South Australia's environmental trend and condition climate report cards 2023

SOUTH AUSTRALIA

Government of South Australia

Department for Environment and Water

Contents

Acknowledgment of country

We acknowledge and respect the Traditional Custodians whose ancestral lands we live and work upon and we pay our respects to their Elders past and present. We acknowledge and respect their deep spiritual connection and the relationship that Aboriginal and Torres Strait Islanders people have to Country.

We also pay our respects to the cultural authority of Aboriginal and Torres Strait Islander people and their nations in South Australia, as well as those across Australia.

Your guide to statewide report cards

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Trend

Over more than 30 years, significant regional variation can be seen in seasonal rainfall trends across South Australia with summer rainfall increasing in the north of the state and winter rainfall decreasing in the south.

Significant drying trends are seen across much of South Australia's southern agricultural areas in April to October (top figure). Rainfall totals across many southern areas of the state have been very much below average compared to all previous 30-year periods since 1900. With April to October rainfall typically averaging 300–500 mm in southern South Australia, declines of 10–40 mm per decade since 1990 are significant. These rainfall declines are consistent with climate change projections and are also seen in other mid-latitude areas in Australia such as south-west Western Australia and Victoria. Pastoral areas in north-western South Australia are seeing increased tropically influenced rainfall during November to March (bottom figure).

Trends were determined from the latest Bureau of Meteorology data based on observed rainfall across Australia.

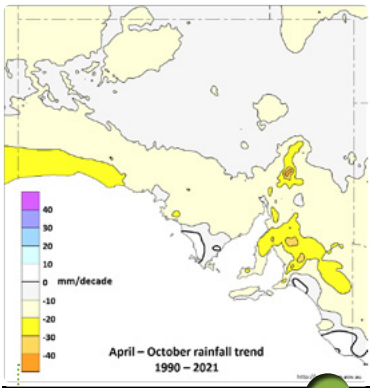
Condition

The condition is rated as fair because there are significant declines in April to October rainfall in southern South Australia.

The persistent drying trend in southern South Australia has the potential to affect future water security, reduce agricultural yields, increase fire risk, and impact ecosystems.

Wetlands and water dependent ecosystems, particularly in the south-east of the state, have experienced a reducing duration of surface water inundation during the drier months of each year, resulting in encroachment of dryland terrestrial vegetation.

Rainfall is declining in April to October in South Australia's southern agricultural areas and increasing in November to March in the north-west. 10



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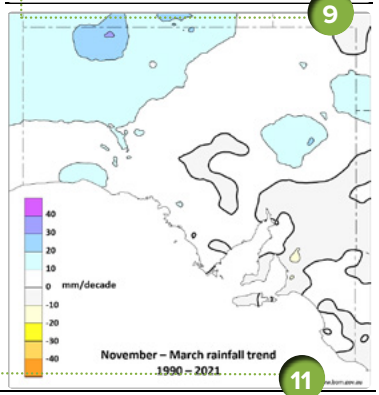

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Why is rainfall important?

Climate affects almost every part of our lives. Communities, industries, landscapes and ecosystems all develop with a tolerance for a range of climate variation. If the climate changes beyond that range of tolerance, then they must either adapt, migrate, transform or decline.

One example of the impact of a warming climate is declining rainfall in mid-latitudes (including South Australia), which will follow a widening of the tropics in a warmer planet. Declining rainfall impacts water security, agricultural yields, fire risk, and ecosystem function.

What are the drivers?

According to the Australian Academy of Science, "Earth's climate has changed over the past century. The atmosphere and oceans have warmed, sea levels have risen, and glaciers and ice sheets have decreased in size. The best available evidence indicates that greenhouse gas emissions from human activities are the main cause. Continuing increases in greenhouse gases will produce further warming and other changes in Earth's physical environment and ecosystems."

What is being done?

The Government of South Australia supports a wide range of initiatives to reduce greenhouse gas emissions and help the state to adapt to the changing climate. These include supporting renewable energy generation and storage, carbon sequestration, land use planning reforms, climate related hazard risk reduction, coastal protection, greening to cool urban environments, circular economy initiatives, and regional adaptation projects. The government provides downscaled climate projections information and tools for South Australia.

For further information see: technical information 12

Government of South Australia

1. The '**indicator**' is what we measured to assess trend and condition. This is the focus of the report card.
2. The overarching '**theme**' of the report card.
3. The '**sub-theme**' of the report card represented by an icon.
4. The **banner colour** indicates the trend of the report card.
5. The '**trend**' is the change in the indicator (see 1) over time. Generally this is a statewide trend, however for some report cards it applies to a smaller geographical area.
6. The '**condition**' is the current state of the indicator (see 1).
7. Rating out of 5 for the **reliability of the information** based on collection methods, age of the information, and how applicable and accurate the information is.
8. The **Pressure-State-Response model category** for the indicator: 'State' is an indicator that describes a natural value or asset. 'Pressure' is an indicator that drives change in a natural value or asset. 'Response' is an indicator that describes management interventions aimed at improving the condition of the assets.
9. A **map**, which is on most report cards, generally shows regional trends.
10. The **key message** that sums up the report card.
11. **Background information**.
12. A hyperlink to access further **technical information.**

Icon index

Trend

- Getting better
- Stable
- Getting worse
- Unknown

Condition

- Very good
- Good
- Fair
- Poor
- Not applicable
- Unknown

Information reliability

- Excellent
- Very good
- Good
- Fair
- Poor

2023 environmental trend and condition climate report cards

Image: Tourism Australia, Flinders Ranges & Outback

Climate theme

Climate change is a pressing issue affecting South Australia, driven primarily by human-induced greenhouse gas emissions. The state has witnessed significant changes in its climate, including rising temperatures, increased frequency of hot days, heightened fire danger weather conditions, declining rainfall, and rising sea levels. Projections based on climate models indicate that these changes will persist in the coming decades, necessitating effective planning and preparedness. The South Australian Government is actively involved in providing climate science information, promoting renewable energy and emissions reduction.

