



Climate Adaptation Strategy

Building WA's climate resilient future

July 2023





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Minister's foreword

We hear Western Australians' call for ambitious climate action.

Western Australia is already experiencing the impacts of climate change, with our vulnerable communities most affected. The south-west of our state is becoming hotter and dryer with increased heatwaves and bushfire risk. At the same time, we are witnessing extreme weather events such as record flooding in the Kimberley and cyclones making landfall in the Mid West.

The Cook Government is committed to working with all sectors of the economy to achieve net zero emissions by 2050. We have set ambitious targets for reducing State Government emissions and made substantial investments in green energy infrastructure to achieve this goal. But reducing emissions is only half the picture. The latest climate science demonstrates that even with decisive global action to reduce emissions, further climate change impacts are unavoidable.

We need to act and adapt now to ensure our communities are equipped to respond. The decisions we make today can prepare our state for the climate of the future and reduce the costs of climate impacts.

This Climate Adaptation Strategy has been developed in consultation with Aboriginal people, local governments, business peak bodies, community organisations and researchers. I am grateful for the engagement and constructive input of these groups to the strategy, which will guide Western Australia's climate adaptation over coming years.

The strategy identifies four directions to support and accelerate climate adaptation across the state:

1. Produce and communicate credible climate information and resources.
2. Build public sector climate capability and strengthen accountability.
3. Enhance sector-wide and community partnerships to unite and coordinate action.
4. Empower and support the climate resilience of Aboriginal people.

The State Government's climate change legislation, to be introduced to Parliament this year, will strengthen our commitment through an enduring framework for climate adaptation. Through this strategy and the new legislation, the State Government will continue to work closely with communities, business and local governments to support good decision-making and strengthen resilience.

Western Australians are resourceful, innovative and determined, and each of us has a part to play in climate adaptation. Together, we can ensure that our state is well-prepared for the challenges ahead and continue to thrive in the face of a changing climate.

A handwritten signature in black ink, appearing to read 'Reece Whitby'.

Hon Reece Whitby MLA
Minister for Environment; Climate Action

Building a more resilient WA

The science is clear. Western Australia's climate has changed and further change is inevitable.

Western Australia is already experiencing the impacts of climate change, including more frequent and severe droughts, heatwaves, high-risk bushfire weather, extreme rainfall events and rising sea levels. These changes are affecting our communities, our infrastructure, our environment and water supplies, and all sectors of the state's economy.

Many of these impacts will worsen as the climate continues to change and there is an urgent need to better prepare for the accelerating risks posed by this.

Every increment of warming of the atmosphere will intensify climate-related hazards (IPCC 2023). Taking action to reduce global greenhouse gas emissions to minimise the amount of future warming is critically important.

The Government of Western Australian is committed to reducing greenhouse gas emissions and is working with all sectors of the economy to achieve net zero emissions by 2050. It has pledged to reduce whole-of-government emissions by 80 per cent below 2020 levels by 2030 and is investing in clean energy infrastructure to support this goal.

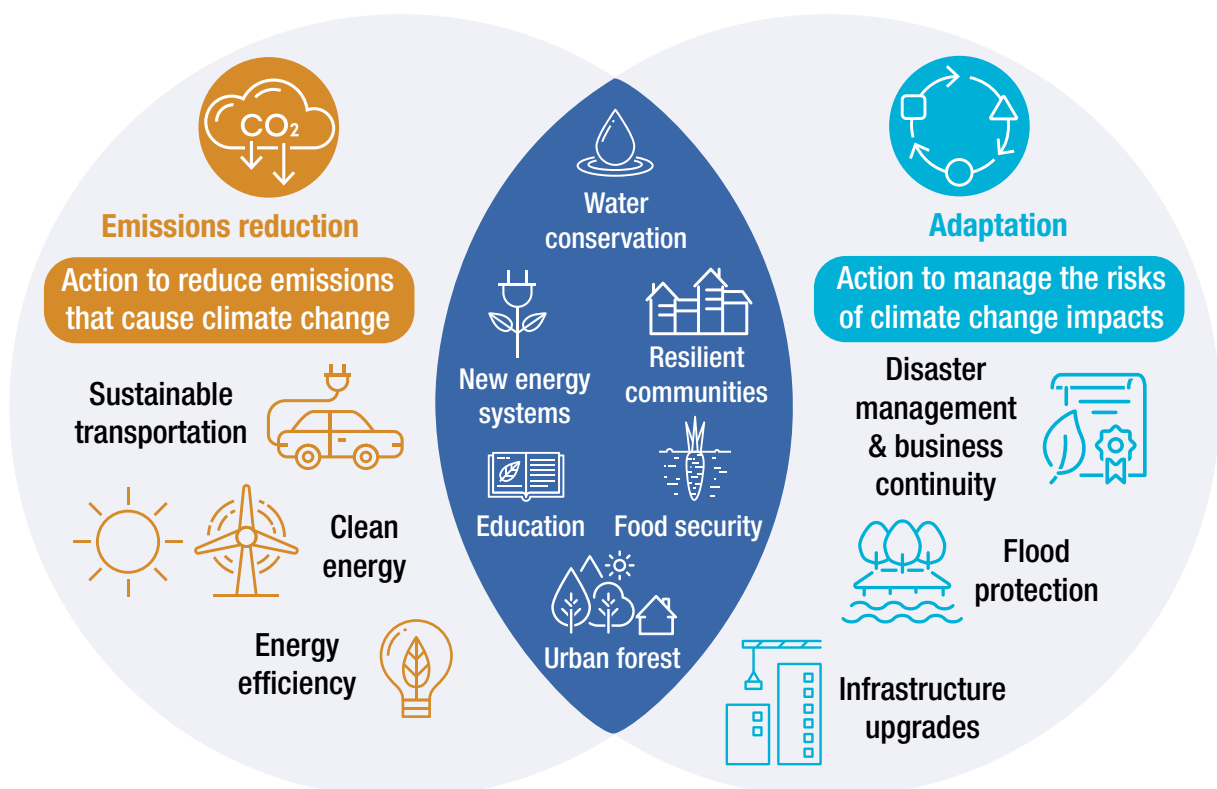
Adaptation refers to the process of adjustment to the actual or expected effects of climate change to moderate harm or take advantage of beneficial opportunities (IPCC 2022a).

