RECOVERY & RESILIENCE

Disaster Resilience Framework

2021

clarence VALLEY COUNCIL

CONTENTS

All photos by Narelle Wilson unless otherwise specified.

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge the Bundjalung, Gumbaynggirr and Yaegl people as the Traditional Owners of the land on which we live and work. We honour the First Nations peoples culture and connection to land, sea and community. We pay our respects to their Elders past, present and emerging.

First Nations peoples continue to show great resilience and generosity of spirit towards other peoples with whom they now share their land and waters. Clarence Valley Council recognises that by acknowledging our shared past, we are paving the way for a future where all Australians are embraced.

FOREWORD

In the Clarence Valley, we are all too familiar with the devastation and disruption that natural disasters such as bushfires, heatwaves, severe storms, drought, and flooding can cause.

Over the last decade Australia has made great progress towards being more resilient to natural hazards and in disaster risk reduction. However, with climate change as a driver, there is growing potential for natural disasters to occur on unimagined scales, in unprecedented combinations, and sometimes in unexpected locations.

Natural disasters are becoming more frequent and intense. More people and assets are being exposed and are vulnerable to these disasters. The essential services we rely on – power, water, telecommunications, the internet, finance – are also exposed to these impacts. As a result, the cost of disasters is increasing for all sectors of society including local government, industry, business, not-for-profit, community, and individuals. This includes not only direct costs, but indirect costs from flow-on effects that disasters have on organisations and community.

Across these sectors, the Clarence Valley Council (CVC) is already working to enrich community prosperity, safety and security, wellbeing, and economic growth, both in recovery from recent disasters and in long-term strategic planning. This is being achieved by taking collective action in the recovery stage, and reducing the risk of future disasters through mitigation investments to build resilience. These actions are necessary for affected communities and for Council to quickly return to an adequate level of functionality after future natural disaster events.

> Unprecedented is not a reason to be unprepared.[1]
>
> **Mark Binskin (Chair), Royal Commission into Natural Disaster Arrangements**

Investment in reducing natural disaster risks can deliver benefits beyond avoiding loss and suffering. Disaster risk reduction can unlock economic opportunities and broader social and economic benefits, even without a natural disaster occurring. This can be true of the implemented investment in disaster risk reduction in all sectors across the built, social, economic, and natural environments.

Shannon Creek Dam
Water Catchment, Clarence
Photo: Narelle Wilson

All levels of government, especially severely impacted Local Government Areas such as Clarence Valley, are better positioned now than ever before to take a comprehensive approach to addressing the risk mitigation investments identified. Doing so will improve disaster preparedness relating to infrastructure and the communities at risk due to natural disasters. The aim of Council, therefore, is to invest more in risk reduction and mitigation so that less financial investment will be needed to deal with response and recovery.

CVC can meet these objectives by giving urgent priority to a broad and sophisticated program of improvement works, and by taking advantage of government funded projects. This will ensure CVC and our communities can endure more frequent and intense natural disasters by implementing the resilience capacity building strategies recommended in this Disaster Resilience Framework (Framework).

The Framework also aims to develop the resilience of CVC's organisational operations, enabling both business and our communities to recover and thrive following these events, and being more resilient overall.

In responding to resilience opportunities and challenges, the Disaster Resilience Framework directs Council's comprehensive strategic approach to proactively mitigating disaster risk and reducing impacts, now and into the future.

This Framework addresses the need for a localised Disaster Resilience Framework for CVC. It examines the current situation, our vulnerabilities, gaps and future requirements. It concludes with recommendations to develop a set of resilience strategies and actions that will underpin a future, broader, CVC Disaster Resilience Framework.

> Disaster risk reduction aims to prevent new and reduce existing disaster risks, strengthening the resilience of people, systems, and approaches[2]
>
> **UN Office for Disaster Risk Reduction**

PURPOSE

The Disaster Resilience Framework guides CVC's whole-of-organisation effort to proactively implement disaster risk reduction and resilience in our infrastructure, business and community, in order to minimise the losses and disruption caused by natural disasters in the Clarence Valley Local Government Area (LGA). The purpose of informing Council of identified risks is to develop risk mitigation proposals and incorporate the Clarence Valley LGA Climate Change Impact Assessment report into strategic planning.

The overall objective is to reduce the impacts of natural disasters on Council and communities. Implementing the Framework will accomplish this by informing future strategic decision making and planning within CVC.

SCOPE

The Disaster Resilience Framework is not exhaustive, nor entirely prescriptive. Rather, it provides strategies, actions and recommendations for Council's planning and decision-making, taking advantage of informed scientific research; the Climate Change Impact Assessment report, climate forecasting, climate change modelling predictions, lessons learned, and ongoing expert consultation. These recommendations and strategies can be holistically applied across the whole organisation and between the four key environments impacted by natural disasters: **Built Environmental, Social Environment, Natural Environment and Economic Environment** (as outlined in figure 1).

The Disaster Resilience Framework will largely be implemented and embedded through Council's Integrated Planning and Reporting Framework and, predominantly, Council's Operational Plan.

BUILT ENVIRONMENT

Physical and social infrastructure assets such as transport, energy and telecommunications, water utilities, cultural and commercial precincts, housing and fixed assets.

NATURAL ENVIRONMENT

Natural assets such as wetlands, rivers, land, forests, oceans, other complex natural exosystems, agriculture, and water sources.

SOCIAL ENVIRONMENT

Socioeconomic and demographic trends, social networks and relationships, cultural practices, technology, innovation, wellbeing, esential services such as health and education, and lifestyles.

ECONOMIC ENVIRONMENT

Public sector, private sector and individual economic activities; workforce participation; credit, debt, and finance; and small, medium, national and multinational business.

Figure 1[3]

ACKNOWLEDGEMENT

The CVC Disaster Resilience Framework acknowledges and incorporates a range of strategies for actions informed by:

- United Nation's Sendai Framework for Disaster Risk Reduction 2015-2030[4]
- Royal Commission into National Natural Disaster Arrangements Report October 2020[5]
- Final Report of the NSW Bushfire Inquiry 31 July 2020[6]
- National Disaster Risk Reduction Framework.[7]
- Clarence Valley LGA Climate Change Impact Assessment – Prepared by Risk Frontiers[8]

The initial strategic outcomes of the National Disaster Risk Reduction Framework are intended to align with Australia's commitment to the Sendai Framework for Disaster Risk Reduction 2015–2030, endorsed by the United Nations General Assembly as an international agreement on targets and priorities for action.[9] The Climate Change Impact Assessment (CCIA) developed by Risk Frontiers addresses the specific climate adaptations needed for CVC's LGA, informed by scientific climate change predictive modelling.[10]

INTRODUCTION

Disasters may not happen every year, but when they do they are often recurringly catastrophic. During 2019-2020-2021, the Clarence Valley Local Government Area (LGA) experienced drought, heatwave, bushfires, floods, and the impacts of the COVID19 pandemic restrictions. These events serve to provide a glimpse of the level of concurrent, cascading, and unprecedented natural disaster events that the Clarence Valley can expect to face in the near future. It is imperative that Clarence Valley Council (CVC) implements resilience measures and improves disaster preparedness in light of the increasing impacts of natural disasters on Council, community, and our environment.

In our four key environments, the built, social, natural, and economic environments, humans and nature have been truly intertwined. However, we are now living in an era of rapid and unprecedented change. The science is telling us extreme weather events are caused by climate change. The scale and frequency of such events are causing huge biodiversity losses, including human and animal life, and plants and habitat, which is consequently affecting our four key environments. Therefore, these extreme weather events are increasing the incidence of highly disruptive and unpredictable shocks from the impacts of natural disasters.

At a local council level, it is critical for CVC to implement disaster resilience through risk mitigation and adaptive processes that facilitate response to the threat of natural disasters through:

- a capable operational system to re-organise strategies and actions
- adaptation and sustainability
- change and reform; and
- learning and knowledge sharing.

This can be achieved by leveraging off a multi-sector system of Federal Governance being applied to address natural disasters and emergency management, which is a complex form of polycentric governance involved in decision-making processes. These sectors include:

- Prime Minister & Cabinet Office (PM&C)
- National Recovery and Resilience Agency (NRRA) Resilience NSW
- Royal Commission Reports & Inquiries
- NSW Rural Fire Service (RFS) Regional Emergency Management Office (REMO)
- Local Emergency Management Committee (LEMC)
- Local Emergency Management Officer (LEMO)

- Bureau of Meteorology (BOM)
- State Emergency Services (SES)
- Police force
- Local councils
- and numerous service providers

While many of these sectors overlap, each operates with some degree of autonomy to solve problems and advance our collective understanding of the complex natural disaster challenges which occur at different scales in different locations. The benefit of multi-sector approach to disaster resilience is that government's governance system should provide a collective action approach to a complex shared problem.

Disaster resilience, in the context of this Framework, is having the ability to live with change and to develop. Resilience is also about cultivating the capacity to sustain development and continue business in the face of climate change and natural disasters - however incremental and abrupt, expected, unexpected, or unpredicted they may be.

The ever-increasing risk of natural disaster impacts for Council and community requires a much greater investment to mitigate identified risks, in order to protect infrastructure, property, and communities.

The need for implementing disaster resilience is reflected in the:

- Royal Commission into National Natural Disasters Arrangements, which made 80 recommendations in October 2020
- NSW Rural Fire Service Bushfire Inquiry in July 2020
- Sendai Framework 2015-2030 (the United Nation's global agreement to reduce and prevent disaster risks across the globe), which states that to strengthen resilience, we must prevent new, and reduce existing disaster risks.

Therefore, the purpose of this Disaster Resilience Framework is to guide CVC to implement risk mitigation strategies and risk reduction actions. This can best be achieved through a whole-of-Council partnership with the community. This is a synthesis that is useful and insightful in helping to guide actions towards developing an improved natural disaster preparedness and response strategies for Council and community. The Disaster Resilience Framework guides Council to continue with change on the current path of business and development, but through reimagining disasters, CVC can improve resilience and be innovative on that path.

