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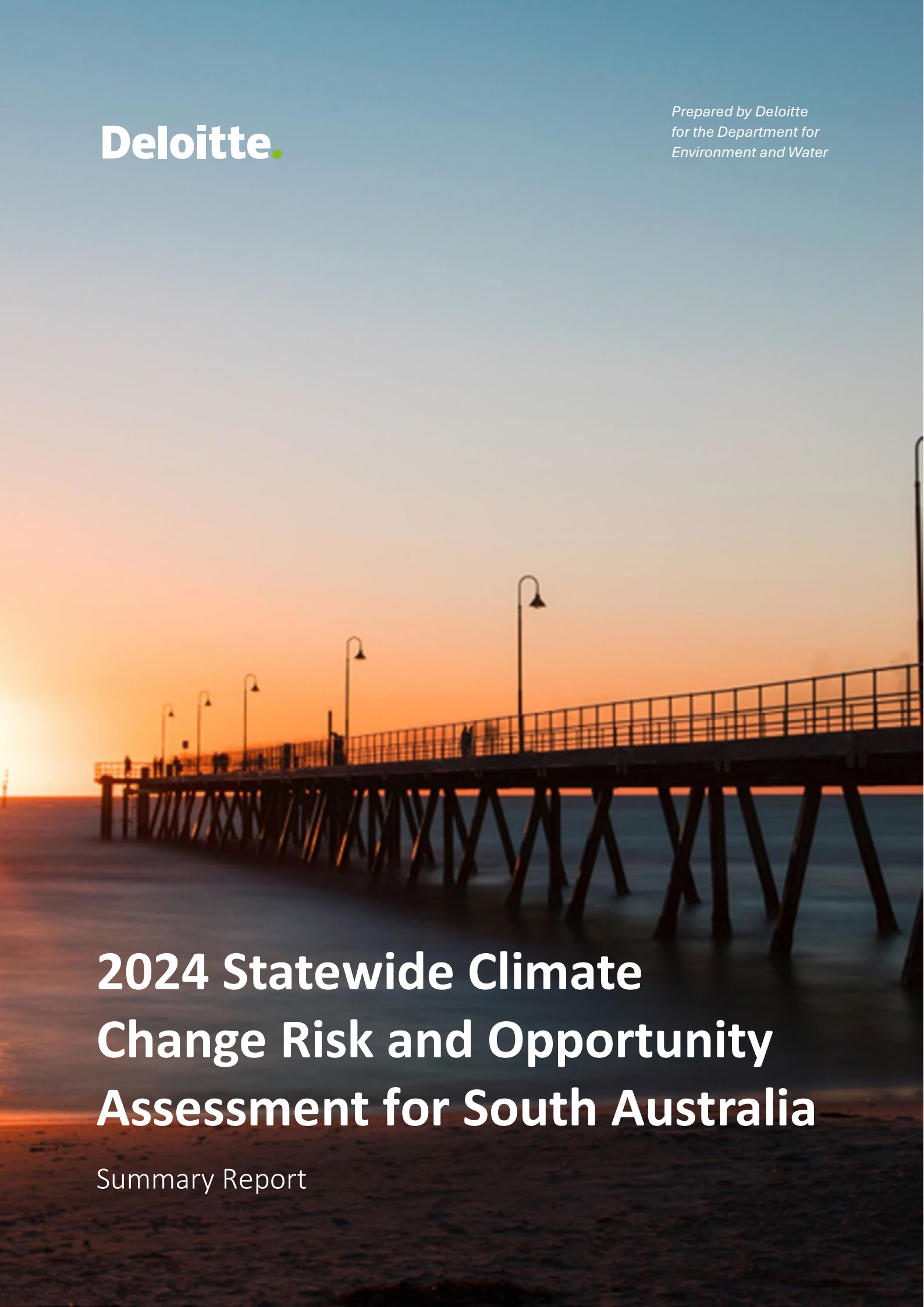
*Prepared by Deloitte for the Department for Environment and Water*



# 2024 Statewide Climate Change Risk and Opportunity Assessment for South Australia

Summary Report


*Prepared by Deloitte for the Department for Environment and Water.*

# SOUTH AUSTRALIA'S CLIMATE CHANGE RISK ASSESSMENT: SUMMARY REPORT

This Summary Report provides an overview of South Australia's first statewide climate change risk and opportunity assessment (the SA climate change risk assessment) and its key findings. The climate change risk assessment was undertaken from 2023 to late 2024. More detail on the climate change risk assessment method and outputs can be found in the *2024 Statewide Climate Change Risk and Opportunity Assessment for South Australia: Technical Report* (the Technical Report).

## KEY FINDINGS

South Australia's first climate change risk assessment provides a picture of how South Australia's people, places and environments could be impacted by climate change, to guide the state can respond and adapt to climate change risks and opportunities. It has been prepared as the statewide climate change risk assessment required under the *Climate Change and Greenhouse Emissions Reduction Act 2007* (SA).

The SA climate change risk assessment found that a wide range of actions are being taken to address climate change. However, these efforts may not be sufficient to fully address current and projected risks and opportunities.

Over time and without further action, climate-related risks could become more major and extreme, and in some cases irreversible, requiring more significant interventions. At the baseline time period (1995 to 2014), 75% of the 35 physical risks assessed were rated as having minor consequences, but by 2090, 75% were projected to have extreme consequences.

Eleven high-priority risks (Tier 1 risks) were identified across four value domains – natural, built, economic and social. These risks require new or stronger adaptation action within the next 5 years, over and above that already planned. The high-priority risks are:

1. Significant loss of biodiversity (N1).
2. More intense erosion and inundation of coastal structures and ecosystems (N2).
3. Adverse impacts on flood and coastal protection defences such as levee banks, seawalls and beach replenishment) (B4).
4. Disruption to transport including aviation, ports, roads, rail and public transport (B6).
5. Adverse impacts on water availability, quality, supply, and demand (B9).
6. Impacts on agriculture and forestry production and profitability (E1).
7. Insurance becoming unaffordable and/or unavailable (E3).
8. Disruption to supply chains and logistics including transport, supplier production and availability of raw materials (E8).
9. Adverse impacts from extreme weather on employment and financial wellbeing (S1).
10. Increasing impacts on physical and mental health and wellbeing (S2).
11. Reduced capacity of emergency services to prepare, manage and respond (S10).

