Australian Government
National Emergency Management Agency

Northern Rivers Resilience Initiative – Frequently Asked Questions

General information

1. What has been delivered under the NRRI so far?

- The Australian Government announced the NRRI following the 2022 floods in the Northern Rivers region.
- So far, phase one of the project has been completed and phase two is currently underway.
- Under phase one, CSIRO assessed and prioritised community supported flood mitigation projects and delivered two reports:
    - Rapid Prioritisation for Flood Resilience in the Northern Rivers region
    - Characterisation of the 2022 floods in the Northern Rivers region.
- The findings from the first report, the Rapid Prioritisation for Flood Resilience, helped inform which projects received funding under the Australian Government's $150 million Northern Rivers Recovery and Resilience Program.
- Following the release of CSIRO's report, NEMA worked closely with the NSW Reconstruction Authority (known at the time as the Northern Rivers Reconstruction Corporation) to conduct due diligence checks on the projects identified by CSIRO and, of those, 36 projects received funding.
- Many of the projects align with recommendations from the NSW Flood Inquiry, and with local floodplain risk mitigation programs. All seven LGAs of the Northern Rivers region – Ballina, Byron, Clarence Valley, Kyogle, Lismore, Richmond Valley and Tweed – will benefit or are already benefiting.
- Under phase two, CSIRO has collected Light Detection and Ranging (LiDAR) data for the entire Northern Rivers region and river bathymetry for the Richmond and Tweed rivers and parts of the Brunswick River.
- On 28 June 2024, all of this data was made publicly available through GeoScience Australia's Elvis website.
- This is the first time comprehensive high-quality landform and river floor mapping data for the Northern Rivers region has been captured and made available to the community.

- The data is a key input to the NRRI model and forms a critical scientific evidence base that can be used by the NSW Government, local councils, and non-government organisations for a range of purposes including:
    - land use
    - transport and housing planning
    - environmental and ecological studies
    - hydrological assessments
    - flood mitigation strategies and plans for the Northern Rivers region.

2. What is going to be delivered under the NRRI in 2025?

- The next major milestone for the project is the finalisation of the hydrodynamic model and release of the technical report on 30 June 2025.
- Following this, NEMA and CSIRO will consult with the community on flood mitigation interventions for the Richmond River catchment.
- CSIRO will then assess and short-list the interventions and they will be shared back with the four LGAs in the catchment and the NSW Government for discussion and agreement.
- Once agreed, CSIRO will run between two and five scenarios through the hydrodynamic model. Each scenario may be made up of several flood mitigation interventions and will take several months to run.
- A final report outlining the modelling results and recommendations for future flood mitigation options for the Richmond River catchment will be released in June 2026.
- It is important to note that no funding to implement recommendations has not been committed by the Australian Government to avoid pre-empting any findings.
- Instead, once the final report has been released and recommendations are known, NEMA will support the NSW Government to consider the findings in further hazard risk reduction programs and investigations, including the Northern Rivers Disaster Adaptation Plan.

3. Are the 2022 Floods likely to happen again?

- The Northern Rivers region is highly vulnerable to disaster from severe weather, particularly flooding. The 2022 event was an extreme and rare flood event but it remains possible that floods similar to the 2022 event could happen again.
- Although it is not possible to fully disaster-proof the region, we can enhance our understanding of extreme events and improve the resilience and recovery capacity of the communities.

- The Australian and NSW governments have made significant investment towards a number of mitigation measures to reduce the impact and severity of any future floods.
- The modelling being undertaken under NRRI will help to understand the region's flood risk and identify the most effective flood mitigation interventions to ensure communities are better prepared.

4. Will the work under NRRI help to flood proof the region?

- No, we can't completely flood-proof the region, but we can deepen our understanding of extreme events and strengthen the community's resilience and capacity to recover from flooding.
- The NRRI will further our understanding of the flood dynamics for the Richmond River catchment and provide insights into ways of mitigating flood risk.