Importance of the theme

Understanding and addressing climate change in South Australia is of critical importance due to its wide-ranging impacts. The changing climate poses risks to communities, industries, infrastructure, and the environment. Rising temperatures and prolonged heatwaves can have detrimental effects on human health, agriculture, and ecosystems. Declining rainfall patterns affect water availability and agricultural productivity, while increased fire danger weather conditions pose significant risks to lives, properties, and biodiversity. Additionally, rising sea levels threaten coastal areas and infrastructure. Recognising the importance of this theme is crucial for developing strategies to mitigate and adapt to climate change impacts.

Pressures and drivers

The primary pressure driving climate change in South Australia is the accumulation of greenhouse gas emissions resulting from human activities, particularly from fossil fuel energy generation. These emissions contribute to long-term shifts in temperatures and weather patterns, impacting rainfall, temperature, sea levels, and fire risk. To address these pressures, reducing emissions and promoting carbon sequestration are essential. South Australia has made progress in decreasing greenhouse gas emissions, with notable reductions in agriculture, fugitive emissions, and stationary energy sources. However, emissions from transport, waste, and industrial processes have increased since 2005.

Changing trend and condition

South Australia has experienced a strong warming trend since the 1970s, with average temperatures currently 1.1°C warmer than in the 1970s.

The frequency of days reaching 40°C in Adelaide in the past decade has been three times the average frequency of the preceding four decades.

Climate projections forecast further temperature increases and more days above 40°C by 2050. Rainfall trends vary across the state, with summer rainfall increasing in the north.

Fire danger weather conditions have become more frequent and severe since the late 1970s, particularly in eastern parts of the state.

Sea levels along the coast of South Australia have been rising at an average rate of approximately 2 mm/year between 1966 and 2022.

Actions and management

The South Australian Government has taken significant actions to address climate change and manage its impacts. It has set ambitious targets, aiming for 100% net renewable energy by 2030, a reduction of over 50% in net greenhouse gas emissions below 2005 levels by 2030, and achieving net zero emissions by 2050. These targets align with global efforts to limit global warming and mitigate climate change.

By providing accessible and high-quality climate information, the South Australian Government aims to assist governments, businesses, and communities in making informed decisions and taking proactive measures.

Climate theme

Indicator	Trend	Condition	Information reliability	Summary of change
Rainfall	Getting worse	Fair	Good	Rainfall is declining in April to October in South Australia's southern agricultural areas and increasing in November to March in the north-west.
Projected rainfall	Getting worse	NA Not applicable	Fair	Annual and spring rainfall across South Australia is projected to decline significantly by 2050.
Temperature	Getting worse	Fair	Good	Average annual temperatures have increased across South Australia, particularly in the arid north-east.
Projected temperature	Getting worse	NA Not applicable	Good	Higher maximum temperatures and more days of 40°C or more are projected for South Australia.
Sea level	Getting worse	Fair	Good	Sea levels along South Australia's coast are rising, and the rate of rise is increasing.
Projected sea level	Getting worse	NA Not applicable	Good	Sea levels along South Australia's coast are rising, and the rate of rise is projected to increase in the future.
Fire danger weather	Getting worse	Fair	Good	Fire danger weather has increased in occurrence and severity across most of the state since the 1970s.
Greenhouse gas emissions	Getting better	Good	Good	South Australia's greenhouse gas emissions decreased by 42% between 2004–05 and 2020–21.
Renewable energy	Getting better	Very good	Very good	South Australia has transformed its energy system from 1% to over 69% renewable energy in just over 20 years.

Rainfall

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting worse

Condition
Fair

Reliability
Good

STATE

Trend

Over more than 30 years, significant regional variation can be seen in seasonal rainfall trends across South Australia with summer rainfall increasing in the north of the state and winter rainfall decreasing in the south.

Significant drying trends are seen across much of South Australia's southern agricultural areas in April to October (top figure). Rainfall totals across many southern areas of the state have been very much below average compared to all previous 30-year periods since 1900. With April to October rainfall typically averaging 300–500 mm in southern South Australia, declines of 10–40 mm per decade since 1990 are significant. These rainfall declines are consistent with climate change projections and are also seen in other mid-latitude areas in Australia such as south-west Western Australia and Victoria. Pastoral areas in north-western South Australia are seeing increased tropically influenced rainfall during November to March (bottom figure).

Trends were determined from the latest Bureau of Meteorology data based on observed rainfall across Australia.