The State Government is also developing climate change legislation to provide an enduring framework for reducing emissions and enhance our climate resilience.

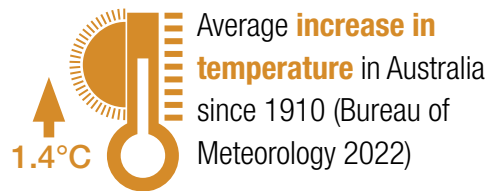
Cutting emissions is only half of the picture. Despite worldwide action to reduce emissions to date, global warming is set to continue.

A comprehensive response to climate change must include measures to reduce emissions, and measures to adapt and build resilience. Adaptation is a critical part of our response to address the unavoidable impacts of climate change.

The latest climate science indicates that a child born today is projected to experience a significantly higher number of extreme climate events throughout their life compared to their grandparents (IPCC 2023).



As our climate changes, we need to adapt



Western Australians are already experiencing the impacts of climate change

Our state is on the frontline of climate change. Over the past century, the average global temperature has risen by about 1.1°C.

Since the 1930s, the number of days over 40°C in Perth has doubled, and the number of heatwaves has increased by 50 per cent (Breshears et al. 2021). In Australia, heatwaves have caused more deaths than all other extreme weather events combined (Coates et al. 2022).

Western Australia's south-west has experienced climate-induced drying at one of the fastest rates in the world, and this is projected to continue (IPCC 2021b). At the same time, extreme rainfall events across the state are becoming more frequent and intense, leading to localised flooding and infrastructure damage (CSIRO and Bureau of Meteorology 2015).

Our state's bushfire weather is changing, with fires burning more intensely and bushfire seasons getting longer.

Our marine environment and fisheries are also being impacted by climate change through increases in average sea surface temperatures (CSIRO and Bureau of Meteorology 2022; Hobday and Pecl 2013) and marine heatwaves (Caputi et al. 2016; Le Nohaïc et al. 2017).

Climate change is increasing pressure on every ecosystem in Australia, posing challenges for management of our natural environment, national parks, biodiversity and other cultural assets, such as natural springs. The number of threatened species in Australia rose 8 per cent between 2016 and 2021, and more extinctions are expected in the coming decades (Murphy and van Leeuwen 2021).

Western Australia's south-west is a hotspot for both global biodiversity and climate-induced drying. Many of our rivers and wetlands now dry out more frequently through summer and autumn, causing major problems for freshwater animals and fringing vegetation (Carey et al. 2023).

Climate change is affecting every community in the state. People living in rural and remote regions face additional challenges because of their relative isolation. Remote and regional households have reduced access to services and infrastructure, particularly during emergencies and times of disaster, as well as limited capacity to rebuild in the aftermath (Weeramanthri et al. 2020).

Climate change impacts human health directly, through extreme weather events or heatwaves, or via complex pathways such as altered patterns of disease transmission and spread. There are also mental health impacts, including those associated with experiencing an extreme weather event (Weeramanthri et al. 2020).



Shem Bisluk © Department of Biodiversity Conservation and Attractions

Aboriginal people are disproportionately impacted

Aboriginal people are significantly and disproportionately impacted by climate change. Historic and ongoing injustices have impacted the prosperity, independence and wellbeing of Aboriginal people, making them and their communities more vulnerable to climate change.

Aboriginal people, particularly those living in remote communities, can face barriers to accessing fit-for-purpose housing, food, healthcare and culturally-safe education. Essential services in some communities do not meet appropriate standards, and services are increasingly being disrupted by climate change. The 2023 Kimberley floods are a stark example of the impact that extreme weather events have on communities and critical infrastructure.

Climate change has a profound impact on Aboriginal people's connection to Country. Caring for Country involves land and sea management for cultural, economic, social, physical and emotional wellbeing. As climate change disrupts animal and plant habitats, waterways and access to the land, it also disrupts cultural practices, posing a threat to traditional practices and the deep cultural and spiritual connections to Country held by Aboriginal people.

Climate change impacts will intensify



Record-breaking floods

Fitzroy Crossing, 2023

In December 2022 and January 2023, heavy rainfall associated with Ex-Tropical Cyclone Ellie caused the Kimberley to experience the worst flooding Western Australia has ever seen. Water levels near Fitzroy Crossing peaked at 15.81 m, almost 2 m higher than the previous record. The floodwaters damaged major roads and infrastructure, cutting off towns including Fitzroy Crossing and many remote Indigenous communities along the Fitzroy River. Defence aircraft were deployed to evacuate hundreds of residents and transport supplies to towns cut off by the floods. Pastoralists estimate thousands of cattle were lost.

Record-breaking floods

Fitzroy Crossing, 2023



Hottest Australian day on record

Onslow, 2022

On 13 January 2022, Onslow equalled the Australian hottest day on record, reaching 50.7°C. Mardie and Roebourne both reached 50°C.

Hottest Australian day on record

Onslow, 2022

Coral bleaching

Ningaloo Reef, 2022



Tropical Cyclone Seroja

Kalbarri and Northampton, 2021



Extreme heatwave

Perth, 2022



Wooroloo bushfire

Perth Hills, 2021



Coral bleaching

Ningaloo Reef, 2022

In 2021-22, sea surface temperatures in Western Australia remained in the highest 10 per cent of observations since 1900. Coral bleaching was reported on reefs in the Kimberley, Pilbara and at Ningaloo.



Extreme heatwave

Perth, 2022

The summer of 2021-22 was Perth's hottest summer on record. The city experienced 13 days of 40°C or over, nearly double the previous summer record of seven days. In January, Perth recorded six consecutive days in excess of 40°C.



Tropical Cyclone Seroja

Kalbarri and Northampton, 2021

In April 2021, Tropical Cyclone Seroja caused widespread damage in the Mid West. About 70 per cent of buildings in Kalbarri and Northampton were damaged in the cyclone as winds reached up to 170 km/h. Seroja made landfall unusually far south. Many properties were not constructed to withstand such weather systems and damaged asbestos buildings resulted in extensive contamination. The impact area of the cyclone was estimated at about 133,000 km², with associated insurance claims reported to reach \$372 million.



