NARCliM

NSW GOVERNMENT

Illawarra Shoalhaven

Climate Change Snapshot

environment.nsw.gov.au

Acknowledgement of Country

The NSW Government acknowledges First Nations people as the first Australian people and the traditional owners and custodians of the country's lands and water. The NSW Government acknowledges the Wodi Wodi, Wandandian, Yuin and Murramarang Aboriginal people from the Illawarra Shoalhaven region as having an intrinsic connection with the lands and waters. The landscape and its waters provide the First Nations people with essential links to their history and help them to maintain and practise their traditional culture and lifestyle.

Australia's First Nations people have lived in NSW for over 60,000 years and have significant spiritual, cultural and economic connections with its lands, waters, seas and skies.

They are the first astronomers and scientists who have been listening to and caring for Country for generations.

We pay respects to Elders past and present and acknowledge the significance of their traditional knowledge in adapting to changes in climate over tens of thousands of years.

We recognise the importance of their wisdom at this pivotal moment in time.

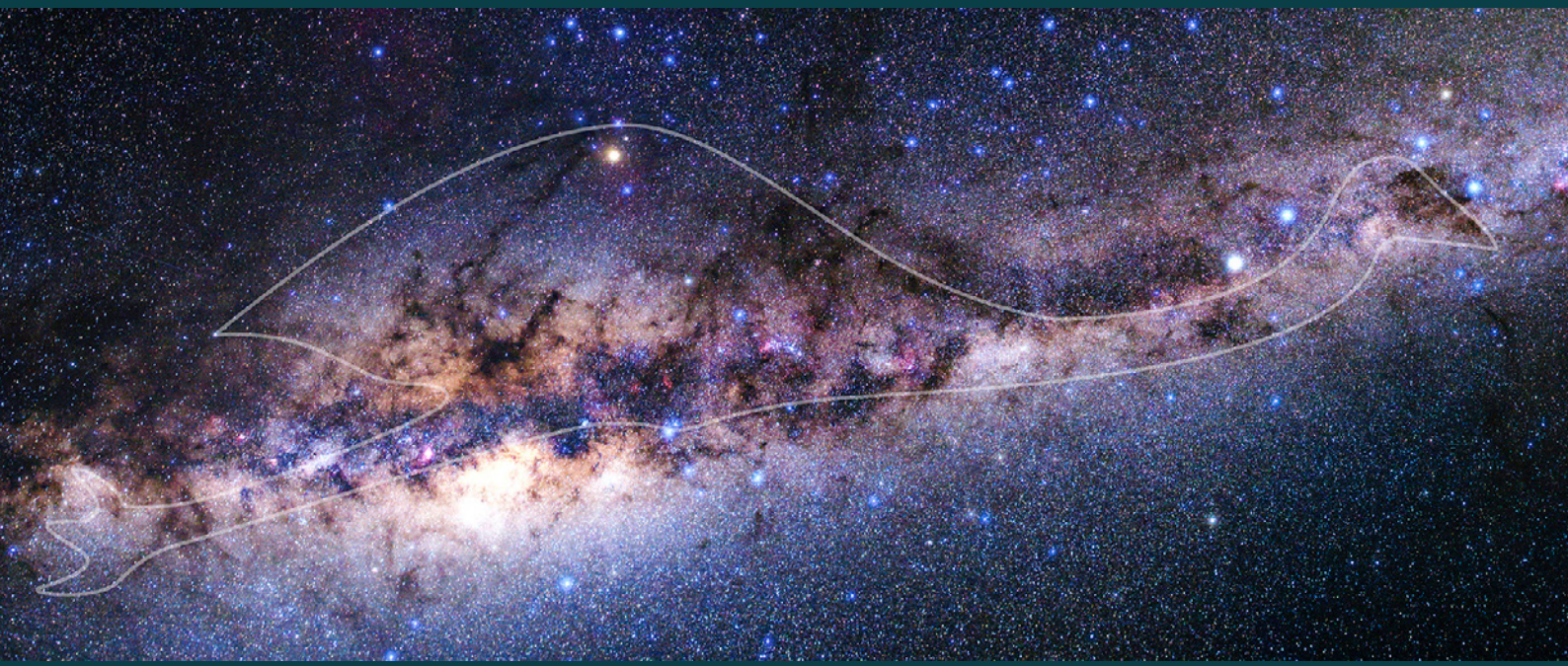

Photo caption:
The Emu in the Sky is an Aboriginal constellation that is made up of the dark clouds of the Milky Way. With the movement of the earth, the position of the Emu in the Sky changes throughout the year. Aboriginal people in some nations across NSW and Australia relate the position of the Emu in the Sky to the breeding behaviour of the emu on the land. Cultural astronomy teaches us about the relationship between the sky and land; and that we are all interconnected.

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About this snapshot

The New South Wales (NSW) and Australian Regional Climate Modelling (NARCliM) project delivers high-resolution climate change projections for NSW and south-east Australia.

This snapshot summarises the latest NARCliM2.0 projections for temperature, average rainfall, hot days 35°C and above, cold nights under 2°C and severe fire weather (Forest Fire Danger Index greater than 50) at a 4km resolution for NSW and the Australian Capital Territory (ACT). There is information for both a low-emissions scenario (SSP1-2.6), and a high-emissions scenario (SSP3-7.0) to the year 2100 to show the range of plausible climates that may be experienced, depending on our actions to reduce greenhouse gas emissions. The snapshot also summarises the latest projections for sea-level rise, derived from the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report released in 2021. Detailed climate projection information is available through the AdaptNSW Interactive Map and the Climate Data Portal.

Understanding current warming

NSW and the ACT have already warmed by 1.4°C since national records began in 1910.[1] This local warming figure represents surface air temperature over land in NSW and is not directly comparable to average estimates of global warming which include surface air temperature over both land and ocean. Surface warming occurs faster over land than the ocean. Significant impacts from climate change are already occurring in NSW and are expected to be felt more widely in the future, particularly if concerted global effort is not taken to reduce greenhouse gas emissions and adapt to the expected impacts of climate change.

How to use this snapshot

This snapshot provides a summary of plausible future climate change in the Illawarra Shoalhaven region relative to a baseline of average climate from 1990–2009. The projections for 2050 represent averaged data for 2040–2059 and projections for 2090 represent averaged data for 2080–2099. In translating the projections, it is important to consider the previous historical changes that occurred prior to 1990–2009. For example, national temperature records indicate that NSW has warmed by 0.84°C between 1910–1930 and the 1990–2009 baseline.[1]

Modelling climate change at a local level provides detailed insights into how NSW communities, built environments and natural environments will continue to be impacted by climate change. Information in this snapshot can be used in conjunction with detailed information that is available through the AdaptNSW Interactive Map and the Climate Data Portal.

NARCliM climate projections

NARCliM2.0 projections provide nation-leading climate model data that span the range of plausible future changes in climate for south-east Australia at a 4km resolution, and for the broader Australasian region at a 20km resolution. NARCliM2.0 projections are the next generation of NARCliM, building on previous generations delivered in 2014 and 2021. NARCliM is the NSW Government's trusted source of climate information and data for all audiences and sectors. Detailed information on NARCliM can be found at AdaptNSW.

Methods and uncertainty

To help address future uncertainty, NARCliM2.0 is built on a selection of emissions scenarios, global climate models and regional climate models that, together, capture a range of climates that could occur. This is referred to as the NARCliM model ensemble. The NARCliM2.0 model ensemble is made up of different combinations of 5 selected global climate models and 2 regional climate models, giving 10 model combinations in total. Unless otherwise specified, the presentation of data in this snapshot is averaged across a 20-year period from the NARCliM model ensemble.

Combining multiple models through averaging and other statistical methods produces better projections by providing a comprehensive range of possible future climate scenarios. To ensure that NARCliM models adequately simulate regional climate, scientists use them to simulate the past climate and compare the results with actual observations. Outputs undergo rigorous quality control and scientific technical peer review. There is more information on the modelling project and scientific methods at AdaptNSW.

