Outback SA Drought Resilience Plan

A framework to guide future effort and investment

OCTOBER 2024

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

Government of South Australia
Department of Primary Industries and Regions

Government of South Australia

Outback Communities Authority

An Australian Government Initiative

Regional Development Australia FAR NORTH SA

LANDSCAPE SOUTH AUSTRALIA SA ARID LANDS

SA DROUGHT HUB

OUTBACK SA
DROUGHT
RESILIENCE
PLAN

Acknowledgement of Country

The Outback SA Drought Resilience Steering Committee acknowledge Aboriginal people as the First Peoples and Nations of the lands and waters we live and work upon. We pay our respects to Elders past, present and emerging. We acknowledge and respect the deep spiritual connection and the relationship that Aboriginal and Torres Strait Islander people have to country and commit to working with the First Nations People of the region as we deliver the Outback SA Drought Resilience Plan.

In particular, we acknowledge the Traditional Owners of the Outback SA region, including:

- Adnyamathanha
- Antakirinja Matu - YankunytjatjaraKuyani
- Arabana
- Barngarla
- De Rose Hill - Ilpalka
- Dieri
- Eringa
- Far West
- Gawler Ranges People
- Irrwanyere
- Kokatha
- Malyankapa
- Ngadjuri
- Nukunu
- Tjayiwara Unmuru
- Walka Wani
- Wangkangurru/Yarluyandi
- Wilyakali
- Yandruwandha/Yawarrawarrka

Funding acknowledgement

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This plan has been prepared by URPS for the Outback SA Regional Drought Resilience Steering Committee. The Steering Committee was chaired by Jan Ferguson OAM, Presiding Member, Outback Communities Authority with members including Jodie Gregg-Smith, General Manager, SA Arid Lands Landscape Board; Claire Wiseman, Chief Executive Officer, Regional Development Australia Far North; Margaret Howard, Director, Outback Communities Authority; Melissa Horgan, Principal Regional Advisor - Far North, Department of Primary Industries and Regions; and Tony Randall, Knowledge Broker, SA Drought Hub.

URPS

Contents

1.0 Introduction

Drought is part of life in South Australia's Outback region. First Nations peoples have lived with drought for thousands of years and the natural environment has evolved to cope with cycles of droughts and floods. The Outback's communities and industries have established in this environment.

Drought resilience refers to the ability of individuals, communities, industries or environments to adapt, reorganise or transform in response to drought to maintain or improve economic, environmental or social wellbeing. The existing and in some cases inherent resilience of the region's people, communities, industries and environments explains why they have been able to survive the variability and impacts of drought so many times before.

Maintaining and strengthening this resilience as the climate changes is essential for the future of the region, as droughts become longer and hotter and rainfall even more unpredictable.

The strategies and opportunities for action proposed in this Outback SA Drought Resilience Plan (the Plan) will help South Australian Outback communities maintain and strengthen resilience. The Plan identifies opportunities to build resilience to ensure regional values are maintained and economic and social development opportunities are optimised. Delivering these actions will need people from all across the region working together, including pastoralists, community groups and organisations, government agencies and non-government organisations. By working together we can achieve a region that stays strong, connected and prosperous through the drought times we know will come our way.

The delivery of these opportunities will be led by the Outback SA Drought Steering Committee's partner organisations; the Outback Communities Authority, SA Arid Lands Landscape Board and Regional Development Australia Far North, Department of Primary Industries and Regions and the SA Drought Hub. Their ongoing collaboration and strong connections to the people and environment of Outback SA will enable locally focused delivery that reflects and meets the often unique needs of each town, community and landscape.

1.1 Preparing this Plan

This Plan was informed by information collated through the following tasks:

- Literature review.
- Key informant interviews with local subject matter experts.
- Key informant interviews with drought resilience planners from other regions.
- Regional in-person engagement with 78 people across the Outback SA region.
- Online workshop and an online survey.
- Regular steering committee meetings.

This Plan contains a summary of the information gathered from these tasks. Further detail and findings from all tasks are described in the *Background Paper* (included as an attachment to this Plan).

Regional engagement including 16 face-to-face workshops, drop-in sessions and dinner conversations were undertaken with stakeholders and communities in 13 outback towns throughout March and April 2024. In total more than 4000km were travelled across some of the most remote areas of South Australia. Opportunities for online engagement were also provided through an online survey, online workshop and phone calls to individuals. 114 individuals took part in the engagement.

The regional engagement helped the project team to understand:

- How is the Outback SA region impacted by drought?
- What makes Outback individuals, communities and regions resilient to drought?
- How can the resilience of the Outback SA region to drought be maintained and enhanced?

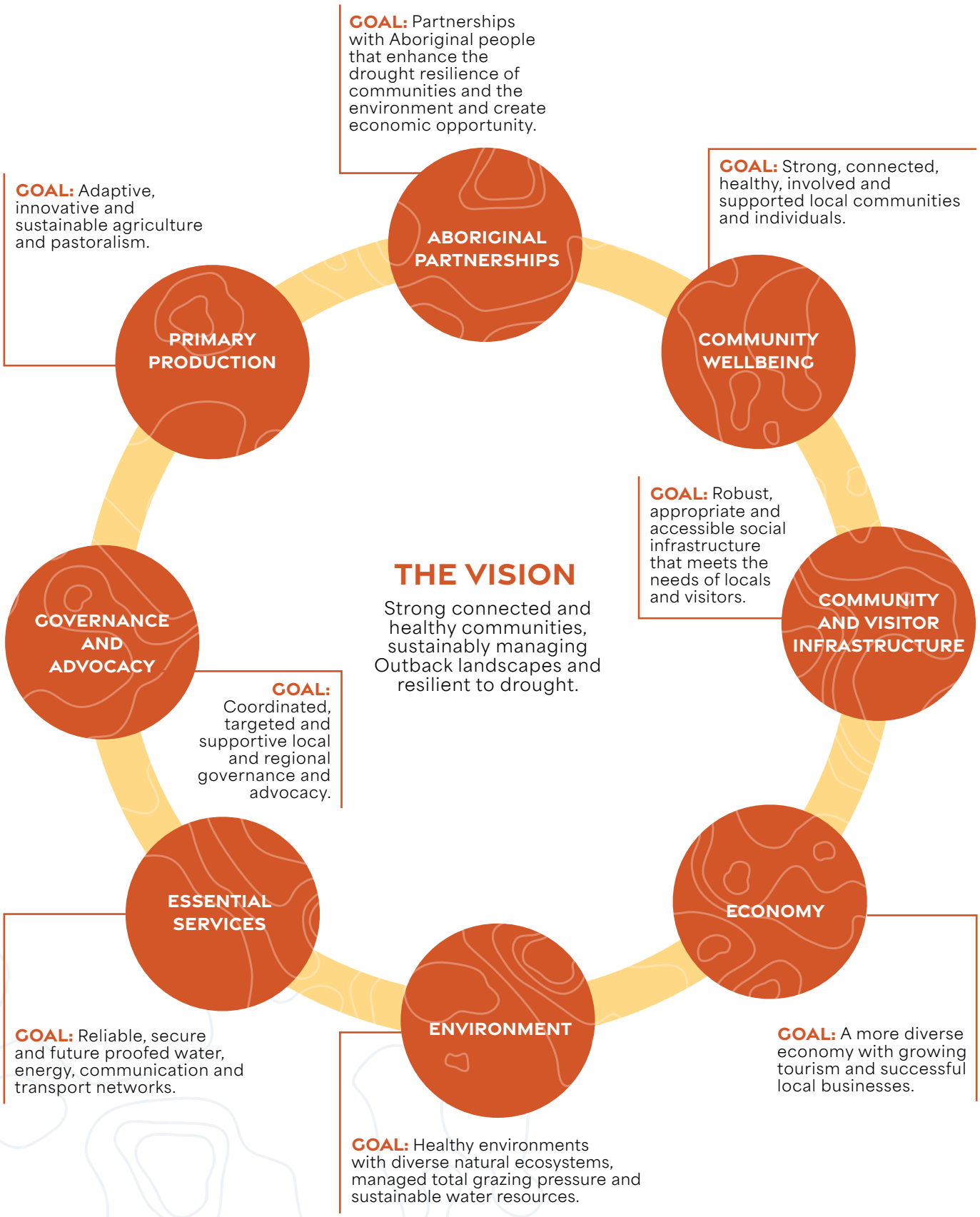
Community members and stakeholders shared a wide diversity of perspectives, experiences and priorities. These are summarised in the Engagement Summary Report that is included as an Appendix to the *Background Paper* and embedded through this Plan.

Quotes from community members and stakeholders collected through the engagement activities are included in the yellow speech bubbles throughout this Plan reflecting personal experiences and views of drought in their own words.

2.0 Our vision and goals

DROUGHT RESILIENT OUTBACK SA

Strong connected and healthy communities, sustainably managing Outback landscapes and resilient to drought.

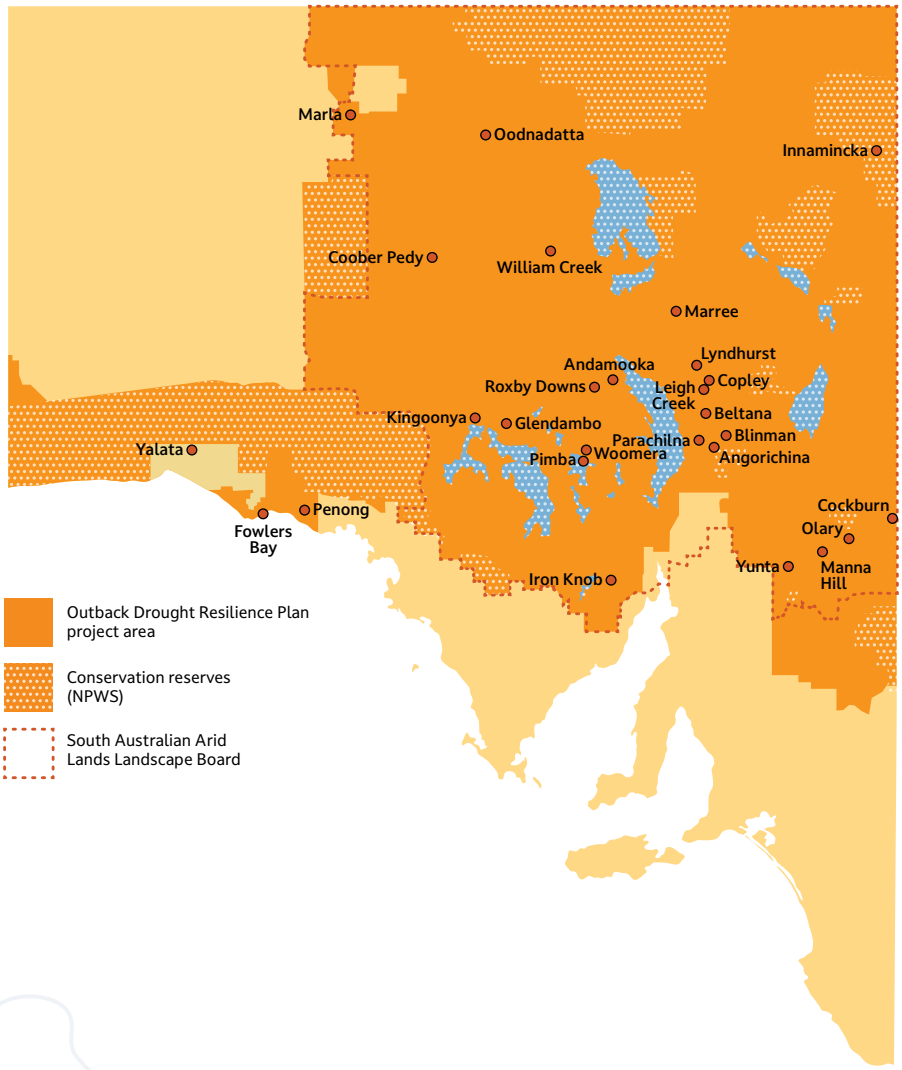

GOAL: Partnerships with Aboriginal people that enhance the drought resilience of communities and the environment and create economic opportunity.
ABORIGINAL PARTNERSHIPS
GOAL: Strong, connected, healthy, involved and supported local communities and individuals.
COMMUNITY WELLBEING
GOAL: Robust, appropriate and accessible social infrastructure that meets the needs of locals and visitors.
COMMUNITY AND VISITOR INFRASTRUCTURE
GOAL: A more diverse economy with growing tourism and successful local businesses.
ECONOMY
GOAL: Healthy environments with diverse natural ecosystems, managed total grazing pressure and sustainable water resources.
ENVIRONMENT
GOAL: Reliable, secure and future proofed water, energy, communication and transport networks.
ESSENTIAL SERVICES
GOAL: Coordinated, targeted and supportive local and regional governance and advocacy.
GOVERNANCE AND ADVOCACY
GOAL: Adaptive, innovative and sustainable agriculture and pastoralism.
PRIMARY PRODUCTION
THE VISION
Strong connected and healthy communities, sustainably managing Outback landscapes and resilient to drought.

3.0 The Outback SA region

The Outback SA Drought Resilience Plan covers the region within the boundary of the unincorporated area of South Australia, as well as the Coober Pedy and Roxby Downs local government areas.

The region has less than 1% of the state's population living in 63% of its land mass. Its immense land size, small population and mostly arid climate is different to every other part of South Australia. It also means there is high variability across the region in terms of its economies, environments, people and governance.

FIGURE 1: OUTBACK SA REGION



KEY SOCIAL AND ECONOMIC CHARACTERISTICS OF THE OUTBACK SA REGION					
	Total Outback SA region	**Unincorporated SA**	**Roxby Downs**	**Coober Pedy**	**South Australia**
Resident population (ABS 2021)	8,554	3,006	3,976	1,566	1,781,516
Aboriginal and Torres Islander peoples	13.6%	24.4%	5.0%	15.1%	2.4%
Volunteering rate	17.1%	21.8%	14.0%	15.1%	14.1%
Median age	37 years	42 years	31 years	50 years	41 years
Unemployment rate	4.4%	5.0%	2.1%	11.8%	5.4%

	Unincorporated SA	**Roxby Downs**	**Coober Pedy**
Top 3 Industries of employment (2021) By place of residence	Agriculture (29.5%), Mining (14.7%) Accommodation and food services (10.5%)	Mining (49.9%) Construction (11.4%) Accommodation and food services (5.9%)	Accommodation and food services (18.5%) Health care and social assistance (18.1%) Retail trade (13.0%)
Top 3 Industries of employment (2021) By place of work	Mining (54.7%) Construction (13.3%) Agriculture (7.6%)	Mining (57.1%) Construction (15.1%) Accommodation and food services (4.9%)	Accommodation and food services (21.0%) Health care and social assistance (17.0%) Public administration and safety (11.5%)
Gross Regional Product (GRP) (2021)	$1.5 billion (1.4% of SA's gross state product)	$425 million (0.5% of SA's gross state product)	$91.82 million (0.08% of SA's gross state product)

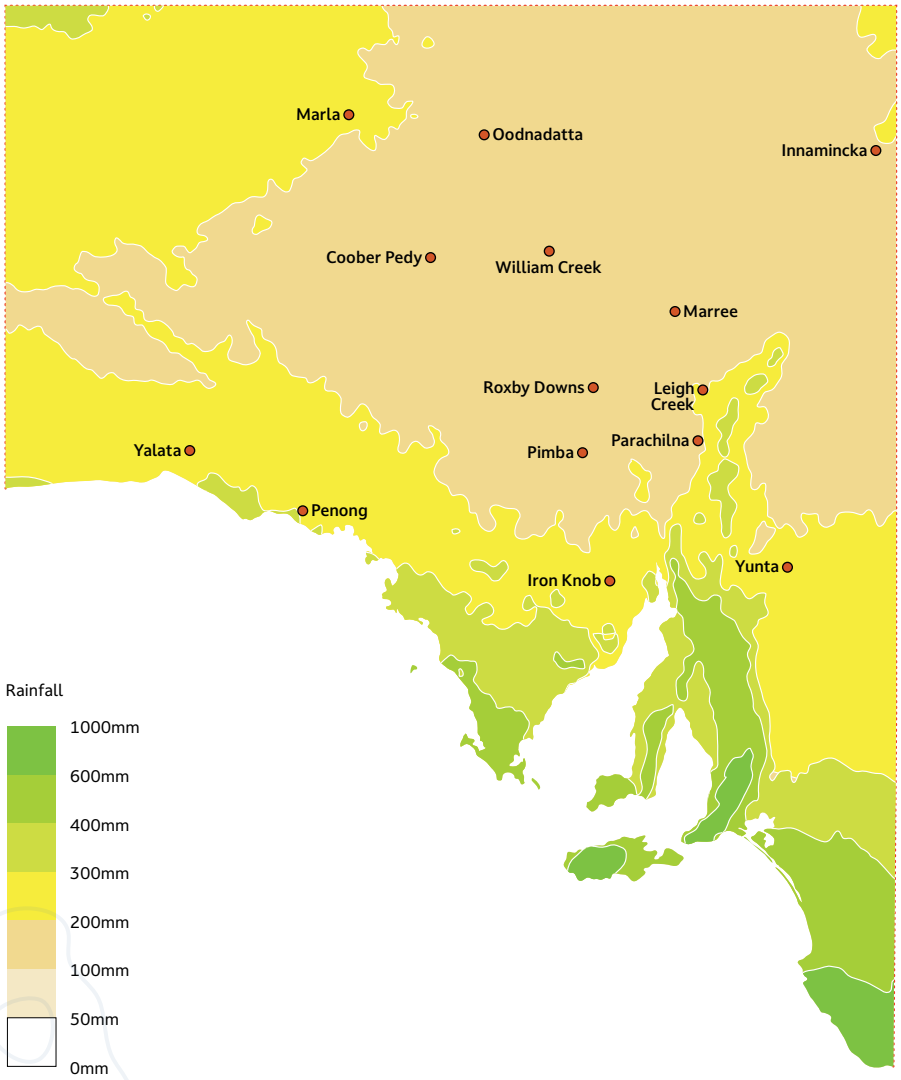
All data sourced from 2021 Census.
NOTE - The 2021 census data may not accurately reflect the population of very remote communities in South Australia.

> "Learnt experience and reverting to practice that works helped us get through drought."

3.1 Climate

Most of the Outback SA region receives an average of 100-200mm of rainfall per year[1] shown in *Figure 2*. The seasonality of this rainfall differs across the region. The majority of the region in the north experiences summer-dominant rainfall. A central zone generally experiences seasonal rainfall, and the southern-most part of the region receives winter dominant rainfall[2].

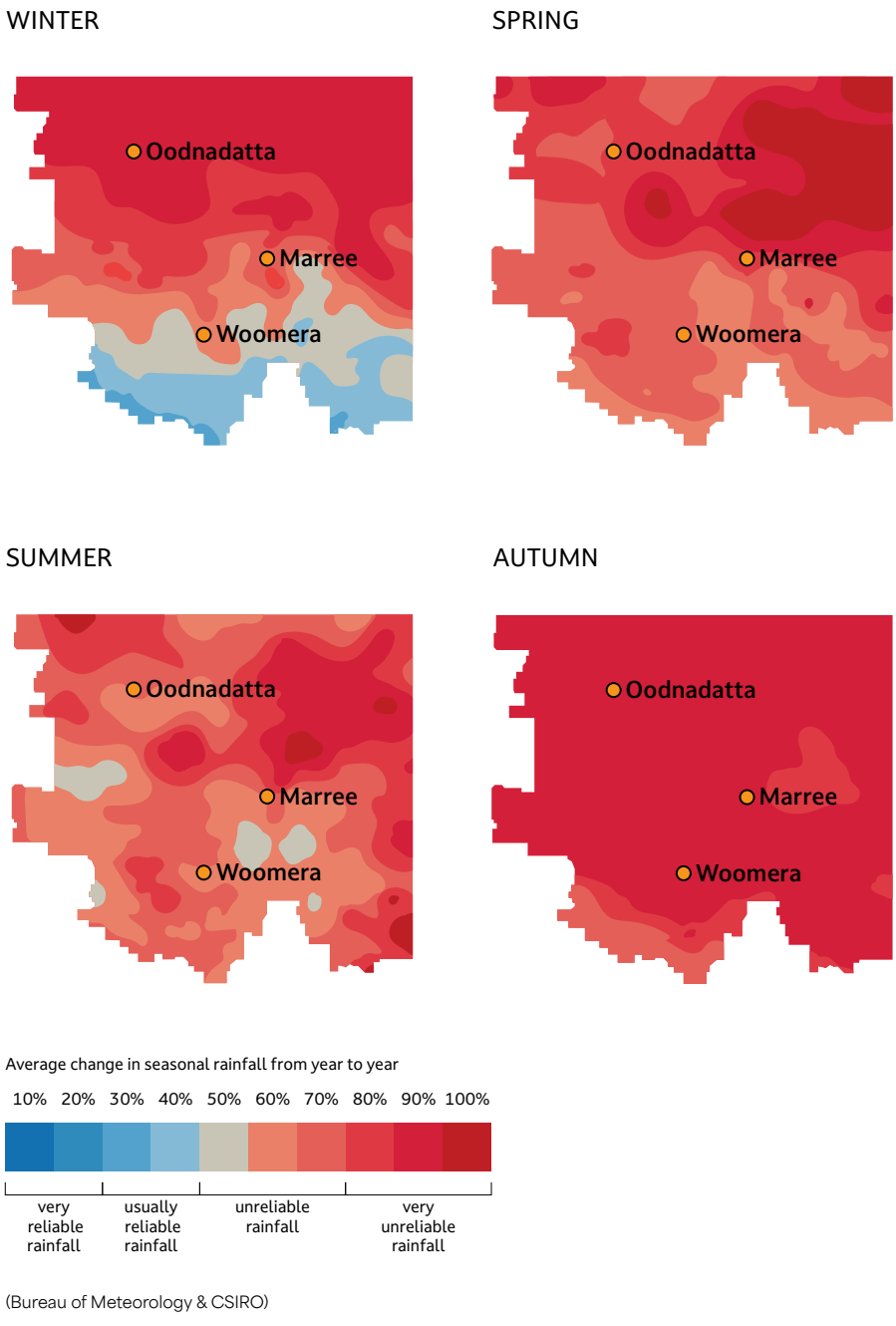
FIGURE 2: AVERAGE ANNUAL RAINFALL 1991 - 2020[3]



In addition to different seasonal trends in different parts of the region, rainfall across the Outback SA region is highly variable. It experiences the boom and bust of wet and dry cycles. In the last 30 years (1989-2018) in the SA Arid Lands region, dry years (receiving the lowest 30% of total annual rainfall) have occurred nine times and wet years (highest 30%) 11 times[4]. Bureau of Meteorology data shows the extremes in annual rainfall; Innamincka weather station has recorded a record annual low of 13.2mm of rain with a record high of 866.6mm[5].

Rainfall reliability maps for the past 30 years (*Figure 3*) show that across the majority of the South Australian Arid Lands region, rainfall has been unreliable (red areas) across all seasons[6]. The only exception is winter rainfall, which has been moderately reliable in a limited area south of Woomera (beige and blue areas).

FIGURE 3: RAINFALL RELIABILITY 2019



(Bureau of Meteorology & CSIRO)

> "The extended dry spells are more impactful when it is also unusually hot."

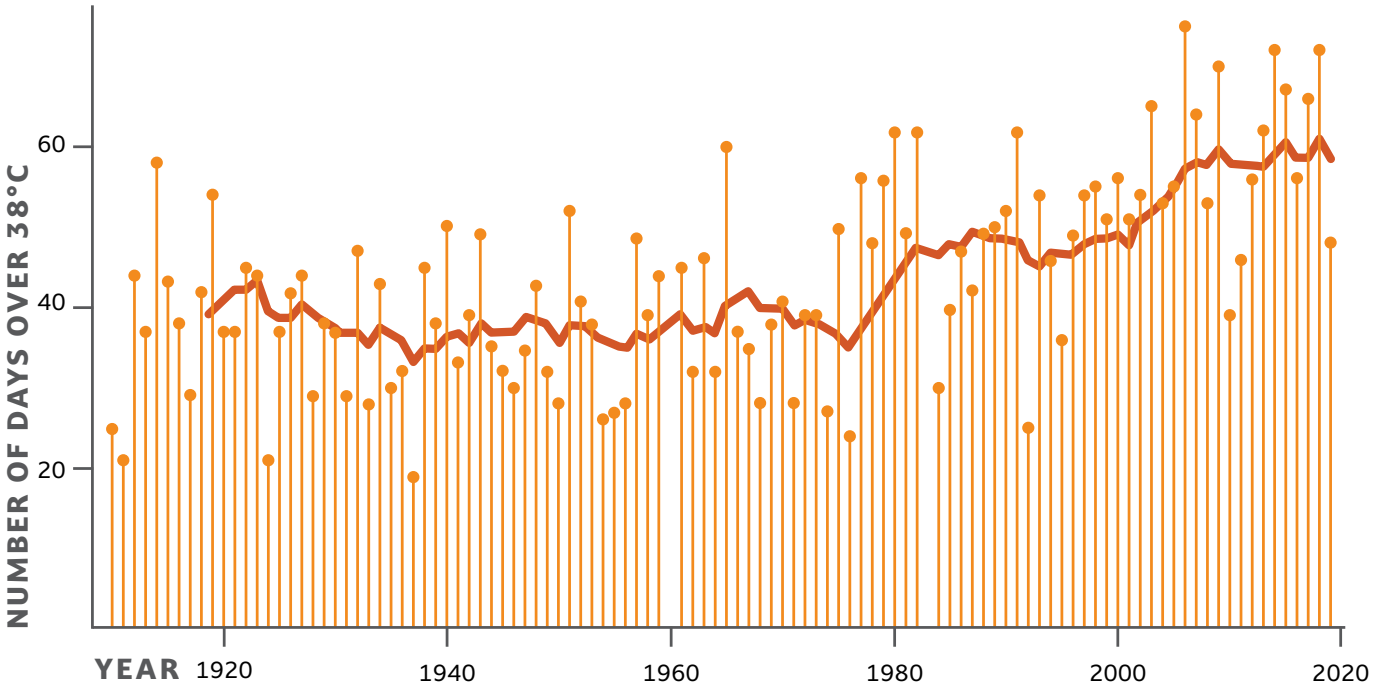
In Outback SA, 10 mm of rainfall is a critical threshold for feed growth to begin[7]. In the last 30 years in the SA Arid Lands region, useful rain events have occurred on average four times per year. On average, Woomera gets about five rainfall events (single or multi-day) of 10 mm or more each year, and Marree gets four, however this can range from zero to 12 events at both locations. There have been three years since records began that Woomera did not receive at least one 10 mm rainfall event. Marree has had only one year in the last 30 without a 10 mm rainfall event.

