A coordinated catchment

Mary Regional Resilience Strategy

January 2020

Acknowledgement of Country

We acknowledge the Aboriginal peoples and Torres Strait Islander peoples as the Traditional Owners and Custodians of this Country. We recognise and honour their ancient cultures, and their connection to land, sea and community. We pay our respect to them, their cultures, and to their Elders, past, present and emerging.

Foreword

A region that works together is a resilient region.

The Mary region is home to some of Queensland's most iconic landscapes, environmental attributes and a sense of community and identity that sets us apart. These attributes go the very heart of who we are in the Mary region, and form a significant part of our individual and collective community values.

To protect these values, we must work together across government, communities, organisations and as individuals, to collaborate and share our knowledge and efforts on our pathway towards our resilient future.

The Mary region, and its diversity of communities, is well-versed in dealing with the often sudden onset of a range of natural hazards from catchment-wide flooding to fast-moving bushfires, as well as severe storms and the occasional tropical cyclone. We rise to the occasion, always. However, we must also remain dedicated to a cycle of continuous improvement in how we prevent and prepare for natural hazard events.

Coordinating to build resilience in the Mary region means proactively drawing upon the skills, knowledge and experiences of all members of our community, to contribute and collaborate - working together in new ways with mutual respect, to collectively drive our region from strength to strength. It is about building our longer-term capacity to adapt to changing circumstances and inevitable natural hazard impacts, in a healthy, productive and constructive way.

A Coordinated Catchment - the Mary Regional Resilience Strategy recognises the extensive range of valuable disaster resilience studies, programs, projects and strategies already underway across the region and being implemented by a host of organisations, community groups and individuals. It is a partnership between the Wide Bay Burnett Regional Organisation of Councils (WBBROC), the Queensland Government and the four councils of the Mary region:

- Sunshine Coast Council
- Noosa Shire Council
- Gympie Regional Council
- Fraser Coast Regional Council.

A Coordinated Catchment - the Mary Regional Resilience Strategy is a locally-led blueprint which provides us with the basis upon which to come together across local government boundaries and in partnership with the Queensland Government, our valued communities and other local stakeholders. It charts a pathway for us to coordinate, collaborate, connect and champion multi-hazard resilience efforts into the future.

Cr Mick Curran
Chairman of the Wide Bay Burnett Regional Organisation of Councils

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Image: Flood monitoring station,
Fraser Coast Regional Council.

Our vision

*Across the Mary region, we know serious weather and we take it in our stride.
Our historical roots were forged by flood and fire.*

*We are resourceful and self-reliant, and we take great pride in looking after
our family, neighbours and friends.*

*We maintain strong community bonds. Community connection is at the core of our resilience in
the Mary region. Our sporting groups, community groups, special interest groups, charity and
volunteer groups are all examples of our diverse forms of community.*

*We go to great lengths to be prepared for the unexpected, each and every day.
We know that to be resilient, each one of us has a role to play. We take this role seriously.*

*We look out for the vulnerable in our community – our elderly, our children, the ill
and those with disability.*

*We are conversant with the types of natural hazards we face every year, and we are constantly
improving how we endure. We do this by forward planning for serious weather
and climate impacts.*

*We take proactive steps to coordinate our resilience behaviours and actions as individuals,
families and communities for a safer, more resilient Mary region.*

Our shared values

As a community, we have a story to tell...

Our sense of community spirit is our greatest and most valued asset. We are genuine, authentic and friendly. We warmly welcome newcomers and visitors to our great region.

We are proud of our rich heritage. From gold mining, to agricultural production, from fishing villages to the home of Mary Poppins. Our identity as a region is formed by our historical roots - with beautiful period architecture to match.

Our weather and climate is enviable, most of the time. We enjoy the best of Queensland's sub-tropical climate, from sunshine to rain which keeps our landscape looking lush. We acknowledge that Mother Nature can sometimes pack a punch.

Our natural landscape is diverse and dramatic. We are the adventure capital of Queensland, with boundless opportunity to take in the best of all the great outdoors has to offer, coupled with rich ecological and biodiversity values which we seek to protect.

Our lifestyle is bound by the bush and the beach. From national parks to some of Australia's most notable and secluded beaches, our region is the gateway to unparalleled lifestyle options.

Our region offers a variety of experiences.

The Mary region has something to offer everyone.

Our potential is unlimited.

Image: Food'n' Groove concert.
Courtesy of Fraser Coast Regional Council.

Mary River catchment
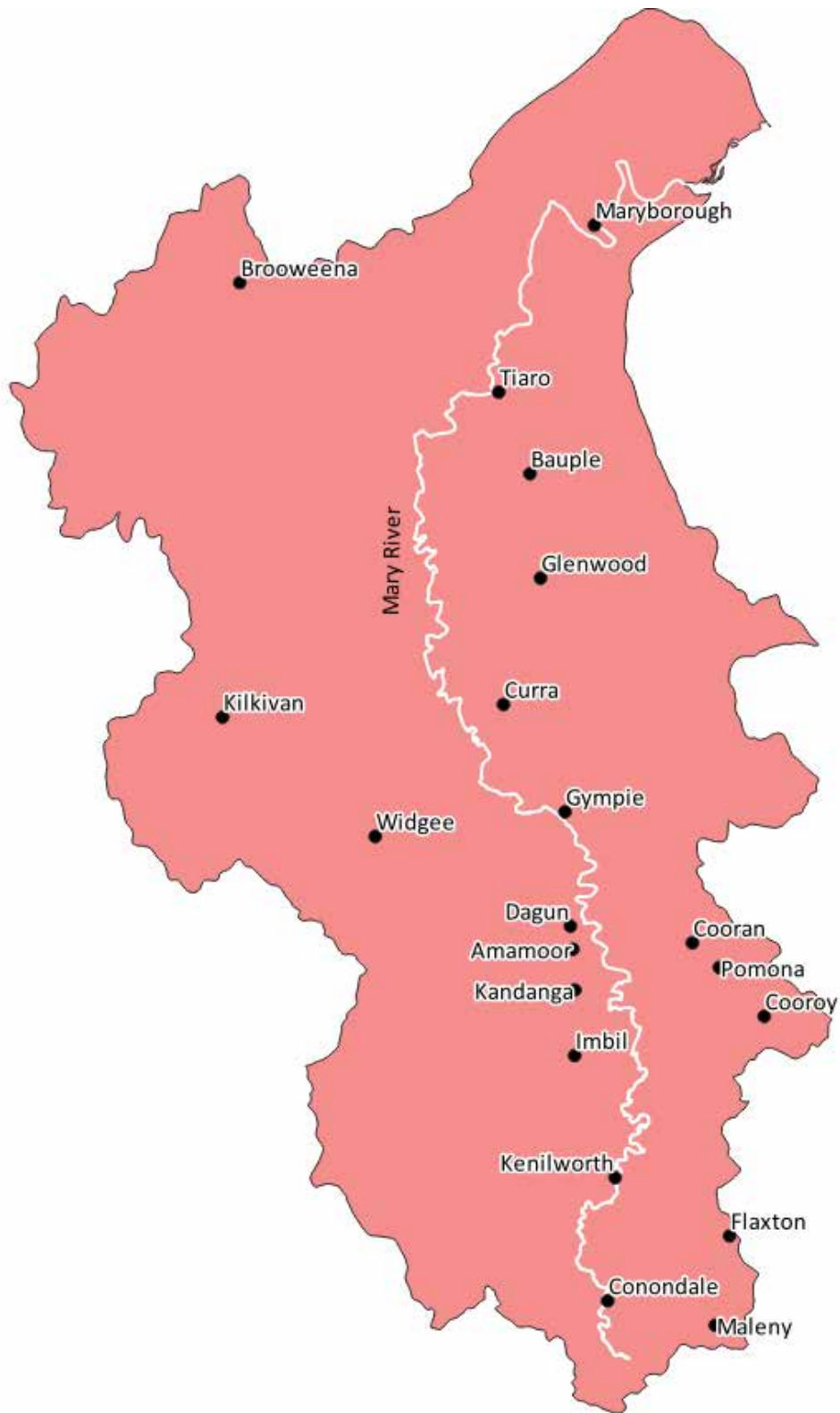
Our community

The Mary region and natural hazards

The Mary region takes in the area of the Mary River catchment.

The Mary River emanates from the southern Conondale Ranges, Maleny and Jimna and flows north through Kenilworth toward Gympie, and on to Maryborough.

The Mary River is joined by tributaries that flow through local towns and communities, flowing east from around Goomeri, and flowing west from around Cooroy. Major tributaries include the Obi Obi, Little Yabba, Six Mile, Amamoor, Kandanga, Tinana, Deep, Munna and Wide Bay Creeks.

The Mary River catchment collects rainfall and flood water, discharging into the Ramsar-listed Great Sandy Strait at River Heads – north-east of Maryborough and south-east of Hervey Bay.

From flooding to bushfire, cyclones and severe storms to heatwaves – the Mary region is familiar with the onset of emergency and disaster events.

Coupling both topography and rainfall patterns, the streamflow of the Mary River is highly variable with large areas of the catchment exposed to flash flooding.

Severe storm is no stranger to the Mary region, with clear topographical characteristics in the western area of the catchment and beyond which support increased storm activity in specific locations across the region. As a fertile region, the Mary also supports a thriving agricultural industry, with grazing land and crops often impacted by various weather and hazard events.

Much of the upper reaches, or headwaters, of the catchment comprise National Parks, bushland reserves and forestry plantations and these locations can be susceptible to bushfire and landslip.

Local governments

The Mary region primarily includes areas of the Fraser Coast, and Gympie (both of which are part of the Wide Bay Burnett Regional Organisation of Councils), along with the Noosa and Sunshine Coast local government areas.

These four Councils are working together with a key focus on delivering shared solutions to common resilience challenges across the Mary region.

Information about local hazards and resilience is available via the following council websites and Disaster Dashboards:

Fraser Coast Regional Council
https://www.frasercoast.qld.gov.au/

http://disaster.frasercoast.qld.gov.au/

Gympie Regional Council
https://www.gympie.qld.gov.au/

http://disaster.gympie.qld.gov.au/

Noosa Shire Council
https://www.noosa.qld.gov.au/

http://disaster.noosa.qld.gov.au/

Sunshine Coast Council
https://www.sunshinecoast.qld.gov.au/

https://disasterhub.sunshinecoast.qld.gov.au

Image: Mary Valley, Conondale.

Our community

The Mary region takes in almost 979,950 hectares, comprising more than 53,660 individual properties. It is home to a population of approximately 128,600 within the catchment. The population is growing rapidly with new residents attracted to the region for a range of lifestyle, employment and financial reasons.

The original inhabitants of the Mary area were the Kabi Kabi (Gubbi Gubbi) and Butchulla Aboriginal Peoples.

Today, the Mary region includes a broad cross-section of communities including small settlements and villages, service towns and hinterland towns, rural production areas, national parks and plantations, through to major urban settlements such as Gympie and Maryborough.

Townships in the upper Mary region include Montville, Maleny and Mapleton at the top of the catchment. Kenilworth and Kandanga are located in the centre valley area.

The lower Mary region is approximately double the size of the upper reaches of the catchment, stretching from Gympie to Tiaro and through to Maryborough, before being joined by Bunya Creek and the Susan River towards the river mouth at River Heads.

Outside the Mary region, communities such as Hervey Bay, the Cooloola Coast and the coastal villages of the Great Sandy Strait are directly and indirectly impacted or influenced by natural hazard events in the Mary region.

Whilst the population of the Mary region is diverse, it shares many unifying factors which extend beyond just geographic or catchment-based location such as shared key economic activities and industries, shared value sets and shared historical linkages.

From an economic perspective, the primary sectors producing the largest industry output in the Mary region over recent years are construction, real estate services and manufacturing. Growth industries across the region include mining, financial and insurance services, and health care and social assistance sectors. Noting the region's increased proportion of the population aged +65 years, relative to the state average, it is unsurprising that health and social industries continue to experience growth.

Image: Maleny Lane. Courtesy of Tourism Australia.

Our community snapshot

Local government areas	4	
Catchment population	128,600	
Agricultural land use	51%	
Low income	55%	vs 44.8% across Queensland
Ageing population	22.3%	65 years+ vs 15% across Queensland
Children	17.8%	aged 14 years and younger vs 19.6% across Queensland
Indigenous population	3.3%	vs 4% across Queensland
Persons with disability	7.7%	vs 5.2% across Queensland

How catchments work

Almost every season, somewhere in Queensland will experience heavy rainfall which can lead to flash flooding and riverine flooding. This is due to our sub-tropical climate and can be driven by monsoon troughs, east coast low events and cyclones.

Where rainfall goes, depends upon topography. Queensland incorporates a number of drainage basins, within which we have 64 river catchments, including the Mary River catchment.

River catchments are defined by elevated areas, known as the headwaters, at the top of the catchment. These elevated areas determine where water will flow, either out to the Pacific Ocean or south into New South Wales or South Australia. Catchments generally comprise a number of tributaries which catch and convey rainfall into our major river systems.

Catchments are not just relevant in terms of flooding and floodwater, but can be important to consider in relation to other natural hazards such as bushfires and landslides. The inter-linkages between different hazards is highly evident at the landscape-scale. For example, in some cases bushfire events can burn very hot, stripping vegetation and damaging soils across vast areas. Degraded landscapes can also occur after years of persistent drought.

Especially in Queensland, the disaster season is that period of the year where we can experience all types of natural hazard events, and this is changing as a result of climate-related considerations. This means we might experience a bushfire event one week, and a major flood the next. Where our landscape is degraded, either by fire, drought, or poor land management practices, flooding rains can lead to landslips and extensive landscape and riverine erosion.

Catchment contamination, erosion, sedimentation and silting are particular challenges for the environmental quality of our rivers, and the fauna and flora they support. This can also impact the quality of our water supplies, on which our communities and economies depend.

Understanding how our catchments work is vitally important, as they can be subject to impacts from a wide range of natural hazards beyond just flooding.

Walking the landscape

The Mary Regional Resilience Strategy is supplemented by a separate body of work led by the Department of Environment and Science, called Walking the Landscape. The primary aim of the framework is to help develop a whole-of-landscape understanding to improve evidence-based decision making for the sustainable management and restoration of ecological systems.

Walking the Landscape incorporates available knowledge on landscape components e.g. groundwater dependent ecosystems, lacustrine wetland, riparian vegetation and processes e.g. hydrological, geological. The framework integrates existing scientific information with local knowledge about how catchments work. Through this process, the Department of Environment and Science worked with local stakeholders, local and state government and communities to gain a collective understanding of many Queensland catchments from Cape York to South East Queensland.

The process helps answer questions like how the landscape impacts water movement or why groundwater dependent ecosystems occur in certain locations.

