Shoalhaven City Council

Adaptation Plan 2022 - 2025

Preparing for a climate resilient Shoalhaven

Contents

Acknowledgement of Country

We would like to acknowledge the Traditional Custodians of the land in which we gather upon today. We acknowledge their continuing connections to the land, culture and community. We pay respect to Elders past, present and future.

Introduction

The climate in New South Wales, and the rest of the world, is already changing. As average temperatures continue to rise, extreme weather events are becoming more frequent and intense, and long-term changes to weather patterns are evolving.

Council's operations, assets and the services we deliver to the community are vulnerable to a range of climate hazards, including storms, heatwaves, bushfire, drought, coastal inundation and flooding. Adapting and building resilience to climate change and the overall health and wellbeing of our community are important issues for Council, and Council is committed to integrating risk management into all its operations, decision making processes and governance structures.

Council has been assessing and responding to climate change risks for over a decade. In 2010 Council completed its first Climate Change Risk Assessment and developed a responding Adaptation Plan detailing actions and adaptation measures to help reduce the impacts of climate change. In June 2021, Council completed an updated Climate Change Risk Assessment, to ensure that the actions and measures we are taking remain effective against future changes.

This Plan details the climate change risks which have been identified as part of this assessment and outlines the measures Council will take to address these risks and work toward a more resilient Shoalhaven community.

The Plan has been developed in line with the Department of Planning, Industry and Environment 'Climate Risk Ready NSW Guide: Practical guidance for the NSW Government sector to assess and manage climate change risks' (2020).

Purpose of this plan

Climate change adaptation is action taken to prepare for actual or expected changes in the climate in order to minimise harm. It is about adjusting the way we behave and do business in a manner which considers and prepares for the future climate.

This Plan has been prepared to address climate risks which will impact Council and our community, and identifies actions which either:

- Increase Council's resilience to deal with the stated risk, or
- Reduce the likelihood of the risk occurring.

Mitigation versus adaptation

Climate change action is typically divided into two categories: adaptation and mitigation. Adaptation focuses on living and coping with the impacts of climate change, while mitigation focuses on dealing with the causes of climate change, most commonly by taking action to reduce greenhouse gas emissions.

As an Adaptation Plan, this document focuses primarily on actions that will help Council and our community better adapt to the changing climate. However, Council is also taking action to mitigate climate change and reduce our emissions through a number of initiatives, as outlined in Council's Sustainable Energy Policy and Strategy (2020). These include:

- A commitment to reduce corporate greenhouse gas emissions, with a key target of achieving net zero emissions by 2050*.
- Improving energy efficiency across Council assets and infrastructure to reduce energy-related emissions.
- Increasing renewable energy generation across Council assets to reduce our reliance on fossil-fuels.

- Trialing Electric Vehicles to reduce transport emissions.

* Council's Sustainable Energy Policy will be reviewed in 2022. This review will consider recommendations to strengthen Council's net zero emissions target, in line with the findings of the Intergovernmental Panel on Climate Change Sixth Assessment Report.

The figure below outlines some of the different mitigation and adaptation actions, including actions which incorporate both approaches.

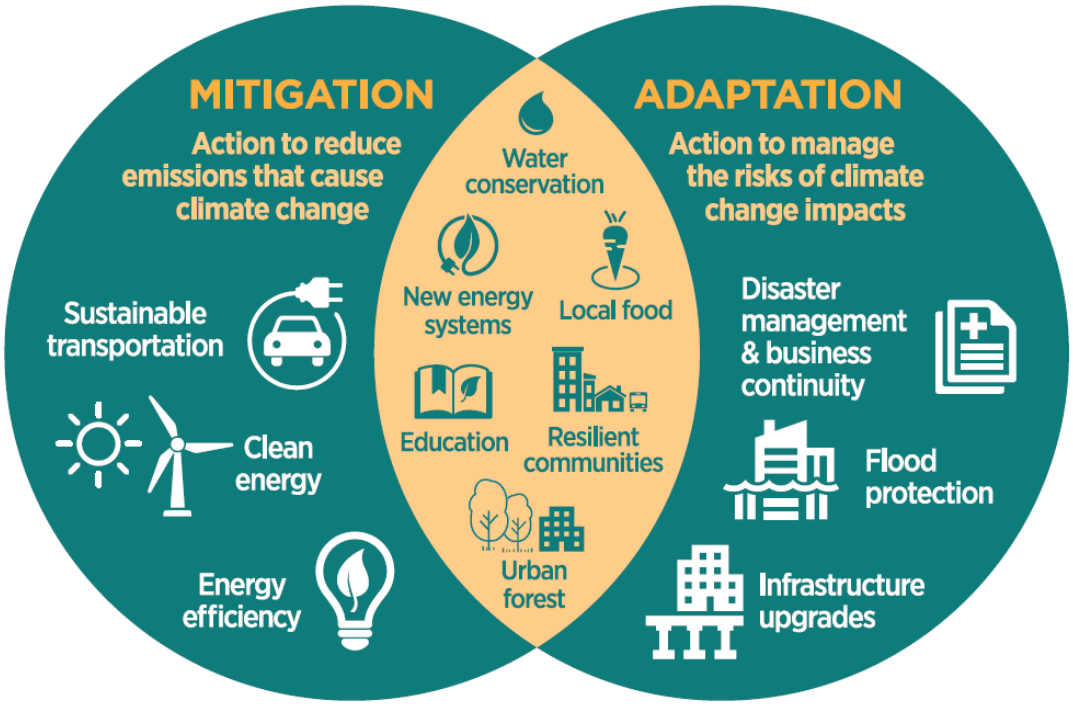

Figure 1 Environment, Energy and Science (in Department of Planning, Industry and Environment) 2021, "Climate Risk Ready NSW Guide. Practical guidance for the NSW Government sector to assess and manage climate change risks".