Wooroloo bushfire

Perth Hills, 2021

Emergency responders faced a rapidly evolving bushfire in the Perth Hills. High temperatures, strong persistent winds, low humidity and extremely low dew points, coupled with steep and inaccessible terrain and high fuel loads, made suppression very difficult. The fire caused significant damage to critical infrastructure and services including power, telecommunications and roads. Eighty-six homes were lost and more than 100 other structures were damaged or destroyed.



Increase in very high fire danger days in Western Australia by mid-century

(CSIRO and Bureau of Meteorology 2021)

By mid-century the climate of Perth could be more like the current climate of Jurien

(CSIRO and Bureau of Meteorology 2021)

Investing now in adaptation makes economic sense.

While climate change is estimated to cost the nation up to \$1 trillion by 2050, \$380 billion of these costs can be avoided if immediate action is taken to adapt and reduce emissions (Deloitte Access Economics 2022).

The return on investment for adaptation projects is up to \$10 for every \$1 spent (Global Commission on Adaptation 2020).

Adaptation will create additional jobs in construction, transport, manufacturing and land management. Timely and targeted adaptation responses, such as building climate-resilient infrastructure, and providing resources and services to enhance resilience, can also support vulnerable communities and enhance social equity.

Realising these multiple benefits, however, requires that we continue to shift our focus from disaster response and recovery to planning and preparation.

We all have a part to play

Each of us has a part to play in creating a climate-resilient Western Australia. By working together we can harness our potential to respond to the enormous challenge of climate change.

An effective climate response requires energised and empowered communities to contribute to tangible adaptation action. Business and industry need to manage their climate risks, and local, state, and Australian governments will continue to play roles in delivering services and setting policy frameworks to advance climate action and support other stakeholders in their adaptation efforts.

This strategy has been developed through targeted consultation in 2022 and 2023 with the State Government, local governments, Aboriginal and environmental groups, and peak industry bodies. It reflects the significant and unique perspectives of those stakeholders in relation to climate change.

The strategy and action plan sets out the actions that the State Government will take to ensure it is addressing climate change in its own operations and supporting all Western Australians to adapt.

Bardi Jawi Oorany Rangers with DBCA staff © Shern Bisluk and DBCA



Climate change impacts will intensify

Western Australia will continue to experience climate extremes and higher average temperatures.

The latest assessment from the Intergovernmental Panel on Climate Change suggests global average temperatures will reach or exceed 1.5°C above pre-industrial levels in the early 2030s (IPCC 2023).

In Western Australia, the south-west will continue to become drier, especially during winter and spring, with less runoff and recharge, and longer fire seasons (CSIRO and Bureau of Meteorology 2022).

The northern regions of Australia are projected to experience fewer but more intense tropical cyclones. The intensity of rainfall associated with tropical cyclones is also expected to increase. Rising sea levels are likely to amplify cyclone impacts (CSIRO and Bureau of Meteorology 2022) and pose significant risks to Western Australia's coastal infrastructure and iconic sandy beaches.

The rate of sea level rise is accelerating, increasing to 3 cm per decade since the 1990s (CSIRO and Bureau of Meteorology 2022). This amplifies the risks of coastal erosion and inundation, and saltwater intrusion into groundwater systems.

A total of 55 coastal erosion hotspots in Western Australia have been identified where sea level rise is expected to affect public and private physical assets, and require adaptation action within 25 years. Twenty-one hotspots require urgent action, and a further 31 locations are on a watchlist (DPLH and DoT 2019).

Increased and longer-lasting marine heatwaves will further stress marine environments, increasing the likelihood of more frequent and severe bleaching in coral reefs or loss of seagrass beds, including in the listed world heritage areas of Ningaloo and Shark Bay (CSIRO and Bureau of Meteorology 2022). Heatwaves will also have a major impact on fish stocks.

Acting now delivers economic benefits and more resilient communities

Climate-induced extreme weather events have cost Australian communities an estimated \$120 billion over the past 50 years, and this is expected to increase to \$150 billion over the next decade. Research also demonstrates that delaying investment in adaptation responses will increase the costs of managing future impacts (Deloitte Access Economics 2022).

This strategy sets out the actions that the State Government will take to improve the climate resilience of its infrastructure, assets and services, and to enhance climate adaptation by communities, business and local government.

Vision

Western Australia's communities, environment and economy are resilient and continuously adapting to climate change in a forward-looking, fair and collaborative manner.

Principles

The State Government will adopt the following principles to ensure climate adaptation actions are proactive, equitable, collaborative and promote resilience now and for future generations.



Collaborate

Work together across all levels of government, business, academia and the community to prepare for, and adapt to, a changing climate.



Adjust as we go

Design actions and make decisions in a flexible and iterative way, to adjust as circumstances change and new information emerges.



Make well-informed decisions

Use the best available evidence, including Aboriginal and local knowledge, to anticipate change and develop effective adaptation responses.



Mainstream adaptation

Develop policy, systems and processes that make climate change adaptation part of everyday decision-making and planning.



Think long-term

Take an intergenerational perspective that extends beyond political, planning and financial cycles.



Adapt locally

Enable communities to prepare for the risks and opportunities they face, and tailor adaptation actions to the local situation.



Promote equity

Help the people, places and infrastructure most vulnerable to climate impacts, while building adaptive capacity for all. Address equity implications for affected stakeholders.



Maximise co-benefits

Take action that achieves complementary outcomes including reducing greenhouse gases while avoiding adaptive responses that reduce resilience.

Directions

Key directions to enhance the resilience of our communities, regions, economic sectors and environment:



1. Produce and communicate credible climate information and resources



2. Build public sector climate capability and strengthen accountability



3. Enhance sector-wide and community partnerships to unite and coordinate action



4. Empower and support the climate resilience of Aboriginal people



Direction

1. Produce and communicate credible climate information and resources

High-quality, accessible climate science is crucial to understand climate risks and respond effectively

The State Government plays a vital role in helping Western Australians understand the risks of climate change and make informed decisions.

Business, industry and the community require relevant climate information, including detailed projections of how our climate may change and information about impacts for specific regions and sectors.

By improving the quality and accessibility of information, we can make better decisions and be more prepared for future climate change.

