

ADVERSE EVENT PLAN DROUGHT RESILIENCE

Prepared for:
Alexandrina Council

Date:
5 March 2021

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Final Plan

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1 - INTRODUCTION

1. Introduction

1.1. Background

Local government in South Australia is eligible for a range of Federal Government drought assistance measures to support communities impacted by drought.

This includes the Drought Communities Programme (the program) which provides funding over three years from 2018-19. The intent of the program is to deliver immediate economic stimulus and other benefits to targeted drought affected regions of Australia.

Eligible councils are determined by the Federal Government based on need using rainfall deficiency data from the Bureau of Meteorology as well as population and industry data (reliance on agriculture).

The local government area of the Alexandrina was approved for funding as part of the extension program in 2019.

As well as economic stimulus, the program seeks to build resilient communities that can plan for and manage adverse events. This Adverse Events Plan has been prepared by the Alexandrina Council (the Council) to meet the requirements of the program and specifically to improve Council preparedness for drought.

1.2. Purpose

This Adverse Events Plan has been prepared by the Alexandrina Council to:

- Demonstrate the systems, capacity and resilience of Council and it's communities for managing adverse events
- Provide ongoing value to those communities in relation to prevention, preparedness, response and recovery to adverse events
- Nominate critical projects, gaps and future opportunities that can improve the resilience of communities to adverse events
- Assist in identifying and mitigating strategic and operational risks to Council from adverse events.

Part 1 of the plan provides a framework-based assessment of the way the Council manages adverse events across the district. Part 2 of the plan will guide Council's response in preparing for drought through building community resilience and implementing drought response and recovery in the district.

1.3. Framework-based Assessment

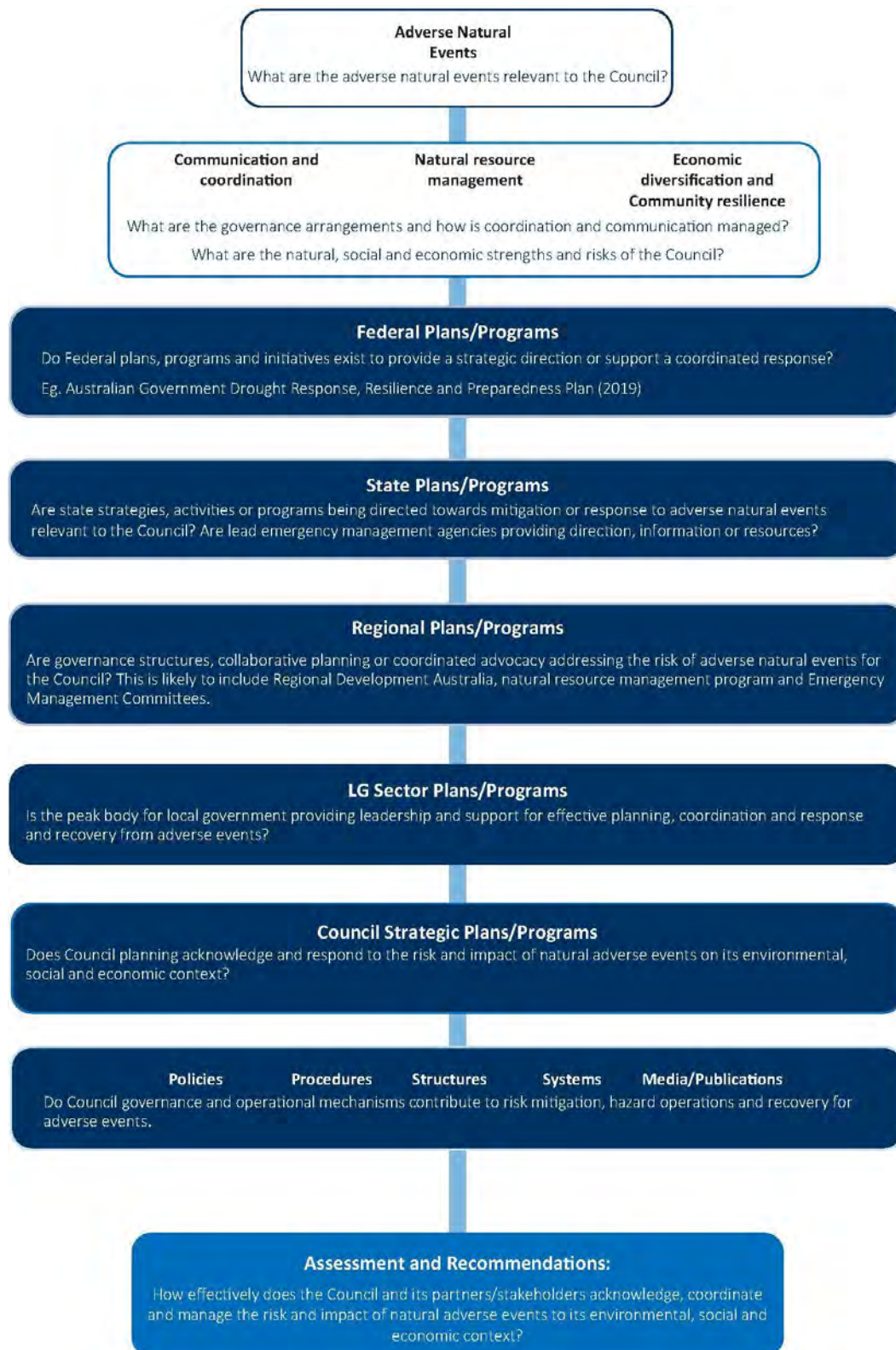
The Adverse Events Plan (the Plan) provides a framework-based assessment which draws on relevant context and direction for managing adverse events and reflects key considerations in the areas of:

- Communication and coordination
- Natural resource management
- Economic diversification and community resilience.

The framework approach is set within the statutory considerations provided by local government strategic, risk and emergency management planning. It does not seek to duplicate these established frameworks. Rather the Adverse Events Plan seeks to inform established frameworks by identifying gaps and opportunities to build resilient communities.

The approach relies on a desk-top assessment of existing policies, plans and systems for managing adverse events and communication by Council. The approach has not considered the effective delivery or implementation of identified policies, plans and systems. The approach has allowed the targeted identification of gaps and opportunities for future prioritisation in the district.

1.4. Adverse Event Framework



2 – SNAPSHOT OF THE DISTRICT

2. Snapshot of the District

2.1. Description of the District

The district's climate is mild temperate with lower day time temperature ranges near the coast and higher day time temperatures inland. Winter is typically mild to cool with low humidity and summers are hot to very hot with moderate humidity. Average rainfall in the district varies from over 800mm a year in Mount Compass to between 400-500mm a year in Milang, Clayton, Goolwa, Strathalbyn and Port Elliot.

Alexandrina Council is located within the Southern Fleurieu Peninsula and is situated approximately 70 kilometres from Adelaide in South Australia.

The district comprises an area of about 1,827 square kilometres and supports a population of approximately 27,427 people (2019). The district encompasses land from the north-western side of Lake Alexandrina to the Murray Mouth, and the western end of the Coorong capturing the river communities of Clayton Bay, Goolwa, Hindmarsh Island, Langhorne Creek and Milang. Along Alexandrina's south coast are the townships of Middleton, Port Elliot and Chiton.

The townships of Mount Compass and Strathalbyn are located inland. The townships of Strathalbyn, located to the north-east along the edge of the Adelaide Hills, and Goolwa, located near the Lower Lakes, form focal points of the district. Population density is low and, outside of Goolwa and Strathalbyn, most people live in Port Elliot.

The townships of Mount Compass, Middleton and Milang having smaller populations. There are other smaller townships and settlements in the district.

Alexandrina has a strong and critical agricultural sector including wine and grape production, dairy, horticulture, cropping, sheep and cattle. As well as major industries, there are many small and micro traders underpinning the economy of Alexandrina.

Agriculture, forestry and fishing is the largest employment industry in the district. In 2018 – 2019, agriculture production generated \$183 million (23.7%) of the region's total economic output. Historically, Goolwa was known for the transportation of grains, wools and produce. Cereal and Lucerne crops can be found throughout the district, along with livestock farming and dairy production. The forestry industry is prevalent within Kuitpo where pine forests are present. The region is renowned for its production of high-quality wines from vineyards located within Langhorne Creek and Currency Creek.

The district's tourism economy is driven by the variety of picturesque holiday locations ranging from the Murray River, the Coorong which offers both kayaking and recreational fishing opportunities, Langhorne Creek wine area, Strathalbyn and a variety of south coast towns and beaches. Whale watching opportunities are available from Port Elliot and Middleton.

The district is rich in natural resources due to its diverse landscape and is inhabited by many threatened flora and fauna species. Alexandrina has 15 kilometres of coastlines with open sand beaches, dunes and rocky outcrops. The district also contains significant water resources including sections of the Bremer, Angus, Finniss and Murray Rivers, Lake Alexandrina and the Murray Mouth. The district contains several conservation areas including the Coorong National Park, Cox Scrub Conservation Park, Finniss Conservation Park and Kyeema Conservation Park. Threatened species are also found on private land.

Alexandrina Council recognises the Ngarrindjeri people as the traditional custodians of the lands and waters of the Coorong, Lower Lakes and Murray Mouth region.

The district has a complex multi-cultural community, with 16% of the district's population born overseas, mainly from Europe and a population of First Nations Peoples comprising about 2% of the total population.

Figure 1. Alexandrina Council Area



Figure 2. Alexandrina Location Map



2.2. Council's Objectives

"Climate change is the issue of greatest concern to the people of Alexandrina. Increasingly frequent adverse events, the fragility of our ecosystems and the security of our water supplies led to our Climate Emergency declaration in 2019."

[A2040 Our plan to thrive 2020-2024](#)

Council's objectives are defined through a suite of strategic plans, policy and commitments. The lead document is Alexandrina 2040 (A2040) which sets a vision for a Thriving Alexandrina that is Liveable, Green and Connected. A2040 is the product of comprehensive community and stakeholder input.

- Liveable Alexandrina is defined by distinctive townships, places, spaces and transport networks that support active lifestyles, vibrant cultures and productive enterprise.
- Green Alexandrina is climate-ready, a place where nature is valued and resources are managed sustainably and creatively to support a new economy.
- Connected Alexandrina is created for, with and by the community. We are safe, healthy and all enjoy accessible infrastructure and services.

The Adverse Events Plan is one way the Council is delivering on its commitment of [Climate Response](#).

3 –ADVERSE EVENTS IN THE DISTRICT

3. Adverse Events in the District

3.1. Our Exposures

The Adverse Events Plan recognises that there will always be adverse events and that an effective management approach must focus on prevention and preparedness as well as response and recovery.

Adverse events have been experienced in the past and can reasonably be anticipated to occur again. With climate change, adverse events are expected to be experienced more frequently and more intensely.

The district forms part of the broader Adelaide Hills, Fleurieu and Kangaroo Island Zone for the purposes of emergency management. Adverse events in the Adelaide Hills, Fleurieu and Kangaroo Island Zone Emergency Management Plan (ZEMP) are described as being:

- Rural Fire
- Extreme Heat
- Extreme Storm
- Tidal Inundation
- Animal and Plant Disease
- Earthquake.

Australia experienced its hottest and driest year on record in 2019 according to the Annual Climate Statement 2019 produced by the Bureau of Meteorology (BOM). This included significant heatwaves in January and December 2019, drought across much of the country and widespread severe fire weather. 2020 was Australia's four-warmest year on record, with the annual national mean temperature 1.15°C above average. These climate and weather events were felt across South Australia and the district. Given the significance of these events and because drought is a significant contributing factor to severe and catastrophic fire weather conditions, the Adverse Events Plan specifically considers drought as an adverse event.

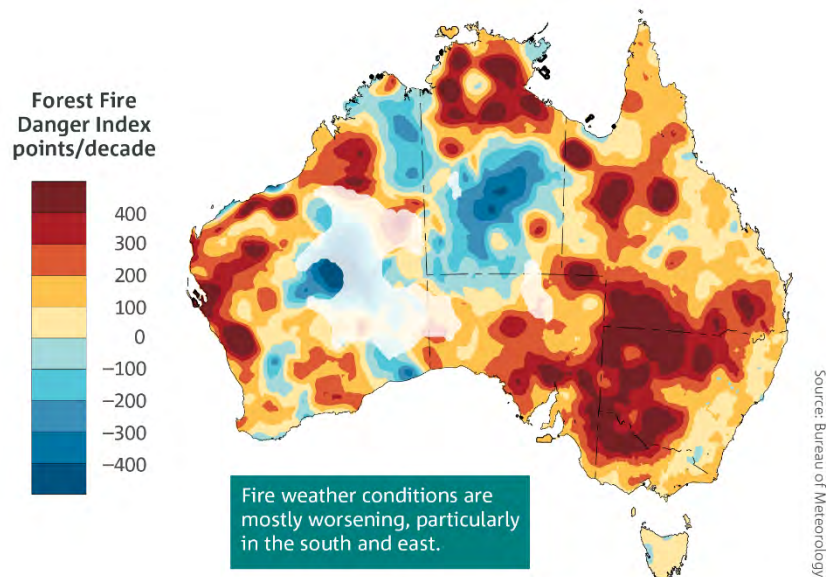
Alexandrina is vulnerable to the impacts of drought and increased drought resilience is imperative given near proximity to, and reliance on the River Murray, Lower Lakes and the Murray Mouth. There are significant complexities associated with managing water resources and drought for communities across the Murray Darling Basin. Both surface and groundwaters in the district are afforded various protections and water use is within a regulated environment.

This section provides a summary of the nature of adverse events likely to be experienced by the district based on trends for Australia, South Australia and the Adelaide Hills, Fleurieu and Kangaroo Island Zone as well as recent experience of the Council.

3.2. Bushfire

Fire weather in Australia is largely monitored using the Forest Fire Danger Index (FFDI). This index estimates the fire danger on a given day based on temperature, rainfall, humidity and wind speed. Annual trends indicate an increasing length and intensity of the fire weather season. South Australia can expect six or seven serious fires every 10 years.

Figure 3. Forest Fire Danger Index



The Adelaide Hills, Fleurieu and Kangaroo Island Zone Emergency Management Plan notes a long history of bushfires in the Zone including Ash Wednesday in 1983.

In the lead up to Ash Wednesday, Australia had experienced drought lasting ten months. In the days preceding the disaster, South Australia (SA) and Victoria experienced heatwave conditions, low humidity, strong to gale force winds and temperatures between the high 30s to mid-40s. In SA, 28 people died including three Country Fire Service volunteers, more than 1,500 people were injured, 383 homes and 200 other buildings were destroyed, and 160,000 hectares of land burnt. Major fires burnt outside of the district particularly in the Adelaide Hills, Clare Valley and Mount Gambier. The Insurance Council of Australia estimated the 1983 damage for South Australia at \$38 million (and the 2011 estimated repeated cost of \$307 million).

More recently dangerous fire weather conditions prevailed in SA during the 2019-20 bushfire season. Strong winds combined with existing dry conditions, low humidity and high temperatures resulting in various bushfires across the state. On 20 December, more than 200 bushfires burned across the state. Major fire locations included Cudlee Creek threatening nearby townships and Kangaroo Island. Recovery efforts in these areas are ongoing. SA's estimated insured value of the bushfire season as at 28 May 2020 was about \$186M from 3,054 claims.

3.3. Extreme Heat

South Australia experienced more warm days in 2019, with day-time temperatures 2.3°C above average (mean maximum) across the State and the highest on record in many areas of the north and west pastoral districts. Night-time temperatures were closer to average, but still warmer than average in most districts. Overall, it was South Australia's second-warmest year on record.

In the 12 months to 31 December 2020, the district experienced average mean temperatures. The long-term trend in mean temperature shows an increase in temperatures for the district.

The effects of climate change are expected to be felt differently in the South Australian Murray Darling Basin Region. Recent work by CSIRO and BOM under the Climate Change in Australia program provides comprehensive information about climate change projections in various regions of the Basin. For Alexandrina it means that average temperatures will continue to increase in all seasons; with more hot days and warm spells; decreasing winter rainfall; increased intensity of extreme rainfall events; a harsher fire-weather climate in the future; and increased sea level rise.

Figure 4. Average Mean Temperatures in the 12 months to 31 December 2020

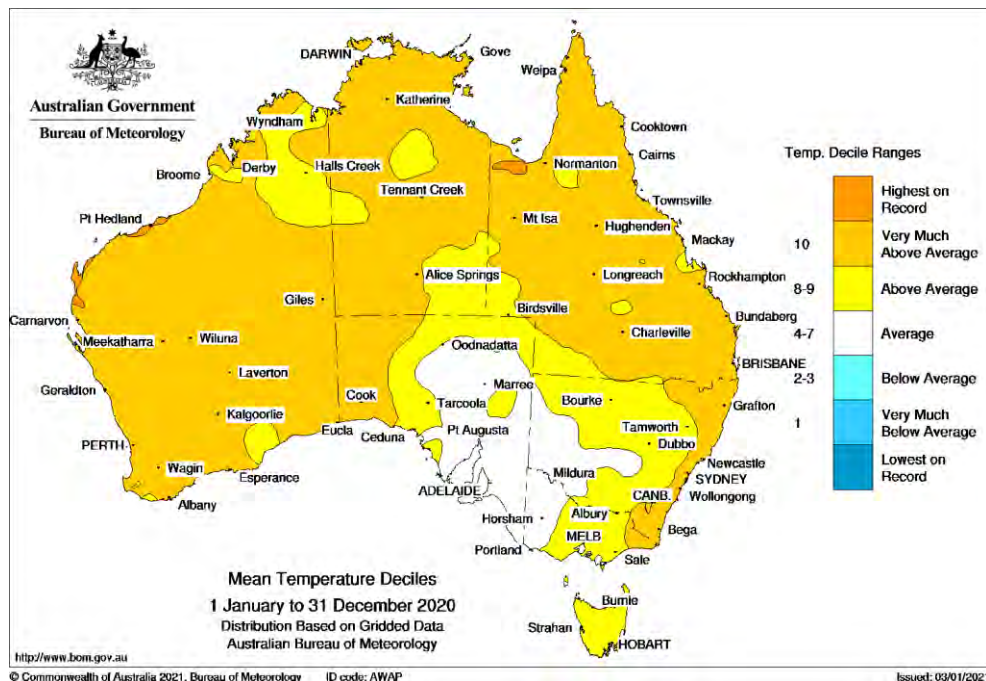
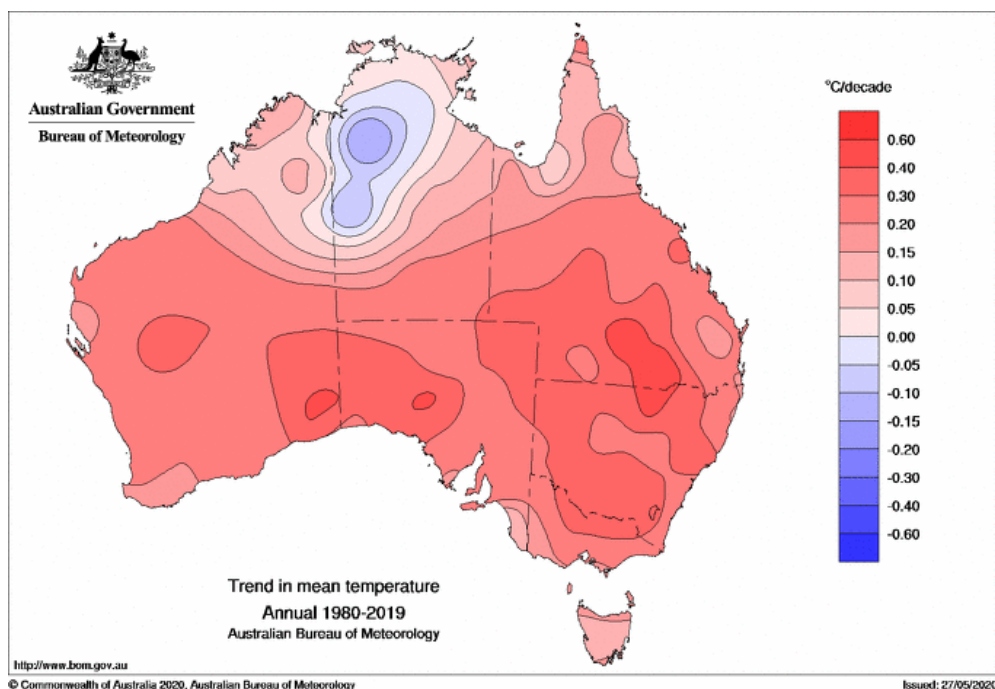


