NSW GOVERNMENT | Office of Environment & Heritage

AdaptNSW

Central West and Orana
Climate change snapshot

Overview of **Central West and Orana Region** climate change

Based on long-term (1910–2011) observations, temperatures have been increasing in the Central West and Orana since about 1970, with higher temperatures experienced in recent decades.

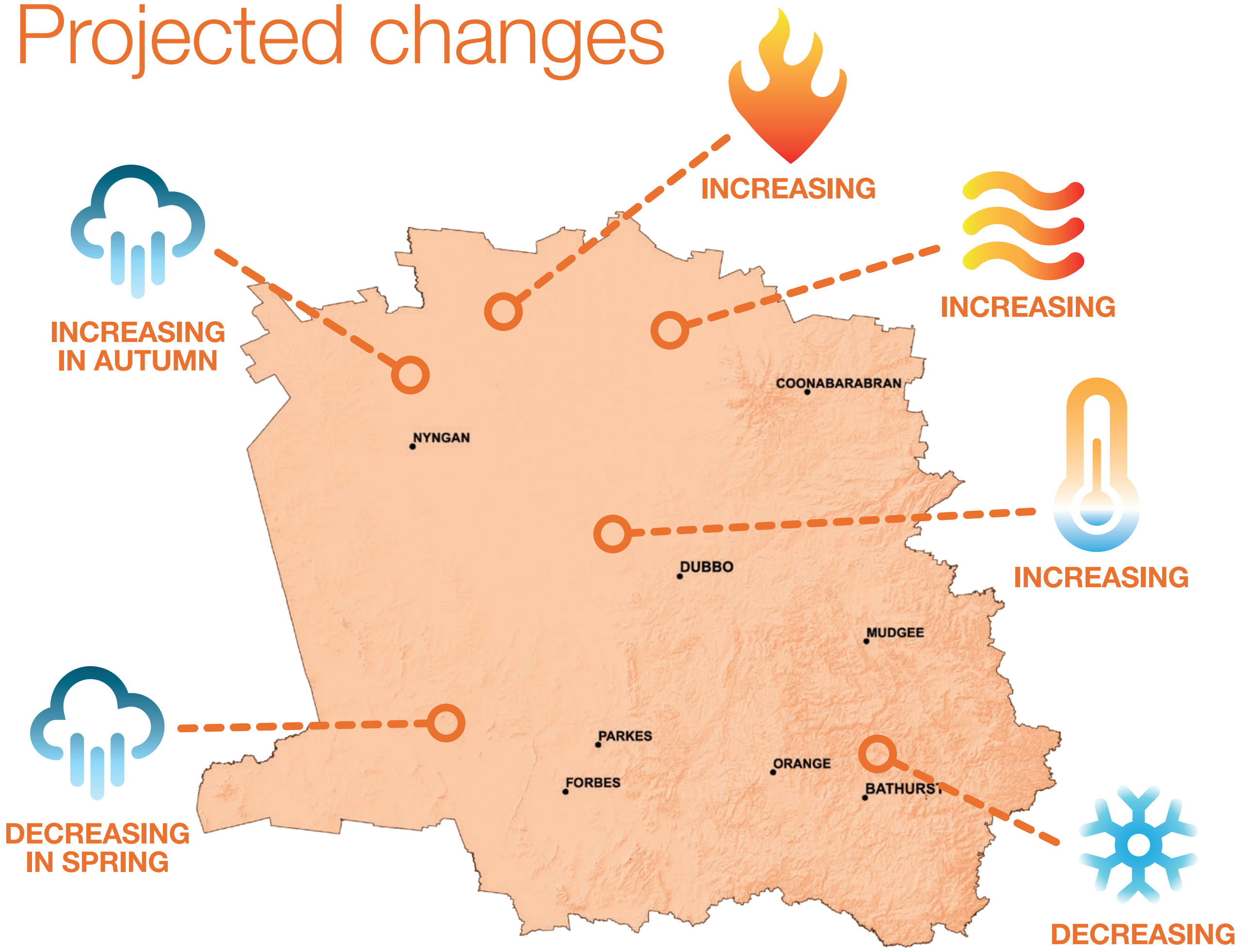
The region is projected to continue to warm during the near future (2020–2039) and far future (2060–2079), compared to recent years (1990–2009). The warming is projected to be on average about 0.7°C in the near future, increasing to about 2.1°C in the far future. The number of hot days is projected to increase and the number of clod nights is projected to decrease.

The warming trend projected for the region is large compared to natural variability in temperature and is of a similar order to the rate of warming projected for other regions of NSW.

The Central West and Orana currently experiences considerable rainfall variability across regions, seasons and from year-to-year and this variability is also reflected in the projections.

Front Cover: Farmland in the Central West region of New South Wales, Australia. Copyright: Phillip Minnis. Page 2: Darling River, in outback Australia is one of the largest in the country. Copyright: THPStock. Page 4: Sheep grazing. Tablelands near Oberon. New South Wales. Australia. Copyright: Ilia Torlin. Page 9: Carcoar Dam, recreational area and eco-friendly Blayney Wind Farm. Copyright: Leah-Anne Thompson.

Projected changes



Projected **temperature** changes	
Maximum temperatures are projected to increase in the near future by 0.4 – 1.0°C	Maximum temperatures are projected to increase in the far future by 1.8 – 2.7°C
Minimum temperatures are projected to increase in the near future by 0.5 – 0.9°C	Minimum temperatures are projected to increase in the far future by 1.5 – 2.6°C
The number of hot days will increase	The number of cold nights will decrease
Projected rainfall changes	
Rainfall is projected to decrease in spring	Rainfall is projected to increase in autumn
Projected Forest Fire Danger Index (FFDI) changes	
Average fire weather is projected to increase in summer, spring and winter	Severe fire weather is projected to increase in summer, spring and winter

Regional snapshots

NSW and ACT Regional Climate Modelling project (NARCliM)

The climate change projections in this snapshot are from the NSW and ACT Regional Climate Modelling (NARCliM) project. NARCliM is a multi-agency research partnership between the NSW and ACT governments and the Climate Change Research Centre at the University of NSW. NSW Government funding comes from the Office of Environment and Heritage (OEH), Sydney Catchment Authority, Sydney Water, Hunter Water, NSW Office of Water, Transport for NSW, and the Department of Primary Industries.

The NARCliM project has produced a suite of twelve regional climate projections for south-east Australia spanning the range of likely future changes in climate. NARCliM is explicitly designed to sample a large range of possible future climates.

Over 100 climate variables, including temperature, rainfall and wind are available at fine resolution (10km and hourly intervals). The data can be used in impacts and adaptation research, and by local decision makers. The data is also available to the public and will help to better understand possible changes in NSW climate.

Modelling overview

The NARCliM modelling was mainly undertaken and supervised at the Climate Change Research Centre. NARCliM takes global climate model outputs and downscales these to provide finer, higher resolution climate projections for a range of meteorological variables. The NARCliM project design and the process for choosing climate models has been peer-reviewed and published in the international scientific literature (Evans et. al. 2014, Evans et. al. 2013, Evans et. al. 2012).

Go to climatechange.environment.nsw.gov.au for more information on the modelling project and methods.

Interpreting climate projections can be challenging due to the complexities of our climate systems. ‘Model agreement’, that is the number of models that agree on the direction of change (for example increasing or decreasing rainfall) is used to determine the confidence in the projected changes. The more models that agree, the greater the confidence in the direction of change.

In this report care should be taken when interpreting changes in rainfall that are presented as the average of all of the climate change projections, especially when the model outputs show changes of both wetting and drying. To understand the spread of potential changes in rainfall the bar charts should be considered along with the maps provided in this document. Help on how to interpret the maps and graphs in this report is provided in Appendix 1.