Understand how our climate may change

Robust and high-resolution climate projections are essential for adaptation planning, helping us understand how the climate may change across different parts of the state over time.

The State Government is partnering with other Australian jurisdictions and world-class research institutions to deliver the Climate Science Initiative. The initiative is being delivered in collaboration with Murdoch University, the New South Wales Government and the Pawsey Supercomputing Research Centre, which houses the most powerful research supercomputer in the Southern Hemisphere.

The Climate Science Initiative will provide detailed climate projections for the state's south-west, supporting the most up-to-date assessment of how the state's climate may change to 2100. Stakeholders have called for the program to be expanded to enhance coverage to other regions.

Research is also needed to improve consideration of how the changing climate will impact our environment, and public and private infrastructure. We need to better understand the 'urban heat island' effect on our cities, as well as the implications of changes in bushfire seasons, marine heatwaves, flood risk and other extreme weather events.

Due to the complexity of climate change adaptation and cross-sector implications, there is a need for statewide coverage for the Climate Science Initiative.

– Infrastructure WA State Infrastructure Strategy (IWA 2022)



The State Government will:

1. Expand the Climate Science Initiative to produce detailed climate projections for the north-west of Western Australia.
2. Model the urban heat island effect of Perth's future climate to provide better data for local adaptation planning.
3. Investigate the impacts of marine heatwaves on fisheries and the marine environment
4. Upgrade weather stations to better support pastoralists' preparedness and response to extreme weather events in the Southern Rangelands.
5. Model the impact of climate change on selected state-owned cultural buildings and recreational camps, and prioritise responses.



Pawsey Setonix supercomputer © Pawsey

Communicate science and adaptation knowledge to improve how we respond

Clear and relevant communication on climate change is critical for educating and mobilising individuals and business about climate risks and improving decision-making.

Effective communication requires the translation of complex climate science into relevant adaptation knowledge and practical tools and information. These resources should be impactful, meaningful and resonate with individuals and communities on the ground.

Data needs to be made available to community service organisations that is relevant to the community members they support.

– Community service organisation stakeholder

Communication resources need to be tailored for Western Australia's diverse communities and businesses, including Aboriginal people, culturally and linguistically diverse households, and people with disability.

Community organisations should be engaged in the design of communication products to ensure these better reflect needs of different audiences. Resources should be included within a broader communications campaign to build awareness and understanding of climate change risks and options to respond.

Collaborating with national and peak scientific bodies will improve our understanding and communication of climate change. By using knowledge and expertise from across Australia, we can identify and effectively communicate new research findings.



The State Government will:

6. Produce climate science communication materials, including visualisation tools, to make climate projections more accessible for communities, non-profit organisations and businesses.
7. Develop and promote climate change communications materials to build community awareness of climate risks and practical options for responding.
8. Collaborate with the Bureau of Meteorology and Commonwealth Scientific and Industrial Research Organisation (CSIRO) to understand and communicate the impact of climate change on Western Australia's water resources.

Case study

Heat Mapping Vulnerability Project

The Heat Mapping Vulnerability Project, a collaboration between the State Government and the Western Australian Council of Social Services, will map high heat and heatwave risk across Western Australia. The mapping will enable the design of targeted strategies to reduce the risk of heat-related morbidity and mortality, in collaboration with people most vulnerable to high heat and heatwaves.

The project will identify service gaps by using climate modelling and geospatial mapping to plot vulnerable groups against available support services in regions identified as being at high heat risk. The project will also explore how 'cooling centres' could support vulnerable people during periods of extreme heat.



DWER scientific officers monitoring the response of river ecosystems to climate changes and other pressures © DWER



Strengthen adaptation research to drive innovation

Effective adaptation relies on further investment in adaptation research and collaboration between research institutions. Partnerships between researchers, businesses, community organisations and government ensure research is focused on priority needs and research outcomes are applied.

Adaptation research is required in a range of disciplines including society, environment, health, built environment and traditional knowledge.

Climate-resilient agriculture will increasingly require innovative management practices and advanced technologies to enhance crop, livestock and horticultural production.

Research is also necessary to better understand and manage the impacts of climate change on biodiversity, particularly threatened species and ecological communities.

Evidence-based adaptive management approaches are required to manage Western Australia's south-west native forests to prioritise biodiversity and forest health, maximise carbon storage and improve climate resilience.

The State Government will:

9. Collaborate with researchers, community organisations and the private sector to establish a Climate Adaptation Research Hub that identifies priority research needs and funding requirements.
10. Support climate adaptation research on Western Australia's biodiversity, including threatened species and ecological communities, and identify on-ground actions to enhance climate resilience.
11. Evaluate the climate risk for rivers in the south-west to inform priority actions to enhance resilience.
12. Collaborate with universities, other research institutions and stakeholders to develop a prioritised and targeted research program to address key climate change challenges for the Western Australian water sector.
13. Manage the south-west native forests through an adaptive, evidence-based approach that prioritises biodiversity, forest health and climate resilience.

Case study

Understanding the impact of marine heatwaves on fisheries

Fish stocks are highly sensitive to environmental factors including climate change. Climate-related events such as the 2011 extreme marine heatwave are expected to continue, with the lower west coast of Australia identified as one of the world's hotspots for water temperature increases.

Climate-resilient fisheries management requires comprehensive monitoring of the ocean environment and surveys to understand changes in abundance.

The Marine Heatwave Project, led by the Department of Primary Industries and Regional Development (DPIRD), will see climate risks become an integral part of fisheries harvest strategies by providing assessments of climate change impacts on fish stocks and the risks to those stocks.



Direction

2. Build public sector climate capability and strengthen accountability

Climate resilience must be embedded in all areas of the public sector.

Climate change will stretch the capacity of the public sector and pose challenges for provision of essential services, including water, electricity, health care and emergency response.

Climate change considerations must be embedded into government policies, decision-making, planning and procurement to address climate risks and ensure the ongoing provision of essential services and resilient infrastructure for the community.

Set the right policies to enhance decision-making and encourage action

There are long-term benefits to investing in infrastructure that can withstand the impacts of climate change, even if it comes at a higher up-front cost. Making Western Australian buildings and infrastructure more resilient to climate change will protect people and deliver co-benefits including more comfortable living environments, reduced energy costs and emissions, and improved wellbeing.