Pastoral areas can benefit from rainfall at any time of the year, however due to higher temperatures and increased evaporation in the warmer months more rain is required during this period to be effective in initiating vegetation growth and recruitment. In the cropping areas around Penong heavy summer rainfall can be damaging to production.

The region experiences very high temperatures especially during summer, with most of the region experiencing average summer maximum temperatures in the high 30°Cs.

In the last 30 years, there has been an increase in the number of hot days (temperature over 38°C). *Figure 4* shows the annual number of hot days (red bars) with a 10-year running average (solid red line) for Marree. Marree experienced an average of 54 days per year above 38°C between 1989-2018, compared to an average of 41 days per year above 38°C between 1959-1988.

FIGURE 4: NUMBER OF DAYS PER YEAR OVER 38°C AT MARREE[7]



3.2 Defining features of the Outback SA region

The outback is characterised by a set of features that are not individually unique, but which together cause it to function in ways that are fundamentally different to other physical and social environments[8].

These features have been reviewed and adapted in relation to the Outback SA region in the table below through research and discussions during stakeholder engagement. They influence the way community and stakeholders in the region are able to build resilience to drought.

FEATURES OF THE OUTBACK SA	
Feature	**What this looks like in the Outback SA region**
Climate variability	The region experiences highly variable rainfall and other episodic weather events that rarely follow predictable annual cycles. One property can be in drought while its neighbour is in flood. Rainfall patterns differ greatly across the region. Every drought is different too. The droughts experienced in the past have affected different areas in different ways and been of varying durations.
Scarce resources	Low soil fertility and harsh conditions mean stocking rates are often kept low. High per capita delivery and maintenance costs influence the provision of physical infrastructure and community services including roads, internet and phone connectivity, water, energy and waste management.
Sparse population	The human population in this region is small and geographically dispersed. Coober Pedy (population 1,427 in 2021) and Roxby Downs (pop. 3,671) are the largest towns, while the remaining scattered towns have less than 300 residents each. There are also many transient people that move out over the summer period or travel in and out to work in the mining industry.
Remoteness	Many towns in the region are extremely isolated. Decision making is often centred far away in regional centres such as Port Augusta or Adelaide. Government service provision is often focused elsewhere due to the lack of population. Most markets are distant and transport networks are critical.

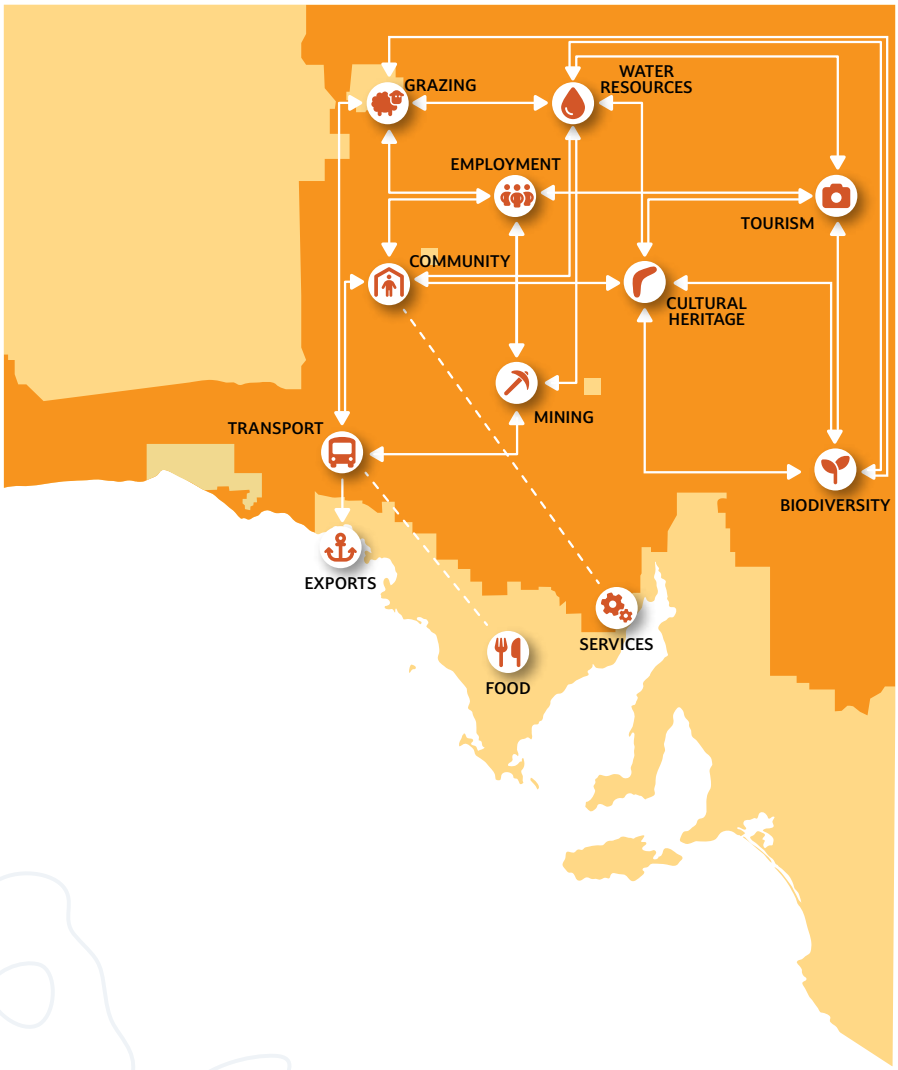
FEATURES OF THE OUTBACK SA	
Feature	**What this looks like in the Outback SA region**
Economic variability	Heavy reliance on the mining/resources sector can lead to uncertainty when this industry experiences downturn or other disruptions. Besides agriculture and pastoralism and tourism, the majority of other industries in the region are underpinned by the success or otherwise of mining. Agriculture and pastoralism is greatly impacted by drought and is vulnerable to changing commodity prices.
Local knowledge	Remoteness and sparse populations contribute to relatively low levels of research effort and formal capture of knowledge in the Outback SA region. In contrast, Aboriginal traditional knowledge is vast and their knowledge about their country is extensive. Many station people, pastoralists and farmers have lived and worked on their land for years. Many of the region's residents have experienced multiple drought and flood cycles.
Cultural differences	The people who choose to live in the Outback are accustomed to a unique way of life. They have a strong sense of identity, community and family. They recognise that living in the Outback means living with hot dry conditions and without many of the everyday conveniences available to city people. They love their country and way of life.
Reliance on volunteers	In the unincorporated areas, the lack of councils and emergency services mean that the locals 'do it all'. Volunteers undertake everything from managing town infrastructure, running community events and upgrading community halls to responding to vehicle crashes and fires. There is a strong culture of volunteering. However, overreliance on volunteers can lead to burnout and impacts on the community. The number of volunteers in the regions is decreasing, and volunteers are ageing.

3.3 The Outback SA 'system'

The Outback SA region is a complex "system" of connections and interactions between people, industries and natural resources. These connections and interactions mean that when one feature is impacted, flow on effects will be experienced by other features in the system. Developing this understanding can help identify the factors that make the system resilient or vulnerable to change. The Outback SA system and its key features is conceptually depicted in *Figure 5*.

FIGURE 5: CONNECTIONS AND INTERACTIONS BETWEEN KEY FEATURES OF THE OUTBACK SA SYSTEM

Note the location of the icons are placed for design purposes and not location specific.



Water resources are a key feature of the system with many connections. Water resources are critical to sustain communities, biodiversity, grazing stock in pastoral areas and mining operations. The lakes, watercourses, springs and wetlands are of significant cultural value to the Aboriginal people of Outback SA and many are popular tourist attractions. Cultural values are intrinsically linked to water resources and biodiversity.

Although annual rainfall is low, high intensity rainfall events can see more than the average annual rain fall in a single event, damaging infrastructure and eroding watercourses and floodways, limiting mobility and disrupting freight networks. Regional biodiversity has evolved with this variability which contributes to its inherent resilience. Some species are dependent on high intensity rainfall events to create suitable breeding conditions, and others are reliant only on groundwater from permanent or semi-permanent springs. Rainfall from outside the region is important with northern floodplains reliant on flood pulses from upstream catchment areas in the Northern Territory and Queensland.

In the north of the region most mines access groundwater from the Great Artesian Basin (GAB) to meet operational requirements. Research has demonstrated that the majority of recharge in the western margin on the GAB (aligning with the western edge of the Outback SA region) occurred over 10,000 years ago with virtually no recharge occurring since[10] meaning that groundwater use by mining operations is unlikely to be impacted by drought. In southern areas around Penong and Yunta, groundwater is extracted from shallow aquifers for stock and domestic use. There are no observation wells in these areas however anecdotal information suggests lowering of groundwater levels during recent droughts.

> "There are less and less people doing more and more."

The large distances separating communities and industries, the need to bring in food produced outside the region and the need for the community to access services outside the region, means that a reliable transport system is essential. Community and industry viability are vulnerable to weather impacts on the transport network. During drought, increased requirements to move stock can impact road condition. Heavy rainfall events following drought can be even more destructive to the road network, requiring significant maintenance or renewal and food drops.

The impact of drought on the feed base in pastoral areas varies across the region and is impacted by total grazing pressure. During drought, annual feed sources (herbs and some grasses) and may not be available and stock will graze perennial native shrub and grass species, potentially having a great impact on local biodiversity[11].

The Outback SA system supports the industries and businesses that sustain the region's community. With agriculture and pastoralism and tourism as key employers, the impacts of drought on these sectors has flow on impacts to communities and individuals. The reliance of the community on food produced outside the region means food security is vulnerable to disruptions to transport. Although water security is being improved in some Outback SA towns through the installation of small-scale desalination plants, many remote residents rely on rainwater tanks to supply domestic use.

The existing and in some cases inherent resilience of the region's people, communities, industries and environments considered together as a system, explains why they have been able to survive the variability and impacts of drought so many times before. Some features of the system are more vulnerable to the impacts of drought and the potential for longer and hotter droughts and even more unpredictable rainfall have potential to have greater flow on effects to the Outback system.

3.4 Outback SA strategic context

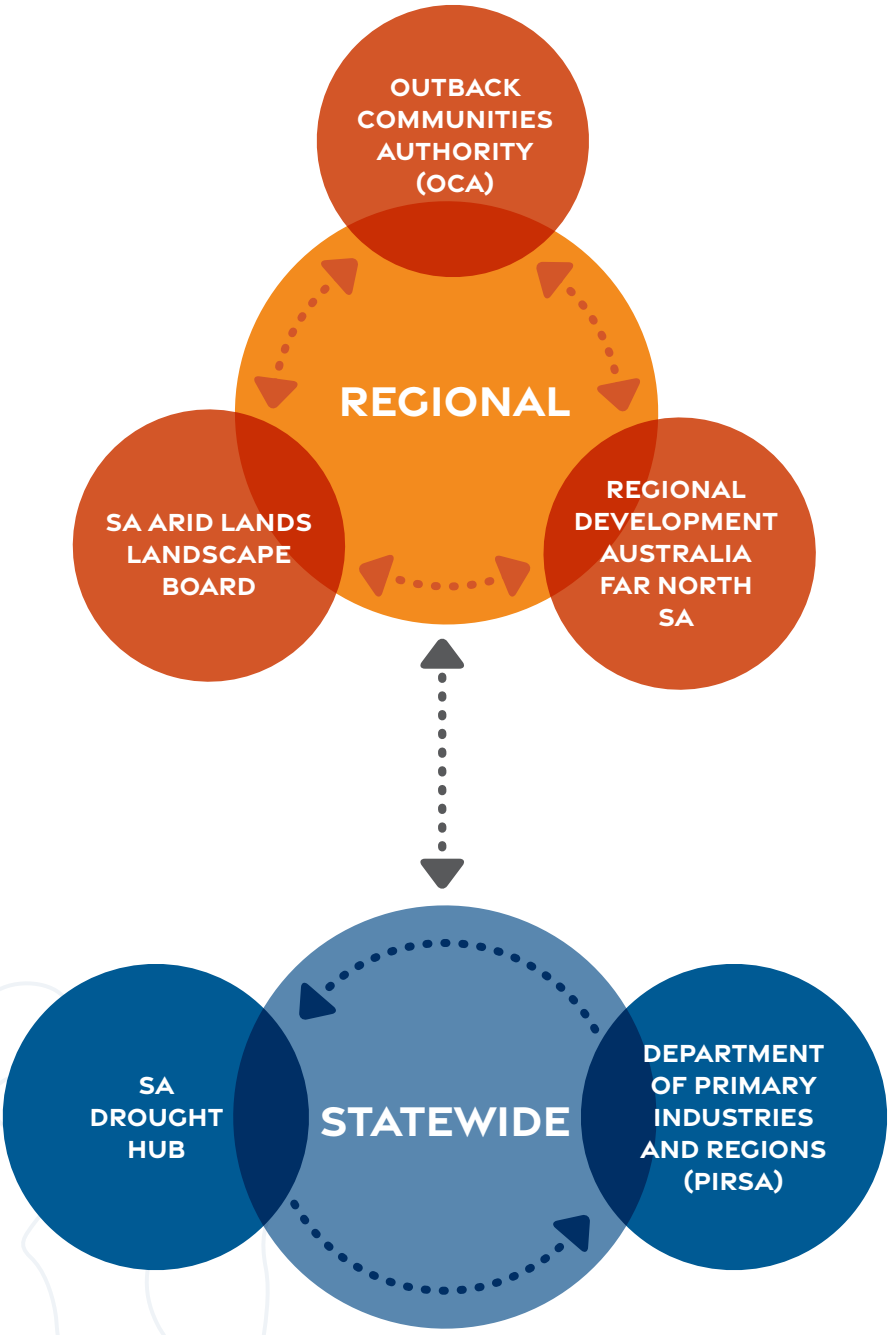
The Outback SA Drought Resilience Plan aligns with other regional strategic plans developed by organisations on the Regional Drought Resilience Steering Committee, each aiming to build resilience in each organisation's areas of responsibility.

Planning for the implementation of the opportunities in this Plan will identify alignment with these strategic plans to identify opportunities for collaboration, maximise efficiency and minimise duplication of effort.

The organisations represented on the Steering Committee, and how they relate to each other is represented in *Figure 6* below.

The areas of responsibility and key strategic plans are outlined in the table on page 25.

FIGURE 6: CONNECTIONS AND INTERACTIONS BETWEEN THE ORGANISATIONS WITHIN THE STEERING COMMITTEE



REGIONAL		
Organisations	**Areas of responsibility**	**Strategic Plan**
Landscapes South Australia SA Arid Lands	• Sustainable land and water management • Biodiversity protection • Connecting people • Fostering partnership	South Australian Arid Lands Regional Landscape Plan 2021-2026
Outback Communiites Authority (OCA)	• Public service provision • Infrastructure development • Community advocacy	The Strategic Blueprint for Outback SA (draft for consultation)
Regional Development Australia Far North SA	• Economic development • Strategic infrastructure investment • Business capacity building • Regional investment attraction • Workforce development	The Regional Blueprint (Regional Development South Australia)
STATEWIDE		
Organisation	**Areas of responsibility**	**Strategic Plan**
Department of Primary Industries and Regions (PIRSA)	• Pastoral management • Biosecurity management • Regional growth • Agricultural innovation	Strategic Plan 2021-2025
SA Drought Hub	• Drought resilience • Research and innovation • Knowledge sharing	

4.0 Drought

Drought is not simply low rainfall. If this were the case, Outback SA could be considered to be in almost constant drought. Rather, drought is a comparatively dry period compared to normal conditions. It also considers the ability of those affected to cope with drier than usual conditions

FOR THIS PLAN, DROUGHT IS DEFINED AS:

A prolonged period of abnormally dry conditions that impact negatively on water availability and agricultural production in a region and, consequently, impacts negatively on the economy and environment of the region and the health and wellbeing of its residents.

4.1 The National Drought Agreement

Many community members referred to concerns about drought declarations, and perceived inequities when lines on maps are drawn to delineate where drought is and is not.

It is important to note that the Government of South Australian no longer makes any declaration of drought, consistent with the National Drought Agreement.

> "As a primary producer the biggest impact is on your well-being and finances. It takes years to recover both financially and mentally from drought."

In December 2018, the Council of Australian Governments agreed and signed a National Drought Agreement that sets out a joint approach to drought preparedness, responses and recovery[12]. One of the principles underpinning this agreement was that 'there should no longer be Exceptional Circumstances declarations and associated lines on maps'. This means that all government agreed that drought declarations would no longer be made as a trigger for support becoming available during droughts.

A review of the 2018 NDA was published in 2022, including recommendations to strengthen the Agreement to ensure that farm businesses, farming families and farming communities across the country are appropriately supported in advance of, during, and post drought events. Recommendation 25 describes proposed updated principles for the next iteration of the Agreement, including that 'support needs are highly variable, and eligibility should be based on need, not activated by drought declarations[13].

The development of this Plan is consistent with the Agreement's objectives to prioritise objectives and outcomes that enhance long-term preparedness, sustainability, resilience and risk management for farming businesses and farming communities in Australia.

During the engagement undertaken to inform the development of this plan it was evident that there remains a strong belief that drought declarations may still be made in South Australia. Increasing awareness and understand of the NDA has been identified as an opportunity for action.

> “It’s terrible to watch the land deteriorate and see the animals and native wildlife be decimated”

4.2 Drought in the Outback SA region

Drought in the Outback SA region is caused by a number of natural atmospheric conditions including the Positive Indian Ocean Dipole and El Niño-Southern Oscillation. A positive Indian Ocean Dipole typically results in significantly less rainfall across Outback SA and higher than normal temperatures during winter and spring[14]. El Niño typically results in reduced rainfall over Outback SA and warmer temperatures. Although most major Australian droughts have been associated with El Niño, analysis of past El Niño events shows that widespread drought does not occur with every event, and the strength of an El Niño is not directly proportional to the rainfall impacts[15].

The *Background Paper* summarises information on these climate drivers developed by the Bureau of Meteorology.

Before European colonisation, the Aboriginal people of the Outback SA region would have experienced numerous drought periods. Since written records started, the region has experienced a number of significant declared droughts including[16]:

- The Federation drought: 1895 to 1902.
- The 1914 to 19 drought.
- The World War II drought: 1937 to 1945.
- The 1965 to 1968 drought (only affecting parts of the region).
- The 1982 to 1983 drought.
- The Millennium drought: 1997 to 2009 (in particular 2002-2003 for the Outback region).
- The 2017 to 2019 drought (the Tinderbox drought).

The 2017 to 2019 drought, whilst one of the shortest, was extremely severe in the eastern parts of the Outback SA region. In Yunta, rainfall in 2019 was close to the lowest in recorded history. In the western parts of the Outback SA region around Penong, impacts were much lower as annual rainfall was near average for 2017-2018 and only below average in 2019.

4.3 Drought impacts on the Outback SA region

Past droughts have had widespread impacts across the region. Key impacts shared by community members that have lived through drought in the region are summarised below.

Social impacts

- Significant impacts on mental health and wellbeing exacerbated by financial pressure and associated with feelings of stress, exhaustion and loss of control, resulting in family violence and family breakdowns and death by suicide in extreme cases.
- Reduced community cohesion and connection caused by an increased farm business workload and less time or inclination to socialise.
- Reduced amenity, health and wellbeing and an increased workload resulting from a decline in the condition of the natural environment (loss of trees and reduced cover, dead animals, dust etc.).
- Impacts on the wellbeing of children and young people associated with household stress and environmental degradation.

> *"It was difficult to watch the community struggle with financial and social impacts of drought. I felt very helpless."*

Aboriginal Cultural impacts

- Reduced condition of natural cultural heritage sites including surface water and groundwater dependent ecosystems and culturally significant plants and animals. This can lead to impacts on health, and wellbeing as cultural and environmental stewardship duties are made more difficult and the condition of the country is diminished.

Economic and Financial impacts

- Reduced income for pastoralists, farmers and local business owners, leading to staff layoffs and reduced spend in the local economy. This is often coupled with increased production and business costs associated with the provision of supplementary feeding or agistment.
- Difficulties in finding staff following droughts as people leave the region and do not return.
- While tourism numbers don't seem to be majorly affected by drought, local communities have less capacity to manage tourist impacts such as overuse of water, and off-road vehicle impacts.

Pastoral and Agricultural impacts

- Reduced feed and water mean graziers need to provide supplementary feed, destock or move stock to agist in areas less affected by drought.
- Lower capacity of pastoralists and farmers to plan for and develop their business as their time is taken up by an increased work load, particularly when staff have been laid-off.

Environmental impacts

- Loss of native vegetation and wildlife, lack of surface water and increases in soil wind erosion.
- Reduced recharge and increased extraction of groundwater leading to lower groundwater levels.
- Loss of gardens and community green spaces.

Infrastructure impacts

- Drying of bores, rainwater tanks and dams requiring installation of additional water infrastructure (eg new bores) or carting in water.
- Reduced road surface condition with reduced water for grading and more trucks on the roads transporting stock.
- Increase in power outages on hot days and during dry lightning storms resulting in no telecommunications and inability to pump water, run fridges and freezers and run air conditioners.
- Drought breaking rains often damage roads, bores, solar panels, fences and tanks.

> "I worked with farmers that had gone broke and some took their own lives."

Beneficial impacts

While droughts have overwhelmingly negative impacts, there can be beneficial impacts resulting from drought, or the action taken during drought including:

- Reduction in the number of pest and overabundant animals such as goats, camels, horses, rabbits and kangaroos.
- Provision of grants and other funding for community projects which have a lasting beneficial impact.
- Encouragement of economic diversification.
- Improved community resilience, connection and sense of community support when times are tough.
- Increased water use efficiency.
- Innovation in land and water management practices.

4.4 Climate projections and drought

The drought projections developed by the Earth Systems and Climate Change Hub indicate that under a warming climate the Outback SA region will tend to spend more time in drought, with longer drought duration and more intense drought. Nevertheless, there is considerable uncertainty in the projections, with the positive end of results indicating positive (less) drought outcomes and the negative end of results indicating very extreme drought outcomes[17].

Climate Change in Australia provides the following projections for the region[18]:

PROJECTIONS FOR OUTBACK SA			
Weather event		**Projection**	**Confidence**
Rainfall	Summer rainfall	Changes are possible but unclear.	Direction of change cannot be reliably projected
	Winter rainfall	Projected to decrease in the south.	High
Drought		Time spent in drought is projected to increase.	Medium
Extreme rainfall events		Increase in intensity.	High
Average temperatures		Increase in all seasons.	Very high
Mean, maximum and minimum temperatures		Continued substantial increases.	Very high
Hot days and heatwaves		Substantial increase in the temperature reached on hot days, the frequency of hot days, and the duration of warm spells.	Very high
Potential evaporation		Increase in all seasons as warming progresses.	High

Climate Change in Australia notes that on an annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall.

Climate projections for locations in the region can be sourced from http://myclimateview.com.au

Rainfall and temperature projections from MyClimateView for 3 locations in the region at 2050 using RCP 8.5 are shown in the table below. For Innamincka, annual rainfall is projected to increase by 2050 driven largely by an increase in summer rainfall. For Yunta and Penong, annual rainfall is projected to decline. At Yunta, spring rainfall is projected to have the greatest decline, with slight increases projected for summer and autumn. At Penong, rainfall is projected to decline in all seasons. Consistent with the regional statements from Climate Change in Australia described above, maximum temperatures are projected to increase at all locations and there will be a substantial increase in the number of hot days (over 35°C).

RAINFALL AND TEMPERATURE PROJECTIONS

	Innamincka		Yunta		Penong	
	1994 - 2023	**2050s average**	**1994 - 2023**	**2050s average**	**1994 - 2023**	**2050s average**
Total annual rainfall	189 mm	203 mm	218 mm	211 mm	289 mm	248 mm
Summer rainfall	81 mm	92 mm	67 mm	70 mm	52 mm	35 mm
Autumn rainfall	39 mm	37 mm	37 mm	41 mm	63 mm	50 mm
Winter rainfall	30 mm	32 mm	45 mm	43 mm	109 mm	104 mm
Spring rainfall	46 mm	41 mm	70 mm	55 mm	66 mm	56 mm
Average maximum temperature	29.9°C	31.8°C	24.8°C	26.5°C	23.4°C	24.7°C
Annual hot days (over 35°C)	113 days	141 days	42 days	61 days	27 days	34 days

5.0 Other drivers of change

Global, national and regional influences are driving changes in markets, technology, governance arrangements, values, and social factors. Key drivers and their implications for the Outback SA region are described overleaf, with additional information available in the Background Report.

KEY DRIVERS	
Global drivers	
Climate change and decarbonisation	Responding to climate change requires a shift in the global economy to reduce carbon emissions and action to adapt to a new and changing climate. In Outback SA mining, agriculture and pastoralism and transport industries that are key sources of emissions will require transformational change.
Urbanisation	Larger towns and cities and high amenity areas continue to draw population growth and economic activity away from many smaller towns. It can be challenging for the Outback SA region to compete with the economic, education and social opportunities available in urban areas.
National and state drivers	
Increased cost of living	Increasing costs of living is placing pressure on Australians to fund their everyday needs. There is high variability in the income security of the Outback SA community and this driver will be felt differently in different communities.
Health challenges	The research and engagement for this project highlighted the significant adverse impacts on mental health of drought and the need for increased services to remote communities.
Regional drivers	
Decreasing population	The Outback SA's population has decreased by 22% from 2011 to 2021. While the overall population is projected to stabilise in the coming years, this smaller population often means less community diversity, resources and services. Some towns may experience greater decline than others.
Difficulty attracting and retaining labour	As our world becomes increasingly urbanised, regional areas such as Outback SA experience greater difficulty in attracting and retaining labour. A lack of local services and amenities contributes to this.
High reliance on volunteers	Volunteers play a critical role in the vitality of the Outback SA. However, an overdependence on these volunteers can lead to burnout, with flow-on impacts to local communities. Volunteering rates are falling in the Outback SA region.
Increased digital connectivity	Recent improvements including Starlink have greatly improved the Outback SA region's digital connectivity. This has opened new opportunities for education, employment, health and social connection however the cost of digital access is prohibitive for many households and may amplify disadvantage for those that cannot afford access.