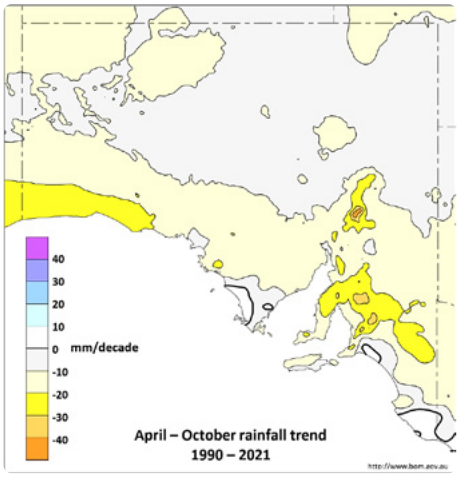
Condition

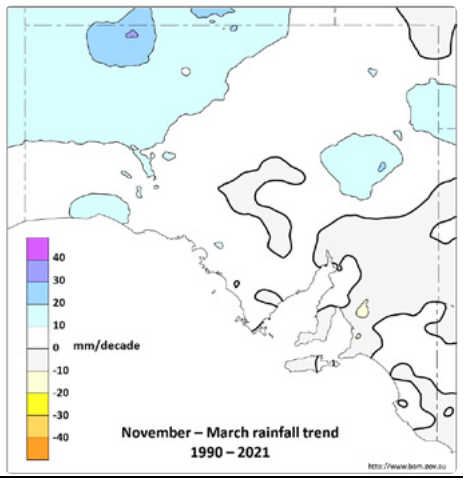
The condition is rated as fair because there are significant declines in April to October rainfall in southern South Australia.

The persistent drying trend in southern South Australia has the potential to affect future water security, reduce agricultural yields, increase fire risk, and impact ecosystems.

Wetlands and water dependent ecosystems, particularly in the south-east of the state, have experienced a reducing duration of surface water inundation during the drier months of each year, resulting in encroachment of dryland terrestrial vegetation.

Rainfall is declining in April to October in South Australia's southern agricultural areas and increasing in November to March in the north-west.





Why is rainfall important?

Climate affects almost every part of our lives. Communities, industries, landscapes and ecosystems all develop with a tolerance for a range of climate variation. If the climate changes beyond that range of tolerance, then they must either adapt, migrate, transform or decline.

One example of the impact of a warming climate is declining rainfall in mid-latitudes (including South Australia), which will follow a widening of the tropics in a warmer planet. Declining rainfall impacts water security, agricultural yields, fire risk, and ecosystem function.

What are the drivers?

According to the Australian Academy of Science, "Earth's climate has changed over the past century. The atmosphere and oceans have warmed, sea levels have risen, and glaciers and ice sheets have decreased in size. The best available evidence indicates that greenhouse gas emissions from human activities are the main cause. Continuing increases in greenhouse gases will produce further warming and other changes in Earth's physical environment and ecosystems."

What is being done?

The Government of South Australia supports a wide range of initiatives to reduce greenhouse gas emissions and help the state to adapt to the changing climate. These include supporting renewable energy generation and storage, carbon sequestration, land use planning reforms, climate related hazard risk reduction, coastal protection, greening to cool urban environments, circular economy initiatives, and regional adaptation projects. The government provides downscaled climate projections information and tools for South Australia.

For further information see: technical information

Projected rainfall

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting worse

Condition
N/A
Not applicable

Reliability
Fair

STATE

Trend

Average annual rainfall across South Australia is projected to decrease by between 4% and 23% by 2050 under plausible emissions scenarios.

Under a medium emissions (RCP4.5) scenario, average annual rainfall is projected to decline by 2–10% by 2030 and by 4–23% by 2050. Beyond 2050, changes are greater under a high emissions (RCP8.5) scenario, particularly later in the century. By 2090, projected rainfall declines are 7–20% under medium emissions and 23–37% under high emissions (top figure).

In most South Australian landscape regions, the projected decline is greater for average spring rainfall than for average annual rainfall. Under a medium emissions scenario, average spring rainfall is projected to decline by 8–24% by 2050. Beyond 2050, there is a further projected decline in the northern regions and Kangaroo Island, but not in the southern agricultural regions of the state. Changes are much greater under a high emissions scenario, with projected spring rainfall declines of 35–52% by 2090 (bottom figure).

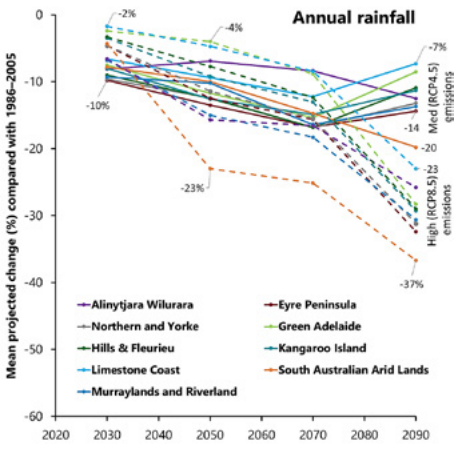
Condition

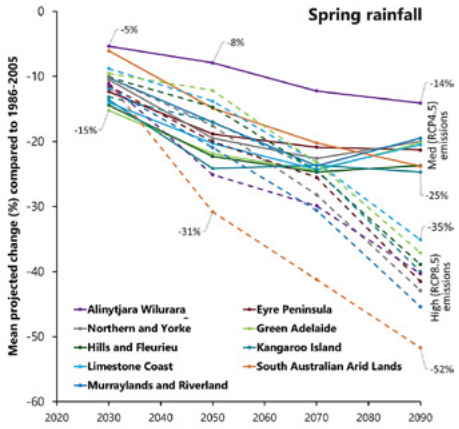
A condition rating is not applicable as this is an assessment of projected rainfall under likely climate scenarios.

This assessment draws from rainfall projections presented in the Government of South Australia's Guide to Climate Projections for Risk Assessment and Planning.

Each of the graphed projections is the average of 6 projections from a combination of 3 global climate models and 2 regional climate models. The projected changes are relative to rainfall during a baseline period spanning 1986–2005. Two scenarios of global atmospheric greenhouse gas concentrations are shown, representing medium and high greenhouse gas emissions.

Annual and spring rainfall across South Australia is projected to decline significantly by 2050.