CLIMATE CHANGE IMPACT ASSESSMENT

In 2021, CVC engaged climate change scientists to develop a Climate Change Impact Assessment (CCIA) specifically for the Clarence Valley LGA. Identifying the climate change vulnerabilities in our LGA, using predictive modelling and innovation, enables analysis of the highest risk areas to prioritise the need for risk mitigation measures.

The Clarence Valley LGA spans a range of biophysical environments including sandy beaches, coastal plains, rainforests, and river valleys. As such, it is exposed to a range of weather and climate risks including drought, flood, bushfire, heatwave, and river and coastal erosion. As one of NSW's fastest growing regions, the major industries including tourism, agriculture and fisheries are increasingly susceptible to natural hazards. This was evident through 2019-20 when the region was impacted by drought, fire, and flood over a short period. In order to better understand and adapt to these risks, the CCIA will inform corporate governance and strategic planning decisions. This feeds into the overriding objective of the Disaster Resilience Framework to reduce and mitigate disaster risk impacts on Council and community across the four key environments.

The CCIA evaluates the suitability and effectiveness of existing policies, plans and strategies, and benchmarks these against other LGAs to provide recommendations for improvements. The Framework must remain relevant and undergo regular re-evaluation and updated assessments that are in step with advancements in climate risk science and modelling. From this point on, CVC must do more than respond to natural disasters that affect the LGA if it is to have an impact on building resilience to future events. Resilience planning that anticipates the impacts of events can help ensure Council's operations and the community are not left worse off in the future.

Yamba Surf Life Saving Club, Main Beach
Photo: CVC File Footage

GOALS OF THE CVC CCIA

- Understand the climate adaptation needs over the range of biophysical and socio-economic conditions in the region.
- Identify the range of existing data, assessments, tools and processes suited to enhance adaptation over a wide range in a Clarence Valley context (catchment, rural, peri-urban, and coastal)
- Interpretation and use of climate projections, and their use in planning and decision making for Clarence Valley Council installations and investments.
- Develop a whole-of-system framework to enable climate vulnerability assessments under a range of scenarios and projections that incorporate biophysical and socio-economic components.
- Inform dialogue on climate change adaptation within the Clarence Valley Council and collectively deliberate over options for planning and decision support.

New information will continue to emerge about the likelihood of future climate change impacts on our LGA and its consequences, and Council will need to prepare plans that are flexible enough to adapt to and incorporate new information. CVC's future decision making will also involve identifying the triggers that necessitate new decisions based on predictive scientific climate change modelling, which calls for a new resilient and adaptive planning process.

Some may ask, why does resilience planning and climate adaptation need to be different in the future?

It is because when we are challenged by more intense and more frequent natural disasters, we need to be strengthening the adaptive capacity of the organisation and community. The Disaster Resilience Framework is a guide to develop strategies and accommodate the continuously evolving impacts of climate change into Council's planning processes.

Climate change is dynamic and climate models can provide a range of likely future climate scenarios, with greater certainty for the near term, and a wider range of possibilities in the long term. As a result, planning approaches that consider a range of possible futures and recognise the need to shift goalposts and actions over time will be most cost-effective given future uncertainty.

DRIVERS FOR ACTION - FROM LOCAL, REGIONAL, STATE TO NATIONAL[11]

Natural disasters are more frequent and intense

Many natural hazards are becoming more frequent and intense, driven by Australia's changing climate. The Bureau of Meteorology/CSIRO's 2018 'State of the Climate' report describes the effect of Australia's changing climate, including warming temperatures, rising sea level, more severe fire weather, plus increased rainfall in Australia's north and decreases in the south. It is predicted these changes will continue and new natural disaster threats will emerge. There is growing potential for a cumulative and/or concurrent, large-scale natural disaster to occur.

> If you have a problem that can be solved with an action, you do not have a problem.[12]
>
> **Sean Cruxton**

Essential services are interconnected and interdependent

Australians depend on reliable and affordable food, water, energy, telecommunications, transport networks (including road, rail, aviation and maritime) and financial services. These functions also depend on each other. The networks that ensure the sustained delivery of food, water and energy involve complex interactions between infrastructure, people, the environment, money and technology. A failure in any of these elements could have wide-ranging consequences across communities, businesses, governments, and economies.

People and assets are more exposed and vulnerable

As cities and regional centres expand to accommodate growing populations, the buildings and infrastructure needed to support our future communities will be exposed and vulnerable to natural disasters. The 2021 Intergenerational Report notes Australia's population is growing – at its slowest rate in over a century – but the challenge is an ageing population with increasing life expectancies. Our overall standard of living has improved, yet socioeconomic differences among communities remain, and people and assets continue to be located in at-risk areas such as coastal zones, floodplains, remote bushlands, and areas where bushland meets cities and towns.[13]

The cost of disasters is growing

Deloitte's 2021 Special Report: Update to the economic costs of natural disasters in Australia[14], Australian Business Roundtable for Disaster Resilience & Safer Communities, builds on previous estimates of the costs of natural disasters with new, more comprehensive data and extends the analysis to estimate costs under different climate change scenarios. Natural disasters in Australia have a devastating financial and social impact on individuals, families, local communities, businesses and governments. A deeper understanding of these costs informs better decision-making around investments in resilience, mitigation and post-disaster recovery. The report estimates that natural disasters will cost Australia $73 billion by 2060 under a low emissions scenario. This is significantly higher than the $39 billion by 2050 reported in 2017. Today, natural disasters cost the Australian economy $38 billion per year on average.

Disaster impacts are long term and complex

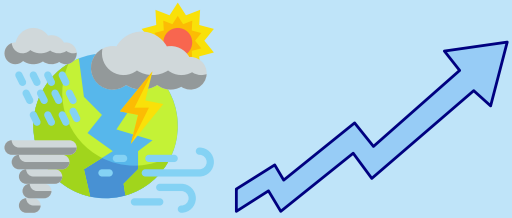
The impacts of disasters can be long term, complex, and intangible. Collectively, we are only now beginning to fully understand indirect, flow on and cumulative effects of disasters. We do know that disasters can trigger long-term challenges across a range of areas, including reduced education and workforce participation, increased crime, and physical and mental health and wellbeing. These impacts are often felt disproportionately by vulnerable or susceptible groups. Factors such as health and wellbeing, economic resources, social capital and knowledge influence a person's ability to prepare for, respond to, and recover from disasters.[15]

Photo: Narelle Wilson

CLARENCE VALLEY LGA / 2021

CLIMATE CHANGE IMPACTS ON CLARENCE VALLEY COUNCIL'S ASSETS, INFRASTRUCTURE, OPERATIONS & BUSINESS [16]

Historical trends 1980 to present day



Frequency of extreme weather is increasing

Present

Average damage to homes and businesses from extreme weather at least

$550

million per decade

2050

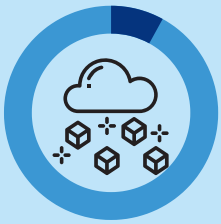
Average damage to homes and businesses from extreme weather at least

$610

million per decade

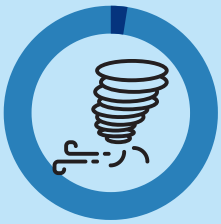
Proportion of losses per hazard

85%
River flooding

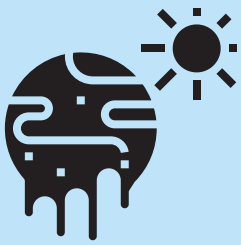


8%
Hail

6%
Bushfire



2%
Cyclones



Heatwave

2021	2050
20 days per year	36 days per year

Heavy rainfall

2021	2050
5 days per year	5.3 days per year

Dangerous fire weather

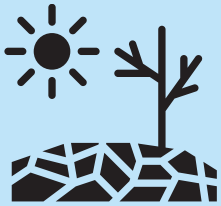
2021	2050
12 days per year	20 days per year

Sea level rise

2021	2050
+3.7 mm per year	+250 mm above present

East Coast Low

2021	2050
1.7 days per year	2 days per year



Drought

2021	2050
current severity is increasing	+16% drought index maximum

Explainer: This data represents a modelled future state which is uncertain and higher or lower values could occur. Climate values are 20-year averages in order to best represent climate. Data has been used from multiple sources.

CLIMATE CHANGE IMPACTS ON CLARENCE VALLEY COUNCIL'S ASSETS, INFRASTRUCTURE, OPERATIONS & BUSINESS

Earth's climate system has warmed over recent decades. This warming will affect the frequency and intensity of a wide range of weather and climate related risks in the Clarence Valley LGA.

COUNCIL ASSETS AND RESPONSIBILITIES IMPACTED BY EXTREME WEATHER

ASSET/ RESPONSIBILITY	FLOOD	STORM	BUSHFIRE	HEAT	DROUGHT	SEA LEVEL RISE
COUNCIL FACILITIES	✓	✓	✓	✓	✓	✓
COUNCIL OPERATIONS	✓	✓	✓	✓		✓
COST OF INSURANCE	✓	✓	✓			✓
PLANNING	✓	✓	✓	✓	✓	✓
ECONOMY	✓	✓	✓	✓	✓	✓
LANDFILL WASTE	✓	✓	✓			
FLOOD LEVEES	✓	✓		✓	✓	✓
STORMWATER	✓	✓	✓			✓
SEWER NETWORK	✓	✓			✓	✓
WATER SUPPLY	✓	✓	✓	✓	✓	✓
ROADS & BRIDGES	✓	✓	✓	✓	✓	✓
PARKS & PUBLIC FACILITIES	✓	✓	✓	✓	✓	✓
COASTAL ZONE		✓	✓	✓		✓
NATURAL RESOURCES & ENVIRONMENT	✓		✓	✓	✓	✓

Explainer: This data represents a modelled future state which is uncertain and higher or lower values could occur. Climate values are 20-year averages in order to best represent climate. Data has been used from multiple sources.