6.0 Drought resilience

Resilience is more than just bouncing back. In some cases, disruption can be seen as an opportunity to move in a new direction, not just recover back to a previous state. Resilience is about proactively changing in order not to be changed.

FOR THIS PLAN, DROUGHT RESILIENCE IS DEFINED AS:

Drought resilience means the ability to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and changed seasonality of rainfall, for improved economic, environmental and social wellbeing.

6.1 Why is drought resilience important?

In the past, droughts have had serious impacts on the Outback SA region. Past droughts had major consequences for employment and income, mental health and wellbeing, the ability to feed livestock or grow crops, the size of regional populations, and the health and function of the environment.

Resilience is about taking action to try to avoid or minimise these negative impacts before they happen rather than waiting until they do occur to act, or just focusing on recovery. Building resilience can help to create economic, social and environmental development opportunities.

Drought resilience often has a focus on the agricultural sector. However, the unique climate, geographic, social and economic factors of the Outback region mean that drought affects communities as a whole and other industries outside of the agricultural sector.

Building resilience will help the Outback SA region to endure droughts with less negative impact, and recover from them sooner.

6.2 Characteristics of drought resilient individuals, communities and regions

Resilience looks different for every person, community and region depending on its unique experience, attributes, risks and characteristics. However, there are a number of common attributes of drought resilience identified in the Outback SA community engagement (refer *Background Paper* for more detail).

Drought resilient individuals in the Outback SA region are or have:

- Strong relationships with friends and family and are part of a connected communities.
- Able to or have shared their struggles, are willing to accept support and understand the impacts on those around them.
- Good relationships with staff from organisations that provide health, education, land management and community support.
- Willingness to try doing things differently and innovate and adapt to different conditions, whether it be on the land or in town.
- Good long-term business and financial planning and decision-making – ability to 'play the long game' and use the profits from good years to get through the bad years.
- Diverse sources of household income.
- Access to and awareness of financial support available.

- Pastoralists that manage total grazing pressure and undertake sustainable land management.
- Land managers that understand their land, rainfall variability and drought risk and undertake long-term proactive planning.
- Land managers that have a plan on how to manage property and livestock leading into, during, and post drought, and implementing the plan in a timely manner.
- Access to good education, healthcare and digital connectivity.
- Reliable water infrastructure that maximises water capture and minimises water loss.
- High quality housing with large rainwater tanks or bores and good thermal insulation.
- Drought resilient Aboriginal people are able to live and work on Country, access cultural heritage sites, practice cultural activities and share knowledge between generations.

Drought resilient communities in the Outback SA region are or have:

- Strong, connected, caring communities that help each other in times of need.
- Good relationships between Aboriginal people, wider communities, and government agencies.
- Strong community organisations and volunteer base who are willing and able to put in the work for the benefit of their community.
- Local services including shops and medical facilities (including mental health and preventative health) and access to regional centres with health, education and support services.
- Reliable access to water, power, energy, digital connectivity and food.

- Diversified local economies that may include tourism, mining, workers accommodation, carbon farming, renewable energy etc.
- Access to community grants and other funding.
- Investment in projects that give good return to the community and employ local people.
- Local employment opportunities that support people to stay in the community.
- Low populations of pest/overabundant animals through proactive management before drought.
- Maintainable public spaces which improve amenity, wellbeing and tourism attraction and enable local people to come together.
- Support from external agencies in ways that meet the unique needs of each community.
- Opportunities to undertake training and skills development and diversification.

Drought resilient regions are or have:

- Road and roadside infrastructure to support movement of stock, local travel and tourism (including sealed roads, toilets, rubbish bins, parking bays, showers etc.).
- Timely and localised provision of information about rainfall and forecasts, along with information about available support or activities that will help communities during drought.
- Good communication and provision of information about available community grants and programs, best practice management options, and other resources to provide assistance.
- Coordinated services with permanency of support staff to provide a sense of continuity and allowing trusted relationships to be built.

7.0 The Drought Resilience Strategy

7.1 Vision

THE OUTBACK SA REGION'S VISION IS FOR:

Strong, connected and healthy communities, sustainably managing Outback landscapes and resilient to drought.

7.2 Goals, strategies and opportunities

The goals, strategies and opportunities to build drought resilience in the Outback SA region are described in the following sections. The strategies seek to leverage existing strategic planning and avoid duplication of effort by referring to the implementation of other regional plans. Strategies will be high level to provide flexibility to accommodate changing circumstances, new evidence and evolving knowledge while remaining accountable to stated goals, vision, and regional values.

The goals, strategies and opportunities are presented under the following themes:

- Aboriginal partnerships
- Community wellbeing
- Community and visitor infrastructure
- Economy
- Environment.
- Essential services.
- Governance and advocacy
- Primary production.

The practical and implementable strategies and opportunities to build drought resilience have been developed with the region's community and stakeholders who have identified and supported them because they believe they will be effective

The timing for delivery of each opportunity has been categorised according to when it would fit within the drought cycle:

PREPARING FOR DROUGHT FOUNDATION | PREPARING FOR DROUGHT | RESPONDING TO DROUGHT | RECOVERING FROM DROUGHT

A lead for each opportunity has been identified. Lead organisations are members of the Drought Resilience Steering Committee, or the Steering Committee itself.

Priority strategies that have potential to have the greatest influence in building drought resilience are identified with a **star icon**. These priorities have been identified by stakeholders and the community through engagement on the draft plan.

Many of the strategies relate to work that is already underway, and either needs to be extended, expanded or accelerated to have greater benefit. Some of the strategies present opportunities that are limited in their current application, or are not at all part of current action in the Outback SA region.These present **new opportunities** that could lead to significant or transformational change for the region, and are flagged with a **lightbulb icon**.

Where a project officer is mentioned in the opportunity, this does not necessarily mean delivery requires a full-time resource, but rather than delivery requires additional resources. One or two full time roles may be able to support all of the project officer opportunities.

7.3 Delivery principles

Through the community and stakeholder engagement, a number of ideas were consistently raised and have been used to inform the following drought resilience project principles:

- All of the Outback's communities have developed as a result of differing needs over time. The consultation highlighted the significant differences across town and districts that often have unique and differing needs during drought. The planning, design and delivery of drought resilience building projects will be tailored to each town, community or landscape, reflecting their unique characteristics and needs. Local community involvement is key to provide each community with what they need to be resilient.
- Investment in drought resilience projects will focus on enhancing long-term preparedness and resilience. Resilience building outcomes will be optimised when project delivery occurs when times are good and the community has energy and focus.
- Support will be available to everyone and not disadvantage those that respond early to emerging risks or issues, or focus on those that are slow to respond.

7.4 Aboriginal partnerships

Aboriginal people have strong enduring cultural, social and spiritual connections with the Outback landscapes.

A greater proportion of the Outback SA region's population community identify as Aboriginal or Torres Strait Islander people than in other areas of the State. Native Title has been determined to exist across most of the region.

Traditional Owner groups in the region lead and are involved in a range of land management, environmental management, tourism, mining and pastoral activities including environmental monitoring and management, livestock management, mine activity land remediation, and heritage.

The region's Aboriginal people have contributed to the development of the strategies and opportunities to build the drought resilience of Aboriginal people and the environment.

GOAL
PARTNERSHIPS WITH ABORIGINAL PEOPLE THAT ENHANCE THE DROUGHT RESILIENCE OF COMMUNITIES AND THE ENVIRONMENT

Potential partners
• Traditional Owner groups • Aboriginal community groups • SA Arid Lands Landscape Board • mining companies • Co-management Boards • NGOs • Indigenous ranger groups

Strategies	Opportunities	Lead	Timing
Engage with Aboriginal people to understand opportunities to build drought resilience	Employ a project officer to engage further with Aboriginal people to understand their needs and what would assist in enhancing the drought resilience of their communities and the environment and support the delivery of identified projects.	OCA	
Support programs that deliver on Aboriginal priorities	Support programs that enable Aboriginal people to share cultural land management knowledge across generations and use this to build the resilience of the natural environment.	SAALLB	
	Support Emerging and other Ranger Groups and other Aboriginal people's delivery of land management and monitoring including pest plant and animal control, water and erosion management.	SAALLB OCA	

OCA Outback Communities Authority
SAALLB SA Arid Landscape Board

7.5 Community and visitor infrastructure

Community and visitor infrastructure is key to facilitating community events and activities and supporting tourism. In the Outback SA region, each community is different and so needs fit for purpose infrastructure that supports their unique characteristics. any towns include halls, sporting clubs, ovals and associated facilities, some have playgrounds and other recreation facilities. In smaller communities, the hall is often the only available community space which becomes heavily used during droughts for community activities to support wellbeing.

The Outback Communities Authority has a role to manage and promote improvements to public facilities and infrastructure across the unincorporated area, with Roby Council and Coober Pedy Council taking these responsibilities in their towns.

GOAL
ROBUST, APPROPRIATE AND ACCESSIBLE INFRASTRUCTURE THAT MEETS THE NEEDS OF LOCALS AND VISITORS

Potential partners
• Outback Communities Authority (OCA) • Department for Infrastructure and Transport • Regional Development Far North • Progress Associations and other community organisations • Councils • local businesses

Strategies	Opportunities	Lead	Timing
★ PRIORITY **Improve provision of regional infrastructure that facilitates community events and tourism to build resilience before droughts occur**	Funding upgraded or new community infrastructure that is maintainable, sustainable and provides a place for community connection and diverse uses (including community halls, sporting facilities, irrigated green space, community facilities with backup power generation etc.).	OCA	
	Enhance town environments through the establishment of additional landscaping and green infrastructure that can be adequately and sustainably maintained.	OCA	
	Undertake a needs analysis to identify opportunities to build additional and upgrade existing infrastructure to support economic diversification via tourism in towns including public toilets, showers, water , shaded outdoor tables and chairs, campground facilities etc.	OCA RDA	#1
	Implementing the recommendations of the Kati-Thanda Lake Eyre Flood Tourism Management Plan to support a strategic approach to visitor facility provision and management[19].	RDA	

OCA Outback Communities Authority
RDA Regional Development Far North

7.6 Community wellbeing

The region's population is small, declining and geographically dispersed. Apart from the larger centres of Roxby Downs and Coober Pedy, all other towns have less than 300 people with the largest being Andamooka, Iron Knob, Leigh Creek, Oodnadatta, Penong and Woomera. There are numerous smaller townships, communities and settlements scattered across the region.

The regions' communities have high rates of volunteering and strong connections. Many people have lived in the region for many years, following generations of family members that have made the region home.

In the unincorporated areas of Outback SA, Progress Associations and other community groups are responsible for local services and facilities. Many people "wear many hats" involved in social, sporting, health and education organisations.

Community and stakeholders in nearly all locations shared the lasting impacts of droughts on the community. Drought-breaking rains do not mean the impacts of drought immediately reduce. Recovery can take significant time - individuals, families and businesses can still be recovering well after the environment has recovered.

> "The weather associated with drought brings down mains power and this means no water (pumps), no aircon, no refrigeration. It takes too long for the power to be reinstalled."

GOAL
STRONG, CONNECTED, HEALTHY, INVOLVED AND SUPPORTED LOCAL COMMUNITIES AND INDIVIDUALS

Potential partners

• Outback Communities Authority • Councils • Progress Associations and other community groups
• Royal Flying Doctors Service • SA Health • PIRSA • Family and Business (FaB) mentors • Rural councillors • Centrelink
• Rural Aid • Not for Profit organisations • external/out of region community organisations • regional and community programs funded through the Australian Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts

Strategies	Opportunities	Lead	Timing
★ PRIORITY **Maintain and strengthen community wellbeing**	Convene a working group to bring potential delivery partners together and determine delivery mechanisms for mentoring, counselling, financial advice, training, and support services for Outback communities to support and enhance drought preparedness and resilience. Employ a project officer to support service delivery with appropriate reach and depth of provision.	OCA	
	Work with and support the Royal Flying Doctor Service, Country Health and other Aboriginal health service providers to provide services, including mental health (for men and women) and allied/preventative health, and preferably with continuity of staff who build trusted relationships with the local community.	OCA SA Health	
Increase opportunities for community connection during drought	Employ a project officer to develop a program of social events and activities for Outback communities that reflect the creativity and individuality of each town or audience. Target different activities to different audiences including whole families, children, young people, women and men, First Nations and culturally diverse communities.	OCA	
	Facilitate knowledge exchange and sharing of drought experiences among communities in formal event and informal settings.	SADH	
Support volunteer activity	Continue volunteer training on skills such as preparing grant applications, writing minutes, financial management, what resources are available, event management, digital literacy, managing insurances etc.	OCA	
	Explore new ways to support volunteer and volunteer organisation involvement, and review systems and processes to identify opportunities for improvement to reduce burden on volunteers and make it easy for volunteers to participate. trusted relationships with the local community.	OCA	

OCA Outback Communities Authority
SADH SA Drought Hub

GOAL STRONG, CONNECTED, HEALTHY, INVOLVED AND SUPPORTED LOCAL COMMUNITIES AND INDIVIDUALS			
Strategies	**Opportunities**	**Lead**	**Timing**
Provide easy to access, direct financial support	Employ a project officer to support community awareness and understanding of community grant opportunities and support grant applications that allow funding for project management.	OCA RDA	
	Advocate for accessible, quick, easy, streamlined personal/ business financial supports during drought such as long-term low interest business loans, water infrastructure rebates, supports similar to Job Keeper etc. with minimal red tape. Town residents may also need access to financial support for example with cost of living (power and water costs).	RDRSC	
	Advocate for financial support to help the region to recover and rebuild after drought.	RDRSC	
Improve financial literacy	Provide mentoring or training for business finances and planning, succession planning and sharing information on the types of business support that is available.	RDA	
	Supporting households to diversify their incomes prior to drought, especially into industries that are not reliant on water (for example historical tourism, dark sky tourism, station stays, fossil tourism, cultural tourism, education, health or community services).	RDA OCA	
Maintain township vibrancy	Promote remote Outback life to encourage people to move to remote communities.	RDA	

OCA Outback Communities Authority
RDA Regional Development Far North
RDRSC Regional Drought Resilience Steering Committee

7.7 Economy

The economy of the Outback SA region is dominated by mining as measured by both employment and contribution to Gross Regional Product. Pastoralism, tourism and construction are other key industries of employment. The reliance on mining makes the region vulnerable to economic shocks caused by falling commodity prices.

Regional Development Australia (RDA) Far North has a key role to play in developing a more resilient and sustainable economy through their work in supporting existing businesses to develop, attract new enterprises to the region, and assisting the growth of strong and viable businesses as well as working towards attracting new business investment to grow the economy of the region.

GOAL A MORE DIVERSE ECONOMY WITH GROWING TOURISM AND SUCCESSFUL LOCAL BUSINESSES			
Potential partners • Regional Development Australia Far North • Outback Communities Authority • Councils • Flinders Ranges and Outback Tourism Committee • Tourism SA • National Parks and Wildlife Service SA • tourism operators			
Strategies	**Opportunities**	**Lead**	**Timing**
Support local employment	Support and promote full time and part time local jobs and education that allow local people to diversify their work and stay in the local community. Ensure local promotion of local job opportunities.	RDA	
	Support industries which enable local employment and economic benefit (eg culture and recreation, tourism, manufacturing, construction, administration) through the provision of training, grants and infrastructure.	RDA	
Promote Outback tourism	Increase promotion of outback tourism across the Outback SA region, optimising opportunities to enhance regional identity.	RDA	
	Consult with DEW and other relevant parties to explore opportunities for safe, sustainable and culturally appropriate visitor experiences in protected areas, as identified in relevant management plans.	RDA	

RDA Regional Development Far North

7.8 Environment

The Outback SA's environment is shaped by low, irregular rainfall, episodic weather and limited human disturbance. The region includes some of the driest parts of Australia and has the largest percentage of intact ecosystems and natural biodiversity in the state. Prolonged droughts can be followed by intense rainfall events and flooding which lead to an explosion of life.

Water resources are critical to sustain communities, biodiversity, grazing stock in pastoral areas and mining operations. The lakes, watercourses, springs and wetlands are of significant cultural value to the Aboriginal people of Outback SA and many are popular tourist attractions. Some of these connections are more greatly influenced by drought than others. Cultural values are intrinsically linked to water resources and biodiversity.

The SA Arid Lands Landscape Board plays a key role in managing the region's natural resources. Working in partnership with Traditional Owner groups, Landscape Groups, local organisations and landholders the Board delivers programs and projects to improve land and water management, biodiversity and pest animal and plant control. The Department for Environment and Water through the National Parks and Wildlife Service are responsible for the management of the 45 conservation reserves and national parks that cover nearly 30% of the region. Biodiversity is also protected on private land through Heritage Agreements and on a number of privately owned or managed reserves and sanctuaries.

GOAL

HEALTHY ENVIRONMENTS WITH ABUNDANT NATIVE VEGETATION, MANAGED TOTAL GRAZING PRESSURE AND SUSTAINABLE WATER RESOURCE

Potential partners

• SA Arid Lands Landscape Board (SAALLB) • Traditional Owner groups • Landscape Groups
• Department for Environment and Water • National Parks and Wildlife Service • National Park Co-management Boards
• conservation and environmental NGOs

Strategies	Opportunities	Lead	Timing
Control overabundant native animals and feral animals' contribution to total grazing pressure	Ongoing support and partnerships for land managers to manage feral animals and over-abundant native species.	SAALLB	
Improving drought resilience of threatened species and ecological communities	Undertake landscape scale planning to inform management interventions including pest plant and animal control, that improve the resilience of native species and communities to drought.	SAALLB	
Monitor and report on environmental condition	Work in partnership to improve long-term monitoring of groundwater, surface water, native flora and fauna including during drought to increase knowledge of the impacts of drought on keystone species and support adaptive management. Undertake regular reporting of monitoring outcomes to the community and key stakeholders.	SAALLB	
Deliver conservation priorities	Implement SA Arid Lands Landscape Board conservation priorities to protect and enhance biodiversity to build resilience before drought: • Managing key threats to protect natural values. • Taking action for threatened species and ecosystem recovery.	SAALLB	
	Continue to support action to progress the goals and objectives of the Lake Eyre Basin Strategic Plan[20], and Great Artesian Basin Strategic Management Plan[21].	SAALLB	

SAALLB SA Arid Landscape Board

7.9 Essential services

The resilience of the Outback SA region is highly dependent on infrastructure that can function effectively and deliver essential services under all conditions.

The large distances separating communities and industries, the need to bring in food produced outside the region and the need for the community to access services outside the region, means that a reliable transport system is essential. Essential services such as power, water and communications are inconsistent across the region. Some towns still do not have household supply of mains water, and many areas have power supplies that are frequently disrupted, impacting food storage and internet connections and sometimes taking days to restore.

There are multiple organisations with responsibility for regional infrastructure. The Department of Infrastructure and Transport is responsible for about 10,000km of outback roads. SA Water is responsible for the operation of desalination plants to supply town water to numerous towns. Other towns and communities rely on local water supply options, including ground water and rainwater tanks. Leigh Creek, Woomera and Roxby Downs are connected to the national electricity grid. The state government own the electricity supply infrastructure to several towns. Coober Pedy, Andamooka and Yunta are supplied through power purchase agreements from independent suppliers[22]. Other communities and stations rely on on-site generation through either renewables and/or diesel generators. Private companies supply telecommunications.

GOAL
RELIABLE, SECURE AND FUTURE PROOFED WATER, ENERGY AND TRANSPORT NETWORKS

Potential partners
• Outback Communities Authority • Department for Infrastructure and Transport • SA Water
• Department for Energy and Mining • SA Power Networks

Strategies	Opportunities	Lead	Timing
★ PRIORITY **Improve provision of regional infrastructure**	Undertake a needs analysis to identify required improvements to road and roadside infrastructure for stock agistment, local travel and tourism, including road sealing, unsealed road maintenance, and installation of parking bays, toilets, showers and rubbish bins. Present analysis to Outback Roads Consultative Forum.	RDA OCA	#1
	Improving water security for all communities, prioritising communities identified as having medium and high risks to water supply[23].	OCA with other agencies	
	Encourage decentralised community scale production and storage of renewable energy to improve energy security and reduce power outages (which also cut out water pumps, fridges, air conditioners, telecommunications etc.).	OCA with other agencies	
	Deliver universal access to public Wi-Fi so the community and visitors can better access emergency services, health, education and other support services.	OCA RDA	
	Encourage and support water recycling initiatives and expand town Community Wastewater Management Systems.	OCA	
Improve efficiency of household infrastructure	Providing incentives for household solar generation and storage, energy and water efficient housing and rainwater tanks.	RDRSC	

OCA Outback Communities Authority
RDA Regional Development Far North
RDRSC Regional Drought Resilience Steering Committee

7.10 Governance and advocacy

The majority of the Outback SA region is unincorporated, meaning it has no local government areas. Instead, the Outback Communities Authority manages and promotes improvements to public services and facilities in outback communities, and articulates the views, interests and aspirations of outback communities.

Each community generally has a Progress Association (or similar) to represent it. These associations generally assist with community needs and priorities and, where resources allow, maintain facilities and services and undertake important town management roles including running community events. Membership of the Progress Associations is voluntary and positions are unpaid.

There are two local government areas in the region for this Plan: District Council of Coober Pedy and Municipal Council of Roxby Downs (Roxby Council) although these councils have different operating structures to most local government bodies in South Australia. During the engagement undertaken to inform this Plan, numerous community members referred to drought declarations. The Australian Government no longer makes drought declarations[24]. In 2018 all Australian governments agreed on a revised National Drought Agreement that recognises the need to support farming businesses and farming communities to manage and prepare for climate change and variability[25].

GOAL
COORDINATED, TARGETED AND SUPPORTIVE GOVERNANCE AND ADVOCACY

Potential partners
• Outback Communities Authority • Regional Development Australia Far North • Councils • SA Arid Lands Landscape Board

Strategies	Opportunities	Lead	Timing
★ PRIORITY **Instigate effective drought governance to support project delivery**	Establish a cross-agency group to coordinate and support drought resilience project funding applications and project delivery, and improve the coordination and funding of programs from different agencies.	OCA	#1
	Investigate how inclusion of drought as a hazard in the State Emergency Management Plan could benefit communities and unlock alternate approaches and support for preparation, response and recovery through a review of other jurisdictions' approaches.	OCA	
	Advocate for and support long-term funding, review and improvement processes to ensure governance agencies learn from past experiences.	RDRSC	
	Encourage city-based volunteer groups to come into regional communities and help during drought times through for example running social events, assisting with weed management etc.	OCA	
Engage with communities and promote available support	Employ a project officer to support community access to and knowledge of the full range of drought resilience, management, and support opportunities and initiatives including the National Drought Agreement and mechanisms to access support.	OCA	#1
	Undertake ongoing engagement with communities to understand what they need and want, and delivering this in partnership with the community.	OCA	
	Increase visibility and access to government agencies (eg PIRSA, OCA, RDA, SAALLB) in on-ground work in the regions, including more personal contact and relationships in the regions (not just in Port Augusta) and supporting continuity of staff where possible.	RDRSC	
Celebrating and sharing success	Celebrating volunteering and community successes, promoting good practice that will strengthen drought resilience.	OCA SAALLB	

OCA Outback Communities Authority
RDRSC Regional Drought Resilience Steering Committee
SAALLB SA Arid Landscape Board

7.11 Primary production

Primary production is a key industry of the Outback, as one of the region's largest employers, a key contributor to GRP and the industry most impacted by drought. The region's 323 pastoral stations cover more than 400,000km^2 or 70% of the region. There are areas of cropping near the west coast around Penong where rainfall is more reliable.

> "As an employee there was a cut down of staff so more work for those of us left"

In pastoral areas, drought results in greater competition for available feed sources and where grazing pressure from pest or native species is high, feed available for sheep and cattle may be inadequate and supplementary feed or destocking may be necessary to avoid environmental damage.

Carbon farming projects are being initiated across South Australia that include practices that increase the amount of carbon stored in soil and vegetation (sequestration) or avoid or reduce greenhouse gas emissions. These can be achieved through rotational grazing with extended rest spells that allow vegetation cover to recover, or by removing stock completely from pastoral properties. Carbon farmers can receive revenue from carbon farming by selling carbon credits through the Australian Government's Emissions Reduction Fund or to private investors or businesses, providing an opportunity for alterative on-farm income[26]. Future demand for verifiable and premium carbon credits is expected to grow however it is understood that carbon credit estimation methods are currently under review.

The World Economic Forum and United Nations have identified biodiversity loss as a major risk to businesses and financial capital[27]. Global conservation organizations, institutes, and business and finance coalitions are seeking a target of nature positive by 2030[28]. A market for biodiversity credits is emerging and may present opportunities for regional landholders to receive financial benefit from taking nature-positive action.

Key agricultural stakeholders include the Pastoral Board which has responsibility to manage and conserve pastoral land in the region and the SA Arid Lands Landscape Board which supports land and water management and pest animal and plant control. Primary Industry and Regions South Australia (PIRSA) are support the delivery of two drought programs in South Australia under the Future Drought Fund including the Farm Business Resilience Program which with industry partners such as Livestock SA will support Australian farmers to better manage risks relating to drought and improve resilience.