Why is rainfall important?

Climate affects almost every part of our lives. Communities, industries, landscapes and ecosystems all develop with a tolerance for a range of climate variation. If the climate changes beyond that range of tolerance, then they must either adapt, migrate, transform or decline.

One example of the impact of a warming climate is declining rainfall in mid-latitudes (including South Australia), which will follow a widening of the tropics in a warmer planet. Declining rainfall impacts water security, agricultural yields, fire risk, and ecosystem function.

What are the drivers?

According to the Australian Academy of Science, "Earth's climate has changed over the past century. The atmosphere and oceans have warmed, sea levels have risen, and glaciers and ice sheets have decreased in size. The best available evidence indicates that greenhouse gas emissions from human activities are the main cause. Continuing increases in greenhouse gases will produce further warming and other changes in Earth's physical environment and ecosystems."

What is being done?

Climate change projections, including rainfall projections, are periodically improved and updated in line with advancements in climate modelling.

Actions in response to the changing climate include those that mitigate South Australia's emissions as part of a global effort to stem further change in the global climate. The Government of South Australia has statewide goals to reduce net greenhouse gas emissions by more than 50% by 2030, achieve net zero emission by 2050, and achieve 100% renewable energy generation by 2030.

For further information see: technical information

Temperature

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting worse

Condition
Fair

Reliability
Good

STATE

Trend

Average annual temperatures across South Australia have been increasing since the 1970s, with the highest rates of increase in the north of the state.

This assessment uses Bureau of Meteorology Australian variability and change trend maps. These are based on observed temperature data from Bureau monitoring stations distributed across Australia.

Mean annual temperature, averaged across South Australia is now approximately 1.1 degrees Celsius (°C) warmer than in the 1970s.

The increase in annual average temperature has been variable, such that the coolest parts of the state in the Limestone Coast (LC) region have seen the lowest increases (top figure).

The highest rate of increase in temperature is observed in the South Australian Arid Lands (SAAL) region, where mean annual temperatures in some areas have increased by up to 1.5°C over the past 50 years in what was already the warmest part of South Australia.

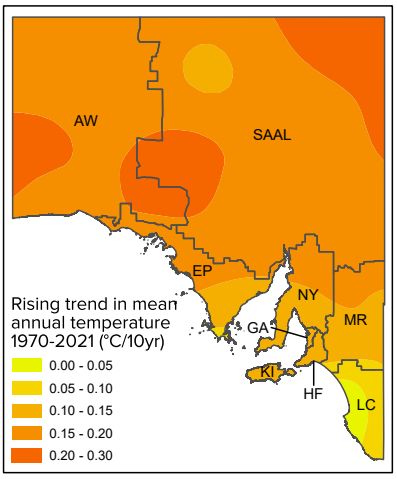
Condition

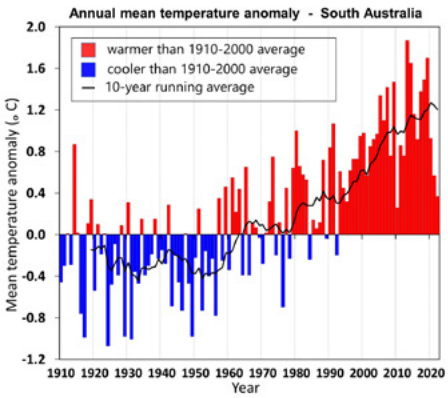
The condition is rated as fair. Overall, changes in temperature across South Australia since the 1970s have been manageable.

In the 30 years from 1993–2022, South Australia has not experienced any years with a mean temperature below the mean annual temperature of the 20th century (bottom figure).

The hot and arid north-east of South Australia now experiences a higher frequency of very hot daytime and nighttime temperatures during summer. In Adelaide, the average frequency of days reaching 40°C in the 10 years from 2013–2022 has been 5.1 days per year. This is nearly 3 times the frequency of 40°C days in the preceding 40 years.

Average annual temperatures have increased across South Australia, particularly in the arid north-east.





Why is temperature important?

Climate affects almost every part of our lives. Communities, industries, landscapes and ecosystems all develop with a tolerance for a range of climate variation. If the climate changes beyond that range of tolerance, then they must either adapt, migrate, transform or decline.

One example of the impact of a rise in average temperatures is an increase in the occurrence of severe heatwaves. This has important implications for human health, food production and biodiversity.

What are the drivers?

According to the Australian Academy of Science, "Earth's climate has changed over the past century. The atmosphere and oceans have warmed, sea levels have risen, and glaciers and ice sheets have decreased in size. The best available evidence indicates that greenhouse gas emissions from human activities are the main cause. Continuing increases in greenhouse gases will produce further warming and other changes in Earth's physical environment and ecosystems."

What is being done?

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For further information see: technical information

Projected temperature

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting worse

Condition
N/A
Not applicable

Reliability
Good

STATE

Trend

Average daily maximum temperatures across South Australia are projected to increase by between 1.4 and 2.2 degrees Celsius (°C) by 2050 under plausible emissions scenarios.

Two scenarios of global atmospheric greenhouse gas concentrations are shown, representing medium (RCP4.5) and high (RCP8.5) emissions (top figure). Under medium emissions, average maximum temperatures could increase by between 1.0°C and 1.3°C by 2030 and by between 1.4°C and 1.8°C by 2050. Changes are even greater under high emissions, with projected increases of between 1.0°C and 1.3°C by 2030 and between 1.5°C and 2.2°C by 2050. Beyond 2050, temperatures are projected to rise considerably more, particularly under a high emissions scenario.