Shared Socioeconomic Pathways

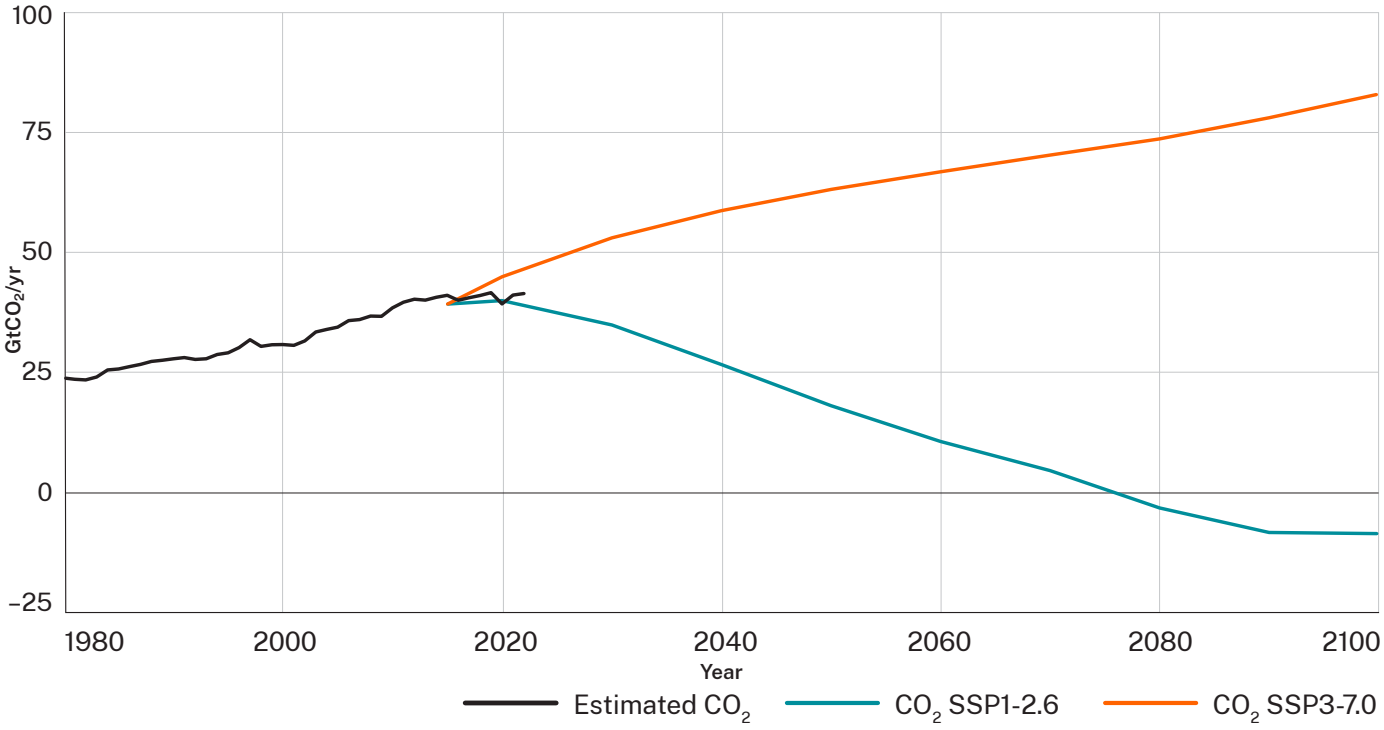
Shared Socioeconomic Pathways (SSPs) are the most recent emissions scenarios adopted in the IPCC's Sixth Assessment Report.

The SSPs describe how greenhouse gas emissions and socioeconomic factors – such as population, economic growth, education, urbanisation and land use – may change in the future. Global carbon dioxide emissions modelled for a low-emissions scenario and a high-emissions scenario are displayed below (Figure 1). For more information on emissions scenarios, visit AdaptNSW.

SSP1-2.6 describes a low-emissions future with a global transition towards sustainable and equitable development.

SSP3-7.0 describes a high-emissions future of regional conflict and development where countries do not collaborate on tackling climate change and do not focus on sustainable and equitable development.

Figure 1. Human-caused global emissions of carbon dioxide – past and projected



Mental health support

Climate change information can be distressing for some readers, with many Australians of all ages experiencing significant eco-anxiety. For supporting information, please visit the Black Dog Institute or Australian Psychological Society or speak with your local healthcare provider.

Projected changes
Illawarra Shoalhaven

Low-emissions scenario

Average temperature increase

↑ **1.0°C**
2050

↑ **1.1°C**
2090

Hot days per year will increase by:

2050	2090
2.5	3.1

Sea level will rise by:

2050	2090
17cm	33cm

Severe fire weather days per year will increase by:

2050	2090
0.3	0.4

High-emissions scenario

Average temperature increase

↑ **1.7°C**
2050

↑ **3.3°C**
2090

Hot days per year will increase by:

2050	2090
3.9	9.3

Sea level will rise by:

2050	2090
21cm	55cm

Severe fire weather days per year will increase by:

2050	2090
0.6	1.4

Regional impacts

Isolated coastal towns

Increased severe fire weather

Coastal settlements

Inundated by rising sea levels

Inundated by rising sea levels

Low-lying floodplains

Increased severe fire weather

National parks

Data is based on NARCliM2.0 (2024) projections for SSP1-2.6 (low-emissions) and SSP3-7.0 (high-emissions) and is presented relative to the historical climate baseline of 199–2009. The projections for 2050 represent averaged data for 2040–2059 and projections for 2090 represent averaged data for 2080–2099. Values presented are averages across the NARCliM2.0 model ensemble, and do not represent the full range of plausible climate futures. Regional climate change impacts are used to highlight how the region is likely to be affected by climate change, and impacts are not limited to the examples provided. Sea-level rise data is from the IPCC's Sixth Assessment Report is presented relative to a baseline of 1995–2014.

Climate of the Illawarra Shoalhaven

The climate of NSW underpins a diverse array of important industries, lifestyles and natural ecosystems. A stable climate is critical to support a range of values in NSW, including our food systems, recreational activities and unique biodiversity.

The Illawarra Shoalhaven region covers an area of 7000 km^2 south of Sydney and is home to regional cities, commercial hubs and settlements, including Wollongong, Shellharbour, Kiama, Nowra and Milton-Ulladulla. The region contains unique natural features and is the backdrop to a mix of coastal, urban and rural lifestyles.

Current climate

The geography of the Illawarra Shoalhaven region affects local weather conditions, which together have led to a range of unique and important ecosystems. The region has a mostly cool temperate climate, but there is considerable variation in climate conditions because of the region's proximity to the coast and its topography. Summers are mild throughout most of the region, with winters cool closer to the Southern Highlands. The coastline stretches 200km from the Royal National Park south of Sydney down to Durras Lake. The Illawarra Range escarpment is 120km long and separates the coastal plains in the east from the rolling hills of the Southern Tablelands in the west. The region contains diverse ecosystems, including rainforests and tall eucalypt forests along the Illawarra Escarpment, dry sclerophyll forests on sandstone plateaus and tall open forests on the coastal plain.

Table 1. Baseline climate for the Illawarra Shoalhaven

	Average temperature	Hot days	Cold nights	Rainfall	Severe fire weather days
Observed	15.9°C	1.9	14.6	1064mm	0.3
Historical model	15.4°C	2.5	12.5	1100mm	0.7

Table 1 outlines the annual average values for the 1990–2009 baseline period in this snapshot. All observed data is calculated from Bureau of Meteorology products. Long-term temperature change data is from the long-term temperature record.[1] Observed information and data in graphs come from Australian Gridded Climate Data (AGCD).[2]

Temperature

The Illawarra Shoalhaven is getting warmer

Temperature is the most robust indicator of climate change. In NSW, 6 of the 10 warmest years on record since 1910 have occurred since 2013. The warmest years on record for both mean temperature and maximum temperature in the Illawarra Shoalhaven region were 2016 and 2019, when average temperature was 0.9°C above the 1990–2009 average.[2]

3.3°C

rise in average temperature across the Illawarra Shoalhaven by 2090 under a high-emissions scenario

6 of 10

warmest years on record have occurred since 2013

Projections

Across the Illawarra Shoalhaven region, average temperatures will increase throughout this century (Figure 2).

Under a low-emissions scenario, the average temperature increase across the region is projected to be less than 0.1°C between 2050 and 2090 (Table 2). However, a major temperature increase of 1.6°C is projected during the same period under a high-emissions scenario. Notably, the temperature projections for 2050 under a high-emissions scenario are expected to exceed the projections for 2090 under a low-emissions scenario.

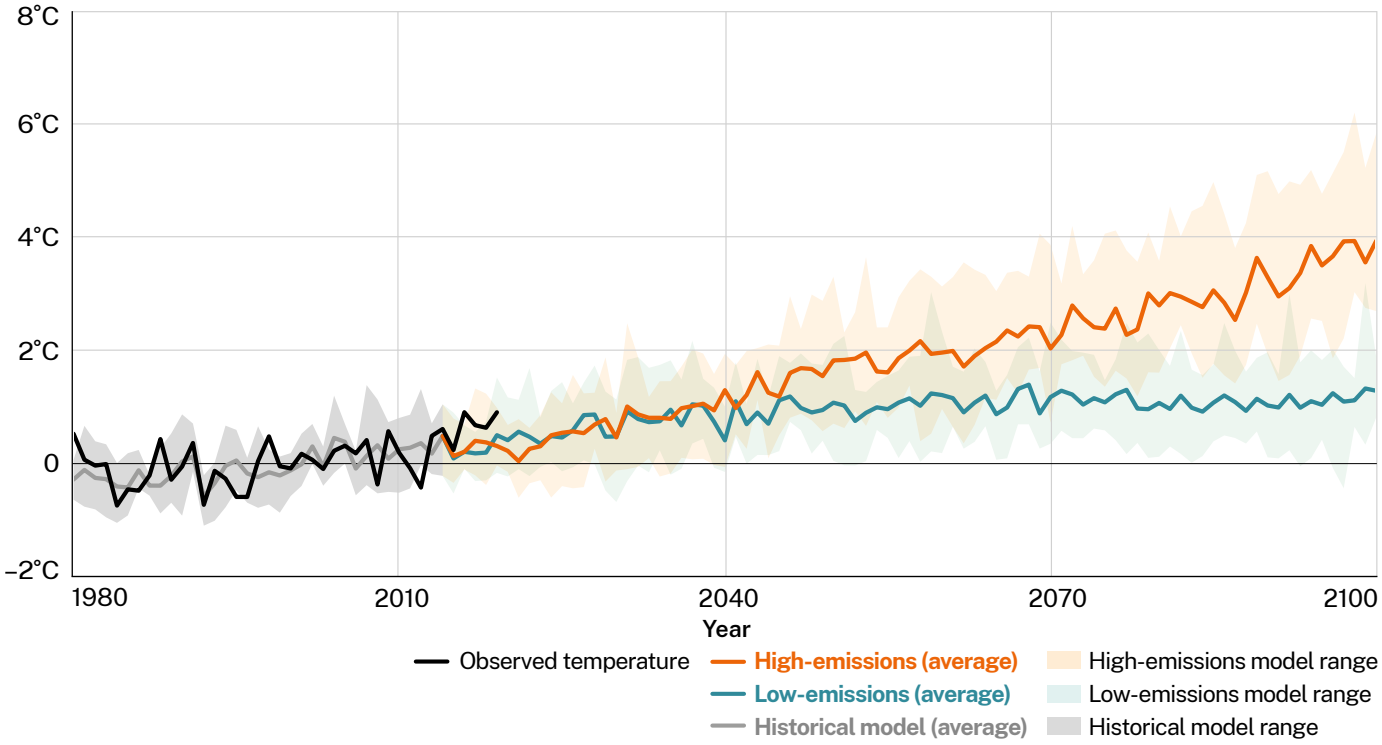
Temperature increases are expected in all parts of the region (Figure 3) and across all seasons. The temperature increase is likely to be uniform throughout the region due to the moderating influence of the ocean along the coast. By 2090, Wollongong is likely to experience an increase in temperature of 1.1°C under a low-emissions scenario and 3.3°C under a high-emissions scenario.