Climate change has been considered in the implementation of major infrastructure programs such as METRONET through a robust climate risk assessment. Mainstreaming this practice across government will improve decision-making and enhance resilience.

The State Government is developing a Climate Risk Framework that will guide state agencies on the assessment, management and disclosure of climate risk. The framework will strengthen the State Government's consideration of climate change and enable reporting on the implications for the state's finances, physical assets and service delivery.

New climate change legislation to be introduced to Parliament this year will create statutory requirements for development of adaptation strategies and plans, further enhancing the focus on climate resilience across the public sector.

Land use planning is a key tool for government to address the effects of climate change for new development and land use. Integrating climate considerations into the State Planning Framework will support better land use planning and climate risk management across Western Australia.

With climate change increasing bushfire frequency and intensity, new approaches are also required to reduce bushfire risk.



The State Government will:

14. Develop climate change legislation, including statutory requirements for adaptation strategies and plans to enhance climate resilience.
15. Implement a Climate Risk Framework to monitor, assess and report on implications of climate change on the state's finances, physical assets and service delivery.
16. Incorporate climate adaptation into the State Planning Framework and policies to inform land use planning and management decisions.
17. Implement new approaches to identification of future bushfire hotspots and improve fuel management strategies.

Case study

Assessing vulnerability of roads to future climate risks and natural hazards

Main Roads is identifying a best practice approach for assessing network and asset vulnerability, funded through the Western Australian Road Research and Innovation Program. Main Roads is seeking to understand the effects of climate change on the transport network, including potential socioeconomic impacts.

Main Roads piloted a Network Vulnerability Assessment Framework on a section of the road network, informed by asset and network data. The successful pilot demonstrated the framework's feasibility, and it will now be refined to produce a whole-of-network climate vulnerability assessment.

Drive transformation through State Government leadership

State Government leadership can support adaptation within and beyond the public sector. Investment in its adaptive capacity, and demonstration of good adaptation practice, can enhance the public sector's resilience and provide a model for others to follow.

Forward-looking State Government investment is required to secure Perth's future drinking water supply in the face of declining rainfall. Since 2001, more than \$2.35 billion has been invested in climate-resilient water sources, including desalination and groundwater replenishment. In September 2021, the State Government committed to help fund Perth's third desalination plant, to be powered by renewable energy.

New water infrastructure will also be required in the state's south-west to service the region's expanding population and address pressures on existing groundwater sources.

As sea level rise exacerbates coastal erosion and inundation, a coordinated statewide approach to coastal hazard adaptation and protection will be critical. Government plays a key role in planning for, managing and protecting the Western Australian coast from the impacts of coastal hazards to ensure sustainable coastal development.



The State Government will:

18. Strengthen the capability of the public sector to assess and manage climate risk through training programs and tools.
19. Deliver a program of new water sources for Perth, with the immediate priority being the finalisation of planning and design for Perth's newest water source, the proposed Alkimos Seawater Desalination Plant
20. Explore regional water supply options for key towns to address the impact of climate change.
21. Invest in a more climate-resilient water supply for the wider Busselton area.
22. Seek to secure Infrastructure Australia's support for future coastal and estuary adaptation initiatives.

Develop appropriate metrics to measure progress

Measurement is important to track progress towards enhanced climate resilience. Unlike emissions reduction targets, however, there is no single quantitative metric for effective climate adaptation.

Climate adaptation involves a range of factors including social, economic and environmental variables, making it difficult to develop metrics that can capture all aspects of adaptation. What works in one region may not work in another, so it is necessary to develop context-specific metrics.

Managing uncertainty and risk is a fundamental part of climate adaptation, and developing metrics that accurately capture progress over the long-term is challenging. The involvement of multiple stakeholders with various perspectives and priorities, including governments, communities and businesses, further complicates the development of metrics.

Examples of possible adaptation metrics include reduced critical infrastructure damage from extreme weather events, changes to the incidence of heat-related illnesses and presentations to hospitals, the adoption of drought-resistant crops and incorporation of adaptation actions in biodiversity management.



The State Government will:

23. Establish robust metrics to measure progress towards building climate resilience and adaptation across Western Australia's communities and sectors.



Top: Port Beach nourishment via rainbow dredging. Left: Coastal erosion at Port Beach. Right: Port Beach after sand nourishment completed © DPLH

Case study

Managing coastal erosion hotspots

The [Assessment of Coastal Erosion Hotspots in Western Australia](#) (2019) report identified 55 hotspots where erosion is expected to threaten coastal values and assets, and an additional 31 for future investigation. To address the recommendations of this report, the State Government invested of \$33.5 million over five years from 2021 in to CoastWA.

CoastWA is administered by the Department of Planning, Lands and Heritage (DPLH), the Department of Transport (DOT), with support from the Western Australian Local Government Association. CoastWA provides grants to coastal managers for preparation and implementation of Coastal Hazard Risk Management and Adaptation Plans (CHRMAP), and to deliver on priority actions.

To date, 30 CHRMAPs have been completed and 11 are underway, covering 54 of the 55 coastal erosion hotspots. More information is available at on the [CoastWA website](#).



Direction

3. Enhance sector-wide and community partnerships to unite and coordinate action

Collaborations and partnerships are fundamental to the development of place-based adaptation solutions and resilient communities.

Western Australian communities are at the forefront of climate change impacts.

Many local governments and communities are already taking steps to adapt to climate change. Long-term trends such as rising temperatures and changing rainfall patterns will present ongoing challenges to resilience and prosperity.

Support local communities to create their own adaptation pathways

Western Australia is home to diverse communities with varying exposure to climate risk and capacity to adapt.

Effective adaptation responses need to address a community's specific vulnerabilities to climate change. Adaptation actions should build on established relationships and support access to the right knowledge and tools.

Place-based local adaptation responses are more effective when local communities actively participate in decisions related to them.

Some individuals, local governments and regional communities face unique challenges related to equity, shortages of labour or expertise, and limited access to funding or information necessary for adaptation planning.