Catchment stories produced by the Department of Environment Science can be viewed online via the Wetland Info website.

www.wetlands.des.qld.gov.au

Image: Mary River. Courtesy of QRA.

About this strategy

Mary Regional Resilience Strategy

The Mary region is one of Queensland's most environmentally, socially and economically diverse regions, and a region which is characterised by the depth of values shared by its residents. These values go to the core of community and individual identity, and can often be impacted by disaster events – of which the Mary region has experienced many over the years. When these values are impacted by disaster events, our resilience to, and recovery from, disasters can be challenged.

From flooding to bushfire, cyclones and severe storms to heatwaves – the Mary region is familiar with the onset of emergency and disaster events. Into the future, the region is not immune from larger magnitude events and community-led disaster resilience will enable us all to work better together to prevent, prepare for, respond and recover – to maintain and protect our community values.

Supporting community leadership in fostering disaster resilience is a core focus of this strategy, recognising communities and individuals as key players in developing pragmatic and fit-for-purpose approaches to disaster resilience and recovery.

This strategy takes both a bottom-up and top-down approach to the coordination of resilience actions and effort, recognising both the valuable role of grassroots, community-led resilience as well as government-led, multi-disciplinary coordination in coupling sustainable communities and sustainable development with disaster risk reduction.

Recognising regional values

Identifying, understanding and reflecting region-wide community values is an essential aspect in driving resilience action into the future. This is because our values, the very reasons why we choose to live, work and play in the Mary region, are often the things we lose in a disaster event. These values also set us apart from other parts of Queensland.

These values can relate to sense of place and belonging, community identity, places and occasions for people to come together to share and celebrate, or they can be values such as the ability to make a livelihood, feel safe or familiarity with local surroundings. Environmental values can be damaged or even lost. When our core values are impacted by a disaster, it makes our recovery process as individuals, families and communities more challenging and we find ourselves needing to adapt to our new circumstances. Some people will find this easier than others, requiring community-led leadership to look out for and care for those who may find dealing with severe weather events, disaster impacts and transitions into recovery, a challenging process.

Video: Find out more about the Mary Regional Resilience Strategy at www.qld.gov.au/maryregion

Diagram: Core elements of the Mary Regional Resilience Strategy.

Grassroots community-led action → **Disaster resilient communities** ← **Sustainable development + disaster risk reduction**

Image: Aerial view of Fraser Coast region with Mary River.

Our aspirations for resilience

This strategy is a regional blueprint for coordinated resilience action that will work to the following objectives:

- sharing, leveraging and coordinating resilience efforts across the region
- adopting a place-based approach to resilience action, tailored to the varied characteristics of the region and its communities
- aligning sustainable development with disaster risk reduction
- telling our unique resilience story, recognising that one size does not fit all
- recognising the role of disaster resilience to our local and regional economy and social (or community) resilience.

Effective disaster risk reduction requires an integrated, coordinated and whole-of-region approach.

Coordinating resilience across the Mary region

This strategy seeks to guide how we work together to proactively journey toward enhanced community and climate-related disaster resilience over time.

Its purpose is to combine strategy and investment in resilience action in a way that encompasses the impacts of our weather and climatic conditions across the Mary region. This strategy adopts a holistic view of the factors which underpin and contribute to disaster resilience, having regard to the multitude of natural hazards we are exposed to across the region, and the various ways in which we can collectively address our risks.

The strategy sets out a coordinated 'blueprint' for improving disaster resilience across the Mary region, building upon a comprehensive suite of existing studies and strategies derived at a local and regional level. It aims to 'change the game' in how we reduce disaster risk and strengthen the resilience of our individuals, communities, the economy and the environment.

Whilst the coordination of disaster resilience action is a key aspiration, we recognise that no two places or communities are the same – though we do share some common characteristics.

Image: Mary River downstream of Maryborough.
Courtesy of QRA.

Strategic focus

This strategy takes a multi-hazard approach to the varied aspects of disaster resilience, noting that many resilience-building measures and activities are often multi-dimensional. That is to say, many measures or activities identified for particular hazards, for example, flooding, can equally apply to the resilience-base necessary for communities to prepare for, and recover quickly and effectively from, other natural hazards such as cyclones or bushfires.

The reason for this is because of the strategic, systems-based approach required to underpin resilient communities. Disaster resilience is not just about hardening critical infrastructure. Rather, it requires a combination of social, environmental, economic, built environment and infrastructure measures. When considering matters of community-based disaster resilience from this strategic, systems-based perspective we can start to understand, identify and develop robust multi-hazard resilience measures to strengthen our communities to endure Queensland's dynamic weather and changing climate.

A systems-based approach

The purpose of this strategy is to guide how we share and coordinate approaches to improved resilience and disaster risk reduction across the Mary region. It is developed as a partnership between the Queensland Government, Fraser Coast Regional Council, Gympie Regional Council, Noosa Shire Council and Sunshine Coast Regional Council.

Collaboration and integrated engagement across this partnership have been critical to the successful development of this strategy. It involved a multi-disciplinary approach engaging with a range of professionals who specialise in mental health, engineering, planning, community and economic development, disaster management, transport, environmental management, communications and more.

A coordinated approach to community resilience, sustainable development and disaster risk reduction enables us to work across jurisdictions, disciplines and communities to adopt innovative and fit-for-purpose approaches to:

- better understand our collective risk
- work better together to limit our exposure
- seek out new, cutting edge opportunities to reduce disaster risk
- continuously improve how we prepare for, respond to and recover from disasters.

Working across the elements of resilience

This multi-dimensional and cross-disciplinary approach has informed the adoption of four elements which contribute to holistic resilience action:

Diagram: The elements of disaster resilience

It is the intention of this strategy that coordination of effort across government, communities, stakeholder groups and disciplines integrates a resilience mindset to embed a streamlined approach to business as usual across a wide variety of policy and strategy. This may include, but is not limited to:

- regional plans
- regional economic development strategies
- regional transport and infrastructure plans
- natural resource management plans
- water resource plans
- local and district disaster management plans
- local asset management and capital works plans
- local corporate and community development plans
- land use planning schemes
- local and regional health strategies.

Integrating related programs and projects

This strategy combines and builds upon a range of local and regional strategic documents to articulate the various aspects of resilience action identified across the Mary region. Plans, projects and studies have been drawn upon to inform this strategy.

National Disaster Risk Reduction Framework

The National Disaster Risk Reduction Framework is a multi-sector collaboration led by the National Resilience Taskforce within the Australian Government Department of Home Affairs. The framework was co-designed with representatives from all levels of government, business and the community sector. Over 100 participants from a diverse range of over 80 organisations came together at a three-day intensive 'policy sprint' to develop key components of the framework.

The framework outlines a coordinated approach to reducing disaster risk. This is one critical component to enable resilience. It is designed to leverage the great work and progress made across all sectors since the release of the National Strategy for Disaster Resilience in 2011 to better understand and reduce disaster risks, improve resilience, and bolster the capability and capacity of communities to withstand natural hazards.

More than ever, limiting the impact of disasters now and in the future requires a coordinated effort across and within many areas including land use planning, infrastructure, emergency management, social policy, agriculture, education, health, community development, energy and the environment.

Queenslanders are disaster resilient when...

Diagram: The four objectives of the Queensland Strategy for Disaster Resilience

Image: Mary Valley hinterland. Courtesy of QRA.

National Land Use Planning Guidelines for Disaster Resilient Communities

Prepared by the Planning Institute of Australia on behalf of the Australian Government Attorney-General's Department, the National Land Use Planning Guidelines for Disaster Resilient Communities were released in 2016 to provide a guide on best practice approaches across various hazards. Focusing largely on policy and strategic land use planning, the guidelines provide a toolbox of methodologies for various activities typically associated with land use planning and the integration of natural hazard, risk, climate change and community resilience considerations into everyday planning practice.

It incorporates elements such as policy making and strategic (planning scheme) plan making, hazard identification and risk assessment, risk mitigation and community consultation. The Guidelines seek to better equip planning (and other) professionals with the knowledge and information required to effectively integrate resilience-based practices into all manner of land use planning activities, including catchment-based approaches to flood resilience.

Profiling Australia's Vulnerability

Profiling Australia's Vulnerability explores the interconnected causes and cascading effects of systemic disaster risk. Prepared in a partnership approach between the National Resilience Taskforce, CSIRO and a range of professional organisations across Australia, this report examines the relationship between our values and our vulnerabilities, and aims to understand how Australians can collectively prioritise efforts to reduce loss and harm.

Factors that impact on resilience – such as climate change, demographic shifts and a reliance on interconnected systems and infrastructure – are addressed throughout the report, supported by references to relevant research, experiences and disaster events. The report provides a new way of looking at disaster risk based on the premise that hazards only lead to disaster if they intersect with an exposed and vulnerable society and when the consequences exceed people's capacity to cope.

Resilient Queensland – delivering on the Queensland Strategy for Disaster Resilience

Resilient Queensland will see every region across Queensland have an individually-tailored regional resilience plan by 2022. The Mary Regional Resilience Strategy is amongst the first tranche of pilot projects delivered for Resilient Queensland, and will be used to guide future regional resilience strategies being developed throughout the state. In particular, it seeks to identify and address locally-derived challenges and opportunities which are particular to the Mary region, linking back to the objectives of the Queensland Strategy for Disaster Resilience.

As the most disaster-impacted state in Australia, it is critical we harness best practice and look for new ways to work together to improve the resilience of communities across Queensland, adopting pathways toward a safer, stronger and resilient Queensland.

Queensland Climate Adaptation Strategy

The Queensland Climate Adaptation Strategy 2017-2030 outlines how Queensland will collectively prepare for current and future impacts of a changing climate that reduces risk and increases resilience. This strategy recognises that, as a state, we are already experiencing hotter summers, more frequent natural disasters and impacts on our natural environment, and that these changes pose a threat to our economy, our communities, our environment and our way of life.

The strategy, along with specific sector-based adaptation plans, outlines our commitments and the actions we will take to transition to a low carbon, clean growth economy and adapt to the impacts of a changing climate.

Queensland State Natural Hazard Risk Assessment 2017

Prepared by Queensland Fire and Emergency Services, the State Natural Hazard Risk Assessment provides a statewide analysis of relevant natural hazard risks including tropical cyclones, severe storms, flooding, coastal hazards, heatwaves, bushfires and earthquakes. The assessment considers the nature of natural hazards relevant to Queensland, as well as elements of likelihood, consequence, exposure and vulnerability to understand both inherent and mitigated risk profiles. The assessment links to the Queensland Emergency Risk Management Framework (QERMF) which provides a comprehensive and systematic approach to inform risk-based planning across Queensland.

Image: Sea wall, Esplanade, Urangan, Hervey Bay.

Queensland State Planning Policy 2017

The State Planning Policy (SPP) is an instrument under the *Planning Act 2016 (Qld)* which sets out the state planning interests critical to responsible land use planning and development across Queensland. Under this instrument, the State sets out the particular state planning matters to be preserved and protected (the state interests). These state interests are arranged under five broad themes:

- liveable communities and housing
- economic growth
- environment and heritage
- safety and resilience to hazards
- infrastructure.

The SPP covers all natural hazards from floods, cyclonic and storm events, earthquakes, bushfires, storm tide inundations and landslides. The actions required by local government to integrate the policy include:

- identifying hazards in the first instance especially through mapping
- undertaking a risk assessment
- ensuring land in the erosion prone area is not to be used for urban purposes
- ensuring development on land in other hazard areas is avoided or mitigates risk to a tolerable level
- ensuring development does not hinder emergency service or create further risk to public safety
- ensuring built coastal protection options are a last resort.

Queensland Floods Commission of Inquiry

The Commission of Inquiry was established by the Premier of Queensland in response to the 2010-2011 flood events. The Commission of Inquiry conducted a comprehensive review focusing on areas such as preparation and planning, adequacy of response, adequacy of forecasts and early warning systems, and land use planning in the lead up to the 2010-2011 floods.

The final report included recommendations across a vast range of technical and governance disciplines which highlighted the complexity of flood risk management in Queensland. Included in the recommendations was the need to conduct additional flood studies and undertake further consultation with local governments to enhance the cooperative approach to flood risk management.

Sunshine Coast Council Disaster Resilience Plan 2019-2022

In 2018 the Sunshine Coast Regional Council launched its Disaster Resilience Plan, supporting the implementation of its Local Disaster Management Plan, as well as Council's Environment and Liveability Strategy 2017, the Regional Economic Development Strategy 2013-2033 and the Social Strategy 2015. The Plan recognises the multi-dimensional nature of resilience action, reinforcing Council's commitment to a strong community by identifying principles and priority areas to guide the application of disaster resilience activities.

The Sunshine Coast Regional Council is the first local government in Queensland to develop a local disaster resilience plan.

Image: The Mary River looking south east, 18 February 2013, at its peak of 19.95m. Photo by Craig Warhurst, Gympie Times.

What is resilience?

Individual resilience

It is important to know what exactly is meant by the term 'resilience', and it can often mean different things to different people. However, there do remain common characteristics which define what it means to be a resilient person. Often, this can be confused with stoicism, however these two qualities are quite different.

Stoicism tends to be characterised as a show of strength in the face of adversity and hardship to continue on and persevere. Resilience, on the other hand, is about being equipped over the longer term to adapt to rapid change and new circumstances – both for individuals and for communities more holistically. Resilience can include the following attributes:

- a sense of resourcefulness and self-sufficiency
- adaptability
- open mindedness
- self-reliance, independence and self-responsibility
- awareness
- ingenuity and innovation
- capability
- strength of core values
- mateship and connection with others.

These attributes stand a person in good, solid stead to overcome and adapt to life's challenges. It is necessary we understand that sometimes we cannot return to our lives, the way they were before a specific event. In some cases, we need to find value in our new life circumstances and learn to adapt, in order to move forward in a healthy, mindful manner.

> Resilience is everyone's business.
> We all have a role to play.

Community resilience

Collective community resilience tends to be defined by a different set of characteristics to those which define individual or personal resilience. Across the Mary region, community resilience tends to be associated with:

- connection
- leadership
- capability and capacity
- inclusiveness
- identity
- innovation
- opportunity.

From a practical perspective, support for community resilience across the Mary region is also interpreted to include activities and actions such as:

- infrastructure betterment, such as raising roads above flood levels
- human/community well-being and ownership of risk
- organisational readiness, such as undertaking drills and updating procedures in readiness for storm and cyclone season
- property-based resilience, such as preparing your property for hazards, like raising floor levels and event-based protection like sand-bagging
- economic resilience, such as maintaining the operation of agriculture and industry in preparation for, during and following an event.