5. Has the NRRI project been delayed and if so, why?

- The Australian Government announced the NRRI following the 2022 flooding event in the Northern Rivers region.
- While phase one was delivered in line with the agreed timeframe, phase two of the project was delayed due to prolonged poor weather in the region which impacted data collection activities.
- Project delays were first communicated to the community by the CSIRO Project Lead, Dr Jai Vaze, at a media conference held in the Northern Rivers on 28 July 2023.
    - Dr Vaze meets regularly with NEMA and is in regular contact with all Mayors from seven local government areas impacted by the February-March 2022 catastrophic flood event through regular updates to the Northern River Joint Organisation.
- In the interest of receiving the best possible product and advice to support the Northern Rivers community, in November 2024 NEMA agreed to extend the delivery date of the flood mitigation option identification and analysis to 30 June 2026, based on the following:
    - A hydrodynamic model at the scale of the Richmond River catchment takes detailed calculations and validation.
    - CSIRO only received the final LiDAR and bathymetry data in early 2024 as data collection activities were significantly impacted by inclement weather in the region.
    - CSIRO is working as quickly as possible to incorporate this information into the model.
    - CSIRO has advised that trying to rush this work will compromise the quality and validity of the model and scenario options for analysis.

Information about the data release

6. Can you describe the LiDAR and bathymetry datasets in more detail?

- The LiDAR data is the first consistent high-quality topography dataset across the whole Northern Rivers region covering more than 30,000 km² collected after the 2022 floods. It is quality assessed and is highly accurate with point density averages around 16 points per square metre and suitable for any detailed modelling.
- This bathymetry data is the first consistent high-quality dataset for the main tributaries of the Richmond and Tweed Rivers and sections of the Brunswick River in Northern Rivers region (~500 km). It was collected using side scan sonar which collects continuous river cross sections (every one metre). The bathymetry for major water storages in the region is also available providing accurate water storage capacity.

7. How can the public access and download the LiDAR and bathymetry data?

- All the LiDAR and bathymetry data has been made available on the Geoscience Australia website.
- The ELVIS webpage provides step by step guidance to access and download the data for the area of interest.
- Almost all topography and bathymetry/seabed data collected by Australian agencies is made available to users through this website.

8. How can the LiDAR and bathymetry data be used by councils?

- The data forms the critical scientific evidence base that can be used by the NSW Government, local councils, and non-government organisations for a range of other purposes including:
    - land use,
    - transport and housing planning,
    - environmental and ecological studies,
    - hydrological assessments, and
    - flood mitigation strategies and plans for the Northern Rivers region.

9. Why was LiDAR and Bathymetry data collected for other parts of the Northern Rivers if the model is only focused on the Richmond River catchment?

- While the focus of the hydrodynamic model has always been the Richmond River catchment, when CSIRO was undertaking the LiDAR and bathymetry data

collection, there was capacity to collect additional data so the decision was made to expand data collections activities to provide additional benefit to the community.

- This resulted in LiDAR data being collected for the entire Northern Rivers region and river bathymetry for the Richmond and Tweed Rivers and parts of the Brunswick River.
- This is the first time comprehensive high-quality landform and river floor mapping data for the Northern Rivers region has been captured and made available to the community.
- The data forms the critical scientific evidence base that can be used by the NSW Government, local councils, and non-government organisations for a range of other purposes including:
    - land use
    - transport and housing planning
    - environmental and ecological studies
    - hydrological assessments
    - flood mitigation strategies and plans for the Northern Rivers region.

10. Is there any data available now that councils can use to inform flood risk management plans?

- Yes. As part of the data collection activities required to develop the hydrodynamic model for the Richmond River catchment, CSIRO collected Light Detection and Ranging (LiDAR) data (using planes) to inform spatial analysis for the entire Northern Rivers region. CSIRO also collected river bathymetry (using boats) for the Richmond and Tweed Rivers and parts of the Brunswick River.
- The quality-assessed LiDAR and Bathymetry datasets became publicly available on 28 June 2024 through the Geoscience Australia Elvis website.
- This was the first time high-quality LiDAR and river floor mapping data (for three rivers) had been captured and made available for the Northern Rivers region.
- Such a comprehensive overview of the river systems in the NSW Northern Rivers region will provide an evidence base for future planning, including reducing the impacts of floods.