The State Government will:

24. Evaluate outcomes of the Regional Climate Alliance Pilot Program and consider options to strengthen local government capacity.
25. Support small-to-medium enterprises to better anticipate, manage and adapt to the impacts of climate change through delivery of a Climate Adaptation Toolkit, a training program, and science and innovation funding.
26. Expand the Rangelands Revitalisation Project to build capability of pastoralists to enhance resilience and ecological outcomes.
27. Support WaterSmart farms – enhancing the resilience of farmers, rural agribusiness and small communities by ensuring access to high-quality water.



Case study

Building capability of local government

The Regional Climate Alliance Pilot Program is a collaboration between the Western Australian Local Government Authority (WALGA) and the State Government. Between 2021–23, the program promoted collaborative partnerships to improve decision-making, enhance capability, and deliver local government-led climate action projects.

Successful projects have included a pioneering regional adaptation plan in the Goldfields and prioritisation of sustainability-oriented retrofits for council assets in the Great Southern.

The State Government has also supported development of WALGA's Climate Change Action Framework, which helps enable climate risk assessment and adaptation planning for local government authorities.

Develop and deliver adaptation action plans together

Partnerships between government, industry and community organisations are essential to addressing climate risks that affect entire sectors.

Sector adaptation planning enables the government and community to work together to build a shared understanding of climate impacts and prioritise adaptation responses. Using local knowledge and perspectives across the state, through consultation with communities and local governments, is fundamental to effective adaptation.

Sectoral adaptation plans will be a valuable tool for government, industry and the community to develop a common understanding of future impacts and opportunities to manage or reduce climate impact risks on infrastructure.

– State Infrastructure Strategy (Infrastructure WA)

The State Government is coordinating the development of Western Australia's first sector adaptation plans for health and emergency management, in partnership with the wider community and the private sector.

Consultation has identified support for a more comprehensive, sector-based adaptation approach to build a shared understanding of climate impacts, risks and vulnerabilities, and to collaboratively prioritise management actions.

Where relevant, adaptation planning should incorporate the perspectives, knowledge and connection to Country of Aboriginal people, recognising the unique experience of those living on Country.

Partnerships with Aboriginal people should be mutually beneficial, with the aim of empowering and improving the resilience of Aboriginal communities while using First Nations knowledge to improve broader adaptation planning.



The State Government will:

28. Deliver a Sector Adaptation Plan Program for Western Australia to identify sector-specific climate impacts and priority adaptation actions.

Plans will be required for sectors such as: health and human services, emergency management, primary industries, small-to-medium enterprises, natural environment, built environment and water.

Case study

Regional Drought Resilience Planning

DPIRD is working with the Australian Government to help regions prepare for climate change through the Regional Drought Resilience Planning Program, funded by the Future Drought Fund.

The Regional Drought Resilience Planning Program has supported partnerships of regional organisations, local government, communities and industry to develop Regional Drought Resilience Plans and fund priority actions.

Regional Drought Resilience Plans will help ensure regional communities build resilience to droughts by identifying innovative and transformative drought projects to guide future investments, and improve natural resource management. A rollout of this successful program is now planned across Australia.



Direction

4. Empower and support the climate resilience of Aboriginal people

First Nations people have 60,000-plus years of knowledge and practices in caring for Country (Janke et al. 2021).

Through their long-standing connection to Country, Aboriginal people have considerable experience in responding to past changes in climate. The knowledge and contribution of Aboriginal people should be recognised and respected, and their voices included in adaptation decision-making, to promote empowerment and a more effective and integrated adaptation response.

Indigenous peoples have been faced with adaptation challenges for centuries and have developed strategies for resilience in changing environments that can enrich and strengthen current and future adaptation efforts.

– IPCC AR6

The State Government’s annual report on Closing the Gap highlights the interconnectedness of environmental health, education and economic outcomes for Aboriginal people, and emphasises the need for a coordinated and comprehensive approach.

The State Government Aboriginal Empowerment Strategy, developed in partnership with the Aboriginal Advisory Council of WA, recognises the importance of incorporating Aboriginal knowledge and prioritising community-led solutions. The strategy provides a framework for government policies and initiatives that are culturally responsive and based on genuine partnerships with Aboriginal people.

Recognition of these principles should be embedded in climate change policy development to ensure the unique perspectives of Aboriginal people are acknowledged and valued. This will support development of adaptation initiatives that better serve the needs of Aboriginal people, as well as the wider community.

By designing climate adaptation responses alongside efforts to improve these outcomes, the State Government is taking a step towards addressing climate-related challenges holistically.

Caring for Country

Caring for Country centres on the relationships between Indigenous peoples and their Country, which includes their lands, waters, plants, animals, heritage, culture, ancestors, laws, religions and more (Rose 1992, 1996). Caring for Country activities reinforce and support Indigenous peoples’ relationships with their physical, cultural, social, economic and spiritual environment. (Weir et. al. 2011)

Commit to engaging with Aboriginal people, communities and Elders. It takes a long time to build up relationships and trust; however, these are the people who are going to be impacted by these policies the most.

– Aboriginal stakeholder

Enhance adaptive capacity of communities and create opportunities for Aboriginal people

There are significant opportunities to enhance the inclusion of Aboriginal voices and knowledge to support identification of climate risks, and to develop adaptation solutions.

Capturing these opportunities requires engagement in a manner that is culturally safe and allows Aboriginal people to apply their knowledge, maintain their connections to Country, and exercise their rights of self-determination.

Culturally respectful and regionally focused two-way dialogue that integrates traditional knowledge and Western science is critical.

Climate resilience for Aboriginal people will be best achieved through empowerment of local decision-making and integration of local knowledge. Communication, consultation and engagement processes should be designed around respectful partnerships and governance arrangements that foster consent, trust, accountability and reciprocity.

Community engagement needs to be inclusive, so that all voices are heard in the development of policies and actions that address the needs of the community. Aboriginal people must be empowered to share their deep knowledge of the changing climate, including through opportunities for cultural mapping, on-Country consultations, collection of traditional ecological knowledge, two-way science and collaboration.



The State Government will

29. Engage with Aboriginal organisations and academics on the Adaptation Research Hub to ensure existing Aboriginal research and future priorities of Aboriginal people are incorporated.
30. Investigate climate adaptation practices currently being delivered through groups funded by the Department of Biodiversity, Conservation and Attractions’ (DBCA) Aboriginal Ranger Program, and identify future opportunities.