Table 2. Projected annual average temperature increase – Illawarra Shoalhaven

	2050		2090	
	Low-emissions	High-emissions	Low-emissions	High-emissions
Temperature	**1.0°C** (0.5–1.6°C)	**1.7°C** (0.8–2.6°C)	**1.1°C** (0.5–1.8°C)	**3.3°C** (2.2–4.8°C)
Maximum temperature	**1.0°C** (0.5–1.7°C)	**1.8°C** (0.9–2.9°C)	**1.2°C** (0.5–2.1°C)	**3.3°C** (2.2–5.0°C)
Minimum temperature	**1.0°C** (0.5–1.5°C)	**1.6°C** (0.9–2.4°C)	**1.1°C** (0.6–1.7°C)	**3.3°C** (2.2–5.0°C)

The bold number is the ensemble average for the period. Underneath the average is the ensemble range.

Figure 2. Historical and projected average temperature change – Illawarra Shoalhaven

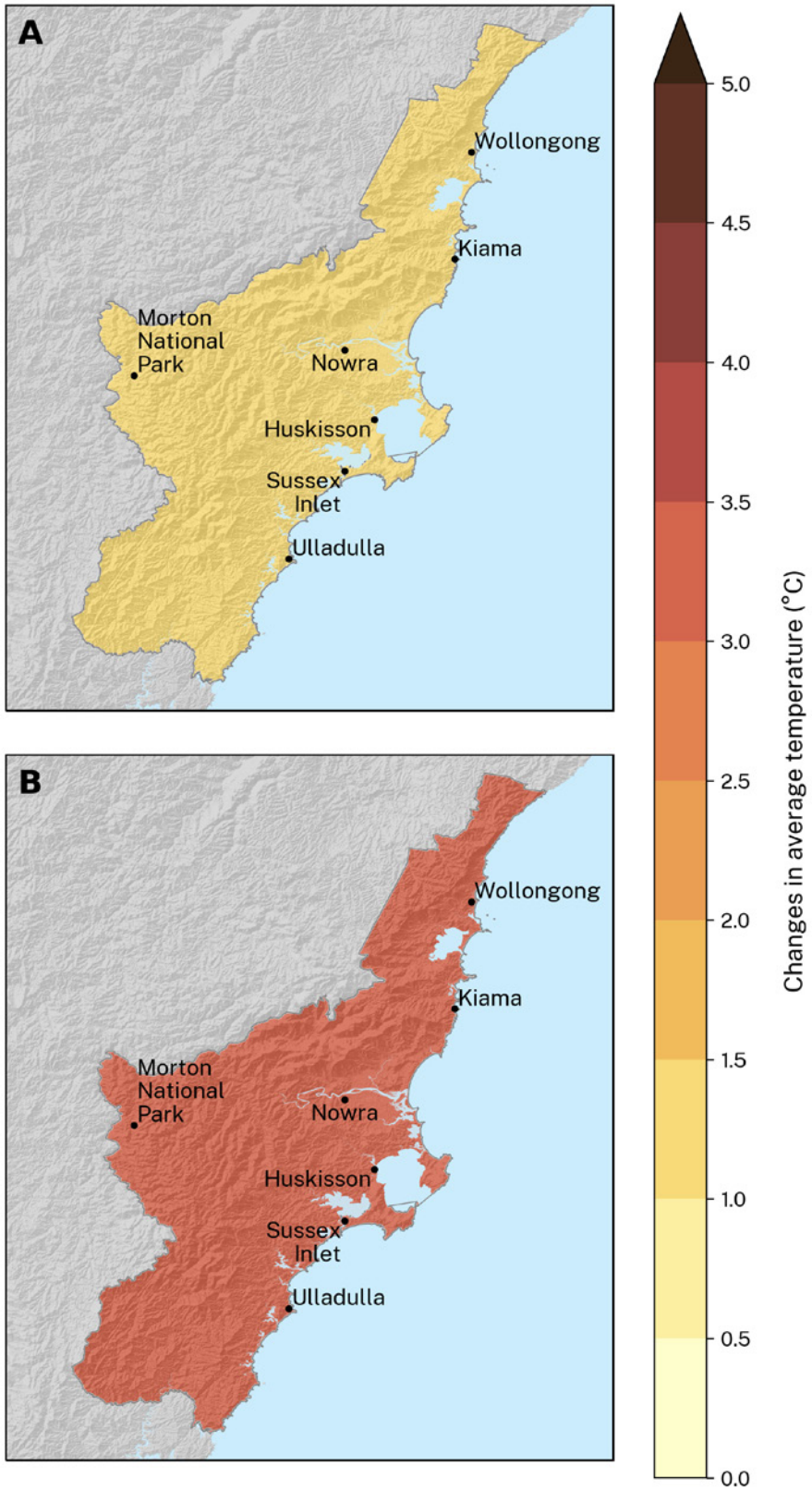


The shading around the graphs

The climate change projections presented in this snapshot are relative to the historical climate baseline of 1990–2009. The graphs provide a projected annual average for the 2 emissions scenarios.

The range of plausible climate futures across the NARCliM model ensemble is shown by light shading. For historical climate data, both recorded observational data (dark line) and modelling of the past climate in NARCliM2.0 (grey) are presented.

Figure 3. Projected change in average temperature by 2090 for the Illawarra Shoalhaven under A) a low-emissions scenario and B) a high-emissions scenario



Hot days

Hot days will become more frequent

Prolonged hot days where maximum temperatures are equal to or above 35°C increase the incidence of illness and death – particularly among vulnerable people. Seasonal changes in hot days could have significant impacts on bushfire danger, infrastructure and native species.

Projections

The number of hot days in the Illawarra Shoalhaven region is relatively uniform. During the baseline period, areas on the coast such as Kiama had on average 1 hot day per year. Areas further from the coast, such as Nowra and Morton National Park, had on average 3 hot days per year.

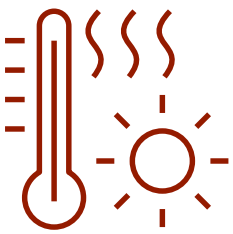
The number of hot days will increase for the Illawarra Shoalhaven region by 2050 for both a low-emissions and a high-emissions scenario, with an even greater increase by 2090 under a high-emissions scenario (Table 3). The number of hot days is projected to increase across spring, summer and autumn, with the largest increase in summer.

Under a low-emissions scenario, there is a minimal increase in the number of hot days between 2050 and 2090, with less than 1 additional day projected across the region (Table 3). However, an increase of 5.4 additional hot days is projected under a high-emissions scenario during the same period.

By 2090, the Illawarra Shoalhaven could experience nearly four times the number of hot days under a high-emissions scenario.

Increases to hot days will occur across all of the region (Figure 5). Inland areas such as Nowra and Morton National Park are projected to experience the greatest increases in the number of hot days. By 2090, Nowra is projected to experience 3.6 additional hot days per year under a low-emissions scenario and 9.5 additional hot days per year under a high-emissions scenario. A high-emissions scenario is projected to more than quadruple Nowra's baseline period average of 3 hot days per year. Comparatively, in the south of the region, Ulladulla's baseline period average is 1.5 hot days per year. By 2090, Ulladulla is projected to experience an additional 1.5 hot days per year under a low-emissions scenario and 4.1 additional hot days per year under a high-emissions scenario.

Changes to **temperature extremes** often have **more pronounced impacts** than changes in average **temperatures.**



Higher maximum temperatures affect health through **heat stress** and exacerbate existing health conditions.

Table 3. Projected increase in average annual number of hot days – Illawarra Shoalhaven

2050		2090	
Low-emissions	High-emissions	Low-emissions	High-emissions
2.5 days (0.6 to 5.2 days)	**3.9 days** (0.9 to 10.4 days)	**3.1 days** (0.5 to 7.4 days)	**9.3 days** (3.8 to 18.2 days)

The bold number is the ensemble average for the period. Underneath the average is the ensemble range.