To help inform management planning and action, the risk assessment identified suggested further actions to address these 11 high-priority risks (more information is provided in Chapter 12 of the Technical Report).

Another 21 physical risks were identified as requiring further investigation and action (Tier 2 risks) in the next 5 years to strengthen adaptation efforts, and another 3 risks as requiring current adaptation actions to be sustained (Tier 3 risks). No risks were identified as requiring a watching brief (Tier 4 risks). Refer to Chapter 12 of the Technical Report for more information.

Climate change risks are often complex and interconnected which amplifies the impacts. Two or more climate hazards occurring at the same time are also expected to increase. For example, more frequent floods and bushfires not only damage housing but also affect insurance and property values, food security, and community health and wellbeing. Flooding and bushfires may occur at the same time in different parts of the state, affecting transport, supply chains and emergency response capacity. Six case studies of complex risks show that adaptation is only effective when it addresses their interconnections and complexity. Refer to Chapter 9 of the Technical Report for more detail.

The changing global policy, economic and market landscape as countries adapt and transition to net zero greenhouse gas (GHG) emissions presents both risks and opportunities. Five transition risks were identified for South Australia relating to:

- increased long-term costs and reduced access to capital for business and government due to insufficient action on climate change (TR1)
- reduced housing access and affordability linked to migration to support growth of new green industries (TR2)
- adverse economic growth impacts from a failure to transition to a low emissions future (TR3)
- waste management systems that are unprepared to handle renewable energy waste (TR4)
- damage to the natural environment from renewable energy infrastructure (TR5).

More detail is available in Chapter 10 of the Technical Report.

South Australia is well positioned to take advantage of several social, economic and environmental opportunities associated with adapting to climate change and reducing GHG emissions. These are opportunities for:

- economic growth through low emissions technologies, industry and farming (O1)
- improved recycling and circular economy systems (O2)
- improved outcomes for biodiversity, natural resource management, air quality and cultural heritage (O3)
- increased public and active transport use, with benefits for lower emissions, reduced traffic congestion, and better air quality and health outcomes (O4)
- stronger planning and building codes that support climate-resilient and low emissions development (O5)
- more flexible and reliable electricity infrastructure through renewable energy and storage development and associated grid modernisation (O6)
- education and skills development in emerging low emissions industries (O7).
- integrating Aboriginal culture, values and economic participation into carbon offset and renewable energy projects (O8).

Further information is available in Chapter 11 of the Technical Report.

As a high-level overview of statewide climate-related risks and opportunities, the assessment also identified areas for further investigation and improvement for future statewide risk assessments.

The South Australian Government will continue to engage with stakeholders in considering these findings to inform future adaptation planning, develop additional actions and support continuous improvement for future risk assessments. Refer to Chapter 12 of the Technical Report for more information.

# 1. INTRODUCTION

South Australia's first statewide climate change risk and opportunity assessment (the SA climate change risk assessment) provides a picture of how South Australia's people, places and environments could be impacted by climate change, to guide how the state can respond and adapt to climate change risks and opportunities.

South Australia's unique environment, diverse communities and economy are exposed to the changing climate, and are already experiencing the effects of this. As the climate continues to change, the impacts and costs will increase.

Warmer temperatures, sea level rise and more frequent extreme weather events will continue to degrade ecosystems and biodiversity; damage coasts and flood defences; strain water supplies and transport infrastructure; and place increasing pressure on emergency services. These changes will also affect public health and wellbeing; reduce the affordability of insurance; disrupt supply chains; and affect jobs, incomes and key industries such as agriculture and transport.

This climate change risk assessment helps inform how South Australians can respond and adapt to climate change risks. It is a resource for use by governments, business, the community and research organisations to guide decision making, as well as to help plan how to reduce climate change risks and harness opportunities.

# 2. HOW WAS THE RISK ASSESSMENT CONDUCTED?

The SA climate change risk assessment commenced in 2023 and was led by Deloitte on behalf of the South Australian Government.

The SA climate change risk assessment aimed to answer the following question:

**Based on the latest understanding of current and future climate-related risks and opportunities, as well as current and planned adaptation action, what are the most urgent areas for further action in the next 5 years?**

The objectives were to:

- identify and prioritise climate change risks and opportunities at a state level
- collect and analyse quantitative and qualitative data, evidence and information on priority risks and opportunities, socio-economic implications, and adaptation gaps and options
- seek input from key stakeholders and build awareness, knowledge and support for addressing climate change risks and opportunities.

The SA climate change risk assessment used a framework based on national and international best practice. The framework combines assessment of hazards, vulnerability, exposure, complexity, consequences and adaptation responses to understand and prioritise risk.

It assessed the physical risks arising from climate change in the short (2030), medium (2050) and long term (2090) based on the level of climate change anticipated under different global GHG emissions scenarios. Physical risks were examined across four value domains – natural, built, economic and social.

### Natural domain

Landscapes, seascapes, forest and woodlands, ecosystems, and diverse plant and animal life within South Australia and its oceans.

### Built domain

Human-made surroundings, structures and any supporting infrastructure created using material, spatial and human resources to facilitate life, health, work and play; and physical and digital infrastructure systems.

### Economic domain

Production and consumption of goods, productivity, industry, financial systems and the economy.

### Social domain

People, their communities, their culture and cultural values, institutions, governance, support systems. This domain recognises Aboriginal communities as a demographic that faces specific risks, including to their cultural heritage.

The SA climate change risk assessment used the latest available (in 2024) climate modelling data downscaled for South Australia. Both chronic hazards and changes (i.e. ongoing or longer-term changes) – such as average annual temperatures and sea level rise – and acute hazards (i.e. extreme events) – such as extreme rainfall, heatwaves and bushfires – were assessed.