Information about the model

11. What is a hydrodynamic model and what does it do?

- A hydrodynamic model represents water flows across a set area. In the case of the NRRI, this type of model is being developed by CSIRO to represent water flows across the entire Richmond River catchment (more than 7000 km^2).
- The model will be used to reproduce the past flooding history of the Richmond River catchment and will enable CSIRO to model the impact of different infrastructure and non-infrastructure flood mitigation interventions.
- The findings from the modelling process will be available in June 2026 and may be used as part of the evidence-based required to inform feasibility assessment and investigations into large scale infrastructure investment.
- It is important to note that the NRRI model is useful for catchment scale modelling, however it may not be the most appropriate model when it comes to town/small area planning because the focus of the model is to represent the flooding regime across the entire catchment rather than an individual street or area.

12. Will the modelling be based on historical events or a design event?

- One or more of the scenarios which CSIRO models may be based on a design event if that is what the community and councils puts forward during the consultation process.
- While modelling scenarios based on a design event may be helpful to understand the impact of proposed interventions into the future, it is important to be aware that these results cannot be validated as the event has not yet occurred.
- Instead, there is benefit to modelling the proposed flood mitigation interventions using historical floods to see what impact the interventions would have had if they were implemented before that historical event took place.

13. Which flood events are being used to inform the model?

- The model is based on five historical flood events:
    - 1 in 8 year return period – 2008
    - 1 in 12 year return period – 2009
    - 1 in 7 year return period – 2013
    - 1 in 21 year return period – 2017
    - maximum observed and two peaks – 2022.
- Although the focus of the project is on reproducing larger flood event peaks (e.g., 2017, 2022), a full range of flood events from small to the maximum observed are selected to investigate and demonstrate the ability of the developed model to simulate flood behaviour across the entire Richmond River catchment for the complete range of floods.

14. How will the recent flooding from Ex-Tropical Cyclone Alfred be factored into the modelling?

- The flooding resulting from Ex-Tropical Cyclone Alfred is not one of the five historical flood events being considered under NRRI. However, any event can be modelled with the NRRI hydrodynamic model and additional events may be considered once the NRRI project has been completed in June 2026 and the model has been made available to the NSW Government.

15. How will climate change be factored into the modelling?

- One or more of the scenarios CSIRO models may be based on future climate projections if that is what the community puts forward during the consultation process.
- While modelling scenarios based on projected climate conditions is helpful to understand the impact of proposed interventions into a future changed climate, it is important to be aware that these results cannot be validated as the event has not yet occurred and may never occur.
- Instead, there is benefit to modelling the proposed flood mitigation interventions using historical data to see what impact the interventions would have had in previous flooding events.

16. Why does the hydrodynamic model only focus on the Richmond River catchment?

- To cover all the catchments in the Northern Rivers region, four to six separate hydrodynamic models would be needed as these river basins drain through different points (and are independent of each other).
- All these models would need to be developed in parallel and, at the time the NRRI was announced in 2022, there was insufficient resourcing to support this.
- Instead, Government agreed to focus only on the Richmond River catchment given the continual incidence of flooding and likely compounding impacts changed climate and hydrology is having on the region.
- While the model is focused on the Richmond River catchment, lessons from this process will be applicable elsewhere.

17. There are several flood models that have been developed for the Northern Rivers region, why was a new model needed?

- While several local area models have been developed, to analyse and investigate flood mitigation options at the catchment scale, a full catchment scale model was considered necessary for the entire Richmond River catchment.
- The focus of the catchment model is on reproducing larger flood event peaks (e.g., 2017, 2022) while also making sure that the final model setup (i.e. same setup for all events with the only change of event specific initial spatial soil moisture,

rainfall and evapotranspiration) can reproduce reliable inundation estimates at the Richmond River catchment scale for the complete range of floods.

- The model will be used to reproduce past flooding history across the Richmond River catchment and to investigate the effectiveness of proposed flood mitigation scenarios at the local and catchment scale.