Figure 4. Historical and projected change in annual number of hot days – Illawarra Shoalhaven

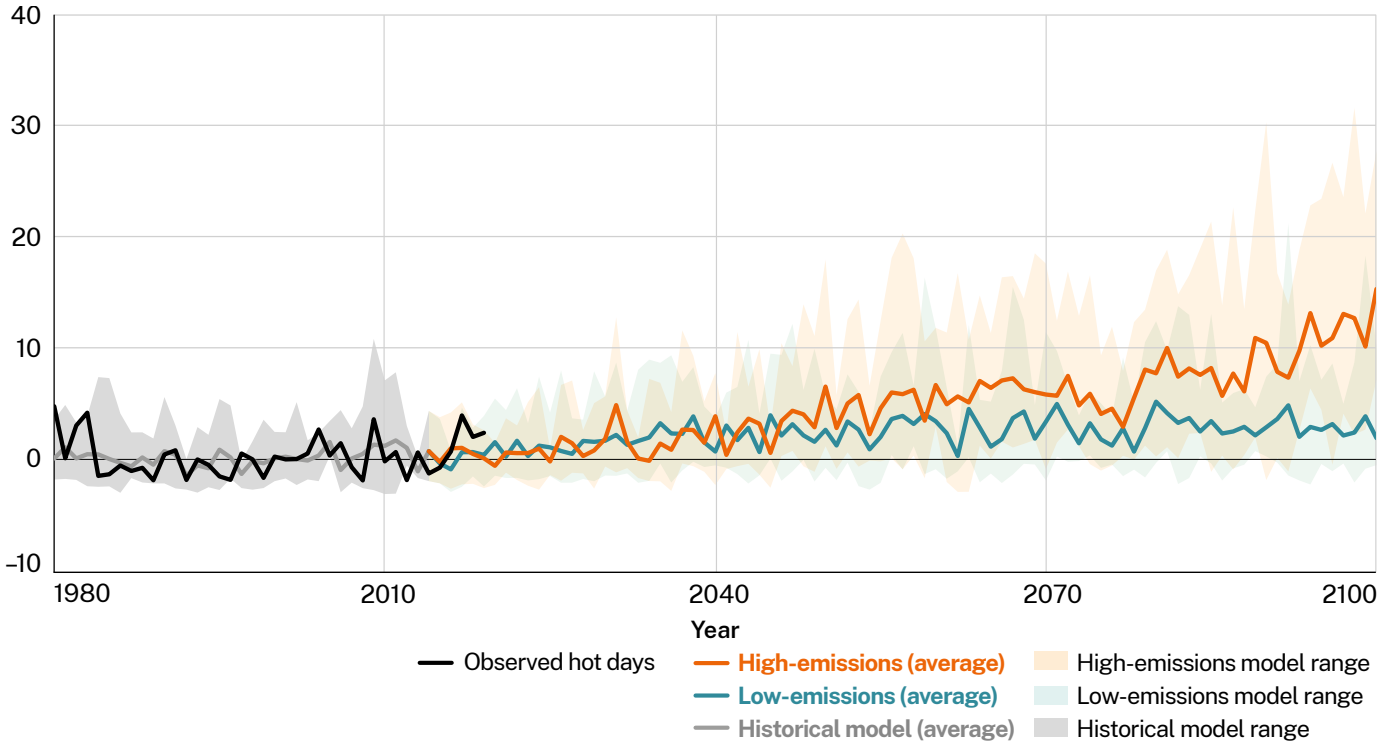
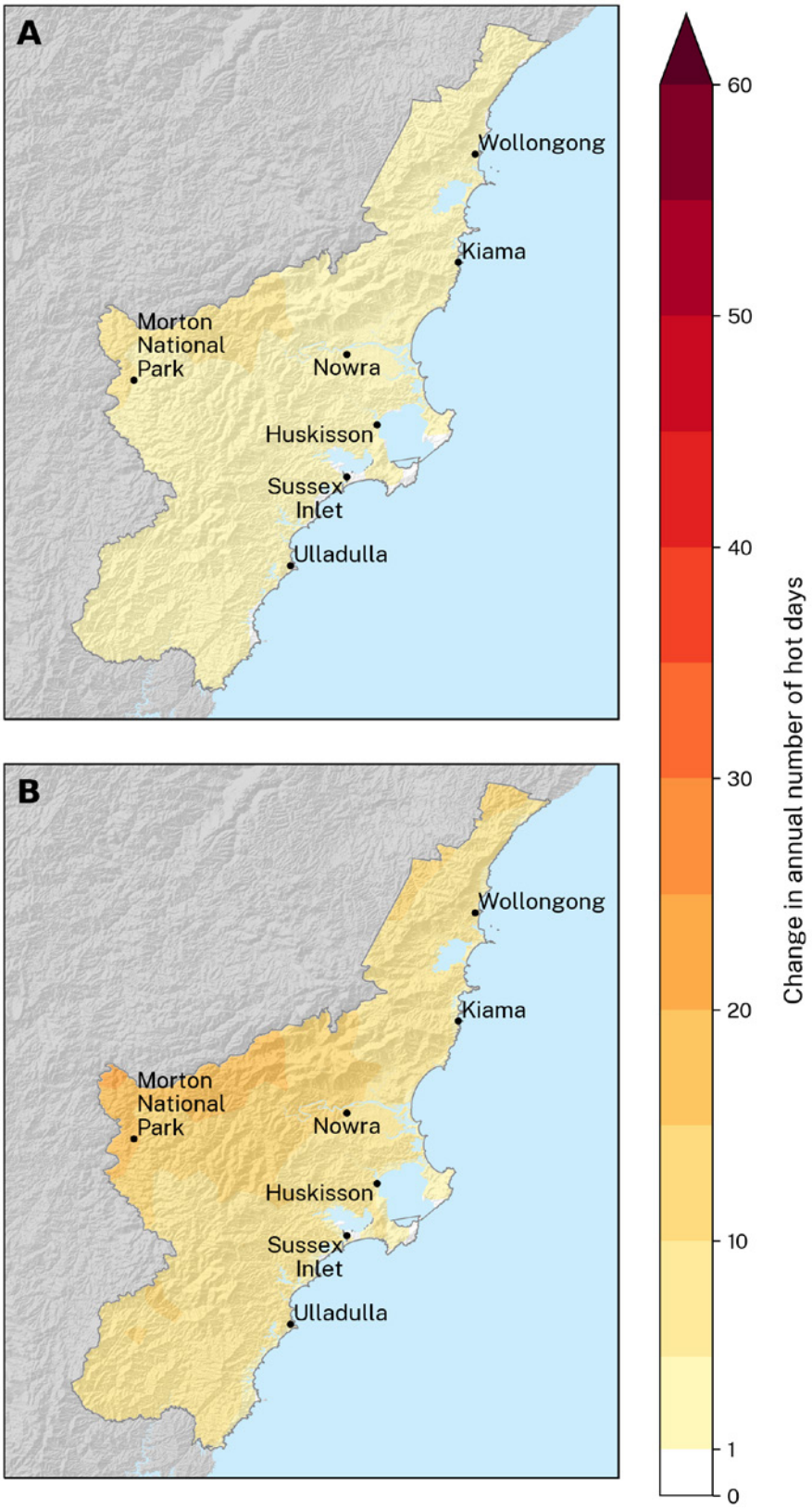


Figure 5. Projected change in annual number of hot days by 2090 for the Illawarra Shoalhaven under A) a low-emissions scenario and B) a high-emissions scenario



Cold nights

Cold nights will decrease

Cold nights are those where the minimum temperature drops below 2°C. These are important for the viability of some important plant species. For example, some common temperate fruit species require sufficiently cold winters to produce flower buds.

Projections

Cold nights in the Illawarra Shoalhaven region only occur in the west of the region in higher elevation areas such as Morton National Park. During the baseline period, this region had on average 60 cold nights per year. Areas along the coast of this region do not typically experience cold nights.

The number of cold nights will decrease for the Illawarra Shoalhaven region by 2050 for both a low-emissions and a high-emissions scenario, with an even greater decrease by 2090 under a high-emissions scenario (Table 4). The number of cold nights is projected to decrease across autumn, winter and spring, with the largest decreases in winter.

Under a high-emissions scenario, there could be a greater than 80% reduction in the annual number of cold nights across the Illawarra Shoalhaven by 2090.

Cold nights will decrease across some of the region, particularly in inland areas in the southwest of the region (Figure 7). Coastal areas will not experience any changes, as they do not experience cold nights below 2°C. The greatest decreases are projected to occur for Morton National Park and Budawang National Park. By 2090, Morton National Park is projected to have 16.8 fewer cold nights per year under a low-emissions scenario and 44.2 fewer cold nights per year under a high-emissions scenario. A high-emissions scenario is projected to reduce Morton National Park's 58.1 cold nights per year base period average by more than 75%.

Table 4. Projected decrease in average annual number of cold nights – Illawarra Shoalhaven

2050		2090	
Low-emissions	High-emissions	Low-emissions	High-emissions
4.2 days (2.4 to 6.1 days)	**6.6 days** (4.0 to 8.1 days)	**4.9 days** (2.7 to 6.6 days)	**10.5 days** (8.5 to 11.9 days)

The bold number is the ensemble average for the period. Underneath the average is the ensemble range.