Vision

This Adaptation Plan is aligned with Council's vision, as set out in the Community Strategic Plan 'Shoalhaven 2027', that

> "We will work together in Shoalhaven to foster a safe and attractive community for people to live, work, stay and play; where sustainable growth, development and environmental protection are managed to provide a unique and relaxed lifestyle."

The actions outlined in this Plan will assist Council to achieve the following priorities:

1. **Resilient, safe, accessible and inclusive communities**

1.1 Support inclusive, safe and connected communities

1.1.1 Our communities are safer and more resilient

2. **Sustainable liveable environments**

2.1 Manage our infrastructure and assets for long term sustainability to meet community need

2.1.1 Public infrastructure is maintained for its current purpose and for future generations

2.1.2 Infrastructure is planned for the long term

2.2 Manage growth and development with respect for environmental and community values

2.2.2 Environmentally sound and climate resilient development

2.3 Protect the natural environment and enhance sustainability

2.3.1 Adapting to climate change and work collaboratively to mitigate our impacts

3. Thriving local economies

3.2 Deliver, safe, vibrant, and attractive public spaces

4. Effective, Responsible & Authentic Leadership

4.1 Deliver reliable, high quality services

4.1.1 Our community continues to have access to high quality public services

4.2 Provide transparent leadership through effective government and administration

4.2.1 Decision-makers lead, govern and regulate in an ethical, equitable, transparent and accountable way

4.3 Inform and engage with the community about the decisions that effect their lives

4.3.2 Increased awareness of the key issues impacting our community

Climate change trends

According to the Intergovernmental Panel on Climate Change (2021) each of the last four decades have been successively warmer than the last, and surface temperatures will continue to increase until at least the mid-century. The rise in Australia's average temperatures has also accelerated in recent decades, with current temperatures now 1.4°C higher than they were in the 1950s, and further warming still expected.

The CSIRO and the Bureau of Meteorology have reported that extreme weather across Australia is occurring more frequently and with greater intensity, and there have been longer-term changes to weather patterns. Rising sea levels around Australia are also increasing the risk of inundation and damage to coastal infrastructure and communities.

As global temperatures increase, extreme weather and climate impacts such as heatwaves, fire weather, heavy rainfall, and more severe flooding are all occurring more frequently and with greater intensity, and the likelihood of compounding extreme weather events happening at the same time or in succession is increasing.

Our region and climate

Shoalhaven is located on the coastal plain of the south coast of New South Wales bounded by the Illawarra escarpment to the west and the Pacific Ocean to the east.

At a regional level, Shoalhaven City Council sits within the Illawarra region, which is typically characterised by a mostly cool temperate climate, with an average annual rainfall slightly under 1100 mm. Temperatures across Shoalhaven are generally mild with average temperatures of 15.5C and 26.5C for June and January respectively. Rainfall is more pronounced during the summer and autumn months and the average run-off of 310 mm is the second highest in the state. Lower evaporation in autumn and winter results in substantially more run-off during these seasons when compared to summer.

The Shoalhaven coastline is approximately 165 kilometres long, and the proportion managed by Shoalhaven City Council is larger than any other local government area in New South Wales. As a coastal council, Shoalhaven is vulnerable to the impacts of sea level rise, coastal inundation and storm surge. The surrounding forested areas and mountainous regions are also at risk of bushfire, and high levels of precipitation and run-off have implications for flood events.

Environment and industry

Crown Land, State Forest and National Park make up 64% of the Shoalhaven land area providing significant habitat for flora and fauna. Diverse coastline habitats represented by beaches, estuaries, wetlands and lakes along the coast are important for both the biodiversity values of the Shoalhaven and commercially for recreational and fishing opportunities. Tourism and primary industries such as dairy, forestry and fisheries provide an important economic base for the region.

Expected regional climatic changes

According to the Department of Environment, Climate Change and Water NSW *Climate Impact Profile*, the Shoalhaven and Illawarra region is expected to experience a number of climatic changes in the near and far future.

Temperatures are virtually certain to rise

Both minimum and maximum daily temperatures are very likely to increase by 1.5–3.0°C throughout the region. The increase is projected to be greatest in spring, autumn, and winter. The region is also expected to experience more hot days in the future, with the greatest increase projected West of Nowra with an additional 1–5 hot days per year in the near future and 5–10 additional hot days per year by 2070.

Summer rainfall is likely to increase substantially

The region is likely to experience a substantial increase in summer rainfall and a slight to moderate increase in spring and autumn rainfall.

Sea level is virtually certain to rise

2010 climate models for NSW predicted a sea level rise of 0.4 m above the 1990 mean sea level by 2050 and a 0.9 m rise by 2100. However, according to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report released in 2021, relative sea level across Australia has risen at a higher rate than the global average in recent decades. It is a trend predicted to continue into the next century, contributing to increased coastal flooding and shoreline retreat along sandy coasts.

Flooding behaviour is likely to change

The combination of rising sea levels and catchment-driven flooding is likely to increase flood frequency, height, and extent in the lower portions of coastal floodplains. Run-off is likely to decrease moderately in spring but increase substantially in summer.

Fire regimes are likely to change

Higher temperatures and changes to rainfall patterns are likely to result in an increase in average and severe fire weather and fire frequency. Very high to extreme fire danger days are projected to increase by 10–50% and the conditions conducive to large and intense fires (such as prolonged drought, low humidity, number of days with high temperature and high wind speeds) will likely increase.

Increased evaporation is likely in all seasons, leading to drier conditions in spring and winter

Evaporation is likely to increase by up to 50% in spring and summer as a result of increased temperatures. Projected increases in temperature and evaporation, combined with projected changes to rainfall, are likely to result in drier soil conditions in winter and spring.

Short-term droughts are projected to become more severe

Changes in rainfall, evaporation and run-off are expected to result in more severe short-term drought, while medium and long-term droughts are projected to become less severe.