Summary documents for each of the state planning regions of NSW are available and provide climate change information specific to each region.

The snapshots provide descriptions of climate change projections for two future 20-year time periods: 2020–2039 and 2060–2079.

1. The climate projections for 2020–2039 are described in the snapshots as **NEAR FUTURE, or as 2030**, the latter representing the average for the 20-year period.
2. The climate projections for 2060–2079 are described in the snapshots as **FAR FUTURE, or as 2070**, the latter representing the average of the 20-year period.

Further information about the regions will be released in 2015.

Introduction

This snapshot presents climate change projections for the Central West and Orana Region of NSW. It outlines some key characteristics of the region, including its current climate, before detailing the projected changes to the region's climate in the near and far future.

Location and topography

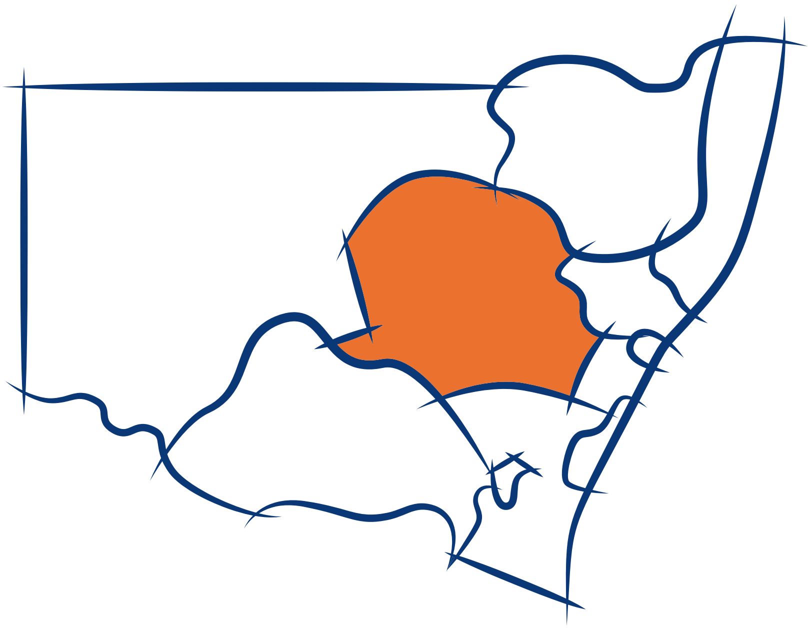
Lying entirely within the Murray–Darling Basin, the Central West and Orana Region extends from Bathurst in the south-east to Nyngan in the north-west. The region is characterised by wide valleys and floodplains, with a number of major Darling River tributaries running through the region, including the Macquarie River. In the east of the region, the Great Dividing Range provides the headwaters to a number of Darling River tributaries, including the Macquarie River.

Population and settlements

Major towns in the Central West and Orana Region include Orange, Bathurst and Dubbo. The region has a population of about 276,850, with a work force of approximately 116,400. The main industries in this region are agriculture, tourism, educational services and retail.

Natural ecosystems

This region supports a diverse range of flora and fauna due to its inclusion of the western edge of the Great Dividing Range and extension onto the semi-arid floodplains of western NSW. Wetlands are a major ecological feature of the region, including the internationally significant Macquarie Marshes on the Darling Riverine Floodplain, and the Bogan and Lower Castlereagh floodplains. Major conservation reserves include the Pilliga and Macquarie Marshes nature reserves and parts of Wollemi, Blue Mountains, Kanangra-Boyd and Gardens of Stone national parks. A large proportion of the vegetation in this region has been cleared and modified for agriculture, ranging from pastoralism to broad-acre cropping and irrigation.



Climate of the region

The topography of the Central West and Orana Region results in a large range of climatic conditions. It is relatively dry on the western plains compared to the Central Tablelands. Summers are warm to hot on the western plains and cooler on the Tablelands which also experience cool to cold winters. Temperatures are milder on the slopes, with summer temperatures cooler than the plains and winter conditions warmer than the tablelands.

Temperature

The Central West and Orana regions experience a distinct seasonal and regional variation in temperature. Average maximum temperatures during summer range from 34°C in the far north-west to 20–22°C in parts of the Central Tablelands. In winter, the average minimum temperature ranges from 4–6°C on the western plains to –2 to 0°C in the Tablelands.

Seasonal variations are shown by the monthly average, minimum and maximum temperatures averaged across the region (Figure 1). Temperatures increase the you move inland from the edge of the Blue Mountains.

Temperatures in the Central West and Orana increased in the second half of the 20th century, with the largest increases in temperature occurring in the last couple of decades.

Temperature extremes

Temperature extremes, both hot and cold, occur infrequently but can have considerable impacts on health, infrastructure and our environment. Changes to temperature extremes often result in greater impacts than changes to average temperatures.

Hot days

The number of hot days per year, where temperatures exceed 35°C, varies greatly across the Central West and Orana but increases moving to the west. The east of the region, which includes the Central Tablelands cities of Orange and Bathurst, experiences fewer than 10 hot days per year. Areas around Forbes, Parkes and Dubbo will on average experience 20–30 hot days per year, whereas over 50 hot days per year are recorded north-west of Nyngan.

Cold nights

The number of nights per year where minimum temperatures reach below 2°C also varies greatly across the region. In the Tablelands, up to 130 cold nights are recorded per year, while the number of cold nights reduces sharply moving west, with fewer than 20 per year recorded west of Nyngan.

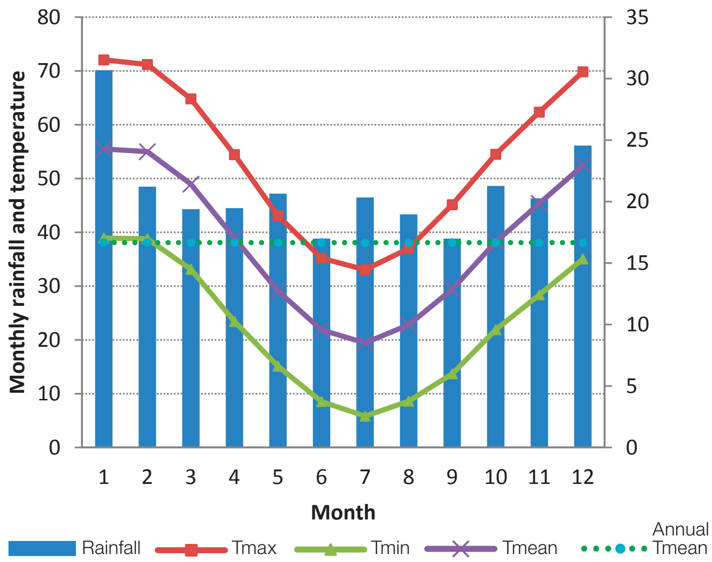


Figure 1: Seasonal rainfall and temperature variations (AWAP[1] data for 1960–1991).

1. Australian Water Availability Project, see www.csiro.au/awap/.




Rainfall

Rainfall varies considerably across the region. This variability is due to the complex interactions between weather patterns in the region, the influence of larger-scale climate patterns such as El Niño Southern Oscillation, the topography of the Blue Mountains and Great Dividing Range and distance from the coast.

Much of the Central West and Orana experiences annual average rainfall in the range of 400–800 mm. The Central Tablelands typically receive rainfall of 800-1200 mm per year, whereas the far western plains receive only around 400 mm per year.

Throughout the year, rainfall is fairly uniform across much of the region, which typically receives from 100–200 mm per season. The higher rainfall areas of the Central Tablelands receive 200–300 mm per season.