Figure 6. Historical and projected change in annual number of cold nights – Illawarra Shoalhaven

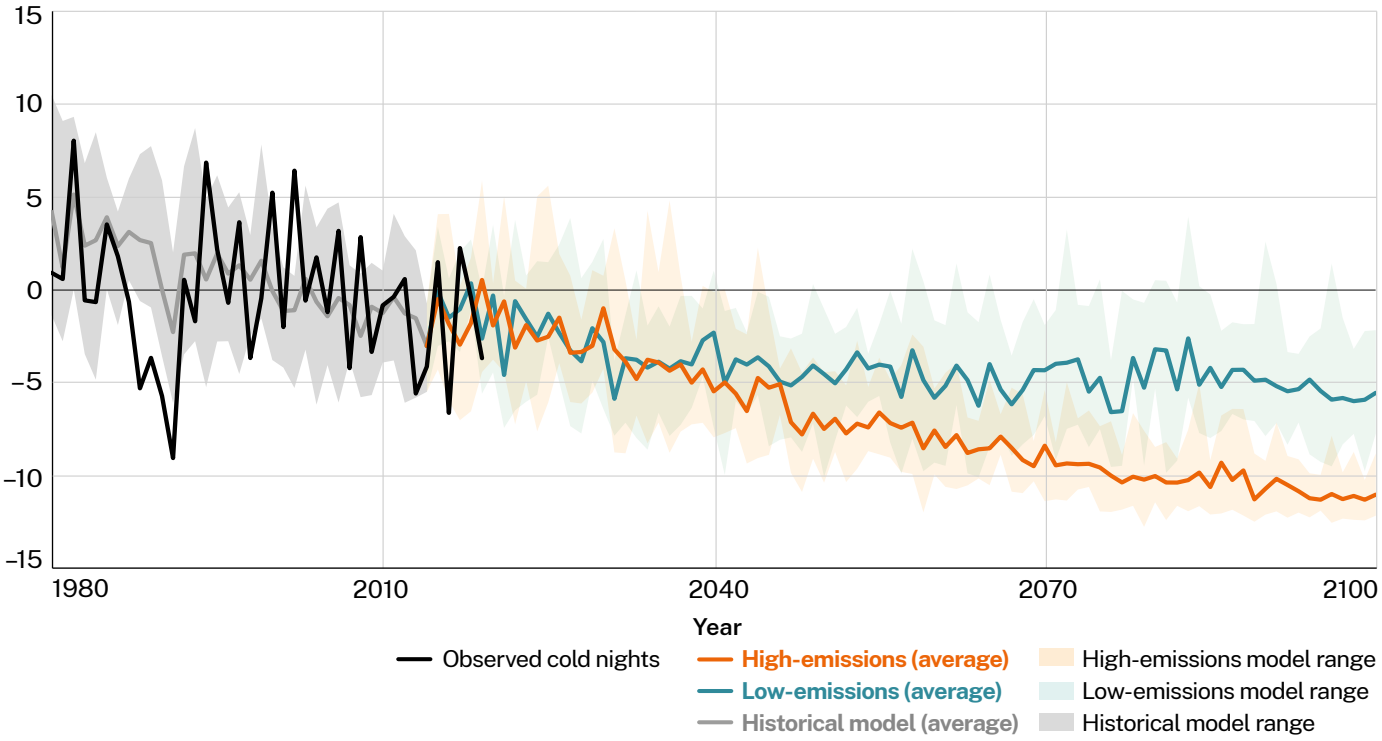
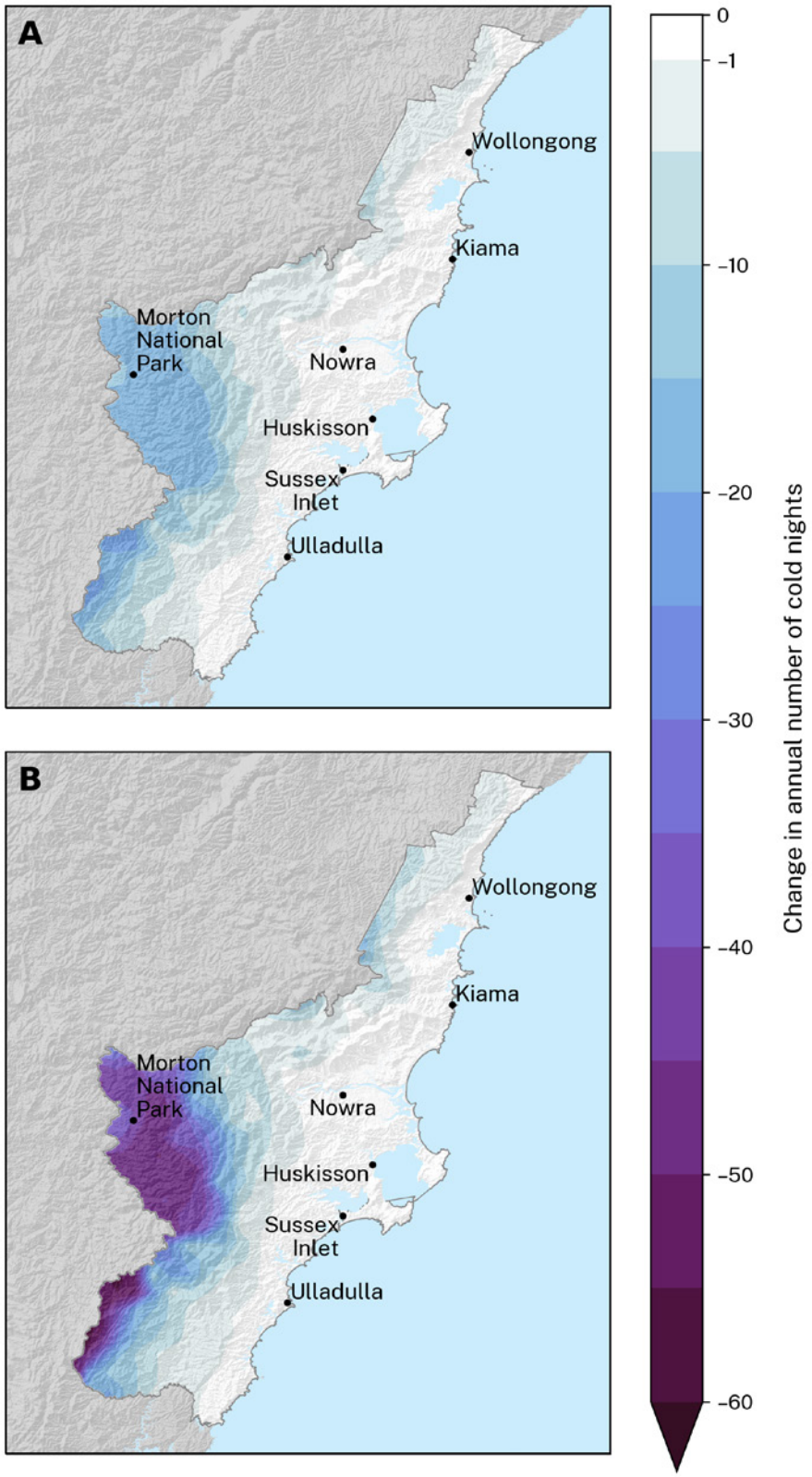
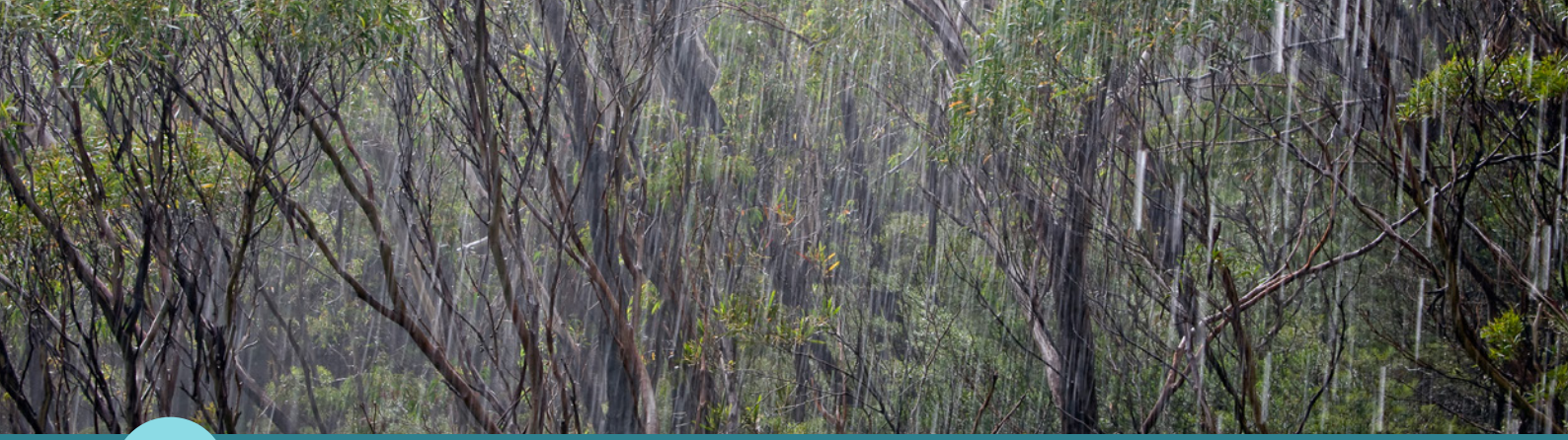


Figure 7. Projected change in annual number of cold nights by 2090 for the Illawarra Shoalhaven under A) a low-emissions scenario and B) a high-emissions scenario





Rainfall

Rainfall is projected to remain variable

Climate change will influence rainfall patterns and the total amount of rainfall that NSW receives. These changes may have widespread impacts on water security, agricultural productivity and native species' reproductive cycles.