DISASTER RESILIENCE FRAMEWORK

Actions to Reduce Disaster Risks
for Clarence Valley Council

1 UNDERSTANDING THE RISK

2 ACCOUNTABLE DECISIONS

3 ENHANCED INVESTMENTS & RESOURCES

4 GOVERNANCE, OWNERSHIP & RESPONSIBILITY

FRAMEWORK PRIORITIES

1: UNDERSTANDING THE RISK

Having an organisation-wide approach to understanding the inherent risks of natural disaster in the Clarence Valley LGA will ensure the aims of resilient strategies that are clear, robust, and accountable are achieved. Such strategies will enable a comprehensive understanding of the accumulated risks, as well as the associated costs of neglecting risk reductions and failure to implement risk mitigations.

Disaster resilience strategies will have the capability to be informative, accountable, and consist of robust systems, which will form a chain of organisational resilience. There are important strategies to be incorporated into CVC's systems to encapsulate these important operational services, plus critical infrastructure services and delivery to the community. The systems and strategies will combine to form a chain of committed and long-term disaster resilience measures, both before a disaster and in the response and recovery phase.

Part of understanding the risk is having disaster resilience measures implemented throughout the Clarence Valley LGA. Providing real-time live data will inform current, consistent, and accurate disaster information, both internally and externally. For Council to clearly understand the risks, it will require systems that integrate the data from risk reduction infrastructures into operational communication channels.

Having the procedural systems in place will also ensure the risk is clearly understood by the whole organisation, including a clear strategy for procedural decision-making to be made at the most appropriate level. Having the provisions to make assessments on risk mitigation and analysis will help decision makers understand and mitigate risks so far as reasonably feasible. This information also enables Council to understand the residual risk and inform the organisation to take appropriate actions. CVC must be resourced to fulfil these functions.

CVC's understanding and awareness of risks allows the organisation to also understand the inherent risks that require mitigation actions.

The Climate Change Impact Assessment not only provides a clearer understanding of the risk, it also provides scientific-based evidence to support CVC's business cases when applying for government funding for risk mitigation projects.

The natural disaster resilience measures that CVC embeds into strategic planning and business operation will require agreement, commitment, and action. The time to act to improve CVC's disaster resilience is now. As the Royal Commission into National Natural Disaster Arrangements Commission Chair, Air Chief Marshal Mark Binskin AC, states: "Unprecedented is not a reason to be unprepared"[17]. CVC must be prepared for the future in an environment of climate change impacts. There are lessons to be learned from previous natural disasters to enable CVC to advance in risk reduction.

Part of the resilience process is to provide an understanding of risks to communities and individuals through disaster awareness campaigns. Preparedness campaigns will provide knowledge to the wider community that the future of natural disasters requires a readjustment of their expectations of recovery and resilience. This will also require the community to take ownership and responsibility of the inherent risks. It is undoubtedly in everyone's interest to have situational awareness and to reassess their own individual risk. Natural disasters have changed, and it has become clear that Council and the community in the Clarence Valley LGA must adopt different disaster resilience strategies.

Priority Strategies for Action

PRIORITY 1: Understanding Disaster Risk

STRATEGY	DESIRED OUTCOME
STRATEGY A Implement clear, robust, and accountable systems for broader operative approach to understanding the risks	• Integrated procedural & data systems in place ensure the data is captured and the risk is clearly understood by the whole organisation. • Build understanding of the extent of accumulated risks and costs associated with not implementing mitigation, preparedness, response and recovery plans in Council's strategic planning. • A whole-of-organisation operational approach for disaster resilience decision making, providing a full scope of resilience works in future planning.
STRATEGY B Identify and overcome the GIS, data, information & resource gaps to provide systems linkages	• Integration of geographic information systems (GIS) data in corporate systems to provide electronic spatial data storage, mapping, and analysis tools - comprising of software, hardware, and data input. • The GIS system will produce simple maps and complex analysis, based on several data sources (or layers) which can identify gaps in information, critical infrastructure and capital assets, and strategic planning. • Integrated information data collection and processing for S44 Claims to occur through corporate business software, to record and capture the disaster response and recovery from the outset, avoiding the potential loss of unclaimed costs.

STRATEGY	DESIRED OUTCOME
STRATEGY C Integrate plausible future scenarios into planning	• Future planning to account for concurrent and compounding natural disaster impacts, and the consequences for evacuation centres, community, and CVC business and staff continuity, including pandemic scenarios. • Focus on areas of critical infrastructure, essential services, and location of operational staff in scenario testing. • Staff training to be delivered through specific scenarios to fully understand the inherent disaster risks in the event of natural disasters, and why resilience measures in preparedness are critical. • The CVC Climate Change Impact Assessment's predictive modelling is incorporated in scenario-based risk and vulnerablilty analysis to inform planning.
STRATEGY D Develop consistent disaster risk information; access to and improvements to communication capabilites for Council & community	• Communities and individuals understand the risks through regular disaster awareness campaigns, which readjust the expectations on Council in recovery phase and resilience and ensure ownership of risk responsibility attributed appropriately. • Blackspot Mobile Network Communication access and challenges in CVC LGA are addressed through advocacy of CVC. • Communities and staff, particularly those lone and remote workers, are aware of up-to-date emergency messaging. • Staff benefit from 100% coverage in communication systems
STRATEGY E Support long-term solutions-driven research, innovation and knowledge practices & disaster risk education throughout the Clarence Valley	• A dedicated Coordinator of Emergency Management and Resilience delivers natural disaster and impact awareness communications and community education, incorporating and demonstrating Simtable simulators and GIS software. • Community Emergency Response Plans are regularly reviewed and revised in conjunction with government agencies and service providers. • Innovative solutions will be used to track and measure climate change induced natural disaster vulnerability and risk analysis. • Predictive modelling and scenario projections from Climate Change Impact Assessment to be considered in proposals.

Nymboida Community Bushfire Recovery Mural, November 2020
Photo: Narelle Wilson

2: ACCOUNTABLE DECISIONS

Natural disasters have changed, and it's clear that our LGA's disaster resilience must also change. A re-imagining of natural disasters in the Clarence Valley LGA is needed to enable new, innovative, proactive and accountable decisions to be developed and implemented to truly provide disaster resilience.

Council's disaster resilience measures will need to be considered across all accountable decision-making sectors, and applied to strategies and actions, including:

- land-use planning
- road network infrastructure
- critical infrastructure
- local emergency management & response
- Neighbourhood Safer Places
- social policy
- economic and commercial productivity
- telecommunication networks
- water security
- community awareness & preparedness
- renewable energy/power supply
- flood plains planning
- coastal erosion
- natural environments

A resilient Council is one that plans systematically for natural disasters and seeks to manage and mitigate the associated risks. To prepare for and recover from disaster, and adapt to climate change in our operations, CVC needs to build the resilience capability across the organisation and the community.

Doing so will require capacity building and innovative and proactive decision-making that addresses disaster risks across policy, planning, and infrastructure investments. It is also critical to adapt to the rapid changes and make a fundamental shift in strategic thinking about risk mitigation and how CVC prepares and responds to disasters. Such an approach will involve the consideration of future disaster impacts on the Clarence Valley LGA in planning and development. The fundamental shift includes a willingness to include more bottom-up initiatives addressing a range of local issues that could improve resilience for Council and community.

Decisions based on risk reduction and mitigation can reduce the impact and the trauma on communities and CVC operations in the future. Council is aware that staff and the wider community have been severely impacted by concurrent disasters, and Council will continue to engage them and be inclusive in resilience decision-making processes.

The Disaster Resilience Framework strongly recommends enhanced inclusion of all sectors in the community, including Culturally and Linguistically Diverse (CALD) and disabled and vulnerable groups within the Clarence Valley LGA. It is also important that CVC ensures local knowledge and cultural diversity is captured and informs the decision making in natural disaster resilience and recovery strategies.

Priority Strategies for Action

PRIORITY 2: Accountable Decisions

STRATEGY	DESIRED OUTCOME
STRATEGY A Consider potential avoided loss and broader benefits in all relevant decisions	• Criticality assessments are prioritised and used to address the risk reduction needs (those with the greatest potential impact), and to proactively mitigate the risk of the greatest loss as identified in the Disaster Resilience & Risk Mitigation Infrastructure Plan. • Integrated and robust frameworks are used to assess and reduce disaster risk in all environments, particularly critical infrastructure, land use and development planning.

STRATEGY	DESIRED OUTCOME
STRATEGY B Identify highest priority disaster risks and mitigation opportunities	• Findings of the predictive modelling from the CCIA identifies the highest priority for risk mitigation investments in CVC and these are incorporated into 4 and 10 year workplans.
STRATEGY C Build the capability and capacity of decision-makers addressing disaster risks	• Decision-makers respond to the identified priority and future disaster risks and related challenges, advised by sector-specific expertise. • Where it is established that the expertise is deficient in the organisational structure, development of staff and/or recruitment to the role is considered and incorporated in the business structure, or consultants are sought.
STRATEGY D Maintain planning and develop practices that adapt to rapid social, environmental, economic & cultural change	• A dedicated Coordinator of Emergency Management and Resilience informs the organisation of emerging disaster risks and the strategic investments needed as an ongoing process. • Infrastructure, land use, development planning and staff work practices are integrated, strategic and adaptive, to avoid creating new disaster risk. If the focus is only on today and not future complex risks, short-term concerns can crowd out long-term strategic thinking. • Decisions made in insolation in silos are avoided through improved knowledge sharing systems across the whole organisation.
STRATEGY E Establish proactive incentives, and address disincentives and barriers, to recovery and reducing disaster risks	• Incentivised sustainable rebuilds and regeneration are supported. • Incentivise landowners to meet regulations and legislative responsibilities to build resilience by removing obstructive hurdles that inhibit adaptative measures.