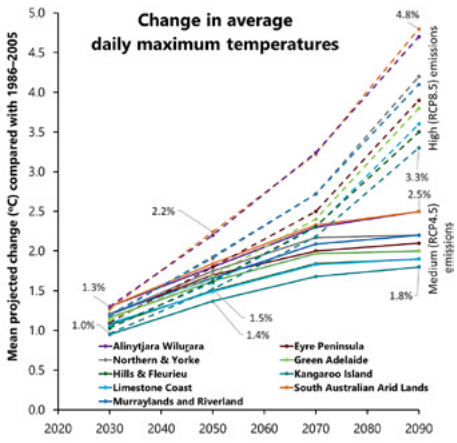
With increasing average temperatures, there is a greater occurrence of very hot weather. For example, for Adelaide, the average annual number of days reaching 40°C or more in the 20 years from 2020–2039 is projected to increase to 3 days per year, compared to 1.2 days per year during the 1986–2005 period (bottom figure).

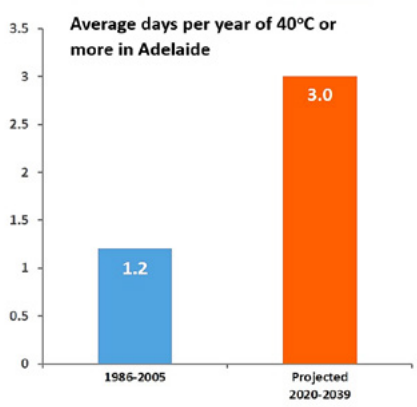
Condition

A condition rating is not applicable as this is an assessment of projected temperatures under likely climate scenarios.

This assessment draws from temperature projections presented in the Government of South Australia's Guide to Climate Projections for Risk Assessment and Planning. Each of the graphed projections is the average of 6 projections from a combination of 3 global climate models and 2 regional climate models. The projected changes are relative to temperatures during a baseline period spanning 1986–2005 and are in addition to the approximately 0.7°C of warming that occurred between the pre-industrial baseline period of 1850–1900 and recent baseline period of 1986–2005.

Higher maximum temperatures and more days of 40°C or more are projected for South Australia.





Why is temperature important?

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One example of the impact of a rise in average temperatures is an increase in the occurrence of severe heatwaves. This has important implications for human health, food production and biodiversity.

What are the drivers?

According to the Australian Academy of Science, "Earth's climate has changed over the past century. The atmosphere and oceans have warmed, sea levels have risen, and glaciers and ice sheets have decreased in size. The best available evidence indicates that greenhouse gas emissions from human activities are the main cause. Continuing increases in greenhouse gases will produce further warming and other changes in Earth's physical environment and ecosystems."

What is being done?

Climate change projections, including temperature projections, are periodically improved and updated in line with advancements in climate modelling.

Actions in response to the changing climate include those that mitigate South Australia's emissions as part of a global effort to stem further change in the global climate. The Government of South Australia has statewide goals to reduce net greenhouse gas emissions by more than 50% by 2030, achieve net zero emission by 2050, and achieve 100% renewable energy generation by 2030.

For further information see: technical information

Sea level

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting worse

Condition
Fair

Reliability
Good

STATE

Trend

Sea levels along South Australia's coast rose by an average rate of around 2 mm per year between 1966 and 2022. The rate of sea level rise is increasing and from 1993 to 2022 was between 3 mm and 5 mm per year in some locations.

Trends of gradual rise in sea level have been observed in all long-term sea level gauge records in South Australia (top figure).

Measurements are stated relative to a local fixed reference height, which in some cases may be changing over time due to slow changes in the elevation of the land level at the location. Hence, in some locations, the vertical movement of the local reference point is a component of the observed rise.

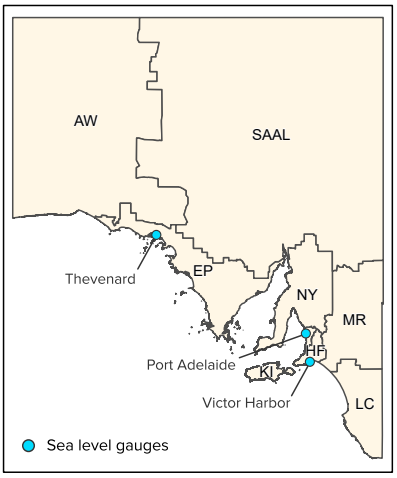
Consistent satellite records since 1993 have enabled comparison with sea levels from long-term sea level gauge records and improved estimates of the rates of change of sea level.

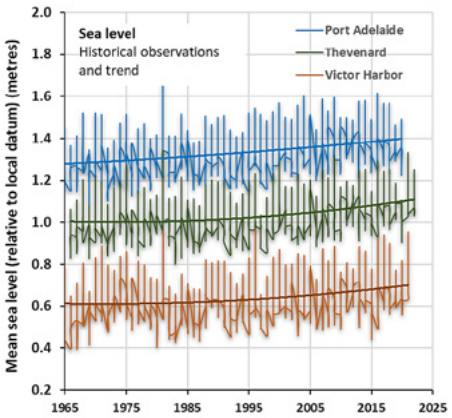
Condition

The condition is rated as fair as the observed changes in sea level do not currently impact on most social, economic and environmental values.

Mean sea levels at tide gauges at Thevenard, Port Adelaide and Victor Harbor were 10–12 cm higher in 2017–2021 compared to sea levels in 1965–1969 (bottom figure).

Sea levels along South Australia's coast are rising, and the rate of rise is increasing.





Why is sea level important?