Nyul Nyul Rangers at a controlled burn © Sophie Henderson DBCA

Empower Aboriginal-led climate adaptation action

There are structural and systemic barriers to the integration of Aboriginal perspectives and traditional knowledge. Recognising and addressing the ongoing effects of colonisation on Aboriginal communities is a crucial part of building trust and empowering Aboriginal-led adaptation (Hill et al. 2020).

Empowering Aboriginal people to build their climate resilience can help to close the gap in life expectancy and adaptive capacity between Aboriginal and non-Aboriginal Australians. Empowerment requires establishment of sustainable partnerships with the Aboriginal community-controlled organisations sector, native title holders and other community organisations.

Building partnerships through conversations on Country takes time but is crucial for developing trust and for genuine partnerships to emerge.

Empowering Aboriginal-led climate adaptation also requires clear communication. Communication materials should be relevant, culturally appropriate, delivered in local languages and reflect impacts observed on Country.

Investment is required to improve the delivery of essential water and power services for remote Aboriginal communities and bring services into line with comparable communities in Western Australia.



The State Government will:

31. Engage with Aboriginal leaders and regional communities on a First Nations Climate Resilience Fund to build trust, share knowledge and design a dedicated fund for Aboriginal-led adaptation projects.
32. Develop an Aboriginal-led West Kimberley Climate Adaptation Strategy through a community-led and collaborative design approach, informed by Traditional Owner knowledge and Western science.
33. Collaborate with the Aboriginal Health Council of WA to support Aboriginal communities develop place-based climate-related health adaptation measures.
34. Deliver improved and more climate-resilient water and power services to remote Aboriginal communities through the Transfer of Essential Services program.
35. Deliver the Remote Communities Fund to support improved and more climate resilience, and co-designed sustainable, culturally appropriate housing in remote communities.
36. Evaluate climate risk to airport infrastructure in remote Aboriginal communities and identify investments to enhance resilience.

Case study

Walking together to create Waterwise communities

Kep Katitjin – Gabi Kaadadjan is the Whadjuk and Bindjareb Noongar term for ‘water knowledge’ in Boorloo (Perth) and Bindjareb (Peel). This is the title for the second Waterwise Perth Action Plan that sets out actions to conserve our precious water resources and build climate-resilient communities by supporting biodiversity and urban greening.

Integral to [Kep Katitjin – Gabi Kaadadjan](#) is the commitment to walk together with Noongar people to incorporate traditional environmental knowledge into waterwise action. For example, Bindjareb Elders co-designed the [Bring Together Walk Together Framework](#) that creates a pathway to build and maintain strong partnerships to achieve better Aboriginal land and water outcomes.

[Kep Katitjin – Gabi Kaadadjan](#) commits to increase understanding, value and recognition of Aboriginal and Torres Strait Islander cultures, histories, knowledge and rights through cultural learning and engagement.



Tracking progress of the Climate Adaptation Strategy

Adaptation is a learning process. This strategy and the actions contained within it will enhance existing adaptation and support future responses to climate change.

Understanding how well the strategy is performing is important to provide the community with confidence and improve future adaptation planning.

The State Government will develop a framework for monitoring, evaluation and reporting to track implementation progress. The framework will align with requirements at a state level, such as those to be introduced through the new Climate Change Act and the Climate Risk Framework.

The framework will respond to national initiatives, including the national climate risk assessment. The approach to monitoring, reporting and evaluation will also consider international reporting obligations under the Paris Agreement, the Sendai Framework for Disaster Risk Reduction, and emerging international accounting practices.



Linking actions to anticipated outcomes, through an outcomes logic approach, will be adopted to evaluate the strategy. This will improve our knowledge, enhance delivery of the Climate Adaptation Strategy and improve the resources allocated to adaptation in the future.



The State Government will:


37. Develop a framework for monitoring, evaluation and reporting to track implementation progress.

Climate Adaptation action plan

Action	Lead agency	Completed by
Direction 1: Produce and communicate credible climate information and resources		
Understand how our climate may change		
1. Expand the Climate Science Initiative to produce detailed climate projections for the north-west of Western Australia	Department of Water and Environmental Regulation	2028
2. Model the urban heat island effect of Perth's future climate to provide better data for local adaptation planning	Department of Water and Environmental Regulation	2026
3. Investigate the impacts of marine heatwaves on fisheries and the marine environment	Department of Primary Industries and Regional Development	2027
4. Upgrade weather stations to better support pastoralists' preparedness and response to extreme weather events in the Southern Rangelands	Department of Primary Industries and Regional Development	2027
5. Model the impact of climate change on selected state-owned cultural buildings and recreational camps, and prioritise responses	Department of Local Government, Sports and Cultural Industries	2024
Communicate science and adaptation knowledge to improve how we respond		
6. Produce climate science communication materials, including visualisation tools, to make climate projections more accessible for communities, non-profit organisations and businesses.	Department of Water and Environmental Regulation	2028
7. Develop and promote climate change communications products to build community awareness of climate risks and practical options for responding	Department of Water and Environmental Regulation	2028
8. Collaborate with the Bureau of Meteorology and CSIRO to understand and communicate the impact of climate change on Western Australia's water resources	Department of Water and Environmental Regulation	2025
Strengthen adaptation research to drive innovation		
9. Collaborate with researchers, community organisations and the private sector to establish a Climate Adaptation Research Hub that identifies priority research needs and funding requirements	Department of Water and Environmental Regulation	2028
10. Support climate adaptation research on Western Australia's biodiversity, including threatened species and ecological communities, and identify on-ground actions to enhance climate resilience	Department of Biodiversity, Conservation and Attractions	2028
11. Evaluate the climate risk for rivers in the south-west to inform priority actions to enhance resilience	Department of Water and Environmental Regulation	2027
12. Collaborate with universities, other research institutions and stakeholders to develop a prioritised and targeted research program to address key climate change challenges for the Western Australian water sector	Department of Water and Environmental Regulation	2027
13. Manage the south-west native forests through an adaptive, evidence-based approach that prioritises biodiversity, forest health and resilience	Department of Biodiversity, Conservation and Attractions	2033
Direction 2: Build public sector climate capability and strengthen accountability		
Set the right policies to enhance decision-making and encourage action		
14. Develop climate legislation, including statutory requirements for adaptation strategies and plans to enhance climate resilience	Department of Water and Environmental Regulation	2023
15. Implement a Climate Risk Framework to monitor, assess and report on the implications of climate change on the state's finances, physical assets and service delivery	Department of Water and Environmental Regulation, Department of Treasury	2026
16. Incorporate climate adaptation into the State Planning Framework and policies to inform land use planning and management decisions.	Western Australian Planning Commissions, Department of Planning, Lands and Heritage	Ongoing
17. Implement new approaches to identification of future bushfire hotspots and improve fuel management strategies	Department of Fire and Emergency Services	Ongoing