During much of the first half of the 20th century the region experienced drier conditions. There was greater year-to-year variability in rainfall during the 1950s to 1990s. The first decade of the 21st century was characterised by below average rainfall during the Millennium Drought. This dry period ended with two of the wettest years on record for Australia (2010–2011), and 2010 the third wettest year on record for New South Wales.

Fire weather

The risk of bushfire in any given region depends on four 'switches'. There needs to be enough vegetation (fuel), the fuel needs to be dry enough to burn, the weather needs to be favourable for fire to spread, and there needs to be an ignition source (Bradstock 2010). All four of these switches must be on for a fire to occur. The Forest Fire Danger Index (FFDI) is used in NSW to quantify fire weather. The FFDI combines observations of temperature, humidity and wind speed with an estimate of the fuel state.

Long-term observations of FFDI come from daily measurements of temperature, rainfall, humidity and wind speed at only a small number of weather stations in Australia, with 17 stations located in NSW and the ACT (Lucas 2010).

Long-term FFDI estimates are available for only one station within the region, Dubbo (Table 1). At Dubbo the average annual FFDI estimated for the period 1990–2009 is 10.3. The highest average FFDI occurs in summer and the lowest in winter.

Fire weather is classified as 'severe' when the FFDI is above 50, and most of the property loss from major fires in Australia has occurred when the FFDI reached this level (Blanchi et al. 2010). FFDI values below 12 indicate low to moderate fire weather, 12-25 high, 25-49 very high, 50-74 severe, 75-99 extreme and above 100 catastrophic.

Severe fire weather conditions are estimated to occur on average three days per year at Dubbo, and are more likely to occur in summer and spring.

Average FFDI					
Station	Annual	Summer	Autumn	Winter	Spring
Dubbo	10.3	16.1	10.1	4.1	10.9
Number of severe fire weather days (FFDI>50)					
Dubbo	3.05	1.65	0.05	0	1.35

Table 1: Baseline FFDI values for meteorological stations within the Central West and Orana Region.

Temperature

Climate change projections are presented for the near future (2030) and far future (2070), compared to the baseline climate (1990–2009). The projections are based on simulations from a suite of twelve climate models run to provide detailed future climate information for NSW and the ACT.

Temperature is the most reliable indicator of climate change. Across the Central West and Orana Region all of the models agree that average, maximum and minimum temperatures are increasing.

Summary temperature

Maximum temperatures are projected to increase in the near future by 0.7°C

Maximum temperatures are projected to increase in the far future by 2.1°C

Minimum temperatures are projected to increase by near future by 0.7°C

Minimum temperatures are projected to increase by far future by 2.1°C

There are projected to be more hot days and fewer cold nights

Projected regional climate changes

The Central West and Orana are expected to experience an increase in all temperature variables (average, maximum and minimum) for the near future and the far future (Figure 2).

Maximum temperatures are projected to increase by 0.7°C in the near future by 2.1°C in the far future (Figure 2b). Spring and summer will experience the greatest changes in maximum temperatures, with temperatures increasing by 2.5°C by 2070 (Figure 2b). Increased maximum temperatures are known to impact human health through heat stress and increasing the number of heatwave events.

Minimum temperatures are projected to increase by 0.7°C in the near future and by 2.1°C in the far future (Figure 2c). Increased overnight temperatures (minimum temperatures) can have a significant effect on human health.

These increases are projected to occur across the region (Figures 3–6).

The long-term temperature trend indicates that temperatures in the region have been increasing since approximately 1950, with the largest increase in temperature variables coming in the most recent decades.

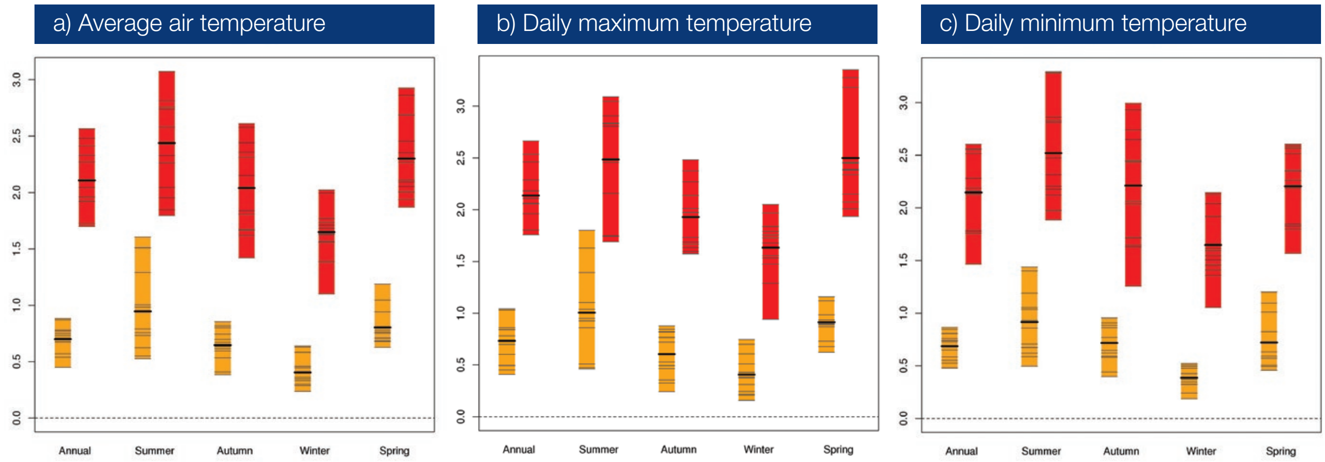


Figure 2: Projected air temperature changes for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red): a) average, b) daily maximum, and c) daily minimum. (Appendix 1 provides help with how to read and interpret these graphs).

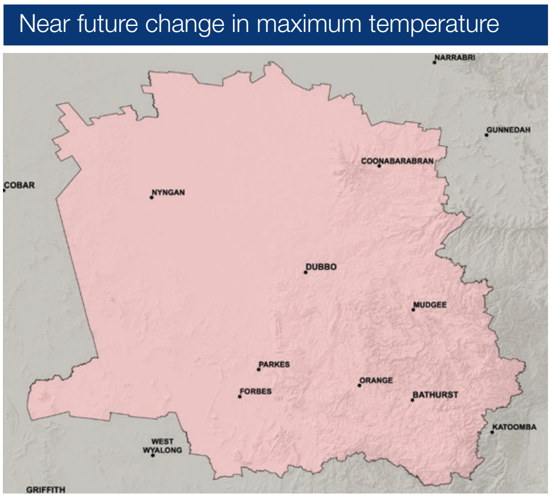


Figure 3: Near future (2020–2039) change in annual average maximum temperature, compared to the baseline period (1990–2009).

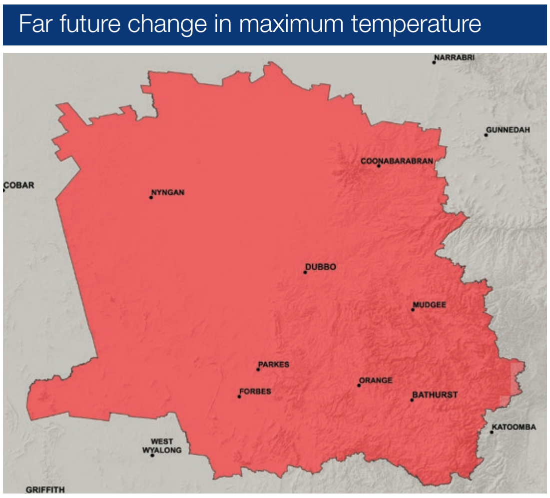


Figure 4: Far future (2060–2079) change in annual average maximum temperature, compared to the baseline period (1990–2009).

