



## 2022-23 Annual Report

The National Partnership for Climate Projections is a new, voluntary collaboration of all states and territories, peak science bodies and the Australian Government.

It aims to develop a coordinated approach to delivering high quality and consistent climate information that is comparable, robust and fit-for-purpose. Access to future climate information will enable a wide range of users to assess their climate risk.

Members have been working together as the Partnership since 2022. They recognised that the new global climate model outputs, as well as other new investments, provided opportunities to enhance collaboration across the projections community. This would ultimately deliver better and more coherent climate projection information to a growing list of users.

The [National Climate Projections Roadmap](#), published in March this year, guides the focus areas for collaboration and establishes governance for the group (Appendix A of the roadmap). This governance includes publishing an annual report that provides an overview of the partnership's progress against Partnership agreed goals and Partnership work plans. The annual report is provided to the Energy and Climate Senior Officials Group, via the interjurisdictional Adaptation Working Group. This inaugural report provides a short summary of achievements in the establishment year of the Partnership.

Questions or suggestions for the Partnership or these reports are welcome and can be provided to the secretariat at [climate.science@dceew.gov.au](mailto:climate.science@dceew.gov.au).

### Key achievements in the establishment year

To date, coordination between partners has delivered the Partnership Roadmap to guide focus; established working groups with leads driving action across the 3 focus areas: climate change science and projections; technology, computing and data; climate services and user needs; and agreed a revised Terms of Reference for partnership governance. This includes a steering committee to provide strategic oversight and decision-making. Partners have come together through 2 workshops and 4 online meetings, in addition to monthly meetings of each of the 3 working groups.

Feedback in the partnership plenaries and other meetings has been positive, with members reporting benefits realised through the partnership experience including:

- *Communication of user needs to improve the design and utility of climate projections.* The facilitated communication of climate projections needs from user perspectives is clarifying key choices in the design of climate projections, areas of potential standardisation and considerations for the inter-comparison of different portals and assessments.
- *Easier access to relevant knowledge for better collaboration.* Knowledge-sharing and networking on technical, scientific and communication topics relevant to the field is enabling high quality information to be shared early in project timelines and highlighting areas of collaboration across organisations.

Currently, all working groups have active participation from member state and territory governments, and relevant Australian government agencies and initiatives. University involvement in the partnership has been through their connections via the National Environmental Science Program Climate Systems Hub and the ARC Centre of Excellence for Climate Extremes and 21st Century Weather.

Appendix A provides further information on collaborative activities delivering benefits to members across the Partnership.

## Progression of major modelling initiatives

Section 2 of the Roadmap outlines 3 major climate projections initiatives that were planned or in train by partnership members at the time of publication. These initiatives are in progress and are tracking well. For example:

- National set of downscaled climate projections at a 10-20km resolution, primarily focused on climate hazards including tropical cyclones, heatwaves, fire weather, and heavy rainfall that leads to flooding will be published by the end of 2023.
- Production of climate projections of standard variables at finer spatial resolution (ranging from 1 km to 5 km) will be staggered from late 2023 to 2024-25.

The formation of the partnership means that the multiple different projections being produced by different actors are more comprehensive and useable than if these activities had not been coordinated through a voluntary partnership.

Appendix B summarises the status, timelines and next steps of these major climate projection initiatives.

## Working groups are identifying and addressing ongoing challenges

Ongoing challenges to achieving the objectives of the partnership include:

- Coordinated and consistent use of outputs, data and frameworks and associated messaging (to avoid confusion or conflicting messages about climate change for users).
  - Working group 1 is addressing the consistency of outputs and working with Working Group 3 to understand what users of climate projections are seeking from climate information.
- Coordinated access to super-compute infrastructure and data storage solutions to ensure partners delivering high-performance projections modelling can share outputs and data.
  - Working Group 2 convenes users to identify and progress issues around computing and data storage. A greater understanding of current and future super compute needs has identified strengths and weaknesses of developing a 'federated' approach to data sharing. The Partnership provides an opportunity to explore options for further resource sharing or co-investment.



## Appendix A: Working group progress against Partnership Goals - Key Deliverables 2022-23

The Roadmap identified 6 expected benefits from a collaborative approach to climate projections:

1. Promoting consistent and federated approaches to delivery of projections, including the possible development of a framework and/or national standards over time.
2. Building a community of practice across those designing, producing and delivering climate change projections to address common challenges.
3. Improving data sharing and federation, and coordinating access to high-performance computing capacity and infrastructure.
4. Coordinating the presentation of climate projections information for consumers and supporting technical knowledge brokerage for users of climate services.
5. Identifying priorities for research and further development of projections capabilities.
6. Improving the integration of user needs with the considerations of producers of climate projections and those involved in processing data for inclusion in climate services.

Initial feedback from members indicates that facilitation of knowledge-sharing through each working group and partnership plenary meetings are key drivers to realising these benefits. The partnership expects to be able to report progress against the expected benefits in 2023-24 as coordinated activities mature.