GOAL
ADAPTIVE, INNOVATIVE AND SUSTAINABLE PASTORALISM AND AGRICULTURE

Potential partners

• SA Arid Lands Landscape Board (SAALLB) • Eyre Peninsula Landscape Board • Pastoral Board • PIRSA • SA Drought Hub • Primary Producers SA • Livestock SA • Grain Producers SA • farming systems groups • agricultural service providers • Meat and Livestock Australia • Wool Industries Australia • Australian Government Department of Agriculture • Fisheries and Forestry

Strategies	Opportunities	Lead	Timing
★ PRIORITY **Increase capacity of pastoralists and farmers to undertake adaptive land management and manage total grazing pressure**	Increase pastoralists' capacity in adaptive land management, including rotational grazing, destock decision making, locating watering points and erosion control to support uptake and increase pastoral sustainability and resilience.	SAALLB	
	Support landowners to manage total grazing pressure associated with stock, pest animals (eg goats, pigs, deer) and overabundant native animals.	SAALLB	
	Provide information and support for pastoralists to make early and informed decisions about stock management during drought, for example alternative feed sources, destocking or agistment when vegetation cover is declining to prevent overgrazing.	PIRSA SAALLB SADH	
★ PRIORITY **Support and promote carbon farming and nature positive outcomes**	Investigate and share emerging opportunities for biodiversity credits, carbon farming, emissions reduction and other approaches that enable diversification and can deliver finanical benefit from nature positive outcomes.	PIRSA SAALLB	
	Promote land management approaches that create nature positive outcomes.	SAALLB	
	Support pastoral properties to diversify to nature positive markets through increasing sustainable practices and by providing clear pathways. Facilitate information sharing from properties that have already done this.	SAALLB	

PIRSA Department of Primary Industries and Regions
SAALLB SA Arid Landscape Board
SADH SA Drought Hub

GOAL
ADAPTIVE, INNOVATIVE AND SUSTAINABLE PASTORALISM AND AGRICULTURE

Potential partners

• SA Arid Lands Landscape Board (SAALLB) • Eyre Peninsula Landscape Board • Pastoral Board • PIRSA • SA Drought Hub • Primary Producers SA • Livestock SA • Grain Producers SA • farming systems groups • agricultural service providers • Meat and Livestock Australia • Wool Industries Australia • Australian Government Department of Agriculture • Fisheries and Forestry

Strategies	Opportunities	Lead	Timing
Share information and resources about climate and drought response	Share links to online information for pastoralists seeking information during/after drought, with information including registered stockists or providers for feed or agistment. Contextualising technical information such as climate data, forecasts, tools etc. to individual property or business decisions.	SAALLB PIRSA	
Encourage, support and accelerate long-term property planning	Deliver individual farm business assessments which support producers to assess their drought preparedness and develop long-term plans for improvement that address land management, financial sustainability and succession planning.	SAALLB PIRSA	
Deliver local research and innovation	Research and trial new and improved grazing and cropping land management practices in the Outback SA context.	SADH SAALLB	
	Improve localised weather and climate forecasting, monitoring and warning systems.	SAALLB	
Support infrastructure that reduces workload and improves water use efficiency	Support the uptake of proven infrastructure that reduces workload through pastoral property demonstrations of proven equipment, practices and technologies eg telemetry to monitor water levels, stock grids to replace gates.	SADH SAALLB	

PIRSA Department of Primary Industries and Regions
SAALLB SA Arid Landscape Board
SADH SA Drought Hub

8.0 Implementation, governance, monitoring and evaluation

8.1 Implementation

This Plan has been prepared as a framework or prospectus to guide future effort and investment in regional drought resilience.

The opportunities identified in this Plan are unfunded and some may only be progressed with further investment.

It is the intention that the implementation of this Plan will be addressed by a number of different delivery partners. The Outback SA community will be able to address some, while others will require coordination and cooperation between government agencies, non-government organisations and the private sector.

Through the engagement to support the development of this Plan we have heard clearly that communities want to be involved in the decisions that affect them. Planning the delivery of all projects will include the community from the start, to get buy-in and support and more beneficial outcomes.

8.2 Governance

It is proposed to establish a cross-agency group to coordinate and support project funding applications and project delivery to avoid duplication of effort and maximise local and regional benefits. The group would include the partners involved in the development of this Plan, as well as representatives from health. It is proposed the group meets regularly to maintain an ongoing shared understanding of emerging issues as well as being ready to support funding applications to any available source.

8.3 Monitoring, evaluation and reporting

This Plan and its implementation will be monitored, evaluated and reported on according to the *Regional Monitoring, Evaluation and Learning Guide* prepared by the Department for Primary Industries and Regions for the South Australian Regional Drought Resilience Plans.

Monitoring and evaluation are essential parts of delivering any plan, project or program. Undertaking monitoring and evaluation will help the Steering Committee, stakeholders and the community understand if the vision and goals are being progressed and assist in refining the project approaches to optimise outcomes. It also ensures accountability and provides information to share with partners and stakeholders to demonstrate program value.

This monitoring and evaluation framework is based upon a program logic approach. Program logic illustrates cause and effect relationships to provide understanding of how program resources are used to produce outputs and deliver outcomes in the short to long term. The model also acknowledges the interaction of assumptions and external factors with outputs and outcomes. The elements of the program logic model shown in *Figure 7* are defined overleaf[29].

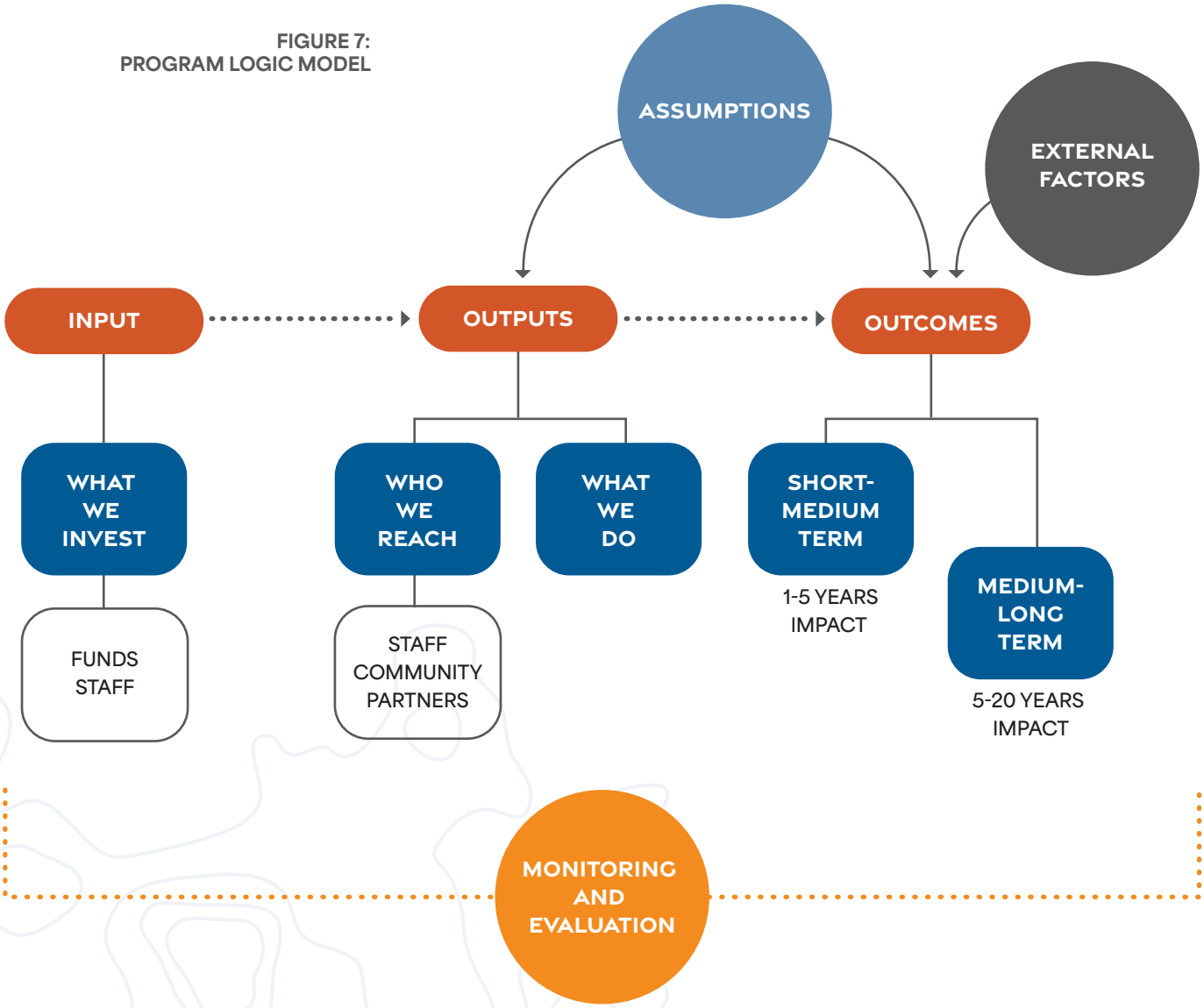
Outputs: measurement of the direct actions taken, for example the activities and events delivered, the services provided and the funds spent. Output measures include both activities and associated participation.

Assumptions: the expectations we have that the actions we take and the participants involved will lead to the outcomes or change we seek to achieve.

Outcomes: the desired results of direct actions on individuals, groups, communities, organisations and the environment in the short-medium and medium-long term. Outcomes in the medium-long term are often influenced more by external factors (actions undertaken by others or changes in environmental, social or governance factors).

External Factors: the uncontrollable factors in the wider environment surrounding our programs that may interact with and influence outcomes.

FIGURE 7:
PROGRAM LOGIC MODEL



The program logic and monitoring indicators for the priority strategies of the Outback SA Regional Drought Resilience Plan are provided in *Appendix A*. This will be reviewed and revised as projects are funded and planning for delivery commences.

As projects are scoped for funding and then implemented, an evaluation process will be established that will consider:

- How effective was the project/program in achieving its intended outputs and outcomes?
- To what extend did the project/program contribute to the relevant goals, and what other things helped or hindered its implementation?

Once implementation commences, a biannual evaluation of the Outback SA Drought Resilience Plan itself will be initiated that will consider:

- To what extent has the Plan been implemented and has impacted on regional stakeholders' capacity and resources to better plan, manage and recover from drought?
- What changes/support are/is needed to ensure that the Plan best provides an effective framework for action and stakeholders can effectively work together towards implementing those actions?

9.0 Glossary

Climate projection
A scenario of future climate, generally resulting from running a global climate model (GCM) with a specified greenhouse gas concentration scenario (or RCP). A projection differs from a prediction in that it is conditional on the representation of a particular GCM and the uncertain assumptions of the model inputs (primarily the greenhouse gas concentration scenario, or RCP)[30].

Carbon farming
Carbon farming includes:

- sequestering carbon in the landscape through regeneration and planting of native vegetation; farm and plantation forestry; and improving soil management to ensure that carbon inputs exceed outputs.
- reducing emissions, such as livestock methane emissions; fertiliser emissions and through manure management[31].

Carbon insetting
Carbon insetting is when a company offsets their emissions with a carbon offset project that comes from their own value chain. Insetting on a pastoral property would means the carbon credits never enter the open market and instead be used to balance out the emissions generated on that property[32].

Decarbonisation
The removal or reduction of carbon dioxide and other greenhouse gases output into the atmosphere.

Drought
A prolonged period of abnormally dry conditions that impact negatively on water availability and agricultural production in a region and, consequently, impacts negatively on the economy and environment of the region and the health and wellbeing of its residents.

Drought resilience
Drought resilience means the ability to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and changed seasonality of rainfall, for improved economic, environmental and social wellbeing.

El Niño-Southern Oscillation
El Niño refers to the extensive warming of the central and eastern Pacific Ocean that leads to a major shift in weather patterns across the Pacific. In Australia (particularly eastern Australia), El Niño events are associated with an increased probability of drier conditions[33].

Green infrastructure
Green Infrastructure refers to all of the vegetation that provides environmental, economic and social benefits such as clean air and water, climate regulation, food provision, erosion control and places for recreation in a township or urban setting. It includes parks and reserves, watercourse corridors, street trees and roadside verges[34].

Indian Ocean Dipole
The Indian Ocean Dipole (IOD) is defined by the difference in sea surface temperatures between the eastern and western tropical Indian Ocean. A negative phase typically sees above average winter-spring rainfall in Australia, while a positive phase brings drier than average seasons[35].

Nature positive
Nature positive is a term used to describe circumstances where nature - species and ecosystems - is being repaired and is regenerating rather than being in decline[36].

Total grazing pressure
The combined grazing pressure exerted by all herbivores - domestic and wild, native and feral - on the vegetation present in an area.

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11.0 Appendix A

Program logic and monitoring indicators for priority strategies

The tables below describes the program logic for the priority strategies in the Outback SA Regional Drought Resilience Plan and identifies proposed monitoring indicators for outputs and outcomes.

PRIORITY STRATEGY:
IMPROVE PROVISION OF REGIONAL INFRASTRUCTURE THAT FACILITATES COMMUNITY EVENTS AND TOURISM

OPPORTUNITIES FOR ACTION

- Fund upgrades or new community infrastructure
- Enhance town environments through the establishment of additional landscaping and green infrastructure
- Undertake a needs analysis to identify opportunities to build additional and upgrade existing tourism infrastructure
- Implement the recommendations of the Kati-Thanda Lake Eyre Tourism Management Plan

POTENTIAL OUTPUTS Activities and participation	DESIRED OUTCOMES Related goal	OUTCOME INDICATORS	
		1-5 years	5-20 years
• Number of upgrades or new assets delivered • Number of people living in communities services by new or upgraded assets • Number of towns with additional landscaping • Completion of tourism infrastructure needs analysis • Number of recommendations in Tourism Management Plan contributed to	Robust, appropriate and accessible social infrastructure that meets the needs of locals and visitors	• Number of events and activities facilitated through new or upgraded assets (target increase) • Action plan for new tourism infrastructure developed (target completion)	• Community connections (target increase / strengthen connections) • Liveability of remote towns and communities (target increase) • Economic contribution of tourism to the region (target increase contribution from tourism)

PRIORITY STRATEGY: MAINTAIN AND STRENGTHEN COMMUNITY WELLBEING

OPPORTUNITIES FOR ACTION

- Convene a working group to bring potential delivery partners together and determine delivery mechanisms for mentoring, counselling, financial advice, training, and support services
- Employ a project officer to support service delivery with appropriate reach and depth of provision
- Work with and support the Royal Flying Doctor Service, Country Health and other Aboriginal health service providers to provide services

POTENTIAL OUTPUTS Activities and participation	DESIRED OUTCOMES Related goal	OUTCOME INDICATORS	
		1-5 years	5-20 years
• Establishment of working group • Development of program for service provision • Employment of project officer • Number of health providers engaged	Strong, connected, healthy involved and supported local communities and individuals	• Number of people accessing support services (target increase) • Geographic distribution of people accessing support services (target increase)	• Resilience and wellbeing of regional communities and primary producers (target increase)

PRIORITY STRATEGY: IMPROVE PROVISION OF REGIONAL INFRASTRUCTURE

OPPORTUNITIES FOR ACTION

- Undertake a needs analysis to identify required improvements to road and roadside infrastructure
- Improve water security for all communities
- Encourage decentralised community scale production and storage of renewable energy
- Provide safe community spaces with backup power sources for community to go when the power goes out
- Deliver universal access to public Wi-Fi
- Encourage and support water recycling initiatives and expand town Community Wastewater Management Systems

POTENTIAL OUTPUTS Activities and participation	DESIRED OUTCOMES Related goal	OUTCOME INDICATORS	
		1-5 years	5-20 years
• Completion of transport needs analysis • Number of water security projects delivered • Number of households with increased water security • Number of small scale renewable energy projects • Number of community respite places established • Number of public Wi-Fi sites established • Number of water recycling initiatives commenced	Reliable, secure and future proofed water, energy, communication and transport networks	• Action plan for Outback transport delivered • Community-scale risk to water security (target decrease) • Community risk to energy security (target decrease) • Volume of water recycled (target increase)	• Effective function of transport network (target reduce disruption from extreme weather) • Equitable access to telecommunications (target increase) • Electricity disruptions (target decrease time without access to electricity)

PRIORITY STRATEGY: INSTIGATE EFFECTIVE DROUGHT GOVERNANCE TO SUPPORT PROJECT DELIVERY

OPPORTUNITIES FOR ACTION

- Establish a cross-agency group to coordinate and support drought resilience project funding applications and project delivery
- Investigate inclusion of drought as a hazard in the State Emergency Management Plan
- Advocate for and support long-term funding, review and improvement processes

POTENTIAL OUTPUTS Activities and participation	DESIRED OUTCOMES Related goal	OUTCOME INDICATORS	
		1-5 years	5-20 years
• Establishment of cross-agency group and development of Terms of Reference • Investigation into drought hazard complete • Number of advocacy submissions	Coordinated, targeted and supportive local and regional governance, advocacy and project delivery	• Number of successful funding applications and value of funding received • Outback SA voice represented in decisions that affect drought resilience in the region • Community and stakeholder satisfaction with project delivery and support	• Success of drought resilience project delivery on time and on budget • Reputation of cross-agency group to support, deliver and advocate (target increase)

PRIORITY STRATEGY: INCREASE CAPACITY OF PASTORALISTS AND FARMERS TO UNDERTAKE ADAPTIVE LAND MANAGEMENT AND MANAGE TOTAL GRAZING PRESSURE

OPPORTUNITIES FOR ACTION

- Increase pastoralists' capacity in adaptive land management
- Support landowners to manage total grazing pressure
- Provide information and support for pastoralists to make early and informed decisions about stock management during drought

POTENTIAL OUTPUTS Activities and participation	DESIRED OUTCOMES Related goal	OUTCOME INDICATORS	
		1-5 years	5-20 years
• Number of capacity building events or activities • Number of pastoralists and landowners participating in events and activities • Support provided to manage pest animal populations • Development of templates to provide information to pastoralists	Adaptive, innovative and sustainable pastoralism and agriculture	• Total grazing pressure (target maintain at sustainable levels)	• Land cover in pastoral areas (target maintain and increase) • Soil erosion and dust issues (target decrease) • Regional economic contribution of primary production (target maintain and increase)

PRIORITY STRATEGY: SUPPORT AND PROMOTE CARBON FARMING AND NATURE POSITIVE OUTCOMES			
OPPORTUNITIES FOR ACTION • Investigate and share emerging opportunities for biodiversity credits, carbon farming, emissions reduction and other approaches • Promote land management approaches that create nature positive outcomes • Support pastoral properties to diversify to nature positive markets			
POTENTIAL OUTPUTS **Activities and participation**	**DESIRED OUTCOMES** **Related goal**	**OUTCOME INDICATORS**	
		1-5 years	**5-20 years**
• Quantity of information shared • Number of landowners accessing information • Number of capacity building events or activities • Number of pastoralists and landowners participating in events and activities	Adaptive, innovative and sustainable pastoralism and agriculture	• Number of properties implementing nature positive land management (target increase)	• Area of land managed to provide economic benefit from non-agricultural purposes (eg carbon farming or biodiversity credits) (target increase) • Distribution and abundance of keystone species (target maintain and increase) • Land cover in pastoral areas (target maintain and increase)

OUTBACK SA
DROUGHT
RESILIENCE
PLAN

Outback SA
Regional Drought Resilience Plan
Steering Committee

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Outback SA Drought Resilience Steering Committee
23ADL-0865
21 October 2024

Outback SA Regional Drought Resilience Plan – Background Paper

Outback SA Regional Drought Resilience Plan – Background Paper

21 October 2024

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URPS Ref	23ADL-0865

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Contents

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This plan has been prepared by URPS for the Outback SA Regional Drought Resilience Steering Committee. The Steering Committee was chaired by Jan Ferguson OAM, Presiding Member, Outback Communities Authority with members including Jodie Gregg-Smith, General Manager, SA Arid Lands Landscape Board; Claire Wiseman, Chief Executive Officer, Regional Development Australia Far North; Margaret Howard, Director, Outback Communities Authority; Melissa Horgan, Principal Regional Advisor – Far North, Department of Primary Industries and Regions; and Tony Randall, Knowledge Broker, SA Drought Hub.

Acknowledgement of Country

The Outback SA Drought Resilience Steering Committee acknowledge Aboriginal people as the First Peoples and Nations of the lands and waters we live and work upon. We pay our respects to Elders past, present and emerging. We acknowledge and respect the deep spiritual connection and the relationship that Aboriginal and Torres Strait Islander people have to country and commit to working with the First Nations People of the region as we deliver the Outback SA Drought Resilience Plan.

In particular, we acknowledge the Traditional Owners of the Outback SA region, including:

- Adnyamathanha
- Antakirinja Matu – Yankunytjatjara
- Arabana
- Barngarla
- De Rose Hill – Ilpalka
- Far West
- Dieri
- Eringa
- Gawler Ranges People
- Irrwanyere
- Kokatha
- Kuyani
- Malyankapa
- Ngadjuri
- Nukunu
- Tjayiwara Unmuru,
- Walka Wani
- Wangkangurru/Yarluyandi,
- Wilyakali,
- Yandruwandha/Yawarrawarrka,

1. Introduction

Drought is part of life in South Australia's Outback region. First Nations peoples have lived with drought for thousands of years and the natural environment has evolved to cope with cycles of droughts and floods. The Outback's communities and industries have established in this environment.

Drought resilience refers to the ability of individuals, communities, industries or environments to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and changed seasonality of rainfall, to maintain or improve economic, environmental or social wellbeing. The resilience of the region's people, communities, industries and environments explains why they have been able to survive the variability and impacts of drought so many times before.

Maintaining and enhancing this resilience as the climate changes and the boom and bust of drought cycles become more unpredictable is essential for the future of the region.

The Australian Government established the Future Drought Fund (FDF) to provide secure, continuous funding for drought resilience initiatives. Through the FDF, the Australian Government is working with the South Australian Government to support the Outback SA region in developing a Regional Drought Resilience Plan to prepare for and manage future drought risks.

The Outback SA Drought Resilience Steering Committee is guiding the preparation of a Regional Drought Resilience Plan for Outback SA, URPS has been engaged to work with the Steering Committee to develop the Plan.

The Outback Drought Resilience Plan will document how the region's shared values might be impacted by drought, describe a desired future vision that acknowledges increasing impacts of drought and identifies strategies and actions to build resilience to ensure regional values are maintained and economic and social development opportunities are optimised.

This Background Paper was prepared as the foundation for preparing the Outback SA Drought Resilience Plan.

1.1 Preparing the Background Paper

This Background Paper was prepared through the following tasks:

- **Literature review**: collation and synthesis of published and unpublished information about the region and shared values, challenges and opportunities through review of regional plans and strategies and other relevant regional documents. The review also looked at literature on leading resilience practice, planning and implementation from elsewhere to identify 'lessons learnt' or ideas for action.
- **Key informant interview with local subject matter experts** to understand how drought has impacted the Outback SA region in the past, what programs have worked well to build drought resilience and how the Drought Resilience Plan can best be implemented. Interviews were held with the following stakeholders:
  - Principal Scientist Climate Applications, SARDI (South Australian Research and Development Institute)

  - Director, Native Vegetation, Pastoral Land Management and Landscape Services, Manager Pastoral Land Management and Senior Policy Officer Landscape Services, Pastoral Board
  - Chair, South Australian Arid Lands Landscape Board
  - General Manager, South Australian Arid Lands Landscape Board
  - Director, Office for the Outback Communities Authority
  - Chair, Outback Communities Authority
  - Principal Regional Advsior, Far North, Primary Industries and Regions (PIRSA)
  - Chief Executive Officer, Regional Development Australia (RDA) Far North
  - Knowledge Broker, Ag Excellence Alliance and SA Drought Hub
- **Key informant interviews with drought resilience planners from other regions** to learn from the experiences of other regions and gain insights into how the Regional Drought Resilience Plan can be prepared most effectively for the Outback SA region. Interviews were held with drought resilience planners who worked on the following Regional Drought Resilience Plans:
  - Northern and Yorke Regional Drought Resilience Plan
  - South West Queensland Regional Drought Resilience Plan
  - The Murraylands and Riverland Plan.
- **Regional engagement** with 78 people across Outback SA to understand how drought impacts the region, what makes individuals, communities and regions resilient to drought, and what the region needs to build its resilience to drought. Workshops were held in the following locations:
  - Andamooka
  - Coober Pedy
  - Copley
  - Gawler Ranges (Nonning)
  - Innamincka
  - Marla
  - Marree
  - Oodnadatta
  - Parachilna
  - Penong
  - Port Augusta
  - William Creek
  - Yunta
- **Online workshop and an online survey** to engage community and stakeholders unable to attend the regional workshops.
- **Regular Steering Committee meetings**

In total 114 individuals were engaged, in addition to the Steering Committee.

Appendix A contains the Regional Engagement Summary Report.

2. The Outback SA Region

The Outback SA Regional Drought Resilience Plan covers the region within the boundary of unincorporated areas of mainland South Australia, as well as the Coober Pedy and Roxby Downs local government areas (Figure 1). This covers almost two thirds of South Australia, from the state's north-east corner to its borders with the APY Lands, New South Wales, Queensland and Northern Territory. The region also encompasses the far west coast from Penong to the Western Australian border.

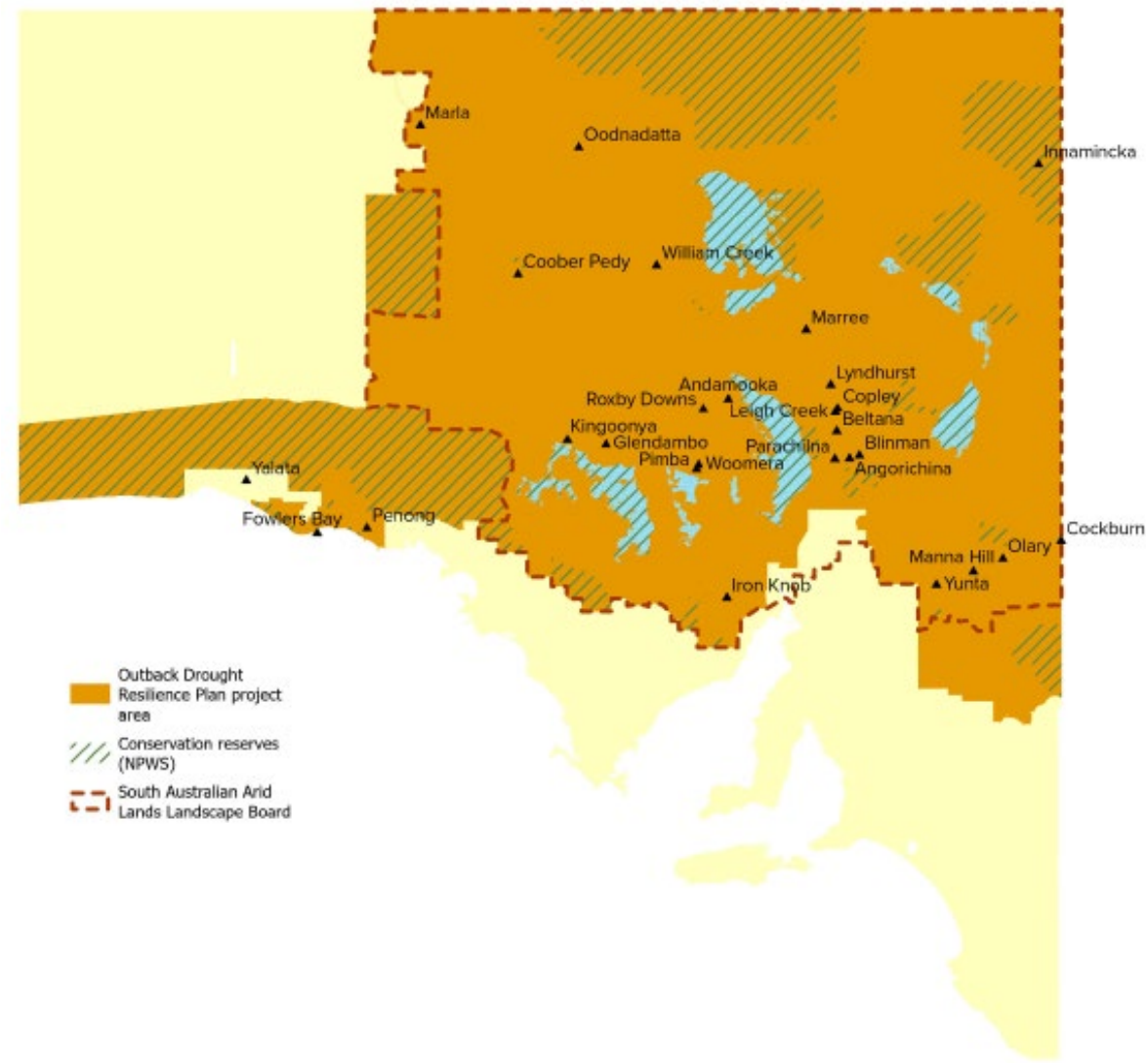


Figure 1 The Outback SA Regional Drought Plan region

The region has less than 1% of the state's population, living in 63% of its land mass. Its immense land size and small population makes it different to every other part of South Australia. It also means there is high variability across the region in terms of its people, economies, environments, climate and governance.