When our communities are connected and collaborating, collective efforts benefit immensely from coordination – across disciplines, levels of governments, localities and communities. Coordination of resilience activities and action is a core element of proactive community resilience building.

Image: Sunshine Coast Get Ready Schools Program.
Courtesy of Sunshine Coast Regional Council.

Place-based resilience

Resilience necessitates different activities or ways of thinking in different locations across the region because each of our communities are unique.

The uniqueness of our communities bares a relationship with our settlement types and locations. For example, the resilience needs and values of our rural communities is different to that of the residents of our services towns, which is also different to that of our major river cities – Gympie and Maryborough.

On this basis, a place-based approach is adopted by this strategy to reflect the place-based values and resilience needs of the varied communities across the Mary region. This is discussed in further detail in the 'Place-based approach' section of this strategy.

Cumulative, cascading and compounding risks

When thinking about resilience to disaster risk, there are sometimes a range of secondary or indirect risks which may not necessarily be front of mind.

In certain severe weather or disaster events, a series of complex cumulative, cascading and compounding risks can emerge, further complicating both emergency and community response, as well as holistic community recovery. Due to the nature of these potential indirect risks, we should consider:

- cumulative risk – the aggregate of multiple risks which can coalesce or merge into substantial, broad and far-reaching impact beyond that initially understood or forecast. Cumulative risk often occurs incrementally, subject to certain sets of circumstances, but can be characterised by either rapid or longer-term onset
- cascading risk – this style of risk is typically associated with higher-order risks which can result in a different set of flow-on risks. Cascading risk can usually be identified through risk assessment processes, where an evaluation of certain events, action or non-action can assess follow-on consequences and relative likelihood
- compounding risk – occurs when a multitude of different risks give rise to a build-up of overall risk, inherently changing or increasing the risk profile beyond that merely associated with single or even multiple direct risks.

Community resilience is complex and far-ranging. The impact of a severe weather or disaster event is certainly challenging in itself however, there are multiple considerations beyond this which dictate our collective level of resilience. The influence of human behaviour and human activity in consideration of risk further multiply direct risks into a complex range of indirect risks, of which we are not always immediately aware and may take time to emerge.

Images: Kilkivan. Courtesy of Gympie Regional Council.

Resilient settlements and infrastructure

Case study:
Get Ready Generation Z

School leaders collaborate on resilience

As part of 'Get Ready Queensland' week, Fraser Coast Regional Council facilitated a collaborative workshop with high school leaders from across the region to discuss disaster management and community resilience, and what it means to 'Generation Z'.

Generation Z are our emerging leaders, and will inherit this landscape over the coming decades as its stewards. Their voice and their views make an important contribution to the broader conversation on community-led disaster resilience.

A statewide first, this workshop unpacked the various foundations of resilience and how disasters have impacted the Mary region in the past. Students shared stories of personal experiences, observations and their own thoughts on what it takes to be a resilient member of a resilient community.

A key component of this process was the immersion of students within the Mary River catchment landscape, using a 'big map' process where students walked on and explored the map to gain a strategic appreciation of the broader landscape within which they live, work and play. This process was largely focused on building a greater awareness and understanding of how catchments work, the nature of natural hazard exposure across the region, and an improved understanding of local and regional natural hazard risks.

One of the four objectives of the Queensland Strategy for Disaster Resilience focuses on improved understanding of the risks we face. This immersive, hands-on workshop helped equip our emerging leaders to better comprehend natural hazard risk, be prepared, and have the conversation with their peers, families and friends to share learnings.

It is intended these workshops continue to be rolled out across the region, and potentially more broadly across Queensland, further building on Generation Z's criteria for community resilience.

Generation Z's criteria for community resilience

Collaborating for change, the Mary region's Generation Z have started to come together to workshop their criteria for community resilience. To date, the elements of community resilience identified by the Mary region's Generation Z are outlined below.

Social resilience

The Generation Z workshop participants identified the following:

- catering for the elderly and ease of transition through life's stages
- community awareness of hazard and risk, and the landscape we live in
- a focus on social media as a source of critical information, and managing poor or incorrect information
- connecting with all demographics and altering resilience messages to suit
- strengthening community values.

Built Environment Resilience

The Generation Z workshop participants identified the following:

- resilient settlements and infrastructure
- retrofitting existing buildings to better withstand flooding, bushfire, cyclone and storm surge
- hardening essential or critical infrastructure services, including network redundancy
- consideration of placement of buildings and how we mitigate potential impact of natural hazards
- consideration of the materials used in certain areas for buildings
- upgrading sewer systems to protect clean water during and after an event
- consider road immunity from hazards as well as community evacuation
- consideration of connectivity between towns and communities
- public transport availability in times of emergency and disaster
- reinstatement of landline telephone boxes in public locations as redundancy in telecommunications if mobile networks fail.

Image: Fraser Coast Get Ready High School Workshop.

Resilient economy

The Generation Z workshop participants identified the following:

- focus on opportunities and pathways to keep businesses operating after an event
- ensuring local residents maintain employment
- encouraging local businesses to maintain appropriate levels of insurance
- encouraging local businesses to prepare business continuity plans, identifying risks before they happen
- exploring opportunities for businesses to include emergency and disaster recovery into annual operating budgets
- encouraging employers to engage with employees (and vice versa) about emergency and disaster arrangements for the business.

Resilient environment

The Generation Z workshop participants identified the following:

- consideration of wildlife in decision-making, including marine life and farm animals
- management of river sediment and its discharge to the ocean
- focus on natural mitigation processes fostered by valuable ecological communities such as mangroves
- retention and management of forests and bushland
- protection of environmental systems from both natural hazards and future development
- consideration of increased infrastructure on environmental values
- consideration of increased population in terms of risk exposure and impact on environmental systems.

The connection between responsible, sustainable development and disaster risk reduction is inherent throughout the group's insights. This not only reinforces the relationship between complex natural, built environment and human systems, but is testament to the critical thinking and understanding of our emerging leaders across the Mary region, in contemplating matters of disaster resilience.

From a disaster resilience perspective, the strategic insights made by this group could be symptomatic of the generational change or shift already occurring, back to increased self-sufficiency, risk understanding and risk awareness.

Image: Fraser Coast Community Coordination Committee workshop. Courtesy of QRA.

Case study: Community resilience coordination

Fraser Coast's Community Coordination Committee (CCC) was established following the 2013 ex-Tropical Cyclone Oswald event which led to significant flood inundation, loss and damage across the Mary region.

At that time, Council noted the need for increased dialogue and improved relationships across Fraser Coast communities, particularly given the extent of isolation inherent across the region.

The CCC represents a best-practice approach to community resilience coordination that is open, transparent and mutually beneficial. Council approached individual community groups across the region, and what started with delivery of community training and provision of radios, transformed into a large-scale group of committed community champions representing 17 individual communities, including two on Fraser Island, across the Fraser Coast region.

The CCC now meets every three to four months and has informal weekly communication through which Council can share information, for example risk reporting and weather intelligence. This helps to build community capacity and capability in understanding risk and taking mitigation action. Through this network Council also receives on-the-ground reporting and real time information and updates during events. During an event, the CCC is a critical connection between the local disaster coordination centre and the region's numerous communities.

Council's 2019-20 budget includes allocation for community resilience-building activities which have funded a range of local actions, led by local community groups.

A 'big map' resilience workshop was facilitated with the CCC group which included approximately 50 community members from across the region.

Critical infrastructure was one of the core focus elements of the CCC group, largely related to the isolation of individual communities during major flood events. The cumulative, cascading and compounding risks associated with isolation of individual communities has been identified including the ability for self-sufficiency during periods of isolation where infrastructure services are lacking.

There are logistical challenges in managing and servicing the needs of a large number of isolated communities, particularly considering the vulnerabilities and needs of the elderly, persons with disability, and the ill, noting Fraser Coast's higher than average population aged +65 years, and the region has the highest proportion of persons outside Brisbane utilising the National Disability Insurance Scheme (NDIS),

The CCC represents a best practice, grassroots, community-led approach to resilience activity.

I love a sunburnt country,
a land of sweeping plains,
of ragged mountain ranges,
of droughts and flooding rains.

I love her far horizons,
I love her jewel-sea,
Her beauty and her terror -
the wide brown land for me.

An excerpt of the poem *'My Country'* by Dorothea Mackellar OBE

Our exposures

Flooding

The headwaters of the Mary River emanate in high rainfall areas around Maleny and Mapleton, with annual rainfalls around 2000 millimetres. In the lower areas of the catchment, north of Gympie, average annual rainfall is around 1200 millimetres.

Coupling both topography and rainfall patterns, the streamflow of the Mary is highly variable with large areas of the catchment exposed to flash flooding, where overland flood makes its way towards creeks and tributaries and the river itself, rising quickly during high rainfall events.

The meandering path of the Mary River follows a path of least resistance – carved over millennia through the landscape of mountains, valleys, paddocks and plains. Many of the towns and localities that follow its path become isolated after heavy rainfall, and some can be regularly inundated.

Gympie and Maryborough, the two main centres in the Mary catchment, have a long history of flooding with detailed records available from 1910. Reports of major flooding prior to 1910 are available as far back as 1870. At Gympie, nearly 80 per cent of flood events have occurred between December and April.

Gympie's flood history has been well documented since the first major flood recorded in March 1870. A 'major flood' in Gympie is determined when water levels reach 17 metres in height at Kidd Bridge. A flood marker pole is located at Lake Alford in Gympie which showcases the history and heights of Gympie's major floods throughout recorded history.

Maryborough has endured many great floods. In February 1863, two weeks of bad weather resulted in the Mary River breaking its banks to submerge the wharf. In March of the same year a heavy storm raised water levels even higher. Evacuation procedures began as houses became inundated, with some floating away. Floods continued to occur in 1870, 1875, 1890 and throughout the 1900s.

The Mary River catchment was affected by the 2010-2011 major floods, which followed nearly four months of wet weather at the end of 2010, with six major rain events taking place between late November 2010 to mid-January 2011. Heavy rain in the Mary River catchment led to flooding in Gympie and Maryborough.

In January 2013, the Mary region experienced extreme rainfall and major flooding as ex-Tropical Cyclone Oswald made its way south, with the worst flooding occurring in the sub-catchments located downstream of Gympie. In these areas, many long-term flood records were broken.

Flooding and severe weather in Australia, and particularly along the east coast, is typically associated with key climate drivers, such as the Indian Ocean Dipole (IOD) and the El Nino Southern Oscillation (ENSO). The ENSO is a natural cycle in Pacific Ocean temperatures, winds and cloud, which influences global climate. It includes three key phases including La Nina, Neutral and El Nino.

The Bureau of Meteorology River Brochure for the Mary River provides detailed information in relation to the history of flooding across the Mary, as well as key flood forecast and flood classifications for river height stations across the catchment.

Images: (Top) Gympie 2011 flood. Courtesy of Gympie Regional Council.
(Left) Mary Valley storm.
Photo by Tanya Easterby. Courtesy of Gympie Times.

Cyclone and storm surge

Tropical cyclones are low pressure systems that form over warm tropical waters with gale force winds (sustained winds of 63km/h or greater, and gusts in excess of 90km/h) near the centre.

Tropical cyclones are dangerous because they can produce extreme winds, heavy rainfall with flooding and damaging storm surges that can cause inundation of low-lying coastal areas. Cyclonic winds can cause extensive property damage and turn airborne debris into potentially lethal missiles. It is important to remember when the eye of a cyclone passes over a location, there will be a temporary lull in the wind, but that this will soon be replaced by destructive winds from another direction.

Heavy rainfall associated with the passage of a tropical cyclone can produce extensive flooding. Heavy rain can persist as the cyclone moves inland and weakens into a low-pressure system, hence flooding due to an ex-tropical cyclone can occur a long way from where the cyclone made landfall.

As well as extreme winds, a tropical cyclone can cause the sea to rise well above the highest tide levels of the year when it comes ashore. These storm surges are caused mainly by strong, onshore winds and also reduced atmospheric pressure. Storm surge is potentially the most dangerous hazard associated with a tropical cyclone.

While it can be perceived that it is unusual for a cyclone to track this far south, it is in fact quite common. Each tropical cyclone is unique, and it is difficult to make historical comparisons. In the early 1970, Tropical Cyclone Althea crossed the Queensland coast north of Townsville and tracked south as a low along the coastline before steering east between Maryborough and Double Island Point. It was, at the time, considered to be one of the strongest cyclones to affect the Queensland coast.

In 2013, ex Tropical Cyclone Oswald brought with it a flood event which is recorded as one of the largest and most significant since European settlement in the region. A total of approximately 6500 properties across 90 towns were damaged, at a cost of an estimated $2.4 billion. The Mary catchment was in flood during this period, with some parts of the system reaching Major flood height.

In March of 2017, Cyclone Debbie made landfall near Airlie Beach as a powerful Category 4 system. The system tracked south along the coast, over Brisbane and into New South Wales. The Bureau of Meteorology's Tropical Cyclone Debbie Technical Report notes the rainfall over the March catchment reached between 100 and 150 millimetres, with some locations exceeding 200 millimetres. The highest total was 285 millimetres recorded at Maleny. The recorded rainfall totals resulted in river rises along the Mary River, with higher flood levels generally observed in the lower Mary River, north from Gympie.

Image: Sea wall at Urangan following Cyclone Oswald, 2013. Courtesy of Fraser Coast Chronicle.

In 1990 Tropical Cyclone Nancy tracked as far south as Brisbane and in 2019 Tropical Cyclone Oma impacted the Sunshine Coast. Whilst some cyclones, such as Tropical Cyclone Oma, do not make landfall, they may impact the southern Queensland coast for several days with high tides, dangerous surf and damaging winds.

In 1990 when Tropical cyclone Nancy grazed the coast of South East Queensland before moving offshore, the main impacts were coastal erosion and flooding for Gold Coast beaches and the adjacent hinterland. On 1-2 February 1990, Nancy's progress just off the Queensland coast near Brisbane was slow and irregular. Heavy rain - of up to 530mm in 24 hours and 132mm in three hours, occurred between the coast and coastal ranges south of Brisbane causing flash flooding, and tragically four people drowned.

Storm surge is an abnormal rise in sea level over and above the normal (astronomical) tide levels. It can be thought of as the change in the water level due to the presence of a storm. These powerful ocean movements are caused by strong winds piling water up against the coast as a tropical cyclone approaches.

Storm tide is the water level that results from the combination of the storm surge and the normal (astronomical) tide. A three metre storm surge on top of a high tide that is two metres above the mean sea level will produce a storm tide that is five metres above mean sea level. Storm tides can swamp low-lying areas, sometimes for kilometres inland. Strong winds at the coast can also create large waves, worsening the impact and giving rise to coastal erosion.