Yulgilbar Cattle Station: Baryulgil, Clarence Valley
Photo: Narelle Wilson

3: ENHANCED INVESTMENTS & RESOURCES

A Disaster Resilience Framework is not a static document; it requires application of a continuously evolving analytical process to remain relevant. This analytical process will involve an evaluation of natural disasters and climate change factors affecting any present and future developments, infrastructure, and strategies. Through enhanced investments and additional resources, it is possible to implement an evaluation process to determine and action outcomes. This process is important to development resilience planning proposals to overcome current inherent risks and challenges and enables a commitment to be made that addresses critical disaster resilience investments.

An enhanced investment in natural disaster mitigation strategies and resources will assist in the key disaster resilience areas of - Prevention, Preparedness, Response & Recovery (PPRR). The Framework outcomes will be enhanced by investments in resources that capture data, such as geographic information systems (GIS), providing electronic spatial data storage and mapping and analysis tools. This will require an enhanced resource investment in software, hardware and data input. GIS can produce simple maps as well as complicated analysis based on several data sources (or layers). This is where the implementation of updated mapping software, such as NearMaps as a resource, is an important tool to access information and infrastructure data so risks can be analysed and understood.

The integration of NearMaps into the new CiAnywhere business software will serve to feed back into the Disaster Dashboard for communication, and act as central data base of remote infrastructure operations e.g. flood monitoring LiveCams; VMS boards; flood gates; power failure back-up systems to critical infrastructure.

Enhanced investment in climate change preparedness will improve the reliability of resilience strategies and reduce response and recovery costs. Additionally, by identifying the natural disaster climate change hazards for CVC, the Framework can inform planning and operations of the recommended implementations and installations required to help mitigate the climate change impacts.

CVC will be informed by climate change projections identified in the Climate Change Impact Assessment (CCIA) to invest in appropriate risk mitigation measures that enable preparedness and resilience strategies. These strategies support critical infrastructure development such as micro-power grids, mains water enhancement, levee banks, and increased water catchment storage capacity and increase water security and resilience.

Predictive modelling from the CCIA will guide decision making in relation to a range of investments that mitigate future risk. By analysing the risks identified in the CCIA from multiple-natural disaster impacts, the climate change modelling scenarios can be demonstrated through the use of a Simtable. This scenario-based software technology will provide an understanding of the impact of doing nothing.

Priority Strategies for Action

PRIORITY 3: Enhanced Investment

STRATEGY	DESIRED OUTCOME

STRATEGY A
Develop a Strategic Plan of Disaster Risk Reduction Investments for risk mitigation
	• Future disaster recovery costs are minimised by investing in disaster risk reduction and mitigations. Identified risk reductions will inform how to invest in risk mitigation and resilience measures to deliver multiple dividends such as:
	  • avoiding loss and suffering;
	  • reducing future disaster costs; and
	  • unlocking economic opportunities and broader economic and social benefits to be realised even in the absence of a natural hazard.
	• A strategic workplan guides delivery of risk mitigation investments, measures the success of the Framework recommendations.

STRATEGY	DESIRED OUTCOME
STRATEGY B Leverage existing and future government programs to fund priority risk reduction measures	• There is an organisational approach to developing priority risk reduction measures in readiness for attracting government funding. • Funding and grants from Federal and State Government are sought to provide CVC with financial support to invest in infrastructure disaster resilience development. • CCIA informs improvements to existing infrastructure across all four key environments and is used to support funding applications to deliver disaster risk reduction actions.
STRATEGY C Empower communities, individuals, small business and primary producers to make informed and sustainable investments	• Council collaborates with government initatives to help businesses transition and adopt the required adaptive practices of marketing and productivity that can deal with climate change impacts in the region. • Commercial and agriculture producers, and small and medium local businesses, are encouraged to respond and adapt to the climate change-induced natural disaster risk challenges through sustainable investments. • Stakeholders are engaged where risk mitigation infrastructure may impact other parties' disaster resilience outcomes or livability.
STRATEGY D Developing & implementing strategies, planning & reports for future investments	• CVC's CCIA is shared with all sectors of business, community, and other LGAs to identify and leverage the broader economic value and opportunity created by investments in disaster risk reduction and resilience. • Framework recommendations are implemented for long-term planning for disaster resilience through the Integrated Planning and Reporting Framework and Operational Plan. • Research and collaboration with external stakeholders is supported to benefit CVC in disaster preparedness investments and innovation in enhanced resilience investments. • Wider regional resilience strategies that align with CVC's Disaster Resilience Framework are supported to achieve regional resilience enhancement.
STRATEGY E Pursue collaborative commercial options for disaster risk reduction	• Commercial options where the collaboration can provide beneficial outcomes and disaster risk reductions measures are supported.

NSW RFS Aviation Brigade, Clarence Valley Council's Grafton Airport, during 2019-2020 Black Summer Bushfires.
Photo: NSW RFS

4: GOVERNANCE, OWNERSHIP & RESPONSIBILITY

Disaster risk reduction requires strong governance that not only responds to the uncertain and changing nature of disasters and a changing climate, but to the interrelated and complex distribution of responsibility for identifying, managing, and reducing the risk and impact from natural disasters. It is critical that governance mechanisms include all relevant departments, and stakeholders, and clearly identifies their roles and responsibilities.

Disaster resilience planning and analytical processes are designed to identify, reduce, and manage risk to council operations and the four key environments; built, social, natural and economic. An accurate profile of these key environments helps the governance mechanisms support the Framework's effectiveness.

Responsible and supportive governance mechanisms are fundamental to actioning the disaster resilience strategies for Council. These strategies are designed to prevent internal disruptions resulting from natural disasters, which are costly and disruptive to the day-to-day business and operational functionality of the organisation.

Also, the community increasingly expects a high availability and reliability of services from councils. With tolerance to long periods of unavailability decreasing, dissatisfaction impacts the reputation of Council as an organisation and service provider. Therefore, to be effective at recovery, the actions recommended to reduce disaster risk must be prioritised, sustainable, accountable and undertaken in collaboration with all departments and stakeholders involved in the ownership of the disaster recovery and resilience development.

Council's governance in the disaster resilience area will rely on improved information and data collection processes. It will be necessary to implement new innovative real-time data and analysis into business software systems to assist with strategic planning and infrastructure investment analysis of risks.

Additionally, to enable the recording and capturing of natural disaster responses, recovery, and costs and cost savings, each step needs to build upon preceding steps, providing a logical framework for planning efforts and producing a series of interrelated outcomes. Together, these outcomes comprise of the strategies informed from the Framework, through the actioning of the Disaster Resilience & Risk Mitigation Infrastructure Action Plan.

> If I had to select one sentence to describe the state of the world, I would say we are in a world in which global challenges are more and more integrated, and the responses are more and more fragmented, and if this is not reversed, it's a recipe for disaster.[18]
>
> **Antonio Guterres, United Nations Secretary-General, January 2019**

It will be valuable to implement monitoring of the disaster resilience developments, followed by evaluation. This will enable Council to gauge the benefits of the Framework's recommendations against implementation costs, and help to identify which interventions have the highest rate of return. This will help to determine future investments in disaster resilience infrastructure and measures.

Priority Strategies for Action

PRIORITY 4: Governance, Ownership & Responsibility

STRATEGY	DESIRED OUTCOME
STRATEGY A Establish an implementation plan for the Disaster Resilience Framework	• Directors and Managers oversee the implementation of the Disaster Resilience Framework. • Recommendations are implemented through the Operational Plan over coming years based on priority.
STRATEGY B Establish ongoing dedicated Coordinator of Emergency Management & Resilience	• A Disaster Procedure Manual with step-by-step disaster guidelines for operational staff (who does what, where what is, and when the procedure is activated) is maintained and promoted by the Coordinator of Emergency Management & Resilience. • The Coordinator of Emergency Management & Resilience delivers the multiple technical and operational components of recovery and resilience, and forges ongoing partnerships with organisations that support CVC's disaster management and communication advice between all internal & external stakeholders. • The EMPLAN is regularly reviewed to ensure risk mitigation actions are applied to all natural disaster response plans. • The Disaster Resilience Framework and its capacity through informed research, climate science data, and consultation, is an evolving document.
STRATEGY C Consistently report on disaster risk reduction efforts & outcomes	• Reports on the success of CVC's disaster risk reduction investments are shared widely as they are continuously implemented. • Results in loss reduction are identified and reported. • Work undertaken on risk reduction operations, and risk mitigation infrastructure planning, informs decision making and minimises duplication.
STRATEGY D Create clear governance pathways for pursuing disaster risk reduction projects	• The Disaster Resilience Framework informs risk reduction measures to improve CVC's disaster resilience. • Officers and community understand levels of responsibility to reduce disaster risk and improve resilience.