2.1 The Outback SA "system"

The Outback SA region is a complex "system" of connections and interactions between people, industries and natural resources. These connections and interactions mean that when one feature is impacted, flow on effects will be experienced by other features in the system. Developing this understanding can help identify the factors that make the system resilient or vulnerable to change. The Outback SA system is conceptually depicted in Figure 2.

Figure 1 Connections and interactions in the Outback SA system

Water resources are a key feature of the system with many connections. Water resources are critical to sustain communities, biodiversity, grazing stock in pastoral areas and mining operations. The lakes, watercourses, springs and wetlands are of significant cultural value to the First Nations people of Outback SA and many are popular tourist attractions. Some of these connections are more greatly influenced by drought than others. Cultural values are intrinsically linked to water resources and biodiversity. Although annual rainfall is low, high intensity rainfall events can see more than the average annual rainfall fall in a single event. Regional biodiversity has evolved with this variability. Some species are dependent on high intensity rainfall events to create suitable breeding conditions, and others are reliant only on groundwater from permanent or semi-permanent springs. Rainfall from outside the region is important with northern floodplains reliant on flood pulses from upstream catchment areas in the Northern Territory and Queensland.

Most mines access groundwater from the Great Artesian Basin (GAB) to meet operational requirements. Research has demonstrated that the majority of recharge in the western margin on the GAB (aligning with the western edge of the Outback SA region) occurred over 10,000 years ago with virtually no recharge occurring since. (SAAL Landscape Board 2021) meaning that groundwater use by mining operations is unlikely to be impacted by drought.

The large distances separating communities and industries, the need to bring in food produced outside the region and the need for the community to access services outside the region, means that a reliable transport system is essential. Although drought itself has a low impact on road, rail and air transport, heavy rainfall events after drought can be destructive and require significant maintenance or renewal.

The impact of drought on the feed base in pastoral areas varies across Outback SA, and depending on the vegetation type, condition and the total grazing pressure. Annual grasses and herbs that provide the bulk of nutrition stock feed require rain and the types of feed available will depend on the timing and amount of rain. During drought, annual feed may not be available and stock will graze perennial native shrub species, potentially having a great impact on local biodiversity (Department of Primary Industries and Regions 2020).

The Outback SA system supports the industries and businesses that sustain the region's community. With agriculture and tourism as key employers, the impacts of drought on these sectors will have flow on impacts to communities and individuals. The reliance of the community on food produced outside the region means food security is vulnerable to disruptions to transport. Although water security is being improved in many Outback SA towns through the installation of small-scale desalination plants, many remote residents rely on rainwater tanks to supply domestic use.

Further information on community demographics, statistics and features of the region is summarised in the following sections.

2.2 Population

The region's population is small and geographically dispersed. Larger townships include Roxby Downs, Coober Pedy, Penong, Andamooka, Woomera, Iron Knob, Oodnadatta and Leigh Creek. There are numerous smaller townships and settlements scattered across the region. The population of many settlements is highly variable with large numbers of fly-in-fly-out workers and residents that move to cooler areas during the hot summers.

Key demographic statistics from the Australian Bureau of Statistics 2021 Census have been summarised in the table below. The 2021 census data may not accurately reflect the population of very remote communities in South Australia.

Table 1 Key demographics for the Outback SA region and SA

	Total Outback SA region	**Unincorporated SA**	**Roxby Downs**	**Coober Pedy**	**South Australia**
Resident population	8,554 people	3,006 people	3,976 people	1,566 people	1,781,516 people
Population change	Decreasing population (22% decrease	Decreasing population	Decreasing population (-15.4% decrease from 2011-2021)	Decreasing population (7.6% decrease from 2011-2021)	Increasing population (11.3% increase

	Total Outback SA region	Unincorporated SA	Roxby Downs	Coober Pedy	South Australia
	from 2011 to 2021)	(32.3% decrease from 2011-2021)			from 2011 to 2021)
Projected population	Stable – 0.1% decrease from 2021-2041 (medium growth scenario)	-0.4% decrease from 2021-2031 (medium growth scenario)	0.3% increase from 2021-2031 (medium growth scenario)	-0.7% decrease from 2021-2031 (medium growth scenario)	11.0% increase from 2021-2031 (medium growth scenario)
Median age	37 years	42 years	31 years	50 years	41 years
Ages cohorts	As compared to SA: Higher proportion of children 0-9 years and workforce 25-59 years Lower proportion of older people aged 60+	As compared to SA: Higher proportion of people aged 45 to 69 years Lower proportion of young people aged 0-19 Lower proportion of people age 50+	As compared to SA: Higher proportion of young people age 0-14 years and workforce aged 25-44 years Lower proportion of people aged 50+	As compared to SA: Lower proportion of young people aged 0-24 years Higher proportion of older people 50+	N/A
Aboriginal and Torres Islander peoples	13.6%	24.4%	5.0%	15.1%	2.4%
Households where a non-English language is used	13.6%	15.2%	11.5%	30.3%	19.0%
Most common language other than English used at home	Pitjantjatjara (3.2% speak at home)	Pitjantjatjara (8.3%)	Tagalog (1.7%)	Sinhalese (4.5%) Greek (4.5%)	Mandarin (1.8% speak at home)
Highest level of education **Bachelor degree level and above**	11.1%	7.9%	13.7%	11.4%	22.7%

	Total Outback SA region	Unincorporated SA	Roxby Downs	Coober Pedy	South Australia
Certificate III & IV Level **Year 12** **Year 10**	22.3% 12.8% 9.7%	18.4% 13.1% 11.0%	28.7% 13.9% 8.9%	15.5% 9.9% 9.3%	17.6% 15.2% 9.4%
Labour force (includes employed and unemployed)	12,647 people	8,139 people (noting Olympic Dam is located in Unincorporated SA)	3,913 people	594 people	834,812 people
Unemployment rate	4.4%	5.0%	2.1%	11.8%	5.4%
Population that needs assistance with core activities	2.8%	3.2%	1.1%	5.7%	6.7%
Volunteering rate	17.1%	21.8%	14.0%	15.1%	14.1%
Median weekly household income	N/A	$1,105	$3,140	$764	$1,455
SEIFA Index of Relative Socio-economic Disadvantage (The lower the number, the greater disadvantaged)	N/A	905 (ranked 61st out of 71 LGAs)	1048 (7th out of 71 LGAs)	868 (67thout of 71 LGAs)	982

2.3 First Nations people

A greater proportion of the Outback SA region's population community identify as Aboriginal or Torres Strait Islander people.

Native Title has been determined to exist across most of the region.

Traditional Owner groups include:

- Adnyamathanha
- Antakirinja Matu – Yankunytjatjara
- Kokatha
- Kuyani

- Arabana
- Barngarla
- De Rose Hill – Ilpalka
- Far West
- Dieri
- Eringa
- Gawler Ranges People
- Irrwanyere
- Malyankapa
- Ngadjuri
- Nukunu
- Tjayiwara Unmuru,
- Walka Wani
- Wangkangurru/Yarluyandi
- Wilyakali
- Yandruwandha/Yawarrawarrka

Traditional Owner groups in the region lead and are involved in a range of land management, environmental management, tourism, mining and pastoral activities including environmental monitoring and management, land livestock management, mine activity remediation, and cultural heritage assessments (surveys and site visits).

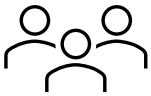
2.4 Economy

The economy of the Outback SA region is dominated by mining as measured by both employment and contribution to Gross Regional Product. Agriculture (mainly sheep and cattle), tourism and construction are the other key industries of employment.

The economic data provided in Table 2 is taken from the Region Economic Growth & Investment Strategies prepared for the Outback Communities Authority, Roxby Downs and Coober Pedy regions (RDA Far North & OCA 2019, RDA Far North & District Council of Coober Pedy 2019, RDA Far North & Roxby Council 2016) unless otherwise specified.

Table 2 Economic characteristics of the Outback SA region

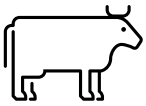
	Unincorporated SA	**Roxby Downs**	**Coober Pedy**	**Total Outback SA**
Industries of employment				
 Data source: ABS Census 2021	Mining (54.7%), construction (13.3%) and agriculture (7.6%)	Mining (57.1%), construction (15.1%), and accommodation & food services (4.9%)	Accommodation & food services (21.0%), health care & social assistance (17.0%) and public administration & safety (11.5%)	**Mining (66.7%), construction (17.1%) and accommodation & food services (7.9%)**
Gross Regional Product (GRP)				
Total GRP 	$3.3 billion (1.4% of SA's gross state product)	$1.7 billion	$130 million (0.08% of SA's gross state product)	**$5.1 billion** (3.6% of SA's GSP)

	Unincorporated SA	Roxby Downs	Coober Pedy	Total Outback SA
GRP per capita 	$1 million per capita	$435,252 per capita	$83,020 per capita	Compares to $79,727 per capita for SA
GRP per worker 	$483,666 per worker	$417,104 per worker	$237,244 per worker	Compares to $170,140 per worker for SA

2.5 Natural environment

The Outback SA's environment is shaped by low, irregular rainfall, episodic weather, and limited human disturbance. The region includes some of the driest parts of Australia and has the largest percentage of intact ecosystems and natural biodiversity in the state. Prolonged droughts can be followed by extensive flooding which leads to an explosion of life. Key features and characteristics of the region's natural environment are described in Table 3.

Table 3 Natural environment - key features and characteristics

Theme	Key features and characteristics
Protected areas 	45 conservation reserves and national parks, accounting for 28% of the Outback SA's area (Conservation Reserve Boundaries - data.sa.gov.au) Malkumba-Coongie Lakes National Park protects Coongie Lakes which is listed as a Ramsar Wetland of International Importance.
Species with conservation status 	Outback and Far West NPW Districts (includes APY lands and excludes south-eastern part of Outback SA region) record: • 16 flora species and 70 fauna species with national conservation ratings under the *Environment Protection and Biodiversity Conservation Act 1999* • 238 flora species and 175 fauna species with state conservation ratings under the *National Parks and Wildlife Act 1972*
Pastoral land use 	66% of the region is used for grazing of native vegetation

2.5.1 *Water Resources*

Water resources in the Outback SA region are critical to communities, plant and animal health, maintenance of cultural values, and the viability of regional pastoral, mining, and tourism industries. Groundwater is the only reliable source of water in the arid outback as rainfall occurs sporadically and is highly variable.

The Water Allocation Plan for the Far North Prescribed Wells Area (FNPWAPWA) describes the volumes of groundwater that can sustainably be extracted from all groundwater sources in the Far North PWA including the Great Artesian Basin.

The surface catchments of the central and northern parts of the region are large, lowland interior basins. Following large rainfall events, surface water flows down networks of minor waterways that join to form large, broad, and often braided streams across extensive floodplains, to terminal surface water features such as clay pans, small fresh brackish lakes and ephemeral water holes, and the large salt lakes of Lake Torrens, Lake Frome and Lake Eyre.

The Lake Eyre Basin (the Basin) contains one of the largest unregulated river systems in the world. The Basin is home to many rare, endangered, and endemic species of plants and animals that have adapted to survive the floods and droughts that characterise the environment.

Table 4 Water resources – key features and characteristics

Water resource	**Key features and characteristics**
Great Artesian Basin 	Much of the water used across the north of the region is supplied by groundwater from the Great Artesian Basin: • One of the largest underground freshwater basins in the world. • Spans more than one-fifth of the Australian continent. • Estimated total storage capacity of 65 million gigalitres. • Recharges extremely slowly. • Critical to the health of ecological communities, the viability of the pastoral, mining and tourism industries, and to First Nations' cultures. • Provides water for many towns and stations. (Smerdon et al, 2012, Australian, New South Wales, Queensland, South Australian and Northern Territory Governments 2019)
Springs 	Great Artesian Basin springs are points of natural discharge of water from the aquifers of the GAB. Support a range of unique flora and fauna. Of great spiritual and cultural significance for First Nations people. Valued by local communities and provide tourism opportunities. In some areas of the region, artificial wetlands have been created from free-flowing bores drilled into the Great Artesian Basin. (SA Arid Lands Landscape Board n.d.)
Other aquifers 	There are a number of other groundwater aquifers across the region of varying depths and salinity (South Australian Arid Lands Landscape Board 2021).

Water resource	Key features and characteristics
Surface water 	Surface water is limited in the region. Following rainfall events, water travels through a huge dispersal system of braided channels, floodplains, claypans, waterholes and wetlands. Farm dams have been constructed across the region to provide water for stock after rain. The shallow water is exposed to extreme evaporation. Creeks and rivers run only for short periods, The Kati Thanda – Lake Eyre Basin contains one of the largest unregulated river systems in the world. It is home to many rare, endangered, and endemic species. Many people in the region have large rainwater tanks to capture rainfall Dams are used to capture and store surface water on pastoral properties (Department of Climate Change, Energy, the Environment and Water 2023)
SA Water township supply 	SA Water operates a number of desalination plants in the region to supply townships including in Yalata, Oodnadatta, Leigh Creek and Marla, with another under construction in Marree.

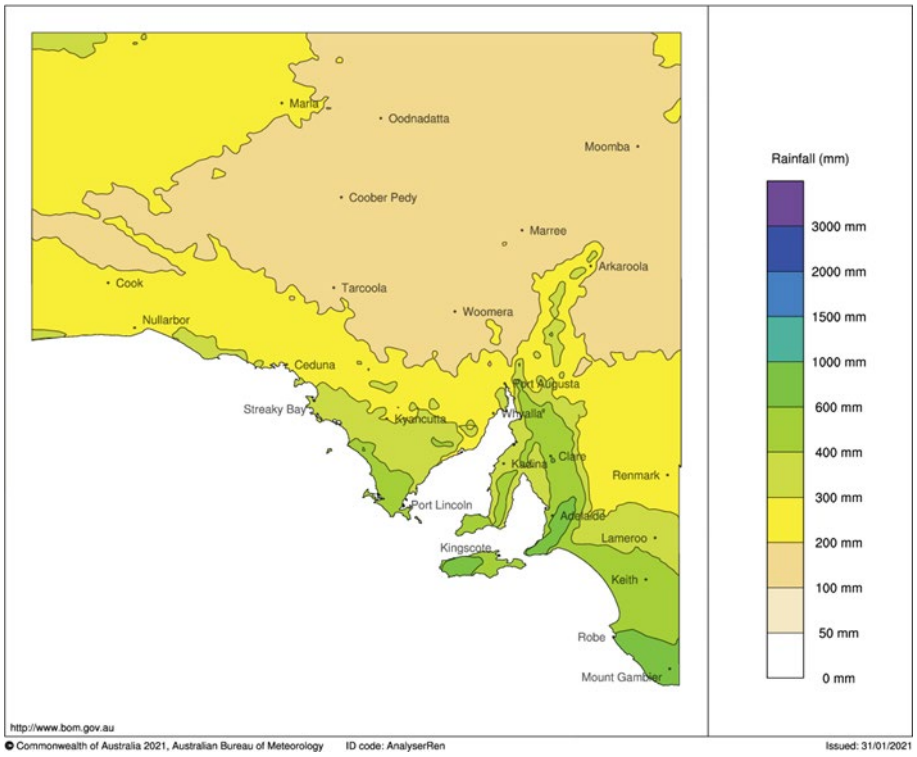
2.6 Climate

2.6.1 Rainfall

Most of the Outback SA region experiences an arid or semi-arid climate. Arid zones are defined as areas which receive an average rainfall of 250mm or less. Semi-arid zones receive an average rainfall between 250-350mm.

Figure 3 shows that majority of the Outback SA region receives on average 100-200mm of rainfall per year (Bureau of Meteorology 2021b). This places much of the region among the driest in Australia.

Figure 2 Average annual rainfall 1991 – 2020 (Bureau of Meteorology)



The region covers three broad rainfall zones (Wiseman & Bardsley 2015, South Australian Arid Lands Landscape Board 2022). The majority of the region in the north, experiences summer-dominant rainfall. A central zone generally experiences aseasonal rainfall, and the southern-most part of the region receives winter dominant rainfall (refer Figure 4 and Figure 5, BOM 2021).

Figure 3 Percentage of annual average rainfall occurring in summer 1991 to 2020 (Bureau of Meteorology)

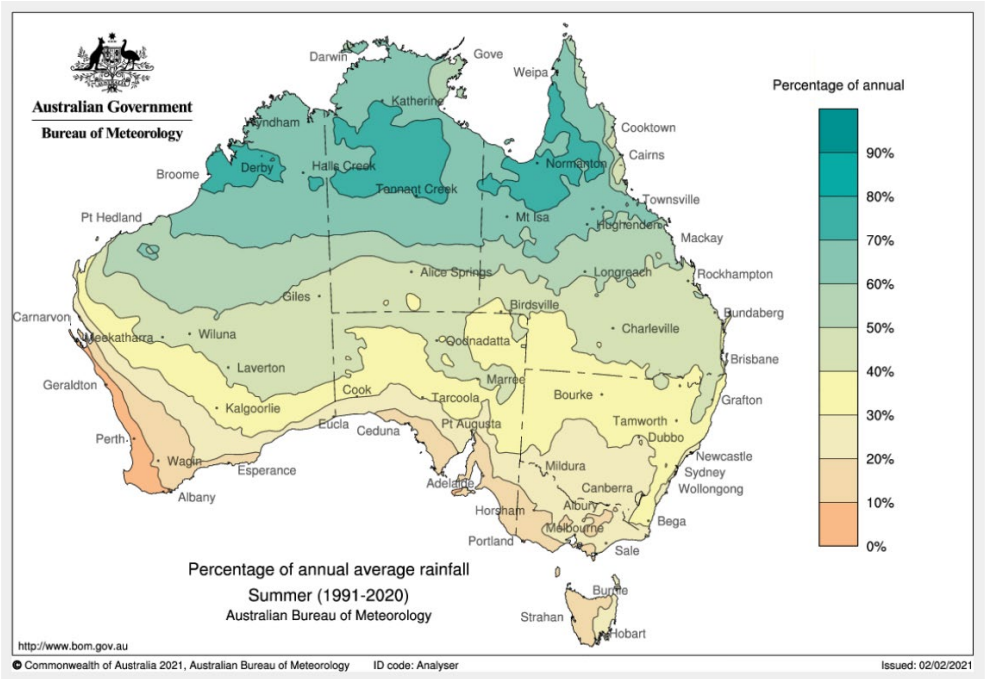
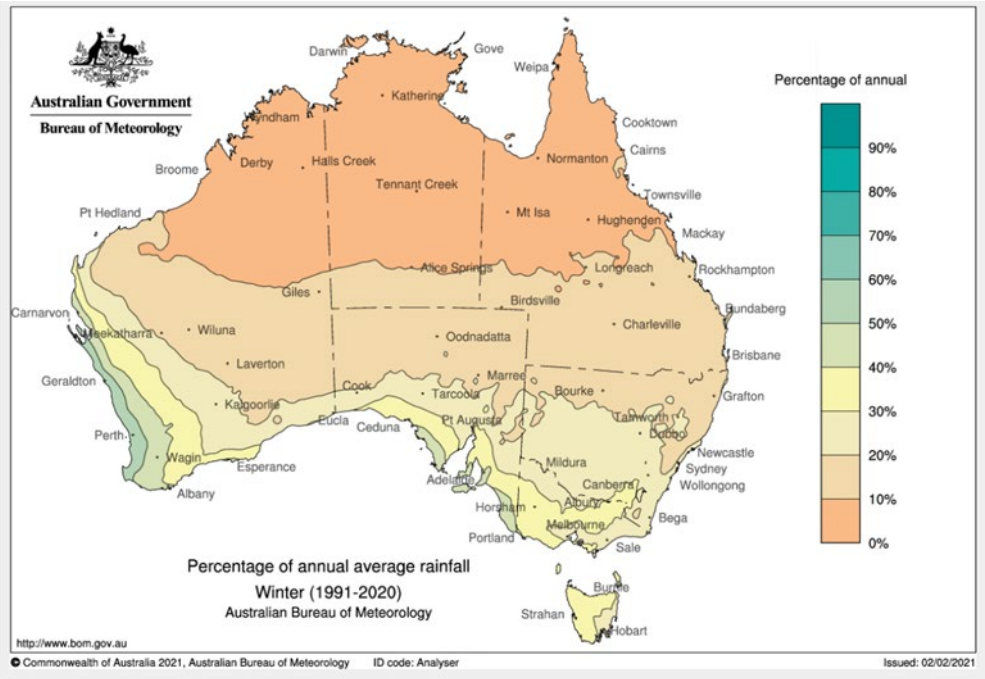
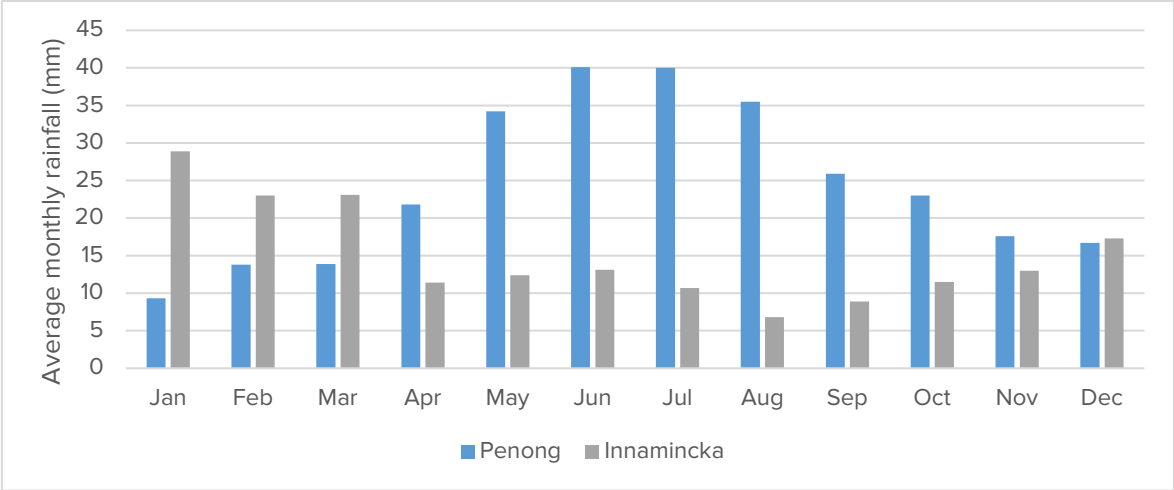


Figure 4 Percentage of annual average rainfall occurring in winter 1991 to 2020 (Bureau of Meteorology)



This means that rainfall patterns are very different in different parts of the region. Figure 6 below shows that Penong (in the south-west) receives winter dominant rainfall, while Innamincka (north east) receives a summer dominant rainfall and on average in smaller amounts.

Figure 5 Average monthly rainfall 1889 to 2022, Penong and Innamincka (Bureau of Meteorology)

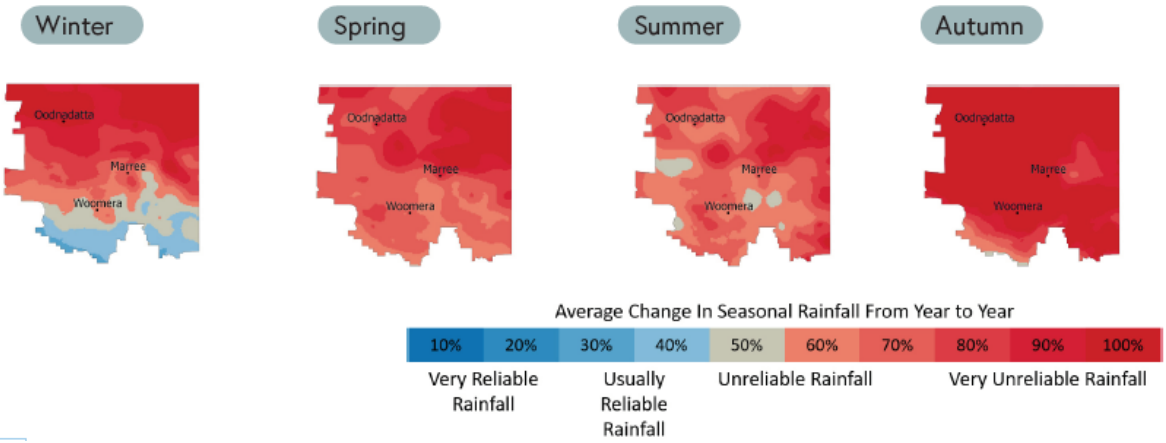


In addition to different seasonal trends in different parts of the region, rainfall across the Outback SA region tends to be highly variable. It experiences the boom and bust of dry and wet cycles. In the last 30 years (1989–2018) in the SA Arid Lands region, dry years (the lowest 30% of total annual rainfall) have occurred nine times and wet years (highest 30%) 11 times (Bureau of Meteorology & CSIRO 2019). Historic Bureau of Meteorology data shows that rainfall can be extremely low in some years and high in others. For example, Innamincka weather station has recorded an annual record low of 13.2mm of rain with an annual record high of 866.6mm (BOM 2024c).