In addition to physical risks, opportunities and transition risks as a result of the shift to a low emissions future were assessed at a high level. How climate risks interact and amplify each other was also examined through 6 case studies on complex risk. The different categories of risk are defined in Table 1.

**Table 1: Different categories of climate-related risk**

| Physical risks | Transition risks | Opportunities | Risk complexity |
|---|---|---|---|
| Risks from increasing intensity and frequency of extreme weather events. | Risks from policy, regulation, technology development and market changes as a result of actions to reduce global GHG emissions. | Opportunities that arise due to a changing climate and global actions to reduce GHG emissions and adapt to climate change. | Risk complexity arising from multiple climate hazards occurring concurrently, and/or from multiple risks compounding and interacting through connected systems and regions. |

The SA climate change risk assessment was conducted over 4 stages (Figure 1). Information was gathered from a range of sources including scientific and technical literature, a stocktake of adaptation actions, and consultation with government and non-government stakeholders and experts.

Stakeholders and experts from over 119 individual organisations contributed to the SA climate change risk assessment, representing a diverse cross-section of government, industry, research and community sectors.

Stakeholder consultation helped tailoring the best practice methodology for SA as well as identify, test and validate the SA climate change risk assessment findings.

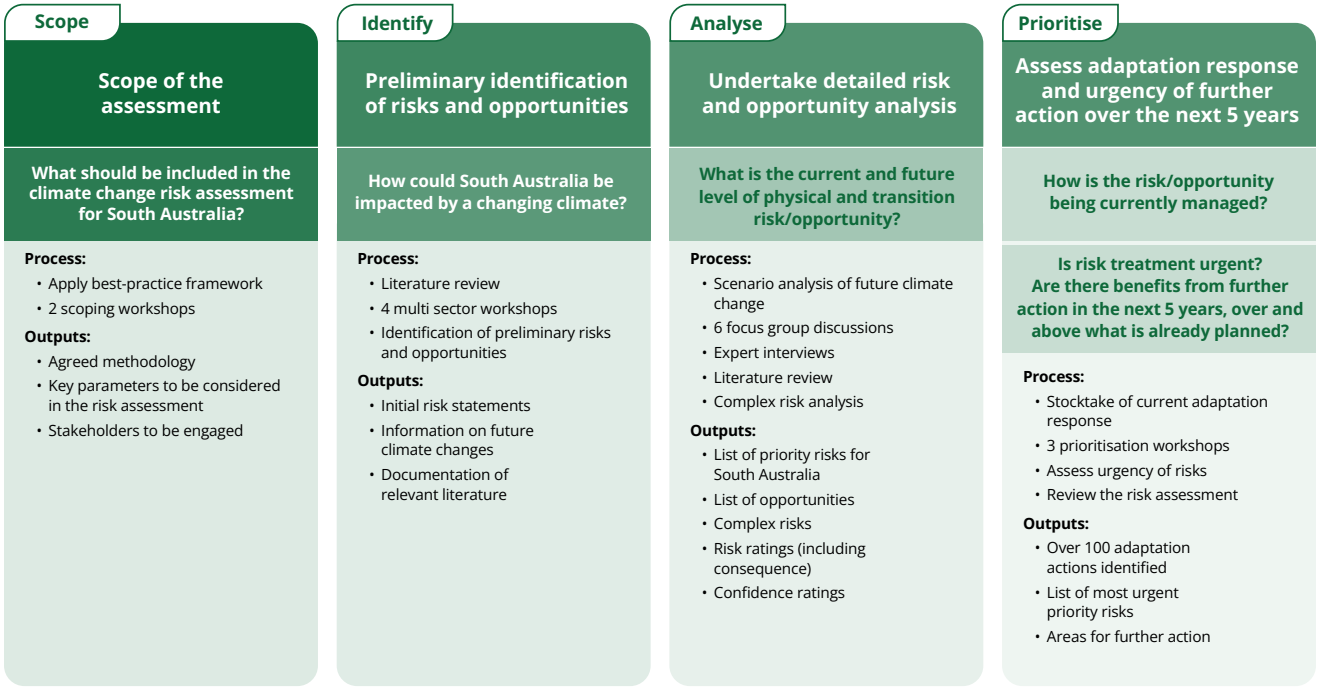



**Figure 1: SA climate change risk assessment process**

## 3. PHYSICAL RISK ASSESSMENT

Thirty-five physical risks were assessed in detail and rated for their adaptation urgency using a combination of consequence, complexity, adaptation shortfall and confidence criteria (Table 2 and Figure 2).

**Table 2: Key criteria used in the SA climate change risk assessment**

| Consequence | Complexity | Adaptation shortfall | Confidence |
|---|---|---|---|
| Consequence is defined as the outcome of an event that may result from a hazard. It can be expressed quantitatively (e.g. units of damage or loss, disruption period, monetary value of impacts or environmental effect), semi-quantitatively by category (e.g. high, medium or low level of impact) or qualitatively (a description of the impacts).[a] It is also defined as the outcome of an event affecting objectives.[b] | Complex risks result from multiple climate hazards occurring concurrently, and from multiple risks interacting, compounding overall risk and resulting in risks transmitting through interconnected systems and across regions.[c]<br><br>Complex risk is an emerging field within climate change risk assessments. | Shortfalls in existing adaptation efforts for each risk area or system were assessed through a review of how climate risks are currently managed and what adaptation measures are planned. | Confidence reflects the validity of a finding based on the type, amount, quality and consistency of evidence, as well as the level of agreement among experts. |

a Adapted from Ministry of Civil Defence and Emergency Management [MCDEM], 2019.

b ISO/IEC 27000:2014 and ISO 31000: 2009, Ministry for the Environment, 2019.

C Adapted from O'Neill, B., Aalst, M. v. & Z. Zaiton Ibrahim, 2022. Key Risks Across Sectors and Regions. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge: Cambridge University Press 2022.

Likelihood scoring was not applied, consistent with best practice for this type of climate change risk assessment, which considers longer-term trends and is not event-based like most risk assessments. In this assessment, the magnitude of consequences was assessed based on an 'uncontrolled' or 'unmitigated' scenario. That is, the score reflects the potential impact in the absence of effective controls, policy responses or adaptation measures. For transition risks, the same principle was used, but with more qualitative and high-level analysis.

