

Northern Rivers Resilience Initiative

The National Emergency Management Agency has engaged CSIRO to undertake a project to understand flood risk factors in the Northern Rivers region of NSW and identify flood mitigation options.

The Australian Government is providing \$150 million in 2022–23 for priority flood resilience projects in the Northern Rivers region of New South Wales. This investment recognises that the Northern Rivers region is highly vulnerable to disaster from severe weather events, particularly frequent flooding, and experienced significant damage during the February–March 2022 flood event.

The Northern Rivers Resilience Initiative will provide science to inform the investment, through a rapid design process to understand the drivers behind the unprecedented flood event and develop community-supported solutions for resilient investment.

The National Emergency Management Agency (NEMA) has engaged Australia's national science agency CSIRO to support the Northern Rivers Resilience Initiative, which will consider climate, catchment and hydrological systems, and the broader influences of land-use practice and infrastructure to generate system-wide options and opportunities for mitigating risks and building a more resilient region.

The \$11.2 million Initiative will assess different mitigation scenarios, consider the broader influences of land use practice and infrastructure, and identify and prioritise options for mitigating flood risks in the Northern Rivers region. A core part of the project is to undertake engagement with key stakeholders to seek their views regarding priorities for investment.

The Initiative will inform the allocation of the \$150 million investment in the region in 2022–23, to support the New South Wales Government to fast-track resilience efforts.

The project consists of two key parts:

1. Rapid review and assessment – Over the first six months, previous studies will be reviewed to identify flood mitigation options across the Northern Rivers region. Each of the seven flood-affected Local Government Areas in the region, Ballina, Byron, Clarence Valley, Kyogle, Lismore, Richmond Valley and Tweed, will be consulted to identify and prioritise the most effective intervention options.

Outcome – This work, due in December 2022, will inform investment in the Northern Rivers region in 2022–23, to support recovery and resilience efforts.

2. Detailed modelling – This two-year program of work will collate and generate Light Detection and Ranging (LiDAR) data to provide spatial analysis and hydrological/hydrodynamic modelling of water movement for the Northern Rivers region. It will also involve examining and evaluating possible events or scenarios that could take place in the future and predict possible outcomes, drawing on local knowledge and expertise on the catchment and flooding.

Outcome – In addition to capturing LiDAR data for modelling and analysis of the entire Northern Rivers region, this work will deliver a detailed hydrodynamic model for the Richmond River catchment. The model will be used to investigate a range of possible scenarios and actions to mitigate flood risk in the Richmond River catchment, which has been identified as a priority due to the extent of the impact of recent floods on this area and the likely impact of climate changes in the future. Delivered in stages, the final report is due in May 2024.



This map identifies the flood-affected Local Government Areas in the Northern Rivers region of NSW where the project will be carried out.

What the local communities can expect to see

From July to October 2022 – Stakeholder consultations by the CSIRO team in the flood affected areas

CSIRO is working closely with Alluvium Consulting, an environmental consultancy, and their local staff, along with NEMA Support Officers based in the region for the rapid review and assessment over the first six months.

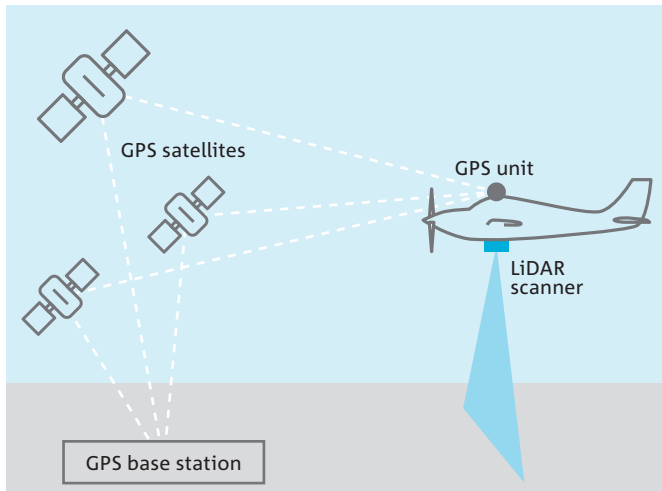
Meetings and workshops with local councils and community groups will discuss existing available information, identify other relevant materials on flood risk, and seek community views to inform the research. CSIRO will assess infrastructure and other options. Stakeholder engagement includes targeted briefings with Councils, and public forums in the flood affected areas to document ideas, priorities and scenarios.



This project will provide science to inform resilient investment decisions in the Northern Rivers region of NSW.

From July 2022 to March 2023 – Researchers on the ground gather data

LiDAR flights – An aeroplane with LiDAR sensors attached, will be flying over the region. These sensors are a remote sensing method used to collect accurate digital elevation models for the region for hydrodynamic modelling. There will also be ground crew doing surveys to ground-truth information collected by the LiDAR tool attached to the plane.



LiDAR sensors, connected to a plane, collect digital elevation information for hydrodynamic modelling, supported by satellite data and crews doing on-ground surveys.

River bathymetry – You may also see boats in the rivers with sonar equipment collecting accurate information on the cross sections of the river network (river bathymetry) to inform the hydrodynamic model. This may include small remote-controlled boats (see inset) for smaller and steeper streams.



Researchers will use sonar equipment from boats like this, including remote controlled boats (inset), to collect accurate information about cross sections of the river network (known as river bathymetry) to inform their hydrodynamic modelling. This image, from geospatial experts AAM, pictures AAM personnel using sonar equipment on the water.

From July 2022 to May 2024 – Detailed hydrological modelling and targeted stakeholder engagement

Hydrological and detailed hydrodynamic modelling for the Richmond River catchment – This will involve setting up a detailed hydrodynamic model for the whole Richmond catchment to reproduce past flooding history and overland flood inundation, develop adaptation/mitigation scenarios which may be a combination of infrastructure and non-infrastructure options, scenario analysis to investigate

adaptation/mitigation options and a report describing the modelling undertaken, results and possible actions.

Engagement with communities and key stakeholders – To build an understanding of hydrological behaviours in the catchment, to help validate the hydrological modelling, develop scenarios for evaluation in the hydrological models and inform and seek feedback on project progress and outputs.

Project team: The project is managed by CSIRO and the project team includes: Project Director Dr Chris Chilcott, Project Leader Dr Jai Vaze, Project Coordinator Dr Nikki Thurgate.

This project is funded by the National Emergency Management Agency



As Australia's national science agency and innovation catalyst, CSIRO is solving the greatest challenges through innovative science and technology. CSIRO. Unlocking a better future for everyone.

Contact us
1300 363 400 | csiro.au/contact
csiro.au