Storm surges are at their most dangerous when they arrive at high tide - when the sea is already at its high point. The resulting storm tide can flood inland areas.

For more information, refer to the Bureau of Meteorology or the Queensland Fire and Emergency Services Queensland State Natural Hazard Risk Assessment.
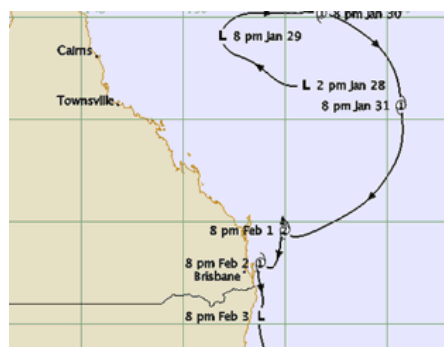

Diagram: 1990 TC Nancy track and intensity map Source: Bureau of Meteorology.

Bushfire and grassfire

Across Australia, fire is a natural partner of vegetation. Bushfires can occur in any season, however this risk increases during periods of below-average rainfall and drought as moisture levels drop and fuels cure. Just as strong of a relationship is also shared with floods, severe storms and cyclones. These events can trigger considerable fuel growth, and increase the amount of dead and decaying ground fuel matter which may be stripped off trees during severe wind events.

Forest and scrub fires have long been part of the Australian landscape, however fast-moving grassfires are equally as common. Grassfires may not carry the same fireline intensity or behaviour of large bushfires, but they move swiftly. In some cases, grassfires move so quickly they can catch people off guard. On grazing land, in cropping areas and across agricultural lands the threat of grassfire can be significant as pasture and crops remain a critical economic asset.

This was particularly felt by the residents of Woolooga following the 2018 fires which burnt through more than 6000 hectares. This event was rapid in its onset and burnt within metres of town buildings and dwellings. Fortunately, none were lost due to the significant efforts of emergency services.

One of the broader region's largest events on record occurred in 1994 under near-catastrophic conditions where major fires burnt through almost 5000 hectares of bushland and timber plantation at Beerwah, Beerburrum and the Glasshouse Mountains to the south of the Mary region. This resulted in a total resource loss of more than $10 million. Over 1000 residents were evacuated.

From an environmental perspective, the ecology of many Australian flora species is reliant upon fire to germinate or propagate. Many bushfires in Queensland are ignited via lightning strike, with others caused by accidental or deliberate ignition.

Managing our fuel loads across both private and public land is a core component of managing our bushfire risk, as much as it is also necessary for good land management. Fuel load management can be conducted by prescribed burning, chemical or manual treatments. Smoke is typically an undesirable component of both bushfires and prescribed burns. Some people may be more vulnerable to the effects of smoke, and should be encouraged to take steps to minimise exposure. Fire agencies and local Councils issue advanced notice of planned burns to enable vulnerable residents to prepare.

Whilst it is not possible to forecast the exact location of a bushfire ignition, the ability to prepare for and mitigate the potential impacts of bushfire allows us the opportunity to take steps to get ready. How residents manage fuel loads across private lands, prepare properties, maintain dwellings and prepare 'what if' and bushfire survival plans can influence life and property survival.

One of the easiest steps to take for people who live or work in bushfire prone areas is to check your risk (including your journey to or from home, work, schools, child care centres, the homes of relatives and so on) using the Queensland Fire and Emergency Services Bushfire Postcode Checker, learn more about what you can do to prepare for bushfire season, and prepare a household survival plan.

The fire itself is only one element of the danger. Burning embers can spread many kilometres from the location of a large bushfire, causing smaller spot fires to break out which can quickly coalesce into larger bodies of fire. Ember attack can also strike at the most vulnerable parts of a building, leading it to catch alight. According to the CSIRO, 80 to 90 per cent of buildings lost to bushfire are lost as a result of ember attack. The often 'random' nature of house loss associated with bushfire is largely a function of dwelling siting, design, materials and features vary remarkably from house-to-house, and across landscapes.

Radiant heat can be felt more than 100 metres away from a large bushfire and has the potential to melt or fracture objects e.g: parts of cars, glass windows. It also presents a significant risk to life, as exposure to radiant heat - even at low levels - can cause immediate pain, burns and can lead to loss of life in some circumstances.

Toxic fumes and heavy smoke produced from bushfires can impair vision and impact on air quality and create difficulties in breathing.

The Bureau of Meteorology, Queensland Fire and Emergency Services and your local disaster dashboards can be consulted for fire weather warnings on days of increased fire danger. These are also broadcast via media outlets and social media. Fire weather warnings enable residents to be vigilant and prepared for increased fire danger conditions.

Image: Woolooga bushfire, September 2018.
Photo by Ilse Heidegger.

Severe storm

The Bureau of Meteorology defines a severe thunderstorm as a thunderstorm that produces:

- large hail (two centimetres in diameter or greater)
- damaging wind gusts (90 kilometres per hour or greater)
- tornadoes
- heavy rainfall conducive to flash flooding.

Thunderstorms are associated with a very tall cloud mass called a cumulonimbus cloud, and usually develop when warm, humid air carrying a lot of water vapour near the ground is forced upwards due to converging surface winds with an approaching front or low pressure trough to make the moist air rise rapidly in an unstable atmosphere.

Thunderstorms can become severe when the atmosphere is particularly unstable and/or additional energy is drawn in from surrounding winds.

Spring and summer seasons in Queensland are particularly known for the rapid onset of severe storms, super cells and downbursts.

A key example of this is the October 2018 storm event that impacted the South Burnett and Gympie area, and moved easterly toward Tiaro and on to Hervey Bay. A tornado warning was issued during this event, with widespread damage and injury to persons and stock. The insurance claims associated with this event alone reached more than $63 million.

Diagram: Severe storm, Gympie radar, October 2018.
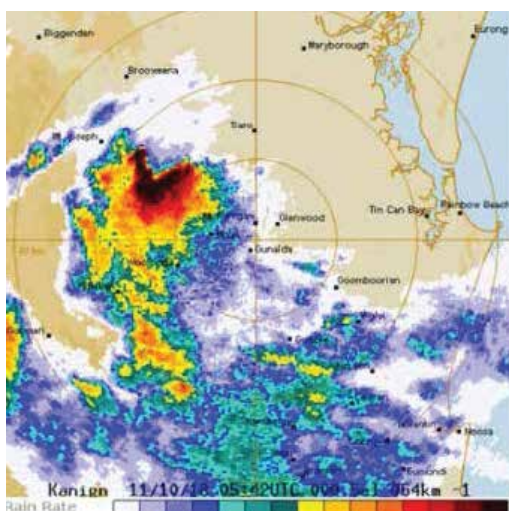
Development of a National Hail Climatology

To better understand severe storms across Australia, thunderstorm researchers at the University of Queensland have developed a national hail climatology using weather radar data from the Bureau of Meteorology's radar network. Radars can be used to distinguish thunderstorms from smaller rain clouds as large raindrops and hailstones reflect a greater portion of the radar signal. The intensity of the signal reflected back to the radar can also be used to estimate the size of hail within a storm. Once a storm is identified in radar imagery, its size and position are used to generate a storm track that shows where it moved throughout its lifetime. All of the storm tracks in the radar archive are combined to show where hailstorms occur most frequently.

An example hail frequency map from the national climatology is shown below for the Gympie radar. The map is coloured according to the average annual frequency of hailstorms with greater than three centimetre hail, calculated using data between 2002 and 2018.

Peak hailstorm activity can be seen across the Blackall and Conondale Ranges, associated with sea breeze activity across the Sunshine Coast and thunderstorm triggering on the elevated topography of these ranges. A secondary maximum located west of Hervey Bay and Maryborough is likely the product of sea breeze activity from Hervey Bay and Fraser Island. Further west, enhanced hailstorm activity can also be seen along the eastern escarpment of the Darling Downs through Kingaroy.

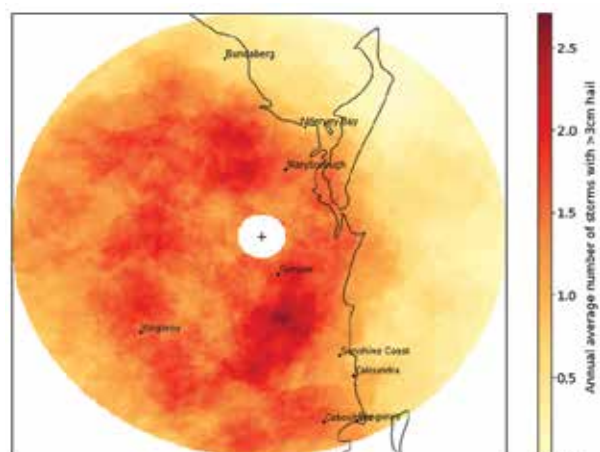*Diagram: Hail frequency map, Gympie radar..*

Image: (Top) Lighting over Tin Can Bay Rainbow Beach looking east from Gympie.

Heatwave

A heatwave is defined as three days or more of high maximum and minimum temperatures that are unusual for that location.

From a health perspective, heatwaves cause more deaths than bushfires, cyclones, earthquakes, floods and severe storms combined. Heat exhaustion and heat stroke are the main health illnesses connected with heat and heatwaves, relating to a person's body temperature.

Heatwaves can result in significant health stress on vulnerable people. This stress may result in death during the heat event and, in many cases, well after the heatwave has passed. Often the cause of death during a heatwave is difficult to determine as many people who die due to this extreme heat have a pre-existing or contributing health condition.

Heatwaves are the deadliest natural hazard in Queensland, leading to the loss of more than 100 lives every year.

Heatwaves can impact anyone. However, there are members of our community who are particularly vulnerable and need to take special care during heatwaves. These include:

- babies and young people
- the elderly
- people with medical conditions such as asthma
- pets
- people who work outdoors.

The Queensland Fire and Emergency Services Queensland State Heatwave Risk Assessment was released in 2019, and combines scientific data across hazard and risk, health and environmental science. Human health and the well-being of animals and plants remain the core direct impacts, along with direct impacts to community infrastructure. This can be in the form of mechanical failure, failure or damage to essential services such as electricity and water supply, and interruption to transport.

An estimated 25 per cent increase in heatwave frequency over the 70 years to 2090 is forecast for the Mary region.

Urban areas generate higher temperatures than nearby rural areas in a phenomenon called the urban heat island effect (UHIE). Dark, heat absorbing and impermeable materials used to construct urban buildings and infrastructure radiate heat into their immediate surroundings and cool slowly at night. This, combined with the canyon-like form of cities, high density of vehicles and lack of green space, makes urban areas very hot.

The UHIE can cause urban temperatures to be between 2°C and 12°C higher than nearby rural areas. Accordingly, the effect of heatwaves on the health and wellbeing of urban populations is exacerbated by UHIE. Urban populations are exposed to increasing levels of heat, as lack of green space, buildings blocking air flow, and the prevalence of hard and heat-absorbing structures in urban areas have a multiplying effect. Moreover, heat-absorbing surfaces release heat slower at night, exposing people to elevated temperatures for longer.

Compound extremes have the capacity to make the impact of related extreme events worse when compared to the impact of each individual event in isolation. The Victorian bushfires in 2009 and Queensland bushfires in 2018 and 2019 are clear examples of compound extremes which emerged due to preceding heatwaves.

Significant increasing trends have been observed and are predicted for Queensland to the end of the current century. South-west and Central Queensland had a greater rate of increase in heatwave characteristics over the past 70 years than the rest of the state, while future projections indicate a widespread increase. While the above refers to all heatwave intensities, long-term increases in the occurrence of heatwaves classified as severe and extreme have also been observed across large parts of Queensland since the 1940s. Notably, the pace and scale of change has, and is, escalating with time.

For further information, refer to the Queensland State Heatwave Risk Assessment.

Other hazards

Landslides

Landslides can be caused by earthquakes or volcanic activity, but in Queensland, they are generally caused by heavy rain. This occurs when rain saturates the soil on a hillside – often where there has been human activity for example, construction where trees and plants have been removed. In some cases, remaining vegetation may not be able to support the soil's weight against the force of gravity causing the top saturated layer of soil to slip down the slope, taking whatever is on the land with it.

In areas burned by fire, a lower threshold of rainfall may initiate landslips due to the damaged nature of the landscape. This can also be the case for degraded landscapes where poor land management practices have been applied.

Landslides can injure people and animals, damage property and infrastructure, as well as interfere with supplies and isolate communities.

Movement of landslide material can vary from abrupt collapses to slow, gradual slides and at rates ranging from almost undetectable to extremely rapid. Sudden, rapid events are the most dangerous because of a lack of warning and the speed at which material can travel, as well as the force of its impact.

Debris flows, sometimes referred to as mudslides, are common types of fast-moving landslides. These flows generally occur during periods of intense rainfall. They usually start on steep hillsides as shallow landslides that liquefy and accelerate in speed. The consistency of debris flows ranges from watery mud to thick, rocky mud that can carry large items such as boulders, trees and cars. Debris flows from different sources can combine in channels, and their destructive power may be greatly increased. They continue flowing down hills and through channels, growing in volume with the addition of water, sand, mud, boulders, trees and other materials. When the flows reach flatter ground, the debris spreads over a broad area, sometimes accumulating in thick deposits that can wreak havoc in developed areas.

Sinkholes

'Nearshore landslips' are also commonly referred to as sinkholes and the broader region has experienced a number of these events over recent years. In 2015, a sinkhole opened up at Inskip Point near Rainbow Beach into which a caravan, a vehicle and tents were lost. A further event was recorded in 2018, and another in 2019.

Likely caused by the combined effects of tides, waves and currents undermining the shoreline, the broader region is a hot spot for nearshore landslips. It is important to note these are naturally-occurring events and little can be done to forecast or prevent them. Instead, beach-goers and campers should be alert at all times.

Earthquakes

Earthquakes are the vibrations caused by rocks breaking under stress. The underground surface along which the rock breaks and moves is called a fault plane. Earthquakes in Australia are usually caused by movements along faults as a result of compression in the earth's crust.

While earthquake magnitude was traditionally measured on the Richter scale, Australia's earthquakes are relatively small and infrequent. Therefore, it is now calculated using the 'local magnitude' scale, which is derived from the Richter scale, but has been adapted to local conditions.

Australia does not typically experience large earthquakes. On average, a single magnitude 5 (or greater) event may occur each year. This is because Australia is not located on the edge of a tectonic plate, unlike New Zealand that experiences far greater earthquake activity as a result.

Two of Queensland's largest earthquakes have occurred near the Mary region, offshore from Fraser Island. These events both occurred in 2015 with a magnitude of 5.3 and 5.4, respectively.

Image: A major sinkhole at Inskip Point swallowed vehicles, September 2015. Courtesy of ABC.