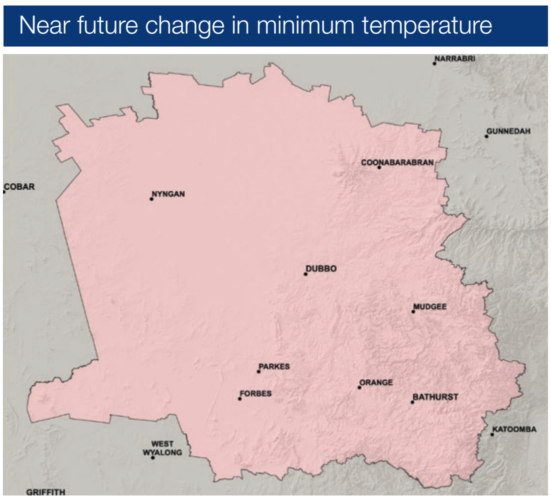


Figure 5: Near future (2020–2039) change in annual average minimum temperature, compared to the baseline period (1990–2009).

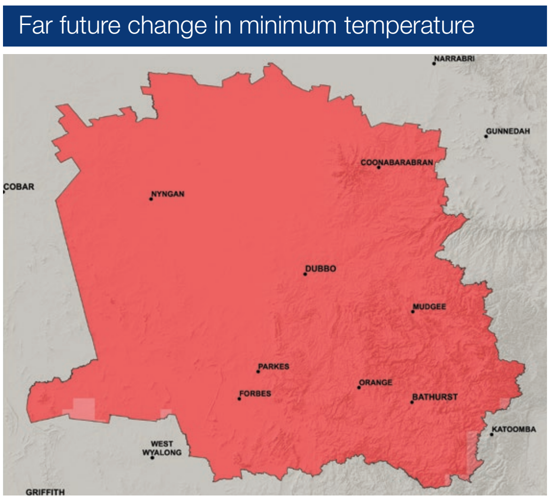


Figure 6: Far future (2060–2079) change in annual average minimum temperature, compared to the baseline period (1990–2009).

Central West and Orana

Change in annual average daily temperature (°C)

- 2.5 – 3.0
- 2.0 – 2.5
- 1.5 – 2.0
- 1.0 – 1.5
- 0.5 – 1.0
- 0.0 – 0.5

Hot days

DAYS PER YEAR ABOVE 35°C

Currently the Central West and Orana Region experiences fewer than 10 hot days per year in the Central Tablelands. Parkes and Forbes experience an average of 20–30 hot days each year and the western plains have over 50 hot days each year. International and Australian experiences show that prolonged hot days increase the incidence of illness and death – particularly among vulnerable population groups such as people who are older, have a pre-existing medical condition or who have a disability. Seasonal changes are likely to have considerable impacts on bushfire danger, infrastructure development and native species diversity.

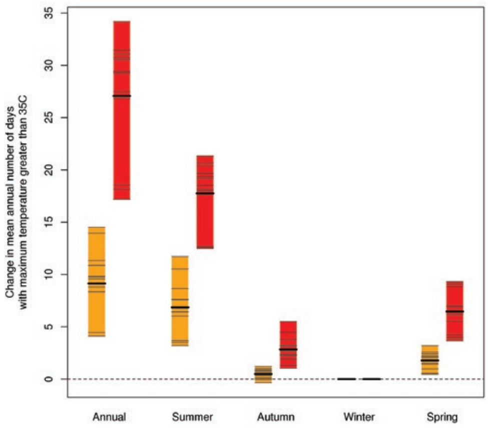


Figure 7: Projected changes in the number of hot days (with daily maximum temperature of above 35°C) for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red). (Appendix 1 provides help with how to read these graphs).

Projected regional climate changes

All models agree that the Central West and Orana are expected to experience more hot days in the near future and the far future (Figure 7).

The greatest increase is projected for the western plains with an additional 10–20 hot days in the near future (Figure 8), and 30–40 additional hot days by 2070 (Figure 9). Between 20 and 30 more days are also projected for much of the Central West including Parkes and Forbes.

The region, on average, is projected to experience an additional nine hot days in the near future (ranging from 4–15 days across the 12 models) and 27 more hot days by 2070 (17–34 days across the 12 models) (Figure 7).

These increases are projected mainly in spring and summer although in the far future hot days are also extending into autumn (Figure 7).

Near future change in days per year above 35°C

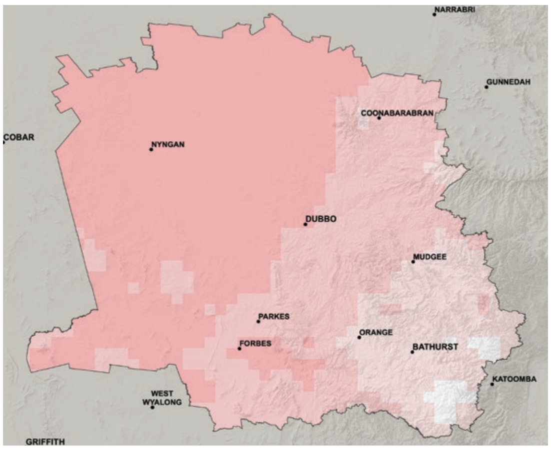


Figure 8: Near future (2020–2039) projected changes in the number of days per year with maximum temperatures above 35°C.

Far future change in days per year above 35°C

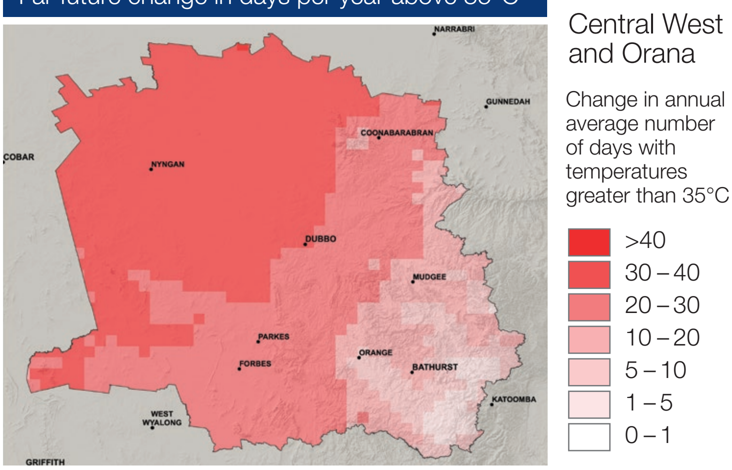
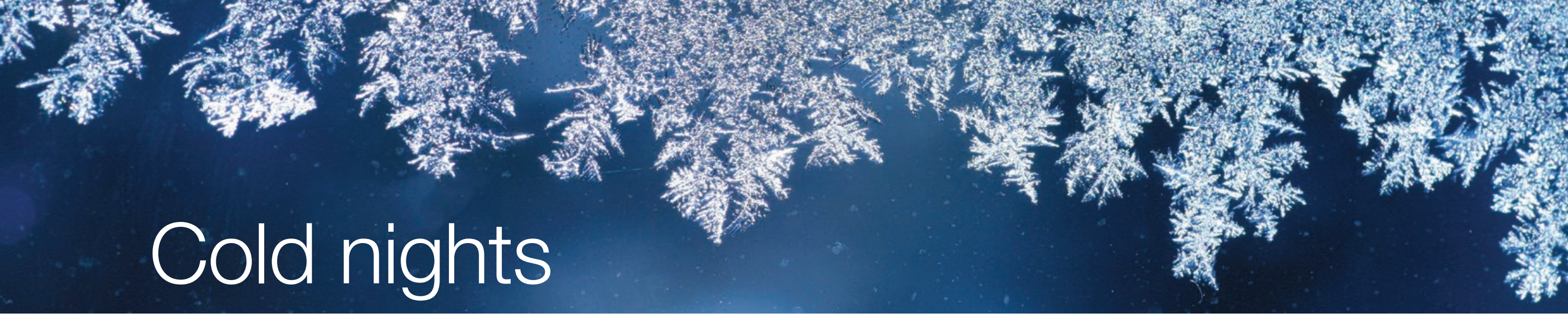


Figure 9: Far future (2060–2079) projected changes in the number of days per year with maximum temperatures above 35°C.