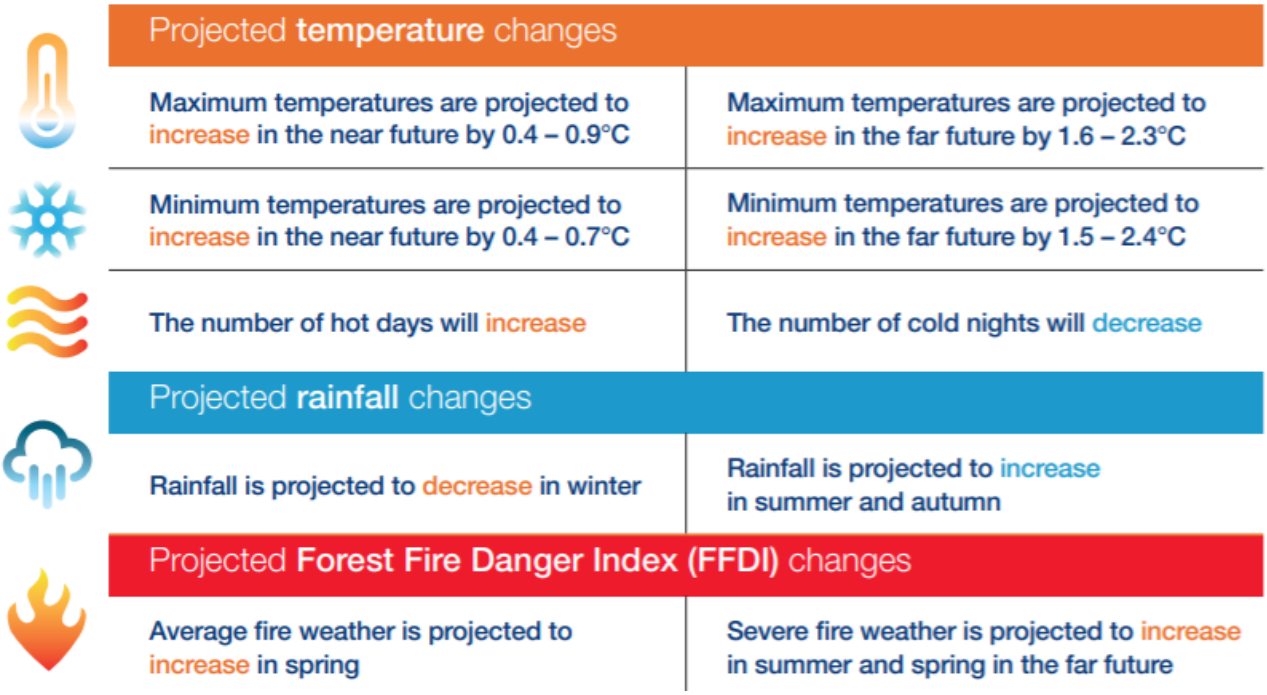

Figure 2 Illawarra Climate Snapshot 2014

Preparing for a changing climate

Climate Risk Ready NSW

Local governments and other agencies can prepare for and address climate change risks by undertaking risks assessments and integrating risks into enterprise risk management frameworks and procedures.

In line with the advice of the Department of Planning, Industry and Environment 'Climate Risk Ready NSW' guide, Council has adopted the recommended four-step process for climate change risk assessment and management. This process draws on national and international leading practice in climate risk management, and industry and government experience, and is aligned to ISO 31000:2018 Risk Management – Guidelines, and NSW Treasury Internal Audit and Risk Management Policy.

Figure 3 Climate Risk Ready NSW Recommended Process

This Adaptation Plan details the approach Council has taken to achieve steps one and two above and outlines the actions Council will take to complete the final two steps by treating the risks identified and continuing to monitor and review these risks into the future.

Climate Change Risk Assessment

On 30 June 2021, Council completed a Climate Change Risk Assessment workshop facilitated by Statewide Mutual. The process was undertaken using the latest available climate data and considered the projected climate impacts specific to the local region. The Australian Standard for Risk management – ISO 31000 was central to the process and provided the framework for assessing climate change impacts. The workshop involved a range of nineteen technically skilled staff from across all areas of Council, who helped identify and assess climate risks against a 'possible consequence' model.

The Climate Change Risk Assessment process was broken down into three stages:

1. Research on the relevant climate data
2. Workshop facilitation, and
3. Development of a report outlining the risk assessment results.

The assessment made use of the data and scenarios available at the time of the assessment, including NARCliM Regional Climate Modelling for key catchment areas and climate change projections at a regional scale. However, it is understood that there is a level of uncertainty regarding climate change projections, including those for New South Wales. The 'Climate Risk Ready NSW' guide therefore recommends that Climate Change Risk Assessments should be completed every five years, to ensure that adaptation planning can remain responsive and appropriate to the latest data and information available.

Report findings

The workshop and report identified twenty-eight climate change risks to Council, with impacts considered in relation to the following functional areas:

- Council Infrastructure and Assets
- Environment Management and Protection
- Corporate Services
- Emergency Management and Natural Disaster Preparedness
- Community Services
- Land-use Planning and Development

The risk assessment process considered the likelihood of risks occurring, the adequacy of any current controls or adaptation initiatives that Council has in place to mitigate these risks, and the consequence of the risk to determine a rating of low, medium, high, or extreme.

The report recommended that Council develop responding adaptation measures for all risks rated high or extreme, and develop measures for any medium risks, as appropriate.

Risk evaluation

In line with Council's Risk Management Policy, Council is committed to manage risk across the organisation through an enterprise risk management framework consistent with the current Australian Standard for risk management (AS ISO 31000:2018). As part of this framework, Council evaluates all risks using its adopted evaluation matrix, which ensures that risks are evaluated consistently and can be included in Council's Corporate Risk Register for ongoing monitoring and reporting.

The risk evaluation matrix adopted by Statewide Mutual as part of the initial Climate Change Risk Assessment workshop was not consistent with Council's risk assessment approach. Following a report and recommendations from the Executive Management Team and Council's Audit Risk & Improvement Committee, each risk identified in the report was therefore re-evaluated in line with Council's corporate risk

evaluation matrix. Risks with identical controls and adaptation measures were also combined as part of this re-evaluation.