Figure 5. Trend in Mean Temperature 1980 to 2019

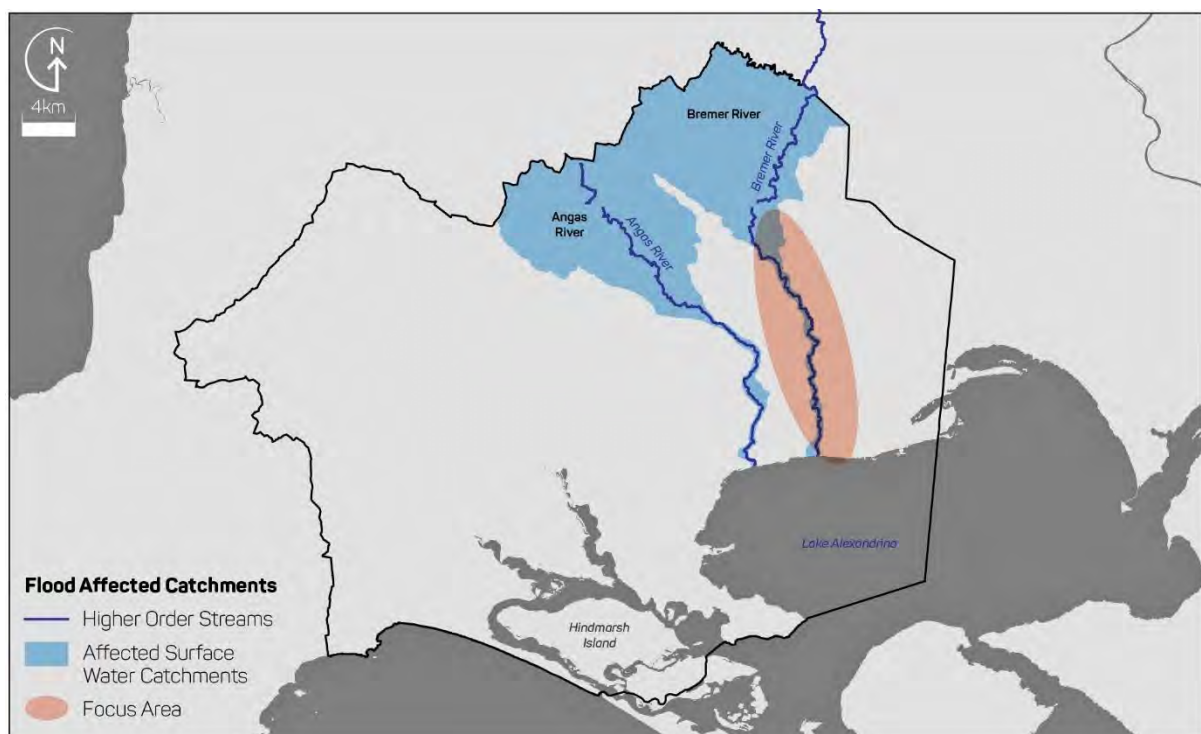


3.4. Extreme Storm, Flood and Inundation

South Australia experienced an extreme weather event in 2016 which brought thunderstorms, destructive winds, large hailstones and heavy rain triggering a black system event. The state-wide blackout damaged transmission and distribution assets. Local assets such as roads, bridges, community wastewater management schemes, trees and coastal infrastructures such as sea walls, jetties and boating facilities were severely impacted. Most power supplies were restored in 8 hours, however the wholesale market in SA was suspended for 13 days. The Far North, West Coast and Eyre Peninsula were without power for three days.

The loss of power supply corresponded with a widespread outbreak of supercell thunderstorms with an exceptional number of tornadoes particularly in central and eastern districts of SA. The significant rain event occurred on an already saturated environment with dams at or near capacity. This resulted in an almost instantaneous spikes in river levels. The Angus-Bremer catchments were affected with the lower reaches of the Bremer River a focus of flooding (shown indicatively on Figure 6).

Figure 6. Food Affected Catchments, 2016 Black System Event



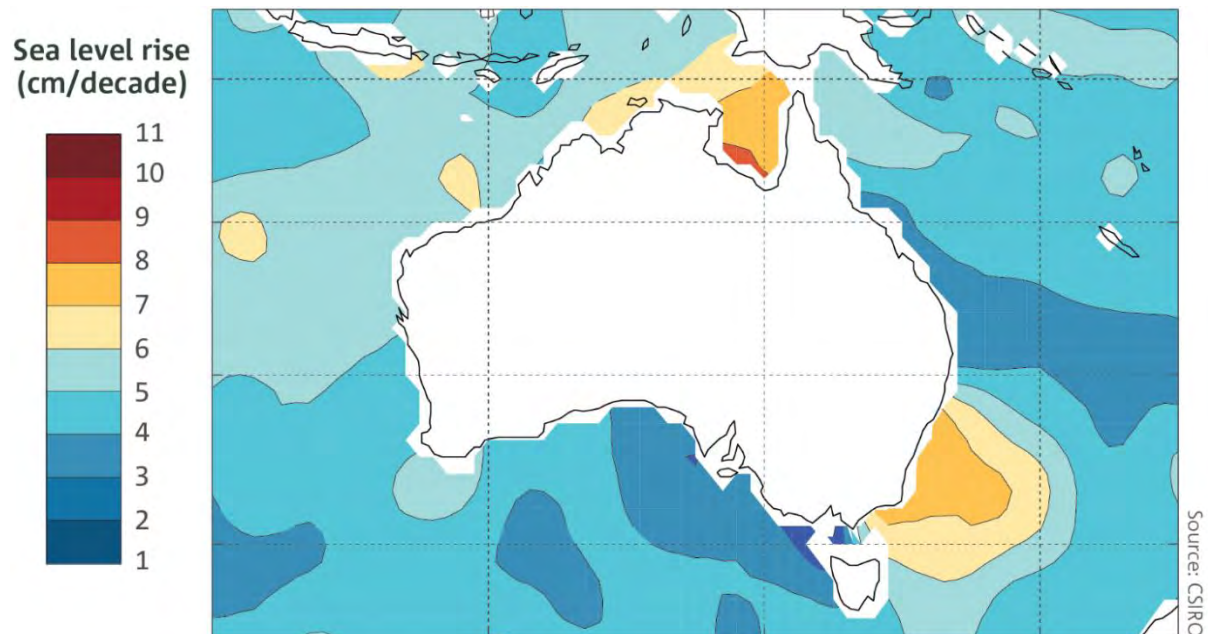
The Angus and Bremer River catchments are part of the Lower Murray River Basin that discharges into Lake Alexandrina. There is a long history of flooding in and around the townships in these catchments including Strathalbyn and Langhorne Creek. Due to heavy rain preceding the 2016 event, Langhorne Creek, Ashbourne, Strathalbyn and Finnis had already been identified as areas of concern for potential flooding and houses in these areas were sandbagged to protect them during storm events. Around the Langhorne Creek area, water levels were higher than the 2002 floodwaters. Roads were inundated and quickly became impassable.

Outside of extreme events, flooding from storms occurs across the district particularly along rivers and watercourses and can inundate road networks and lower lying areas. Rain events during high tides can also combine to flood coastal areas.

Sea levels along South Australia's coast have risen by 1.5–4 mm/year between 1965 and 2016, and the rate of rise is projected to increase in the future. Between 1992 and 2017, global sea level reportedly rose by 8 cm (approximately 3 cm decade). Further rises in sea level are projected, with the rate of rise to increase through

the 21st century. Rising sea levels are expected to exacerbate the existing impact of coastal erosion and inundation on coastal areas and natural resources.

Figure 7. Sea level rise, 1992-2017



3.5. Animal and Plant Disease

The Adelaide Hills, Fleurieu and Kangaroo Island Zone Emergency Management Plan identifies specific disease hazards. These include Karnal Bunt/Partial Bunt Disease, Foot and Mouth Disease and Phylloxera Disease.

The Crop and Pasture Report – Harvest 2019-20 prepared by Primary Industries and Regions South Australia (PIRSA) indicates that grain yields for the Adelaide Hills, Fleurieu and Kangaroo Island were generally below average and other crop yields were variable. Pasture quantity and quality available for livestock was well below average due to the dry spring. Livestock numbers were well below average, but stock condition was good. No specific disease concerns were noted.

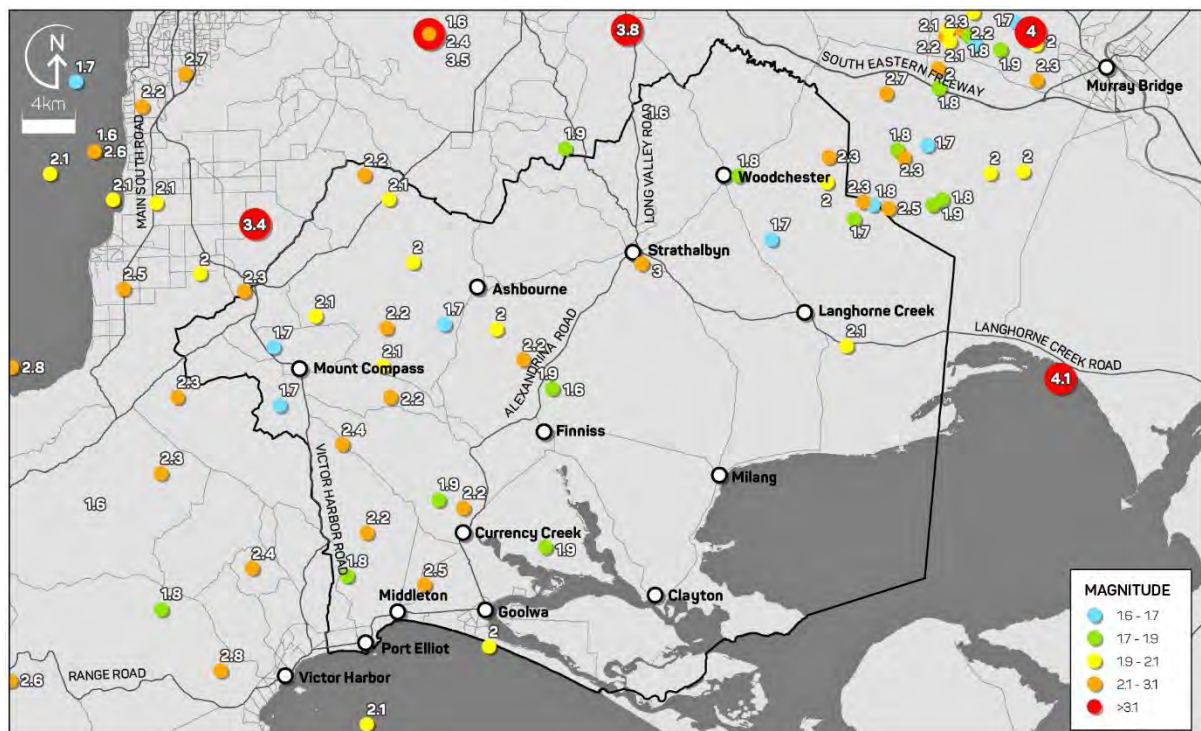
3.6. Earthquake

Australia averages about 80 earthquakes per year with a Richter magnitude (ML) of 3.0 or greater, while an earthquake of ML 5.5 is experienced on average every two years and an earthquake of ML 6.0 is experienced every five years. In Australia, earthquakes with magnitudes of less than 3.5 seldom cause damage while earthquakes of magnitude 4.0 or greater can cause infrastructure and building damage, and trigger landslides.

For every unit increase in magnitude, there is approximately a thirty-fold increase in energy released.

Earthquake history for the Region shows few earthquakes of magnitude that would be considered of serious detriment to human life (Figure 8).

Figure 8. Distribution of Earthquakes across the District



3.7. Drought

3.7.1. Recent Drought Experience

Australia has experienced a prolonged period of below average rainfall spanning several years with much of the country affected by rainfall deficiencies since early 2017 (Figure 9). For more than two years the greatest impacts of prolonged below average rainfall in Australia (and impacting South Australia) has been in the cooler months of April to October.

Australian rainfall is highly variable, however April to October rainfall deciles between 1999 and 2018 indicate a shift towards drier conditions across south-western and south-eastern Australia during April to October (Figure 10).

Parts of Australia received above average rainfall for one or more months in 2020, however, rainfall deficiencies persisted over much of the country. Long periods of low rainfall impacted water storages such as the Murray Darling Basin and persistent, widespread, above average rainfall over an extended period is needed to lift some areas from long-term deficiency.

South Australia, like Australia, experienced its driest year on record in 2019 with rainfall 65% below average and drought conditions experienced across the State. In the twelve months to November 2020, rainfall deficiencies had decreased over most of Australia (Figure 11), following above average rainfall across large areas.

A similar trend was experienced in the district. In the 36 months to November 2020, the district experienced an extended dry period with serious (or severe) rainfall deficiency (Figure 12). In the twelve months to November 2020, rainfall decile ranges returned to average (Figure 13) as did average soil moisture. Average rainfall recorded at nearby weather stations between 2015-2019 ranged from 371.5mm at Hindmarsh Island to 773.4 mm at Mount Compass (Table 1). Drier years were evident in 2018 and 2019.