Cold nights

DAYS PER YEAR BELOW 2°C

Most of the emphasis on changes in temperatures from climate change has been on hot days and maximum temperatures, but changes in cold nights are equally important in the maintenance of our natural ecosystems and agricultural/horticultural industries; for example, some common temperate fruit species require sufficiently cold winters to produce flower buds.

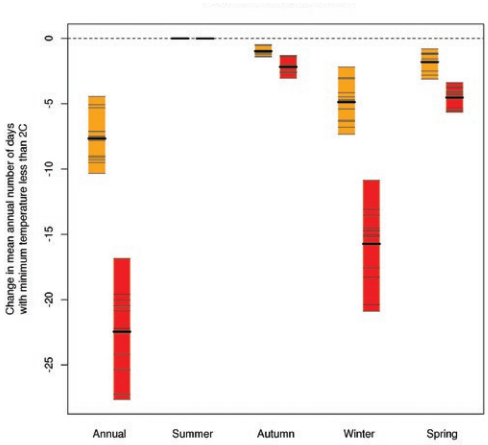


Figure 10: Projected changes in the number of low temperature nights for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red). (Appendix 1 provides help with how to read and interpret these graphs).

Projected regional climate changes

The Central West and Orana is expected to experience fewer cold nights in the near future and the far future (Figure 10).

The greatest decreases are projected to occur near the Blue Mountains and on the Central Tablelands. These areas are projected to experience a decrease of 10-20 fewer cold nights in the near future and 20–30 fewer cold nights by 2070 (Figures 11 and 12).

All models agree with a decrease in the number of cold nights in the near future by an average of approximately eight per year (ranging from 4 –10 nights across the individual models). The decrease in the average number of cold nights is projected to be even greater in the far future, with an average decrease of 23 fewer cold nights per year, (ranging from 17–28 nights across the individual models) (Figures 11 and 12).

The largest decrease in cold nights is projected for winter , but fewer cold nights are also projected for autumn and spring (Figure 10).

Near future change in number of cold nights (below 2°C) per year

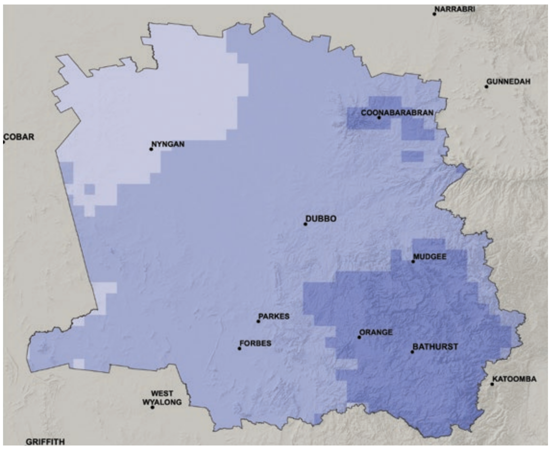


Figure 11: Near future (2020–2039) change in the number of days per year with minimum temperatures below 2°C, compared to the baseline period (1990–2009).

Far future change in number of cold nights (below 2°C) per year

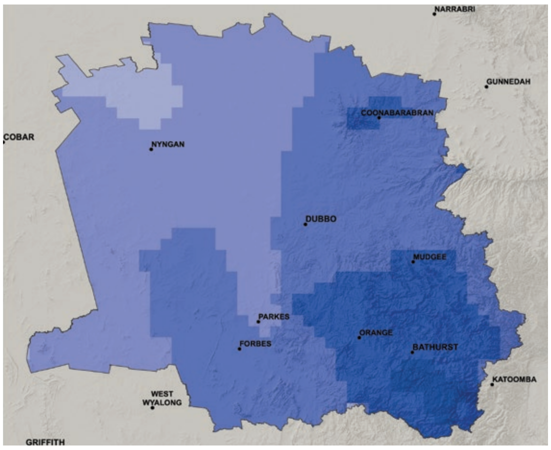


Figure 12: Far future (2060–2079) change in the number of days per year with minimum temperatures below 2°C, compared to the baseline period (1990–2009).

Central West and Orana

Change in annual average number of days with temperatures less than 2°C

- -1 – 0
- -5 – -1
- -10 – -5
- -20 – -10
- -30 – -20
- -40 – -30
- < -40

Rainfall

Changes in rainfall patterns have the potential for widespread impacts. Seasonal shifts in rainfall can impact native species' reproductive cycles as well as impacting agricultural productivity; for example crops that are reliant on winter rains for peak growth.

Rainfall changes are also associated with changes in the extremes, such as floods and droughts, as well as secondary impacts such as water quality and soil erosion that occur as a result of changes to rainfall intensity.

Modelling rainfall is challenging due to the complexities of the weather systems that generate rain. 'Model agreement', that is the number of models that agree on the direction of change (increasing or decreasing rainfall) is used to determine the confidence in the projected change. The more models that agree, the greater the confidence in the direction of change.

Care should be taken when interpreting changes in rainfall from averaging climate change projections when the model outputs project changes of both wetting and drying. To understand the spread of potential changes in rainfall the bar charts should be considered along with the maps provided in this document.

Rainfall is projected to decrease in spring and to increase in autumn

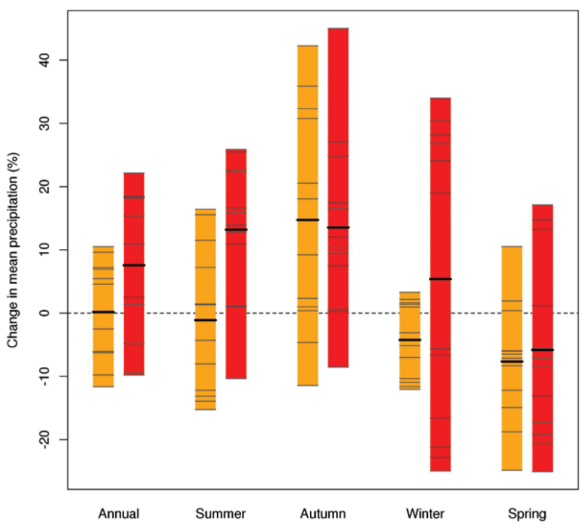


Figure 13: Projected changes in average rainfall for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red). (Appendix 1 provides help with how to read and interpret these graphs).

Projected regional climate changes

In the Central West and Orana the majority of models (9 out of 12) agree that spring rainfall will decrease in the near future and the far future (8 out of 12 models) (Figures 13).

The majority of models (10 out of 12) agree that autumn rainfall will increase in the near future and the far future (11 out of 12 models) (Figure 13).

The greatest reduction in rainfall is projected around Parks, Forbes and Cowra in spring (Figures 14 and 15). Autumn increases are relatively uniform across the region.