The evaluation resulted in a total of twenty-six risks, with 3 risks rated high, 19 rated medium, and 4 rated low. These risks and rating are detailed in the table below.

Risks and ratings

ID	Risk statement	Current controls	Adequacy	Risk rating
R1	There is a risk that sea level rise will cause an increase in flooding and adverse environmental impacts, including coastal erosion processes, as a result of tidal inundations, wave action and storm surges in low lying areas, impacting infrastructure, assets, existing land uses and natural areas.	Local Environmental Plan (LEP) / Development Control Plan (DCP) / Coastal Management Program Risk Assessments / Sea Level Rise Projections and Policy Framework / Asset Management Plans	Mostly beneficial (reduces consequence)	High
R2	There is a risk that sea level rise will lead to adverse impacts on existing land uses	LEPs and DCPs / Sea Level Rise Projections and Policy Framework	Mostly beneficial (reduces consequence)	High
R3	Climate change will lead to an increase in average and severe fire weather days that will affect Council's ability to access and deliver services including local transporting infrastructure, electricity and drinking water.	Emergency Management Plan (EMPLAN) / Asset Management Plans	Mostly beneficial (reduces consequence)	High
R4	Increased intensity and volatility of rainfall events will cause localised flooding resulting in an increased risk to public safety, natural areas, economy, and assets.	Flood Investigations, Floodplain Risk Management Plan / Forward Flood Program / DCP	Some benefit (reduces likelihood)	Medium
R5	As a result of an increase in annual average temperature there will be an increase in both pest and weeds species.	Weed Management Plans	Some benefit (reduces likelihood)	Medium
R6	There is a risk that as a result of increased frequency and intensity of bushfires, ambient temperature rise, and sea level rise, there will be shifts of terrestrial and aquatic ecosystem/biodiversity, resulting in potential decline in biodiversity and natural protection mechanisms	Bushfire Environmental Assessment Code / Threatened flora and fauna species lists / Natural Areas Plans of Management / Coastal Management Plan / Foreshore Policy	Some benefit (reduces likelihood)	Medium
R7	There is a risk that as a result of an increased frequency and intensity of bushfires there will be shifts in terrestrial and aquatic ecosystem/biodiversity, resulting in a potential decline in biodiversity.	Shoalhaven Emergency Management Plan (EMPLAN) / Bushfire Environmental Assessment Code	Some benefit (reduces likelihood)	Medium
R8	There is a risk that as a result of increase in sea level rise will cause shifts in terrestrial and aquatic ecosystem/biodiversity, resulting in potential decline in biodiversity	Coastal Management Plans, Foreshore Policy / Natural Areas Plans of Management	Some benefit (reduces likelihood)	Medium

ID	Risk statement	Current controls	Adequacy	Risk rating
R9	Climate change will lead to an increase in bush fire activity that will affect local communication networks.	Recovery into Resilience Program	Mostly beneficial (reduces consequence)	Medium
R10	Increased bush fire risk will lead to an increased adverse impact on the community including sustainability and wellbeing.	Recovery into Resilience Program / Recovery Action Plan	Mostly beneficial (reduces consequence)	Medium
R11	There is a risk that as a result of an increase in ambient temperature, roads, footpaths, and bridges infrastructure will degrade at a greater rate	Asset Management Plans	Some benefit (reduces likelihood)	Medium
R12	Climate change will lead to an increase in bush fire activity that will increase demand for heavy plant, equipment, and resources.	Shoalhaven Emergency Management Plan (EMPLAN)	Highly beneficial	Medium
R13	As a result of an increase in average temperature, that there is a risk that there will be a greater demand for shade/cooling options at Council recreational facilities and public parks.	Master Plans	Some benefit (reduces likelihood)	Medium
R14	There is a risk that as a result of an increase in the number of hot days within the LGA, combined with ageing electricity supply infrastructure, power outages and brown outs may occur with far greater regularity.	Asset Management Plans / Recovery into Resilience Project / Sustainable Energy Policy	Some benefit (reduces likelihood)	Medium
R15	As a result of an increase in the number of hot days annually, there may be increased visitation to the LGA - Impacting coastal attractions, roads, infrastructure, and servicing	Asset Management Plans	Some benefit (reduces likelihood)	Medium
R16	Decreased levels of rainfall may cause severe drought, resulting in impacts on the natural environment economy and liveability of urban areas	Secure Water Yield Assessment / REMS / Drought Management Plan / Demand Management Plan	Some benefit (reduces likelihood)	Medium
R17	As a result of an increase in the number of hot days annually there could be reduced stream flow into the catchment, greater evaporation at water storage areas as well as significantly increased demand on potable water supplies.	Secure Water Yield Assessment / Drought Management Plan / Demand Management Plan / Water Sharing Plan	Highly beneficial	Medium
R18	There is a risk that as a result of increases in ambient temperature, sporting fields/leisure centres/community amenities will require greater usage of water	REMS / automated irrigation systems / Asset Management Plans	Mostly beneficial (reduces consequence)	Medium