NSW has experienced rainfall extremes in recent decades, with significant impacts on communities, infrastructure and natural ecosystems.

Modelling rainfall is more difficult than modelling temperature due to the complexities of the weather systems that generate rain. NARCliM projections capture a range of plausible climate futures under the 2 emissions scenarios, including wet and dry outcomes. This means that rainfall is inherently more variable in the NARCliM projections than temperature, and the full range of rainfall projections should be taken into account. This can be explored further on the AdaptNSW Interactive Map.

Annual rainfall across the Illawarra Shoalhaven region averages about 1060mm.[2] Rainfall is nearly uniformly distributed throughout the year with slightly more rain in summer and autumn. The driest year on record was 1944, with an average of only 580mm across the region. A notably dry year was also experienced in 2019, with approximately 630mm of rainfall across the region.[2]

Projections

This snapshot provides data on average rainfall change and does not provide data on rainfall extremes and the impacts of climate change on flooding.

Annual average rainfall in the region is projected to remain variable throughout this century (Figure 8). By 2090, on average, annual rainfall is projected to decrease by 11% under a low-emissions scenario and by 10% under a high-emissions scenario (Table 5).

By 2090, average winter rainfall is projected to decrease by 21% under a low-emissions scenario and by 35% under a high-emissions scenario (Table 5). Inland areas such as the Illawarra Escarpment and Morton National Park are projected to experience the greatest decreases in average winter rainfall. For average winter rainfall, Morton National Park is projected to experience 22% decrease under a low-emissions scenario and a 38% decrease under a high-emissions scenario.

Under a high-emissions scenario, average winter rainfall could decrease by 35% across the Illawarra Shoalhaven.

Average summer, autumn and spring rainfall is projected to change by 14% or less across the region by 2090 under both a low-emissions scenario and a high-emissions scenario. Refer to the Interactive Map for further seasonal information.

Table 5. Projected change to average rainfall – Illawarra Shoalhaven

	2050		2090	
	Low-emissions	High-emissions	Low-emissions	High-emissions
Annual	**–7.4%** (–19.9% to +12.8%)	**–17.1%** (–30.3% to +1.9%)	**–10.8%** (–24.8% to +12.5%)	**–9.6%** (–34.7% to +16.1%)
Summer	**–11.4%** (–23.7% to +10.8%)	**–17.4%** (–34.4% to +7.5%)	**–13.7%** (–25.8% to +15.1%)	**–1.2%** (–33.6% to +37.1%)
Autumn	**+2.0%** (–24.2% to +21.4%)	**–11.7%** (–33.2% to +6.7%)	**–3.2%** (–27.4% to +24.8%)	**+1.0%** (–24.5% to +53.5%)
Winter	**–16.9%** (–33.5% to +37.4%)	**–31.3%** (–52.2% to –2.3%)	**–20.9%** (–38.0% to +11.6%)	**–35.4%** (–61.4% to –3.8%)
Spring	**–5.0%** (–17.9% to +22.7%)	**–8.5%** (–22.9% to +7.0%)	**–6.2%** (–17.3% to +9.3%)	**–10.5%** (–30.8% to +11.3%)

The bold number is the ensemble average for the period. Underneath the average is the ensemble range.

Figure 8. Historical and projected change to average rainfall – Illawarra Shoalhaven

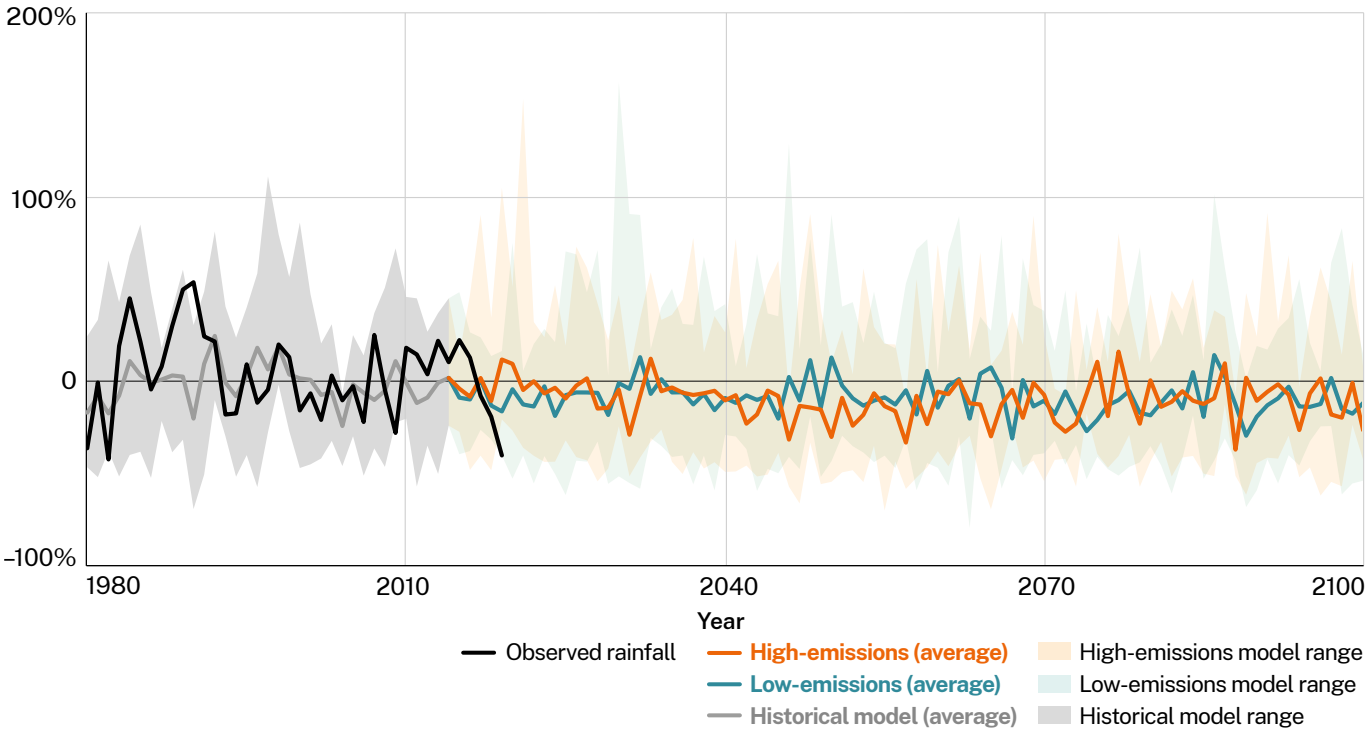
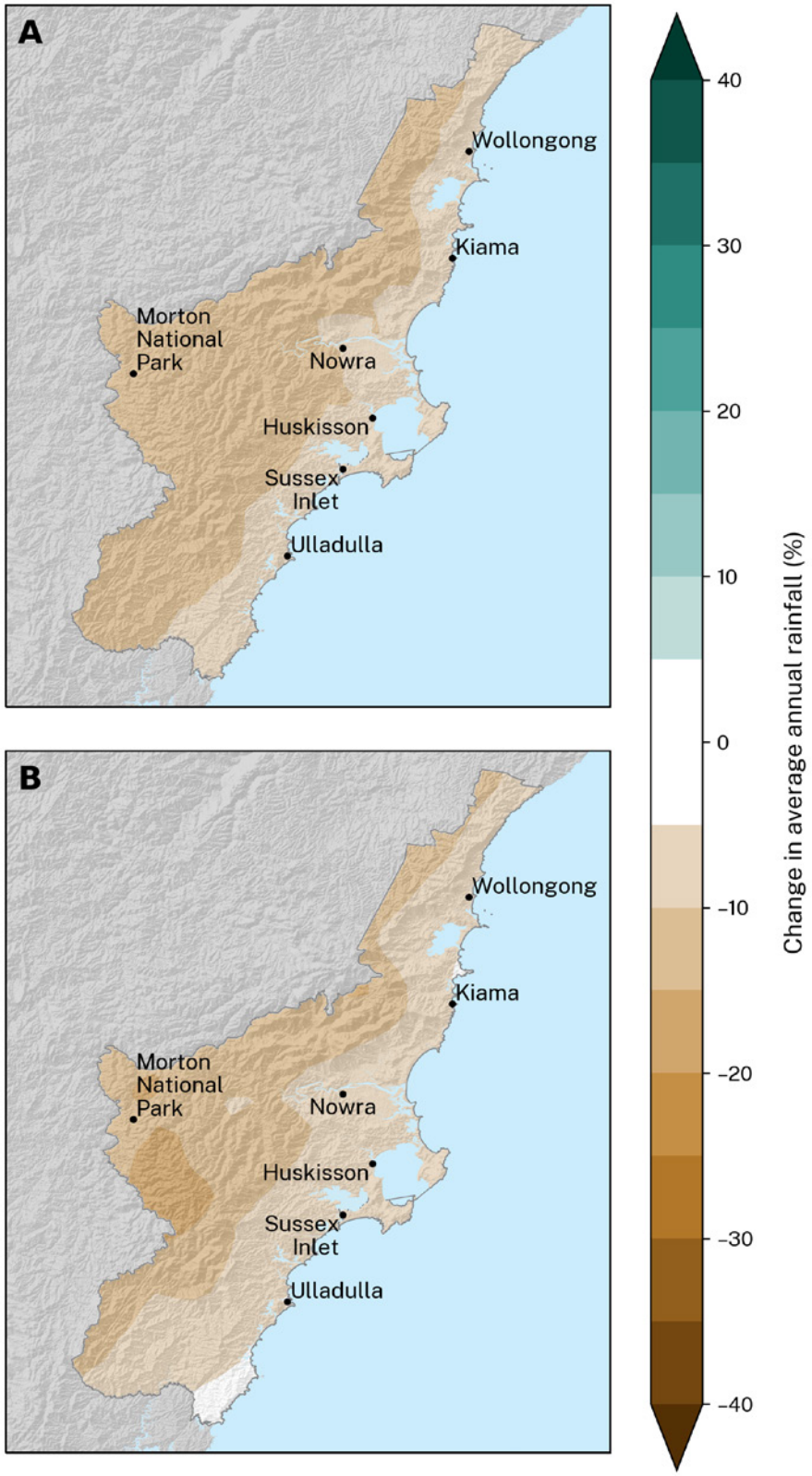