Figure 9. Rainfall deficiency, Australia, 1 January 2017 to 30 November 2020

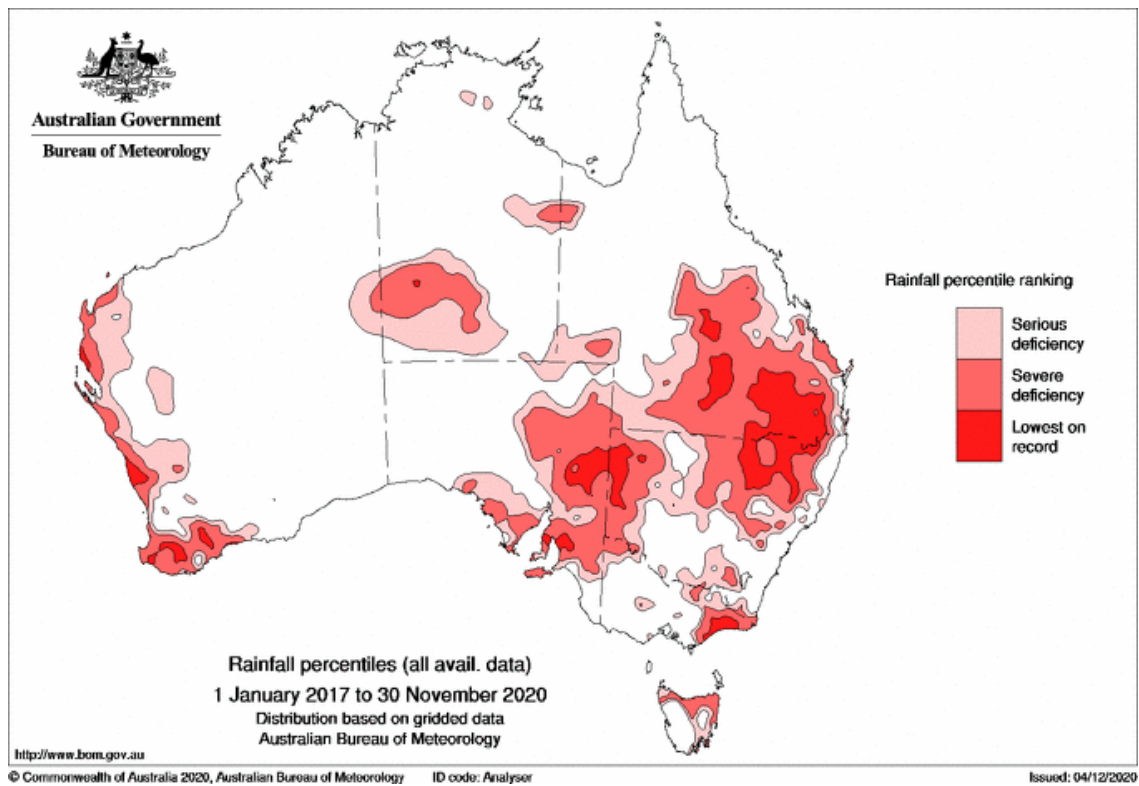


Figure 10. April 1999 to October 2019 rainfall decile ranges, Australia

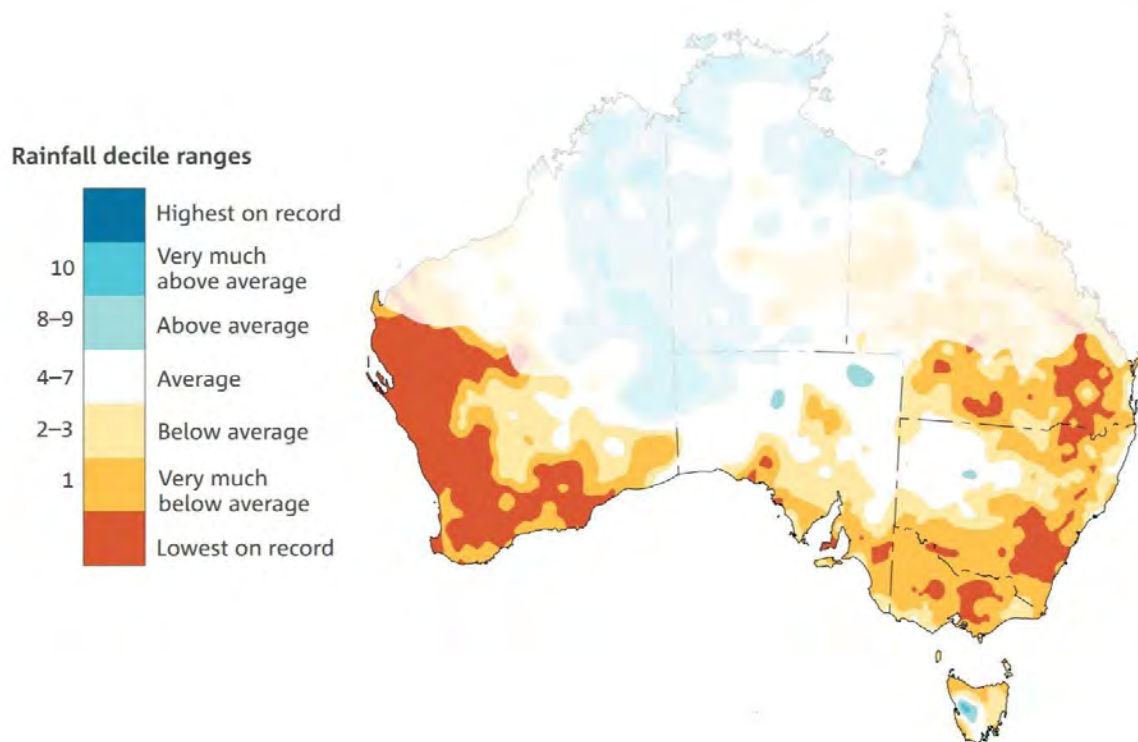


Figure 11. Rainfall deficiency, Australia, 1 December 2019 to 30 November 2020

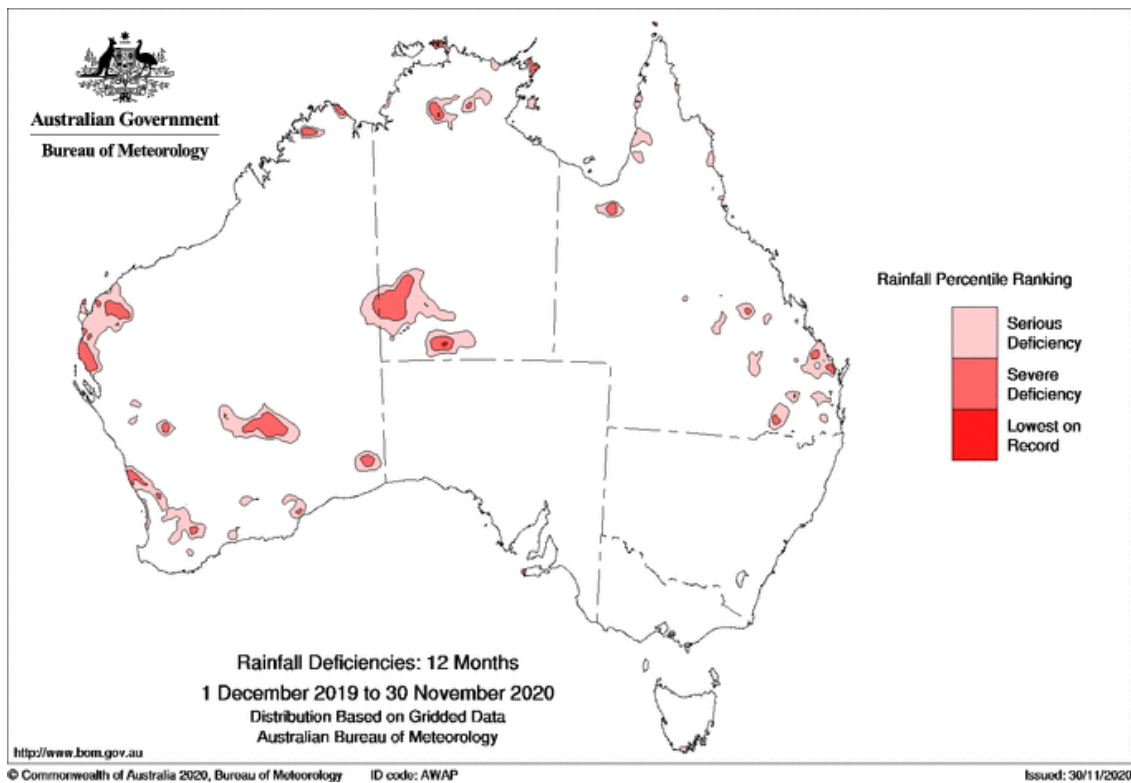


Figure 12. Rainfall deficiency, South Australia, 1 December 2017 to 30 November 2020

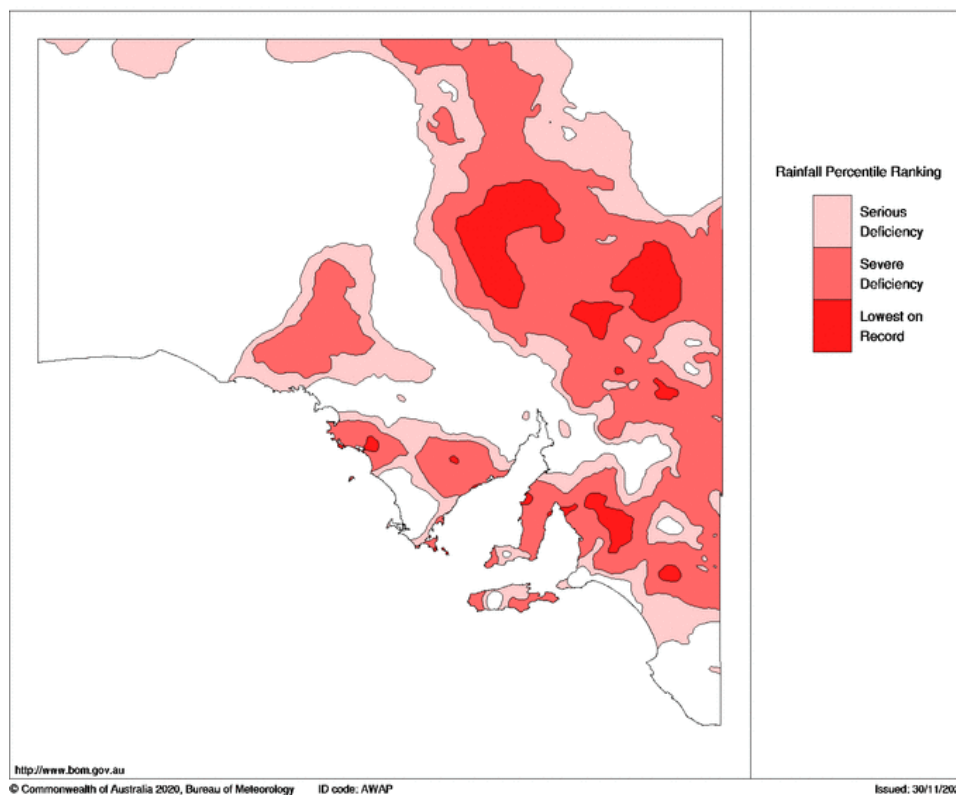


Figure 13. Rainfall deficiency, South Australia, 1 December 2017 to 30 November 2020

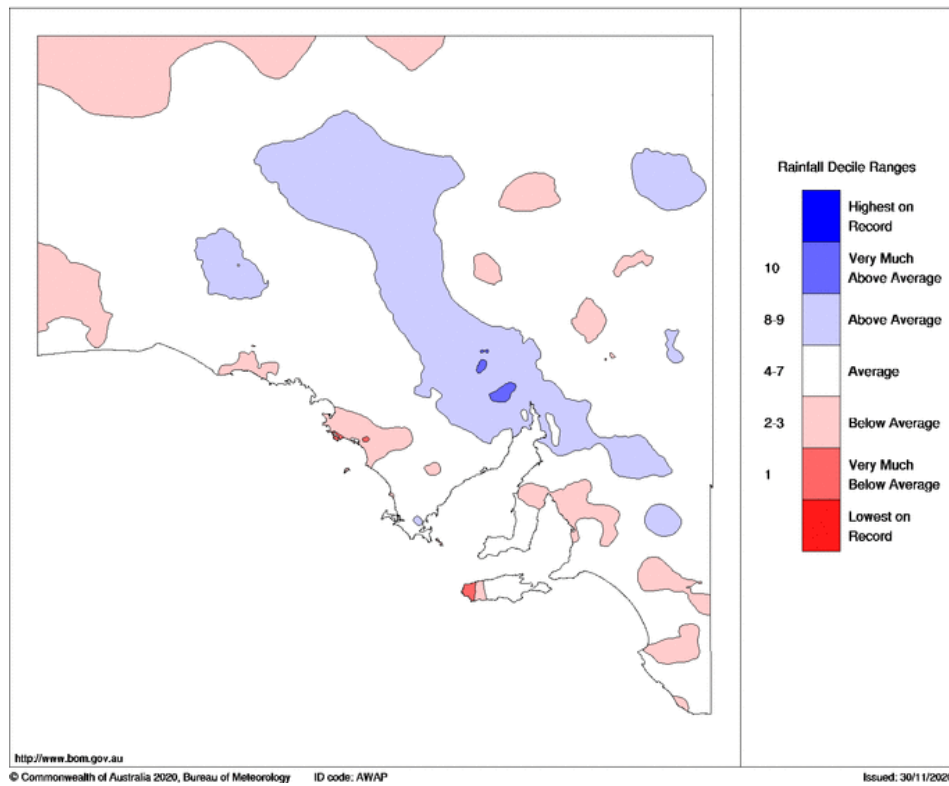


Table 1. Annual Rainfall (mm), nearby weather stations, 2015-2019

Weather Station	2015	2016	2017	2018	2019	Average
Hindmarsh Island AWS	333.4	522.4	382.6	288.4	330.8	371.5
Langhorne Creek	405.2	486.0	409.0	264.2	-	391.1
Goolwa barrage	356.9	613.1	386.3	294.8	341.1	398.4
Milang (Navarino)	397.2	568.2	417.0	297.6	326.8	401.4
Point Sturt	405.0	577.2	440.4	262.4	350.4	407.1
Milang	428.0	572.4	455.1	284.9	302.8	408.6
Strathalbyn racecourse	371.4	657.8	499.4	310.4	299.8	427.8
Goolwa Council depot	417.6	620.8	498.6	355.4	375.7	453.6
Strathalbyn	408.3	725.7	540.3	343.9	334.4	470.5
Finniss	383.6	747.6	546.0	379.8	396.6	490.7
Mount Compass	646.7	1197.3	No record	659.9	589.7	773.4

3.7.2. Millennium Drought

“Water levels in Lake Alexandrina drew down to -1.05AHD (compared to a long-term average of 0.7AHD) whilst salinity levels as high as 9000 EC (uS/cm) and 6500 EC (uS/cm) were recorded at Point McLeay and the middle of Lake Alexandrina respectively. As water levels dropped, acid sulphate soils were exposed and acidification of surface waters in the Lower Lakes became a real threat. Acidification of surface waters did occur over an area of 2,173ha in the shallow margins of the lakes with acid sulphate soils exposed over a much greater area (~20,000ha).”

Alexandrina Council Environmental Action Plan 2014-18

Much of southern Australia experienced a prolonged period of dry conditions, known as the Millennium Drought, from late 1996 to mid-2010. The drought was both widespread and protracted.

Prior to adoption of the Murray Darling Basin Plan in 2012, the unsustainable use and management of Basin water resources (combined with severe drought) had a devastating impact on Alexandrina’s community and local environment. The impacts of the Millennium Drought on our region are well documented elsewhere but included low water levels, elevated salinity, vast exposure of acid sulphate soils, and localised acidification of surface waters, a problem that continues to have long standing environmental impacts on our environment and has needed significant investment from State and Federal Governments to continue to work toward resolving. In addition, what lake water there was became either inaccessible or unusable for irrigation, whilst low water levels had a significant impact on tourism and related industries, with associated drops in property values and sales.

Alexandrina Council and its communities were severely affected by the impacts of the Millennium Drought (2001-2009). Council reports indicate that over-extraction along the length of the River Murray combined with the worst drought conditions in over 100 years resulted in extremely low flows and threatened the Lower Lakes. High salinity levels in the lakes from low freshwater inflow had significant environmental, social and economic ramifications. This included major loss of freshwater species, threats to irrigation reliant industries, reduction in tourism related business and impacts on community wellbeing. Sea levels were higher than the lakes for most of the drought period and the Goolwa barrages closed between 2007 to 2010. Dredging of the Murray Mouth was a regular feature of the drought and is a practice continued today.

Since the Millennium Drought, Council has advocated strongly for the establishment and implementation of the Murray Darling Basin Plan which was developed post the Millennium Drought to set annual water use limits for the Basin. The Basin Plan is a partnership by the Australian and State Governments in the Murray Darling Basin.

Council is also a member of the Murray Darling Association Inc. which seeks to provide effective representation of local government and communities at State and Federal level in the management of the Basin.

4 – COORDINATION AND COMMUNICATION

4. Coordination and Communication

4.1. Emergency Management

Emergency Management is governed by various national and state policies and legislation as follows:

1. Prevention and Preparedness
 - » National Drought Agreement 2018 (replaces the Intergovernmental Agreement on National Drought Program Reform 2013)
 - » Drought in Australia, Coordinator-General for Drought's advice on a Strategy for Drought Preparedness and Resilience
 - » Future Drought Fund
 - » Murray Darling Basin Authority – the Basin Plan
 - » National Strategy for Disaster Resilience, Council of Australian Governments, February 2011
 - » Emergency Management Act 2004
 - » State Emergency Management Plan (SEMP)
 - » National Emergency Risk Assessment Guidelines (NERAG).
2. Response and Recovery
 - » National Principles for Disaster Recovery
 - » National Natural Disaster Relief and Recovery Arrangements – Determinations (annual)
 - » Emergency Management Act 2004
 - » State Emergency Management Plan (SEMP)
 - » National Emergency Risk Assessment Guidelines (NERAG)
 - » Fleurieu Bushfire Management Area Plan (BMAP).

4.2. Local Government Sector

The local government sector and Adelaide Hills, Fleurieu and Kangaroo Island Region have actively engaged in planning for (Prevent and Prepare) and supporting response to (Response and Recovery) hazards and adverse natural events:

1. Prevention and Preparedness
 - » Adelaide Hills, Fleurieu and Kangaroo Island Zone Emergency Management Plan (ZEMP) Key Hazards and Risks Summary, September 2018
 - » LGA SA Council Ready Program, Emergency Management, Disaster Resilient, Australia Get Ready
 - » Zone Emergency Management Committee.
2. Response and Recovery
 - » Local Government Emergency Management Framework, LGA SA, July 2019
 - » Local Government Association (LGA) is currently working with Primary Industries and Regions SA (PIRSA) on the LGA SA Adverse Events Framework for Drought

Potential Gap: a sector wide focus on drought adverse events is recognition that drought could be a gap in local adverse event management.

4.3. The Role of Council

Under the State Emergency Management Plan (*Emergency Management Act 2004*), the role of local government includes:

- Prevention – build resilience and mitigate risk
- Preparedness - educate communities about emergencies
- Response - support emergency service agencies in response to an emergency
- Response - provide local knowledge to support responses to emergencies
- Recovery - support the community during recovery.

Council is required to develop policies and plans that guide coordinating resources and effective communication when responding to hazards and adverse natural events.

Opportunity: Council has current community emergency management plans, emergency management policies and public consultation policies that address communication during emergency situations.

4.4. Coordinating Response to Drought

The National Drought Agreement sets the framework for the Australian and State Government to support regional communities to prepare for and manage drought adverse events.

The Future Drought Fund (Federal) provides funding support to Australian farms and regional communities to prepare for improved resilience to drought. The Fund includes a Regional Drought Resilience Planning Program to build drought resilience at a regional level with support from local government.

The State has a key role in capability building programs for farming businesses, animal and stock welfare and land management issues during drought.

Primary Industries and Regions SA (PIRSA) is the Government agency responsible for leading South Australia's drought response and working with other State agencies and support services, Australian and local governments and industry. PIRSA's role includes assisting rural communities and farming businesses and families to prepare for and manage drought conditions.

The Department of Environment and Water (DEW) is the Government agency responsible for leading South Australia's management of water availability and water resource operations in the River Murray.

5 – NATURAL RESOURCES AND LANDSCAPES

5. Natural Resources and Landscapes

5.1. Surface and Groundwater

Alexandrina is located at the end of the River Murray with the district's eastern boundary at the Murray Mouth. The district includes Lake Alexandrina incorporating Goolwa Channel, Hindmarsh Island and Currency Creek. The Lower Lakes are predominantly freshwater to brackish (saline) systems which are separated from the Coorong, Murray Mouth and Southern Ocean by dune systems that prevent sea water incursion.

The River Murray including Lake Alexandrina forms part of the River Murray Prescribed Watercourse and is subject to a Water Allocation Plan (WAP) (current under review by the Murraylands and Riverland Landscape Board). The WAP is the legal document which determines use of the water resources via water licence or permit. The draft WAP shows water use has increased in recent years and is nearing the water cap.

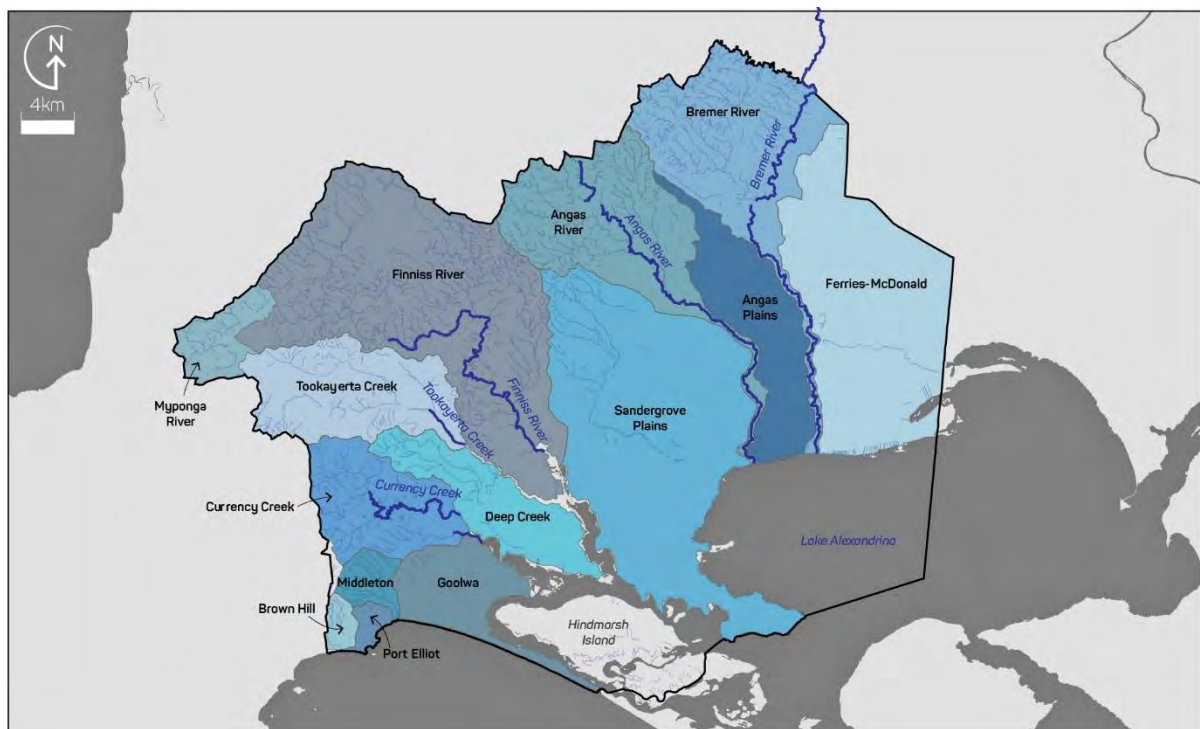
Three priority environmental assets are identified that rely on water from the River Murray for environmental watering with improvements proposed to environmental water requirements. They are:

- South Australian River Murray Floodplain
- South Australian River Murray Channel
- Coorong, Lower Lakes and Murray Mouth

Challenge: the district is located at the lower reaches of the Murray Darling Basin and is vulnerable to upstream water management practices.