Figure 2 [19]

CRITICAL INFRASTRUCTURE RESILIENCE

CIR is improved through Infrastructure, Organisational and Community Resilience

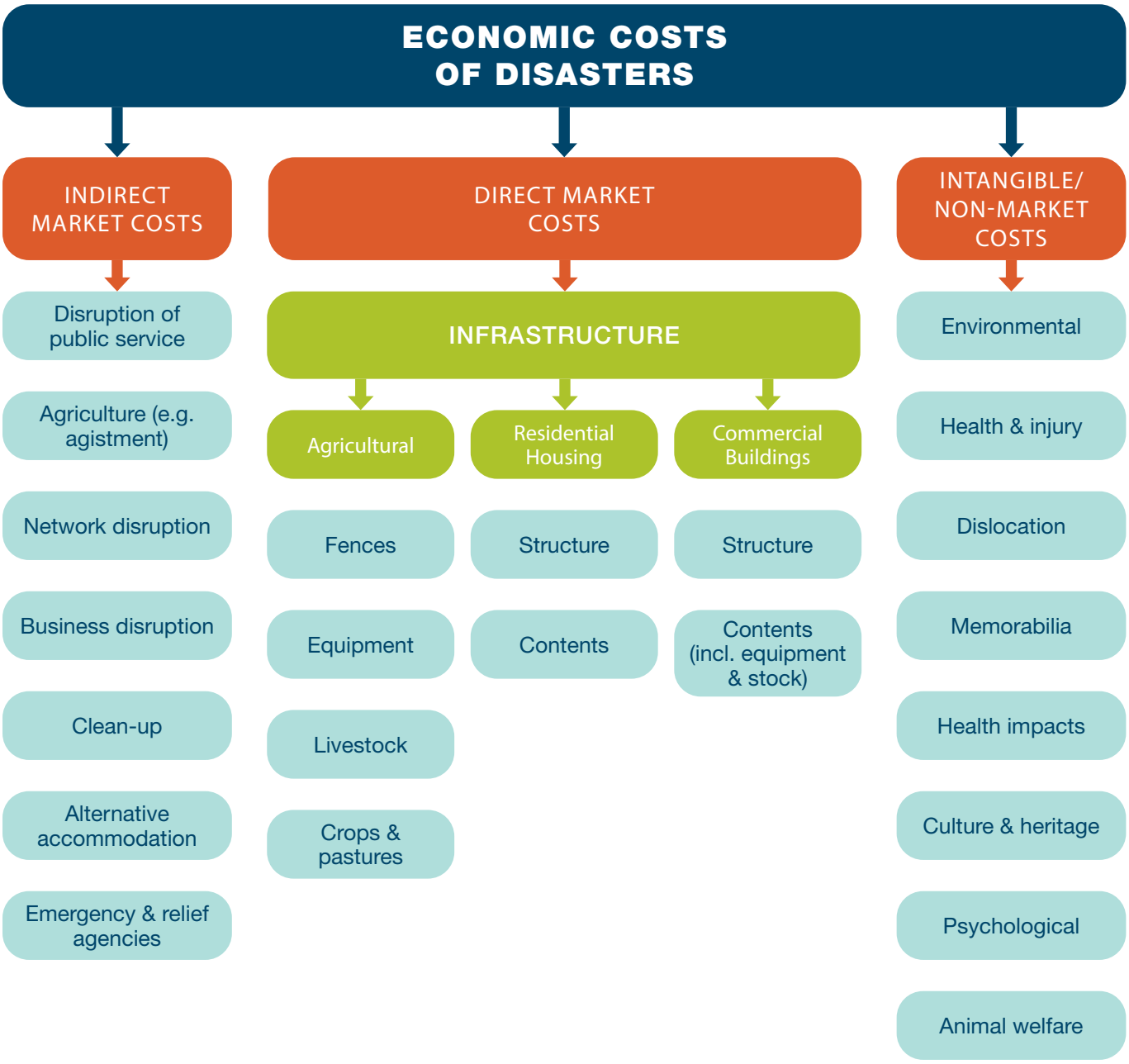
Resilience is a choice. The businesses that will remain resilient and competitive in the face of a changing climate will be those that seek to improve their risk mitigation in order to minimise the risk of any business interruption. Providing an example, the 12 drivers in the City Resilience Framework collectively determine the city's ability to withstand a wide range of shocks and stresses.

ECONOMIC COST

Globally, the tally for disasters exacerbated by climate change soared to an estimated $210 billion. Investing in risk reduction before disaster strikes can save about $6 for every $1 spent. In lower-income countries, every $1 invested in more resilient infrastructure yields $4 in benefit.[11]

A useful Framework for identifying and categorising the costs of bushfires was developed by the Productivity Commission and is reproduced in Figure 3. Under this framework, the costs of bushfires are broad and include direct market costs, indirect market costs and intangible or non-market costs. CVC has engaged a consultant to provide a report on Economic Recovery Post Bushfires, to be implemented into the Framework and made

Figure 3 [20]


ECONOMIC COSTS OF DISASTERS
INDIRECT MARKET COSTS
DIRECT MARKET COSTS
INTANGIBLE/ NON-MARKET COSTS
Disruption of public service
Agriculture (e.g. agistment)
Network disruption
Business disruption
Clean-up
Alternative accommodation
Emergency & relief agencies
INFRASTRUCTURE
Agricultural
Residential Housing
Commercial Buildings
Fences
Equipment
Livestock
Crops & pastures
Structure
Contents
Structure
Contents (incl. equipment & stock)
Environmental
Health & injury
Dislocation
Memorabilia
Health impacts
Culture & heritage
Psychological
Animal welfare

Rethinking disaster risks and vulnerability

Resilience is the capacity to withstand and recover quickly from difficulties. It means strengthening the ability to survive, adapt and thrive. Within the context of CVC, it involves the capacity of individuals, communities, businesses, ecosystems and infrastructure to bounce back from nature disasters.

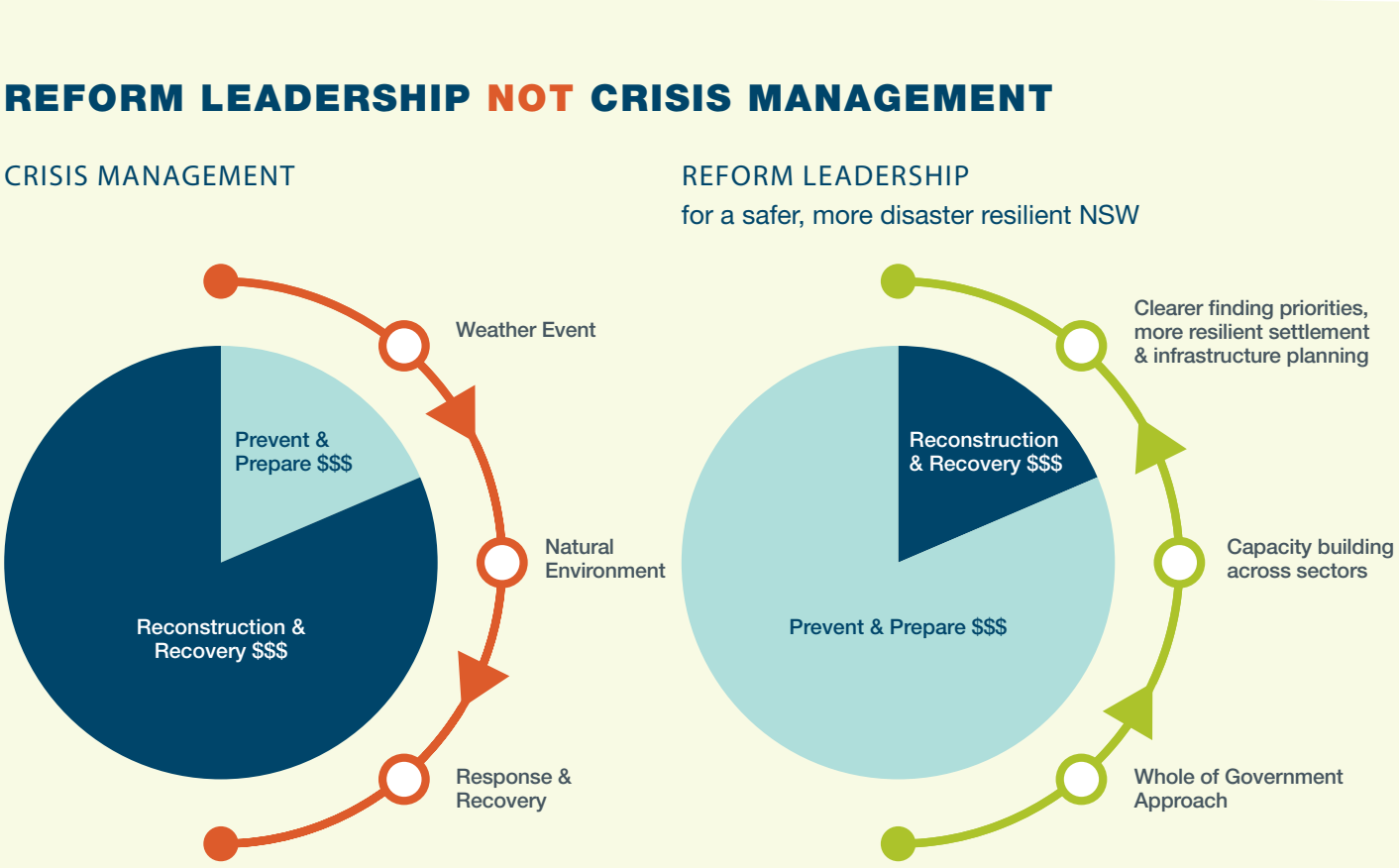


Figure 4 [22]
Credit: Adapted from both Queensland Reconstruction Authority along with Public Leadership in Times of Crisis: Mission Impossible? - Arjen Boin and Paul Hart, while at

Profiling CVC's vulnerability: The interconnected causes and cascading effects of systemic disaster risk.

Profiling CVC's vulnerability provides policy makers, practitioners, and business and community leaders with a different way of thinking about disaster risk. It speaks to vulnerability, complexity, uncertainty and ambiguity, but it also speaks to hope and informed, inspired action.

It supports those grappling with how to make effective high-stakes decisions to take informed and responsible action in times of uncertainty and increasing complexity.

The purpose of the Framework and the CCIA is to:

- Highlight what people value and focus on how the tensions and trade-offs between different values in influence priorities and choices now and in the future.
- Promote discussion about the interconnected and cascading effects of the systemic causes of vulnerability and the implications of decisions on future preparedness and resilience.
- Enable good intentions to be turned into focused and sustained action at various levels in our society, in ways that reduce vulnerability and build resilience.[23]

Photo: CVC

CASE STUDY

A Clarence Valley Council employee's experience of 2019/2020 Black Summer Bushfire Disaster: Lessons learned

Why a case study?