ID	Risk statement	Current controls	Adequacy	Risk rating
R19	There is a risk that as a result of a decrease in average rainfall levels, Council will be faced with degraded water quality impacting local economy	Water Sharing Plan / Secure Water Yield Assessment / Water quality monitoring	Mostly beneficial (reduces consequence)	Medium
R20	There is a risk that sea level rise will impact on entrance management of ICOLLs as a result of tidal inundations, wave action and storm surges.	Entrance Management Policies / Coastal Management Plans and Program	Some benefit (reduces likelihood)	Medium
R21	Due to changing patterns to the quantity of rainfall there is a risk of increased water quality issues in ICOLLs and an imbalance between catchment and coastal processes resulting in significant community pressures	Entrance Management Policies / Coastal Management Plans and Program / Water quality monitoring programs	Mostly beneficial (reduces consequence)	Medium
R22	There is a risk that due to an increase in the number of hot days operational staff, contractors and volunteers may be exposed to adverse health risks (heat stress, heat stroke, dehydration) and the associated downtime costs	Work Health and Safety Policy	Mostly beneficial (reduces consequence)	Medium
R23	As a result of an increase in the number of hot days, food safety compliance within local food outlets may be compromised leading to a rise in food safety concerns such as the incidence of foodborne illness.	Food and Environmental Health and Safety Inspections	Mostly beneficial (reduces consequence)	Low
R24	There is a risk that as a result of an increase in the average ambient temperature, Council may be faced with increased usage of facilities and the need for upgrade existing/installation of new A/C systems in Council's buildings	Asset Management Plans	Some benefit (reduces likelihood)	Low
R25	There is a risk that as a result of an increased number of hot days, there may be greater incidents of bitumen bleeding on roads and footpaths infrastructure within the LGA	Asset Management Plans	Some benefit (reduces likelihood)	Low
R26	As a result of a decreased rainfall in winter the potable water storage yields will be less which will create supply issues in Summer.	Secure Water Yield Assessment/ Water restrictions / REMS	Highly beneficial	Low

Adaptation actions

In line with the recommendations of the Climate Change Risk Assessment, adaptation actions have been developed for all risks rated high and medium. These actions build off existing controls that Council has in place to reduce climate risks and were developed in consultation with key areas of council. Lead staff have been assigned to manage these actions accordingly. Actions have also been allocated for short term or medium term delivery.

Risks classified as low do not currently require adaptation actions, however Council will continue to monitor these risks as part of its annual Corporate Risk review process, and should risk factors change, these will be updated and managed accordingly.

High risk - actions and responses

ID	Risk	Actions	Lead	Further detail and recommendations	Term
R1	There is a risk that sea level rise will cause an increase in flooding as a result of tidal inundations and storm surges in low lying areas and impacting on all infrastructure, assets, and natural areas	Continue Coastal Management Program risk assessments for council infrastructure. Review and update Sea Level Rise Projections and Policy Framework. Ensure asset management plans are updated to address risks	Coastal Management Program Coordinator	Review current Sea Level Rise Projections and Policy Framework and update as needed based on latest data and projections. Continue Coastal Management Program risk assessments for council assets to identify and prioritise areas, infrastructure, and assets at risk of coastal inundation, storms, and flooding. Ensure the DCP remains consistent with the LEP and NSW Floodplain Development Manual principles with regard to controls for new development to minimise flood risk to people and property. Ensure asset management plans consider risk of storms, sea level rise and inundation for Council assets and infrastructure.	Short term (1 yr - ongoing)
R2	There is a risk that sea level rise will cause an increase in adverse environmental impact including coastal erosion processes as a result of tidal inundations, wave action and storm surges impacting all infrastructure, assets, and natural areas.	Review and update Sea Level Rise Projections and Policy Framework. Continue Coastal Management Program and prioritise interventions to protect at-risk assets	Coastal Management Program Coordinator / Senior Floodplain Engineer	Review current Sea Level Rise Projections and Policy Framework and Coastal Management Program to identify key areas at risk of coastal erosion, develop framework to prioritise risk areas and develop management strategies which protect against coastal erosion. Investigate use of physical climate risk analysis platforms, such as XDI, and liaise with NSW Department of Planning and Environment regarding expansion of XDI platform to include local government assets.	Short term (1 yr - ongoing)
R3	Climate change will lead to an increase in average and severe fire weather days that will affect Council's ability to access services including local transporting infrastructure, electricity and drinking water.	Review Emergency Management Plan, liaise with Rural Fire Service regarding preventative measures. Resilience plans and resilience projects to protect infrastructure	Local Emergency Management Officer	Identify essential infrastructure and supply routes required to provide services to community in bushfire emergency. Ensure resilience plans and resilience projects include provisions to protect key infrastructure. Liaise with RFS regarding measures to protect these assets, e.g. fuel reduction burning/establishing fire breaks to reduce risk of road closure and identify alternative access or supply routes to service communities if required.	Short term (1 yr - ongoing)

