Government of **Western Australia**
Department of **Water and Environmental Regulation**

Climate Science Initiative WA

National Partnership for Climate Projections

The National Partnership for Climate Projections (NPCP) is a collaboration guiding a national approach to high-quality and consistent climate projections for Australia. It aims to develop a consistent approach to deliver comparable, robust and fit-for-purpose future climate information to assess climate risks and inform adaptation planning.

The partnership includes federal, state and territory governments, and peak science organisations from across Australia (Figure 1). Members are experts in climate science, with substantial knowledge of climate change impacts, adaptation, knowledge brokering and communication.

The partnership has three working groups that concentrate on key aspects of the multi-faceted work involved in delivering climate projections data and services:

- Working Group 1
  – Climate change science and projections
- Working Group 2
  – Technology, computing and data
- Working Group 3
  – Climate services and user needs

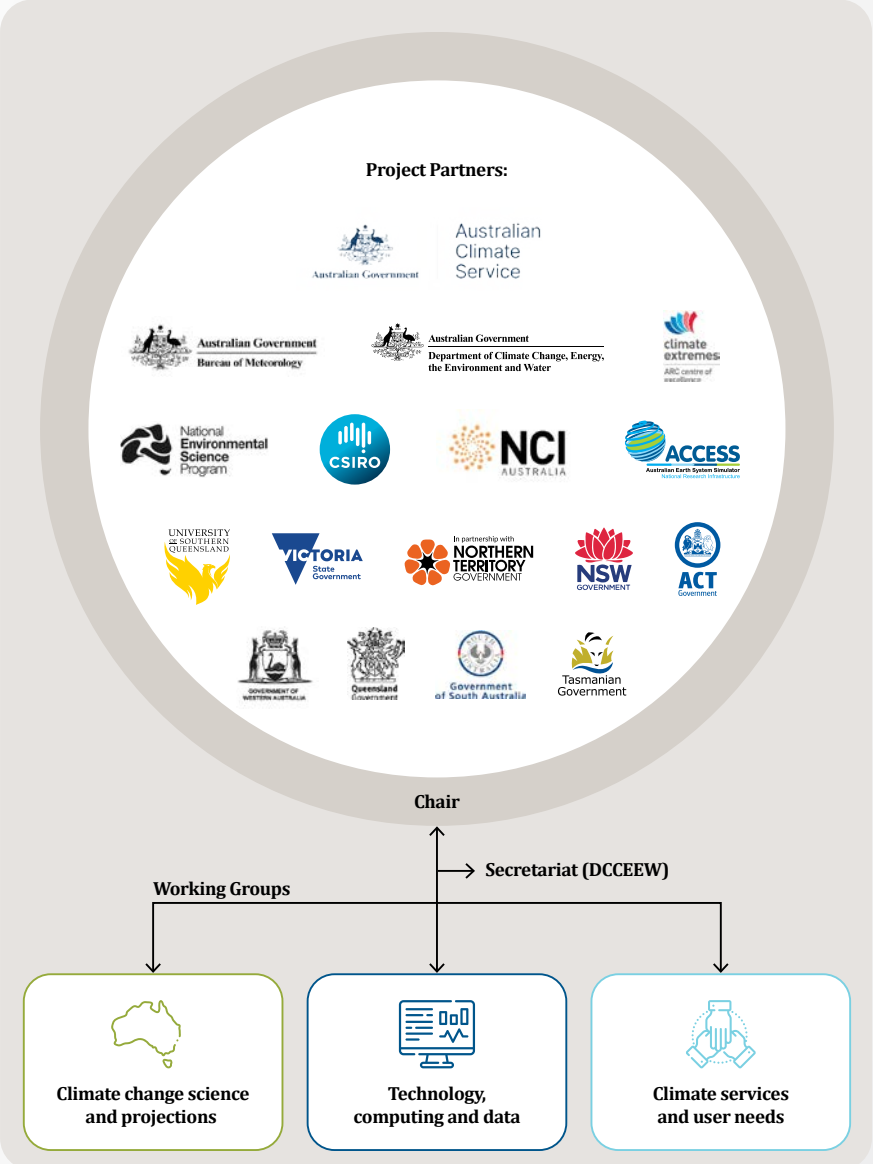

Figure 1 NPCP project partners and governance structure
Image from the NPCP's Climate Projections Roadmap for Australia

The Climate Projections Roadmap for Australia – fostering collaboration

The Department of Water and Environmental Regulation (the department) is a member of the NPCP. The contributions of various project partners to the national climate science program are described in the NPCP's Climate Projections Roadmap for Australia.

The roadmap includes activities related to the production (e.g. model selection), analysis and delivery of projections data and information. It also seeks to increase long-term collaboration to guide investments in climate research and the enabling infrastructure that supports it.

Why is collaboration important?

Collaboration is key to delivering high-quality climate projections data. Across Australia, government agencies and research organisations are using the latest climate models to produce downscaled, fine-resolution regional climate projection information. This work is coordinated through the NPCP to ensure consistency in the models and scenarios that are used by multiple teams.