By March 2020 in Australia, the Black Summer bushfires burnt almost 19 million hectares, destroyed over 3000 houses and killed 33 people. Data showed they were unprecedented in terms of impact on all areas. A number of mega-fires occurred in NSW, resulting in more burned area than in any fire season during the last 20 years. One of them was the largest recorded forest fire in Australian history. Black Summer fires confirmed existing trends of impact categories during the last two decades for NSW and Victoria.[24]

The Clarence Valley Council, which consists of 10,441km^2 and has a population of almost 52,000, had a Bushfire burn area of 6,154km^2, equating to 59% of the entire LGA. An even wider region not directly impacted by the main fire event also experienced the impacts and consequences of a long fire season which began in July 2019 and ended in February 2020.

While it is widely reported that the 2019/2020 Bushfire Disaster was an unprecedented event, Australian government authorities have informed us that the nation should expect disasters on this scale (more severe and more frequent) to happen again. Further disaster impacts have been felt by the Clarence Valley Council and community due to floods and the COVID-19 pandemic, which highlights how concurrent disasters can multiply the risks to Council and communities. In order to prepare, governments, businesses, councils, communities, and organisations, must all redouble efforts to build resilience in a more hazard-prone future. Research has shown that reducing risk in advance of disasters will save lives and money. Climate change impacts and natural disaster risks now necessitate council to build-in new levels of resilience in preparedness for natural disasters. Therefore, the Clarence Valley Council has developed a Disaster Resilience Framework. The aim of this case study is to analyse how Council's operations responded to the Black Summer bushfires, and its recovery processes both on the ground and through flow-on effects to business operations. This case study is particularly revealing given five concurrent and cascading disaster events impacted the Clarence Valley Council in a two-year timeframe. This is from the perspective of Devin Simpson as an employee, and personally, because his property was severely impacted by the Black Summer Bushfires.

INTRODUCTION

Devin Simpson: Team Leader, Capital Works

Devin started working with Clarence Valley Council (CVC) in 2018. Since then, his job roles have changed dramatically in different positions within Council. In September 2021, he was promoted to Team Leader of Capital Works.

As a Clarence Valley Council (CVC) employee, Devin is in a unique position to tell his story of the unfolding of the Black Summer bushfires and its impact on Council, his property, and on himself and his family.

He gives both a personal account and an account of Council's immediate operational response, which includes the challenges of concurrent disasters and the lessons learned.

This is being recorded to enable the historical documentation of the lessons learned, not only from the unprecedented Black Summer bushfires, but also the subsequent concurrent and cascading disasters.

It is being presented in the context of storytelling to accurately capture the Clarence Valley's under-preparedness and lack of unawareness of the potential impact from natural disasters. It also highlights the change needed organisationally for CVC to prepare for future natural disasters, which will likely occur on a more unprecedented scale.

We thank Devin for his honest, frank, and at times traumatic, recounting of his first-hand testimony of enduring the natural disasters, which have provided valuable information to Clarence Valley Council.

Photo: Narelle Wilson

AIM

The aim of the case study is to:

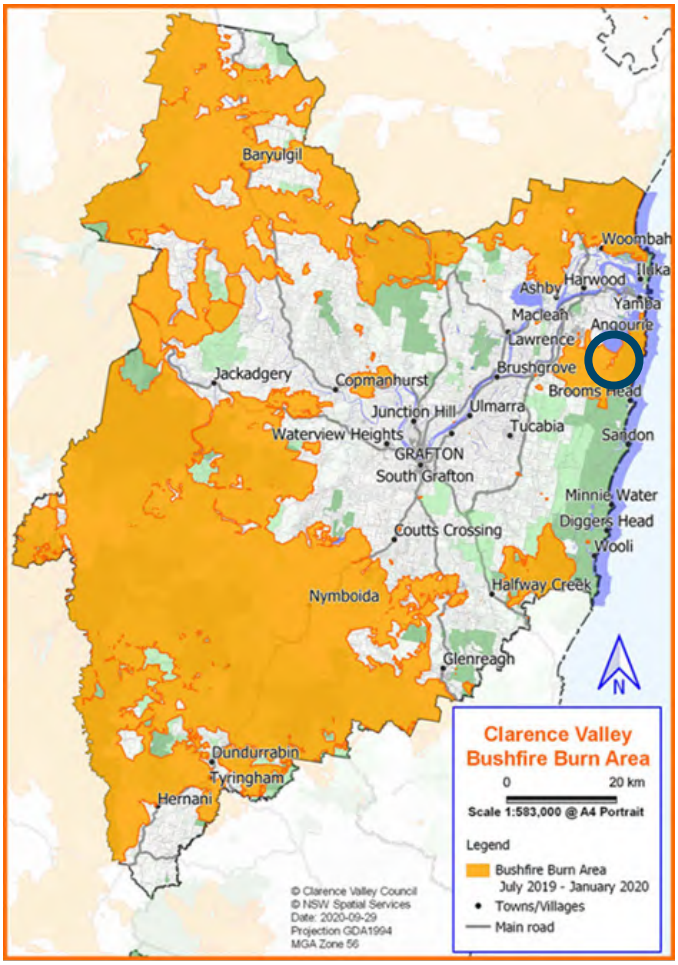
- Determine what lessons can be learnt for Clarence Valley Council from its response and recovery of the Black Summer bushfires & concurrent flooding events. Identify gaps.
- Demonstrate the need for a Disaster Resilience Framework to recommend the implementation of risk reduction and mitigation infrastructure and strategies into its operations, supporting staff, and community in the future.
- Analyse and provide findings to inform recommendations to improve Council's response and recovery, and produce a procedures manual.
- Highlight the importance of an extensive community education campaign on disaster awareness and preparedness.

METHOD

The study was carried out via face-to-face interview and video recording of the primary source, Devin Simpson, in July 2021. This is in addition to broader and other significant place-based observations, internal research and data collection, all of which was analysed as part of the development of the Clarence Valley Council's Disaster Resilience Framework.

RESULTS

- A significant observation is that Council was not, and could not have been, fully prepared for the unprecedented and unimaginable scale of the Black Summer bushfires.
- Through the Disaster Resilience Framework, CVC will require extensive risk reduction and mitigation infrastructure and strategies to be implemented into council operational procedures.
- A dedicated LEMO, as the Coordinator of Emergency Management & Resilience, is a necessity to deal with more frequent and more intense natural disasters and write a step-by-step response procedure manual.
- There is an overwhelming burden of council administration processes associated with cascading and concurrent natural disasters occurring in the Clarence Valley LGA, which needs resolving.



Taloumbi Location

Photo: Narelle Wilson

STORYTELLING - BLACK SUMMER 2019/2020

Devin Simpson: Clarence Valley Council employee

At the time of the interview in July 2021, Devin was a Maintenance Technical Officer for CVC. In July 2019, he was progressing in his new CVC role when the first fires broke out in Orara Way and were quickly extinguished. That was how the Clarence Valley region was used to dealing with bushfires, but on this occasion the fires kept coming. Come September 2019, Devin was appointed Acting Works Coordinator for Civil Services - maintenance and capital works. This involved the coordination of operations for outdoor field staff along with aiding and providing assistance for emergency services during natural disasters.

Devin lives at Taloumbi with his wife Lauren and young son on a property they brought in 2018. They purchased the one hundred acre undeveloped bush block with the intention of building their home.

The bush block has undulating terrain and a sloping area where the house construction is located, and backs onto State Forest and National Park making it a high-risk bushfire area. The property also meets with the Shark Creek and Tyndale swamp land. In 2019, the property had no fire breaks, yet it had previously been burnt as you could see the blackened evidence on the trees, and the grass trees had been burnt and were regenerating. Devin understood that fire was a natural process for this environment. He said he was warned of the bushfire risk when they purchased the property but as he had come from Canada he was aware of bushfires and thought they would be fine with a bushfire plan. That was before the Black Summer bushfires. Not having been impacted by bushfire personally in the past, he said he hadn't given much weight to people's warnings of bushfire in the area. He especially hadn't given much weight to what extent a bushfire could impact him and his family. Devin was acting in his newly appointed role for less than a month when the Shark Creek fire began to flare up in October 2019. It had been burning in the wetland bog and peat for a month and couldn't be extinguished.

The fire escalated quickly and was now coming fast. Bearing in mind Devin had no Fires Near Me App at this time, suddenly everyone in the community sprung into reactive mode and neighbours came together to talk about a strategy. He had a Canadian friend visiting who helped him clear bush directly around the house with a small excavator to protect his assets. As the fire advanced in the evening, they gathered all the hoses, the pump and water tank and were on standby. Devin's wife was seven months pregnant at the time, so she left the Taloumbi property with their two-year-old son and retreated to safety with her family in Yamba.

After spending the entire day preparing to protect his own property, by 2am Devin was exhausted and anxiously anticipating the fire to impact the property. The fire started coming down the road but the RFS had not yet escalated the fire hazard. Fatigued and half-awake, watching and anticipating, Devin's fears were realised. As the fire approached the property there was still no RFS assistance and people were on their own, helping each other. By the time a Rural Fire Service truck did arrive, the firewall was bearing down and it was impossible for one fire truck to manage. Upon arrival, the RFS had assessed that Devin was well set up, so left his property to defend another. Almost as soon as the RFS left, the wind picked up and the fire rapidly progressed towards his home. The fire front roared across his property; the wind blew up and the fire came over the top of them.

Devin said it felt like the firewall came out of nowhere, bearing down on them in just a matter of seconds before appearing to jump over the house. After the fire front passed, they were left to frantically put out spot fires with only garden hoses and a pump, saving whatever assets they could. With no RFS to assist, Devin was grateful to have his Canadian friend's help. He got through with his mate and feels lucky to have had him to experience it with, as they could support each other during and after the fire. Devin said that he felt prepared after getting ready for the fire with hoses, pump and water, and having his own machinery to make fire breaks, but in reality, he knows he was also very lucky as it could have been a lot worse.