An increase in summer rainfall is projected for the far future (11 out of 12 models) but changes in the near future are less uniform with drier conditions in the north and wetter conditions in the south (Figures 14 and 15)

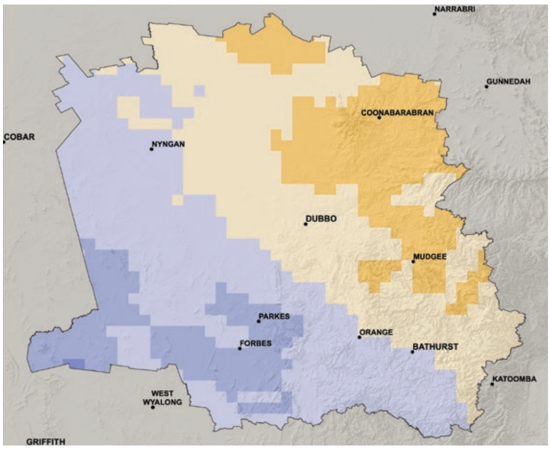
Changes in winter rainfall are less clear with projected decreases in the near future (7 out of 12 models) and projected increases in the far future (Figures 13, 14 and 15).

Seasonal rainfall projections for the near future and far future span both drying and wetting scenarios: in the near future the changes are: summer –15% to +16% , autumn –11% to +42%, winter –12% to +3%, and spring –25% to +11%; in the far future the projected range of changes are: summer –10% to +26%, autumn –9% to +45%, winter –25% to +34%, and spring –25% to +17%.

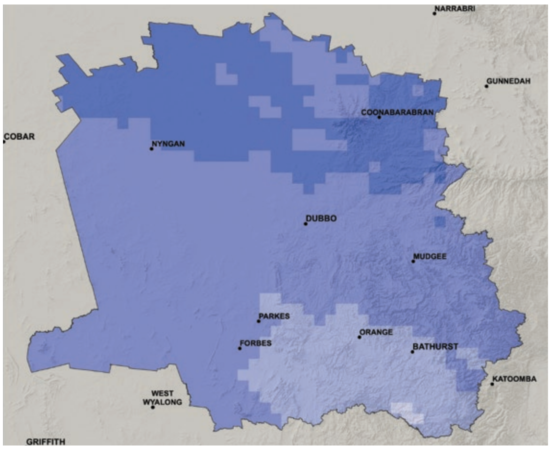
Projections for the region's annual average rainfall range from a decrease (drying) of 12% to an increase (wetting) of 11% by 2030 and still span both drying and wetting scenarios (–10% to +22%) by 2070.

The Central West and Orana currently experiences considerable rainfall variability across regions, seasons and from year-to-year and this variability is also reflected in the projections.

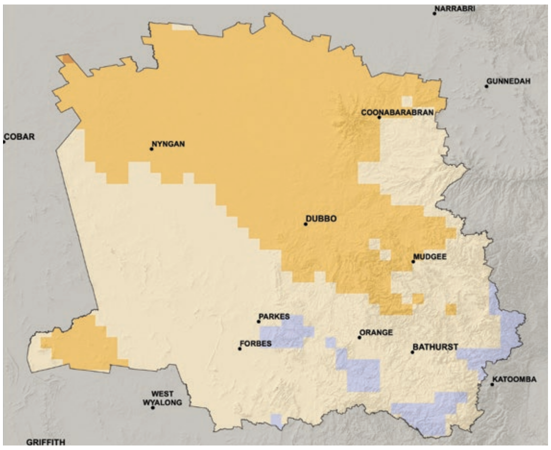
Summer 2020–2039



Autumn 2020–2039



Winter 2020–2039



Spring 2020–2039

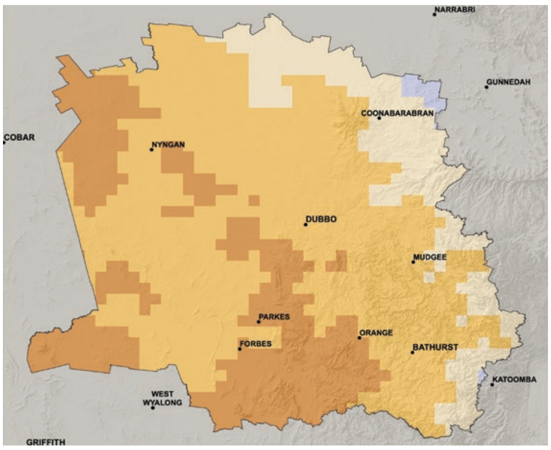
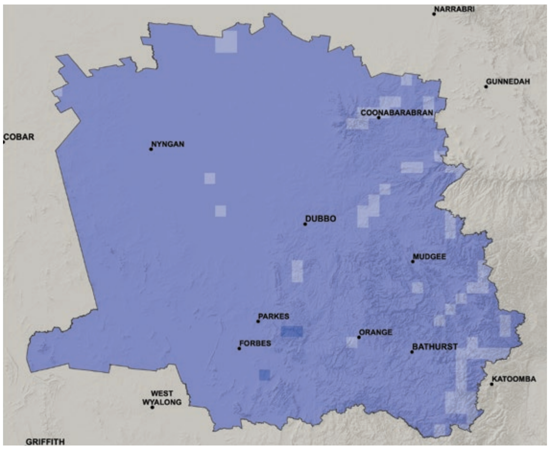
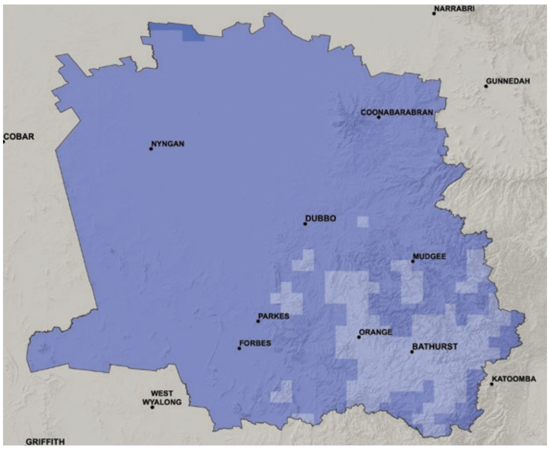


Figure 14: Near future (2020–2039) projected changes in average rainfall by season.

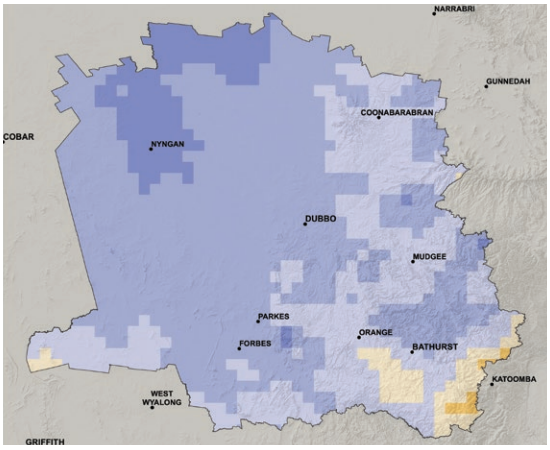
Summer 2060–2079



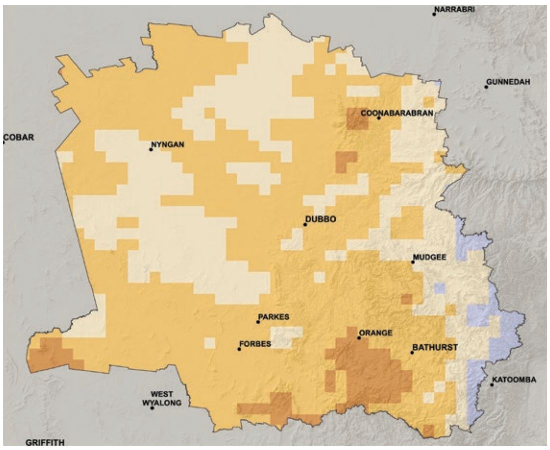
Autumn 2060–2079



Winter 2060–2079



Spring 2060–2079



Central West and Orana

Change in average rainfall (%)

- > 30
- 20 – 30
- 10 – 20
- 5 – 10
- 0 – 5
- -5 – 0
- -10 – -5
- -20 – -10
- <-20

Figure 15: Far future (2060–2079) projected changes in average rainfall by season.