Human-induced hazards

A by-product of modern life is potential for a range of human-induced hazards which can be equally as destructive as natural hazards. Some examples of human-induced hazards might include:

- urban sinkholes
- train derailments
- jet disasters
- industrial fires or explosions
- gas leaks
- chemical and oil spills
- dam breaks
- waste leachate.

Some of these hazards are rare in Queensland whilst others might be of a slightly higher likelihood. Health-related hazards can also lead to widespread concern, including disease pandemics.

Elements of resilience

The following section provides an overview of the various characteristics of holistic community resilience, as they relate to the Mary region.

Social resilience

Social resilience largely focuses on the collective resilience of individuals and communities to be self-sufficient during emergencies and disasters, to the extent possible. Proactive community effort to endure and recover from severe weather events ensures emergency services can focus on those who need help the most.

Approximately 130,000 people call the Mary region home, dispersed across rural areas, villages, rural and service towns, and larger urban areas. Sometimes communities outside of the immediate area can be impacted by events within the Mary region. This is particularly the case in major flood events where surrounding communities can become isolated, just as much as communities within the region are isolated.

The role of the community in taking responsibility for those elements of resilience which are within control is becoming more critical as events become more frequent and intense. This includes:

- every member of the household, wider family, friends and neighbours have the local Council Disaster Dashboard loaded as an app on mobile phones
- ensuring the local Council, emergency services such as Queensland Police and Queensland Fire and Emergency Services, as well as the Bureau of Meteorology social media pages are the first point of contact for accurate and reliable information
- preparing a 'what if' plan, household preparedness plan or bushfire survival plans for a range of situations
- a plan for pets and animals is in place
- a plan for vulnerable relatives, friends and neighbours is in place
- undertaking regular property maintenance to ensure dwellings are appropriately secure, yards are free of potential objects which could cause damage during high winds or these are appropriately secured, and vegetation is well maintained and asset protection zones are of low fuel condition
- volunteering for or becoming a member of local community groups who can provide support during events
- obtaining and maintaining appropriate levels of home and contents insurance, with a specific focus on natural hazard event coverage
- following the instruction of the local Council and emergency services.

More information on your role in community-led disaster resilience can be accessed via the Queensland Government's Get Ready Queensland website.

www.getready.qld.gov.au

Image: Riverside Community Event.
Courtesy of Fraser Coast Regional Council.

Community vulnerability

The CSIRO and National Resilience Taskforce, assisted by a range of allied professions, has published a report titled- Profiling Australia's Vulnerability. This work examines the relationship between our values and our vulnerabilities and aims to understand how Australians can collectively prioritise efforts to reduce loss and harm.

Profiling Australia's Vulnerability identifies that 'vulnerability arises from the relationships that we have with the things we value (people, places, objects, critical services, emergency services, etc.) and how these things may be disrupted as a result of an emergency or crisis. Vulnerability also arises from the tensions and trade-offs we have to make about where to allocate limited time, effort and money in disaster preparation, response or risk reduction, to protect those things of value.

Factors that impact on resilience such as climate change, demographic shifts and a reliance on interconnected systems and infrastructure, are through the lens of relevant research, experiences and disaster events. Profiling Australia's Vulnerability provides a new way of looking at disaster risk based on the premise that hazards only lead to disaster if they intersect with an exposed and vulnerable society and when the consequences exceed people's capacity to cope.

"Vulnerability is a complex web of values, decisions and trade-offs."

CSIRO and National Resilience Taskforce

People are vulnerable and resilient in varying ways. The terms are contrary – lower resilience leads to higher vulnerability along a sliding scale. Despite the wealthy being the most exposed in terms of the value of their assets, it is often the less fortunate who suffer most as they have higher degrees of vulnerability. Resilience should be thought of as a system of complex interwoven dependencies which lead to vulnerabilities across the community. Thus, all parts of society including governments, institutions, organisations, and individuals have a role to play in both increasing resilience and lowering vulnerability.

From a socio-economic perspective, and focusing specifically on vulnerability across the Mary region, the percentage of low income earners is substantially higher, at 55 per cent, when compared with the state average at 44.8 per cent. Partnered with this is a higher proportion of residents aged +65 years in the region, at 22.3 per cent, compared with the state average of 15 per cent.

The proportion of persons living with disability is higher than the state average at 7.7 per cent, compared with the state average of 5.2 per cent. Hervey Bay in particular represents the highest proportion of persons outside Brisbane utilising the National Disability Insurance Scheme (NDIS).

Looking after the vulnerable persons of our communities is therefore a key focus, noting this was identified as a high priority across generations and residents engaged in the formulation of this strategy.

Case study: Sunshine Coast Get Ready Schools Program

The Sunshine Coast Get Ready Schools Program was developed to empower young people to make a difference by helping build community resilience to natural hazards.

The program is designed for primary schools and is aligned with the Queensland school curriculum in Humanities and Social Sciences.

Council staff visit schools across the region and deliver interactive presentations which aim to assist learning, awareness and preparation for disasters and emergency events.

The Sunshine Coast Get Ready Schools program is multi-faceted, including both in-class teaching and an external whole-of-community engagement and education component.

Aimed at a generation of young people who were born into the era of advanced technology, the program capitalises on that ability and interest in all things 'smart' by delivering an interactive in-class session on council's Coast Alert smart phone technology, and award winning Disaster Hub. The Get Ready Schools program took out the 2019 'Resilient Australia' Queensland - Local Government Award.

Additionally, Sunshine Coast Regional Council facilitate a youth advisory panel, who consult with Council on a range of policy and activity matters, helping shape the future of the region.

Case study: 'Get Ready' Food'n'Groove Concert

Kicking off the 2019 disaster season, Fraser Coast Regional Council hosted a 'Get Ready' branded community concert at Pialba. Attracting more than 4000 residents, the event focused on the delivery of emergency and disaster preparedness messages, providing community members with an insight into the operations of emergency services.

The event featured emergency services vehicles, stalls and information booths, accompanied by a free community concert featuring local musicians and a series of food trucks.

The 'Get Ready' Food'n'Grove concert was preceded by a pre-storm season clean-up weekend where Fraser Coast residents could take unwanted items from around the home to waste transfer stations for free.

Image: 'Get Ready' Food'n'Groove Concert.
Courtesy of Fraser Coast Regional Council.

Case study: Community readiness coordination

The Queensland Fire and Emergency Services, in conjunction with Gympie Regional Council, regularly facilitate a range of community-focused disaster readiness workshops across the Gympie region.

Workshops held for the Cooloola Coast community attracted representatives from more than 15 community groups, reflecting the range of different ways people across communities come together.

Communities can be defined both geographically - as those who collectively live in a certain location – as well as by interest group. These types of communities might include surf lifesaving clubs, sporting groups, craft clubs, men's sheds, church groups, fishing clubs, car clubs, veterans groups, and so on.

The community-focused readiness workshops enable community groups to come together to share information and insights in relation to facilities and assets held by each group which could be utilised by the broader community in an emergency or disaster event. They also cover the extent of readiness planning each group may have in place and others which require assistance in this regard, as well as the ability for representatives to liaise with the local disaster coordination centre throughout specific events.

This level of pre-planning for emergency and disaster response and recovery at the community level better equips local communities to support and leverage one another when it counts most

Case study: Noosa flood forecasting

Noosa Shire Council secured Queensland Disaster Resilience funding to undertake an all-inclusive approach to flood tide forecasting. Along with new tide gauges, and rainfall and river monitoring stations, Council is developing a new software application to provide the local disaster coordination centre with increased predictive capability.

The new software application will monitor and interpret official data from rainfall forecasts, rainfall and flood gauges and tide gauges to predict future flood scenarios at nominated locations such as road crossings, gauge locations, coastal locations and townships.

This software application will improve forecasting of flash flooding events in the Mary hinterland area of the Noosa Shire, as well as offering 24 hours advance warning of major flood events in the Noosa River catchment.

The software application is intended to provide flood information directly into the Noosa Disaster Dashboard, improving community resilience, enabling better informed decision-making by communities and emergency services, and reducing potential life loss.

This project is due for completion by mid-2020, subject to testing.

Image: Flooding, Mary River.
Courtesy of Gympie Regional Council.

Resilient economy

Economic resilience is a critical aspect of overall community resilience, ensuring employment is disrupted as little as possible. The essential nature of this is multi-faceted. Economic inputs and outputs which continue to flow through the region are important to keep local business open, maintain local employment, and continue the delivery of goods and services to support the local population.

Maintaining gainful employment after an event is essential for a variety of reasons. The economic impact of severe weather and disaster events can be felt by individuals and households, thus it remains important to ensure cash flow and income certainty. Employment also satisfies a sense of purpose. Having something to do or apply oneself to each day can be a necessary and welcome mechanism in some cases, where the psychological toll of personal experiences has been significant.

From a broader perspective, the primary sectors producing the largest industry output in the Mary region over recent years have been construction, real estate services and manufacturing. Growth industries across the region include mining, financial and insurance services and health care and social assistance sectors. Noting the region's increased proportion of the population aged +65 years, relative to the state average, it is unsurprising that health and social industries continue to experience growth.

The Centre for Economic Development Research in the United States of America identifies two aspects of economic resilience, including 'blue sky' or pre-event initiatives, as well as responsive initiatives after a shock or disaster event has occurred.

Pre-event initiatives

Blue sky or pre-event initiatives are focused on longer-term efforts to improve the community's ability to withstand or avoid shocks. Some examples include:

- comprehensive planning efforts that incorporate a vision for resilience
- implementing efforts to diversify the industrial base
- adapting business continuity plans to assist with recovery following a shock
- supporting a workforce that can shift between jobs and industries
- using geographic information systems (GIS) to map business establishment data and available development sites, integrated with hazard information to allow for rapid post-incident impact assessments
- ensuring redundancy in telecommunications networks
- promoting business continuity by ensuring businesses understand their vulnerabilities, such as their supply chains, in the face of disruptions
- employing safe development practices, such as locating structures outside of floodplains, preserving natural lands as buffers, and protecting existing development and infrastructure from extreme weather.

Responsive post-event initiatives

Enduring severe weather or disaster events is a part of life in the Mary region. Being prepared for business and economic recovery is an essential aspect of community recovery. After an event, the following initiatives could be considered:

- pre-disaster recovery planning that defines key stakeholders, roles, responsibilities, and actions
- developing a system for regular communication, monitoring, and updating of business needs for use after or during an event
- establishing the capability to rapidly contact personnel
- creating coordination mechanisms and leadership succession plans for short, middle, and long-term recovery needs.

Further information and resources to prepare your business or place of employment are available via Get Ready Queensland or Business Queensland websites.

The faster local businesses can recover from a shock or disaster event, the faster local communities can also recover.

Image: Maryborough Heritage City Market.

Regional economic activity

Between September 2012 and June 2015, the labour market of the Wide Bay Burnett region weakened substantially with the loss of almost 18,000 jobs due to the immense impact on industry of disaster events across the region during this period, and the prolonged period of recovery, according to Regional Development Australia.

This data underscores the importance of a focus on a resilient economy. Loss of employment following a disaster event can result in serious cumulative, cascading and compounding risks and impacts endured by individuals and entire communities. The loss of financial capacity to pay bills and purchase essential family goods and services can place significant strain on families and households. In some circumstances, this can also cascade into increased risk of family and domestic violence, substance abuse and serious mental health issues.

To this end, economic resilience is a foundation of overall community and social resilience. Keeping local and regional business and industry in operation after an event is critical in supporting healthy and resilient communities, as much as it is about economic activity, productivity and profit.

Economic diversity across a region and across industries is a strategic opportunity in building resilient local and regional economies. The Wide Bay Burnett region, Noosa and Sunshine Coast areas, maintain relatively diverse economies when compared with other areas of Australia - particularly regional areas. Regional Development Australia identifies that the Mary region maintains a competitive advantage in agriculture, utilities, health, retail, education and accommodation sectors. The Gross Regional Product of the Wide Bay Burnett region (excluding Noosa and Sunshine Coast) was almost $12 billion in the financial year ending June 2016, and continues to grow.

In line with the natural environment, lifestyle and recreation values of the region, tourism and lifestyle-based opportunities are a key economic driver for the region. However, these industries are also subject to weather and disaster events, and can sustain prolonged impact well after the fact, as tourists choose alternate locations - usually with the best of intentions, to avoid placing extra 'burden' on disaster-impacted areas and communities whilst they are in recovery mode. However, this can often be a misconception, with many regional areas thriving on tourism industry and tourism dollars. Rebounding the economy after an event can be challenging, thus it is incumbent upon industry to pre-plan for disaster events to ensure both individual and collective economic recovery is as streamlined as possible.

Image: Mary Cairncross Scenic Reserve.
Courtesy of Tourism Australia.

Resilient environment

The Mary region features a diversity of ecological and biodiversity values and contributes to a broad range of natural processes and systems.

The region is home to over 3600 species of native plants and animals, some of which are not found outside the catchments of the Burnett and Mary rivers. The abundance of wildlife is due to the overlap in northern tropical and southern temperate native species habitat.

The Mary and its tributaries are home to unique aquatic species such as the endangered Mary River Cod, the Mary River Turtle and the vulnerable Australian Lungfish. The landscapes and natural features of the region are culturally important to the residents and in particular to indigenous communities. They help to define how and why we live in our region and they set us apart from everywhere else.

The region's bushland provides important habitat for the iconic Koala and wild Macadamia trees which are recognised under Queensland and Australian conservation legislation as a vulnerable species.

The entire area of Noosa Shire is a declared reserve under the UNESCO Man and the Biosphere program. The designation recognises the unique and special natural attributes of Noosa and underpins the Noosa community's aspirations to continue to strive for a sustainable future, to work together to build economies, communities, and knowledge and to ensure our natural ecosystems and biodiversity is valued, cared for, improved and conserved.

The hinterland and upper reaches of the catchment are characterised by the significant state forest and national park areas including Imbil, Amamoor, Yabba, Gallangowan, Walli, West Cooroy, Curra and Jimna State Forests. National parks include Maleny, Conondale, Kondalilla, Gympie, Goomboorian and Mapleton. The Sunshine Coast Great Walk takes in Lake Baroon across Kondallila to Mapleton National Park and from Mapleton Falls to Kenilworth.

Caring for the environment comes with its challenges not least of which is competition for urban development. The area, like many others, must combat known invasive species, and impacts to the land and water courses from clearing, agriculture and forestry, particularly on drinking water catchments such as Kandanga and Amamoor.

Protecting and enhancing natural processes helps to mitigate the potential impact of various natural hazards. For example, mangrove retention helps to reduce the energy of storm surge, and waterway vegetation helps to reduce the effects of bank erosion and flood velocity. Therefore, preservation and enhancement of these processes is a critical component of natural hazard mitigation but is also essential to critical ecosystem biodiversity, in its own right.

