person language. Specifically designed for public outreach via social media platforms.</li> </ul>
Professor Bradley Eyre	<ul style="list-style-type: none"> <li>• ARC Linkage project sampling intermittent coastal streams between Pimlico and Glenugie for stream metabolism and greenhouse gas emissions. Intermittent streams run dry for part of the year, but the recent La Nina wet period has made it difficult to sample dry periods. The research team's automated data loggers in nine of the streams captured the recent flooding that occurred across the north coast.</li> <li>• ARC Linkage with Healthy Land and Water, South-East Queensland, analysing the effects of floods on C and N budgets in coastal wetlands, including modelling.</li> </ul>
Dr Debra Stokes	<ul style="list-style-type: none"> <li>• Measuring surface elevation change over time in mangroves due to sediment build up in Ballina. Analysing sediment quality to assess flood impacts.</li> </ul>
Professor Anja Scheffers	<ul style="list-style-type: none"> <li>• Identifying trends, patterns or cycles in climate events (i.e. multi-year droughts, decadal periods with clustering of major flood events), this is a collaboration with Professor Jacky Croke at the University College Dublin, Ireland (Adjunct Professor).</li> </ul>
Associate Professor Christian Sanders	<ul style="list-style-type: none"> <li>• Significant 3-year project with NSW Local Land Services to establish mangroves along Emigrant Creek, Ballina, to capture carbon and prevent erosion.</li> </ul>
Professor Amanda Reichelt-Brushett	<ul style="list-style-type: none"> <li>• Revisioning River Health project investigating how history takes its toll on the present and the future: an examination of historical impacts on current river health in the Richmond River Catchment NSW (follow up project to ARC Linkage LP130100498).</li> <li>• Assessment of fish health and risk to human consumption in Tallow Creek, Byron Shire, NSW. Cape Byron Marine Park funded analysis and report was completed in January 2022.</li> </ul>
Professor Kirsten Benkendorff	<ul style="list-style-type: none"> <li>• Proposed collaboration with OZfish for post flood benthic monitoring.</li> <li>• Proposed collaboration with NSW DPIE Marine Estate Management Agency to monitor the leaf oyster populations post-flood in several estuaries, potentially including Sydney rock oysters in the Richmond River.</li> </ul>
Dr Tobias Kretzschmar	<ul style="list-style-type: none"> <li>• ARC Linkage project on the black rice breeding program, which aims to develop a product that grows well in the region, and would be very adaptable to flood prone paddocks. Growing black rice would give farmers on flood prone land a higher and more reliable income.</li> </ul>
Professor Terry Rose (co-investigator)	<ul style="list-style-type: none"> <li>• Landcare project in the avocado, pecan, lychee and custard apple industries, subcontracted through Southern Cross to BioResED (BioResources Research and Education). This project integrates grower stories and impacts through this project from the recent floods in the Northern Rivers NSW and South-East QLD.</li> </ul>
Dr Daniele Cagnazzi (co-investigator)	<ul style="list-style-type: none"> <li>• New research on the bioaccumulation of contaminants in wild population of dolphins to assess the impact of flooding on the health of the local dolphin population.</li> </ul>
Dr Feifei Tong (co-investigator)	<ul style="list-style-type: none"> <li>• Current ARC Discovery with the University of Western Australia on hydrological models using supercomputing facilities. In May 2022, commencing a project to address flood modelling and mitigation strategies via modelling and lab-scale applications relevant to the greater Lismore region.</li> </ul>