Medium risk - actions and responses

ID	Risk	Actions	Lead	Further detail and recommendations	Term
R4	Increased intensity and volatility of rainfall events will cause localised flooding resulting in an increased risk to public safety, natural areas, economy, and assets.	Continue current controls and flood investigations including modelling scenarios for projected sea level rise and increased rainfall intensity	Senior Floodplain Engineer	Continue to undertake flood investigations (Flood Studies, Floodplain Risk Management Study & Plan) in accordance with the Floodplain Risk Management process based on the priorities in Council's forward Flood Program. Flood investigations include modelling scenarios with projected sea level rise and increased rainfall intensity. Identify and prioritise mitigation measures for implementation across the Shoalhaven. Ensure Council's asset management plans for flood mitigation assets consider climate change impacts and is regularly updated. Ensure the DCP remains consistent with the LEP and NSW Floodplain Development Manual principles regarding controls for new development to minimise flood risk to people and property.	Short term (1 yr - ongoing)
R5	As a result of an increase in annual average temperature there will be an increase in both pest and weeds species.	Establish priority weed management control plans	Lead - Land Management	Review advice from Local Land Services, Biosecurity Act and South East Regional Strategic Pest Management Plan/South East Regional Strategic Weed Management Plan to identify current priority pest and weed species and inform management plans. Identify conditions which facilitate pest and weed establishment and monitor incidence of new species. Work with Bushcare teams to gather supporting data and information on pest and weed incidence.	Medium term (1-3 years)
R6	There is a risk that as a result of ambient temperature there will be shifts of terrestrial and aquatic ecosystem/biodiversity, resulting in potential decline in biodiversity.	Monitor and contribute to state-wide recovery management plans and prepare local plans as necessary. Consider biodiversity in urban greening strategy.	Lead - Land Management	Monitor and contribute to state-wide threatened/endangered species management plans. Consider local ecosystems/habitat at risk and establish local management plans as necessary. Identify alternative habitat locations for at-risk species. Identify areas with low urban tree cover and prioritise for revegetation programs, develop programs to promote and support rural tree planting and revegetation. Identify urban refuges protected from predation (feral cats, fox) and manage these to maintain predator exclusion. Consider environmental water allocations required for at-risk aquatic ecosystems.	Medium term (1-3 years)
R7	There is a risk that as a result of an increased frequency and intensity of bushfires there will be shifts in terrestrial and aquatic ecosystem/biodiversity, resulting in a potential decline in biodiversity.	Monitor and contribute to state-wide recovery management plans and prepare local plans as necessary. Consider biodiversity in urban greening strategy. Investigate cool burning practices.	Lead - Land Management	Review State Government advice and recommendations including the Saving Our Species management program to identify and contribute to protection of threatened and endangered species and ecosystems/habitat at risk. Establish reserves in bushfire protected areas. Investigate 'cool burning' - environmental and cultural burning to reduce bushfire intensity within natural areas.	Medium term (1-3 years)
R8	There is a risk that as a result of increase in sea level rise will cause shifts in terrestrial and aquatic ecosystem/biodiversity, resulting in potential decline in biodiversity and natural protection mechanisms	Monitor and contribute to state-wide recovery management plans and prepare local plans as necessary. Establish management plans for threatened or endangered species. Include in urban greening/biodiversity strategy	Lead - Land Management	Review threatened and endangered species and key ecosystems/habitat utilised, review current known distribution of species, map projected changes to habitat/area due to projected sea level rise, monitor and contribute to state-wide recovery management plans and prepare local plans as necessary.	Medium term (1-3 years)
R9	Climate change will lead to an increase in bush fire activity that will affect local communication networks.	Continue current measures and Recovery into Resilience project. Liaise with Telcos regarding contingency plans for network disruptions.	Local Emergency Management Officer	Continue implementation of recovery into resilience program to install off-grid systems and satellite communication networks on key buildings which community members can access when bushfires or emergencies disrupt services. Ensure the community are informed and aware of these facilities. Liaise with Telcos regarding contingency and management plans to avoid network disruptions.	Short term (1 yr - ongoing)

ID	Risk	Actions	Lead	Further detail and recommendations	Term
R10	Increased bush fire risk will lead to an increased adverse impact on the community including sustainability and wellbeing.	Continue current programs and review Recovery Action Plan and assistance measures	Manager - Community Connections / Local Emergency Management Officer	Continue Bushfire Recovery Shoalhaven and recovery into resilience programs and review Recovery Action Plan and assistance measures available. Continue to work with RFS and community to understand and prepare for bushfire, advocate for greater support and funding from State and Federal Government to prepare for and mitigate impacts of bushfire.	Short term (1 yr - ongoing)
R11	There is a risk that as a result of an increase in ambient temperature, roads, footpaths, and bridges infrastructure will degrade at a greater rate	Review current inspection, maintenance and defect response for assets and assess budget requirements. Refer to Practice Note 12.2: Climate Resilient Materials for Infrastructure Assets	Roads Assets Manager	Ensure asset management plans consider these risks and review current inspection, maintenance and defect response for roads, footpaths, and bridges. Refer to Practice Note 12.2: Climate Resilient Materials for Infrastructure Assets - Institute of Public Works Engineering Australasia (ipwea.org) for advice on climate resilient materials. If incidence of asset degradation is increasing, allocate additional budget as required. Ensure Council adheres to Australian Industry best practice standards and monitor the market for products with increased heat resistance	Medium term (1-3 years)
R12	Climate change will lead to an increase in bush fire activity that will increase demand for heavy plant, equipment, and resources.	Review infrastructure condition and capacity to service heavy plants and equipment for key access routes and prioritise for renewal	Local Emergency Management Officer / Section Manager - Works & Services	Review Emergency Management Plan, work with RFS and relevant authorities to determine access requirement for Plant and equipment in response to increased bushfire activity, including roads, footpaths, and bridges. Review infrastructure condition and capacity to service heavy plants and equipment for key access routes and prioritise for renewal or reinforcement where required. Advocate to state and federal government for funding support for these works.	Medium term (1-3 years)
R13	As a result of an increase in average temperature, that there is a risk that there will be a greater demand for shade/cooling options at Council recreational facilities and public parks.	Include requirement to install shade structures/trees for all new playgrounds, review current provision of shade at existing recreational spaces. Develop urban greening strategy.	Manager - Community Planning & Projects	Review and identify urban heat and low canopy cover hot spots across open spaces and prioritise for upgrade/installation of trees and shade structures. Ensure new parks and recreational spaces include shade trees and cooling structures in planning/installation. Advocate for funding for urban greening strategy and develop council strategy.	Short term (1 year)
R14	There is a risk that as a result of an increase in the number of hot days within the LGA, combined with ageing electricity supply infrastructure, power outages and brown outs may occur with far greater regularity.	Continue current controls and liaise with Endeavour Energy regarding current management plans and upgrades to reduce power outages	Manager - Community Connections / Asset Custodians	Liaise with Endeavour Energy to identify areas at risk of power outage and current management plans and upgrades to reduce risk. Communicate the location of buildings and infrastructure which can be accessed by community during periods of power outage. Continue to diversify council electricity resources and increase provision of off-grid systems (including energy capture and battery storage) on council and community buildings. Encourage uptake of solar PV and battery systems for community members.	Short term (1 yr - ongoing)
R15	As a result of an increase in the number of hot days annually, there may be increased visitation to the LGA - Impacting coastal attractions, roads, infrastructure, and servicing	Increase service levels during warmer months. Continue current tourist dispersal programs	Roads Assets Manager / Tourism Manager	Monitor tourist visitation and identify infrastructure and assets under pressure - ensure asset management plans consider risks and increase servicing requirements during periods of high-use. Continue responsible marketing campaigns including 100 beaches campaign to avoid hotspots and disperse visitation throughout the region. Include tourism considerations in community infrastructure plans and consider social licence in destination management plans.	Short term (1 yr - ongoing)
R16	Decreased levels of rainfall may cause severe drought, resulting in impacts on the natural environment economy and liveability of urban areas	Continue current controls. Review REMS program and recycled water supply and capacity to meet needs in times of drought.	Section Manager - Water Asset Planning & Development	Continue recommendations of Shoalhaven Water Secure Yield Assessment regarding water security. Work with state authorities and the community to engage and educate regarding water saving and usage, employ water restrictions as required, continue REMS project to enable fit-for-purpose use of recycled water for irrigation and farms. Advocate to state and federal government regarding drought support and relief funding for community.	Medium term (1-3 years)