Council's response & triggers

The next day, Devin was straight back at work as the spread of bushfires was rapidly escalating and required extensive and evolving road closures, which demanded continuous liaising with RFS and Transport NSW. At this point in time, the fire jumped the road towards Red Cliff and onwards towards Wooloweyah, Angourie and Yamba. The fire got the attention of media and a broader community awareness at this point. These townships are populated, have one road in and out and are bordered by the Yuraygir National Park. The RFS at this point called for aerial firefighting assistance for water-bombing and fire retardant.

Devin states strongly that he thinks that day was the trigger; it was the representation that these fires on a new scale, larger and unlike anything else seen in the region before. The staff Council usually relied on were also being impacted and affected, with their own houses under threat. Council was also now trying to protect assets, roads and public safety. At this point, the community was starting to get frustrated and wanted access to roads, which Council couldn't give them.

The bushfires across the LGA got bigger. The next trigger point was the Armidale Rd fire, likened to an Armageddon in November 2019. Nymboida had been through a lot of fires in the past, but this was like being on another planet, reducing everything to scorched earth. Devin was travelling throughout the LGA and was seeing a lot of fires, but not on this scale. All the road signs were melted and now piles of metal. Two major bridges burnt, and many homes in Nymboida were lost. That was when CV LGA got more attention on a national scale. Fire started erupting all over the LGA. Devin asserts: "For me it wasn't thinking about any one thing. I thrive in high pressure environments, to act quickly, respond quickly, make decisions, think on your feet, and get resources to all these places to the best of my ability. I thrive in that environment; it was real time to pick up another gear and start strategizing the approach, and the triage."

Initiating change

This was the key point in time that Devin, along with the support from management, changed the way Council handled recovery and response. Initially, supervisors and staff were going out to Nymboida and doing what they had always done, pushing trees aside to clear the roads and get them open as quick as possible for the community. That day, however, there were high winds and burnt trees were falling left, right and centre so Devin put a stop to the activities and determined the road should stay closed. This was just the beginning.

Devin set about calling contractors to clear the roads. He separated the LGA into six geographic areas and appointed a lead arborist. Having engaged multiple contractors and teams, he ensured that arborists were involved in the teams checking every roadside tree. Devin built teams based on the scale of the clean-up required. In total there were 15 contractor teams, including assistance from Coffs Harbour Council, all guided by arborists' advice. The teams were made up of a combination of contractor arborists and council staff. Of note, council-employed tree fellers from Open Spaces and Brad King, an arborist from Civil Services, were incredible assets and worked enormous hours assisting with this recovery.

It was critical to ensure the teams had processes in place, with procurement and contractor's Safe Work Statements and Risk Assessments all requiring thorough completion. This meant all risks were mitigated and managed as far as reasonably practicable, and that all workers were working in an experienced team. In addition to the above contractors, Devin sequestered multiple commercial scale forestry harvesters to the areas along Armidale Rd to manage large, dangerous trees. This had never been done before. Armidale Rd was closed for more than a month, despite a lot of outside pressure to open. But with all signage indicating hairpin turns and dangerous corners, two kilometres of guard rail, and two bridges burnt, with roadside trees still burning and falling, it was too dangerous. The lack of bridges meant two bypasses had to be constructed, which were destroyed shortly after by floods and had to be re-constructed.

For Devin, the responsibility of keeping staff safe was paramount, but he was criticised for taking staff out of areas where trees were still on fire and at risk of falling. In addition, he was unfairly and fiercely criticised by the public for road closures. This really highlighted the intangible costs of a fire disaster, with physical and psychological impacts and personal criticisms on workplace decision-making all taking an immeasurable toll.

No monetary value can be put on the psychological impact, lost contact time with family, or time needed

to take stock of and look after one's own mental health. No CVC system was in place to have mental health and support experts on the ground, or in-house during or immediately after the event. Devin noticed everyone was in the moment, being supported by directors and managers at the time. He felt supported by management when he presented risks and a new way of managing the response, and how he made that analysis. This was most helpful.

2019/2021 concurrent natural disasters

The NSW storms and floods that immediately followed the Black Summer bushfires in Jan-February 2020 had an incredibly impactful effect on the Clarence Valley because of vegetation loss from the bushfires. Landmasses washed out, landslips clogged roads and drainage filled with mud sediment and debris, which subsequently blocked storm water drainage and caused damage to road surfaces. The contamination and damage to the water catchment had the flow-on effect of overwhelming the water treatment plant, which ultimately affects the region's drinking water.

Council had constructed a total of five temporary bridge bypass crossings where bridges were burnt out from bushfires. These bypasses were washed out on numerous occasions due to concurrent floods. While bypasses provided access for communities, there were weight restrictions on road users. Many council staff, and residents in general, live in Nymboida and work in Grafton. Council had to constantly advise these residents of the dangers on Armidale Rd and provide residents with a permit to gain access to get in and out. Devin had to do this for each individual resident, which was a huge task in dealing with customer correspondence. In addition to so many other emergence response demands, each person wants your attention and time. At the time (Council had not opted in) under the S44 arrangements, Council could not claim regular hours of council work even though they were dealing with disaster response. Because of this, contractors were called in with about 30 crews on the road and thousands of work orders. It was a challenging task to navigate procurement processes while working under difficult completion timeframes for important projects, including the replacement of nearly every sign on the Nymboida Armidale Rd. To recover these costs, all work had to be completed in line with the state's Essential Public Asset Restoration Guidelines.

Trying to keep roads closed to enable contract road crews to replace road signs and two kilometres of guard rail, while also removing trees without creating a hazard for road users and disruption to workers, was a challenge. Council used the closure to jump-start the work with less traffic management involved.

In addition to coordinating the logistics of recovery over such a large area, there is a significant administrative burden associated to all works being done; as stated in the recovery guidelines, pre-condition, damage, and completed works evidence is required on every single asset for the costs to be claimable. The invoiced works from more than 30 contracted crews then need to align with the completed works on each asset.

Again, it's worth noting this happened before CVC had adopted the opt-in model.

Recommendations

Devin highlighted the need to incorporate permit allocations into Council's operational software systems.

The recovery work from the January/February flood took until the end of 2020 to complete. It was a huge task to finalise the claim, coming in at a cost of $6 million. Devin remembers driving with the administrative agency's officer from Transport NSW, who was auditing the work completed and ensuring it was relevant. He was really happy with how Council had been able to separate the work from affected areas to non-affected areas. It was during this drive that the CVC LGA was hit with the December 2020 flood disaster – yet another disaster which affected the immediate recovery from the previous disaster, which was still in the claim process.

After the December 2020 flood claims and damage came another two flood disasters in February and March 2021. When these are declared separately, the government routinely issues a new set of guidelines, which requires a change in the way you respond. The lack of consistency adds an operational and administrative burden. In the March flood event, Yamba Rd was closed between Yamba and Maclean, isolating communities. Assets were damaged and roads were covered by the flooded Clarence River, resulting in massive amounts of flood mud residue. As of the date of the interview in July 2021, Council had open claims on four natural disasters that were not yet finalised.

Emergency recovery and essential public restorations claims are still open from the March 2021 event, and the administration required to complete this claim is an enormous task. Devin is concurrently undertaking this work while coordinating the recovery operational work. The February 2020 flooding occurred while Council was still in the opt-out option, which meant Devin was still heading the entire recovery process by himself, in addition to managing and coordinating all the regular operations of council maintenance activities and capital works to ensure our annual delivery program is met and fulfilled.

This was all happening at the same time as the management of flood claims, and the impacts of the COVID-19 pandemic which affected Council operations due to stay-at-home orders, staff being required to isolate and worksafe limitations on crew numbers travelling together.

Restrictions on work crews and staff shortages were unhelpful on several fronts. Staff needed to resume work to regain some normality after the bushfires and floods, and small psychology impacts were affecting them, such as that fact staff couldn't shake hands when dealing with stakeholders and in need of some mateship and comradery.

Devin wanted to remind both staff and community members that everyone was doing the best they could under the circumstances. The extent of criticism levelled was unfair and unjust and meant that staff members found they had to be defensive when what they needed most was support. In Devin's words: "that's what gets the most wearing and tiring, that you are out there and bending over backwards trying to juggle so much work scope, and to not be acknowledged for what you have actually achieved. Instead you are picked upon and criticised for any little thing that is lacking or missing. You are managing millions and millions of dollars of restored assets and improved infrastructure – over and above – and you get a "you missed that fricken' little tree on the side of the road". That was probably the most frustrating part of the recovery work, on top of already being totally exhausted from concurrent and cascading disasters, as well as being personally impacted."

Devin found himself working hours reviewing and collating data, claims and reports in the middle of the night or on weekends; unclaimed hours that few know but was for his own pride of work. By this time, Devin's wife had a new baby, born during COVID-19 restrictions.

The events between 2019 and 2021 have been completely unprecedented in terms of concurrent disasters and the intensity of the bushfires. The number of concurrent disasters is indicative of the new normal from climate change impacts, which Council knows it will need to address.

How Council can improve foresight

1. What, in your view, is the way forward to implement strategies to overcome the challenges faced in Council's response to these multiple disasters? What solutions, resources, and administration changes are needed?

"Money, time, and resources," says Devin. His views follow:

The Clarence Valley LGA is acknowledged as a high-risk disaster region and this will continue to be a problem for Council. This requires a strategic approach in how we progress and use funding. Operationally, we haven't done anything to be more prepared and resilient.

Basically, because we are going through disaster after disaster, along with an organisational restructure, we don't have stability and there are a lot of vacancies. This means people are working multiple roles, and still working their original roles on top of recovery for each disaster.

Devin was asked if he thought staff instability and staff vacancies could be attributed to PTSD and/or the burnout of concurrent disasters and work pressure.