Figure 9. Projected change to average rainfall by 2090 for the Illawarra Shoalhaven under A) a low-emissions scenario and B) a high-emissions scenario



Severe fire weather

Severe fire weather will increase

The Forest Fire Danger Index (FFDI) represents an estimate of fire weather risk. The FFDI is calculated from temperature, relative humidity and wind speed, as well as a number representing fuel dryness.

Severe fire weather (FFDI greater than 50) is most likely in summer and spring. Fire weather was the strongest determining factor of house loss during the Black Summer bushfires.[3] The number of severe fire danger days observed for the Illawarra Shoalhaven region is 0.3 days per year on average.[2] The number of severe fire danger days is generally low across coastal areas of the region, with relatively more severe fire danger days in inland areas of the region such as Morton National Park. The record number of severe fire danger days in a year was 2013 with 3.1 days on average across the region.[2] A year of notable severe fire weather was also recorded in 2019, with approximately 2.4 days on average across the region[2], including 2 days recorded at the Kiama station and 11 days recorded at the Nowra station.[4]

Fire weather was the strongest determining factor of house loss during the Black Summer bushfires.[3]

FFDI was monitored by weather stations across NSW and the ACT until the introduction in 2022 of the Australian Fire Danger Rating System. FFDI is used in this snapshot as it can be simulated using the NARCliM projections, whereas data used by the Australian Fire Danger Rating System cannot. FFDI also provides a long history of data and gives context to the NARCliM projections.

Projections

The number of severe fire weather days will increase for the Illawarra Shoalhaven region by 2050 under a high-emissions scenario, with an even greater increase projected by 2090 under a high-emissions scenario (Table 6). The number of severe fire weather days is projected to increase during spring and summer, with the largest increase in spring.

Under a high-emissions scenario, the number of annual severe fire weather days could triple across the Illawarra Shoalhaven by 2090.

Increases to severe fire weather days are projected to occur across most of the region (Figure 11). The greatest increases are projected to occur for Nowra and inland areas of bushland such as Morton National Park, with only small increases projected in some coastal areas of the region such as Huskisson and Ulladulla. By 2090, Nowra is projected to experience 0.7 additional severe fire weather days per year under a low-emissions scenario and 1.9 additional severe fire weather days per year under a high-emissions scenario. A high-emissions scenario is projected to double Nowra's baseline period average of 1.9 severe fire weather days per year. Comparatively, in the south of the region, Huskisson's baseline period average is 0.6 severe fire weather days per year. By 2090, Huskisson is projected to experience 0.4 additional severe fire weather days per year under a low-emissions scenario and 0.8 additional severe fire weather days per year under a high-emissions scenario.

Table 6. Projected increase in average annual number of severe fire weather days – Illawarra Shoalhaven

2050		2090	
Low-emissions	High-emissions	Low-emissions	High-emissions
0.3 days (0.0 to 1.0 days)	**0.6 days** (–0.1 to 1.8 days)	**0.4 days** (–0.3 to 1.4 days)	**1.4 days** (0.1 to 3.3 days)

The bold number is the ensemble average for the period. Underneath the average is the ensemble range.

Figure 10. Historical and projected change to annual number of severe fire weather days – Illawarra Shoalhaven

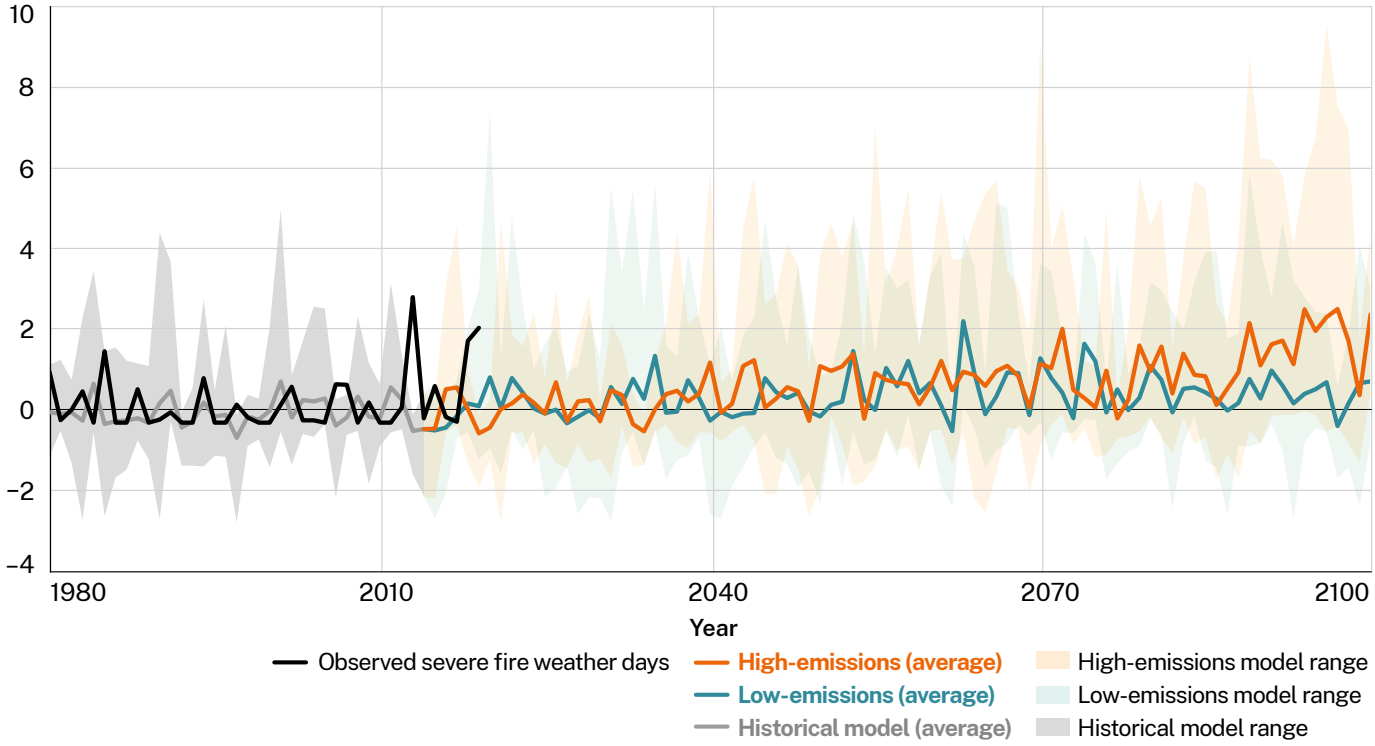
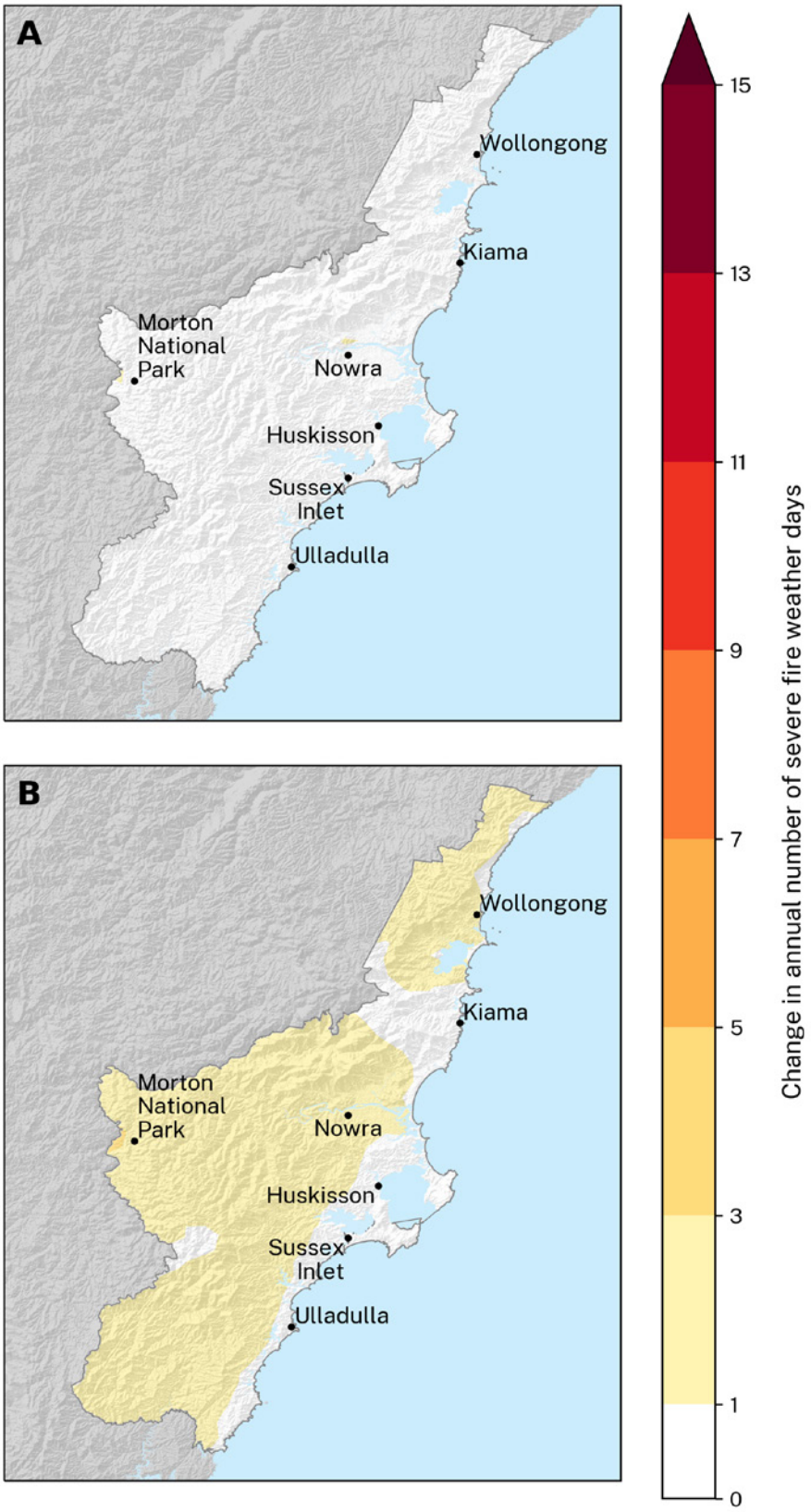
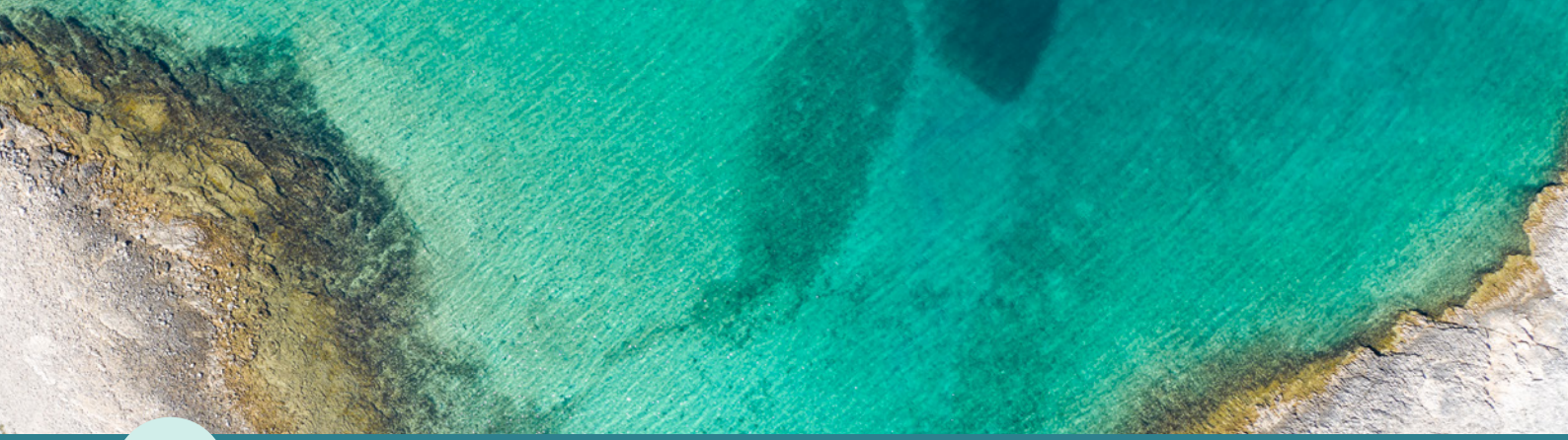