Rainfall reliability maps for the past 30 years (Figure 7) show that across the majority of the South Australian Arid Lands region, rainfall has been unreliable (red areas) across all seasons of the year

times (Bureau of Meteorology & CSIRO 2019). The only exception is winter rainfall, which has been moderately reliable in a limited area south of Woomera (beige and blue areas).

Figure 6 Rainfall reliability (Bureau of Meteorology & CSIRO 2019)



In Outback SA, 10 mm of rainfall is a critical threshold for feed growth to begin (Bureau of Meteorology & CSIRO 2019). In the past 30 years in the SA Arid Lands region, useful rain events have occurred on average four times per year. On average, Woomera gets about five rainfall events (single or multi-day) of 10 mm or more each year, and Marree gets four, however this can range from zero to 12 events at both locations. There have been three years since records began that Woomera did not receive at least one 10 mm rainfall event. Marree has had only one year without a 10 mm rainfall event.

Pastoral areas can benefit from rainfall at any time of the year, however due to higher temperatures and increased evaporation in the warmer months more rain is required during this period to be effective in initiating vegetation regeneration.

2.6.2 Temperature

The Outback SA region experiences very high temperatures especially during summer, with most of the region experiencing average summer maximum temperatures in the high 30°Cs (see Figure 8 and Figure 9).

Figure 7 Average annual maximum temperature 1991 to 2020 (Bureau of Meteorology, 2022)

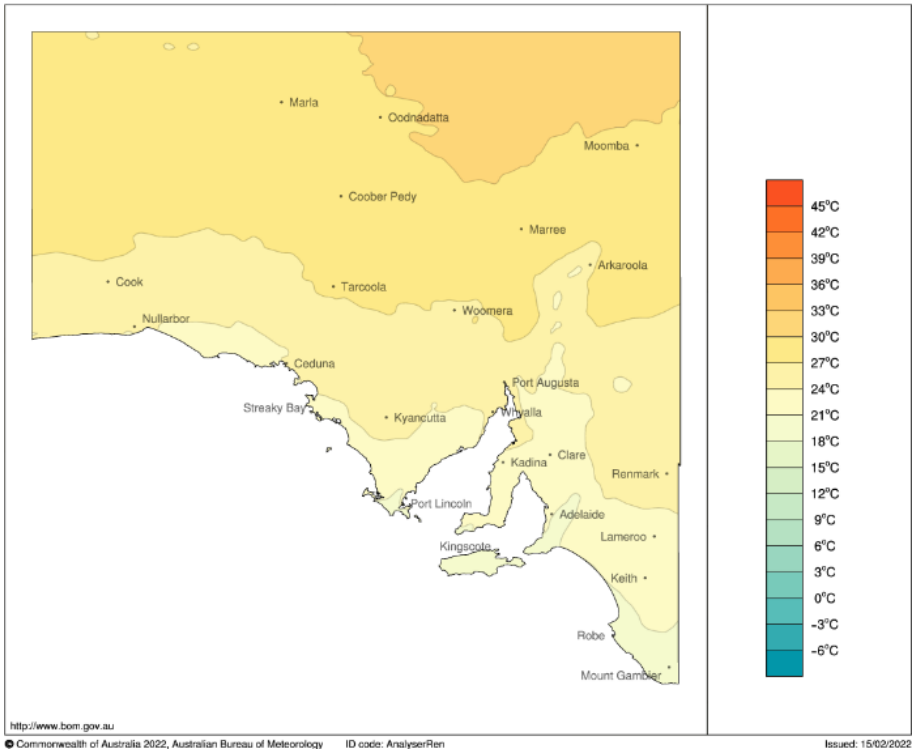
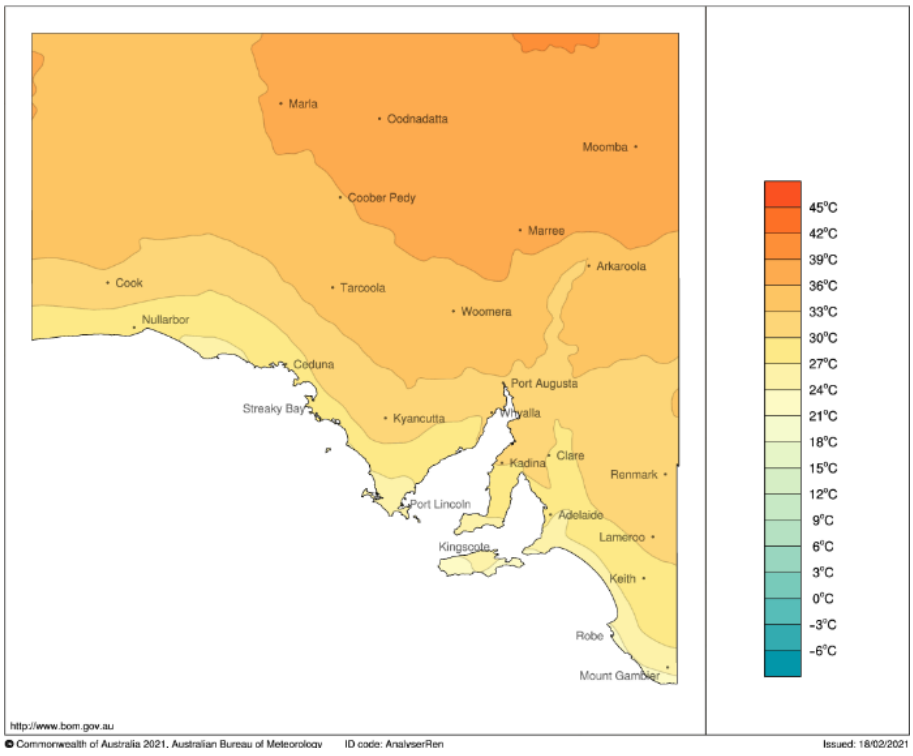


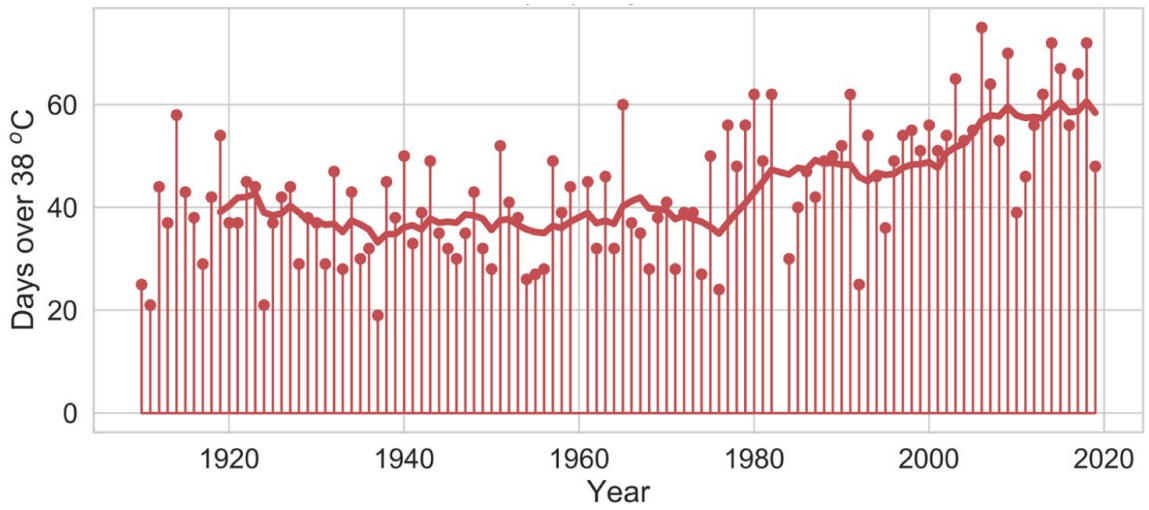
Figure 8 Average summer maximum temperature 1991 to 2020 (Bureau of Meteorology, 2022)



The Outback SA region has experienced more hot days in the past 30 years. Figure 10 shows the annual number of days above 38 °C (red bars) with a 10-year running average (solid red line) for Marree (Bureau of Meteorology & CSIRO 2019). Marree experienced an average of 54 days per year

above 38 °C between 1989–2018, compared to an average of 41 days per year above 38 °C between 1959–1988.

Figure 9 Number of days per year over 38°C (Bureau of Meteorology & CSIRO 2019)



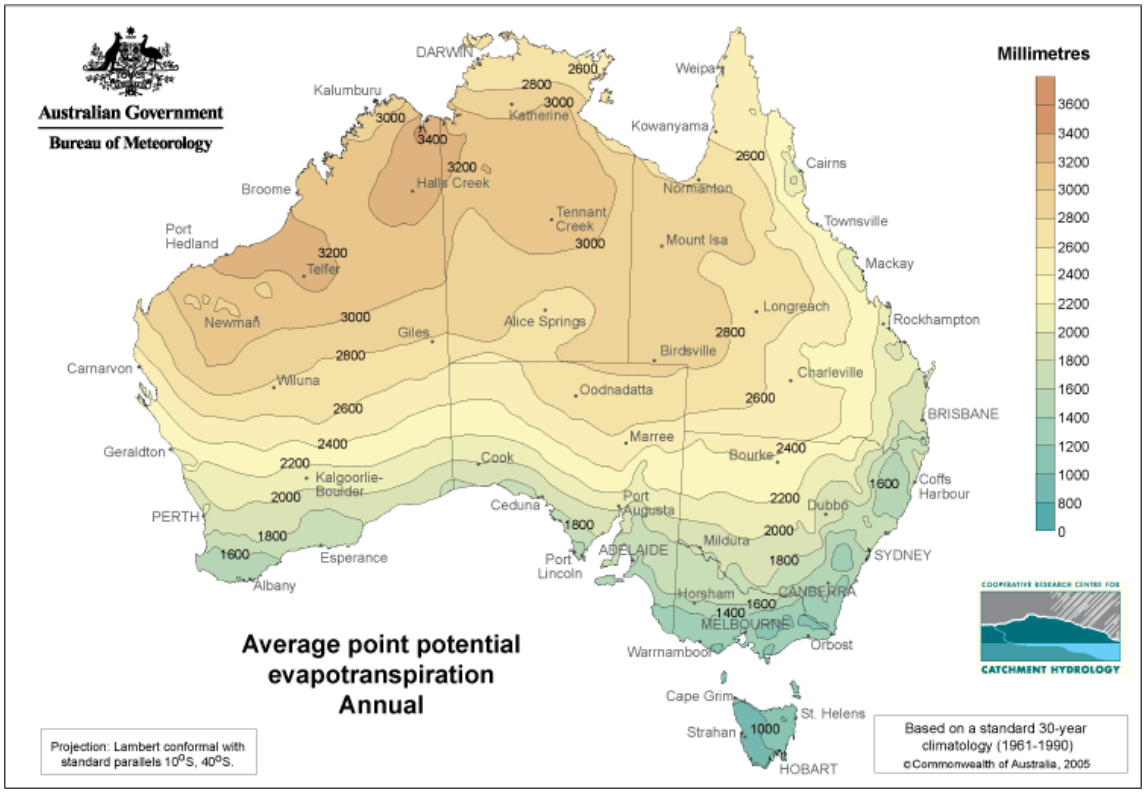
2.6.3 *Evapotranspiration*

Evapotranspiration is a collective term for the transfer of water, as water vapour, to the atmosphere from both vegetated and un-vegetated land surfaces. It is affected by climate, availability of water and vegetation.

Point potential evapotranspiration in the region is between 2 and 3.2 meters (refer Figure 11). This is significant in a region that receives on average 100-200mm of rainfall per year (BOM 2005).

In contrast, actual evapotranspiration is low in the region due to the lack of available water in vegetated and unvegetated land surfaces.

Figure 10 Average point potential evapotranspiration 1961 to 1990 (total annual) (Bureau of Meteorology, 2005)

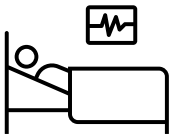


2.7 Assets and infrastructure

Key infrastructure that supports the individuals, communities and industries of the Outback SA region are described in Table 5.

Table 5 Key infrastructure in the Outback SA region

Infrastructure	Description
Road transport 	Major sealed and unsealed roads (including the Stuart Highway, Outback Highway, Eyre Highway, Birdsville Track and Oodnadatta Track) Strzelecki Track?
Rail transport 	Railway lines (interstate mainlines (linking Tarcoola/Northgate, Port Augusta, and Crystal Brook across to NSW, VIC, NT and WA) and The Ghan)
Air transport 	Airports (including Olympic Dam airport and Coober Pedy airport) Sealed airstrips including at Innamincka, Marree, Oodnadatta, William Creek, and Leigh Creek.

Infrastructure	Description
Mining 	Mining and energy infrastructure associated with the Roxby Downs Olympic Dam, Carrapateena and Oak Dam Mine Site, Moomba Gas Fields and Prominent Hill and other mines
Defence 	Defence - Royal Australian Air Force Woomera Range Complex
Water 	Desalination plants (including private plants and SA Water desalination plants in Leigh Creek, Oodnadatta, Marla, Marree, Roxby Downs and Yalata)
Tele-communications 	Telstra and Optus telecommunications (patchy connection in many areas) supplemented by increasing uptake of household Starlink (satellite) infrastructure for high-speed Wi-Fi.
Community infrastructure 	Relatively scarce community infrastructure such as waste dumps or recycle centres, community and recreational facilities. Hospital in Coober Pedy, health centres in Leigh Creek, Roxby Downs, Oodnadatta, Royal Flying Doctor Service Remote Community Health Clinics at Andamooka, Marla and Marree and William Creek.

2.8 Governance

The majority of the Outback SA region is unincorporated, meaning it has no local government areas. Instead, the Outback Communities Authority is the Outback SA's statutory authority established under the *Outback Communities Act 2009*. Its functions are to manage and promote improvements to public services and facilities in outback communities, and to articulate the views, interests, and aspirations of outback communities.

Each community generally has a Progress Association (or similar) incorporated under the Associations Incorporations Act, (1985) to represent it. These associations generally assist with community needs and priorities and, where resources allow, maintain facilities and services, and undertake important town management roles including running community events. Membership of the Progress Associations is voluntary, and positions are unpaid.

The OCA also recognises co-existing Aboriginal community groups in three towns – the Marree Arabanna Peoples' Committee (Marree); Dunjiba Community Council (Oodnadatta) and the Aroona Aboriginal Council (Copley). I know this is on our website but not accurate at the moment… will explain.

There are two local government areas in the region for this Plan: District Council of Coober Pedy and Municipal Council of Roxby Downs (Roxby Council). These councils operate differently to most local government bodies in SA. Roxby Council does not have Elected Councillors, has separate power and water authorities, and The State Government and BHP Billiton are required to approve the Council budget and fund an annual operating Municipal deficit. District Council of Coober Pedy is currently under suspension, with its Elected Member body replaced by State Government appointed administrators.

A number of other organisations have legislative responsibilities in the region. These include:

- The SA Arid Lands Landscape Board (SAALLB) which administers the *Landscape South Australia Act 2019*, managing the region's natural resources with an emphasis on land and water management, biodiversity and pest animal and plant control. The Water Allocation Plan for the Far North Prescribed Wells Area is prepared by the SAALLB under the Landscapes Act
- The Pastoral Board which administers the *Pastoral Land Management and Conservation Act 1989*, managing and conserving pastoral land in the region.
- The Department for Environment and Water which administers the *National Parks and Wildlife Act 1972* that describes the requirements for the management of protected areas including National Parks and Conservation Parks.

Other organisations with responsibilities in the region include:

- Regional Development Australia (RDA) Far North is a not-for-profit Incorporated Association funded through a core agreement with the Commonwealth, State and Local Government bodies to foster and enhance the regional economy.
- The Department for Infrastructure and Transport, responsible for 10,000km of outback roads.
- SA Water which is responsible for the operation of desalination plants to supply town water in Yalata, Oodnadatta, Leigh Creek, and Marla, with another plant under construction in Marree.
- The state government own the electricity supply infrastructure to several towns under the Remote Area Energy Supply (RAES) scheme. Coober Pedy, Andamooka and Yunta are supplied through power purchase agreements from independent suppliers. Other communities and stations rely on on-site generation through either renewables and/or diesel generators.

2.9 Defining features of Outback SA

Stafford Smith (2008) identifies a set of features that define outback Australia in his paper 'The 'Desert Syndrome – causally-linked factors that characterise outback Australia'. He writes that the outback is characterised by a set of features that are not individually unique, but which together cause it to function in ways that are fundamentally different to other physical and social environments.

These characteristics have been reviewed and adapted for the Outback SA region in the table below through research and stakeholder engagement. They have important implications for the development of the Drought Resilience Plan as they influence the way community and stakeholders in the region are able to build resilience to drought.

Table 6 Desert syndrome features in the Outback SA region

Key characteristic and description (adapted from Stafford Smith 2008)	What this looks like in the Outback SA region
Climate variability	The region is large and experiences highly variable rainfall and other episodic weather events that rarely follow predictable annual cycles. One property can be in drought while its neighbour is in flood. Rainfall patterns differ greatly across the region. Every drought is different too. The droughts experienced in the past have affected different areas in different ways and been of varying durations
Scarce resources	Low soil fertility and harsh conditions mean stocking rates are often kept low. High per capita delivery and maintenance costs influence the provision of physical infrastructure and community services including roads, internet and phone connectivity, water, energy and waste management.
Sparse population	The human population in this region is small and geographically dispersed. Coober Pedy (population 1,427 in 2021) and Roxby Downs (pop. 3,671) are the largest towns, while the remaining scattered towns have less than 300 residents each. There are also many transient people that move out over the summer period or travel in and out to work in the mining industry.
Remoteness	Many towns in the region are extremely isolated. Decision making is often centred far away in regional centres such as Port Augusta or Adelaide. Governments often focus elsewhere due to the lack of population. Most markets are distant, which results in economic flows out of the region.
Economic variability	Heavy reliance on the mining/resources sector can lead to uncertainty when this industry experiences downturn or other disruptions. Besides agriculture and tourism, majority of other industries in the region are underpinned by the success or otherwise of mining. Agriculture is greatly impacted by drought and is vulnerable to changing commodity prices.
Local knowledge	Remoteness and sparse populations contribute to relatively low levels of research effort and formal capture of knowledge in the Outback SA region. In contrast, Aboriginal traditional knowledge is vast and their knowledge about their country is extensive. Many station people, pastoralists and farmers have lived and worked on their land for years. Many of the region's residents have experienced multiple drought and flood cycles.
Cultural differences	The people who choose to live in the Outback are accustomed to a unique way of life. They have a strong sense of identity, community, and family. They recognise that living in the Outback means living with hot dry conditions and without many of the everyday conveniences available to city people. They love their country and way of life.
Reliance on volunteers	In the unincorporated areas, the lack of councils and emergency services mean that the locals 'do it all'. Volunteers undertake everything from managing town infrastructure, running community events and upgrading community halls to responding to vehicle crashes and fires. There is a strong culture of volunteering. However, overreliance on volunteers can

Key characteristic and description (adapted from Stafford Smith 2008)	What this looks like in the Outback SA region
	lead to burnout and impacts on the community. The number of volunteers in the regions is decreasing, and volunteers are ageing.

3. Drought

3.1 A definition of drought

Because people use and view water in so many different ways, there is no universally agreed definition of drought. It is measured in different ways and at different timescales, for example:

- Meteorologists monitor the extent and severity of drought in terms of rainfall deficiencies (or shortages, compared to average rainfall for the period).
- Agriculturalists rate the impact on primary industries.
- Hydrologists examine surface and groundwater levels (Bureau of Meteorology, 2024a).
- Sociologists define it by social expectations and perceptions and the impact on the community.

This lack of a clear definition can present a barrier to effective drought planning (Hughes et al. 2022). Governments often select meteorological indicators (such as rainfall and temperature) to serve as drought policy triggers due to their objectivity and transparency. However, this fails to capture the socio-economic outcomes of drought, which can lead to some non-drought affected regions receiving assistance and vice versa.

The Bureau of Meteorology defines drought as *a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use* (Bureau of Meteorology, 2024a).

Drought is not simply low rainfall. If this were the case, Outback SA would be in almost constant drought. Rather, drought is a comparatively dry period compared to normal conditions. It also considers the ability of those affected to cope with drier than usual conditions.

For the purpose of the Outback SA Drought Resilience Plan, drought is defined as:

A prolonged period of abnormally dry conditions that impact negatively on water availability and agricultural production in a region and, consequently, impacts negatively on the economy and environment of the region and the health and wellbeing of its residents.

3.2 Causes of drought

Drought in the Outback SA region is caused by a number of natural atmospheric conditions including the Positive Indian Ocean Dipole and El Niño-Southern Oscillation. Anthropogenic climate change is also projected to impact on drought conditions. The following descriptions have been adapted from the Bureau of Meteorology website.

3.2.1 Positive Indian Ocean Dipole

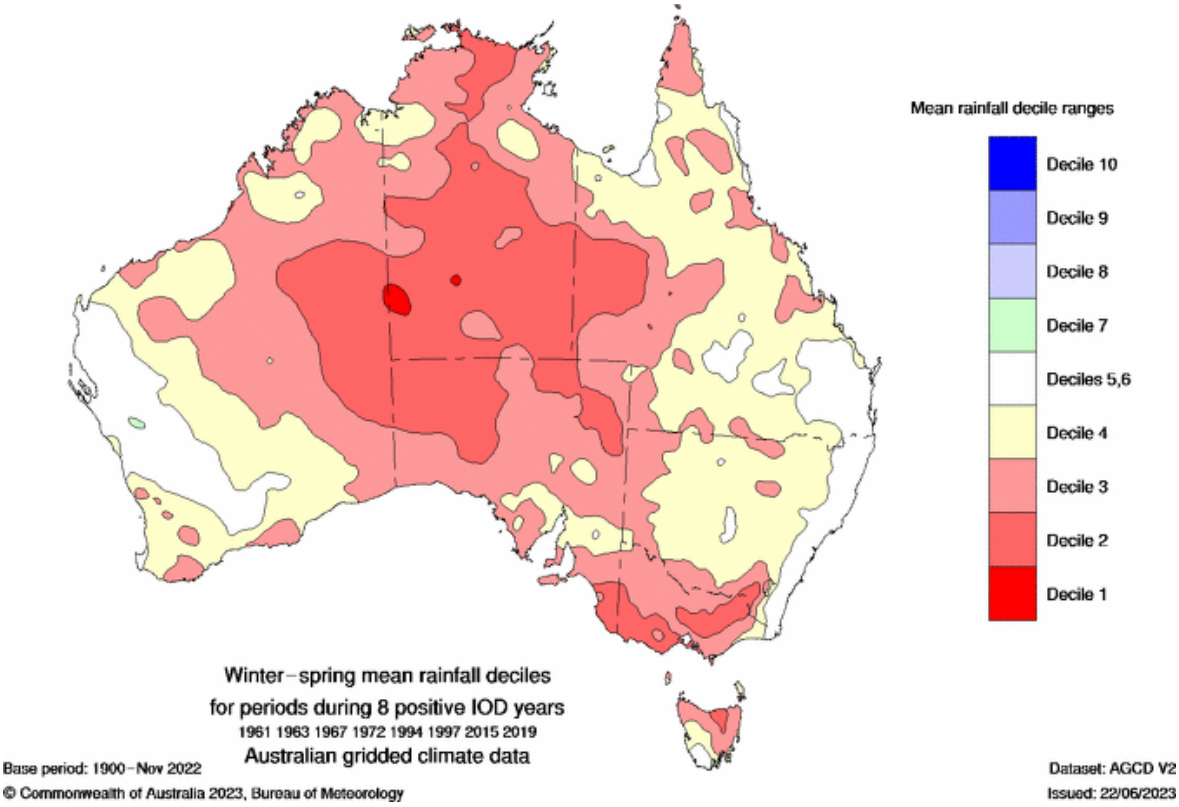
The Indian Ocean Dipole is one of the strongest climate drivers for the Outback SA region. The Indian Ocean Dipole refers to sustained changes in the difference between sea surface temperatures of the tropical western and eastern Indian Ocean (Bureau of Meteorology 2021b). The Indian Ocean Dipole has three phases: neutral, positive, and negative.

During the positive Indian Ocean Dipole phase, westerly winds weaken along the equator allowing warm water to shift towards Africa. Changes in the winds also allow cool water to rise up from the deep ocean in the east. This sets up a temperature difference across the tropical Indian Ocean with cooler than normal water in the east and warmer than normal water in the west. Generally, this means there is less moisture than normal in the atmosphere to the northwest of Australia. This changes the path of weather systems coming from Australia's west, often resulting in less rainfall and higher than normal temperatures over parts of Australia during winter and spring.

A positive Indian Ocean Dipole typically means:

- Significantly less rainfall across Outback SA (see Figure 12)
- Higher than normal temperatures during winter and spring

Figure 12 Winter-spring mean rainfall deciles during positive Indian Ocean Dipole years (Bureau of Meteorology, 2023)



3.2.2 *El Niño*

El Niño and La Niña also influence drought conditions in Outback SA (Bureau of Meteorology 2021a). They are a part of a natural cycle known as the El Niño–Southern Oscillation (ENSO) and are associated with many months of warming (El Niño) or cooling (La Niña) in the central and eastern tropical Pacific. The ENSO cycle loosely operates over timescales from one to eight years.