His response: "Thinking about this now, it is a domino effect. If people at the top are under pressure and spreading themselves thin at the top, then to respond to all pressure, and being taken away from their responsibility of the field staff, has resulted for sure in staff having to perform multiple jobs, and not doing them well."

Devin expressed a wish to have more time to just do one job well – once he fulfills all additional roles, plus the job he is employed to do, he is essentially working five jobs. He believes costs could have been claimed more quickly, had more resources and staff been working on the response and recovery.

With drought, bushfire and four flood events, Council was in a constant triage situation. When there is no time of peace after war, there is no respite. It is just not sustainable to have that level of pressure and stress on timeframes and deadlines. Roads and bridges are an ongoing challenge, and the infrastructure building and project management is an area not being measured and accounted for by State and National governments, which has a huge impact on all LGAs.

Devin has highlighted how applying for State Government assistance through funding is a huge administration burden, as is the subsequent scale of project management, particularly with unrealistic completion/spend dates for funded projects.

A shortage of construction and contracts, civil engineering consultants and project managers became a consequence of concurrent disasters. CVC contractors were requested by Ballina and Coffs Harbour Councils to carry out work during recent floods.

As far as resilience, Devin would like to have the time to overlay the GIS data of damage and defect data from each concurrent disaster event as this would highlight and identify CVC's hotspots – the areas that are most impacted and vulnerable. Historically, the Office of Emergence Management, now Resilience NSW, assessed damage and the aim of restoration was to rebuild like-for-like. That has changed now to resilient build.

CONCLUSION

- This case study shows that Clarence Valley Council must implement robust systems and procedures to ensure a higher level of preparedness and resilience. Preparedness in this case refers to a set of actions taken as precautionary measures in the face of potential disasters, which can include both physical preparation with operational procedural manuals and structural preparation.
- The 4 Rs is referred to by Commodore (Ret'd) Vince Di Pietro as: Repair, Recovery, Resilience & Readiness. Repair is rebuilding like-for-like, Recovery is rebuilding with better, Resilience is making it as failsafe as possible, and Readiness is having done as much as we can in preparedness.
- Historically, government-funded recovery required the need to rebuild like-for-like. It defies logic that you would replace a washed-away road with the same inadequate drainage pipes, only for the road to wash away again. The new approach of 'betterment build' enables Council to prepare for what happens next. Even if you can't predict or control future events, the ultimate resilience goal is for Council to be as prepared as possible.
- The recording of damage and the administration process of natural disaster recovery is a huge burden, particularly surrounding S44 claims and grant applications. This must be addressed and is an area that the CVC Disaster Resilience Framework includes as a strategic action.
- Preparedness is an important quality in achieving resilience by avoiding and mitigating negative outcomes.

REFERENCES

[1] Royal Commission into Natural Disaster Arrangements: https://naturaldisaster.royalcommission.gov.au

[2] https://www.undrr.org/publication/sendai-frameworkdisaster-risk-reduction-2015-2030

[3] Figure 1: https://www.homeaffairs.gov.au/emergency/files/nationaldisaster-risk-reduction-framework.pdf

[4] https://www.undrr.org/publication/sendai-frameworkdisaster-risk-reduction-2015-2030

[5] Royal Commission into Natural Disaster Arrangements: https://naturaldisaster.royalcommission.gov.au

[6] https://www.dpc.nsw.gov.au/assets/dpc-nsw-gov-au/publications/NSW-Bushfire-Inquiry-1630/Final-Report-ofthe-NSW-Bushfire-Inquiry.pdf

[7] https://www.homeaffairs.gov.au/emergency/files/nationaldisaster-risk-reduction-framework.pdf

[8] Risk Frontiers Climate Change Impact Assessment – Clarence Valley Council LGA October 2021

[9] https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1920/Quick_Guides/EmergencyManagementDisasterResilience

[10] Risk Frontiers Climate Change Impact Assessment – Clarence Valley Council LGA October 2021

[11] https://www.homeaffairs.gov.au/emergency/files/nationaldisaster-risk-reduction-framework.pdf

[12] Sean Cruxton; www.seancruxton.com

[13] The 2021 Intergenerational Report - https://treasury.gov.au/sites/default/files/202106/p2021_182464.pdf

[14] Special report _Update to the economic costs of natural disasters in Australia.pdf

[15] Australian Business Roundtable for Disaster Resilience and Safer Communities http://australianbusinessroundtable.com.au/our-research/white-paper

[16] Risk Frontiers Climate Change Impact Assessment – Clarence Valley Council LGA October 2021

[17] Mark Binskin: Royal Commission into Natural Disaster Arrangements: https://naturaldisaster.royalcommission.gov.au

[18] https://www.undrr.org/publication/sendai-frameworkdisaster-risk-reduction-2015-2030

[19] Figure 2: RESILIENT SYDNEY: A STRATEGY FOR CITY RESILIENCE 2018; https://www.preventionweb.net/publication/resilient-sydney-strategy-city-resilience-2018

[20] Figure 3; Economic Costs of Natural Disasters in Australia; Australian Journal of Emergency Management https://knowledge.aidr.org.au/media/3749/ajem-16-02-09.pdf

[21] Economic Costs of Natural Disasters in Australia; Australian Journal of Emergency Management https://knowledge.aidr.org.au/media/3749/ajem-16-02-09.pdf

[22] Figure 4; Adapted from both Queensland Reconstruction Authority along with Public Leadership in Times of Crisis: Mission Impossible? – Arjen Boin & Paul Hart, while at Meridian Urban; https://www.csus.edu/indiv/s/shulockn/executive%20fellows%20pdf%20readings/boin%20-%20crisis%20leadership.pdf

[23] https://knowledge.aidr.org.au/resources/profiling-australiasvulnerability

[24] Alexander I. Filkov et.al, 2020, Impact of Australia's catastrophic 2019/20 bushfire season on communities and environment. Retrospective analysis and current trends, Journal of Safety Science and Resilience, Volume:1, Issue 1, 2020, Pages 44-56, ISSN 2666-4496; https://www.sciencedirect.com/science/article/pii/S2666449620300098

DISASTER RESILIENCE FRAMEWORK

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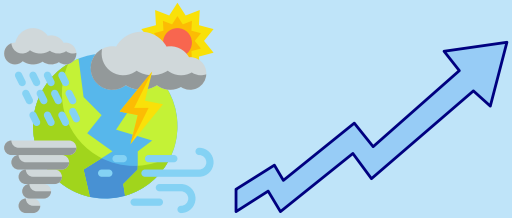
CLIMATE CHANGE IMPACTS ON CLARENCE VALLEY COUNCIL'S ASSETS, INFRASTRUCTURE, OPERATIONS & BUSINESS

Historical trends 1980 to present day



Frequency of extreme weather is increasing

Present

Average damage to homes and businesses from extreme weather at least

$550

million per decade

2050

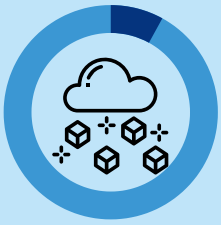
Average damage to homes and businesses from extreme weather at least

$610

million per decade

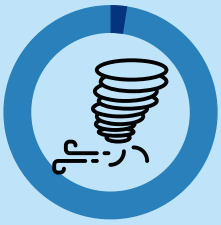
Proportion of losses per hazard

85%
River flooding

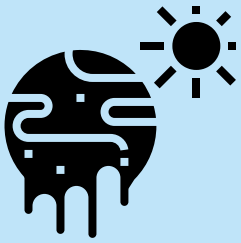


8%
Hail

6%
Bushfire



2%
Cyclones



Heatwave

2021	2050
20 days per year	36 days per year

Heavy rainfall

2021	2050
5 days per year	5.3 days per year

Dangerous fire weather

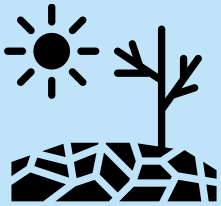
2021	2050
12 days per year	20 days per year

Sea level rise

2021	2050
+3.7 mm per year	+250 mm above present

East Coast Low

2021	2050
1.7 days per year	2 days per year



Drought

2021	2050
current severity is increasing	+16% drought index maximum

Explainer: This data represents a modelled future state which is uncertain and higher or lower values could occur. Climate values are 20-year averages in order to best represent climate. Data has been used from multiple sources.

CLIMATE CHANGE IMPACTS ON CLARENCE VALLEY COUNCIL'S ASSETS, INFRASTRUCTURE, OPERATIONS & BUSINESS

Earth's climate system has warmed over recent decades. This warming will affect the frequency and intensity of a wide range of weather and climate related risks in the Clarence Valley LGA.

COUNCIL ASSETS AND RESPONSIBILITIES IMPACTED BY EXTREME WEATHER

ASSET/ RESPONSIBILITY	FLOOD	STORM	BUSHFIRE	HEAT	DROUGHT	SEA LEVEL RISE
COUNCIL FACILITIES	✓	✓	✓	✓	✓	✓
COUNCIL OPERATIONS	✓	✓	✓	✓		✓
COST OF INSURANCE	✓	✓	✓			✓
PLANNING	✓	✓	✓	✓	✓	✓
ECONOMY	✓	✓	✓	✓	✓	✓
LANDFILL WASTE	✓	✓	✓			
FLOOD LEVEES	✓	✓		✓	✓	✓
STORMWATER	✓	✓	✓			✓
SEWER NETWORK	✓	✓			✓	✓
WATER SUPPLY	✓	✓	✓	✓	✓	✓
ROADS & BRIDGES	✓	✓	✓	✓	✓	✓
PARKS & PUBLIC FACILITIES	✓	✓	✓	✓	✓	✓
COASTAL ZONE		✓	✓	✓		✓
NATURAL RESOURCES & ENVIRONMENT	✓		✓	✓	✓	✓

Explainer: This data represents a modelled future state which is uncertain and higher or lower values could occur. Climate values are 20-year averages in order to best represent climate. Data has been used from multiple sources.