Coastal environments and infrastructure are typically resilient to only the natural variations in sea levels that occur due to tides and occasional storm surges.

Climate change is causing a rise in sea levels globally, this subjects low-lying coastal environments and infrastructure to an increased vulnerability to erosion and seawater inundation. Relatively small changes in mean sea level can result in major increases in the frequency and extent of seawater flooding events.

What are the drivers?

Most of the observed sea level rise is due to thermal expansion of oceans due to a rise in water temperature and the melting of glaciers and continental ice sheets due to global climate change, with some additional contributions from changes in the mass of water stored on land.

Greenhouse gas emissions from human activities are the main cause of warming atmosphere and oceans. Continuing increases in greenhouse gases will produce further warming and consequent changes in Earth's physical environment.

What is being done?

An array of tide gauge stations monitor sea levels around the coastline of Australia to identify long-term changes.

Land surface elevation mapping of the South Australian coastline is maintained by the Department for Environment and Water to enable the assessment of risks of rising sea level to coastal communities and infrastructure. This is used to map sea flood hazards along sections of the state's coastline for a range of sea level rise scenarios.

For further information see: technical information

Government of South Australia

Projected sea level

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting worse

Condition
Not applicable

Reliability
Good

STATE

Trend

Mean sea levels in South Australia are projected to rise approximately in line with global sea levels over the course of this century.

Globally, mean sea levels rose by 15–20 cm from 1900 to 2018. The projections of the Intergovernmental Panel on Climate Change (IPCC) indicate that sea levels will continue to rise, and the rate of rise will increase through the 21st century.

The projected changes in sea levels at individual South Australian coastal locations (bottom figure) vary by up to 14 cm by 2100 but are generally similar to projected changes in global mean sea levels.

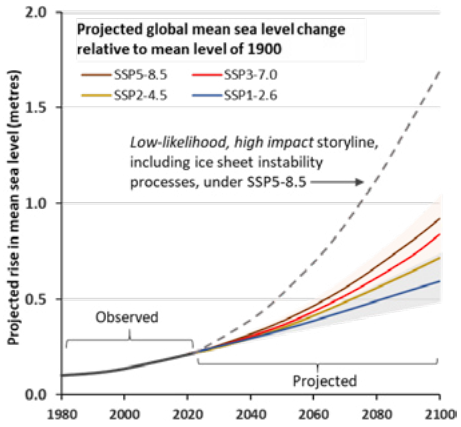
The rate of rise is affected by the future greenhouse gas emissions scenario. Under a low emissions scenario (SSP1-2.6), global mean sea level is projected to rise a further 15–23 cm by 2050 and 33–62 cm by 2100, compared to the mean level during 1995 to 2014 (top figure). Changes are greater under a high emissions scenario (SSP5-8.5), with a projected further rise of approximately 16–33 cm by 2050 and 63–101 cm by 2100.

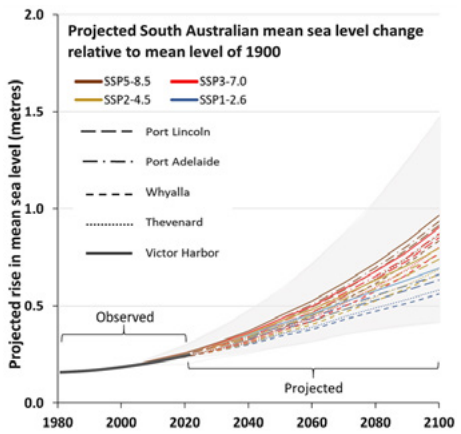
Condition

A condition rating is not applicable as this is an assessment of projected sea level under likely climate scenarios.

Under the higher emissions scenarios (SSP5-8.5), there is great uncertainty in sea level projections for 2100 and beyond associated with the uncertain responses of continental ice-sheets to warming. In the IPCC's low-likelihood, high-impact storyline under a high emissions scenario (dashed line, top figure), ice-sheet instability processes could drive sea level rise at a much faster rate this century, with a possibility of accelerating to 1.5–2.0 m of rise by 2100 (compared with mean sea level in 1900) and up to 5 m by 2150.

Sea levels along South Australia's coast are rising, and the rate of rise is projected to increase in the future.





Why is projected sea level important?

A sustained and substantial rise in sea levels due to thermal expansion of oceans and melting of continental ice will expose low-lying coastal assets, environments and infrastructure to an increasing risk of coastline erosion and seawater inundation.

What are the drivers?

Most of the sea level rise projected is due to thermal expansion of oceans due to a rise in water temperature, and the melting of glaciers and continental ice sheets, with some additional contributions from changes in the mass of water stored on land.

Greenhouse gas emissions from human activities are the main cause of warming atmosphere and oceans. Continuing increases in greenhouse gases will produce further warming and consequent changes in Earth's physical environment.

What is being done?

An array of tide gauge stations monitor sea levels around the coastline of Australia to identify long-term changes.

Land surface elevation mapping of the South Australian coastline is maintained by the Department for Environment and Water to enable the assessment of risks of rising sea level to coastal communities and infrastructure. This is used to map sea flood hazards along sections of the state's coastline for a range of sea level rise scenarios.

For further information see: technical information

Fire danger weather

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting worse

Condition
Fair

Reliability
Good

STATE

Trend

Fire danger weather conditions have increased in both occurrence and severity since the late 1970s, with the highest rates of increase in the east of the state.

The Forest Fire Danger Index (FFDI) is a measure of fire weather conditions and fuel availability which is influenced by recent rainfall. Daily FFDI values can be summed over longer periods of time to determine the accumulated FFDI. The increase in FFDI has been variable across the state (top figure). The far north-west has seen the lowest increases. The highest rates of increase in FFDI are observed in the mid north, south-east and far north-east.