About the local environment

The unique and varied ecology of the Mary region must be carefully understood in order to strengthen the natural hazard resilience of the local environment.

State, national and world heritage

The region's natural environment underpins not only the intrinsic natural processes and ecological values which are inherent to the region, but also the economy and the lifestyle enjoyed by the residents in the region. Many of the broader region's environmental values have received national and international recognition. This includes the World Heritage areas of Fraser Island and the Great Barrier Reef to the north, and the Ramsar-listed Great Sandy Strait wetland - noted as a sand passage estuary of outstanding quality. It is also part of the Great Sandy Marine Park.

Water quality

The Mary River discharges directly into a sensitive Ramsar-listed waterbody. Sediments, nutrients and contamination released by flood waters from upstream areas of the Mary River catchment can have significant and far-reaching environmental impacts on downstream areas.

Stored farm chemicals and hydrocarbons may be inundated and transferred downstream to sensitive areas. This downstream transfer of chemicals, pathogens and other pollutant sources by floodwaters also has an impact on receiving water quality. Other pollution sources within the catchment include licenced landfills, petrol stations, mines and sewage treatment plants.

The role of good land management practices is important on a general level, but becomes increasingly critical during times of flood. Erosion and sedimentation of waterways caused by run-off and large-scale bushfire can also be a compounding influence on overall water quality.

Image: Bunya pines, Araucaria bidwillii, emergent rainforest trees with distinctive domed crowns, pierce the mountain.

Geology and topography

The geology of the region is complex and varied and can significantly affect the flow paths of water falling on the catchment. Through most of the Mary region, the primary flow path is across the surface of the land into local streams, and eventually into the Great Sandy Strait. In the coastal areas associated with sandy landscapes, like Fraser Island, water primarily travels through subsurface pathways to the ocean. This groundwater supports a variety of terrestrial and aquatic groundwater-dependant ecosystems.

The upland areas of the Mary region are different in terms of topography and rainfall. The southern areas of the catchment are characterised by impermeable geologies and the steep slopes of the Blackall range. These areas receive the most rainfall and consequently have the potential for rapid run-off and flash flooding in areas with restricted channels and steep gullies. There are a number of dams in the catchment that capture rainfall which generally results in less flows being available downstream when conditions are dry. However these dams do allow scouring flows from high rainfall events. The Munna Creek sub-catchment, in the far north-west has a totally different character. It is a flatter arid landscape, with prolonged dry periods, slower moving flows, and less regular floods.

The mid-systems of the Mary River receive flows from the upland areas. The River itself is comprised of a series of large, diverse habitat pools linked by reaches of riffles and runs. It is surrounded by a broad well developed alluvium which historically was full of floodplain billabongs, and now only a few of these still remain.

Due to the low lying topography and diverse geologies there are over 600 square kilometres of wetlands that vary from saltmarsh mangroves and freshwater springs to rare ecosystems like the patterned fens of the Cooloola sand masses. These varied ecosystems support a significant number of beautiful, important and endangered species like the Giant Barred frog, the critically endangered Mary River cod, dugongs, whales, and many species of migratory and native shorebirds.

Fragmentation and removal of riparian habitat

Increased intensification of productive and urban land has led to riparian vegetation removal and habitat fragmentation within the region. In 2014, it was estimated that the Burnett and Mary River Catchments had lost more than 20 per cent of riparian forest since pre-European settlement, with the rate of loss being the highest among the reef sub-catchments between 2009 and 2013.

Image: Mary Valley fire. Courtesy of Gympie Times.

Today, about a third of the catchment has been cleared with the main land uses being forestry, grazing, and agriculture such as beans, sugar cane, pineapples and macadamias. The area is also home to about 130,000 people, most living in the major town centres of Gympie, Maryborough and Hervey Bay. Residential and industrial developments, as well as other land clearing, can significantly modify water flow. These developments change the shape of the landscape and add impermeable surfaces, such as roads, which lead to increases in run-off.

Environmental impacts of climate change

Environmental risks of floods, bushfires, severe storms and cyclones are influenced and exacerbated by climate change. In the Wide Bay Burnett Region, climate change forecasts for 2030, 2050 and 2070 predict increased annual temperatures, decreased seasonal rainfall change and increased evaporation rates. In addition, heavy intensity rainfall events are expected to increase and sea levels are predicted to rise.

Bushfire events are likely to become more frequent and intense as average annual rainfall reduces. Whilst higher intensity rainfall events are predicted, these events are more likely to be rapid in onset, punctuated by prolonged below average rainfall and drought periods. Cyclone events are predicted to increase in intensity and may track further south.

Potential environmental risks include increased threats to flora and fauna and associated habitat changes, altered flood, fire and wind regimes, and altered behaviour of invasive species.

Ecological benefits of natural processes

Flood events perform a vital role in maintaining the natural water cycle, bringing long-term benefits to agricultural production and soil fertility, as well as maintaining ecological diversity and function. Ecological benefits of floods include the recharge of groundwater systems and wetlands, increased aquatic habitat connectivity and triggers for breeding and migration of native species. Whilst the environment is naturally designed to be resilient to flooding, the greatest risks arise when the system becomes degraded.

Fires are endemic to many of our landscapes and vegetation communities in Australia. Our land is designed to burn, and when it does, new life is generated. Fire promotes propagation and germination of many native flora species, unlocking dormant seed pods and encouraging new growth. Good land and fuel load management practices are therefore necessary, including prescribed burning, to maintain critical ecosystem health and manage fuel loads where bushland areas interface with communities and critical assets.

Resilient settlements

Integrating and planning for natural hazards and climate change in our settlements, and as part of our critical infrastructure assets and networks, is central to supporting communities and emergency services during and after events.

Our townships across the region, and indeed across most parts of Australia, were originally established to support localised economic development. Whether it be during the gold rush period, as fishing communities emerged, close to ports or waterways, or as agricultural enterprise expanded, many of our townships are inherently exposed to natural hazards as a legacy of the unique conditions which triggered their establishment. But the factors which sometimes form part of the hazard to which our towns and infrastructure is exposed, are often part of the very reason we choose to live where we do. The Mary River and the environments it supports is a large part of why this special part of the world is so loved.

We recognise this, and especially in Queensland we come to expect that on occasion, we might become isolated, need to evacuate to a safer location, or lose electricity or telecommunications. As a community, we accept a certain level of inconvenience, but returning to service as quickly as possible is key.

To this end, built environment and infrastructure resilience is not necessarily about full immunity, though this should ideally be the aspiration for all new development and assets), but about it lasting. It is commonplace for infrastructure services to be turned off or temporarily decommissioned during larger-scale events. Hence why it is important for households to be prepared with food, water, batteries and battery packs to last a minimum of 72 hours. The ability for structures and assets to withstand events, to restore service and operation as quickly after an event as possible is therefore a key focus. The quicker essential services can be restored, the quicker and easier communities can transition from response to recovery.

Exposure

Exposure to natural hazards is a fundamental element of disaster. Exposure occurs when our communities, infrastructure, assets, social and economic values interface with a natural hazard.

Exposure need not be purely geographic or physical exposure, but can also manifest as impact on economic supply chains, the social fabric of communities, and so on. Having particular regard to infrastructure however, reconstruction costs after natural hazard and disaster events are continuing to escalate.

From a private loss and insurance perspective, over $9 billion in private insurance claims have been made in Queensland since 2010.

It must be noted that approaches to mapping flood hazards and bushfire hazard are different, requiring hazard-specific inputs, methodologies and annual return intervals (ARIs). Large portions of the Mary region are vegetated and thus, the extent of potential bushfire hazard is larger in geographical context, than the extent of the Mary River floodplain.

The above estimates of exposure do not translate to direct impact, but rather enables governments and other organisations such as critical infrastructure asset owners, community organisations and others to pre-plan and informs future decision-making.

The location of facilities and assets in hazard prone areas does not necessarily mean they may be subject to flood inundation, isolation, or flame contact or radiant heat, for example. Mitigation measures can be put in place for critical facilities and assets such as hospitals, schools, infrastructure services, and the like. Risk-based approaches to the location and protection of sensitive facilities and assets, and the people who may occupy them, is critical.

Immunity from natural hazards is not easily achieved in a landscape like Australia, with the climate and weather factors to which we are exposed. Thus, building resilience considerations into every facet of our systems and processes will assist us to adapt to our unique conditions.

Image: Kidd Bridge at Gympie in flood.
Courtesy of Gympie Regional Council.

Built environment resilience

One of the key aspects of built environment resilience is the management of development, including allocation of land uses, in hazard-prone areas.

Our built environment, the towns we live and work in and the infrastructure we rely upon, is in many ways the backbone of our community. The built environment of the Mary is where we live, it supports local and regional employment and economic function, is a hub for goods and services and supports many aspects of our lifestyles. The more urbanised the built environment, the more its residents rely on its complex operation. Sometimes this can be to a point where residents become disconnected from the realities of the landscapes we live in.

Natural hazards are natural processes, they become hazards because of the interaction these processes now have with human activity. However, our environment and its processes, including its interactions with climate and weather, can never be tamed. It is therefore incumbent upon us to learn to live with these aspects of our landscapes, and adapt. This includes our approach to the built environment.

26% Agricultural areas **flood** exposed

14% State road network **flood** exposed

63% Agricultural areas **bushfire** exposed

30% State road network **bushfire** exposed

Built environment resilience is much more than simply avoiding development in hazardous locations. Some development, depending on its nature, may be acceptable - or even desirable - in certain locations where natural hazard exposure is present. There is also the legacy of existing development which for the most part, it perhaps a larger-scale issue. This is because over time, planning systems have evolved to reconcile natural hazards and risk profiles earlier on within its processes and now include detailed provisions for development where the risk profile is permitting.

Over time, engineering processes have also changed to utilise cutting-edge data and approaches to better understand natural hazard risk. For example, floodplain risk management has emerged as a particular field of expertise as a strategic and multi-disciplinary approach to proactively guide and manage development within floodplain areas.

Enhanced satellite capability, mapping techniques and data analytics across all hazards assists us to have a better collective understanding of hazard and risk, enabling the opportunity for better informed decision-making.

Resilient building techniques have also advanced over time, providing a suite of options to retrofit existing buildings, and integrate resilience considerations into new development. This includes instruments such as Australian Standard 3959 - Construction of Buildings in Bushfire Prone Areas, and guides such as the Flood Resilient Building Guidance for Queensland Homes which provides information about resilient design and construction options for existing and new homes, resilient building materials and systems and the economic benefits of flood resilient design solutions.

As our climate changes so does our need to adapt to the changing landscape and weather. This is not required only in terms of the built environment and infrastructure we build and rely upon, but the systems and processes in place which influence the built environment and our infrastructure assets and networks.
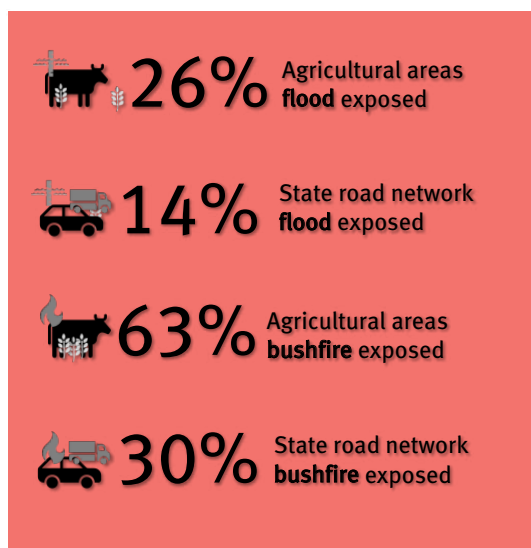
Image: Betterment project at Netherby Road, completed 2017 following Cyclone Marcia. Fraser Coast Regional Council.

Case study:
Gympie flood study investment plan

Gympie Regional Council secured Queensland Disaster Resilience funding to prepare a flood study investment plan, to understand the scope and cost of flood studies required to support disaster management, planning scheme review, infrastructure planning, building approvals and ratepayer information.

Council holds a range of detailed flood information and data sets, and previous studies have utilised a range of modelling methods and approaches to include climate change. However, this project will increase the range or scale of events to enhance the quality of data used to underpin critical local government decision making and public information.

A review and assessment of currently available data has been undertaken, and an action plan identified to address the gaps and additional information required to successfully meet Council's multi-objective needs. Critically, this work will include overland flood assessments for the Gympie urban area. Progressive flood risk mapping will be prepared to assist disaster management purposes, along with an investigation into options for enhanced local flood warning systems.

The Gympie flood study investment plan will enable enhanced floodplain risk management approaches to address existing, future and residual risks.

This project is scheduled for completion by mid-2021.

Case study:
Remembering our history

Remembering our history of natural hazard events serves a variety of purposes. Physical totems, markers, plaques and public art installations help us remember and commemorate past events, their impact and community recovery, and they also assist us in recording historical data. These physical reminders help to keep the legacy of natural hazard impacts to the front of mind, serving as reminders of the potential for future events.

Newcomers and visitors to the community may not be immediately aware of the long history of the Mary region's endurance of Mother Nature. Physical representations of hazard exposure help to educate and inform, and often provide the background behind how our townships and settlements have come to take shape over time.

Image: Maryborough flooding.
Courtesy of Fraser Coast Regional Council. (Insert) Mary River flooding in Gympie. Courtesy of Gympie Regional Council.

Case study:
Sunshine Coast Council
Disaster Resilience Plan

Sunshine Coast Regional Council launched a Queensland-first local strategy for disaster resilience as part of its current Local Disaster Management Plan.
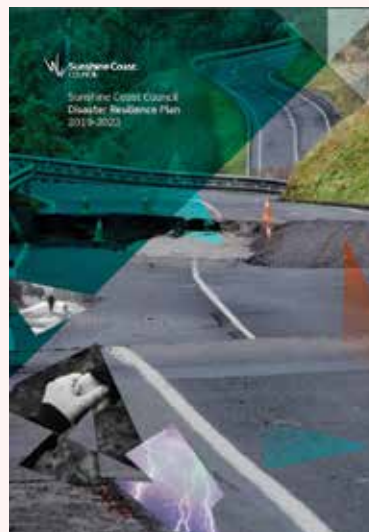
The Plan adopts a four year focus on ensuring the safety of the Sunshine Coast community. It recognises that building community resilience is a shared responsibility between all levels of government, the business community, private sector, community groups and individuals. Each has a vital role to play in implementing the Plan.

The Plan sets out the strategic alignment of resilience policy and strategy from global to local, across a line of sight, which links local action to higher order and broader national goals of disaster risk reduction, climate adaptation and sustainable development.