Figure 11. Projected change to annual number of severe fire weather days by 2090 for the Illawarra Shoalhaven under A) a low-emissions scenario and B) a high-emissions scenario





Sea-level rise

Sea-level rise will accelerate

Sea levels are rising and are projected to have a major impact on coastal communities in NSW over the coming decades. At the NSW baseline sea-level monitoring gauge at Port Kembla, average sea level has been rising at a rate of approximately 3.7mm/year since 1991.

Sea-level rise of 3.7mm/year has already led to increases in inundation of streets in some NSW coastal communities.[5,6]

The 'likely' range of sea-level rise is presented here by the low (SSP1-2.6) and high (SSP3-7.0) emissions scenarios, to correspond with the NARCliM climate projections. This likely range was assessed by the IPCC as data within an uncertainty interval of 66%. A broader range of projections and uncertainty is available in the 2021 IPCC Sixth Assessment Report.

Sea level for the Illawarra Shoalhaven is projected to continue rising under all emissions scenarios. At Port Kembla, sea level is projected to rise by 11–24cm under a low-emissions scenario and by 16–28cm under a high-emissions scenario by 2050 relative to a baseline period of 1995–2014.

Later in the century, sea-level rise is projected to accelerate under both emissions scenarios, with significantly faster acceleration under a high-emissions scenario. Sea-level rise by 2100 is projected to be 24–56cm under a low-emissions scenario and 50–91cm under a high-emissions scenario. Even greater sea-level rise will occur by 2150, with a projected rise of 33–93cm under a low-emissions scenario and 84–165cm under a high-emissions scenario.

These projections do not factor in contributions from ice-sheet instability, which have high uncertainty. The IPCC addresses this uncertainty by providing modelling explained in a low-likelihood, high-impact storyline assessed as 'low-confidence'. At Port Kembla, this low-confidence modelling indicates a potential upper limit of sea-level rise of 55cm by 2050, 2.3m by 2100 and 5.4m by 2150.

Sea-level rise will continue for centuries to millennia due to the longer-term response of the oceans and ice sheets to climate change.

In the longer term, the IPCC indicates sea level will rise for centuries to millennia due to continuing deep ocean warming and ice-sheet melt, remaining elevated for thousands of years. If global warming is limited to 1.5°C, average sea level will rise by about 2–3m worldwide. For 2°C warming, sea-level rise of 2–6m is expected, and for 5°C warming, 19–22m is expected.

Climate change impacts on the Illawarra Shoalhaven

Climate change is already impacting the Illawarra Shoalhaven region, particularly through increased temperatures and sea-level rise. Climate change will continue impacting a variety of important economic, cultural and environment values across the region.

Sea-level rise

Sea-level rise is expected to have significant impacts on coastal ecosystems such as Lake Illawarra. Sea-level rise causes foreshore erosion, loss of sensitive ecological communities such as saltmarsh and the inundation of infrastructure and assets.[7] Infrastructure and assets are expected to be increasingly vulnerable to the impacts of sea-level rise in the future, particularly under a high-emissions scenario. Low-lying coastal areas such as the Shoalhaven River are also vulnerable to reduced floodplain drainage and prolonged inundation of floodplains from sea-level rise. The areas are particularly vulnerable where land is below the low tide level and floodplain drainage infrastructure is aging.[8] Increased inundation of these areas from sea-level rise will have major impacts on land-use and productivity, particularly under a high-emissions scenario.

Bushfires

The region also experienced significant impacts during the 2019–2020 bushfire season with extensive impacts to communities, infrastructure and natural ecosystems. Over 320,000 hectares of the region were burnt and 10,880 buildings were impacted, including 286 homes which were destroyed.[9] There were 23 premature deaths, as well as 30 cardiovascular disease and 107 respiratory disease hospitalisations across the region from poor air quality caused by the bushfires.[10] Large areas of bushland experienced extreme fire severity, including Conjola National Park and Morton National Park. Approximately 80% of Morton National Park was burnt in the fires.[11] Severe fire danger days, which create the underlying conditions for large-scale bushfires, are expected to become more common in the future, particularly under a high-emissions scenario.

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Climate action and information

Climate action

The NARCliM projections for the low-emissions scenario and the high-emissions scenario highlight the stark difference in climate change impacts that will be experienced under each scenario. The differences provide a reminder of the required action across the world to reduce emissions, and specifically within NSW to meet our legislated Net Zero by 2050 emissions reduction targets. This is our best chance at ensuring the future projections under the high-emissions scenario are avoided. The NARCliM projections highlight the importance of taking action to adapt to the impacts of climate change. For more resources on reducing emissions and adapting to the impacts of climate change, visit AdaptNSW.

Information

NARCliM projections are delivered with support from: the ACT, South Australian, Victorian and Western Australian governments; National Computational Infrastructure; Murdoch University; and the University of New South Wales. Detailed information on the methodology and application of the projections can be found on the AdaptNSW website.

Climate change information in this snapshot is delivered as part of the NSW Government's commitment to 'Publish regularly updated and improved local level climate change projections' under Action 3 of the NSW Climate Change Adaptation Strategy.

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