El Niño typically results in:

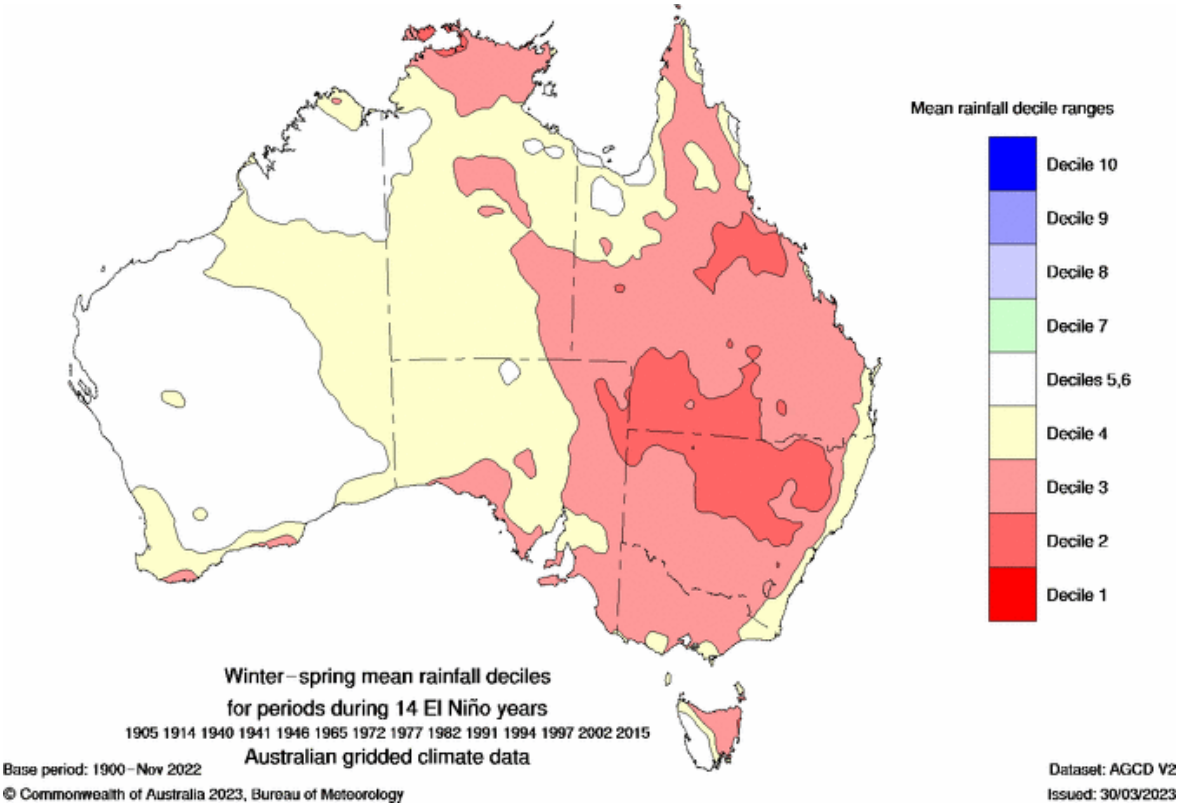
- Reduced rainfall over Outback SA, with the records show greater rainfall reductions over the eastern part of Outback SA and into NSW and Queensland
- Warmer temperatures
- Shift in temperature extremes
- Increased frost risk
- Reduced tropical cyclone numbers
- Later monsoon onset
- Increased fire danger in southeast Australia

An El Niño occurs when sea surface temperatures in the central and eastern tropical Pacific Ocean become substantially warmer than average, which causes a shift in atmospheric circulation. Typically, the equatorial trade winds blow from east to west across the Pacific Ocean. El Niño events are associated with a weakening, or even reversal, of the prevailing trade winds.

The shift in rainfall away from the western Pacific, associated with El Niño, means that Australian rainfall is *usually* reduced through winter–spring, particularly across the eastern and northern parts of the continent.

Although most major Australian droughts have been associated with El Niño, analysis of past El Niño events shows that widespread drought does not occur with every event, and the strength of an El Niño is not directly proportional to the rainfall impacts.

Figure 11 Winter-spring mean rainfall deciles during El Niño years (Bureau of Meteorology, 2023)



3.3 Past droughts

Before European colonisation, the First Nations of the Outback SA region would have experienced numerous drought periods. Since then, the region has experienced a number of significant declared droughts including (Bureau of Meteorology 2020.):

- The Federation drought: 1895 to 1902
- The 1914 to 1915 drought
- The World War II drought: 1937 to 1945
- The 1965 to 1968 drought (only affecting parts of the region)
- The 1982 to 1983 drought

- The Millennium drought: 1997 to 2009 (in particular 2002-2003 for the Outback region)
- The 2017 to 2019 drought (the Tinderbox drought)

The 2017 to 2019 drought, while one of the shortest on record, was extremely severe in the eastern parts of the Outback SA region. In Yunta, rainfall in 2019 was close to the lowest in the recorded history. In the western parts of the Outback region around Penong, impacts were much lower as annual rainfall was near average for 2017-2018 and only below average in 2019.

3.3.1 Past impacts of droughts

These past droughts have had widespread impacts across the region. The literature and stakeholders have identified the following key impacts (Fleming-Muñoz, Whitten & Bonnett 2023, Lehmann 2023, RDA Far North SA 2016, Appendix A – Regional Engagement Summary Report):

Social impacts

- Reduced mental and physical health and wellbeing for individuals, families, and communities, contributing to domestic and family violence, family breakdowns, and death by suicide in extreme cases.
- Feelings of exhaustion, stress, and loss of control from an increased workload, loss of income and the need to make big business decisions.
- Reduced social connection.
- Migration out of the region especially of young people who may not return following drought.
- Dust, causing and exacerbating health conditions such as asthma, increasing need for cleaning and reducing surface water quality.
- High temperatures resulting in heat stress, loss of sleep, increased power bills and general discomfort. Pastoralists may work at night to avoid the hotter temperatures.
- Higher demand for mental health services.
- Decline in condition of the natural environment (loss of trees and reduced cover, dead animals etc.) leading to reduced amenity and personal wellbeing.
- Household financial stress resulting in reduced expenditure on recreational activities, withdrawal of school enrolments etc.
- Poorly planned or managed support programs resulting in a sense of disconnection and feel that ‘city bureaucrats’ are not listening to what locals need.
- Intergenerational impacts with children and young people affected by their parents’ stress, lack of money for education and amusement, environmental impacts and sometimes a reduced desire to stay in the region or take on the family businesses.
- Less water for personal use and gardens.

First Nations cultural impacts

- Reduced condition of natural cultural heritage sites associated with surface water and groundwater dependent ecosystems.

- Reduced ground cover leading to exposure of cultural sites following wind or rain, and other sites being impacted by dust or sediment.
- Reduced ground cover leading to dust impacts and later erosion and channel deepening when it rains.
- Pest animals taking away feed from native species and damage soil and vegetation.
- Many weed species can survive lower rainfall and are often the first plants to recover when it rains.
- Reduction in numbers of culturally significant plants and animals, which impacts on ability to undertake cultural activities such as hunting and collection of bush tucker.

Economic impacts

- Reduced income for pastoralists, farmers, and local business owners, which results in reduced spend in the local economy.
- Some business can't afford to keep employees during drought, and it can be hard to find new employees when they are needed after the drought ends.
- Increased need for off-farm employment
- Changing market conditions negatively impacting pastoralists as fodder and freight prices may increase and stock prices may decrease although this is not always the case.
- While tourism numbers don't seem to be affected by drought, local communities have less capacity to manage the negative impacts of tourism such as overuse of water, vandalism, search, and rescue etc.
- Running out of water resulting in the need to cart in water, drill additional bores or install other water infrastructure at a very high cost.
- Difficulties in paying boarding school fees or other ongoing costs.
- High expenses during the drought recovery period meaning low cash flow to assist with restocking and herd rebuilding

Agricultural impacts

- Lack of feed and water to support stock means pastoralists need to destock or move stock to agist in areas less affected by drought.
- Stock often sold at a lower price and bought back following drought at a higher price.
- Lower capacity of pastoralists and farmers to plan for and develop their business as their time is taken up by an increased workload, particularly when staff have been laid-off.
- Increases in costs including transportation of stock and purchase of water and fodder.
- Reduced crop yields.
- Increased grazing pressure from pest and native species (eg kangaroos) that may graze in protected areas during normal conditions when there is water available but move out to pastoral areas when there is no water in parks.

Environmental impacts

- Loss of vegetation cover as a result of grazing pressure and heat/water stress increasing the risk, magnitude and severity of dust storms.
- Native species are often outcompeted by weeds. Perennial species are lost and recruitment can be limited. Biodiversity loss and reduction in condition of native species.
- Loss of native birds and animals.
- Reduced surface water runoff and recharge of shallow groundwater, increased groundwater extraction, and often changes in water quality, especially increases in the salinity of groundwater as the levels in the aquifer are depleted and there is increased mixing within the resource
- Decrease in groundcover, soil moisture and soil health increases the risk of wind erosion
- Loss of green space in townships
- Drought breaking rains resulting in soil erosion, flooding or removal of vegetation, and salt flush killing trees and other vegetation.
- Increased biosecurity risks as stock and fodder are transported across the region.

Infrastructure impacts

- Drying of bores, rainwater tanks and dams requiring installation of additional water infrastructure or carting in water.
- Degradation of community infrastructure as populations and volunteer capacity decreases.
- Reduced road surface condition with reduced water and funds for grading and more trucks on the roads transporting stock.
- Increase in power outages on hot days and during dry lightning storms resulting in no telecommunications, an inability to pump water, and run fridges, freezers, and air conditioners.
- Kangaroos, goats and camels seeking water and food damaging irrigation infrastructure and eating gardens.
- Lack of sufficient water supplies for fighting fires.
- Drought breaking rains damaging roads, water infrastructure (pumps and pipes), solar panels, fences, and tanks.

Beneficial impacts

While droughts have overwhelmingly negative impacts, there can be a number of beneficial impacts as a result of drought including:

- Reduction in the number of feral animals such as goats, camels, horses,,, cats and rabbits with flow on reduction in impacts on infrastructure and reduced total grazing pressure.
- Reduction in the number of overabundant kangaroos and emus which reduces the total grazing pressure on native vegetation.
- Provision of grants and other funding for community projects and community infrastructure which can have a lasting benefit.

- Encouragement of economic diversification.
- Improved community resilience, connection, and sense of community support when times are tough.
- Increased water use efficiency.
- Innovation in land management practises.
- Attraction of tourists or film companies in some places known for their arid, barren landscapes such as the Breakaways near Coober Pedy.
- Improvement in gypsum and salt mining conditions due to increased evaporation.

3.4 Future climate and drought projections

Climate projections describe what the future climate could be liked, sourced from multiple climate models, and based on numerous assumptions about the factors that influence climate and the trajectory of change in greenhouse gas emissions in the atmosphere.

The CSIRO and Bureau of Meteorology have used up to 40 global climate models to develop projections for different parts of Australia. Each model uses different assumptions and algorithms to project how climate variables such as temperature, rainfall and evapotranspiration will respond in different emissions scenarios over different time frames. The projections presented in online tools and viewers each use a different combination of global climate models and so show slightly different results. Three of the projections tools most commonly used in South Australia are described in the following sections:

1. My Climate View (national focus)
2. Climate Change in Australia (national focus)
3. DEW South Australian Climate Projections Viewer (SA focus)

3.4.1 My Climate View (myclimateview.com.au)

My Climate View is a collaboration between Australia's national science agency CSIRO and the Bureau of Meteorology and has been designed together with Australian farmers as part of the Climate Services for Agriculture program with funding from the Australian Government's Future Drought Fund. Climate trends for specific commodities at a local scale are presented to support decision making.

My Climate View presents projected future rainfall, temperature, and relative humidity data from Climate Change in Australia (see following section), using its Application-Ready dataset. It also presents seasonal forecast data from the Bureau of Meteorology.

My Climate View allows users to select a location and if desired, a commodity (for example sheep or wheat. Projections include key commodity climate factors, for example for sheep it will include winter rainfall for pasture growth and cold exposure at lambing. For wheat it will include growing season rainfall, frost at flowering and heat damage at flowering and grain fill. A default growing season is defined for each location but can be altered in the tool.

Data is presented for each location and commodity at 2050 for a medium emissions scenario (RCP 4.5) as a default, with users able to explore 2030, 2050 and 2070 at a medium or high (RCP 8.5) emissions scenario,

Data is not mapped across the region. Rainfall and temperature projections for 3 locations at 2050 using RCP 8.5 are shown in Table 7.

Table 7 Selected climate projections for three Outback locations

	Innamincka		**Yunta**		**Penong**	
	(1994 – 2023)	2050s average	(1994 – 2023)	2050s average	(1994 – 2023)	2050s average
Total annual rainfall	189 mm	203 mm	218 mm	211 mm	289 mm	248 mm
Summer rainfall	81 mm	92 mm	67 mm	70 mm	52 mm	35 mm
Autumn rainfall	39 mm	37 mm	37 mm	41 mm	63 mm	50 mm
Winter rainfall	30 mm	32 mm	45 mm	43 mm	109 mm	104 mm
Spring rainfall	46 mm	41 mm	70 mm	55 mm	66 mm	56 mm
Average maximum temperature	29.9°C	31.8 °C	24.8 °C	26.5°C	23.4 °C	24.7 °C
Annual hot days (over 35°C)	113 days	141 days	42 days	61 days	27 days	34 days

3.4.2 *Climate Change in Australia (climatechangeinaustralia.gov.au)*

Climate Change in Australia was developed by the CSIRO and the Bureau of Meteorology and provides a number of data products and tools that present projections at different scales for four timescales (centred on 2030, 2050, 2070 and 2090) and three emissions scenarios (RCPs 2.5, 4.5 and 8.5).

The Regional Climate Change Explorer provides a summary of projections across large “cluster” areas. The Outback SA region is within the Rangelands cluster as shown in Figure 14.

Figure 12 Rangelands Cluster area

Key messages for the cluster are described below:

- Average temperatures will continue to increase in all seasons (very high confidence).
- Increased intensity of extreme rainfall events is projected, with high confidence.
- On an annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall.
- Increased intensity of extreme rainfall events is projected, with high confidence.
- Time spent in drought is projected, with medium confidence, to increase over the course of the century.
- Changes to summer rainfall are possible but unclear. Winter rainfall is projected to decrease in the south with high confidence. For the near future, natural variability will dominate any projected changes.
- Changes to annual and summer rainfall for late in the century are possible, but the direction of change cannot be confidently projected given the spread of model results. Impact assessment in this region should consider the risk of both a drier and wetter climate.
- Average temperatures will continue to increase in all seasons (very high confidence).
- There is very high confidence in continued substantial increases in projected mean, maximum and minimum temperatures in line with our understanding of the effect of further increases in greenhouse gas concentrations.
- By late in the century (2090), for a high emission scenario (RCP8.5) the projected range of warming is 2.9 to 5.3 °C. Under an intermediate scenario (RCP4.5) the projected warming is 1.5 to 2.9 °C.
- Potential evapotranspiration is projected to increase in all seasons as warming progresses (high confidence).

NOTE – Climate Change in Australia refers to confidence in a climate projection as a measure of how plausible the projected range of change is for a given emission scenario. High agreement of numerous, high quality lines of evidence is needed to have high confidence.

3.4.3 DEW South Australian Climate Projections and Viewer

The *Guide to climate projections for risk assessment and planning in South Australia* (DEW 2022) provides a summary of the changes in climate and sea levels likely to occur in South Australia, together with guidance on the use of climate projections for risk assessment and planning. Projections are presented for Landscape management regions, with the Alinytjara Wilurara (AW) Eyre Peninsula (EP) and SA Arid Lands (SAAL) Landscape Regions

The guide identifies that by 2030, time spent in drought (over a 20-year period) is projected to increase slightly for the AW and SAAL Landscape Regions, with a small additional increase by 2050. For the EP region, time spent in drought is projected to nearly double.

The AW, EP and SAAL Landscape will experience strong increases in temperature, that especially in the long term, are projected to be more extreme in the Outback SA region than other parts of South Australia.

In the short term, annual rainfall will decrease, offset somewhat by significant increases in summer rainfall. In the longer term, both annual and summer rainfall will decrease.

At the same time, potentially damaging heavy rainfall events are projected to increase in frequency and intensity, and bushfire weather will become harsher. The variability of rainfall is likely to increase.

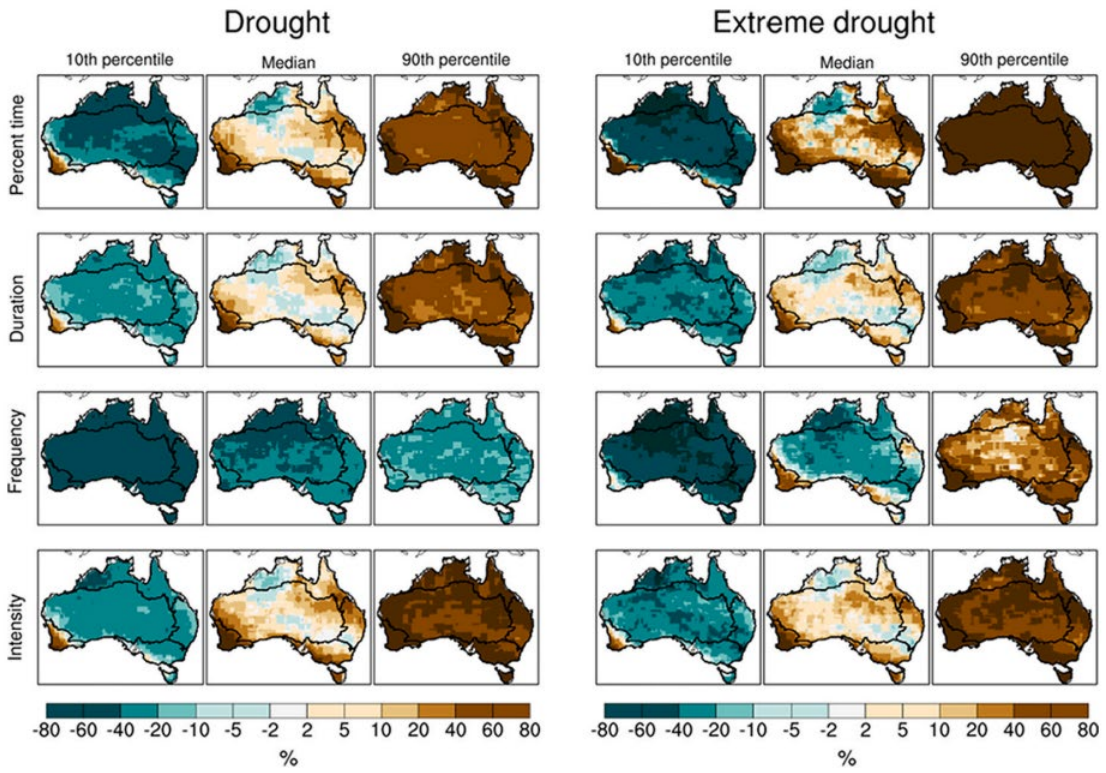
The South Australian Climate Projections Viewer is a new online tool for climate projection maps and data. The interactive maps display projected changes to temperature and rainfall across South Australia for a range of future time periods. The climate data can be displayed in 10km and 50km grids or for individual SA landscape regions for a range of future time periods, climate variables and parameters.

This tool shows that while the AW, EP and SAAL regions will experience decreases in rainfall as a whole, northern parts of AW and SAAL regions are projected to experience increases in summer rainfall in the short term.

3.4.4 Earth Systems and Climate Change Hub

Researchers at the Earth Systems and Climate Change Hub have delivered updated and improved drought projections for Australia at a national and regional level. The new drought projections indicate that under a warming climate Australia will spend more time in drought, with longer and more intense drought conditions, particularly across southern and eastern Australia. Figure 15 shows the results of this work, illustrating projected changes of the Standardised Soil Moisture Index (SSMI) drought metrics in the 21st century (2006-2100) under the RCP8.5 (high emission scenario), relative to the 20th century (1900-2005) (NESP, n.d.)

Figure 13 Projected changes in Standardised Soil Moisture Index indicating changes in drought and extreme drought (NESP, n.d.)



The region will tend to spend more time in drought, with longer drought duration and more intense drought. Nevertheless, there is considerable uncertainty in the projections, with the positive end of results indicating positive drought outcomes (less time in drought) and the negative end of results indicating very extreme drought outcomes.

4. Other drivers of change

A number of other economic, social and environmental trends may influence the resilience of the Outback SA to drought. These are occurring at different scales and have different implications for the region.

4.1 Global drivers of change

Table 8 describes global drivers of change (CSIRO 2022, PwC 2022, Taylor et al. 2017) and how they are or have potential to influence the Outback SA region.

Table 8 Global drivers of change

Global trend	Description
Climate change and decarbonisation	Rising greenhouse gas levels in the atmosphere are causing temperatures to rise, annual rainfall to reduce, and extreme weather events to become more frequent and more severe. Responding to climate change requires a shift in the global economy to reduce carbon emissions and action to adapt to a new and changing climate. In Outback SA agriculture and pastoralism, mining and transport industries that are key sources of emissions will require transformation change.
Technological disruption	A new digital world is filled with opportunities for online work and study, telehealth, online shopping, and digital currency. With technology and automation come consequences for jobs and security. A lack of access to technology due to a lack of infrastructure can lead to disadvantages compared to those with access. In the Outback SA region, access to satellite technology for more reliable and unlimited internet access has increased opportunities for online access to education and health, however households that cannot afford this access may be disadvantaged.
Urbanisation	Larger towns and cities and high amenity areas continue to draw population growth and economic activity away from many smaller towns and remote communities. It can be challenging for the Outback SA region to compete with the economic, education and social opportunities available in urban areas.
Trade disruptions	Sudden and unexpected widespread trade disruptions brought through global pandemics, conflict, geopolitical tensions, or similar events can have significant impacts on supply chains, demand, and commodity prices. The COVID-19 pandemic had a significant impact on the tourism industry globally, with impacts also felt across the Outback SA region.
Consumer focus	Globally there is a strong consumer and citizen push for decision makers to consider trust, transparency, fairness, and environmental and social governance. Demand for sustainable meat is growing and in response the Australian red meat and livestock industry has set a target to be Carbon

	Neutral by 2030. A number of Outback SA pastoralists are responding by altering their production.
Increased demand for meat	As many developing countries become wealthier and individuals receive more income, demand for meat is increasing. In the Outback SA region, pastoralists have an opportunity the contribute to meeting this demand.
Disease	Disease outbreaks can threaten the agricultural industry.

4.2 National and state drivers of change

Table 9 describes national and state drivers of change (CSIRO 2022, Australian Bureau of Statistics 2021) and how they are or have potential to influence the Outback SA region.

Table 9 National and state drivers of change

National and/or state trend	Description
Emissions targets and limits	Australia has committed to reducing its greenhouse gas emissions. This may have significant impacts on high emissions industries including mining and agriculture. It also presents opportunities to build renewable energy and low pollution economies and limit the scale of climate change. As noted above, the Outback SA agriculture and pastoralism, mining and transport industries that are key sources of emissions will require transformation change to contribute to emissions reduction targets.
Increased cost of living	Increasing costs of living is placing pressure on Australians to fund their everyday needs. There is high variability in the income security of the Outback SA community and this driver will be felt differently in different communities, especially by those most vulnerable.
Health challenges	The post-pandemic world has exacerbated existing health challenges posed by an ageing population and growing burden of chronic disease. One in five Australians report high or very high levels of psychological distress. Responding to our health risks and improving health outcomes is becoming more and more important. The research and engagement for this project highlighted the significant adverse impacts on the mental health of the people and communities experiencing drought and the need for increased services. Remote and rural communities often experience disadvantage in access to health services and poorer health outcomes, which can be exacerbated by drought. The increase in availability of tele-health (consultation with a healthcare provider by phone or video call) post COVID-19 is beneficial for Outback communities.

4.3 Regional trends

Through the research and engagement (Appendix A – Regional Engagement Summary Report) undertaken for this Background Paper, a number of trends described in Table 10 have been noted at a reginal scale.

Table 10 Regional trends

Regional trend	Description
Decreasing population	The Outback SA's population has declined significantly in recent years, reducing by 22% from 2011 to 2021. While the overall population is projected to stabilise in the coming years, this smaller population often means less community diversity, resources, and services. Some towns may experience greater decline than others. Anecdotally we are aware that more people would move to, or back to many of our outback townships but lack of housing is a constraint. At the same time as population is decreasing, the number of visitors to the region is increasing placing increasing pressure on community facilities.
Aging population	The Outback SA's population is ageing. This has consequences for economic growth, labour force participation and demand for services.
Difficulty attracting and retaining labour	As the world becomes increasingly urbanised, regional areas such as the Outback SA experience greater difficulty in attracting and retaining labour. A lack of local services contributes to this.
High reliance on volunteers	Volunteers play a critical role in the vitality of the Outback SA. However, an overdependence on these volunteers can lead to burnout, with flow-on impacts to local communities. Volunteering rates are falling in the Outback SA region.
Increased digital connectivity	Recent improvements including Starlink have greatly improved the Outback SA region's digital connectivity. This has opened up a number of opportunities for education, employment, health, social connection and more.

5. Drought resilience

5.1 A definition of resilience

The term 'resilience' is commonly used in a number of subject areas from health and wellbeing to natural resources and the economy. A range of Regional Drought Resilience Plans and literature were analysed to compare their definitions of 'drought resilience'. These are presented in Table 8. From this analysis, the following definition of drought was selected from the Future Drought Fund (Drought Resilience Funding Plan 2020 to 2024) Determination 2020 (Department of Agriculture, Water and the Environment 2020):

Drought resilience means the ability to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and changed seasonality of rainfall, for improved economic, environmental and social wellbeing.

Resilience is more than just bouncing back. In many cases, the intent is to use disruption as an opportunity to move in a new direction, not just recover back to a previous state. It is about changing in order not to be changed.

Building resilience will help the Outback SA region to endure droughts with less negative impacts and recover from them sooner.

Table 11 Definitions of resilience from various drought plans

Source		Definition of resilience/excerpt
Regional Drought Resilience Plans (Department of Agriculture, Fisheries and Forestry 2024)	South West Queensland	'Resilience' is harder to define. The World Bank has defined resilience as the ability "… to anticipate, absorb, accommodate or recover from the effects of a hazardous event in a timely and efficient manner". Australia's CSIRO perhaps more specifically states: "drought resilience will result in a regional Australia that can endure deeper, longer droughts, and recover from them sooner. This will allow our food and agribusinesses to boost national farm income, increase food security, and protect the regional jobs that rely on agriculture. It will increase the resilience of rural and regional communities that depend on agriculture and improve environmental outcomes
	Murraylands & Riverlands	Resilience is more than just bouncing back. In many cases, we want to use disruption as an opportunity to move in a new direction, not just recover back to exactly where we were.
	Northern & Yorke	Resilience has multiple definitions; common traits of resilience include the ability of a system, organisation or individual to withstand adversity and bounce back. For the purpose of the NYRDRP, the definition of resilience has been taken from the Drought Resilience Funding Plan 2020 to 2024 and is described as: *"the ability to adapt, reorganise or transform in response to changing temperature, increasing variability and scarcity of rainfall and changed seasonality of rainfall, for improved economic, environmental and social wellbeing".* (Australian Government, 2019).