The Plan charts a pathway for those with a role in local disaster resilience, across four priority areas which include:

- strengthening community connectedness and social capital
- strengthening economic resilience
- protection of critical infrastructure
- preservation of the environment.

These four priority groups link back to the multi-disciplinary elements of this regional resilience strategy, as well as the resilience and recovery pillars which underpin the Queensland Strategy for Disaster Resilience and Resilient Queensland.

Images: Glass House Mountains, Mary Cairncross Lookout. Courtesy of Tourism Australia. (Insert) Sunshine Coast Council Disaster Resilience Plan.

Climate change in our region

In the future, the region can expect:

- higher temperatures
- fewer frosts
- rising sea level
- hotter and more frequent hot days
- reduced rainfall
- more frequent sea-level extremes
- harsher fire weather
- more intense downpours
- warmer and more acidic seas

Sustainable development and disaster risk reduction

Coordinating multiple objectives

The connection between sustainable development and disaster risk reduction is a strong driver of effort and action across the Asia Pacific region. The 2018 Ulaanbaatar Declaration was adopted by participating governments to accelerate the implementation of the Sendai Framework for Disaster Risk Reduction in the Asia region. The Sendai Framework is the global plan adopted by the United Nations in 2015 to reduce disaster losses.

The Declaration speaks inherently to a multi-disciplinary, multi-sectoral approach that is predicated on real change to the urban environment, not just a focus on life safety. It is therefore clear the disaster resilience narrative at the global scale is orienting towards and will be more inclusive of, broader sustainable development goals, such as the 2030 Agenda for Sustainable Development.

The Australian Government is also driving a renewed focus on disaster risk reduction and resilience building through the release of the National Disaster Risk Reduction Framework.

In order to achieve these global and national goals, we require a true alignment of strategy and action from the local to the global. It means every action at every spatial scale or level of government needs to align to truly meet the intent of the global frameworks – so that when we do something at the site or local level, we can demonstrate we are meeting regional, state, federal, and international intent.

Sustainable development can be broad and far-reaching, and is commonly defined as:

"Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs."

International Institute for Sustainable Development

The United Nations Office for Disaster Risk Reduction identify the preconditions for sustainable development include the importance of information and knowledge sharing, including disaster risk reduction in education (including primary, secondary and tertiary levels), resilient agriculture, business continuity and the creation of financial mechanisms to invest in disaster resilience.

Aligning disaster resilience and climate adaptation

The Queensland State Natural Hazard Risk Assessment prepared by Queensland Fire and Emergency Services provides a clear narrative on the effects that climate change can be expected to have on natural hazards.

Efforts to advance climate adaptation in Queensland are embodied through the Pathways to a Climate Resilient Queensland: Queensland Climate Adaptation Strategy. The effects of climate change go well beyond their manifestation in terms of disaster, but there are commonalities in practice and effort that can and should be aligned.

Climate change cannot be merely categorised as purely an environmental issue - it transcends both social and economic systems. The inter-relationships and inter-dependencies between the environmental, social and economic aspects of climate change demand holistic, systems-based approaches to build climate exposure considerations into business-as-usual decision-making. When this is integrated across disciplines and sectors, we are ensuring 'resilience' in its broadest terms is being built into our everyday actions in an integrated and coordinated manner.

Strategic foundations

The integration and coordination of efforts across the Mary region which contribute to sustainable development, climate adaptation and disaster risk reduction forms a foundational element of this strategy.

This focus recognises the significant extent of existing regionally-applicable policy, strategy and activity occurring across each of these spheres, with a focus on enhanced alignment and coordination across sectors and disciplines. By focusing on coordination of effort, we seek to better integrate sustainable development principles, climate adaptation priorities and disaster risk reduction processes across social, built environment and infrastructure, economic and environmental sectors. This inherently gives rise to improved business-as-usual integration of multi-objective efforts.

A place-based approach

As much as resilience is about people, it is also about place. As people and place vary so much in any locality, region, or disaster affected area, a place-based approach to resilience ensures efforts and activities are locally-derived and locally-appropriate.

Transect approaches that 'classify' areas into places of common characteristics have been used for many years in environmental planning, land use planning, coastal management, urban design and architecture. Taking a place-based approach to resilience building also means that resilience practice can more easily align with the existing efforts of others. For example, a place-based approach to resilience action is easier to implement via:

- land use planning – regional plans and local planning schemes are by their nature instruments to manage growth through mechanisms such as place-based zoning
- infrastructure plans – state level infrastructure planning and even local government infrastructure plans are place-based
- community plans – strategic documents of Councils and regional bodies setting out their visions for their areas are usually deeply connected to place
- environmental plans – natural resource management plans and other plans for areas of environmental significance invariably need to provide solutions based on local characteristics.

The place-based model allows for the unique circumstances of a location with specific characteristics, but also ensures equity and commonality with other places of similar context or characteristics. This also helps disaster managers and other practitioners refine their resilience efforts based on the local context.

The approach enables common approaches across the lines of resilience nuanced to local circumstances and needs.

Mary region settlement typologies

The Mary region and its surrounds traverses diverse natural and plantation areas, rural landscapes of rugged uplands, grazing and agricultural lands, punctuated by a diversity of townships and passing through the centres of Gympie and Maryborough before reaching the Great Sandy Strait coastline.

The various typologies of communities and settlements which form the Mary region not only reflect the cultural identity of distinct communities, they also reflect the particular resilience needs, values and aspirations of different communities, relative to their spatial or geographic context. In this regard, resilience action can be tied to a place-based in order to reflect the different levels of resilience, and resilience need, according to location.

For this purpose, the Mary region is divided into 'settlement typologies'. The first two areas are broader areas which extend across the region, whilst the balance classify a range of different townships and communities into six distinct township typologies. The purpose of this is to identify both region-wide and community-specific resilience priorities.

Production areas

Our production areas comprise our valuable rural and agricultural lands which support grazing, cropping, growing, animal husbandry and other agricultural practices. These commonly include vast areas of the Mary River floodplain, which include the most fertile soils in the region.

Natural landscapes and plantation areas

The natural landscapes and plantation areas of the region are predominantly located across the catchment's headwaters, in the higher areas of the region. This area includes a diversity of national parks, bushland reserves and timber plantation areas.

Villages

The region includes a number of village communities such as Montville, Mapleton and Kin Kin, each of which maintain a unique character. These hinterland villages are largely residential in nature, with bespoke local business and tourism offerings. Limited growth and reliance upon larger centres for access to services are characteristics of village settlements.
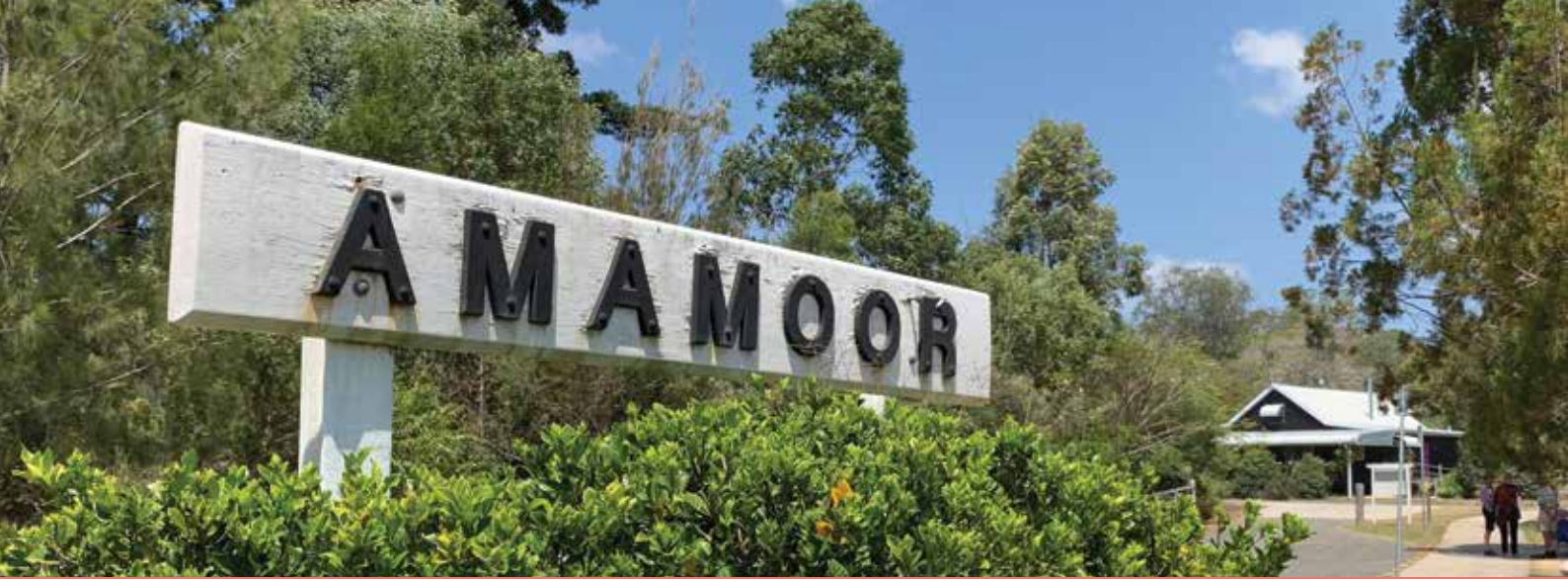
Rural towns

Rural towns maintain a defined character and identity, and constitute a number of communities across the Mary region, such as, but not limited to, Woolooga, Kenilworth, Kandanga, Amamoor, Dagun, Cooran, Pomona and Brooweena. These towns include discrete residential areas, surrounded by rural residential activities, as well as larger rural activities and landholdings. Some rural townships may experience a level of growth or population change as a result of desire for tree-change lifestyles, whilst others will remain subject to limited growth.

Rural lifestyle settlements

Rural lifestyle settlements are characterised as isolated pockets of rural residential areas throughout the region. These settlements including areas such as Glenwood, Bauple, Crystal Waters, Flaxton, Conondale and Pacific Haven.

Coastal towns

Coastal towns both within the Mary region and its immediate surrounds include the major centre of Hervey Bay, as well as River Heads, several coastal townships located along the Great Sandy Strait and the Cooloola Coast. These communities maintain a direct relationship with, and reliance on, the Mary region, particularly during flood events.

Service towns

Service towns in the Mary region were originally established to serve surrounding rural areas and populations, many of which have transformed over the year to diversify into a range of bespoke, boutique economic retail and service offerings. These towns include Maleny, Cooroy, Kilkivan, Imbil, Tiaro, and Howard.

River cities

The river cities of the Mary region include Gympie and Maryborough. These centres maintain larger, diverse concentrations of urban activities. From a planning-based perspective, they are defined as 'principle' centres and maintain the highest urban growth opportunities of the Mary region.

Mary region spatial transect

The map below articulates the spatial transect of the Mary region on the basis of the settlement typologies identified below.
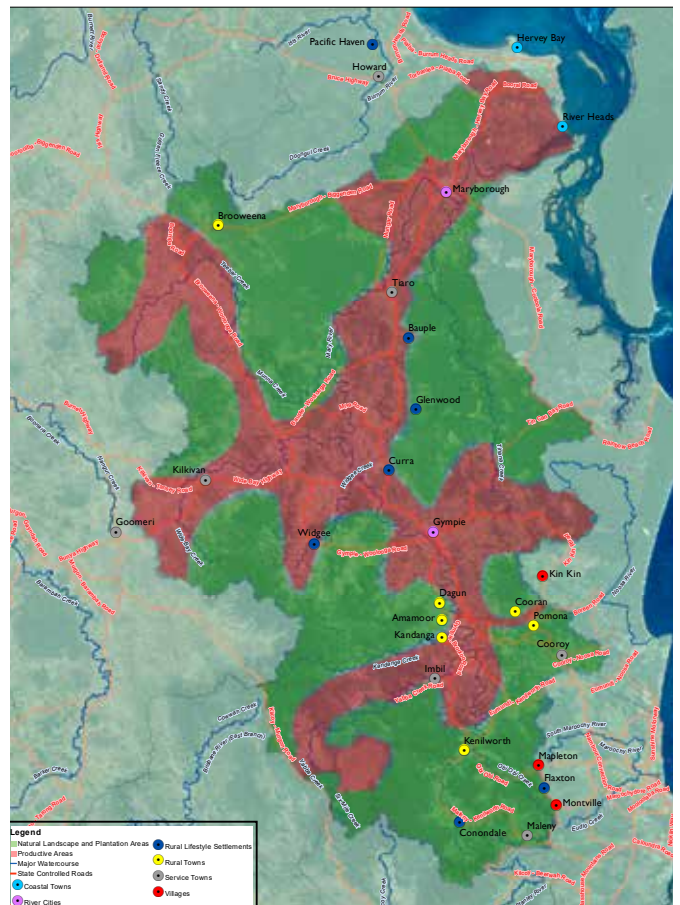

Image: Amamoor. Courtesy of QRA.

Strategic pathways

Achieving our shared objectives

The strategy draws upon the spectrum of existing resilience efforts both undertaken and underway across the region. Acknowledging the integrated, complex, and far-reaching concepts of resilience, the objectives of this strategy are focused on the following:

Sharing, leveraging and coordinating resilience efforts across the region

When we are connected and collaborating, collective efforts need coordination - across disciplines, levels of governments, localities and communities. This helps to front-load resilience considerations across business as usual activities.

Adopting a place-based approach to resilience action, tailored to the varied characteristics of the region and its communities

Resilience necessitates different activities or ways of thinking, in different locations across the region. This is because our communities are unique, and no two are the same. The place-based approach of this strategy reflects the place-based values and resilience needs of our varied communities.

Aligning sustainable development with disaster risk reduction

Recognising disaster risk reduction as a formative element of all development processes, ensuring our region grows in a sustainable and resilient manner.

Telling our unique resilience story, recognising that one size does not fit all

We have a long history of all-manner of weather and climate-related events. Passing on our stories and retaining this important local history will help us to develop stronger pathways to resilience into the future.

Recognising the role of disaster resilience to our local and regional economy and social (or community) resilience

A resilient economy can directly assist a community to recovery after a severe weather or disaster event. Ensuring the world knows we are 'open for business' as quickly as possible is essential, keeping residents in employment and local businesses in operation.

Image: Gympie flood marker installation. Courtesy of QRA.

Pathways to our resilience vision

A range of strategies to inform collaborative approaches to the diversity of resilience objectives across the region are identified below. These strategic pathways form a regional 'blueprint' for coordinated resilience action across the Mary region.

These strategic themes represent potential pathways to meet the aspirations of the region from a social, township and infrastructure, economic and environmental perspective.