Faculty of Health

Leading SCU researchers	Collaborative project details
Professor Anne Graham	Mental health support for children and young people across the region through a collaboration with MacKillop Family Services, the NSW Department of Education, Catholic Schools Office and the NSW Association of Independent schools. This partnership is seeking to deliver the Stormbirds program across impacted schools - providing training, supporting implementation and facilitating ongoing support.
Professor Gillian Gould	<a href="#">iSISTAQUIT</a> Pregnancy is a challenging time and even more so for priority populations during disasters. The iSISTAQUIT project provides training and support for health professionals and services to encourage smoking cessation among Aboriginal and Torres Strait Islander pregnant women. It is especially challenging for those who smoke to quit during these trying times.
Professor John Hurley and Professor Anne Graham	All agency Mental Health and Resilience Project Development of an 'all agency' coordinated response the population's mental health need and resilience building going forward, in collaboration with the Faculty of Health and Mid North Coast and Northern NSW Local Health Districts, North Coast Primary Health Network (NCPHN), and Healthy North Coast.
Dr Christian Swann, Professor John Hurley and Dr Marie Hutchinson	Regional Australia Mental Health Research and Training Institute (RAMHeaRT) As part of our membership with the Regional Universities Network (RUN), the Faculty of Health will contribute to the The RAMHeaRT Institute which aims to address the complex socio-environmental mental health challenges for Regional, Rural and Remote Australia. This collaborative venture is lead by the University of New England.
Associate Professor Christina Aggar, Professor Fiona Naumann, Dr Andrew Woods, Dr Golam Sorwar	In Sync Learning Project – Transforming Healthcare Training with Immersive Mixed Reality: A new reality in collaborative patient safety. Immersive Mixed Reality allows healthcare providers to train in real world environments, enabling skill development and practice without patient risk. Clinicians from Southern Cross University's Faculty of Health and Faculty of Science and Engineering, Northern NSW Health District and Queensland TAFE, are investigating whether interprofessional education combined with the use of immersive Mixed Reality (MR) technology can improve collaboration in deteriorating patient management.
Dr Ya-Ling Huang	Exploring Cultural and Linguistic Diversity in the Emergency Department (CALD ED) study. Gold Coast collaborative grant scheme 2021.
Dr Ya-Ling Huang	Exploring Cultural and Linguistic Diversity in the Emergency Department (CALD ED) study. Emergency Medicine Foundation 2021.
Dr Christian Swann	'Ahead of the Game' in partnership with Movember Evidence-based 'Ahead of the Game' initiative co-developed with Australian researchers at Southern Cross University and the University of Wollongong, focusing on improving youth mental fitness through community sport.
Dr Elizabeth Reimer	Telepractice research project development, NSW Family Services.



Leading SCU researchers	Collaborative project details
Dr Kitty-Rose Foley Students: Joanne Hall and Melanie Hockings	Time to Reconnect: A support worker tool to empower older adults to strengthen social connections An occupational therapy student project which was born as result of the floods. The project is occurring in partnership with HART Organisation ( <a href="https://www.hartservices.org.au/index.php/about-us">https://www.hartservices.org.au/index.php/about-us</a> ).
Associate Professor Christina Aggar and a team lead by Prof Kate Curtis ay University of Sydney	Improving the safety and quality of emergency nursing care. NHMRC partnership grant. This project will evaluate the HIRAIID (History, Identify Red flags, Assessment, Interventions, Diagnostics, communication and reassessment) framework for use by Emergency Nurses.
Associate Professor Christina Aggar and a team lead by Prof Kate Curtis ay University of Sydney	Giving patients an EPIC-START: An evidence-based, data-driven model of care to improve patient care and efficiency in emergency departments. MRFF Models of Care to Improve the Efficiency and Effectiveness of Acute Care Grant. This project evaluates the use of nurse-initiated protocols to reduce ED overcrowding and improve timeliness of ED care.

## Appendix 2 Post-Katrina Initiatives

- Louisiana Coastal Sustainability Studio <https://css.lsu.edu/>
- St Bernard Project <https://sbpusa.org/>
- MIT Department of Urban Planning (Professor Karl Seidman) <https://dusp.mit.edu/user/1438/subjects>
- Habitat for Humanity Musicians Village <https://habitat-nola.org/musicians-village/>
- Home By Hand (Grew out of Project Home Again) <https://www.homebyhand.org/>
- US Army Corps of Engineers New Orleans office <https://www.mvn.usace.army.mil/>
- Greater New Orleans Foundation <https://www.gnof.org/>
- Broadmoor Improvement Association <https://www.broadmoorimprovement.com/>
- City of New Orleans Mayor's Office (Jeff Schwartz as contact person) <https://www.linkedin.com/in/jeffevan/>
- Robin Barnes (former EVP and COO of Greater New Orleans Inc.) <https://sopa.tulane.edu/about-sopa/advisors-faculty-staff/robin-barnes>
- Greater New Orleans Urban Water Plan (Waggoner and Ball?) [https://gnoinc.org/wp-content/uploads/sites/2/2021/01/GNOH2O\\_Pamphlet\\_Trimmed\\_FINAL.pdf](https://gnoinc.org/wp-content/uploads/sites/2/2021/01/GNOH2O_Pamphlet_Trimmed_FINAL.pdf)