Fire weather

The Bureau of Meteorology issues Fire Weather Warnings when the FFDI is forecast to be over 50. High FFDI values are also considered by the Rural Fire Service when declaring a Total Fire Ban.

Average FFDI values are often used to track the status of fire risk. These values can be used when planning for prescribed burns and help fire agencies to better understand the seasonal fire risk. The FFDI is also considered an indication of the consequences of a fire if one was to start – the higher the FFDI value the more dangerous the fire could be.

FFDI values below 12 indicate low to moderate fire weather, 12-25 high, 25-49 very high, 50-74 severe, 75-99 extreme and above 100 catastrophic.

Severe and average fire weather is projected to increase

Severe fire weather in the near future is projected to decrease in autumn

Projected regional climate changes

The Central West and Orana Region is projected to experience an increase in average and severe FFDI values in the near future and the far future (Figures 16 and 17).

Increases in severe fire weather are projected in summer and spring. Although these changes are relatively small in magnitude (3.5 additional days per year for the far future) they are projected in prescribed burning periods (spring) and the peak fire risk season (summer) (Figure 19).

Average fire weather is projected to increase in all seasons in the near and far future except for autumn. Increases in spring are greatest in the western half of the region (Figure 18). These increases are in prescribed burning periods (spring) and the peak fire risk season (summer), reducing the ability for preventative works.

Autumn is projected to have a decrease in average fire weather. As fire weather measurements take into account rainfall, it is likely that the decrease in autumn FFDI is due to projected increases in autumn rainfall across the region (compare Figures 14 and 15 with Figures 18 and 19).

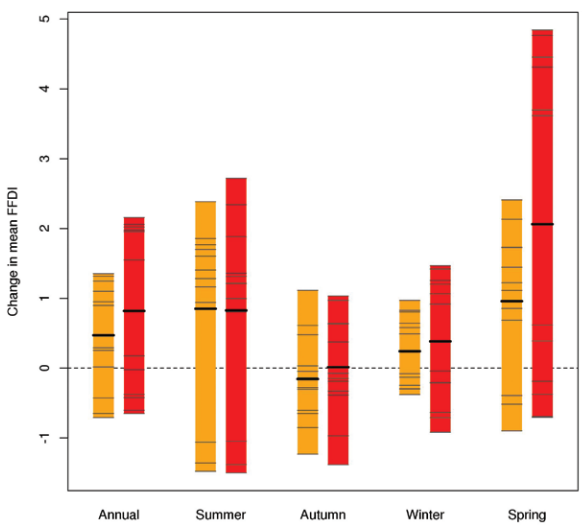


Figure 16: Projected changes in the average daily forest fire danger index (FFDI) for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red). (Appendix 1 provides help with how to read and interpret these graphs).

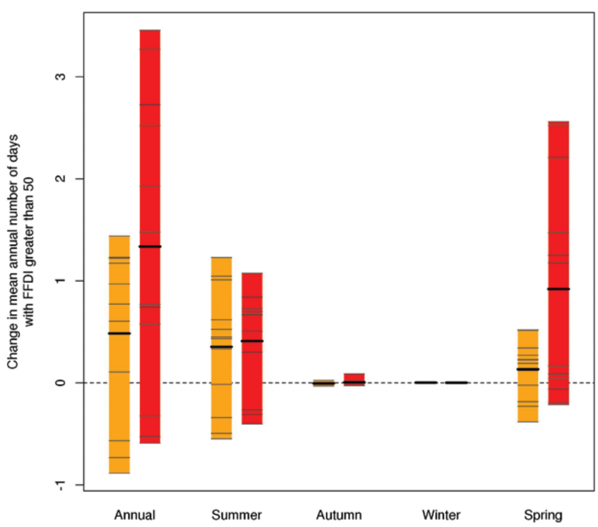


Figure 17: Projected changes in average annual number of days with a forest fire danger index (FFDI) greater than 50 for the Central West and Orana Region, annually and by season (2030 yellow; 2070 red).

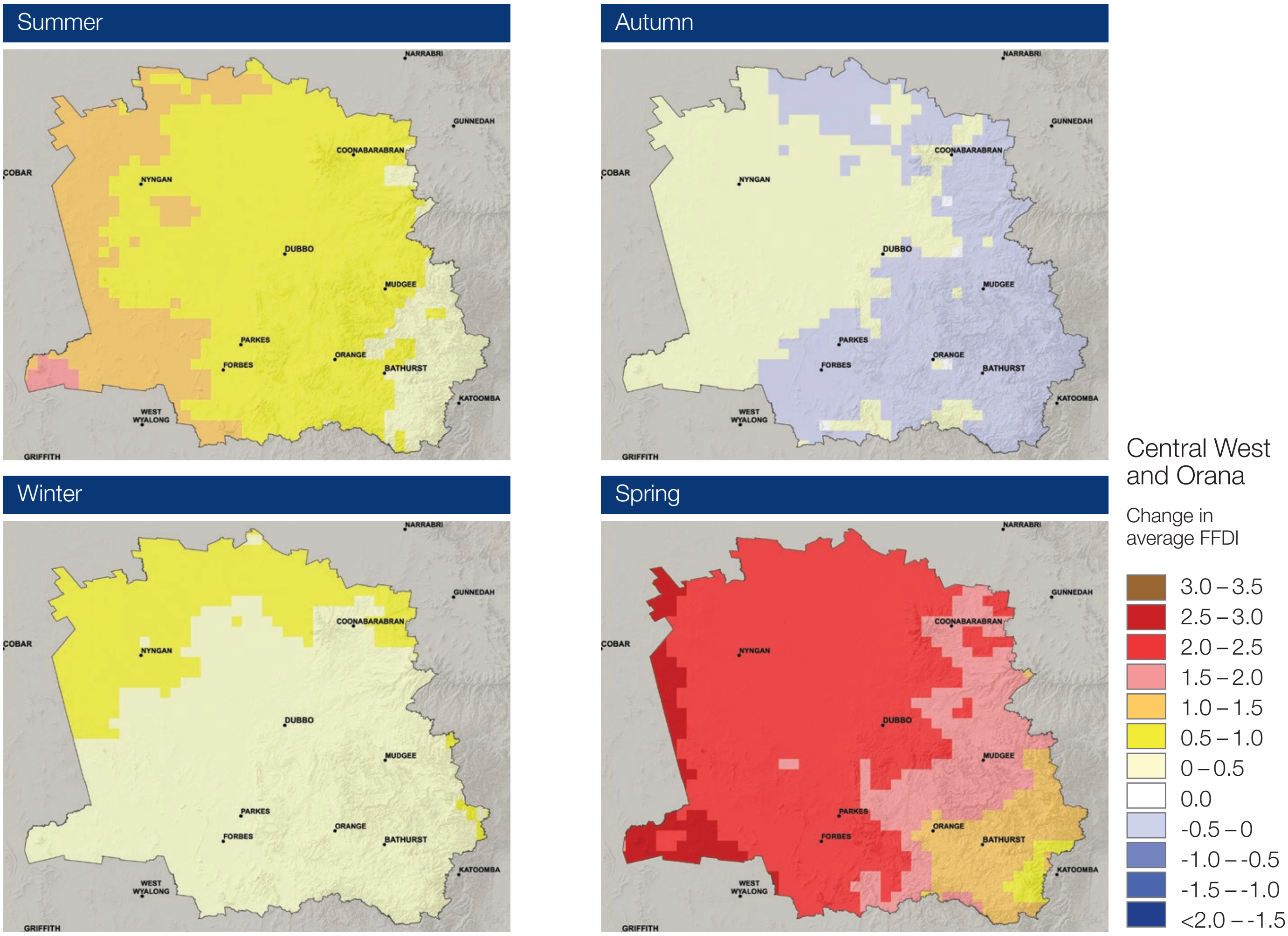


Figure 18: Far future (2060–2079) projected changes in average daily FFDI, compared to the baseline period (1990–2009).