The Angas Plains extend inland from the coast and river to the foothills of the Eastern Mount Lofty Ranges. Important catchments in this area are the Bremer, Angas and Finnis Rivers along with Tookayerta Creek which drain from the eastern side of the Mount Lofty Ranges to Lake Alexandrina. Several creek and river systems support critically endangered Fleurieu swamps and ecological communities, including many endangered flora and fauna species.

Figure 14. Surface Water Catchments



The district's groundwater is characterised as both fractured rock (western half of the LGA) and shallow sedimentary basins (eastern half of the LGA). Most of the western area is within the Adelaide Geosyncline (Adelaide Rift Complex) which is a major complex stretching from the northern parts of the Flinders Ranges to Kangaroo Island and includes the Mount Lofty (and Flinders) Ranges. To the east, groundwater is within the Murray Basin.

Most of the district is in the Eastern Mount Lofty Ranges Prescribed Water Resources Area (water affecting policy area) which incorporates the Angas Bremer Prescribed Wells Area located on the western side of Lake Alexandrina. Lake Alexandrina is managed through irrigation licences and new pump prohibited water extraction zone for its tributary wetlands.

The balance of the Council area is generally within a Water Protection Area associated either with the River Murray (Lake Alexandrina and surrounds) or Mount Lofty Ranges. Land that generally runs along the western boundary of the Council area forms part of the Mount Lofty Ranges Watershed and an area generally west of Mount Compass forms a high priority location for water supply. Water Allocation Plans are in place in relation to the Eastern Mount Lofty Ranges.

Challenge: water allocation planning in the Eastern Mount Lofty Ranges reflects over-allocation of water and unsustainable use patterns in some catchments.

5.2. Wetlands

The Coorong and Lakes Alexandrina and Albert Ramsar Wetland is recognised as a wetland of international importance. The wetland system supports many significant endangered flora and fauna species and is an important international migratory wader and waterfowl refuge and a nursery area for commercial fish species. The Coorong is one of the most significant Aboriginal archaeological sites in Australia.

The Coorong is a shallow, saline to hypersaline, coastal lagoon system more than 100 kilometres in length. It is separated from the Southern Ocean by a narrow sand dune peninsula known as the Younghusband Peninsula. The Coorong is divided by two long peninsulas into a Northern and Southern Lagoon. The Northern Lagoon connects with Lake Alexandrina and Lake Albert with associated shoreline marshes at the mouth of the River Murray. These lakes contain fresh to brackish-saline waters. South of the Southern Lagoon lies a chain of shallow, ephemeral salt lakes and swampy mud flats.

The River Murray is the main source of freshwater for the wetland system with saltwater feeding the system via the Murray Mouth. Smaller water inputs are received from local runoff, rainfall and groundwater.

Opportunity: the Basin Plan has provided a platform for Council to successfully advocate for improvements to the environmental health of the Murray Mouth, Lower Lakes and Coorong.

5.3. Coast and Estuary

The district's coastal landscapes are predominantly developed or semi-developed areas from Chiton at the western extent of the Council area through to Goolwa South. More natural coastal landscapes are found in Goolwa South (east) to the Murray Mouth and associated with the Coorong National Park.

The shoreline from Chiton to west of Port Elliott is a long south facing 'Boomer Beach' named after the heavily dumping waves. The beach begins west of Freemans Nob and extends to a small reef fronted sandy foreshore west of Chiton Rocks. Two headland areas located east and west of Port Elliott include coarse grained beaches. East of Port Elliot, the beach is bordered by high granite headlands.

Coastal landscapes between Fisherman Bay (Frenchman Rock) and Middleton Point provide a long low energy beach particularly at the western end with occasional rock outcrops and reefs off the beach. High tide sand beach and rock platforms characterise coastal areas around Middleton. Beach extends from Middleton toward the township of Goolwa and the Murray Mouth.

Several of these coastal environments support beach nesting birds in particular the threatened Hooded Plovers which have nesting sites ranging from Chiton to Goolwa Beach. Sir Richard Peninsula to the Murray Mouth are also known locations for the Sooty and Pied Oyster catchers and the long sandy beach is the nursery and collection site of the Goolwa Pipi.

The coastal environments particularly around Port Elliot and the Murray Mouth are known seabird sites.

Challenge: coastal landscapes are both sensitive and directly susceptible to extreme weather (storms) and Council infrastructure standards and/or coastal management plans should address coastal vulnerability.

5.4. Marine Parks

South Australia has created a system of marine parks under the *Marine Parks Act 2007* which aim to protect the marine environment, its biodiversity and native species. The parks protect critical habitat such as seagrass meadows, reefs and mangroves, feeding and breeding sites for marine animals and birds as well as fish and shellfish nursery areas. Each marine park has in place a management plan and management zones.

The Encounter Marine Park includes the waters off the coast of Alexandrina Council area and stretches from the Fleurieu Peninsula to the north-eastern coast of Kangaroo Island and the Coorong. The marine park supports some of the most recognisable South Australian marine life such as leafy sea dragons, sea-lions, dolphins and Southern Right Whales.

The Encounter Bay Sanctuary Zone includes part of the nationally significant whale aggregation area at Ratalang (Bashams) Beach. Fishing is prohibited in the sanctuary zone but is otherwise popular in the marine park.

5.5. Conservation Parks

The district forms part of the Adelaide and Mount Lofty Ranges National Parks and Wildlife (NPW) Region (Fleurieu District) to the west and the Riverland and Murraylands NPW Region (Murraylands District) to the east. The district contains and is surrounded by significant protected areas.

- Coorong National Park
 - » Is a premier National Park in South Australia located at the Murray Mouth. The park is a saline lagoon stretching about 140 kilometres separated from the Southern Ocean by the sand dunes of the Younghusband Peninsula. Vegetation is coastal and estuarine. The park includes the Ramsar wetland site and is an important breeding area for the Australian pelican and a refuge for ducks, swans, cormorants, terns, grebes and over 230 international migratory birds that use the area annually.
- Kyeema Conservation Park
 - » Is located about 10 kilometres north-east of Mount Compass and south of Kuitpo Forest. The park is over 347 hectares of dense vegetation with an overstorey of primarily messmate string bark with some pink gum and cup gum with diverse understorey. The park provides habitat for the southern brown bandicoot, swamp rat and western grey kangaroo. Over 80 bird species have been recorded in the park including White's thrush, beautiful firetail, chestnut-rumped heathwren, superb fairywren, striated thornbill, brown thornbill, white-browed scrubwren, crescent honeyeater, yellow-faced honeyeater and grey shrikethrush.
- Mount Magnificent Conservation Park
 - » Is located about 6 kilometres north-east of Mount Compass and sits between Kyeema Conservation Park and Finniss Conservation Park. The park is about 90 hectares of protected land that is a popular location for walking with trails to the summit among the gums and wildflowers. The Heysen Trail passes through the park.
- Finniss Conservation Park

- » Is located about 7 kilometres north-east of Mount Compass and sits between Mount Magnificent Conservation Park and Cox Scrub Conservation Park. The park has views over Finniss River and surrounding landscapes. The park is about 123 hectares of open forest with tall gum species. The eastern section of the park is more densely vegetated.
- Cox Scrub Conservation Park
 - » Is located about 8 kilometres south of Ashbourne. The park is about 544 hectares of undulating land that borders the Finniss River. Vegetation is characterised by low stunted stringybark, banksia and dense understorey which provides habitat for a variety of bird and native fauna.
- Bullock Hill Conservation Park
 - » Is located about 9.5 kilometres south-west of Strathalbyn. The park includes tall stands of pink gum and cup gum with areas of dense acacia and mixed health understorey through to native grass lands. Given a variety of habitats, the park supports bird species such as the brown-headed honeyeaters, red-wattle birds, grey shrike-thrush, rainbow bee-eater and black-faced cuckoo-shrike and Western Grey Kangaroos.
- Hesperilla Conservation Park
 - » Is located about 2 kilometres south of Mount Compass. The park is a nature reserve and was established as protected land in 2010.
- Scott Conservation Park
 - » Is located about 9 kilometres north of Goolwa on the plains to the east of the Mount Lofty Ranges. The park is about 210 hectares of relatively flat land with trails through blue and pink gum woodlands.
- Lawari Conservation Park
 - » Is located at the eastern end of Hindmarsh Island and was established as a conservation park as recently as 2017. The park is 106 hectares of degraded land that is being extensively revegetated for future protection. The land supports diverse habitats and a high number of threatened fish, including the Murray Hardyhead and Yarra Pygmy Perch, as well as numerous bird species, including the Fairy Tern, Far Eastern Curlew and Cape Barren Goose. Lawari Conservation Park will contribute to the long term health of the wetland ecosystems of the Coorong and Lakes Alexandrina and Albert Ramsar site.

The district has two game reserves located near Lake Alexandrina where hunting is permitted at certain times of the year.

- Currency Creek Game Reserve
 - » Is a park of about 128 hectares located about half a kilometre north-east of Goolwa on the south-western side of Lake Alexandrina.
- Tolderol Game Reserve
 - » Is a park of about 4 square kilometres located on the north-western side of Lake Alexandrina and important refuge for shorebirds, waders and waterfowls.

5.6. Landscapes and Biodiversity

Alexandrina has diverse landscapes. The southern boundary is open sandy beaches with some rocky outcrops along the 25 kilometres of coastline. The eastern boundary begins at the Murray Mouth with Lake Alexandrina, Goolwa Channel, Hindmarsh Island, the River Murray and Currency Creek providing key landscapes. The western parts of the district rise as they approach the Eastern Mount Lofty Ranges landscape along the western boundary which includes important surface water catchments. Moving north the Finniss, Angas and Bremer Rivers are important for the district's industries, viticulture and agriculture.

The district's flora and fauna are categorised into three regions (each with subregion) that broadly follow the major landscapes:

1. Adelaide and Mt Lofty Ranges Region (Fleurieu sub-region) to the north-west
2. Murraylands Region (Murray Mallee sub-region) centrally through the district
3. South East Region (Murray lakes and Coorong sub-region) to the south-east.

Council reports indicate less than 12% of remnant vegetation remains across the district and four ecological communities listed as threatened at a national level in the district:

1. Swamps of the Fleurieu Peninsula
2. Peppermint Box Grassy Woodland of South Australia
3. Iron-grass Natural Temperate Grassland of South Australia
4. Subtropical and Temperate Coastal Saltmarsh.

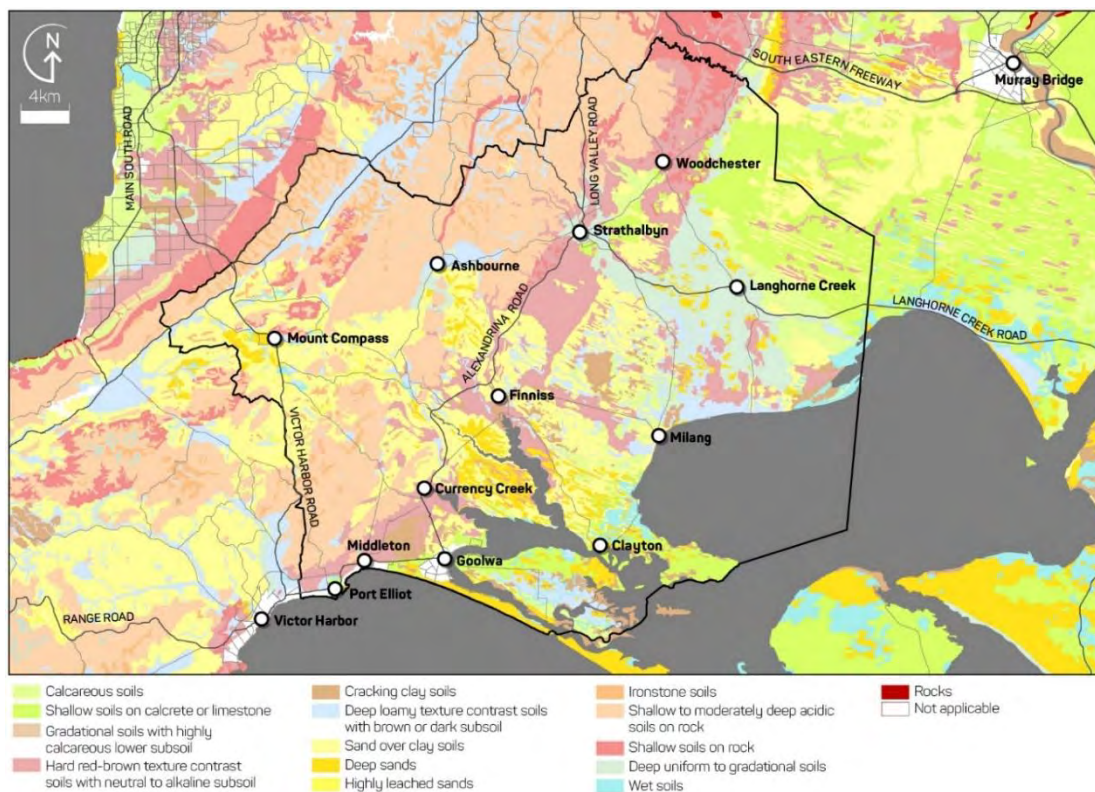
Known nationally threatened plant and animal species include the Orange Bellied Parrot, Mount Lofty Ranges Southern Emu Wren, Hooded Plover, Southern Brown Bandicoot, Southern Pygmy Perch, Fatleaved Wattle, Mount Compass Oakbush, Silver Daisy-bush, Resin Wattle and Coloured Spider Orchard.

Challenge: remnant vegetation outside of conservation parks is generally fragmented and in both public and private ownership. Climate change and drought is likely to have severe impacts on remaining patches of habitat. The ability to establish and provide connectivity across the landscape is also a future challenge for the district.

5.7. Soil

Soils in the district are highly variable. Common soil types include calcareous soils and deep sands and shallow soils on calcrete.

Figure 15. Soil types



Soils of the Eastern Mount Lofty Ranges are vulnerable to soil acidity. In the western parts of the district over 90% of soils are currently categorised as acid prone. Soils in this location also tend to be characterised by high to moderate water erosion potential. Acid prone land and water erosion potential decreases away from the slopes of the Mount Lofty Ranges with lower acid risk in the north-eastern parts of the district and around the Murray Mouth, Lower Lakes and Coorong. In the later locations, there is greater acid sulphate soil potential and watertable induced soil salinity. Dryland salinity is a concern around Lake Alexandrina.

A large proportion of the district's soils are of moderate to low inherent fertility with smaller areas of very low fertility and high to very high fertility. More favourable soil fertility conditions are generally east of the ranges. Much of the Council area has soils with deep drainage potential and capable of supporting cropping and horticultural activities.

Soils most vulnerable to exposure occur along the coast and Coorong while parts of the upper slopes of the Eastern Mount Lofty Ranges and Hindmarsh Island are susceptible to moderate soil exposure. Wind erosion is high to extreme for the coastline, and low to high in other parts of the district.

Challenge: soil quality is a priority in the district for maintaining crop and pasture production and water quality.

5.8. Productive Lands

In 2014–15, the former Adelaide and Mt Lofty Ranges Natural Resources Management Board commissioned an assessment of the climate vulnerability of the agricultural sectors across the region. These sectors included viticulture; perennial and annual horticulture; annual cropping; extensive livestock; and dairy.

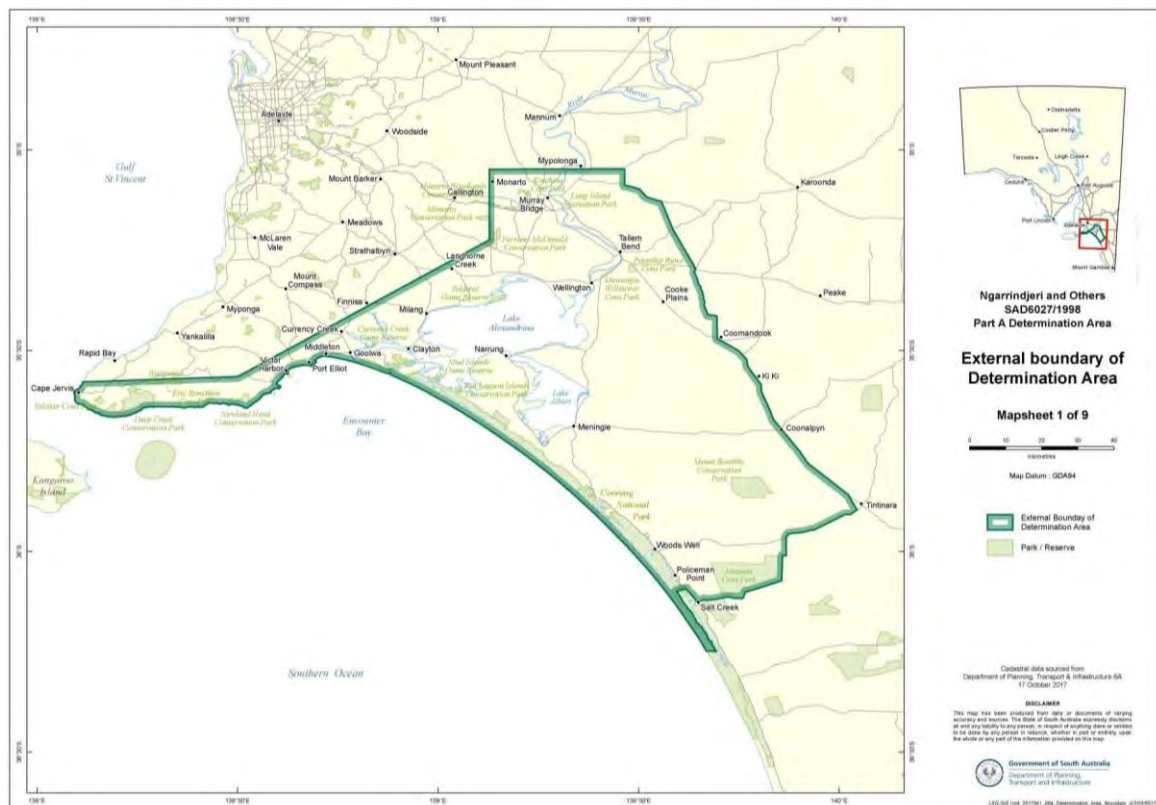
The assessment indicated hot days and heatwaves are already a challenge in the current climate and are expected to become more challenging in future climates. The resultant increased irrigation demand is expected to place additional strain on the supply of irrigation water and the ability of on-farm irrigation systems. Autumn, winter and spring rainfall declines are expected to affect productivity and place further pressure on irrigation waters. Hot days are also a concern to livestock.

Challenge: there is expected to be greater overall demand for agricultural irrigation, as well as an increase in high irrigation requirement days.