A wide range of existing and planned adaptation responses were assessed at a high level to help identify where further adaptation action may be required. Adaptation shortfall ratings were applied to physical risks only, and developed using a structured criterion to evaluate whether existing strategies, plans or policies could reasonably be expected to address the risk. The analysis primarily focused on whether sufficient adaptation is currently in place.

The assessment may not have identified all adaptation activity across government, the private sector and the state and had limited capacity to review private sector or other non-government initiatives.

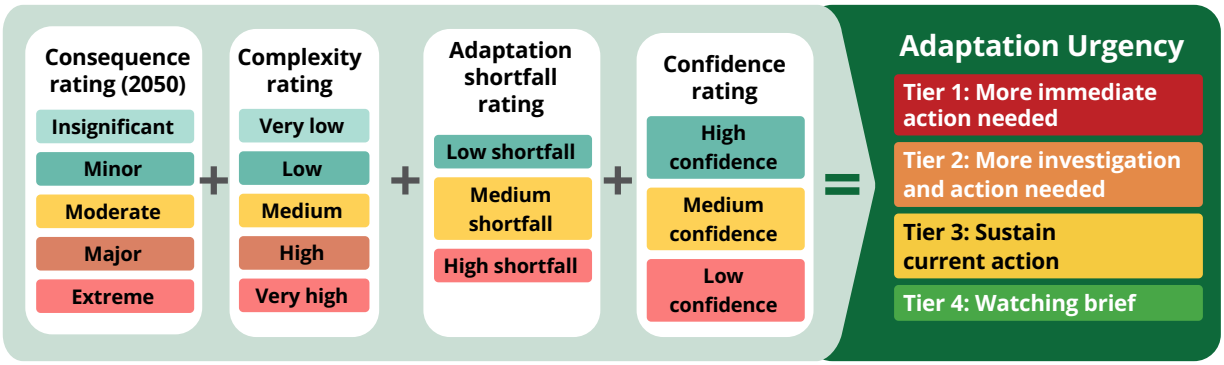



**Figure 2: The SA climate change risk assessment evaluation process**

## 4. OPPORTUNITIES AND TRANSITION RISK ASSESSMENTS

Opportunities were identified through a review of existing literature and refined in consultation with South Australian stakeholders. These are not formally rated but are discussed at a high level in the Technical Report.

Transition risks were also assessed at a high level, focusing on identifying emerging risks and trends, and considering transition drivers rather than climate hazards. Transition risks were not assigned adaptation shortfall ratings. While relevant controls, reforms or policy developments were sometimes referenced in the narrative, these were not systematically assessed or used to generate a shortfall score.

The approach to the SA climate change risk assessment is further detailed in Chapter 2 of the Technical Report.

# 5. FINDINGS OF THE RISK ASSESSMENT

## 5.1. CLIMATE CHANGE PROJECTIONS FOR SOUTH AUSTRALIA

South Australia's climate is becoming warmer and drier with more frequent extreme weather events.

South Australia has experienced a 1°C increase in average temperatures since 1960 and average rainfall is reducing. If global emissions remain high, average temperatures are projected to increase by a further 1.3–2.2°C by 2050 and 2.7–4.2°C by 2090.

Sea levels are rising, and oceans are becoming warmer and more acidic. Extreme weather events such as storms, droughts, heatwaves and heavy rainfall are becoming more frequent and intense. Bushfire risk is also predicted to continue to increase.

**South Australia's future climate**

- Hotter conditions and more frequent heatwaves
- Drier conditions and reduction in average annual rainfall
- More intense rainfall and frequent flooding events
- More frequent bushfire risk
- Rising sea levels and more frequent storm surges
- Warmer and more acidic oceans

## 5.2. PHYSICAL RISKS

Thirty-five physical risks were assessed for their level of adaptation urgency. The Technical Report outlines the risk profiles in detail in Chapters 5 to 8.

Eleven risks were given a Tier 1 adaptation urgency score, meaning they require new or stronger action in the next 5 years, over and above that already planned (Table 3). These risks have potential to result in high to extreme consequences by 2050 and have a medium to high adaptation shortfall.

Twenty-one risks were given a Tier 2 adaptation urgency score, meaning they require further investigation in the next 5 years to inform additional action. Three risks were given a Tier 3 adaptation urgency score, meaning they require the current level of adaptation action to continue.

A summary of risk statements and consequence ratings is provided in **Appendix A**.

The SA climate change risk assessment indicated that climate-related risk will increase over time without further action.