ID	Risk	Actions	Lead	Further detail and recommendations	Term
R17	As a result of an increase in the number of hot days annually there would be reduced stream flow into the catchment, greater evaporation at water storage areas as well as a significant increase demand on potable water supplies.	Continue current controls and water efficiency education program for residents. Implement restrictions as required.	Section Manager - Water Asset Planning & Development	Continue recommendations of Shoalhaven Water Secure Yield Assessment regarding water security Monitor and review projected rainfall to prepare for incidences of reduced stream flow. Review and expand use of recycled water for appropriate uses where possible and review triggers for introduction of water restrictions. Develop/continue internal program to improve water efficiency across council assets, and external water efficiency education program for community members.	Medium term (1-3 years)
R18	There is a risk that as a result of increases in ambient temperature, sporting fields/leisure centres/community amenities will require greater usage of water	Continue current controls and investigate potential to expand use of recycled water for priority/high-use grounds	Manager - Shoalhaven Swim Sport Fitness / Section Manager - Water Asset Planning & Development	Ensure asset management plans consider these risks and irrigation schedules are optimised and responsive to temperature and wind conditions. Diversify water-use to include reclaimed/recycled water. Identify sporting fields without access to reclaimed/recycled water and investigate options to access recycled water for irrigation. Review current grass/turf species, water requirements and provision for playing standards.	Medium term (1-3 years)
R19	There is a risk that as a result of a decrease in average rainfall levels, Council will be faced with degraded water quality impacting local economy	Continue current controls/monitor water quality	Environmental Health Lead / Section Manager - Water Asset Planning & Development	Monitor and review projected rainfall to prepare for incidences of reduced stream flow. Continue water quality monitoring in line with legislative requirements.	Medium term (1-3 years)
R20	There is a risk that sea level rise will impact on entrance management of ICOLLs (Intermittently Closed and Open Lakes and Lagoons) as a result of tidal inundations, wave action and storm surges.	Review current entrance management policies, licence requirements	Environmental Health Lead / Coastal Management Program Coordinator	Review current entrance management policies and licence requirements as required to ensure these documents remain current and fit for purpose. Consider impacts and update plans and policy accordingly.	Medium term (1-3 years)
R21	Due to changing patterns to the quantity of rainfall there is a risk of increased water quality issues in ICOLLs and an imbalance between catchment and coastal processes resulting in significant community pressures	Continue current controls, review current crown land license requirements, and entrance management plans	Environmental Health Lead / Coastal Management Program Coordinator	Continue to test and monitor water quality within ICOLLS and review current crown land license requirements, entrance management plans and triggers for opening ICOLLS	Medium term (1-3 years)
R22	There is a risk that due to an increase in the number of hot days operational staff, contractors and volunteers may be exposed to adverse health risks (heat stress, heat stroke, dehydration) and the associated downtime costs	Continue current controls, Work Health and Safety Policy	Chief Safety Officer	Continue to include triggers in Work Health and Safety Policy to protect workers in adverse heat or weather conditions. WHS Management System includes controls in place for extreme heat events including provision of long sleeve shirts and long pants, availability of cool drinking water, hydration sachets etc. Enable varied starting times to optimise work during safe periods of the day.	Short term (1 year)

Implementation, monitoring and review

Incorporating risks

In line with Council's Risk Management Policy, Shoalhaven City Council is committed to integrating risk management into all its operations, decision making processes and governance structures to enable the council to identify and manage risks while maximising opportunities to benefit the community.

The risks identified in this Plan will be managed through Council's Enterprise Risk Management (ERM) Framework, and included in Council's Corporate Risk Register, where they will be reviewed and monitored on a continuous cycle. The risks and linked actions have been assigned to the most appropriate work team, as agreed with the Executive Management Team, and will be reviewed as required, relevant to their risk rating, during the quarterly Risk Management meetings held with relevant managers and staff.

In line with Council's risk management framework, risks rated as high or extreme will be reviewed every six months and have sign off at Director level, while medium or low-level risks will be reviewed on an annual cycle.

Review

The Director of City Services has overall responsibility for this Plan and bi-annual reports will be prepared on implementation of the actions included in this Plan to the Executive Management Team.

The Climate Risk Ready NSW guide recommends that climate change risks assessments be conducted every 5 years, however given the escalating impacts of climate change, this Adaptation Plan will be reviewed and updated every 3 years to ensure Council's adaptation responses remain valid and relevant to local priorities and climatic conditions. An updated Climate Change Risk Assessment will be completed in 2025.

Appendix 1 - Terms and References

Acronyms

CMP	Coastal Management Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCP	Development Control Plan
EMPLAN	Emergency Management Plan
ICOLLS	Intermittently Closed and Open Lakes and Lagoons
IPCC	Intergovernmental Panel on Climate Change
LEP	Local Environmental Plan
NARCliM	NSW and Australian Regional Climate Modelling
REMS	Reclaimed Water Management System
RFS	Rural Fire Service

Definitions

Climate change

Climate change is the long-term change in climate patterns at the global and regional scale. Current climate change is largely driven by human activities which increase greenhouse gases in the atmosphere.

Climate change adaptation

Adapting to life in a changing climate. The process of adjustment to actual or expected climate impacts.

Climate change mitigation

Taking action to reduce and stabilise greenhouse gas emissions in the atmosphere, thereby limiting further contribution to climate change and reducing future impacts.