Further information on 2022-23 governance and working group activities is below.

### Working group governance and activities

- Agreement to working group leads, Terms of Reference, and membership
- Development of work plans for each working group
- Development of standing agendas for plenary meetings with substantive matters for decision progressing to the steering committee for discussion and decision.

### Working Group 1: Climate change science and projections

- Progressing ongoing works with Working Group 2 to scope options for shared repository for inter-comparison and sharing purposes, including CORDEX and business as usual requirements.
- Coordinating regional climate model ensembles through information sharing via:
  - co-organising conference sessions, national and international representation
  - shared authorship publications
  - special modelling group updates including choice of post processing and analysis decisions.

## **Working Group 2: Technology, computing and data**

- Working with Working Group 1 to clarify super compute and data storage needs.
- Working with members to prepare shared datasets, including defining data repository requirements for upcoming projections work.
- Developing solutions to a range of concerns across infrastructure gaps and other barriers to high-performance infrastructure requirements for partnership members.

## **Working Group 3: Climate services and user needs**

- Coordination of organisations to share information about current projects and services to Working Group 3 members.
- Workshop development to communicate the role of different organisations in climate information production/services, including an exercise to call out relevant member projects and map key features and timelines. This exercise will help discern the climate projection information needs of key user groups.



## Appendix B: Progression of modelling initiatives undertaken by partnership members

Project	Partners	Status	Next Steps	Timelines
<p><b>National-scale climate projections at intermediate spatial resolution</b></p> <p>National set of downscaled climate projections primarily focused on climate hazards including tropical cyclones, heatwaves, fire weather, and heavy rainfall that leads to flooding. Combining Commonwealth, State and Territory projections initiatives and evaluating the final downscaled datasets against multiple criteria will ensure the results are physically plausible and identify their strengths and weaknesses.</p>	<p>States (QLD, NSW, WA, SA), territories (ACT), CSIRO, BoM, University of Queensland, Murdoch University. Programs are:</p> <p>NSW and Australian Regional Climate Modelling v2 (NARClIM2.0) using the Weather Research and Forecasting (WRF) modelling system.</p> <p>The Queensland Dept. of Environment and Science using the Conformal Cubic Atmospheric Model (CCAM) modelling system.</p> <p>The Australian Climate Service (ACS) using the CCAM and BARPA modelling systems</p>	<p>On track. The first set of model simulations at the intermediate spatial resolution (10-20 km) from all partners is nearing completion; various processing and analysis steps are currently underway.</p>	<p>Complete the full suite of model simulations. Publish and process all simulations. Publications of model evaluations, and analysis of projected climate change. Prepare data ready for applied next users and for climate change assessment activities.</p>	<p>End of Q1 2024 (March): model outputs published to Level 1 status (large raw datasets for research and high-level users. Note this is not synthesised or application-ready data or information for stakeholders). Processing, analysis and production of projections to follow. Information products, web portals and climate change assessments with various timelines after this.</p>

Project	Partners	Status	Next Steps	Timelines
<p><b>Climate and hazard projections at a finer spatial resolution</b></p> <p>Production of climate projections of standard variables at finer spatial resolution (ranging from 1 km to 5 km) for some regions. Collaboration will deliver fine-scale, fit-for-purpose future climate projections for the whole of the nation.</p>	<p>States (QLD, NSW, WA, SA, Tas.), territories (ACT), CSIRO, BoM, University of Queensland, Murdoch University. Programs are as above, but also include the NARClIM2.0 Western Australia program.</p>	<p>On track. High resolution modelling at 4km scale nearing completion for NARClIM2.0 (SE Australia) and underway for WA. Planning and testing is well advanced for other partners, including from Queensland and national simulations from the Australian Climate Service.</p>	<p>Ongoing coordination, production, publishing and inter-comparison of outputs. Development of guidance.</p>	<p>NARClIM 2.0 (SE Australia) available in Q1-2 of 2024, others scheduled for completion in 2024-25. Evaluation, analysis, and hazard projections to follow.</p>
<p><b>Updated climate reanalysis for Australia</b></p> <p>A reanalysis takes all available observations and uses a weather model to consistently fill in the fine detail (e.g. time, space and variables) on a uniform grid. This provides a historical baseline that can be used to better understand changes in extremes and provide a basis for assessment of climate projections information.</p>	<p>BoM</p>	<p>On track. High resolution (12 km scale) atmospheric regional reanalysis of Australia (using the BoM's BARRA-R2 model) has been completed from 1979 to present and is currently being extended further back in time. Higher resolution reanalysis models (BARRA-C, 4km scale) have been tested and will be run soon.</p>	<p>Publishing and release of BARRA-R2, updates every 3-4 months. Production runs of higher resolution reanalysis.</p>	<p>Release of BARRA-R2 in 2023, completion of BARRA-C in 2024-25.</p>