This assessment uses FFDI values calculated from observed weather data from Bureau of Meteorology monitoring stations distributed across South Australia.

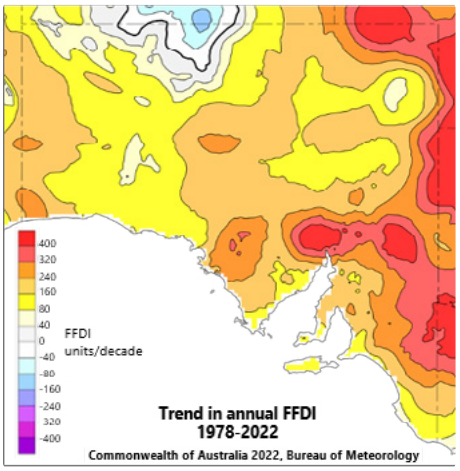
In 2022, the use of FFDI for fire danger ratings was replaced by the Australian Fire Danger Rating System (AFDRS). Future reporting will assess trends using the AFDRS Fire Behaviour Index when a sufficient time series length of data is available.

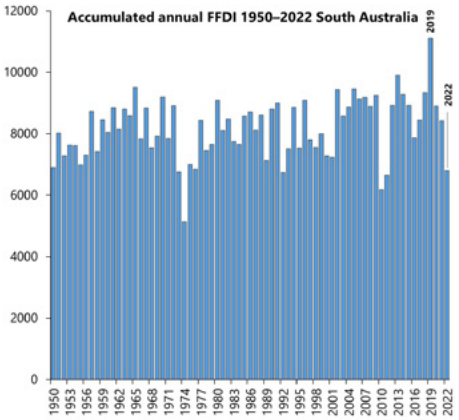
Condition

The condition is rated as fair. Higher rainfall and less extreme temperatures since 2020 have resulted in a return to more typical fire danger ratings over the past 3 years.

After the exceptionally high fire danger weather conditions experienced in 2019, the relatively wet and cool conditions of 2021 and 2022 (bottom figure) resulted in higher moisture content in soils and vegetation, somewhat reducing bushfire risks in many areas. However, in view of observed longer-term trends in temperatures and rainfall, the long-term trend in the accumulated FFDI is expected to continue to increase with increasing temperature and decreasing rainfall.

Fire danger weather has increased in occurrence and severity across most of the state since the 1970s.





Why is fire danger weather important?

The observed changes in the occurrence of severe and extreme fire weather increase the likelihood of bushfires impacting lives, property and the environment in South Australia.

This trend of increase in the occurrence of dangerous fire weather conditions is projected to continue in southern and eastern Australia. Changes in climate will also likely result in changes to bushfire fuel amount, structure and type, and the opportunities for fuel reduction burning.

What are the drivers?

The overall risk from bushfires and grass fires is driven by a range of factors, including the vulnerability of people and assets, weather, fuel availability and dryness, ignition sources, and the viability of fire suppression measures.

The likelihood of fires starting and spreading is strongly affected by weather conditions. Climate model projections indicate increasing temperatures and declining rainfall in parts of South Australia due to to higher concentrations of atmospheric greenhouse gases.

What is being done?

The Country Fire Service leads bushfire hazard risk reduction and bushfire suppression in South Australia and works alongside other state agencies and local government in doing this. Risk management strategies include the management of fuel loads, planning regulations for high risk areas, suppression activities and community education.

For further information see: technical information

Greenhouse gas emissions

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting better

Condition
Good

Reliability
Good

PRESSURE

Trend

South Australia's greenhouse gas emissions decreased by 42% between 2004–05 and 2020–21.

Emissions from energy industries in South Australia have declined significantly since 2004–05 (top figure). In 2020–21, the main sources of the state's emissions were from burning fossil fuels for transport and from agriculture, including livestock (bottom figure). Other emissions sources include industrial processes, fugitive emissions from fuels, and waste to landfill.

South Australia's natural systems sequester carbon as vegetation grows, and release carbon when removed through deforestation. In each year since 2008–09, the net emissions from land use and forestry have been negative, as more carbon was sequestered than released, creating a carbon sink (top figure).

The information in this assessment is based on emissions estimates in the Australian Government's National Inventory Report, submitted to the United Nations Framework Convention on Climate Change.

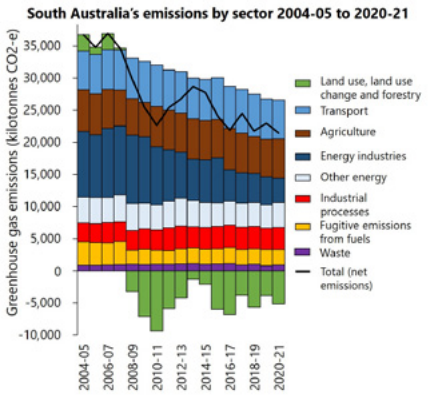
Condition

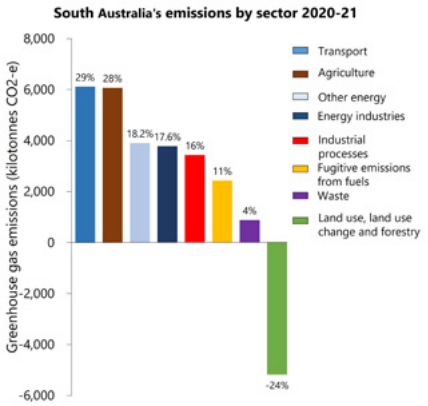
The condition of South Australia's net greenhouse gas emissions is assessed as good.