The themes and pathways are further supported by a range of regional and local actions which link back to the Queensland Strategy for Disaster Resilience, aligning with the Queensland Government's state-wide priorities and commitments for disaster resilience. These strategic pathways and actions will be moved forward under the direction of the Wide Bay Burnett Regional Organisation of Councils, Sunshine Coast Regional Council and Noosa Shire Council, as well as individual stakeholder groups.

The strategic pathways identified below each align with the various objectives of the Queensland Strategy for Disaster Resilience, as per below.

Queenslanders are disaster resilient when...

1 we understand the potential disaster risks we face

2 we work together to better manage disaster risk

3 we seek new opportunities to reduce disaster risk

4 we continually improve how we prepare for, respond to and recover from disasters

Above: The four objectives of the Queensland Strategy for Disaster Resilience.

Place-based pathways for the Mary region

Place typology	Rural and agricultural lands	Natural and plantation areas	Villages	Rural towns	
Place-based visions	Our lands are productive and prosperous, supporting sustainable agricultural practices and opportunities for a wide variety of rural pursuits, food production and innovative rural businesses. We recognise the importance of our agricultural assets by ensuring we plan and manage for natural hazard impacts.	Our natural environment is highly valuable and renowned for its biodiversity and its distinctive landscapes, and reflects our unique identity. We protect and preserve our biodiversity and distinctive landscapes by boosting natural resilience against natural hazards	Our villages have a strong community cohesion and unique character which reflects their hinterland location and heritage. The iconic beauty and biodiversity of the hinterland is of the upmost importance and the foundation of our economy through nature-based tourism. Our focus is on protecting our hinterland by building its resilience to natural hazards	Our rural towns have a strong sense of place and historical character. We hold close connections to the land and our history, and enjoy family-orientated, relaxed outdoor lifestyles. Our rural towns depend on the resilience of small businesses to provide the local needs and services for their community.	
Examples of place	**All rural and agricultural land, which is a predominant land use across the Mary River floodplain**	**Neerdie State Forest** **Goomboorian, Wolvi and the Beenham Valley** **Mothar Mountain and Traveston** **Mary River environs** **Blackall Ranges**	**Kin Kin** **Montville** **Mapleton**	**Brooweena** **Kandanga** **Amamoor** **Dagun**	**Cooran** **Pomona** **Kenilworth**

PLACE-BASED STRATEGIC PATHWAYS

Resilient people and society

We are aware of the risks of natural hazards and prepare for them as part of life

Sharing local knowledge* Building independent resilience by sharing the way the landscape and its systems work and collaborating on innovative processes to mitigate and endure natural hazard events.	**Focusing on visitor awareness** Increasing hazard and risk awareness of informal tourism and casual visitors to our natural and more remote areas in the region.	**Collaboration and connection** Supporting existing informal community connections and develop new connections, with a focus on grassroots community events, community groups and activities to build and maintain community-wide relationships.	**Living with isolation*** Supporting the ability to be resilient by sharing knowledge and knowing what to expect, through the voice of local champions and community spirit. The vulnerability of rural areas is increasing with an ageing population. Embracing opportunities to attract younger generations.

Resilient economy

We recognize the stresses on the economy from natural hazards and strengthen our local supply chains and ensure small business continuity

A resilient agricultural industry Supporting economic prosperity across the region by focussing on resilient approaches to agriculture and primary production, irrespective of scale of operation, including a focus on business continuity and supply chain resilience.	**Sustainable growth** Supporting minimisation of hazard exposure and risk profile of the forestry and timber industry, which makes an important contribution to Queensland's economy and is a significant source of employment in the region.	**Protection of the hinterland** Protecting and preserving the iconic beauty of the hinterland through collaborative and coordinated processes, recognising the primacy of its lifestyle, visual amenity and economic values.	**Supporting local business** Supporting local small business enterprise by making it easy to establish and conduct business in rural towns, supporting local needs and providing local services. This contributes to the overall sustainability and resilience of rural townships and supports opportunities for goods and services availability in disaster events.

Resilient environment

We help our environment to endure and recover from natural hazard events both naturally and sustainably

Stewarding the landscape Focusing on increasing the capacity and capability of landowners across the region to sustainably manage healthy land and waterways, balanced with agricultural processes. This includes contributing to overall catchment water quality.	**Protect biodiversity and environmental qualities*** Focusing on resilience and recovery programs that protect our waterways, water quality and native vegetation from the adverse impact of natural hazards. This includes the management of invasive species and transportation downstream and across the floodplain.	**Valuing our natural environment** Recognising the value of the hinterland environment and protecting and preserving it. Supporting approaches which enable communities to contribute to the stewardship of the natural environment.	**Township scale approaches** Encouraging and supporting community-led opportunities for environmental resilience activities, including the potential for locally-led township resilience plans.

Resilient towns and infrastructure

We integrate and plan for natural hazards and climate change in our settlements and infrastructure to maintain access and connectivity

Support supply chain resilience Collaborating across agricultural industries and third parties to understand supply chain networks and vulnerabilities, and cascading impacts.	**Data intelligence, monitoring and reporting** Our natural landscape and plantation areas attract a high number of visitors to the region. Data collection and intelligence will help support disaster management and emergency decision making.	**Being prepared** Residents in smaller communities and townships across the region must be self-sufficient to that extent possible. Storing food, water, fuel and other essential items.	**Fostering connectivity innovation** Isolation is part of natural hazard impacts. Where road connectivity is vulnerable, innovation in telecommunications (for example UHF or digital radio networks) can help keep communities connected.

Rural lifestyle settlements	Coastal towns	Service towns	River cities
Our rural residential settlements are relatively isolated with few local services, given the topographical and natural hazard constraints. We know how to manage our land and live with natural hazards.	Our coastal towns provide for tourism and recreational activities associated with our coastal setting and high level of access to surrounding settlements and communities. Our social and economic prosperity depends on the resilience of our natural coastal environment and the tourism industry to natural hazards.	Our service towns have a small town character enriched with heritage and history, and a strong affinity with surrounding rural areas. Our economy is predominantly rural with a strong district centre, positioning us to provide access and services to our residents, surrounding towns and visitors to the region.	Our river cities are vibrant and famed for their heritage identity. We attract investment and provide regional employment opportunities. We adjust to natural hazards by avoiding areas of significant risk or where appropriate, designing buildings and infrastructure for resilience.

Rural lifestyle settlements		Coastal towns	Service towns		River cities
Curra **Widgee** **Flaxton** **Conondale**	**Pacific Haven** **Bauple** **Glenwood**	**Hervey Bay** **River Heads** **Burrum Heads**	**Howard** **Tiaro** **Imbil** **Kilkivan**	**Goomeri** **Cooroy** **Maleny**	**Gympie** **Maryborough**

PLACE-BASED STRATEGIC PATHWAYS

We are aware of the risks of natural hazards and prepare for them as part of life

Live ready	**Educating a transient population**	**Encouraging local volunteerism***	**A focus on individual responsibility***
Collaborating to develop robust household 'what if' plans to prepare for the impact of a range of natural hazards	Enhancing awareness of natural hazard risks and supporting opportunities to communicate early advice to empower communities to make better, risk informed decisions. Equipping body corporate and tourism managers with the capabilities and information needed to plan for natural hazard events.	Working across organisations and employers to make it easier for community members to volunteer via innovative, incentivising approaches.	Improving community awareness of the risks of natural hazards through access to timely and accurate information, opportunities to foster conversations, and enhance collective understanding of risk and how to be prepared.

We recognize the stresses on the economy from natural hazards and strengthen our local supply chains and ensure small business continuity

Planning for exposure	**Building tourism industry resilience***	**Encouraging buying local***	**A sustainable economy***
Recognising and planning for the exposure of home based businesses to natural hazard events.	Tourism is a significant driver of economic and social prosperity for the region's towns. The success of the tourism industry is dependent on its resilience to natural hazard events	Supporting buy local schemes and strategies to drive local economies, which helps to foster increased economic diversity, maintain local goods and services availability and enhance resilience through periods of potential isolation, commodity downturns and persistent drought.	Promoting sustained and sustainable economic growth by locating economic development to avoid and minimise hazard stresses on the economy (i.e. loss of employment, delays in transport routes re-opening). Pre-plan for natural hazard impact to support business continuity.

We help our environment to endure and recover from natural hazard events both naturally and sustainably

Know how to live with the environment	**Embracing natural processes**	**Supporting environmental processes***	**Manage the floodplain***
Focusing on the awareness and capability of landowners to know how to live in the rural environment and how to manage the land.	Boosting natural resilience and liveability by reclaiming the foreshores for protection against coastal hazards. Focusing on restorative natural processes to protect the coastline such as mangrove and vegetation rehabilitation, and dune restoration.	Natural hazards are natural processes which have featured as part of the landscape for millennia, helping shape it to how it functions and looks today. Supporting natural processes requires us to adapt our activities which in turn, contributes to our own resilience.	Undertake a catchment wide approach. Development is undertaken in a risk responsive way by understanding how the catchment and its systems work and integrating disaster resilience into land use planning.

We integrate and plan for natural hazards and climate change in our settlements and infrastructure to maintain access and connectivity

Integrating disaster management into land use planning*	**Resilience in asset management and renewal***	**Places of refuge**	**Improving immunity**
Avoiding potential inadvertent ad hoc development outside of identified centres and towns by prioritising natural hazard exposure in strategic planning processes.	Balancing sustainability of assets with disaster risk reduction by considering opportunities to improve resilience in infrastructure and asset upgrade and renewal processes.	Recognising service towns are places of refuge during natural hazard events for surrounding production areas. Being equipped to accommodate surrounding rural populations and visitors is vital.	Improving the immunity of our major centres by embedding resilience considerations as business as usual in all decision making, improving critical infrastructure resilience and designing and avoiding new development in higher risk locations.

*Indicates strategic pathway may have region-wide relevance. Through implimentation, any starategic pathway may be considered across the region or for other place typologies depending on local circumstances.

Strategy implementation

Working together to implement the strategy

This strategy will be implemented as a partnership across the four local governments of the Mary region. The strategy actions will be driven through local leadership and regional resourcing under the direction of the Wide Bay Burnett Regional Organisation of Councils, Sunshine Coast Regional Council and Noosa Shire Council, with appropriate support from other coordinating bodies and entities including District Disaster Management Groups (DDMGs), state government agencies, and not-for-profits.

This approach recognises that while actions are best delivered locally, multi-disciplinary regional level support is also required to encourage cross jurisdictional collaboration, provide technical assistance and proactively assist project implementation. Opportunities that exist to strengthen community and climate-related disaster resilience in the Mary region include:

- supporting a resilient society through community networks and an inherent ability to adapt to changing circumstances
- supporting communities, including individuals and household members, to make their own informed decisions regarding preparation for sever weather and disasters
- enhancing economic resilience through industry involvement and dialogue, supply chain strengthening, focusing on collaboration and partnerships across public and private sectors, enabling infrastructure and business continuity planning
- support for infrastructure through pathways for improved communications and transport linkages for societal and economic benefit
- supporting community-led recovery opportunities and operations following events
- improving funding certainty through proactive planning, prioritisation and coordination for collective benefit.

Enduring governance and funding arrangements

This strategy provides an opportunity to examine and support how local governments, community and service organisations work together to achieve common resilience outcomes for the Mary region. It seeks to inform strategic and coordinated approaches to community and climate-related disaster resilience activities across the region so that funding and action can be aligned to a common intent.

Under this model, the strategy acts as the regional 'blueprint' for coordinated and sustained action. An agreed governance arrangement will support the implementation of the strategy and an enduring commitment to championing resilience into the future.

Stakeholder-identified key requirements for the successful implementation of this strategy are as follows:

- a broad, multidisciplinary approach to resilience building
- sustaining governance arrangements, funding, and resource capability for implementation of resilience actions over time
- a clear understanding of how resilience arrangements interplay with Queensland Disaster Management Arrangements
- greater collaboration between government and non-government organisations to optimise resilience service delivery and efficiency
- clarification of the proposed resilience implementation arrangements at state, regional and local levels so that local actions can be programmed and delivered accordingly.

Image: Mary River. Courtesy of QRA.

Local leadership

Local governments and non-government organisations are encouraged to establish their own multi-disciplinary resilience working groups to transition community and climate-related disaster resilience to front-of-mind in all local government functions. This could be achieved by combining existing recovery group arrangements with an ongoing resilience focus over the calendar year.

Regional coordination

Regional coordination is proposed to fall under the existing governance of the Wide Bay Burnett Regional Organisation of Council, in conjunction with Sunshine Coast Regional Council and Noosa Shire Council, with a strong link to other existing related governance arrangements such as the relevant District Disaster Management Groups (DDMGs).

An opportunity also exists to leverage the existing Wide Bay Burnett Regional Organisation of Councils' officer-level working group or Regional Resilience Committee. This committee includes external third parties such as emergency services, industry group representatives and State agency representatives. This group could provide direction and decision making for the implementation of the strategy and efforts of those tasked to deliver it.

State support

As a locally-led and regionally coordinated strategy, the role of the State is intended to be one of provision of enabling measures such as administration of grant funding programs, delivery of core governmental functions that interface with resilience building, and facilitation/coordination of support that can assist implementation.

Implementation of the strategy provides the opportunity to communicate resilience needs to the State Disaster Coordination Group. This is a multi-agency committee which convenes to discuss state-level resilience and disaster-related challenges, activities and opportunities across Queensland.

The Queensland Resilience Coordination Committee, which reports to the Queensland Disaster Management Committee, has also been convened as an implementation action under Resilient Queensland 2018-2021. Its role is to oversee initiatives and measures necessary to enhance disaster resilience.

Coordinated approaches

This strategy seeks to utilise existing funding streams in a more efficient and strategic way.

A suite of resilience actions have been identified and synthesised against existing local and regional plans, as a means to deliver on the strategic pathways set out in this strategy. Local governments will collaborate via the Regional Resilience Committee or relevant DDMG to develop project business cases based on these resilience actions in advance of funding rounds so that they are ready to be 'pulled off the shelf' to assist funding and grant application processes as they become available.

Monitoring and evaluation

A key aspect of this strategy moving forward is to establish a clear standards-based implementation framework for integrated resilience planning. This approach focuses on deriving specific, regionally-based and fit-for-purpose benchmarks for resilience implementation that is cross referenced to roles, responsibilities and funding. A benchmarking approach aims to provide a range of metrics that reflect the diversity of the region. It is proposed the identification and establishment of maturity benchmarking be further developed as implementation occurs over time.

Images: (Top) Gympie flood marker installation.
Courtesy of QRA. (Back page) Tropical Cyclone Marcia
flooding of Gympie CBD. Courtesy of Gympie Regional Council.

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