Action	Lead agency	Completed by
Drive transformation through State Government leadership		
18. Strengthen the capability of the public sector to assess and manage climate risk through training programs and tools	Department of Water and Environmental Regulation	2026
19. Deliver a program of new water sources for Perth, with the immediate priority being the finalisation of planning and design for Perth's newest water source, the proposed Alkimos Seawater Desalination Plant	Water Corporation	2028
20. Explore regional water supply options for key towns to address the impact of climate change	Water Corporation	2025
21. Invest in a more climate-resilient water supply for the wider Busselton area	Busselton Water	2029
22. Seek to secure Infrastructure Australia's support for future coastal and estuary adaptation initiatives	Department of Planning, Lands and Heritage	2024
Develop appropriate metrics to measure progress		
23. Establish robust metrics to measure progress towards building climate resilience and adaptation across Western Australia's communities and sectors	Department of Water and Environmental Regulation	2025
Direction 3: Enhance sector-wide and community partnerships to unite and coordinate action		
Support local communities to create their own adaptation pathways		
24. Evaluate outcomes of the Regional Climate Alliance pilot program and consider options to strengthen local government capacity	Department of Water and Environmental Regulation	2023
25. Support small-to-medium enterprises to better anticipate, manage and adapt to the impacts of climate change through delivery of a Climate Adaptation Toolkit, a training program, and science and innovation funding	Department of Jobs, Tourism, Science and Innovation	2025
26. Expand the Rangelands Revitalisation Project to build capability of pastoralists to enhance resilience and ecological outcomes	Department of Primary Industries and Regional Development	2027
27. Support WaterSmart farms – enhancing resilience of farmers, rural agribusiness and small communities by ensuring access to high-quality water	Department of Primary Industries and Regional Development	2027
Develop and deliver adaptation action plans together		
28. Deliver a Sector Adaptation Plan Program for Western Australia to identify sector-specific climate impacts and priority adaptation actions. Deliver the following sector adaptation plans:	Department of Water and Environmental Regulation	2028
Health and human services	Department of Health	2024
Emergency management	State Emergency Management Committee	2024
Primary industries	Department of Primary Industries and Regional Development	2026
Small-to-medium enterprises	Department of Jobs, Tourism, Science and Innovation	2025
Natural environment	Department of Biodiversity, Conservation and Attractions	2026
Further consideration will be given to the timeframe for delivery of adaptation plans for Built Environment and Water	Department of Water and Environmental Regulation	2024



Action	Lead agency	Completed by
Direction 4: Empower and support the climate resilience of Aboriginal people		
Enhance adaptive capacity of communities and create opportunities for involving and empowering Aboriginal people		
29. Engage with Aboriginal organisations and academics on the Adaptation Research Hub to ensure existing Aboriginal research and future research priorities of Aboriginal people are incorporated	Department of Water and Environmental Regulation	2028
30. Investigate climate adaptation practices currently being delivered through groups funded by the DBCA's Aboriginal Ranger Program, and identify future opportunities	Department of Biodiversity, Conservation and Attractions	2026
Empower Aboriginal-led climate adaptation action		
31. Engage with Aboriginal leaders and regional communities on a First Nations Climate Resilience Fund to build trust, share knowledge and design a dedicated fund for Aboriginal-led adaptation projects	Department of Water and Environmental Regulation	2025
32. Develop an Aboriginal-led West Kimberley Climate Adaptation Strategy through a community-led and collaborative design approach, informed by Traditional Owner knowledge and Western science	Department of Water and Environmental Regulation	2026
33. Collaborate with the Aboriginal Health Council of WA to support Aboriginal communities develop place-based climate-related health adaptation measures	Department of Health	2024
34. Deliver improved and more climate-resilient water and power services to remote Aboriginal communities through the Transfer of Essential Services program	Water Corporation and Horizon Power	Ongoing
35. Deliver the Remote Communities Fund to support improved and more climate resilience, and co-designed sustainable, culturally appropriate housing in remote communities	Department of Communities	2026
36. Evaluate climate risk to airport infrastructure in remote Aboriginal communities and identify investments to enhance resilience	Department of Transport	2026
Tracking progress of the Climate Adaptation Strategy		
37. Develop a framework for monitoring, evaluation and reporting to track implementation progress	Department of Water and Environmental Regulation	2025

Glossary

Adaptation	The process of adjustment to the actual or expected effects of climate change to moderate harm or take advantage of beneficial opportunities. It can be proactive, reactive, incremental or transformational (IPCC 2022a).
Adaptive capacity	The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities or respond to consequences (IPCC 2018).
Climate hazard	A potential natural or human-induced physical event, trend or disturbance that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources (IPCC 2022a).
Climate impact	The consequences of climate change because of interactions of climate-related hazards (including extreme weather/climate events), exposure and vulnerability. Impacts can be adverse or beneficial (IPCC 2021a).
Climate change projections	The simulated response of the climate system to a scenario of future emissions or concentrations of greenhouse gases and aerosols and changes in land use, generally derived using climate models (IPCC 2021a).
Climate Risk	The potential for negative consequences because of the exposure and vulnerability of human or ecological systems (IPCC 2021a).
Mitigation	Reducing greenhouse gas emissions or enhancing sinks of greenhouse gases to slow the rate of climate change (IPCC 2022b).
Resilience	The capacity of social, economic and ecosystems to cope with a hazardous event, trend or disturbance (IPCC 2022a).
Vulnerability	The propensity or predisposition to be adversely affected, including the sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC 2022a).

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