Greenhouse gas emissions

Greenhouse gases are compound gases that trap heat or longwave radiation in the atmosphere. Their presence in the atmosphere makes the Earth's surface warmer, driving climate change.

Net zero emissions

An overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere. Achieving net-zero emissions means that some greenhouse gases may still be released, but these can be offset by removing an equivalent amount of greenhouse gases from the atmosphere and storing it permanently in soil, plants, or materials.

References

Department of Planning, Industry and Environment, 2021: "Climate Risk Ready NSW Guide. Practical guidance for the NSW Government sector to assess and manage climate change risks."

Department of Environment, Climate Change and Water, 2011: "NSW Climate Impact Profile Technical Report", Office of Environment and Heritage.

IPCC, 2021: Climate Change 2021: "The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change".

Office of Environment and Heritage, 2014: "Adapt NSW: Illawarra Climate Change Snapshot".

Appendix 2 - Council's Corporate Risk Evaluation Framework

Risk Rating Table					
	Consequence				
Likelihood	Negligible	Minor	Moderate	Major	Severe
Almost Certain 5	M	M	H	E	E
Likely 4	L	M	H	H	E
Possible 3	L	M	H	H	H
Unlikely 2	L	L	M	M	H
Rare 1	L	L	L	L	M

Likelihood Rating Table			
Descriptor	Description	Frequency	Level
Almost Certain	The event will probably occur in some circumstances	Once a year or more	5
Likely	This event may occur at some time	Once every 1 - 5 years	4
Possible	The event is not expected to occur	Once every 5 to 20 years	3
Unlikely	The event is likely to occur in exceptional circumstances	Once every 20 to 100 years	2
Rare	The event is highly unlikely to occur in the foreseeable future	>100 years	1

2. Consequence Rating table					
Category	**Negligible (1)**	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Severe (5)**
Community	No injuries or fatalities. Small number displaced for short duration. Little or no disruption to community. No measurable immpact on the environment. Little or no financial loss in the community. Little or no personal support required.	Small number of minor injuries requiring first aid. Some displacement of people (<24hrs). Some minor disruption (<24hrs). Some personal support required. Some damage. Some financial loss.	Medical treatment required - some hospitalisation. Localised displacement of people. Normal community functioning with some medium term inconvenience. Localised damage rectified by routine arrangements. Significant financial loss. Personal support provided by local	Extensive injuries. Large number displaced for >24hrs. External resources required for personal support. Significant damage that requires external resources. Community only partially functioning, some services unavailable. Significant financial loss - some financial assistance required.	Large numbers of severe injuries requiring hospitalisation. General and widespread displacement for extended duration. Community unable to function without significant support. Extensive damage. Extensive personal support.
Contractual & Legal	Isolated non-compliance or breach. Negligible financial impact.	Contained non-compliance or breach with short term significance and minor financial impact.	Serious breach involving statutory authority or investigation. Prosecution possible with significant financial impact.	Major breach with fines and litigation. Long term significance and majory financial impact.	Extensive fines and litigation with possible class action. Threat to viability of programs or services.
Environment	Minimal environmental impact - isolated release only	Minor onsite environmental release immediately contained	Moderate on-site environmental impact contained with assistance	Off-site environmental impact contained with external assistance	Severe off-site environmental impact to one or more ecosystems; Requires LT remediation
Financial	Negligible financial loss (up to 1% of Councils budget). No impact on prgram or business operation	Minor financial loss (up to 3% of Council's budget). Minimal impact on business operation.	Significant financial loss (up to 10% of Council's budget). Considerable impact on business operation.	Major financial loss (up to 20% of Council's budget). Severe impact on business operation.	Extensive financial loss (>20% of Council's budget). Long term consequences for operations.
Industrial Relations	Isolated, internal or minimal impact on staff morale or performance. Minimal loss to organisation.	Contained impact on staff morale or performance of short term significance. Medium loss to organisation.	Significant impact on staff morale or performance of medium term significance. Significant loss to organisation.	Major impact on staff morale or performance of long term significance. Very high loss to organisation.	Extensive impact on organisational morale or performance of long term significance. Threat to viability of programs or services.
Information Technology	No measurable operational impact to organisation	Minor downtime or outage in single area of organisation. Address with local management and resources.	Significant downtime or outage in multiple areas of organisation. Substantial management required and local resources.	Loss of critical functions across multiple areas of organisation. Long term outage. Extensive management required and extensive	Extensive and total loss of functions across organisation. Disaster management required.
Property & Infrastructure	Isolated or minimal loss. Short term Impact. Repairable through normal operations.	Minor loss with limited downtime. Short term impact. Most repairable through normal operation.	Significant loss with temporary disruption of services. Medium term impact on organisation.	Critical loss or event requiring replacement of property or infrastructure. Long term impact on the	Disaster with extensive loss and long-term consequences. Threat to viability of service or operation.
Reputation	Public awareness may exist but there is little public concern. Resolved by day to day management process.	Attention from local media, and/or heightened local concern	Significant and sustained adverse local media attention. Serious concerns expressed and large decrease in support from the public.	Significant adverse national media attention. Significant decrease in public support. Damage to reputation at a national level.	Subject or sustained adverse publicity in multiple media. Significant long-term detrimental effect on business areas.
WHS	Minor injury with no treatment required	Minor injury with first aid treatment required	Medical attendance, time off work	Serious illness, injury or death of employee, contractor or members of the public	Multiple fatalities or permanent disability of employees, contractor or members of the public
Postive Consequences	Small benefit, low financial gain	Minor improvement to image, some financial gain	Some enhancement to reputation, high financial gain	Enhanced reputation, major financial gain	Significantly enhanced reputation, huge financial gain

Shoalhaven City Council

Bridge Road, Nowra (02) 4429 3111
All communication should be addressed to
The Chief Executive Officer:
PO Box 42, Nowra NSW 2541
DX 5323 Nowra NSW

shoalhaven.nsw.gov.au