18. Who will use the model?

- The hydrodynamic model will be used by CSIRO to model the impact of flood mitigation interventions identified through community consultation.
- The findings of this will be published in a report on 30 June 2026 alongside recommendations for future flood mitigation options for the Richmond River catchment.
- Once the NRRI project has been completed, the model will be made available to the NSW Government to assist in future planning activities and investment decisions.

Information about the consultation process and flood mitigation interventions

19. What types of flood mitigation interventions will be considered?

- A range of flood mitigation interventions will be considered, both infrastructure and non-infrastructure, with a focus on interventions that can be modelled using a biophysical hydrodynamic model.
- A part of the consultation process, CSIRO will have a short list of suggested interventions to aid discussion with community and relevant stakeholders.
- This initial list of options will include any catchment-scale recommendations captured under phase one of the NRRI.

20. Who will decide what options get modelled?

- As you would expect, there are differing views about which solutions should be modelled.
- Some consider investing in natural solutions will bring the greatest benefits, while others support engineered solutions.
- To manage this, NEMA and CSIRO will be consulting with community members, local councils and relevant stakeholder groups to determine an initial list of flood mitigation interventions.
- CSIRO will then analyse the interventions put forward, focusing on feasibility and benefit to community. The interventions that meet this criteria will then be bundled up to form scenarios.
- Councils in the four LGAs within the Richmond River catchment, NSW Government and the Australian Government will then agree which two to five scenarios will be

modelled retaining the focus on feasibility and benefit to community. Government will also take into consideration relevant legislation and environmental factors.

- Regardless of the interventions modelled, it is widely agreed that there needs to be a careful, evidence-based approach to informing significant investments.
- The whole-of-catchment model for the Richmond River will enable this and ensure that any future investment is targeted towards effective long-term flood mitigation measures.

21. How will the community be consulted on flood mitigation options?

- Consultation with the Northern Rivers community will take place in coming months to identify community-supported flood mitigation options for CSIRO to test using the hydrodynamic model.
    - Exact dates and times are currently being worked through however, we expect to hold face-to-face community forums in the Northern Rivers region to discuss flood mitigation options for the Richmond River catchment.
    - We will also have an online pathway for those who cannot attend in-person to submit their ideas.
    - Consultation activities will be promoted through council newsletters, social media, and existing stakeholder engagement forums such as the Community Leaders Forum and the Northern Rivers Regional Steering Committee established by NSW Reconstruction Authority.
- To support this process, NEMA is working closely with both CSIRO and the NSW Reconstruction Authority to ensure NRRI engagement and communication activities are aligned with the work the NSW Reconstruction Authority is leading to establish a Disaster Adaptation Plan (DAP) for the Northern Rivers region.
    - The DAP is an initiative co-funded under Round One of the Disaster Ready Fund (DRF) and forms one component of the Northern Rivers Disaster Readiness Program (formerly known as the Northern Rivers Disaster Adaptation Project).
    - The project was awarded $11.19 million including $5.59 million in Commonwealth funding.
    - The three agencies are working together to agree meaningful engagement opportunities to ensure the flood mitigation options identified under the NRRI project are aligned with community values and expectations.

22. How can I participate in the community forums?

- All community members are able to participate in the NRRI forums and can share their views online if unable to attend in person.

- Community forums are scheduled for the second half of 2025 and will be advertised through NEMA and CSIRO's websites, council newsletters, social media posts and relevant stakeholder forums.

23. Is there any funding available to fund the flood mitigation options that are recommended in the final report?

- No funding has been committed to implement the recommendations identified in the final report to avoid pre-empting any findings.
- Instead, once the final report has been released and recommendations are known, NEMA will support the NSW Government to consider the findings in further hazard risk reduction programs and investigations, including the Northern Rivers Disaster Adaptation Plan.
- The Disaster Ready Fund (DRF) may also be an avenue for funding should the NSW Government and/or Councils within the Richmond River catchment choose to submit an application under future rounds of the DRF.