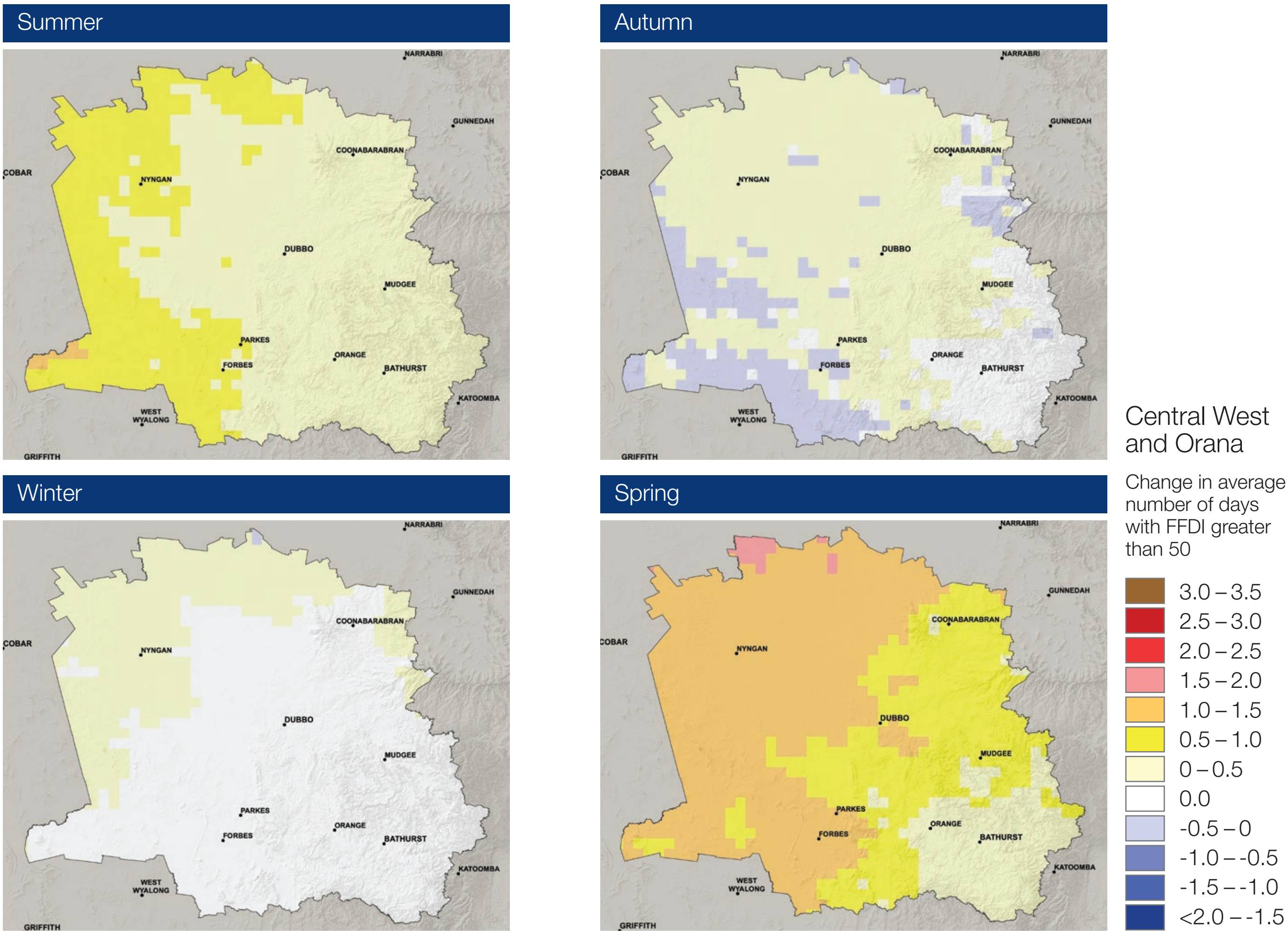


Figure 19: Far future (2060–2079) projected changes in average annual number of days with a FFDI greater than 50, compared to the baseline period (1990–2009).

Appendix 1 Guide to reading the maps and graphs

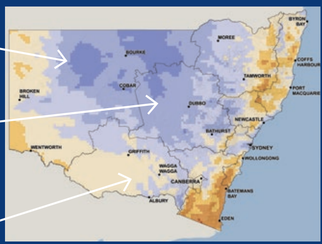
This document contains maps and bar graphs of the climate change projections. The maps present the results of the twelve models as an average of all twelve models. The bar graphs show projections averaged across the entire state and do not represent any particular location within the state. The bar graphs also show results from each individual model. See below for more information on what is displayed in the maps and bar graphs.

How to read the maps

The maps display a **10km** grid.

NSW has been divided into State Planning Regions and each region has a Local Snapshot report.

The colour of each grid is the **average of all 12 models** outputs for that grid.



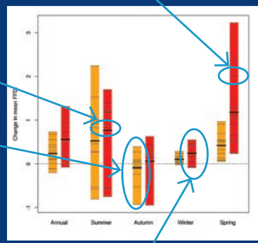
How to read the bar graphs

The thin grey lines are the **individual models**. There are 12 thin lines for each bar.

The thick line is **the average of all 12 models** for the region.

The length of the bar shows the **spread of the 12 model values** for the region

Each line is the **average for** the region. They do not represent a single location in the region.



Note: The yellow bars represent near future scenarios (2020–2039), while the red bars represent far future scenarios (2060–2079).

References

Blanchi, R, Lucas, C, Leonard, F and Finkele, K (2010), 'Meteorological conditions and wildfire-related house loss in Australia', International Journal of Wildland Fire, vol. 19, pp. 914–926.

Bradstock, R (2010), 'A biogeographic model of fire regimes in Australia: current and future implications', Global Ecology and Biogeography, vol. 19, pp. 145–158.

Department of Planning & Environment (2014), NSW Statewide Profile 2014, NSW Department of Planning & Environment, Sydney, available at www.planning.nsw.gov.au/Portals/0/PlanningYourRegion/2014_NSW_StatewideProfile.pdf.

Evans, J. P., Ji, F., Lee, C., Smith, P., Argüeso, D., and Fita, L. (2014) A regional climate modelling projection ensemble experiment – NARCliM, Geoscientific Model Development, 7(2), 621-629, doi: 10.5194/gmd-7-621-2014.

Evans, J.P., F. Ji, G. Abramowitz and M. Ekström (2013) Optimally choosing small ensemble members to produce robust climate simulations. Environmental Research Letters 8, 044050, DOI: 10.1088/1748-9326/8/4/044050.

Evans, J. P., M. Ekström, and F. Ji (2012) Evaluating the performance of a WRF physics ensemble over South-East Australia. Climate Dynamics, 39(6), 1241-1258, DOI: 10.1007/s00382-011-1244-5.

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