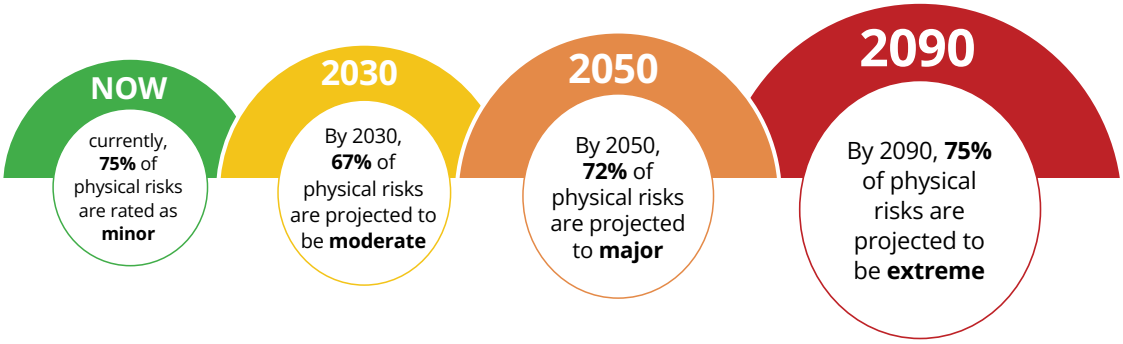



**Figure 3: Summary of likely changes to South Australia's risk profile up to 2090**

**Table 3: South Australia's 11 high-priority (Tier 1) risks**

| Risk type | Risk statement | Consequence |
|---|---|---|
| **Natural domain** | | |
| **N1: Risks to biodiversity** | Chronic shifts in climate and the increased frequency and intensity of acute hazards – such as extreme weather events, bushfires and marine heatwaves – can disrupt ecosystem dynamics across South Australia's terrestrial, freshwater and marine realms. These stressors can alter species interactions and community structure among native, invasive and migratory organisms undermining ecosystem resilience and ultimately leading to significant losses in regional biodiversity. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **N2: Risks to coasts and offshore islands** | Chronic climatic change, coupled with more frequent and intense acute hazards, significantly affect coastal ecosystems – including wetlands, dune systems, coastal groundwater, estuaries, offshore islands, gulfs and reefs – by intensifying erosion and inundation processes. These impacts compromise the structural integrity and natural resilience of the coastline, thereby reducing its capacity to sustain itself and recover from disturbances. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **Built domain** | | |
| **B4: Risks to flood and coastal defences** | Chronic climatic change and increased frequency and intensity of acute hazards affect coastal protection and management methods (seawalls, breakwaters, coastal structures, beach replenishment, sand recycling and bypassing, dune management and restoration), and flood mitigation infrastructure (levee banks, floodgates and barrages). This can result in structural failure, loss of protective function, inundation of communities and ecosystems, and major restoration requirements to maintain safety and serviceability. | 2030 – Moderate 2050 – Major 2090 – Extreme |

| Risk type | Risk statement | Consequence |
|---|---|---|
| **B6: Risks to transport** | Chronic climatic change and increased frequency and intensity of acute hazards impact aviation, ports/maritime, roads, rail, freight infrastructure, public transport and logistics. This can result in delays, and disruptions to supply chains and community connectivity, as well as contribute to increased maintenance, repair and restoration capital expenditure. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **B9: Risks to water resources and availability** | Chronic climatic change and increased frequency and intensity of extreme weather events affect water resources (quality, demand, supply and availability) and associated infrastructure (storage, treatment and distribution of potable water, stormwater and wastewater). This can result in adverse impacts on water resource availability, quality, supply and demand, and increase flow volumes or stormwater. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **Economic domain** | | |
| **E1: Risks to agriculture and forestry** | Chronic climatic change, combined with more frequent and intense acute hazards, impact South Australia's agricultural sector and associated businesses (including small and medium enterprises), including those in grains and crops, grape and wine, horticulture, livestock, wool and dairy. Altered rainfall and temperature patterns and more frequent and intense extreme weather can disrupt growing conditions, impact crop yields and livestock productivity, increase exposure of infrastructure to damage, and contribute to higher production and operational costs. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **E3: Risks to the insurability and affordability of insurance of private and public assets** | Chronic climatic change and increased frequency and intensity of acute hazards place pressure on the insurability and affordability of private and public assets across South Australia. As climate-related events become more severe or widespread, insurers may face higher claims and greater risk exposure, which can increase premiums or reduce insurance availability in high-risk areas. This may affect the ability of households, businesses and governments to access insurance, recover from climate-related impacts and secure necessary capital. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **E8: Risks to supply chains and logistics** | Chronic climatic change and increased frequency and intensity of extreme weather events impact state and national supply chains and logistics, including transport, supplier production and raw material availability. This can lead to supply disruptions; shortages and increased costs to businesses that are passed onto consumers; increased living costs; and health impacts from disruption to food and medical supplies, with adverse flow-on impacts to the state's economy. | 2030 – Moderate 2050 – Major 2090 – Extreme |

| Risk type | Risk statement | Consequence |
|---|---|---|
| **Social domain** | | |
| **S1: Risks to employment and financial wellbeing** | Chronic climatic change and increased frequency and intensity of extreme weather events disrupt and damage housing, businesses, supply chains and productivity. This can lead to repair costs for individuals and businesses, reduced hours, job losses, workplace injuries and increased job insecurity, putting financial strain on individuals and the community. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **S2: Risks to health and wellbeing** | Chronic climatic change and increased frequency and intensity of extreme weather events directly impact physical health, heighten mental health conditions and promote the spread of disease. This can increase demand for already strained healthcare services, and it can increase inequality, ultimately impacting identity, autonomy and wellbeing and reducing quality of life for the community. | 2030 – Moderate 2050 – Major 2090 – Extreme |
| **S10: Risks to emergency services** | Chronic climatic change and increased frequency and intensity of extreme weather events impact demand for emergency services, especially when there are cascading emergencies, and reduce safety for staff and volunteers. This can lead to resource shortages, staff and volunteer fatigue, trauma, mental stress, and a reduced ability to recruit new volunteers – all adversely impacting service delivery. | 2030 – Major 2050 – Major 2090 – Extreme |

## 5.3. INTERACTIONS BETWEEN PHYSICAL RISKS

Climate-related risks do not occur in isolation and a high-level analysis was undertaken through 6 sector case studies to understand and demonstrate how risk can propagate across multiple systems. These sectors include agriculture, horticulture and food security, water security and resources, natural systems, infrastructure and the built environment, local government, and health and community wellbeing.

The key findings of this work were that risks do interact in complex ways that can amplify the impacts and consequences. This means that adaptation responses must address this complexity and interconnection to be effective.

More information on the case studies can be found in Chapter 9 of the Technical Report.

## 5.4. TRANSITION RISKS

The transition to a low emissions future presents both opportunities and risks. Importantly, while an accelerated transition can help unlock economic, environmental and social benefits, it also introduces new risks that require careful planning and management. Five high-level transition risks were identified (Table 4) for consideration in future government planning and policymaking. The impact of these risks changes over time, and 2 transition risks were projected to have an extreme consequence by 2050 under a low emissions scenario. For more information, see Chapter 10 of the Technical Report.