In 2020–21, South Australia's emissions of carbon dioxide equivalent were 11.9 tonnes per capita. This is the third lowest on a per capita basis compared to other Australian states and territories.

The Government of South Australia has a target to reduce the state's net greenhouse gas emissions by more than 50% below 2005 levels by 2030, and to achieve net zero emissions by 2050. The state is making good progress towards achieving this target.

South Australia's greenhouse gas emissions decreased by 42% between 2004–05 and 2020–21.





Why is reducing greenhouse gas emissions important?

Greenhouse gas emissions from human activities are accumulating in the atmosphere and causing the Earth to warm, leading to long-term changes in regional climates and weather patterns. The impacts of climate change in South Australia include higher temperatures leading to more frequent and intense weather-related events like droughts and floods and also rising sea-levels. Reducing South Australia's emissions contributes to a global effort to reduce the risk of climate change.

What are the drivers?

Reductions in greenhouse gas emissions since 2004–05 have mainly been driven by a shift to renewable energy generation and an increase in landscape carbon sinks. South Australia generates almost 70% of its electricity from renewable sources. Other emission sources that have been decreasing include agriculture, fugitive emissions from fuels, and other stationary energy emissions sources such as residential and commercial buildings.

What is being done?

The Government of South Australia is supporting a transition to renewable energy and is implementing a range of actions to reduce emissions and support South Australia to adapt to climate change. South Australia is collaboratively working with stakeholders towards the state's target of net zero carbon emissions by 2050.

For further information see: technical information

Renewable energy

Climate

South Australia's environmental trend and condition report cards 2023

Trend
Getting better

Condition
Very good

Reliability
Very good

RESPONSE

Trend

Since 2000–01, there has been an upward trend of renewable electricity generation in South Australia.

South Australia is making good progress towards its 100% net renewables target by 2030. The Department for Energy and Mining uses adjusted data from the Australian Energy Market Operator (AEMO) South Australian Electricity Report to calculate renewable energy. It calculates progress towards renewable energy generation targets based on the amount of renewable energy generated in the state as a proportion of total electricity generation.

South Australia is a global leader in energy transition, having transformed its energy system from less than 1% to over 69% renewable energy since 2001 (top figure). As renewables increased, gas and diesel generation decreased by 1,100 GWh in 2021–22 (5,235 GWh in 2020–21 to 4,118 GWh in 2021–22).

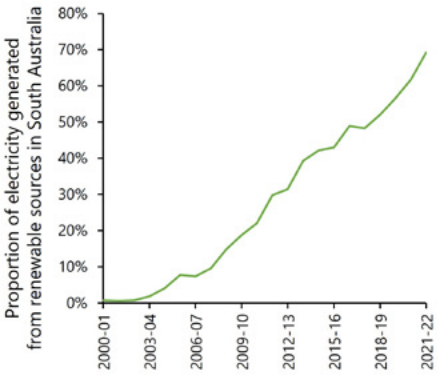
Condition

The condition of renewable energy in South Australia is considered to be very good.

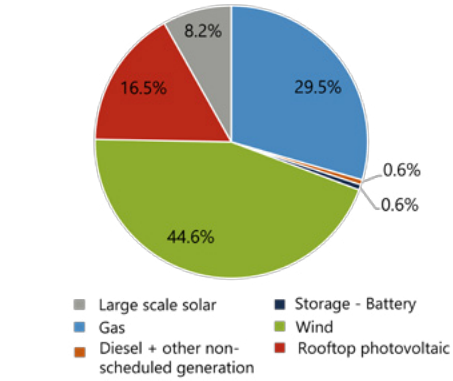
In 2021–22 renewable energy provided approximately 69.3% of the state's total electricity production.

Wind continues to be the dominant renewable energy technology in South Australia (bottom figure). During 2021–22, wind contributed 44.6% of the state's total energy output (approximately 64% of the state's total renewable energy output). Since the introduction of the solar photovoltaic feed-in tariff in 2008, solar photovoltaic output has grown exponentially, from 16 GWh in 2008–09 to 2,269 GWh in 2021–22.

South Australia has transformed its energy system from 1% to over 69% renewable energy in just over 20 years.



South Australia's electricity supply sources 2021–22



Why is renewable energy production important?

Energy generated from renewable resources does not emit greenhouse gases, making renewables the cleanest, most viable energy solution to prevent environmental degradation. Increasing the use of renewable energy will help slow the rate of climate change by removing a significant source of greenhouse gas emissions. Shifting to clean energy sources such as wind and solar also helps address air pollution and health impacts.

What are the drivers?

The global climate is changing due to an increase in atmospheric greenhouse gas concentrations, leading to long-term shifts in temperatures and weather patterns. The impacts of climate change include higher temperatures, more extreme droughts, floods, rising sea-level and more extreme weather events. Reducing greenhouse gas emissions as fast as possible will help to avoid the worst impacts of climate change and enable people to adapt.

What is being done?

The Government of South Australia is supporting a transition to renewable energy and is implementing a range of actions to reduce emissions. South Australia is taking clear steps towards a zero-carbon future, collaboratively working with stakeholders towards the state's target of net zero carbon emissions by 2050. Through the proposed *Hydrogen and Renewable Energy Act*, the Government of South Australia will guide the development of a hydrogen economy and its integration with the expansion of renewable energy.

For further information see: technical information

Government of South Australia

Cover image: Brad Griffin Photography, Eyre Peninsula

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SOUTH AUSTRALIA

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Department for Environment and Water