5.9. Native Title

The *Native Title Act 1993* establishes a legal framework for Indigenous groups to make application to the Federal Court to have their Native Title rights that arise under their traditional laws and customs recognised through a determination. In the Council area, the Ngarrindjeri Native Title Claim Part A has been settled (Native title exists in parts of the determination area). Native Title determinations establish arrangements for the co-existence of Aboriginal and non-Aboriginal people in the area.

Figure 16. Native Title Determination



Opportunity: Aboriginal and Torres Strait Islander populations should be given specific consideration and involvement in managing adverse events.

6 – COMMUNITY RESILIENCE AND ECONOMIC DIVERSIFICATION

6. Community Resilience and Economic Diversification

6.1. Community Characteristics

6.1.1. Current and Future Population

Alexandrina Council has been experiencing positive population growth. Between 2011 and 2016 the population grew by just over 10% (2,347 persons), which was greater than both Greater Adelaide (4.8%) and Regional South Australia (3.5%).

Population is forecast to increase by just under 8,000 persons (30%) to an approximate 2036 population of 34,542.

2011	Change 2011 to 2016	2016	Change 2016 to 2036	2036
24,125	+2,437	26,562	+7,980	34,542

6.1.2. Service Age Groups

The district is characterised by both an older *and* working age population. Just under 45% of the population was between 18 and 59 years of age in 2016. There was also a higher proportion of the population aged 70 years or older (19.3% compared to 14.8% for Regional SA). Table 2 summarises the age profile comparison between Alexandrina Council and Regional SA.

Table 2. Service Age Profile for Alexandrina Council and Regional SA

Service age group (years)	Alexandrina %	Regional SA %
Babies and pre-schoolers (0 to 4)	4.4	5.5
Primary schoolers (5 to 11)	7.8	8.6
Secondary schoolers (12 to 17)	6.6	7.2
Tertiary education and independence (18 to 24)	5.7	6.8
Young workforce (25 to 34)	7.7	10.4
Parents and homebuilders (35 to 49)	16.4	17.8
Older workers and pre-retirees (50 to 59)	14.5	14.6
Empty nesters and retirees (60 to 69)	17.5	14.4
Seniors (70 to 84)	16.1	12.1
Elderly aged (85 and over)	3.2	2.7

There is a distribution of age profiles across the district. For example, a younger or family demographic is more prominent in townships closer to Adelaide, while older or retiree populations are more common in southern or coastal settlements. This is evidenced by median ages across the Council area, the median age in Mount Compass (closer to metropolitan Adelaide) is 40 years and in Goolwa (southern township) is 65 years (ABS 2016).

Between 2011 and 2016 the proportion of population aged over 60 years increased from 32.5% to 37%; an increase of over 1,800 people. This is equivalent to 82% of Council's total population growth for the period. At the same time Council recorded a net loss of population aged between 18 to 24 years (-274 people). Between 2011 and 2016 Goolwa/Goolwa Beach gained 581 persons over 50 years of age and lost 359 persons under 50 years of age, increasing the median age from 63 years (2011) to 65 years (2016). The following table summarises the change in service age groups between 2011 and 2016.

Table 3. Service Age Change for Alexandrina Council 2011 to 2016

Service age group (years)	2016 (%)	2011 (%)	Change (No.)
Babies and pre-schoolers (0 to 4)	4.4	5.2	-96
Primary schoolers (5 to 11)	7.8	7.9	+156
Secondary schoolers (12 to 17)	6.6	7.4	-46
Tertiary education and independence (18 to 24)	5.7	6.2	+17
Young workforce (25 to 34)	7.7	7.9	+115
Parents and homebuilders (35 to 49)	16.4	18.4	-117
Older workers and pre-retirees (50 to 59)	14.5	14.4	+346
Empty nesters and retirees (60 to 69)	17.5	16.8	+559
Seniors (70 to 84)	16.1	13.4	+998
Elderly aged (85 and over)	3.2	2.4	+247

Challenge: The district has a growing and ageing population with a growing number of families. Asset plans an development controls such as in coastal settlements, flood prone areas and dwelling growth in bushfire zones should factor climate resilience.

6.1.3. Households

There were approximately 10,856 households in the district in 2016.

The most prominent household type was 'couples without children' (34.9% compared with 22.8% for Regional SA) which, when correlated with the Council's age profile, could suggest a high proportion of 'empty nesters'.

The second most common household type was 'lone person' which made up just over a quarter of households (26.2% compared to 27.9% for Regional SA). Lone person households are also the fastest growing household type, increasing by 367 since 2011.

Table 4. Household Types Compared with the RDA and Change in Household Types Since 2011

Household Type	District (%)	Regional SA (%)	Change 2011 - 2016
Couples with children	22.3%	22.8%	+123
Couples without children	34.9%	29.6%	+178
One parent families	8.4%	9.0%	+62
Other families	0.6%	0.7%	-10
Group households	1.9%	2.2%	+4
Lone person	26.2%	27.9%	+367
Visitor only	1.7%	3.4%	+29

Challenge: Social connection for lone person households is an important component of resilience to adverse events. Effective communication and support for lone person households preparing for and during an adverse event will become more important as this household type grows.

6.1.4. Housing Tenure

In 2016, fewer households were renting (20.0% compared to 26.0% for Regional SA), with most dwellings fully owned (39.1% compared to 35.5% compared for Regional SA) or under mortgage (32.6% compared to 29.3% for Regional SA). This is reflective of the age structure with both a growing ageing population (full ownership) and a growing working age population (Mortgage).

Of the households renting, more were in private rentals (17.2%) than in social housing (2.2%). Alexandrina Council has lower dependency on social housing and greater housing stability than Regional SA. Social rental was significantly lower in Alexandrina Council compared to Regional SA 19.3%.

6.1.5. Household Income

Household income quartiles in 2016 demonstrate that the highest proportion of the population were in the 'lowest income group' (30.4%). This is followed by the medium-lowest and medium-highest groups respectively. A small percentage of those in the Council area were in the highest income group. This is comparable to Regional SA but well below the RDA Region (Adelaide Hills, Fleurieu and Kangaroo Island) and is likely to reflect the retirement population for the district.

All quartile groups experienced an increase from 2011-2016 suggesting ongoing attraction of a diverse population to the district. Social diversity is a strength of the district.

Table 5. Household Income Quartiles

Quartile Group	District (%)	RDA Region (%)	Regional SA (%)	Change (No.)
Lowest	30.4	27.1	28.5	+170
Medium Lowest	27.4	23.8	27.2	+178
Medium Highest	23.1	23.0	23.1	+153
Highest	19.1	26.0	19.1	+121

6.1.6. Dwelling Type and Occupancy

In 2016 the district had approximately 15,405 dwellings which were characterised mostly by separate dwellings (92.7% compared to 86.1% for Regional SA). Separate dwellings were the fastest growing dwelling type in the district between 2011 and 2016, growing by 1,210 dwellings.

There were fewer medium density dwellings (5.4%) compared to Regional SA (10.5%).

Dwelling occupancy was 70.5% in 2016 (in comparison with 77.7% for Regional SA) suggesting up to a third of dwellings could be holiday homes for seasonal population.

Challenge: Communication and coordination with holiday populations in planning for or managing adverse events and management of unoccupied dwellings for issues such as fire fuel loads are important considerations for Council and hazard leaders/partners.

6.1.7. Migration

Population movements in the district are discussed for the 2011 and 2016 period.

The highest net migration to Alexandrina Council area was from:

1. Onkaparinga (+347 people)
2. Mount Barker (+226 people)
3. Adelaide Hills (+135 people)

The highest net loss from Alexandrina Council was to the following areas:

1. Victor Harbor (-157 people)
2. Yankalilla (-27 people)
3. Queensland (-63 people)

In 2016, the age group with the highest net migration to the district was people aged 55 to 64 years, while the greatest out migration was people aged 18 to 24 years.

Challenge: The highest population loss for the district is persons aged 18-24 years and the greatest population gain is for persons over 55 years of age. Improved retention of younger populations and strategies to attract this segment of the population back to the district will continue to contribute to Council's community diversity.

6.1.8. Need for Assistance

In 2016, about 1,740 people (6.7%) reported needing help in their day-to-day lives due to disability. A significant proportion of these people were those aged 85 and over (40.5%). However, a larger proportion of population 10-59 years of age needed help in their day to day lives due to disability (8.3% compared with 7.3% for Regional SA). Between 2011 and 2016 the number of people under 60 years of age needing help in their day to day life due to disability increased by 174 persons.

6.1.9. Volunteers

Alexandrina reported 27.5% of the population (6,008 people) did some form of voluntary work in 2016. Volunteer rates were almost on par with that of Regional SA (27.8%). Approximately 13.5% (2,941) of the district's population provided unpaid support to a person aged 15 years or older compared with 12.2% for Regional SA.

6.1.10. Mobility

Most people in the district relied on private motor vehicles for transport to work in 2016 (66.6%).

Most households in Alexandrina Council owned two private vehicles (35.7%), closely followed by households owning one private vehicle (33.7%).

Just over 3% of the population did not own a motor vehicle.

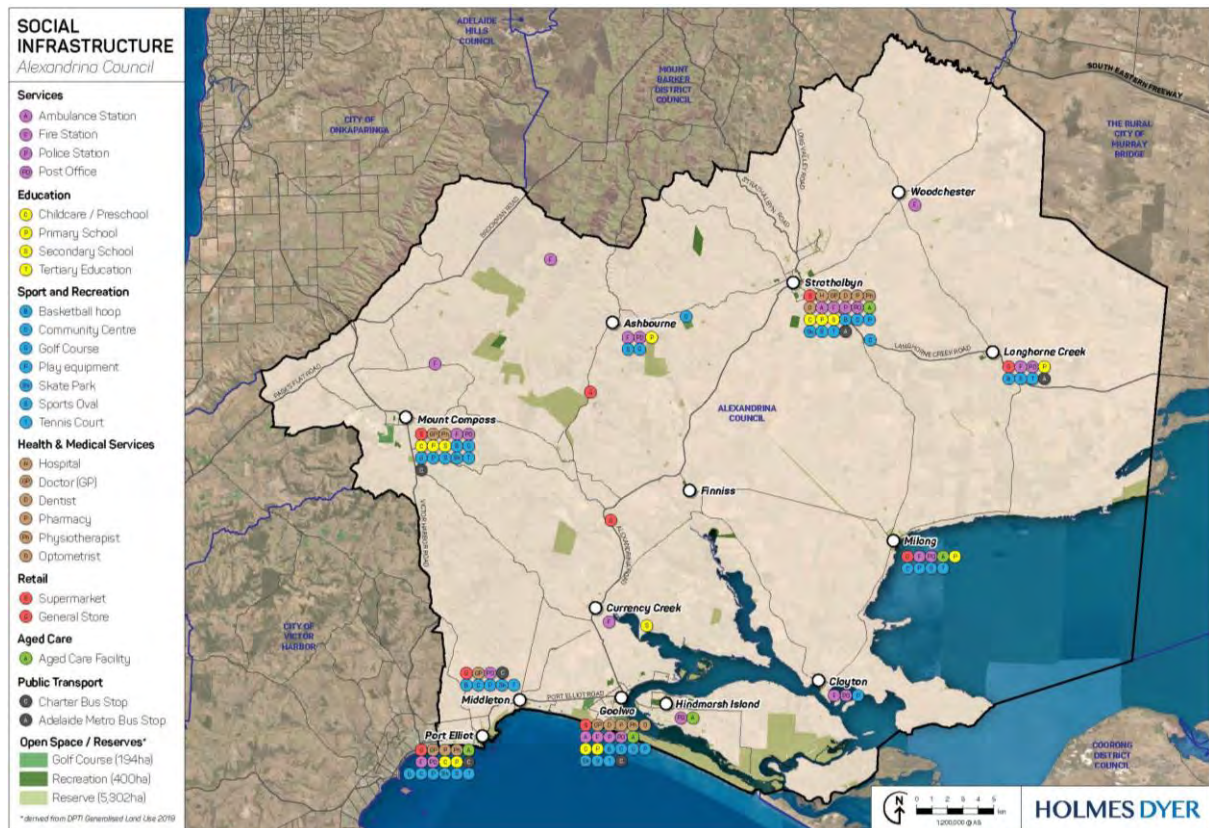
Challenge: Evacuation for older populations and households without vehicles during adverse events may need to be addressed in conjunction with partners and hazard leaders.

6.1.11. Internet Connection

People are increasingly using internet to access important information about emergency preparedness and responses, and therefore internet connection is an important indicator of a community's resilience to adverse events. There also tends to be a correlation between no internet connection and age or other vulnerability (such as low income). In 2016, 1,779 households (16.4%) in the district did not have an internet connection at their dwelling.

6.2. Community Facilities and Social Infrastructure

Figure 17. Social Infrastructures



6.2.1. Social Connections

The district is serviced with social connection facilities including churches (Uniting, Anglican, Catholic, Lutheran and Seventh-day Adventist) located at Port Elliot, Goolwa, Finnis, Milang, Strathalbyn, Mount Compass, Tooperang, Ashbourne and Langhorne Creek; and recreation and community clubs at Port Elliot, Goolwa, Milang, Strathalbyn, Mount Compass, and Ashbourne).

Other recreation facilities include a selection of 9-hole and 18-hole golf courses, netball/tennis courts, ovals and playgrounds.

The district has five libraries (Goolwa Library, Strathalbyn Library, Milang Library Depot, Port Elliot Library Depot, and Mount Compass Library Kiosk) which are part of the one-card network (offering access to a wide range of materials) and provides social and educational activities for the community.

Other community groups include Men's Shed located at Strathalbyn, Milang and Goolwa, and the Alexandrina Contract Bridge Club. The district has active community leadership and participation groups.

6.2.2. Supermarkets and General Store

In total there are five seven-day supermarkets in the district (Goolwa, Mount Compass and Strathalbyn), local convenience shopping (Goolwa) and general stores (Port Elliot, Currency Creek, Strathalbyn, Langhorne Creek, Milang and Ashbourne). Strathalbyn and Port Elliot offers a range of smaller retail, cafes/restaurants and food businesses.

6.2.3. Government and Non-Government Services

The district supports twelve post offices (Ashbourne, Strathalbyne, Langhorne, Milang, Clayton Bay, Hindmarsh Island, Goolwa, Middleton, Mount Compass and Port Elliot), bank branches including NAB, BankSA and Bendigo (Strathalbyn and Goolwa) and ATM locations (Strathalbyn, Mount Compass, Goolwa and Port Elliot). The district offers a small selection of government and non-government facilities which include but are not limited to Alexandrina Council Office and SA Police.

6.2.4. Emergency Services

Twelve Country Fire Services Stations (CFS) are located within the district (Strathalbyn, Woodchester, Blackfellows Creek, Ashbourne, Langhorne Creek, Milang, Currency Creek, Clayton and Mount Compass), with Ambulance Stations and Police Stations located in both Strathalbyn and Goolwa.

6.2.5. Health and Medical Services

Health and medical services are available in the district and include a general hospital (Strathalbyn and District Health Service), General Practitioners (Cadell Medical Clinic, Goolwa Medical Centre, Mount Compass Medical Centre, Port Elliot Medical Clinic, Mill House Medical Centre and Strathalbyn Family Medical Centre), dentists, podiatry and chemists. Additional health and medical services include physiotherapy, optometry, hearing specialists, SA Pathology and Dr Jones & Partners Medical Imaging, along with earth medicine. There is a Link SA bus service to the city and taxi services available.

6.2.6. Education and Learning

Alexandrina has 15 schools located within Strathalbyn, Langhorne Creek, Milang, Ashbourne, Mount Compass, Currency Creek, Goolwa and Port Elliot which incorporate a mix of Early Learning Centres (Where We Grow Early Learning Strathalbyn, Strathalbyn Outreach Kindergarten, Strathalbyn Kindergarten Inc, Tyndale ELC, Mt Compass Preschool Centre and Port Elliot Kindergarten), reception to Year 6 (Eastern Fleurieu School - Langhorne Creek, Milang and Ashbourne campuses, Goolwa Primary School and Port Elliot Primary School) and reception to Year 12 (Tyndale Christian School, Eastern Fleurieu School – Strathalbyn campus, Mount Compass Area School and Investigator College – Currency Creek campus).

In addition to the 15 primary and secondary schools, the district provides two child-care facilities located within Goolwa and Strathalbyn.

While no tertiary facilities are present within the district Alexandrina is located close to Victor Harbor and Mount Barker where tertiary facilities are located.

6.2.7. Aged Care Services

The district has five aged care facilities located within Goolwa, Port Elliot and Strathalbyn which offer a range of high and general level residential care. The Resthaven Port Elliot facility offers 15 beds for people with high level care needs, and 92 beds for low level care needs. The facility caters for Indigenous and Torres Strait Islander people and offers care for those suffering dementia and / or terminal illness. The Strathalbyn and District Aged Care Facility supplies the district with a further 12 beds for people with high level care needs and 80 beds for those with low level care needs. The remaining facilities, Sandpiper Lodge and ACH West Park supply the region with a further 141 low level care beds.

According to the standard rate of provision of aged care beds for persons aged above 70 years (125 beds for every 1,000 persons) the district is heavily underprovided for in terms of aged care beds, and is unlikely to be adequate in regard to the district's increasingly ageing population.

Potential Gap: As the population ages, existing aged care facilities may struggle with demand.

6.2.8. Camping Facilities

Alexandrina Council supports a small selection of camping activities within the district, with Frank Potts Reserve located in Langhorne Creek the only approved camping site within the district which accommodates camping, caravans and self-contained motor homes.

The district supports designated caravan parks located at Milang, Goolwa, Strathalbyn, Hindmarsh Island, Clayton Bay, Middleton, Port Elliot and Mount Compass. Information is readily available on conservation parks including emergency contacts and bushfire closures. In South Australia, owners of caravan parks have certain legal obligations as part of their operation including preparation of an emergency evacuation plan.

6.3. Economy

6.3.1. Economic Diversity

Economic diversity for townships and regions can be characterised by the distribution of employment by industry. The higher the proportion of any single industry the higher the economic vulnerability of the community.

6.3.1.1. Labour Force and Employed Residents

Alexandrina's labour force participation rate decreased between 2011 (53.4%) and 2016 (49.0%) and is below that for Regional SA (54.4% in 2016). This is likely due to the ageing population, with a larger proportion of the population retirees. The labour force status for Alexandrina at 2016 is shown in Table 6.

Table 6. Labour Force Status 2016

Labour Force Status	Alexandrina (%)	Regional SA (%)	Labour Force Change 2011-2016 (No.)
Total labour force (Participation rate)	49.0	54.4	+175
Not in the labour force	44.4	38.6	+1,209
Labour force status not stated	6.6	6.9	+745

There were 10,080 individuals (94.2%) employed in the district in 2016. The number of employed persons increased between 2011 and 2016 (+158 people) as did the overall labour force (+175 people). The greatest increase was seen in part-time employment, which increased by 374 people this growth was offset by a reduction in full-time employed persons (-178 people).

Table 7. Employment Status 2016

Employment Status	Alexandrina (%)	Regional SA (%)	Employment Change (No.)
Employed	94.2	93.4	+158
Employed full-time	48.6	53.8	-178
Employed part-time	43.9	37.8	+374
Hours worked not stated	1.7	1.8	-38
Unemployed (Unemployment rate)	5.8	6.6	+17
Looking for full-time work	3.4	4.3	-7
Looking for part-time work	2.4	2.3	+24

Increasing part time employment and decreasing full time employment is a consistent trend across regional communities and is likely to reflect an increase in health care and social assistance (more Alexandrina residents worked in health care and social assistance than any other industry in 2016), retail and growth in the household services sector.