**Table 4: Transition risks**

| High-level transition risks | | | Rating under low emissions scenario |
|---|---|---|---|
| **TR1** | **Risks to financial position of businesses and South Australian Government** | Risks to the financial position of governments and businesses in South Australia due to delayed or insufficient action to reduce emissions and invest in climate adaptation. Failure to act early is likely to result in increased long-term costs, including higher infrastructure and operating expenses, more stranded assets and reduced access to capital as global climate expectations intensify. | 2030 – Extreme<br>2050 – Extreme |
| **TR2** | **Risks to housing access and affordability** | Risks to housing access and affordability in South Australia due to new people moving to or within the state to support the growth and expansion of industries that mitigate climate change (e.g. hydrogen or renewable energy-related industries). | 2030 – Major 2050 – Extreme |
| **TR3** | **Risks to the economic growth of the state** | Risks to the state's economic growth resulting from failure to transition to low emissions future to meet export market changes. | 2030 – Moderate<br>2050 – Moderate |
| **TR4** | **Risks to recycling processes and systems** | Risks from landfill and waste management systems that are unprepared to handle waste generated from renewable energy deployment, such as solar PV (photovoltaic) panels and large-lithium-ion batteries arising from electric vehicles and energy storage systems. | 2030 – Minor 2050 – Moderate |
| **TR5** | **Risks to natural environment from new renewable energy infrastructure** | Risks to natural environment (including biodiversity) from new renewable energy infrastructure that may damage habitats and ecosystems, disrupt migration paths (e.g. birds), and contribute to potential species and biodiversity decline or loss. | 2030 – Insignificant<br>2050 – Minor |

## 5.5. OPPORTUNITIES

Opportunities identified for South Australia from the global transition to a low emissions future and from taking steps to adapt to climate change are outlined in Table 5. For more information, see Chapter 11 of the Technical Report.

**Table 5: Opportunities for South Australia**

| Opportunity statement | | Description |
|---|---|---|
| **O1** | **Opportunities for South Australia's economic growth** | Opportunities for South Australia's economic growth include creating new low emissions revenue streams and technologies, evolving farming systems and production practices, expanding clean industries (e.g. renewable energy, green steel and critical mineral projects), and positive sustainability credentials that support access to finance (at a business and state level). |
| **O2** | **Opportunities to optimise recycling processes and systems** | Opportunities to expand circular economy practices to reduce emissions and reduce impact on the environment from waste, including reducing waste to landfill, more efficient and considered use of resources, improved collection and increased recyclability for products. |
| **O3** | **Opportunities to improve the natural environment** | Opportunities to improve biodiversity, water quality, water security, air quality, habitat restoration, landscape features and cultural sites from well-considered and sustainably implemented emissions reduction and/ or adaptation actions. These include renewable energy (reduced air pollution), urban greening, climate-independent water supplies, carbon farming, blue carbon and environmental markets. There may also be some changes in biodiversity that may present economic benefit (e.g. fisheries) and tourism benefits. |
| **O4** | **Opportunities to improve public and active transport infrastructure and services** | Opportunities to improve public and active transport infrastructure and services to increase use of these transport options and reduce transport emissions, with flow-on benefits of improved traffic congestion, enhanced efficiency and safety, reduced air pollution and improved health and wellbeing. |
| **O5** | **Opportunities to improve planning and building codes, policy and legislation** | Opportunities to allow for sustainable and climate-resilient buildings and urban design, safe housing locations, protection of at-risk infrastructure, and support for the infrastructure needs of low emissions technology and the circular economy across different sectors. This can create further opportunities for improved energy efficiency and productivity. |
| **O6** | **Opportunities to improve flexibility and reliability of electricity infrastructure** | Opportunities to improve the flexibility and reliability of electricity infrastructure from increased renewable energy generation and storage, and associated grid modernisation. |
| **O7** | **Opportunities for education and skills development** | Opportunities for improved education and skills development in existing and emerging sectors (e.g. hydrogen, renewable energy, low emissions products) and improved societal climate literacy and skills, resulting in improved social cohesion, employment and financial wellbeing. |
| **O8** | **Opportunities to support Aboriginal-led climate solutions for climate adaptation, reconciliation and resilience** | Opportunities to strengthen South Australia's climate response by integrating Aboriginal knowledge systems, cultural practices and leadership in the design and delivery of nature-based climate solutions. Aboriginal-led land management approaches may help support emissions reduction, build ecological resilience, and advance reconciliation and self-determination for Aboriginal communities. |

## 6. SUGGESTED FOCUS AREAS FOR FURTHER ACTIONS

Suggestions for further adaptation actions focusing on the 11 high-priority risks are outlined in Table 6.

More information can be found in Chapter 12 of the Technical Report.

**Table 6: Suggested further actions in the next 5 years**

| Suggested further actions | |
|---|---|
| **N1: Biodiversity** | |
| **N1.1** | Improve the detailed understanding of climate change impacts on biodiversity in South Australia, including by compiling relevant local ecological information (linked to N1.2–1.4). |
| **N1.2** | Undertake more detailed assessments of priority biodiversity risks related to climate change in South Australia and develop specific recommendations for mitigation (linked to N1.3). |
| **N1.3** | Strengthen research, data collection and monitoring and evaluation of species and ecosystems in the context of long-term climate change. |
| **N1.4** | Develop an action-orientated statewide biodiversity plan that responds to climate change impacts. |
| **N2: Coasts and offshore islands** | |
| **N2.1** | Enhance coastal resilience against erosion and flood risk and protect and restore coastal habitats through stronger local planning, partnerships and nature-based solutions. |
| **N2.2** | Develop a staged plan for coastal defence infrastructure adaptation and managed retreat (linked to B4.2). |
| **N2.3** | Expand community engagement and education programs. |
| **B4: Flood and coastal defences (focused on inland and catchment-based flooding)** | |
| **B4.1** | Invest in updating and improving flood data and modelling using consistent and agreed climate scenario timeframes. |
| **B4.2** | Develop a staged and systematic approach, including governance, to evaluate future risks and support investment planning. |
| **B4.3** | Embed flood resilience into planning systems and land-use decisions. |
| **B6: Transport and logistics** | |
| **B6.1** | Embed climate resilience into transport infrastructure planning and upgrades. |
| **B6.2** | Design climate-resilient public transport systems. |