Information about related projects

24. How does the NRRI relate to the Northern Rivers Disaster Adaptation Plan?

- The NSW Reconstruction Authority is developing the state's first multi-hazard regional Disaster Adaptation Plan (DAP) in the Northern Rivers region to identify what actions are needed to reduce the risk of disasters. The plan aims to reduce risk where possible and adapt where the change or impact is unavoidable.
- The Northern Rivers DAP is co-funded by the Australian Government under Round One of the Disaster Ready Fund.
- The Northern Rivers DAP is being developed in partnership with all levels of government, communities, emergency services, industry and technical specialists. It builds on existing hazard-specific plans, strategies, research and data insights from partners into account including the NRRI model.
- The scenario analysis and recommendations put forward by CSIRO in the NRRI final report (due for release on 30 June 2026) will be considered in the development of the Final Northern Rivers DAP, which is due in mid-2027.
- While there is a clear link between the NRRI and the Northern Rivers DAP, it is important to note that the DAP extends beyond the Richmond River catchment and is focused on nine different hazards. As such, any recommendations to reduce flooding within the Richmond River catchment will need to be considered as part of the broader regional plan.

25. How does the NRRI consultation relate to the planned consultation activities on Flood Risk Management Plans (FRMP) and studies?

- In the second half of 2025, local councils, with the support of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) will be consulting with the Northern Rivers community on the:
    - Richmond Valley Flood Risk Management Study and Plan
    - The Overland Flood Study for Alstonville, Lennox and Wardell
    - Ballina Island and West Ballina Stormwater Drainage Management Study and Plan.
- While the context of the above engagements is similar to that of NRRI in terms of the focus on flood and the opportunity for community to suggest mitigation interventions, the scope of each project varies.
- The NRRI is only focused on the Richmond River catchment and interventions that have an impact at a catchment-scale, whereas the consultation on FRMPs and studies will mostly focus on local-level interventions for each council area that have benefit to the immediate surrounding community.
- NEMA, CSIRO and NSW DCCEEW will work together to share the ideas raised at each consultation, to avoid community having to share the same ideas multiple times.

26. How does the NRRI consultation relate the consultation NSW Reconstruction Authority is undertaking on the Northern Rivers Disaster Adaptation Plan?

- The NSW Reconstruction Authority began consultation on the Northern Rivers Disaster Adaptation Plan (DAP) in 2024, focusing on ‘understanding place’ which involved understanding the current risk information, future risk if no action is undertaken and, community values and desired outcomes. Further consultation is planned for 2026 to identify priority projects for the region.
- While the context is similar, the NRRI consultations scheduled to take place in the second half of 2025 will specifically focus on flood mitigation interventions for the Richmond River catchment.
- The options put forward by community as part of the NRRI consultation will be shared with the NSW Reconstruction Authority to inform future engagements and avoid the community having to repeat the same ideas.
- While there is a clear link between the NRRI and the Northern Rivers DAP, it is important to note that the DAP extends beyond the Richmond River catchment and is focused on nine different hazards. As such, any recommendations to reduce flooding within the Richmond River catchment will need to be considered as part of the broader regional plan.

27. What other support has been made available to support the Northern Rivers region to recover from the 2022 floods?

- The NRRI is one of the many initiatives underway in the region, and both the Australian and NSW governments have been working together to deliver a range of

support programs since the 2022 floods including $1.2 billion in support measures under the Disaster Recovery Funding Arrangements.

- In addition to the funding committed under the Northern Rivers Recovery and Resilience Program, the Australian and NSW governments are investing in improving rural drainage systems and further flood mitigation activities, including:
    - The $5 million Northern Rivers Drainage Reset Program was recently announced (announced 7 Feb 23).
    - Projects being delivered as part of the $75 million in flood mitigation and infrastructure works funded by the Australian Government through the Emergency Response Fund and delivered by the NSW Government (announced 26 Aug 22).

28. I have more questions, who can I contact?

- Please email your questions through to NEMA at **NRRI@nema.gov.au** or CSIRO at **nrri@csiro.au**.