Table 8. Employed Residents by Industry

Employed Residents by Industry	(%)
Health Care and Social Assistance	14.8
Retail Trade	10.1
Construction	9.7
Agriculture, Forestry and Fishing	8.7
Education and Training	7.6
Manufacturing	7.4
Accommodation and Food Services	7.1
Public Administration and Safety	5.2

Alexandrina has higher employment than Regional South Australia, and employment across a range of industries suggesting there could employment diversity available to residents, depending on resident place of work.

6.3.1.2. Resident Place of Work

In 2016 the job to worker ratio for Alexandrina was 0.67. The job to worker ratio for the RDA region was 0.65. This means there are less jobs available than resident workers. Over 40% of Alexandrina's working population travels outside of the area for employment, typically when employed in professional occupations (60.3% professionals worked outside of the area).

Strength: Alexandrina Council has a high employment rate compared to Regional SA and there is evidence of employment diversity for residents.

Challenge: Over 40% of residents work outside of the area. There may be a need to partner in a local and regional economic development strategy to grow local jobs relevant to the growing local labour force.

6.3.1.3. Local Jobs

In the 10-year period from 2009 – 2019 local employment grew by 6.2% (+457 jobs). Most of this recent growth occurred in the three years between 2016 and 2019 (4.75% or 351 local jobs).

In 2019, the Household Services sector accounted for 36.5% of employment in Alexandrina Council, an increase from 29.7% (665 jobs) in 2009. Growth in household services is a trend associated with households spending more money on services as income as wealth increases, or from businesses outsourcing non-core functions to smaller service providers.

The Household Services sector provides services including health, education, hospitality and recreation. Many services demanded by households, especially health and education, are less discretionary and so is an important source of growth, including growth in part time employment.

Households also consume other services, such as finance and insurance, but these are classified as Business Services. This sector represented 9.6% of local jobs in 2019 and experienced a growth of 109 jobs since 2009. The following table summarises local jobs by industry for Alexandrina (2019). The following table summarises local jobs by industry.

Table 9. Local Jobs by Industry 2019

Industries	Jobs 2019 (%)	Jobs 2009 (%)	Change Local Jobs (No.)
Household services	36.5	29.7	665
Goods related	34.0	39.8	-268
Agriculture, forestry and fishing	15.0	17.7	-127
Business services	9.6	8.7	109
Public administration and safety	3.5	2.6	77
Mining	1.4	1.5	1
Total Industries	100	100	457

6.3.1.4. Number of Businesses

Alexandrina Council had 2,146 registered businesses in 2019, representing approximately 19 different industries. Five industries accounted for 61.4% of businesses within the district.

Table 10. Top 5 Industries by Number of Businesses

Industry	Business (No.)	Businesses (%)
Agriculture, Forestry and Fishing	521	24.3%
Construction	412	19.2%
Professional, Scientific and Technical Services	164	7.6%
Rental, Hiring and Real Estate Services	142	6.6%
Retail Trade	128	6.0%

Between 2017 and 2019 Alexandrina experienced a slight reduction in total businesses (-10). Agriculture (-31 businesses) and retail (-12 businesses) recorded the greatest reduction between 2017 and 2019. Other services (+23 businesses), Professional and technical services (+13 businesses), and health services (+8 services) recorded the greatest increase for the period.

Strength: Despite an overall reduction in local businesses there is evidence of growth in industries relevant to local labour and demand

6.3.1.5. Economic Value

Agriculture, Forestry and Fishing, Health Care and Social Assistance and Construction are among the most valuable industries in terms of value add (value of output against input), output (gross measure of sales), exports and local sales (the output of local industries that is sold locally). In 2018/19:

- Agriculture, Forestry and Fishing (\$182.8M), Construction (\$102.5M) and Health Care and Social Assistance (\$84.8M) contributed approximately 48% of Alexandrina's total value add
- Construction (\$367.9M) and Agriculture, Forestry and Fishing (\$336.3M) contributed 38% of Alexandrina's total output
- Agriculture, Forestry and Fishing accounted for 40% of Alexandrina's exports. Manufacturing (\$171.4M) was the second highest contributor contributing 30% of exports from the district.

The following table summarises the local sales by industry as value and proportion of total local sales:

Table 11. Local sales by industry as value and proportion of total local sales

Industry	Value \$M	Proportion of Total Local Sales (%)
Construction	367.9	28.7
Rental, Hiring and Real Estate Services	218.3	17.0
Agriculture, Forestry and Fishing	106.2	8.3
Health Care and Social Assistance	92.6	7.2
Manufacturing	66.6	5.2
Accommodation and Food Services	58.3	4.5
Retail Trade	56.2	4.4
Education and Training	53.7	4.2
Professional, Scientific and Technical Services	44.6	3.5
Financial and Insurance Services	33.8	2.6
Transport, Postal and Warehousing	33.1	2.6
Electricity, Gas, Water and Waste Services	29.7	2.3
Wholesale Trade	27.3	2.1
Public Administration and Safety	24.8	1.9
Other Services	23.8	1.9
Administrative and Support Services	21.4	1.7
Arts and Recreation Services	11.2	0.9
Information Media and Telecommunications	7.4	0.6
Mining	7.0	0.5

Strength: Alexandrina has a diverse and high value local economy with evidence of export, import and value adding outputs

6.3.2. Key Sectors

6.3.2.1. Agriculture, Farming and Fishing

In 2015/16, the total value of agricultural output in the Alexandrina Council was \$155.4M, comprising:

- Wine and table grapes (39.8%)
- Livestock (13.7%)
- Vegetables (12.5%)
- Milk (10.3%)
- Nurseries and cut flowers (6.0%)
- Cereal crops (4.7%)
- Fruit (3.9%)
- Eggs (1.0%)
- Nuts (0.2%)

Challenge: Almost 40% of the districts agricultural value is in a single commodity (wine and table grapes) suggesting some vulnerability to pest, climate and disease for economic output and local prosperity.

6.3.2.2. Tourism

Tourism Research Australia identified that for 2019:

- 276 tourism businesses operated in the Council of Alexandrina
- 31,000 interstate visitors spent 124,000 nights in the district
- 230,000 South Australians spent 575,000 nights in the district
- 6,000 international visitors spent 39,000 nights in the district

The two main reasons for visiting were holidaying and for friends and family. Spending from visitors was valued at a total of \$124M for the year. During summer 2020/2021, Alexandrina Council area was a popular holiday area and received higher than usual visitor numbers. This is likely contributed to by the global coronavirus pandemic restricting interstate and international travel.

6.3.2.3. Construction

In 2019/20 the value of building approvals in Alexandrina was \$8.64M, of which \$73.5M (85%) was in residential buildings. Alexandrina has 486 hectares of residential broad hectare land supply and 850 hectares of land identified for growth. Land supply is likely to sustain long term construction employment for the local labour force.

6.4. Essential Infrastructure

6.4.1. Potable Water

SA Water is owned by the State Government to manage water services in SA, including the provision of clean drinking water (and wastewater treatment). The district is largely serviced by SA Water, with the towns of Clayton, Langhorne Creek, Milang and Strathalbyn supplied with potable water from the SA Water's main network. Drinking water comes from the River Murray and is delivered via the Summit drinking water system via the treatment plant at Balhannah.

SA Water provides potable water collected from the Myponga Reservoir for the towns of Goolwa, Middleton, Hindmarsh Island and Port Elliot via the Myponga (Victor Harbour and Fleurieu drinking water system). SA Water supplies Mount Compass with groundwater. Mount Compass is also serviced via a private water supply scheme.

Sixty percent (within an average year) of the potable water supplied is sourced from catchments within the Western Mount Lofty Ranges watershed, while the remainder is sourced from the River Murray. When the region experiences a dry year the River Murray can supply as much as 90% of potable water.

Challenge: Water security is a present risk for the district.

6.4.2. Electricity

Electricity is provided to the district via SA Power Network substations located at Goolwa, Currency Creek, Milang, Belvidere, Strathalbyn and Mount Compass, and is transmitted to the surrounding area.

6.4.3. Mobile and NBN Coverage

There is NBN coverage to residential and business customers in the Council area. Telstra 5G is currently available in Middleton and Port Elliot.

Telstra 4G and digital mobile phone coverage is available across the district with all main towns and small townships able to get good coverage. Telstra 4G coverage is patchy in other parts of the district and some

townships are expected to receive mixed coverage. Similarly, Optus 4G services are available for most towns in the district, with coverage in Mosquito Hill, Mount Magnificent and Ashbourne experiencing somewhat patchy servicing.

Strength: There is good digital and telecommunications coverage for the district to support hazard lead communication and resident access to information.

6.4.4. Wastewater

SA Water provides limited wastewater servicing to the district, with servicing available primarily to select properties in Hayborough.

Council owns and operates six Community Wastewater Management Schemes (CWMS) which are located in Goolwa, Milang, Mount Compass, Port Elliot and Strathalbyn. Privately managed CWMS also operate within the region.

Most townships including Goolwa, Hindmarsh Island, Milang, Mount Compass, Port Elliot and Strathalbyn are serviced via individual on-site CWMS. Each CWMS scheme comprises a gravity collection system from private property to the street network. Council maintains the drainage network within the road reserve, easements and each property's allotment connection up to the property boundary. Within each property the ownership and maintenance of the internal drains and septic tanks is of the responsibility of the landowner.

6.4.5. Road, Rail and Airport

There are seven main bituminised road routes (Port Elliot Road, Alexandrina Road, Langhorne Creek Road, Long Valley Road, Strathalbyn Road, Victor Harbor Road, Pages Flat Road and Brookman Road) through the district and the towns of Port Elliot, Middleton, Goolwa, Currency Creek, Mount Compass, Strathalbyn and Langhorne Creek.

Traffic Volumes for Port Elliot Road, Alexandrina Road and Long Valley Road are all in the order of 2,001 – 10,000 vehicles per day. Traffic volumes for Strathalbyn Road are in the order of 501 – 2,000 vehicles per day. Victor Harbor Road experiences traffic volumes in the order of 10,001 – 20,000 vehicles per day.

Council maintains 770km of unsealed roads in the district. A good proportion of the district's economic output is based on road transport. The district has three local airports located in Goolwa, Strathalbyn and Hindmarsh Island.

A Southern Communities Transport Scheme (SCOTS) community bus provides transport services available to all age groups is available for residents requiring assistance. The Hills Community Transport service, which is run by the District Council of Mount Barker, provides residents within Strathalbyn transport services through bus, taxi and / or coach.

7 – FRAMEWORK BASED ASSESSMENT

7. Framework Based Assessment

7.1. Framework Based Assessment




How risks of drought adverse events are being planned for and managed.

This section will assess the extent to which the district and its stakeholders address the:

- Risk and impact of drought adverse events relevant to the region
- Coordination and communication requirements in planning for and responding to drought adverse events
- Environmental, social and economic vulnerabilities of the region.

The framework is informed by an extensive (but not exhaustive) review of plans, policies, procedures and programs in place at a Federal, State, regional and local level.

The assessment identifies:

	Clear evidence of planning, management, coordination or resourcing of approaches to mitigating or responding to identified risks.
	Partial, indirect or in-development planning, management, coordination or resourcing of approaches to mitigating or responding to identified risks.
	Limited or no contribution to planning, management, coordination or resourcing of approaches to mitigating or responding to identified risks.

7.1.1. Adverse Events

Alexandrina 2040 (Council's Strategic Management Plan) has a strong focus on climate resilience and environmental sustainability including that climate variation is considered in all future planning. In December 2019, Council declared a climate emergency which included the establishment of a Section 41 Climate Emergency Advisory Committee. Alexandrina is also a partner of the Resilient Hills & Coasts cross-sector collaboration between Councils, Landscape Boards, Regional Development Australia and the SA Government, working to strengthen the resilience of its communities, economies and natural and built environments to a changing climate.

Potential Gap: Drought could be a sector-wide gap in adverse event management.							
Adverse Event	Federal Plan	State Plan	Sector Plan	Regional Plan	Council Plan or Policy	Procedure or Operational	Media or Publication
Drought	✓	○	○	○	○	—	○
Bushfire	✓	✓	✓	✓	✓	✓	✓
Extreme Heat	✓	✓	✓	○	—	○	✓
Extreme Storm & Flood	✓	✓	✓	✓	✓	✓	✓
Animal & Plant Disease	✓	✓	○	✓	—	—	—
Earthquake	✓	✓	—	✓	—	—	—
Summary <i>Drought</i> At a Federal level the National Drought Agreement (2019) and the Australian Government Drought Response, Resilience and Preparedness Plan (2019) addresses drought as a unique topic impacting community and economic resilience. More generally the State addresses key hazards and nominates lead agencies. This translates to agency lead planning and management. PIRSA (as the hazard leader for drought) administers the SA Drought Support Package to support communities dealing with drought. PIRSA has developed an Adverse Events Recovery Framework targeting the impacts of drought on primary production. The Local Government Association 'Council Ready' Program and supporting emergency management framework provides guidance for planning, operating and recovering from adverse events relevant to each region. Together PIRSA and the LGA SA are developing an Adverse Events Management Plan template, to add value to the existing Council Ready Program, focusing on drought. Alexandrina Council actively advocates for the health of the Murray Basin and its communities. This is undertaken by Council and through membership of the Murray Darling Association Inc – Region 6 Coorong and Lower Lakes. Environmental sustainability is a platform for key Council documents including its strategic plan and environmental plan. In times of drought SA Water impose water restrictions on the use of mains water including the use of potable water for irrigation of local government open space, parks and gardens. <i>Bushfire</i> Bushfire emergency response is State-led. Alexandrina is addressed in the Fleurieu Bushfire Management Area Plan. Council has information online directly promoting or educating the community (eg fire							

safety/permits/preparedness/ safe zones); or directing the community to relevant authorities (such as police and CFS).

Bushfire danger ratings are produced daily by the Bureau of Meteorology. They do not suggest how likely it is for a bushfire to start, but rather the danger that would be posed by such a fire if it were to begin, based on the weather conditions that day. The ratings range from low to catastrophic, and suggest the actions that should be taken as a result. For example, the Country Fire Service website suggests that on a catastrophic bushfire danger day, people should leave the area the night before or early in the day.

These danger ratings are well known throughout the community, primarily because of the near-ubiquitous fire danger rating boards across country towns. These boards are primarily placed at the entrances to towns and are adjusted daily based on the rating. Residents are reminded of the need for caution and the ways in which they should adapt their behaviour.

Extreme heat

Temperature forecasts and heat waves are widely publicised in the SA media.

The State Emergency Services run heatwave awareness campaigns that have been evaluated as successful in raising general community awareness. At a regional level, the Zone Emergency Management Plan has identified opportunities for evaluating and improving the effectiveness of communication in the lead up to and during extreme heat events.

The Regional Public Health Plan for the district includes a strategy for climate change response but does not specifically identify extreme heat as a risk or address community strategies for managing extreme heat.

Council has in place a WHS policies and procedures which cover staff, contractors and volunteers including guidelines in relation to extreme heat (currently due for review).

Extreme storm, flood

The Bureau of Meteorology monitors river heights for the Angas and Bremer Rivers as part of the Flood Warning Centre. The LGA SA is working on Coastal Adaptation Guidelines focusing on key areas of risk for councils including legal liability, financial impacts, planning and asset management.

Alexandrina has carried out a Coastal Adaptation Study that aims to understand how people, the natural environment and built assets might be impacted by rising sea levels so that Council and other stakeholders, such as State Government and private landowners, can plan for the future.

The LGA Council Ready Program has worked on preparedness for extreme storm and flood. Operationally, Council has a seasonal checklist in place for monitoring of flood conditions.

Animal and plant disease and earthquake

Council provides a supporting role as part of its emergency management function.

Recommendation 1: Council can continue to monitor sector-wide developments in drought adverse event planning.

7.1.2. Coordination and Communication

“It is Alexandrina’s responsibility to lead on behalf of our community. With a commitment to strong, mutually supportive relationships, we can strategically and pragmatically partner with others in government, business and the community.”

A2040 Our plan to thrive 2020-2024

Opportunity: Council has current community emergency management plans, emergency management policies and public consultation policies that address communication during emergency situations.					
Coordination & Communication	Sector Plan	Regional Plan	Council Plan or Policy	Procedure or Operational	Media or Publication
Emergency management	✓	✓	✓	✓	✓
Consultation-communication	✓	✓	✓	✓	✓
Information-governance	✓	✓	✓	✓	✓
Monitoring-hazard data sharing	○	✓	○	—	—
<p>Summary</p> <p><i>Emergency management</i></p> <p>The LGA is a member of the State Emergency Management Committee (SEMC) and associated advisory groups. Local government is represented on Zone Emergency Management Committees. The Zone Emergency Management Plan (ZEMP) for the district provides a comprehensive overview and guide to the coordination of resources by Council in response to adverse events. This includes collaboration between the Adelaide Hills, Fleurieu and Kangaroo Island Zone Emergency Management Committee and the local government sector governance structures organised under the LGA emergency management framework.</p> <p>Council works with the LGA and the Adelaide Hills, Fleurieu and Kangaroo Island Zone Emergency Committee to perform roles required of local government as identified in the State Emergency Management Plan. This support is identified in Council’s Emergency Management Policy.</p> <p>In 2019, the LGA updated the Local Government Emergency Management Framework as the basis for local government to work together to manage emergency risks. Implementation of the framework is shared between councils, the LGA, regional LGAs, the Local Government Functional Support Group and the LGASA Mutual Liability Scheme. A suite of guidelines and templates are available to support councils with implementation of the framework.</p> <p>The LGA’s Council Ready Program includes a Governance Group which meets quarterly to provide strategic oversight and direction for the Program. The Governance Group comprises representatives from councils, the Mutual Liability Scheme and four State Government agencies. The Program is entering a period of evaluation to determine its effectiveness and provide strategic advice about future work in this area.</p> <p>Council’s approach to emergency management, disaster risk reduction, incident operations and recovery is detailed in Council’s emergency management policy and incident operations arrangements. Alexandrina Council has an endorsed Emergency Management Plan. Council’s strategic risk register identifies drought and water shortage as well as environmental factors (such as climate change) as strategic risks.</p> <p><i>Consultation-communication</i></p> <p>Council has established a series of forums, advisory groups and committees to provide advice to Council and facilitate community involvement in economic, environmental and community wellbeing. These groups include the Sustainable Agricultural Round Table (ASART), Environmental Advisory Panel (EAP), Business Alexandrina and Community Wellbeing Advisory Forum (the last to commence in 2021).</p>					

Council has adopted a 'Public Consultation' policy and procedure to guide communication more broadly. Council communicates with its community regularly and can be contacted at office locations, by phone, email, online and social media. Alexandrina has established a MySay consultation hub for current consultations of the Council to community members to sign-up for regular updates.

Information-governance

SA's climate change legislation encourages voluntary sector agreements. Alexandrina Council is part of the Resilient Hills & Coasts collaboration, a cross-sector partnership between councils, Landscape Boards, Regional Development Australia and the South Australian Government, working to strengthen the resilience of our communities, economies and natural and built environments to a changing climate. The Resilient Hills & Coasts partners signed a regional sector agreement in 2017 which expired on 30 June 2020 and the partners are currently seeking a new agreement.