| | |
|---|---|
| **B9: Water resources and availability** | |
| **B9.1** | Identify priority risks to water quality, availability and supply under future climate conditions. |
| **B9.2** | Enhance capability and resources to deliver the 10 strategic priorities in the South Australian Water Security Statement. |
| **E1: Agriculture** | |
| **E1.1** | Assess the current state of adaptation research and development for key agricultural sectors and address major gaps. |
| **E1.2** | Develop sector-based adaptation plans, where needed. |
| **E1.3** | Facilitate implementation of climate change adaptation actions on the ground. |
| **E3: Insurability and affordability of insurance of private and public assets** | |
| **E3.1** | Engage with insurance stakeholders and other governments on opportunities for government to mitigate climate-related risks. |
| **E3.2** | Promote the continued incorporation of climate change risk assessments into financial decision making. |
| **E3.3** | Strengthen land-use planning, development controls and infrastructure standards to reduce future exposure to uninsurable risks. |
| **E8: Supply chains and logistics** | |
| **E8.1** | Strengthen supply chain resilience in South Australia by embedding climate risks and opportunities in strategies and planning. |
| **S1: Employment and financial wellbeing** | |
| **S1.1** | Identify sectors that are most at risk from climate change, and develop mitigation initiatives and explore targeted assistance and retraining programs. |
| **S2: Health and wellbeing** | |
| **S2.1** | Continue supporting existing programs and policies, emphasising focus on the intersection of climate change and human health issues in South Australia. |
| **S2.2** | Enhance collaboration and foster strong relationships with key agencies supporting the health and wellbeing of South Australians. |
| **S2.3** | Promote the continued embedding of climate resilience into health facilities and infrastructure. |
| **S10: Emergency services** | |
| **S10.1** | Enhance collaboration and cooperation within the emergency services sector to promote an integrated approach to climate risk management. |
| **S10.2** | Continue to actively build capacity and capability of the emergency services sector to assess, understand and mitigate climate change impacts. |

# 7. LIMITATIONS AND OPPORTUNITIES FOR IMPROVEMENT

The state-level focus of this climate change risk assessment – despite consideration of regional differences – limits the detail and granularity of the assessment.

Risks to cultural heritage, including Aboriginal cultural heritage, were considered at a high level. Project constraints meant it was not possible to undertake the level of culturally appropriate engagement needed to ensure Aboriginal peoples' experiences and perspectives could confidently inform the consequence, adaptation shortfall and complexity rating of this risk area. Future work will need to prioritise deeper engagement and more detailed assessment to respectfully incorporate these perspectives.

Stakeholder engagement was critical to this assessment; however, limited availability of some stakeholders may have influenced the breadth and depth of information gathered. Similarly, the adaptation shortfall criteria focused on state government policies and leadership, and may not have fully captured adaptation efforts led by the private sector, federal government or local government strategies.

Climate change risks and actions are rapidly evolving, and issues may have changed, or new actions developed during the preparation of this point-in-time assessment. This highlights the need to review and update the SA climate change risk assessment on a regular basis.

Climate models have some limitations, such as uncertainty in their predictions, limited ability to show how different climate impacts might interact or amplify each other, and low detail at local or regional scales. These limitations highlight the need to work to improve and strengthen future assessments.

Opportunities for building on, and improving, future climate change risk assessments include:

- strengthening assessment of cultural heritage, including Aboriginal knowledge and perspectives
- promoting consistency in climate change risk assessment methodologies across South Australia, where practical, to enable assessments to be compared and collated
- supporting more detailed and localised assessments that can inform the next statewide assessment
- monitoring and evaluating South Australia's responses to climate change
- promoting further climate risk research, investigation and innovation.

More information can be found in Chapter 12 of the Technical Report.

## 8. HOW THIS CLIMATE CHANGE RISK ASSESSMENT WILL BE USED

The SA climate change risk assessment provides information for a planned approach to addressing climate change risks and opportunities. The South Australian Government will continue to engage with stakeholders in considering the findings to inform future adaptation planning, develop additional actions and support continuous improvement for future risk assessments.

This first SA climate change risk assessment provides a baseline for future assessments, with the statewide risk assessment to be reviewed at least once every five years.

## APPENDIX A: THE PHYSICAL RISKS BY DOMAIN, CATEGORISED BY CONSEQUENCE AND URGENCY

More information on each risk is provided in Chapters 5 to 8 of the Technical Report.

| Natural | | | Built | | | Economic | | | Social | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tier 1: More immediate action needed** | | | | | | | | | | | |
| **Risk** | **Ratings** | | **Risk** | **Ratings** | | **Risk** | **Ratings** | | **Risk** | **Ratings** | |
| N1 Physical risks to biodiversity | **Urgency** | **Tier 1** | B4 Physical risks to flood and coastal defences | **Urgency** | **Tier 1** | E1 Physical risks to agriculture and forestry | **Urgency** | **Tier 1** | S1 Physical risks to employment and financial wellbeing | **Urgency** | **Tier 1** |
| | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor |
| | **2030** | Moderate | | **2030** | Moderate | | **2030** | Moderate | | **2030** | Moderate |
| | **2050** | Major | | **2050** | Major | | **2050** | Major | | **2050** | Major |
| | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme |
| N2 Physical risks to coasts and offshore islands | **Urgency** | **Tier 1** | B6 Physical risks to transport | **Urgency** | **Tier 1** | E3 Physical risks to insurability and affordability of insurance of private and public assets | **Urgency** | **Tier 1** | S2 Physical risks to health and wellbeing | **Urgency** | **Tier 1** |
| | **Consequence** **Now** | Minor | | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor |
| | **2030** | Moderate | | **2030** | Moderate | | **2030** | Moderate | | **2030** | Moderate |
| | **2050** | Major | | **2050** | Major | | **2050** | Major | | **2050** | Major |
| | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme |
| | | | B9 Physical risks to water and resources availability | **Urgency** | **Tier 1** | E8 Physical risks to supply chains and logistics | **Urgency** | **Tier 1** | S10 Physical risks to emergency services | **Urgency** | **Tier 1** |
| | | | | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Moderate |
| | | | | **2030** | Moderate | | **2030** | Moderate | | **2030** | Major |
| | | | | **2050** | Major | | **2050** | Major | | **2050** | Major |
| | | | | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme |

| Natural | | | Built | | | Economic | | | Social | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tier 2: More investigation and action needed** | | | | | | | | | | | |
| **Risk** | **Ratings** | | **Risk** | **Ratings** | | **Risk** | **Ratings** | | **Risk** | **Ratings** | |
| N3 Physical risks to inland water ecosystems | **Urgency** | **Tier 2** | B1 Physical risks to buildings and structures | **Urgency** | **Tier 2** | E2 Physical risks to fishing and aquaculture | **Urgency** | **Tier 2** | S3 Physical risks to housing and housing access | **Urgency** | **Tier 2** |
| | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor |
| | **2030** | Major | | **2030** | Moderate | | **2030** | Moderate | | **2030** | Moderate |
| | **2050** | Major | | **2050** | Major | | **2050** | Major | | **2050** | Major |
| | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme |
| N4 Physical risks to land | **Urgency** | **Tier 2** | B2 Physical risks to parks and green infrastructure, including national parks | **Urgency** | **Tier 2** | E5 Physical risks to government sector | **Urgency** | **Tier 2** | S4 Physical risks to regional, rural and remote communities | **Urgency** | **Tier 2** |
| | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor |
| | **2030** | Moderate | | **2030** | Moderate | | **2030** | Minor | | **2030** | Moderate |
| | **2050** | Major | | **2050** | Major | | **2050** | Moderate | | **2050** | Major |
| | **2090** | Extreme | | **2090** | Extreme | | **2090** | Major | | **2090** | Extreme |
| N5 Physical risks to marine ecosystems | **Urgency** | **Tier 2** | B3 Physical risks to communications and ICT | **Urgency** | **Tier 2** | E6 Physical risks to tourism | **Urgency** | **Tier 2** | S8 Physical risks to health and social welfare services | **Urgency** | **Tier 2** |
| | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor |
| | **2030** | Moderate | | **2030** | Moderate | | **2030** | Moderate | | **2030** | Moderate |
| | **2050** | Major | | **2050** | Major | | **2050** | Major | | **2050** | Major |
| | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme |

| Natural | | | Built | | | Economic | | | Social | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tier 2: More investigation and action needed** | | | | | | | | | | | |
| **Risk** | **Ratings** | | **Risk** | **Ratings** | | **Risk** | **Ratings** | | **Risk** | **Ratings** | |
| N6 Physical risks to natural heritage | **Urgency** | **Tier 2** | B5 Physical risks to health and medical assets and infrastructure | **Urgency** | **Tier 2** | E7 Physical risks to manufacturing, construction and trade sectors, including mining | **Urgency** | **Tier 2** | S9 Physical risks to sports and recreation | **Urgency** | **Tier 2** |
| | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor |
| | **2030** | Moderate | | **2030** | Minor | | **2030** | Moderate | | **2030** | Minor |
| | **2050** | Major | | **2050** | Moderate | | **2050** | Major | | **2050** | Moderate |
| | **2090** | Extreme | | **2090** | Major | | **2090** | Extreme | | **2090** | Major |
| N7 Physical risks to biosecurity from invasive species | **Urgency** | **Tier 2** | B7 Physical risks to electricity generation, transmission and distribution infrastructure | **Urgency** | **Tier 2** | E9 Physical risks to food and grocery assets | **Urgency** | **Tier 2** | | | |
| | **Consequence** **Now** | Minor | | **Consequence** **Now** | Moderate | | **Consequence** **Now** | Minor | | | |
| | **2030** | Moderate | | **2030** | Moderate | | **2030** | Minor | | | |
| | **2050** | Major | | **2050** | Major | | **2050** | Major | | | |
| | **2090** | Extreme | | **2090** | Extreme | | **2090** | Extreme | | | |
| N8 Physical risks to air quality | **Urgency** | **Tier 2** | B8 Physical risks to waste collection and management | **Urgency** | **Tier 2** | | | | | | |
| | **Consequence** **Now** | Minor | | **Consequence** **Now** | Minor | | | | | | |
| | **2030** | Minor | | **2030** | Minor | | | | | | |
| | **2050** | Moderate | | **2050** | Moderate | | | | | | |
| | **2090** | Major | | **2090** | Major | | | | | | |

| Natural | | Built | | Economic | | | | Social | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tier 3: Sustain current action** | | | | | | | | | | | |
| **Risk** | **Ratings** | **Risk** | **Ratings** | **Risk** | **Ratings** | | | **Risk** | **Ratings** | | |
| | | | | E4 Physical risks to charities and not-for-profits | **Urgency** | | **Tier 3** | S6 Physical risks to skills and education | **Urgency** | | **Tier 3** |
| | | | | | **Consequence** | **Now** | Minor | | **Consequence** | **Now** | Minor |
| | | | | | | **2030** | Minor | | | **2030** | Minor |
| | | | | | | **2050** | Moderate | | | **2050** | Moderate |
| | | | | | | **2090** | Major | | | **2090** | Major |
| | | | | | | | | S7 Physical risks to social cohesion | **Urgency** | | **Tier 3** |
| | | | | | | | | | **Consequence** | **Now** | Minor |
| | | | | | | | | | | **2030** | Minor |
| | | | | | | | | | | **2050** | Moderate |
| | | | | | | | | | | **2090** | Major |
| **Not assessed** | | | | | | | | | | | |
| **Risk** | **Ratings** | **Risk** | **Ratings** | **Risk** | **Ratings** | | | **Risk** | **Ratings** | | |
| | | | | | | | | S5 Physical risks to cultural heritage, including Aboriginal cultural heritage | **Urgency** | | **N/A** |
| | | | | | | | | | **Consequence** | **Now** | N/A |
| | | | | | | | | | | **2030** | N/A |
| | | | | | | | | | | **2050** | N/A |
| | | | | | | | | | | **2090** | N/A |