The next generation of climate projections in Australia

The latest global climate model generation is called the Coupled Model Intercomparison Phase 6 (CMIP6). Projections are made for internationally standard scenarios developed by the Intergovernmental Panel on Climate Change (IPCC). All programs use common scenarios that cover a reasonable range of possible future climates to ensure comparability. These scenarios are known as shared socioeconomic pathways (SSPs). Typically, CMIP6 projections are being produced for three possible global future emissions scenarios:

- SSP1-2.6 (low emissions)
- SSP2-4.5 (moderate emissions)
- SSP3-7.0 (high emissions)

For more information on the new climate projections, see the department's fact sheet on climate modelling, or refer to the National Environmental Science Program's Climate Systems Hub explainer on Understanding SSPs for more information on scenarios.

Modelling groups also follow a common set of guidelines – the Coordinated Regional Downscaling Experiment (CORDEX) guidelines – for a nationally consistent approach.

Table 1 in the Climate Projections Roadmap for Australia (reproduced below) outlines the work underway to produce national, downscaled climate projections across the main modelling groups, including information on the regional downscaling approach, and the models and scenarios applied.

Table 1 Initiatives being delivered by different modelling groups through the NPCP

	WA Climate Science Initiative			Queensland Future Climate Program			NSW and Australian Regional Climate Modelling (NARCliM2.0)			Australian Climate Service (ACS)			
ERA5 reanalysis	X			X			X (x7 RCMs)			X		X	
Regional Climate Models	Weather Research and Forecasting (WRF) (x 2 configurations)			Conformal Cubic Atmospheric Model (CCAM) with bias corrected SSTs			Weather Research and Forecasting (WRF) (x 2 configurations)			Conformal Cubic Atmospheric Model (CCAM) with host model nudging		Bureau of Meteorology Atmospheric Regional Projections for Australia (BARPA)	
Global Models	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP1-2.6	SSP2-4.5	SSP3-7.0	SSP1-2.6	SSP3-7.0	SSP1-2.6	SSP3-7.0
ACCESS-CM2				X_oc	X_oc	X_oc				X	X	X	X
ACCESS-ESM1.5	X	X	X	X (x3)_2oc	X (x3)_2oc	X (x3)_2oc	X	X	X	X	X	X	X
CESM2										X	X	X	X
CMCC-ESM2				X	X	X				X	X	X	X
CNRM-CM6.1-HR				X (x2)_1oc	X (x2)_1oc	X (x2)_1oc							
CNRM-ESM2-1										X	X		
EC-Earth3				X	X	X				X	X	X	X
EC-Earth3-Veg	X	X	X				X	X	X				
FGOALS-g3				X	X	X							
GFDL-ESM4				X	X	X							
GISS-E2-1-G				X	X	X							
MPI-ESM1-2-HR	X	X	X				X	X	X			X	X
MPI-ESM1-2-LR				X	X	X							
MRI-ESM2-0				X	X	X							
NorESM2-MM	X	X	X	X (x2)_1oc	X (x2)_1oc	X (x2)_1oc	X	X	X	X	X	X	X
UKESM1-0-LL	X	X	X		X	X	X	X	X				

*oc = CCAM with interactive ocean model

Note: This table has been amended from the original Table 1 from the Climate Projections Roadmap for Australia to include WA modelling, and updated initiatives by various modelling groups. The modelling teams may further extend their work programs over time to deliver projections for other models and scenarios in addition to those indicated in this table.

Combining and using model outputs

New climate modelling from CMIP5 and CMIP6 generations means there is a lot more climate model data available. There is no single method to determine the best way to use all the data; however, it is important to consider the following points:

- Using the full range of projections data provides a solid evidence base to assess the impacts of climate change for risk assessments or other decision-making activities.
- It is best to avoid relying on results from a single model. Combining or considering multiple model results produces better projections. Resources like the IPCC Interactive Atlas can also be used to compare modelling from CMIP5 and CMIP6 generations.
- Considering different emissions scenarios (e.g. SSP1-2.6 and SSP3-7.0) gives a more comprehensive view of future climate impacts.
- Climate projections are not predictions. Uncertainties exist within the modelling because of climate variability and emissions uncertainty, so there are model-to-model differences.
- While climate projections provide a solid evidence base, they should be used as a guide to the future, and changes above or below the projected range should still be considered when managing risk.

Why are there multiple climate data sources and which should I use?

Many different sources of climate data and information have been developed and released over recent years. These resources have been designed for specific purposes or audiences, and present information in different ways.

Climate projections modelling is always advancing, and continuous research and development is occurring. This means that climate projections will continue to change over time.

As new projections become available across jurisdictions, platforms for presenting information and outputs are being developed and enhanced. The NPCP works to ensure consistent messaging and shared approaches across platforms are developed for the benefit of decision-makers assessing climate risks and undertaking adaptation planning.

Organisations within the NPCP release new information as it becomes available. For example, some states and territories have their own tailored portals to enable easy access to climate projections for their jurisdictions.

For Western Australia, the best source of climate data and information is from the Climate Science Initiative.

Other Australian sources of climate data and information

There are other sources of nationwide climate projections. These include Climate Change in Australia and the Australian Climate Service (ACS). The ACS will produce a climate portal designed to support the release of a comprehensive national dataset on future climate hazards. The newly produced climate projections will be made available through the ACS portal.

In addition to future climate data from Australian Government initiatives, individual state and territory government initiatives have also contributed to nationwide climate datasets, as well as to more specific climate projections tailored to regional areas.

More information about other climate data can be found in these guides:

- A guide to climate science resources for Western Australia
- Finding and selecting the right climate change information for your needs

Climate Science Initiative WA
Climate Systems
National Environmental Science Program
This fact sheet was developed with contributions from the National Partnership for Climate Projections.