In 2020, Alexandrina completed a climate change adaptation governance assessment across the organisation to help better manage Council's exposure to the legal and financial risks associated with climate change.

Council has established a Climate Emergency Advisory Committee under Section 41 of the *Local Government Act 1999* responsible for developing and implementing a Climate Emergency Action Plan to support Council in its goal to reduce carbon emissions towards net zero and pathways to achieve Councils goal.

Alexandrina Council has a strong history of advocacy, one of only a few local governments in SA that develop formal advocacy plans to progress their strategic commitments. Key relevant commitments in the 2019 advocacy plan include: River Murray and Lake Alexandrina, stormwater and wetland infrastructure, mental health and community wellbeing.

Information is more broadly managed by Council in accord with its Records Management Policy.

Monitoring-hazard data sharing

Resilient Hills & Coasts prepared the most comprehensive assessment ever undertaken in South Australia of the climate resilience of a region's housing stock. The project provides insights into: Where We Build – mapping the exposure of the region's existing housing to flood, heat and bushfire risks; What We Build – categorising the sensitivity of the region's existing housing to those risks; and the economics of building or retrofitting climate-ready homes in the region. The outcomes of the Where We Build, What We Build Project have been finalised and updated on Alexandrina's climate change webpage under 'Encouraging the update of climate-ready housing'. The webpage provides an overview of the project as well as access to the maps generated from the project that can be accessed at <http://edge.endevgeo.com/> (project: wwbbwwb); the final report; and factsheets for Alexandrina's community and developers.

In 2020, the Resilient Hills & Coasts also evaluated its progress against its Regional Climate Change Adaptation Plan. Current priorities for action include:

- Climate-ready development: Leverage our leadership and networks to encourage residential and infrastructure development that avoids natural hazards, is built to maximise resilience, and is energy efficient and water sensitive.
- Disaster risk reduction: Support partners and communities to map, understand, plan for to adapt to coastal, bushfire and urban heat hazards.
- Resilient agriculture: Build on and spread regional best practice in enabling agriculture that is sustainable, water smart, resilient to a variable climate, and supports carbon farming as part of a zero emissions pathway.

Sector-wide planning is underway by the LGA to establish guidelines for a coordinated approach to drought and coastal inundation and erosion monitoring, preparation and response.

The Department of Environment and Water are scoping data sharing arrangements for key hazards to improve climate hazard knowledge for bushfire, catchment flooding, heatwaves, coastal inundation, and coastal erosion.

Recommendation 2: Council can use existing emergency and risk management planning to incorporate drought adverse events.

7.1.3. Natural Resources and Landscapes

“The community cherishes our region’s national and global reputation as home to one of the country’s most significant water bodies and aquatic environments, including our many rivers, the coastline and the internationally significant wetlands and habitats of the Lower Lakes, Coorong and Murray Mouth. They must be protected.”

A2040 Our plan to thrive 2020-2024

State Plan	Sector Plan	Regional Plan	Council Plan or Policy	Procedure or Operational	Media or Publication
Challenge: the district is located at the lower reaches of the Murray Darling Basin and is vulnerable to upstream water management practices.					
✓	✓	✓	✓	✓	✓
Challenge: water allocation planning in the Eastern Mount Lofty Ranges reflects over-allocation of water and unsustainable use patterns in some catchments.					
✓	○	✓	✓	○	—
Opportunity: the Basin Plan has provided a platform for Council to successfully advocate for improvements to the environmental health of the Murray Mouth, Lower Lakes and Coorong.					
✓	○	✓	✓	✓	✓
Challenge: coastal landscapes are both sensitive and directly susceptible to extreme weather (storms) and Council infrastructure standards and/or coastal management plans should address coastal vulnerability.					
✓	○	✓	○	○	—
Challenge: remnant vegetation outside of conservation parks is generally fragmented and in both public and private ownership. Climate change and drought is likely to have severe impacts on remaining patches of habitat. The ability to establish and provide connectivity across the landscape is also a future challenge for the district.					
✓	—	✓	✓	✓	—
Challenge: soil quality is a priority in the district for maintaining crop and pasture production and water quality.					
✓	—	✓	—	—	—
Challenge: there is expected to be greater overall demand for agricultural irrigation, as well as an increase in high irrigation requirement days.					
✓	—	—	—	—	—
Opportunity: Aboriginal and Torres Strait Islander populations should be given specific consideration and involvement in managing adverse events.					
✓	—	○	✓	—	—

Summary

Natural resources and productive lands

Council has adopted a strong advocacy role in relation to the Murray Darling Basin and Lower lakes to maintain healthy water levels and quality even in low flow conditions. Council advocates for:

- full and timely implementation of the Murray Darling Basin Plan
- continued focus on environmental water recovery
- a comprehensive climate adaptation plan for the Coorong, Lower Lakes and Murray Mouth region
- improved tourism infrastructure at Sugars Beach for visitors to the Murray Mouth
- increased support for water sensitive urban design and the uptake of alternative water sources such as wastewater and stormwater
- research and innovation to support improved farming practices such as regenerative agriculture which improve soil health and increase resilience to climate change.

Alexandrina Council together with Coorong Council currently supports the Executive Officer Murray Darling Authority.

Alexandrina 2040 (Council's strategic community plan) is the lead strategic document of the Council which sets a strong environmental sustainability focus for the district.

Council's Environmental Action Plan 2014-2018 considers locally achievable actions for water, biodiversity, climate and living locally. It reports that sustainable water management has been one of Alexandrina Council's highest priorities for the past decade and many millions of dollars have been spent on major water projects across the district. The plan is currently being reviewed for alignment with Councils strategic community plan (Alexandrina 2040) currently on public consultation.

Alexandrina's Environmental Advisory Panel (EAP) established in September 2017, provides input and advice to Council regarding implementation, monitoring and review of Council's environmental strategies and policies including current and future iterations of the Environmental Action Plan. Input could include on advice on environmental and sustainability matters including, but not limited to, management; biodiversity conservation; climate change mitigation and adaptation; carbon sequestration and regenerative agriculture; resource recovery and waste management; environmental education and engagement; and reduction of Council's corporate footprint including energy, water and waste management. The EAP is currently assisting in the review of the Environmental Action Plan.

In 2020, the Resilient Hills & Coasts regional priorities were reviewed, and include climate-ready development that encourages residential and infrastructure development that avoids natural hazards; disaster risk reduction to support partners and communities to map, understand, plan for to adapt to coastal, bushfire and urban heat hazards; and resilient agriculture, including water smart and carbon farming as part of a zero emissions pathways.

In 2012, Council prepared an Integrated Water Management Plan for the rural communities of Goolwa and Hindmarsh Island which identified priority actions for water resource management and stormwater infrastructure.

The need for a Coastal Adaptation Study of the Alexandrina Council coastline was identified as a high priority in the Alexandrina Council Community Strategic Plan 2014-2023, the Alexandrina Council Environmental Action Plan 2014-2018, and the 2016 Resilient Hills & Coasts Climate Change Adaptation Plan. In March 2018, Alexandrina Council engaged Integrated Coasts to prepare a Coastal Adaptation Study from Chiton to the Murray Mouth, including an assessment of impacts on residential development on Hindmarsh Island within the Murray Mouth Estuary (i.e. at Mundoo Channel and downstream of the barrages within the Goolwa Channel). Public consultation was carried out in October and November 2020.

The Coastal Adaptation Study identified the majority of Alexandrina's coastline as low-medium risk for future erosion and/or flooding. However, low lying areas, such as the dunes along Goolwa and Ratalang-Basham beaches, or the low lying areas in the Murray Estuary Settlements (Mundoo and Goolwa Channels), are identified as being at a potentially higher risk to flooding and erosion in the future (2050 and 2100). Following the finalisation of the study in early 2021, the outcomes of this study will be used for the ongoing assessment and implementation of long-term adaptation options.

Council is undertaking the Ratalang Basham Dune Stabilisation project with part funding from the Coastal Protection Board while working closely with the Ngarrindjeri authority to deliver dune protection works.

Council has in place a program for the protection and buffering of native vegetation. In 2015, Council prepared a Foreshore Master Plan for Clayton Bay which includes environmental actions focused on weed control and revegetation. Foreshore habitat restoration was also recently completed at Milang.

Council also has stated objectives to encourage development that is both environmentally sensitive and built in areas protected from natural hazards.

Operationally, Council maintains a register of native vegetation on community land and revegetation activities.

Alexandrina Council has established a Sustainable Agricultural Round Table (ASART) with membership comprising representatives from the rural community who are able to advocate for their specific agricultural field. The group meets quarterly and regularly has guest speakers from various government agencies who work within the rural sector. The group was integral in the introduction of the Rural Initiatives Grant, available annually through Council, which is designed to assist with projects or research in the agricultural field and has seen trial sites, soil testing and training programs established in the district.

First Peoples

The State Emergency Management Plan (SEMP) is a four-part plan containing a range of documents that further detail strategies for dealing with emergencies in South Australia. Part 3 includes a framework for vulnerable communities, 'People at risk in emergencies framework for South Australia.' Part 4 details supporting state-wide plans which includes links to Aboriginal Affairs.

Alexandrina 2040 (Council's strategic community plan) reflects a strong commitment to Aboriginal and Torres Strait Islanders as the first peoples and finding ways to work together.

Recommendation 3: Council can build on previously successful environmental strategies to create a new strategic focus for natural resources and environmental sustainability.

7.1.4. Community Resilience

State Plan	Sector Plan	Regional Plan	Council Plan or Policy	Procedure or Operational	Media or Publication
Opportunity: the district has a growing and ageing population with a growing number of families. Asset plans and development controls such as in coastal settlements, flood prone areas and dwelling growth in bushfire zones should factor climate resilience.					
✓	✓	✓	○	○	✓
Opportunity: Volunteers are an important community resource and can assist in managing adverse events.					
✓	✓	✓	✓	—	✓
Challenge: the district has an ageing population who may be vulnerable to adverse events.					
✓	✓	✓	○	—	—
Challenge: social connection for lone person households is an important component of resilience to adverse events. Effective communication and support for lone person households preparing for and during an adverse event will become more important as this household type grows.					
✓	✓	○	✓	○	✓
Challenge: communication and coordination with holiday populations in planning for or managing adverse events and management of unoccupied dwellings for issues such as fire fuel loads are important considerations for Council and hazard leaders/partners.					
✓	—	○	—	○	✓
Challenge: the highest population loss for the district is persons aged 18-24 years and the greatest population gain is for persons over 55 years of age. Improved retention of younger populations and the strategies to attract this segment of the population back to the district will continue to contribute to Council's community diversity.					
✓	○	○	✓	○	○
Challenge: evacuation for older populations and households without vehicles during adverse events may need to be addressed in conjunction with partners and hazard leaders.					
✓	○	○	○	○	✓
Potential Gap: as the population ages, existing aged care facilities may struggle with demand.					
✓	○	○	○	○	○

Summary

Resilient Hills & Coasts is a collaborative, cross-sector partnership between councils, Landscape Boards, Regional Development Australia and the South Australian Government working to strengthen the resilience of its communities, economies and natural and built environments to a changing climate. The Resilient Hills & Coast Action Plan 2020-2025 identifies the need to focus on climate-ready development in the RDA region. The Resilient Hills & Coasts Regional Climate Change Adaptation Plan identifies the need to plan for ageing populations in coastal settlements. Council's website provides information on development in hazard areas. The Southern and Hills LGA has established 'Where We Build What We Build' as a guide for development.

The 'Where We Build What We Build project' is supporting the Resilient Hills & Coasts region by enabling assessment of the climate risk exposure of homes and encouraging better climate risk mitigation decisions. To achieve this, it combines: Where We Build – flood, heat and fire hazard mapping, comparing the data used by the insurance industry and the data available to Councils; and What We Build – risk exposure categorisation of region-specific housing archetypes. The project is an initiative of Resilient Hills & Coasts, in partnership with the Insurance Council of Australia and National Disaster Resilience Program. It is being delivered by Seed Consulting Services and Edge Environment. The project scope covers focus areas within Adelaide Hills Council, Alexandrina Council, District Council of Mount Barker, City of Victor Harbor, and District Council of Yankalilla.

The outcomes of the Where We Build, What We Build Project have been finalised and updated on Alexandrina's climate change webpage under 'Encouraging the update of climate-ready housing'. The webpage provides an overview of the project as well as access to the maps generated from the project that can be accessed at <http://edge.endevgeo.com/> (project: wwbbwwb); the final report; and factsheets for Alexandrina's community and developers.

Council is taking a fresh approach to engaging with the community through the establishment of the Community Wellbeing Advisory Forum in 2021. The primary role of the forum is to provide a reference point for broader community views, for both Council and Council officers. The forum will also have a role in assisting Council to progress the objectives of relevant strategic plans including Alexandrina 2040 and Village Innovation Plans, Regional Public Health Plan, and Disability Access and Inclusion Plan. This will provide a community lead and dynamic avenue for monitoring community resilience and creating deliverable approaches.

Council has an Age Friendly Action Plan 2017-2020. Community participants that assisted Council to develop the plan did not feel the Council was very active in supporting older people to stay safe during emergency situations. The need for emergency housing in Strathalbyn is recognised (also in the Public Health Plan).

The State Government, through the State Public Health Plan provides for an extreme heat warning and preventative interventions for vulnerable and the elderly that has reduced morbidity of heat waves (and now for pandemics). Council actively promotes and communicates impending and actual adverse events. Council's Strategic Plan, Age Friendly Action Plan and Disability Action and Inclusion Plan all discuss lone person households and the importance of actively supporting ageing persons in the district.

Alexandrina Council provides a range of community facilities, places, events and activities that enable the community to come together as well as attracting visitors to the district. These facilities and services are considered to play a key role in community resilience and continue to be a strategic and community priority in Council's community strategic plan (Alexandrina 2040).

While the State and Council have identified the need for attracting and/or retaining age diversity there is limited evidence of the sector or the regional bodies emphasizing population strategies for the region. Council is working on approaches to promote the district as a great place to live, work and visit.

Hazard leaders and zone emergency management is in operation and can effectively take the lead on the evacuation of higher need residents. Council's Public Health Plan includes a strategy that seeks to ensure adequate Emergency Management planning that addresses potential environmental health issues.

Council's Strategic Management Plan A2040 identifies the need for services, including beds/accommodation, for aged care, and the Age Friendly Action Plan 2017-2020 discusses the supply of aged care beds and

accommodation. While at the time the plan identified that supply of aged care beds was adequate, there is potential for demand to exceed supply if not planned for.

Recommendation 4: Council could look to improve its communication of adverse events to ensure a whole of community approach that includes vulnerable populations.

Recommendation 5: There is scope for Council to better consider climate resilience as part of asset lifecycle planning and funding within infrastructure asset management plans and where specifying and budgeting for contract construction works.

7.1.5. Economic Diversification

State Plan	Sector Plan	Regional Plan	Council Plan or Policy	Procedure or Operational	Media or Publication
Strength: Alexandrina Council has a high employment rate compared to Regional SA and there is evidence of employment diversity for residents					
✓	—	✓	✓	—	—
Challenge: over 40% of residents work outside of the area. There may be a need to partner in a local and regional economic development strategy to grow local jobs relevant to the growing local labour force.					
✓	—	✓	✓	○	—
Strength: despite an overall reduction in local businesses there is evidence of growth in industries relevant to local labour and demand					
✓	—	✓	✓	✓	✓
Strength: Alexandrina has a diverse and high value local economy with evidence of export, import and value adding outputs					
✓	✓	✓	✓	✓	✓
Challenge: almost 40% of the districts agricultural value is in a single commodity (wine and table grapes) suggesting some vulnerability to pest, climate and disease for economic output and local prosperity					
✓	✓	✓	✓	—	✓
Summary <p>Council's Economic Development Strategy is currently under mid-point review which includes the Economic Development Advisory Panel initiative. The review is scheduled to be finalised in the immediate future.</p> <p>Alexandrina Council, in partnership with RDA Adelaide Hills Fleurieu & Kangaroo Island and the Australian and State Governments, has established Business Alexandrina as an online (www.businessalexandrina.com.au) and physical hub (12 Cadell Street, Goolwa) supporting businesses in the district. The business support program focuses on skills building through workshops, networking events, business advice, coaching and training opportunities. Council has identified that with the right funding model, the reach of the Business Hub could extend to support drought programs for the agricultural sector in the district.</p> <p>Alexandrina is a close collaborator with the Landscape Board and encourages consideration of this body as a vehicle to provide funding and partnerships to achieve strategic outcomes in the district with a focus on soil health to build ecological and climate resilience. Council holds a view that the Fleurieu is fast becoming a leader in the trial and adoption of regenerative farming techniques.</p> <p>State Government has undertaken planning for climate change for primary industries within the Adelaide Mount Lofty Ranges region with a focus on six key primary industries that occur in the region, including viticulture. PIRSA is also active in the regions supporting the health and sustainability of primary industries, including the South Australian Wine Industry Development Scheme (SAWIDS) which builds and strengthens the state's wine industry through projects that develop capability, grow competitiveness and productivity, and increase profitability through innovation or expanding production.</p> <p>Regional Development Australia Murraylands and Riverland (RDAMR) are leading the new Agri-Food Tourism Development Program to encourage agribusiness diversification, particularly into agri-tourism. The \$250,000 program connects businesses with agri-tourism experts who will help businesses to set up new business opportunities such as farm stays, farm tours, 'pick your own' trails, and local food experiences and tastings.</p>					

Alexandrina is well placed to capitalise on the Agri-tourism market due to its proximity to Adelaide making it easily accessible to large numbers of tourists. Further study may be relevant to see where other businesses could benefit, or further maximise their utilisation of this market.

Recommendation 6: Population growth within hazard areas, demographic diversity, business and jobs growth and resilience of key primary industries could be addressed through the review and renewal of Council's Economic Development Strategy.

7.2. Summary and Recommendations

Overall, the district is showing evidence or demonstrating:

- Ability to plan for, and capacity to respond to, adverse events in coordination with hazard leaders and systems for effective communication to hazard stakeholders.
- Commitment to healthy natural systems and biodiversity that underpin environmental sustainability, agriculture and tourism industries.
- Community resilience and economic diversity that includes good distribution of social and essential infrastructure and diverse industries of employment.

A series of potential gaps, strengths, opportunities and challenges were identified when assessing the district's coordination and communication, natural resources, community resilience and economic diversification. Six key recommendations that respond to existing conditions for further consideration by the Council are:

Recommendation 1

Council can continue to monitor sector-wide developments in drought adverse event planning.

Recommendation 2

Council can use existing emergency and risk management planning to incorporate drought adverse events.

Recommendation 3

Council can build on previously successful environmental strategies to create a new strategic focus for natural resources and environmental sustainability.

Recommendation 4

Council could look to improve its communication of adverse events to ensure a whole of community approach that includes vulnerable populations.

Recommendation 5

There is scope for Council to better consider climate resilience as part of asset lifecycle planning and funding within infrastructure asset management plans and where specifying and budgeting for contract construction works.

Recommendation 6

Population growth within hazard areas, demographic diversity, business and jobs growth and resilience of key primary industries could be addressed through the review and renewal of Council's Economic Development Strategy.

8 – RESILIENCE CASE STUDIES

8. Resilience Case Studies

8.1. Lessons from Australia and New Zealand

This section draws on relevant case studies from Australia and New Zealand to highlight key lessons in managing natural adverse events. The case studies are intended to highlight opportunities in prevention and preparedness as well as response and recovery from adverse events. While not exhaustive, some of the common themes arising are:

- The challenge and importance of a coordinated multi-sector approach to economic diversification and reduced reliance on water intensive agriculture
- Engaging with the community in proactive ways to reduce high risks and build general awareness in readiness for adverse events
- The importance of social infrastructure and community pride as foundations for community-led recovery
- Maintaining connection and creating opportunities for cultural understanding and sensitivity
- Benefits of locally led, coordinated multi-agency approaches to recovery so locals can talk to people with whom they are familiar (and understand the local area) to discuss their needs and recovery pathways
- A specific focus on health and wellbeing during adverse events and throughout recovery which may require specific planning and interventions beyond standard operations.

8.2. Crop Diversification

8.2.1. Lessons from Menindee, New South Wales

Crop diversification requires both the identification of suitable crops for future growing and climatic conditions and local and export markets. Administrative supports at local and regional scale and by all levels of government will be beneficial in making measured change and assisting economies to transition from water-reliant industries.

8.2.2. Case Summary

The central-west NSW town of Menindee (population of about 551 people based on 2016 Census) has been dramatically affected by drought, which saw the huge Menindee Lakes run dry, more than a million fish die in a mass fish kill in 2019, and population and job losses. Tourism suffered as a result of reputational damage and fish-kills, further impacting local employment. The 2016 Census reported high unemployment levels in Menindee (17.8% or 32 people compared with 6.3% for NSW) prior to recent events.

The Menindee Lakes water storage is owned and operated by New South Wales in accord with the Murray Darling Basin Agreement. Drought, low inflows and high evaporation rates present challenges to managing water levels for the environment, irrigation, local use and downstream users. Changes to the management of the Lakes is proposed over-time through the Basin Plan.

Transitioning the local economy in the face of drought and water uncertainty is an enormous challenge. A further factor limiting Menindee's ability to respond to drought is that the local government is in long-term administration with limited resources to support the community. Small success stories can therefore offer important insight.

In Menindee, one landowner has planted seven hectares of land with jujubes, a drought-tolerant Chinese fruit, sometimes called a Chinese date. The fruit is promoted for its health benefits and is reportedly popular in the Chinese market. The trees yield between 20-40kg of fruit per tree, fetching \$30-\$45/kg dried and \$15-\$25/kg fresh.

Figure 18. The Darling River runs dry near Menindee



Image Credit: ABC

8.3. Community Preparedness

8.3.1. Lessons from Roleystone, Perth

Active community engagement strategies can be an effective tool in managing risk. Targeting high risk elements (such as grasstrees in this example) can provide a greater awareness of the broader issue (in this case fire safety techniques) and encourage further engagement. The Alexandrina community has demonstrated high environmental and climate awareness and there is likely to be community readiness and buy-in for community resilience campaigns in the adverse events space.

8.3.2. Case Summary

The Roleystone Volunteer Fire Brigade (on the outskirts of Perth) set out in late 2019 to improve community preparedness for bushfire through a Community Engagement Team. Their first project, “Roleystone, Are You Ready?” provided the community with information about bushfire preparedness, delivered to local community groups, forums at the fire station, and meeting with residents at their properties. This reached approximately 400 residents, of the area’s 6634 residents (2016 census).

The awareness campaign was done in stages to target high risks. The second campaign targeted fuel loads, “Get Ya Skirts Off”, which was aimed at reducing fuel associated with Xanthorrhoea (or grasstrees) which burn with high intensity and provide a serious fuel risk in the area. The campaign saw approximately 5,000 grasstrees treated through mechanical de-thatching or controlled burning.

Continued engagement occurred in the form of both property walk-throughs and market stalls. One of the key parts of these engagements was the, “Get F.I.T. for Summer” campaign, with F.I.T. being an acronym for, “fire information tube”. This tube attached to, for example, the front fence of the property, and had maps and other important information to assist firefighters in defending the property.

The brigade’s work in the community engagement space saw them nominated for the Australian Institute for Disaster Resilience National Award.

Figure 19. A firefighter from the Roleystone Volunteer Fire Brigade with a Fire Information Tube



Image credit: Roleystone Volunteer Fire Brigade (Facebook.com)

8.4. Community-led Recovery

8.4.1. Lessons from Dunalley, Tasmania

A key priority for the small community of Dunalley following bushfire was the rebuilding of the school, which provided a key community focal point. Rebuilding of key community infrastructure was a priority to allow for coordination, communication and community pride, and to facilitate other rebuilding efforts. The disaster also accelerated the economic trends of employment, with the decline of forestry and larger tourism and aquaculture sectors.

8.4.2. Case Summary

In 2013, bushfires destroyed 65 homes in this town of only 316 people, as well as the school, bakery, police station, sawmill and oyster farming businesses. The sawmill alone saw 12 jobs permanently lost, due to the economic unviability of rebuilding.

8.4.2.1. Community Resilience

Community-led efforts to rebuild the primary school saw the town highly commended in the 2017 Australian Institute for Disaster Resilience National Schools Award. Through the close cooperation of local government, volunteers, local business and the school community, the school was rebuilt in time to open just days before the school term began.

Another community-led initiative saw a new boxing gym started to bring community members together. The gym began in a tin shed, paid for through insurance pay-outs due to fire damage. It now has over 70 members, and is an increasing commercial proposition, as well as an important hub for young people.

8.4.2.2. Economic Diversification

The town turned to more diverse streams of employment, including value capture through the oyster industry by encouraging tourists through businesses such as the Bangor Wine & Oyster Shed, a partnership between a group of locals, and funded with help of bushfire recovery grants. The Oyster and Wine Shed employs over 40 people in its operations. Oyster farming has become the biggest industry in the town, since the decline of farming and forestry.

8.4.2.3. Communication and Coordination

To overcome the lack of communications infrastructure in the immediate aftermath, the town set up chalkboards in various places to act as message boards and provide vital information. The boards remain today and are more commonly used for inspirational or uplifting messaging, rather than disaster information.

8.5. Cultural Awareness

8.5.1. Lessons from Nauiyu, Northern Territory

This case study shows the importance of consultation, collaboration and understanding when working with diverse communities. Building understanding and trust, particularly with cultural groups and vulnerable communities, can result in a more stable process and sensitive response to adverse events. In this case, the not-for-profit organisation employed a full-time Community Development Officer to be part of a community of interest. While this may not always be appropriate, building trust, networks and cultural awareness is a concept which can be broadly applied to Alexandrina communities in preparedness for adverse events.

8.5.2. Case Summary

The remote Aboriginal community of Nauiyu on the Daly River in the Northern Territory was the scene of two major floods, in 2016 and 2018. Both times the community had to be evacuated. Red Cross personnel were responsible for managing the evacuation centre and learnt important lessons from the 2016 evacuation to ensure a smoother experience in 2018.

The evacuees were required to stay in Darwin for two weeks while the flood waters receded, which gave time for tiredness, frustration and boredom to become issues. Not all community members stayed in the evacuation centre in the Darwin Showgrounds, with some more vulnerable community members receiving home care in suburban Darwin, and others being hospitalised as a result of illness. The Nauiyu community is home to multiple kinship groups and had a number of visitors from other areas at the time of the floods, which inflamed some cultural tensions.

The 2016 flood saw tensions rise as a result of the centre's organisation and specifically, separating family groups, a lack of understanding of protocols, and other cultural sensitivity issues. To address this in future, community consultation was conducted, including cultural sensitivity workshops, to better ascertain how to set-up the evacuation centre for such a situation. Feedback suggested that this work did result in a better situation in the 2018 floods.

The Red Cross employed a full-time Community Development Officer to live in the community to establish trust and a better point of contact between the communities and the organisation.

Figure 20. Evacuation Centre for Nauiyu residents at the Darwin Showgrounds.



Image credit: Australian Red Cross

8.6. Mental Health and Recovery

8.6.1. Lessons from Waimakariri, New Zealand & Queensland

Specific intervention and support may be required during recovery phases to address mental health impacts, provide social supports and/or undertake domestic violence prevention and education. Access to social workers and mental health support in the district and an existing network of strong community groups to work through is important. However, with community buy-in, specific support groups and resources can also be established to aid the recovery effort.

8.6.2. Case Summary

The Waimakariri District is to the north of Christchurch on New Zealand's South Island. The district was heavily impacted in the Canterbury earthquakes in 2010-2011.

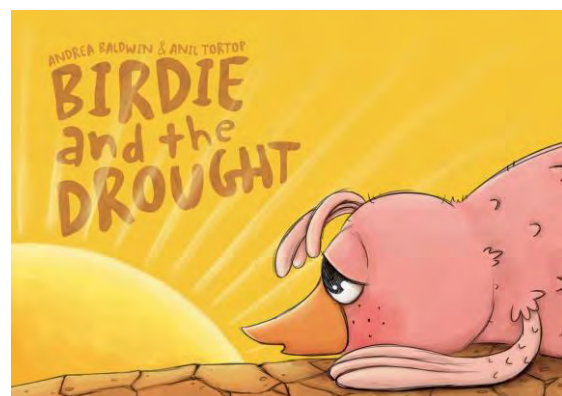
A study into the social impacts of the disaster identified mental health (especially stress and anxiety), social isolation (especially in older people), disrupted schooling, and increased levels of domestic violence and abuse as critical issues post emergency.

The Waimakariri District Council subsequently produced a document called *Social Recovery 101*, which was written as a guide for integrated social recovery efforts after a disaster. This resulted in recommendations for increased social work support, a focus on community facilities, further support for parents and teachers, and preventative work in terms of domestic violence.

8.6.3. Case Summary

Birdie's Tree, operated by the Queensland Government's Children's Health Queensland Hospital and Health Service, provides a range of web-based and take-home resources to assist educators, parents and caregivers to assist young people to work through their experience of natural adverse events. The program includes a series of children's books to assist with communication to young children (www.childrens.health.qld.gov.au/natural-disaster-recovery).

Figure 21. Birdie's Tree Program and Children's Books



8.7. Government Coordination and Supports

8.7.1. Lessons from Waroona- Yarloop, Western Australia

This case study shows the important role of local government in coordination and community connection during recovery. Many Council staff who worked in the recovery effort were local community members and reported “burnout” from being directly affected by the adverse event (in this case fires) and the emotional support to others (neighbours, friends etc). Council emergency management staff should be adequately supported to ensure their important work and emotional wellbeing can be sustained particularly during recovery phases.

8.7.2. Case Summary

In 2016, bushfires damaged 70,000 hectares and destroyed more than 160 homes in the area around Yarloop and Waroona in the Shires of Harvey and Waroona. In the first days after the fire, Council staff and Elected Members played an important community support role, including attending notification interviews, where people were told of the extent of damage to their properties.

Local government worked with the State Government to coordinate evacuation-recovery centres. The recovery centres became a vital “one-stop-shop” for recovery services across government (and the non-government sectors) providing advice on social supports, local laws, building rules, development approval and waste management. The centres operated for 20 months, with at least two Council staff on site to assist in coordinating and answering questions.

Council staff also played a key role in collecting and distributing donations, distributing State Government payments, collecting information from residents, and referring people to relevant agencies. The State Government employed four Community Resilience Officers to assist in this process. Council organised community events such as a weekly morning tea to ensure people stayed connected and informed.

The recovery effort was complicated by contamination from the fires, specifically asbestos, arsenic and cyanide. Yarloop functioned as a closed town for 8 months, with many residents not able to return home, and not able to begin the rebuilding process without outside services. This social isolation led many of those who could not immediately return leaving the town permanently.

Figure 22. The Yarloop Hall during its reconstruction after the 2016 bushfires



Image Credit: Mandurah Mail

9 – DROUGHT RESILIENCE

9. Drought Resilience

9.1. Drought Management

Alexandrina's approach is to manage drought conditions through building community, economic and environmental resilience to drought conditions.

Drought sets in over months or several years with some of the most severe impacts felt as time goes on. Preparing for drought can be difficult as drought conditions can last for a decade or more, and similarly the recovery process can be equally long.

Drought is a feature of Australian landscapes and can be:

- Meteorological: dryness resulting from rainfall deficiencies (lack of precipitation)
- Agricultural: depletion of soil moisture supplies (productive land)
- Hydrological: shortfalls on surface and subsurface water supply.

Given the slow onset of drought, there is time to monitor and work with partners and stakeholders to increase levels of preparedness. Council's play an important role in building community resilience through delivery of services, infrastructure, programs, events and advocacy.

During drought periods and throughout what can be prolonged recovery periods, Council plays an equally important role in drought management through delivery of programs and communication of information to regional communities. They do this through strong local relationships, knowledge of the local environment, understanding of the requirements of each region and its communities, and ability to mobilise local resources.

Alexandrina Council is committed to ensuring that local responses to drought reflect global, national, state and regional priorities for ecological sustainability. Links between managing water resources and international, federal, state and regional policies are shown in Figure 23 which updates a previous iteration in Council's Environmental Action Plan 2014-2018.

Figure 23. *Federal, State, Regional and Inter-governmental water resource management*



9.2. Principles for Drought Management

The Risk Management Framework for Alexandrina Council includes a series of principles for managing risks and identifying opportunities to achieve Council's defined objectives and improve performance. Key features of Council's risk principles are:

- Integration across Council operations, organisational processes and decision making
- Identify and address uncertainty
- Data and evidence-based decisions based on best available information
- Partnerships and timely involvement of stakeholders
- Tailored response to local internal and external context
- Responsive to change and continual improvement.

Council's principles for drought management are:

- **Holistic** – drought is considered in the context of other social, economic and environmental priorities and the wide range of possible consequences of drought on communities.
- **Local knowledge** –drought management is tailored to local context and communities.
- **Community-led** – drought management is community centred, responsive and flexible, engaging with communities and supporting their long-term sustainability and resilience.
- **Accessible** – drought affected communities are supported to access drought information, data and services.
- **Coordination** – there is timely involvement of partners, stakeholders, government and communities in drought response.
- **Integration** – drought management is embedded across Council operations, organisational processes and decision making.
- **Evidence-based** – decisions about drought draw on the best available information (data, expert opinion, monitoring, local knowledge).

Council's principles are based on National Principles for Disaster Recovery, Local Government Emergency Management guiding principles, and principles in Council's Risk Management Framework.

9.3. Stages of Drought

Drought is generally described as [acute water shortage](#). Drought commonly follows a period of below-normal rainfall which reduces water availability and soil moisture. The State and Federal Governments are responsible for declaring drought and consider factors beyond rainfall.

This plan adopts a five-stage definition of drought for adverse event planning based on the definition by Primary Industries and Regions SA (PIRSA), as follows:

Figure 24. Stages of Drought



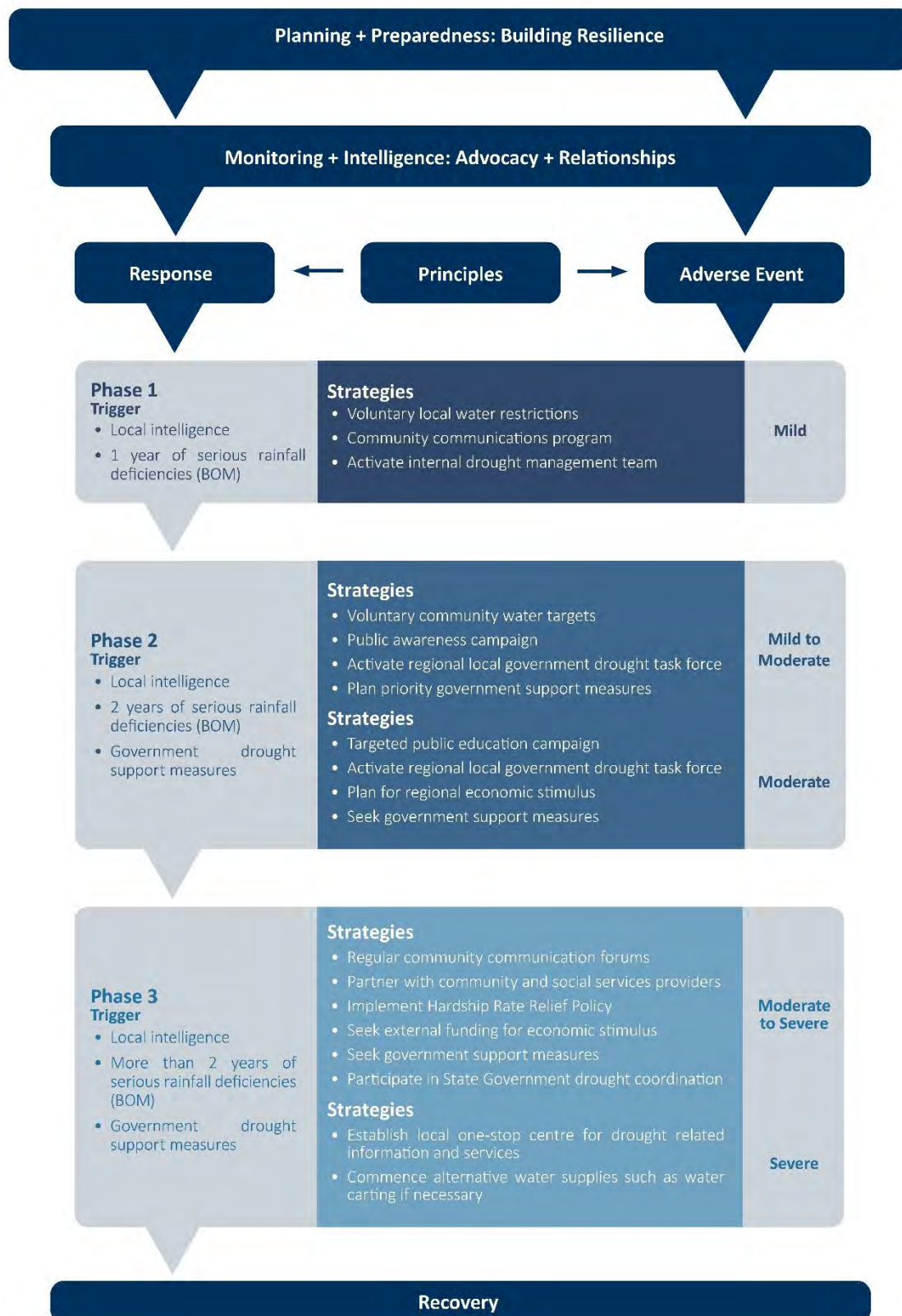
9.4. Structured Approach to Drought

This section provides a structured response to drought adverse events to guide Council's response in preparing for drought through building community resilience and implementation of drought response and recovery in the district.

Council's ultimate response to drought will be captured over-time through its strategic suite of documents which may at any one time include:

- Regional economic development strategies
- Regional landscape plans
- Regional planning strategies
- Regional health plans
- Local risk management plans
- Local emergency management
- Local asset management and capital works plans
- Local corporate and community plans
- Local environmental strategies.

Figure 25. Structured Approach to Drought



10 – REFERENCES

10. References

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