Source		Definition of resilience/excerpt
		Also includes a quote from a participant: Resilience is the ability to withstand bad times or disasters – not to just get back up, but figure out how to move forward, progress and grow in capacity to prevent it from happening again. Must be able to adapt to prevent. - Anita Kuss, Unihub Spencer Gulf
	ACT	While resilience can be defined as "The capacity of a system to absorb disturbance and reorganise so as to retain essentially the same function, structure and feedbacks", rather than framing resilience as "bouncing back", it could be more accurately described as adapting or transforming as needed in response to change.
	Gippsland Victoria	Walker (2020) defines resilience as the capacity of a system to absorb a disturbance and reorganise so as to keep functioning in the same kind of way. Rather than just 'bouncing back,' resilience is all about changing and adapting to circumstances, rather than having them change you. For the purpose of this document, *resilience* is used to describe the ability to respond positively to the known impacts of drought and maintain business functions. It is about being able to adapt, thrive and take advantage of opportunities when encountering change. Rather than 'persistent maintenance' of the current situation, or being stoic, resilience includes the ability to adapt and be decisive during uncertainty and change.
	Wimmera Victoria	For the purpose of this document, resilience is defined as the ability of a system to effectively respond to disruptions, like drought, while maintaining function. It is about being able to consistently and collectively develop, hone and create the tools to adapt, thrive and take advantage of opportunities when encountering change. Rather than 'persistent maintenance' of the current situation resilience includes the ability to adapt and potentially transform the way things are done during periods of uncertainty and change.
	Mid West WA	The capacity of a rural community and landscape as a social-ecological system to absorb disturbance, reorganize, maintain or change functions and feedbacks so as to continue to deliver values.
	Southern Wheatbelt WA	The capacity of a rural community and landscape as a social-ecological system to absorb disturbance, reorganize, maintain or change functions and feedbacks so as to continue to deliver values.
Maru et al. 2017		The capacity of a linked social-ecological system to absorb disturbance and reorganize so as to retain essentially the same function, structure, and feedbacks – to have the same identity. Resilience thinking embraces the ideas of adaptation of the current system, and also transformation to a different kind of system when the existing one is in an irreversibly undesirable state, or on a trajectory towards such a state.

Source	Definition of resilience/excerpt
Walker 2020	The simplest definition of resilience is the ability to cope with shocks and to keep functioning in much the same kind of way. It is a measure of how much an ecosystem, a business, a society can change before it crosses a tipping point into some other kind of state that it then tends to stay in. Possibly the most common misinterpretation of resilience is "bouncing back." Resilience is in fact the ability to adapt and change, to reorganize, while coping with disturbance. It is all about changing in order not to be changed. A resilient system responds to a disturbance by changing the relative amounts of its different parts and how they interact, thereby changing the way it functions. It stays the same kind of system by learning from a disturbance, to be able to better cope with a similar disturbance in the future. It does not bounce back to look and behave exactly like it did before. Resilient systems are learning systems. Resilience is largely about learning *how* to change in order not to *be* changed. Trying to protect a system by keeping it in a constant state reduces its resilience.
Carpenter et al. 2012	Resilience, in the context of environmental management and sustainability, is the capacity of a social-ecological system to absorb disturbance, reorganize, and thereby retain essential functions, structures and feedbacks.
South Australian Fire and Emergency Services Commission, 2019	The ability to survive, adapt and grow, no matter what happens.

The Outback SA Drought Resilience Plan is focused on drought resilience. However, enhancing drought resilience will help the region respond to and recover from other stresses or pressures such as bushfire, flooding rains, pandemics and economic market changes.

5.2 The importance of drought resilience

In the past, droughts have had serious impacts on the Outback SA region. It has had major consequences for jobs and income, mental health and wellbeing, the ability to feed livestock or grow crops, the size of regional populations, and the health of the environment.

Resilience is about taking action to try to avoid or minimise these negative impacts before they happen rather than waiting until they do occur to act, or just focusing on recovery. Building resilience can help to create economic, social, and environmental development opportunities.

Drought resilience often has a very large focus on the agricultural sector. However, the Outback SA Drought Resilience Plan will recognise that the unique climate, geographic, social, and economic factors of the Outback region mean that drought impacts more than just the agricultural sector. In this region, drought has a massive impact on communities as a whole and other industries outside of the agricultural sector.

5.3 Characteristics of drought resilient individuals, communities, and regions

It is important to consider resilience at a variety of scales from the individual to the community and the whole region. Resilience looks different for every community depending on its unique experience, attributes, risks, and characteristics. However, there are a number of common attributes of a drought resilient region that have been identified by stakeholders, community (see Appendix A – Regional Engagement Summary Report) and the literature (Council of Australian Governments 2011; South Australian Fire and Emergency Services Commission 2019; Walker 2020)

5.3.1 *Individuals*

Characteristics of resilient individuals are described in Table 12.

Table 12 Characteristics of resilient individuals

Theme	Key characteristics
Social characteristics	• Social connection and strong relationships with friends and family • Sharing your struggles with others, being willing to accept support and understanding that others are also doing it tough and that you are not alone. • Good relationships with staff from support organisations including the SAAL Landscape Boards (SAAL, AW, EP), PIRSA, OCA, banks, counsellors etc. • A sense of purpose – employment, education, volunteering, family etc. • Experience from previous droughts, including passing this knowledge onto the next generation. • Self sufficiency • Being willing to do things differently and adapting to new conditions
First Nations cultural characteristics	• Being able to live and work on Country, access cultural heritage sites and share knowledge between generations. • Landholders and communities having access to drought relief funding
Economic characteristics	• Good long-term business and financial planning and decision-making – ability to 'play the long game' and use the profits from good years to get through the bad years. • Diverse sources of household income • Access to and awareness of financial support available
Environmental characteristics	• Managing total grazing pressure and undertaking sustainable land management • Land management that seeks to achieve nature positive outcomes

Theme	Key characteristics
	• Good soil and water management that maximise soil health and land cover to minimise erosion.
Agricultural characteristics	All economic and environmental characteristics as well as: • Innovation and implementation of new techniques, tools, and technology • Understanding your country, your business, and the risk of drought • Having land outside of drought affected areas to agist stock. • Infrastructure that reduces workload eg telemetry for stock water monitoring, grates instead of gates etc. • Security of water supply for stock and domestic use • Proactive preparation for drought, including plans for before, during and after that facilitate making timely decisions informed by seasonal changes • Willingness to trial and adopting new practices and technology
Assets and infrastructure characteristics	• Access to good education, healthcare, and digital connectivity • Reliable water infrastructure that maximises water capture and minimises water loss. • High quality housing with large rainwater tanks or bores and good thermal insultation

5.3.2 *Communities*

Characteristics of resilient communities are described in Table 13.

Table 13 Characteristics of resilient communities

Theme	Key characteristics
Social characteristics	• Strong, connected, caring communities that help each other in times of need • Strong community organisations and volunteer base who are willing and able to put in the work for the benefit of their community • Proximity to regional centres with health, education, and support services
First Nations cultural characteristics	• Ability to maintain connections to country • Good relationships between First Nations peoples, wider communities, and government agencies • Local employment opportunities that enable First Nations employment

Theme	Key characteristics
Economic characteristics	• Diversification of local economies into tourism, mining, workers accommodation, goats, renewable energy etc. • Access to community grants and other funding • Investment in projects that give good return to the community, employ local people and have social licence • Local employment opportunities that support people to stay in the community
Agricultural characteristics	• Pastoralists and farmers who are aware of how to minimise their environmental impacts • Uptake of new, improved and adaptive technology and practises
Environmental characteristics	• Low populations of pest/overabundant animals through proactive management before drought • Maintainable public green spaces which improve amenity, wellbeing, and tourism attraction • Good baseline native vegetation cover with a diverse mix and more resilience perennials.
Assets and infrastructure characteristics	• Local services including shops, medical facilities (including mental health and preventative health), tradespeople etc. • Reliable access to water, power, energy, digital connectivity, and food • Community spaces that enable people to come together
Governance characteristics	• Place-based collaborative, long-term approaches and support from external agencies in ways that meet the unique needs of each community

5.3.3 *Regions*

Characteristics of resilient regions are described in Table 14.

Table 14 Characteristics of resilient regions

Theme	Key characteristics
Infrastructure characteristics	• Road and roadside infrastructure to support movement of stock, local travel and tourism (including sealed roads, toilets, rubbish bins, parking bays, showers etc.) • Security of energy and water supply and telecommunications

Economic characteristics	• Strong agricultural commodity market conditions • Diverse business and industry sectors.
Governance characteristics	• Timely and localised government declaration of drought which can unlock funding and support. • Good communication and provision of information about available community grants and programs • Strategic and proactive preparation for drought - investing in good times to increase resilience during bad times • Coordinated services • Permanency of support staff to provide a sense of continuity and allowing trusted relationships to be built • Policy informed by local people, for local people .

6. Approaches to drought resilience planning

6.1 Learnings from other planning regions

Many other regions across Australia have already prepared draft or final Regional Drought Resilience Plans through the Future Regional Drought Resilience Planning program. A desktop review of these plans and online meetings with a number of plan leaders has helped to:

- Understand what has worked well or not worked well in the process of preparing Drought Resilience Plans in other regions around Australia, including in engagement, research, and reporting phases.
- Identify the types of strategies and actions proposed for other regions and the collated evidence that suggests they will be successful in building drought resilience.

The key findings of this review and engagement are summarised below.

Table 15 Key learnings from other planning regions

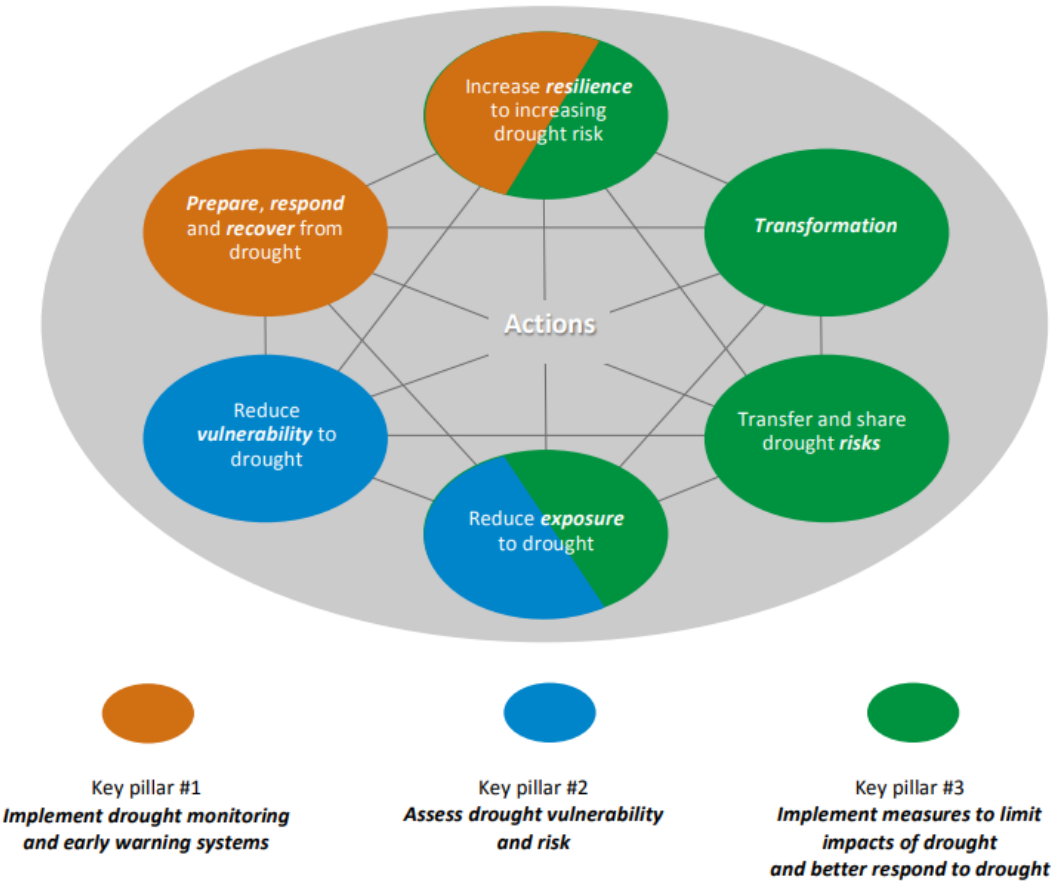
Planning element	Key findings
Structure of plan	• Short, simple, easy to read plans with lots of graphics are more effective than long, context-heavy plans. • Ensure the plan is written for the target audience (ie the people who make decisions about what to do about drought, from Community based organisations, local business owners to state and federal agencies). • Drought resilience plans should be high level to enable flexibility in implementation. The 'how to actually do it' is critical but this sits separately to the plan itself. • Including some tools such as My Climate View/Climate Ready can be useful for those who want something more tangible from the plan (eg support and advice). • Providing a list of potential partners is more effective and achievable than identifying particular responsibilities for each goal/action. • Preparing a 'plan on a page' summary of the plan is a useful approach for those who do not want to read the entire plan.
Strategies and actions	• Strategies and actions should be grouped by themes. • The plan should take a social focus – social/people/community actions are usually the most effective in building drought resilience. • Supporting/funding community clubs/organisations to deliver their own community programs is a very successful approach and helps to ensure the community can continue to implement the plan themselves, and that actions are led by and designed for the community.

Planning element	Key findings
	• Actions should be considered across the range of change types (eg maintaining, modifying, and transforming) with some in each category.
Engagement	• Leverage existing relationships and networks to increase engagement, including for First Nations engagement. • Tailor engagement messaging to ensure you reach all parts of the community. • Online engagement can work well.
Approach	• A risk assessment framework approach is an effective approach. • Using the Drought Resilience, Adaptation and Management Policy (DRAMP) Framework (Crossman, 2018) is an effective approach.

6.2 The Drought Resilience, Adaptation and Management Policy (DRAMP) Framework

The Drought Resilience, Adaptation and Management Policy (DRAMP) Framework (Crossman, 2018) published by the United Nations Convention to Combat Desertification (UNCCD) takes an integrated, multi-pronged approach to reduce risks and impacts of drought. The Framework includes six goals, aligned with three pillars of drought risk reduction illustrated in Figure 16.

Figure 14 The Drought Resilience, Adaptation and Management Policy (DRAMP) Framework (Crossman, 2018)



The six goals of the DRAMP Framework are:

1. Reduce exposure to drought: reduce the potential for loss of people, livelihoods, ecosystem services and resources, infrastructure, as well as economic, social or cultural assets in places that could be adversely affected by drought;
2. Reduce vulnerability to drought: reduce tendency to be adversely affected by drought;
3. Increase resilience to drought risk: strengthen the ability of communities, ecosystems and economies to anticipate, absorb, accommodate or recover from the effects of drought quickly and efficiently by ensuring the preservation, restoration or improvement of natural capital;
4. Transformation: alter fundamental attributes of social, economic and ecological systems, including value systems; regulatory, legislative, or bureaucratic regimes; financial institutions; and technological or biological systems;
5. Prepare, respond, and recover from drought: the backbone of management and planning approaches to reduce drought risk, including development of comprehensive drought monitoring and early warning systems.
6. Transfer and share drought risks: distribute risks among wider section of society to include those who benefit directly and indirectly from robust drought risk management.

6.3 South Australia's Disaster Resilience Strategy

South Australia's Disaster Resilience Strategy was prepared to provide a foundation upon which state and local government, non-government organisations, businesses, and communities can work together to make a safer, more resilient South Australia. The Strategy includes eight guiding principles described in Figure 17 for building disaster resilience that are applicable to drought resilience planning.

Figure 15 Guiding principles for building disaster resilience (Government of South Australia, 2019)

7. Opportunities for increasing drought resilience in the Outback SA region

The following strategies and opportunities have been identified through phase 1 and 2 engagement (see Appendix A – Regional Engagement Summary Report) and the literature review (Climateworks Centre 2023; Fisher & Rola-Rubzen 2011; Nielsen et al 2020; Outback Communities Authority 2021; Rola-Rubzen & McGregor 2009; SA Drought Hub n.d).

These strategies and opportunities will be further explored and considered as the Outback Drought Resilience Plan is prepared, and are presented in the following themes:

- Agriculture
- Community
- Economy
- Environment
- First Nations people
- Governance and
- Infrastructure

7.1 Agricultural opportunities

Strategies and objectives to build the drought resilience of the agricultural sector are described in Table 16.

Table 16 Strategies and objectives to increase drought resilience of agriculture in the Outback SA region

Strategies	Opportunities
Managing total grazing pressure	Providing advice on management strategies and, where appropriate, greater support for agistment or destocking to assist moving stock off the land and preventing overgrazing.
	Supporting landowners more with pest/overabundant native animal control.
Educating pastoralists and farmers	Training pastoralists on adaptive land management processes (eg, rest based grazing, when and how fast to destock, location of watering points etc.) to support uptake and increase their sustainability and resilience.
	Providing a one-stop-shop website for pastoralists seeking information during/after drought, with registered stockists or providers for eg hay/stock etc.
	Providing awareness raising, training and support for uptake of carbon farming, particularly in pastoral areas.
	Contextualising technical information such as climate data, forecasts, tools etc. to individual property or business decisions.

Strategies	Opportunities
Encouraging good long-term planning processes	Delivering an individual farm assessment program which supports pastoralists to assess their drought preparedness and develop an improvement plan.
	Supporting long-term financial planning to help the benefit of good years allow farmers to get through bad years.
	Supporting business and succession planning
Delivering local research and innovation	Researching and trialling new and improved grazing and cropping land management practices in the Outback SA context
	Improving weather and climate forecasting, monitoring, and warning systems.
Reducing workload	Installing infrastructure that reduces workload eg telemetry to monitor water levels, stock grids to replace gates
Promoting sustainability	Promoting the sustainability of red meat (green/blue tick or similar certified marking) to provide financial benefit for pastoralists using sustainable practises and increase recognition of pastoralists.

7.2 Community opportunities

Strategies and objectives to build the resilience of the community are described in Table 16.

Table 17 Strategies and opportunities to build resilience of the Outback SA community

Strategies	Opportunities
Improving community connection	Delivering or supporting community events, including a mix of drought/mental health focused events and general events which promote positivity and community connection.
	Facilitate knowledge exchange and sharing of drought experiences among communities.
Maintaining and enhancing community wellbeing	Continuing to provide free mentoring, counselling, financial advice, training, and support services such as PIRSA Family and Business (FaB) mentors, Centrelink representatives, Mental Health First Aid Course, Are you Bogged Mate etc. Promote continuity of quality staff where possible to enable the formation of trusted relationships.
	RFDS continuing to provide their services, including mental health (for men and women) and allied/preventative health, and preferably with continuity of staff who get involved in the local community.
Providing community infrastructure	Funding of infrastructure that benefits the whole community in the long term and is maintainable eg community halls, sporting facilities, irrigated green space etc.

Strategies	Opportunities
Supporting volunteers	Training for volunteers on skills such as preparing grant applications, writing minutes, financial management, what resources are available, event management, digital literacy, managing insurances etc. Many participants identified that rather than general trainings, communities would benefit from tailored support that meets local needs and can help with answering individual questions. It was noted that upskilling community volunteers on a range of topics would help to combat overreliance on individual community members. I'm a little sceptical… volunteers are already stretched. Recent 'leadership' programs offered by Ariid Lands have struggled for participants. I think we need to look for paid positions.
Providing easy to access, direct financial support	Providing community members with more accessible, quick, easy, streamlined personal/business financial supports during drought such as long-term low interest business loans, freight subsidies, fodder subsidies, water infrastructure rebates, supports similar to Job Keeper etc. with minimal red tape. Town residents may also need financial support, not just pastoralists, for example with cost of living (power and water costs).
	Providing more accessible, quick, easy, streamlined community grant opportunities. Where possible, provide grants that allow allocating funds for project management. Improve communication and awareness of available grants. Support community organisations with grant application writing.
	Continuing financial support after the drought breaks to help the region to recover and rebuild.
	Providing in-kind support such as hay drops, water truck donations etc.
Improving financial literacy	Mentoring/training for business planning, business finances, succession planning and what business support is available.
	Supporting households to diversify their incomes prior to drought, especially into industries that are not reliant on water (eg historical tourism, dark sky tourism, station stays, fossil tourism, cultural tourism, government-based jobs or other work from home jobs).
Enabling local employment	Providing local jobs and education that allow local people to diversify their work and stay in the local community.See comment above about volunteers
Maintaining township vibrancy	Promote country life to encourage people to move to remote communities. Not sure this is about 'country' life… another term?

7.3 Economic opportunities

Strategies and objectives to build the drought resilience of local and regional economies are described in Table 17.

Table 18 Strategies and objectives to increase the drought resilience of the Outback SA economy

Strategies	Opportunities
Supporting local employment	Better advertising of local jobs (eg health, education, NRM) to local people to enable people to diversity and stay in the region. Also job design nnd remote working opportunities.
	Supporting industries which enable local employment and economic benefit (eg culture and recreation, tourism, manufacturing, construction).
Promoting Outback tourism	Increasing promotion and signage of outback tourism (separate from Flinders Ranges) SATC may have a different policy position – need for joined up policy.

7.4 Environmental opportunities

Strategies and objectives to build the drought resilience of the natural environment are described in Table 18.

Table 19 Strategies and objectives to increase drought resilience of the Outback SA environment

Strategies	Opportunities
Controlling total grazing pressure	Managing total grazing pressure by controlling feral animals and over-abundant native species and stock
	Supporting landowners more with pest/overabundant native animal control.
Planning and monitoring	Undertaking landscape scale planning and management to support the condition and extent of native flora and fauna.
	Improving long-term monitoring of groundwater, native flora and fauna including during drought to increase knowledge of the impacts of drought on keystone species.
Delivering conservation priorities	Focusing conservation efforts during drought in areas which naturally have greater water flows.
	Implementing Landscape Board conservation priorities.
Supporting uptake of	Supporting uptake of carbon farming through education and awareness raising, pilot projects and training.

Strategies	Opportunities
carbon farming	
Maintaining township environments	Maintain highly valued environments such as township green space where possible through drought
Reducing emissions	Promoting and striving towards carbon neutrality on pastoral and agricultural properties and in townships.
Promote nature positive outcomes	Promote land management approaches that create nature positive outcomes.

7.5 First Nations cultural opportunities

Strategies and objectives to build the resilience of First Nations people are described in Table 19

Table 20 Strategies and opportunities to build drought resilience of First Nations people in the Outback SA region

Objective	Opportunities
Engaging with First Nations	Engaging with First Nations peoples to understand what they need and what would assist them.
Supporting programs that deliver on First Nations priorities	Enhance the Outback community's awareness of cultural heritage values and support programs that build generational knowledge of cultural land management.
	Support for land management including pest plant and animal control, water and erosion management
	Enable local First Nations employment that facilitates working and living on Country

7.6 Governance and advocacy opportunities

Strategies and objectives to build the resilience of the region through governance and advocacy are described in Table 21.

Table 21 Strategies and opportunities to build drought resilience through governance and advocacy in the Outback SA region

Strategies	Opportunities
Providing effective drought governance	Communities noted that New South Wales and Queensland properties have in the past received assistance earlier, while in the same or even better conditions than their South Australian counterparts. Participants emphasised the importance of ensuring drought declarations accurately reflect the conditions on the ground rather than being based on lines on a map.
	Defining drought as a hazard in the State Emergency Management Plan.
Educate the community about available support	Improve pastoralist farmer and community access to and knowledge of the full range of drought resilience, management, and support opportunities and initiatives.
Engaging with communities	Engaging with communities to understand what they need and want and delivering this in partnership with the community.
	Increasing visibility and accessibility to government agencies (eg PIRSA, OCA, RDA) in on-groundwork in the regions, including more personal contact and relationships in the regions (not just in Port Augusta) and supporting continuity of staff where possible.
	Developing a clear vision and collective identity for the Outback SA region and each outback town in consultation with the community
Supporting volunteers	Simplifying requirements for community organisations and volunteers where possible. Consider providing funds to cover volunteer hours for community works or providing greater OCA support for community organisations.
Funding on-ground projects that provide the community with what they need to be resilient	Investing when times are good, including more grants and support for resilience building actions.
	Ensuring more long-term funding, review, and improvement processes to ensure governance agencies learn from past experiences.
	Ensuring that money hits the ground in the regions/with community organisations where it is needed most.
	Better coordinating programs and funding from different agencies in the regions.

Strategies	Opportunities
Improving coordination of drought programs	Encouraging city-based volunteer groups to come into regional communities and help during drought times through for example running social events, assisting with weed management etc.
	Partnering with mining companies, Roxby Council and District Council of Coober Pedy to increase support for local communities in region.

7.7 Infrastructure opportunities

Strategies and objectives to build the drought resilience through infrastructure upgrades and of infrastructure assets in the Outback SA region are described in Table 22.

Table 22 Strategies and opportunities to build drought resilience through infrastructure in the Outback SA region

Strategies	Opportunities
Improve community infrastructure provision	Improving road and roadside infrastructure for stock transport, local travel and tourism. This may include sealing roads, better maintaining unsealed roads, and installing parking bays, toilets, showers, and rubbish bins.
	Improving water security for all communities , including in Andamooka (certainty of water-carting service from the Roxby Downs-Andamooka pipeline to individual properties), Innamincka (back up groundwater bore for town water supply), Gawler Ranges (plastic lining catchments and bore drilling) Yunta and Copley.
	Funding upgraded or new community infrastructure that is maintainable, sustainable and provides a place for community connection and diverse uses (including community halls, sporting facilities, irrigated green space, community facilities with backup power generation etc.)
	Deliver universal access to public Wi-Fi so the community and visitors can better access emergency services, health, education and other support services
	Increasing local production and storage of renewable energy or otherwise improve energy security and reduce power outages (which also cut out water pumps, fridges, air conditioners, telecommunications etc.).
	Building more infrastructure to support tourism in towns including public toilets, showers, water (can be pay for use), shaded outdoor tables and chairs, campground facilities etc.
	Providing safe community spaces with backup power sources for community to go when the power goes out – with good thermal insulation, drinking water supply, air conditioning, fridges/freezers etc.

Strategies	Opportunities
	Encourage and support water recycling initiatives
Improve efficiency of household infrastructure	Providing incentives for household solar generation and storage, energy and water efficient housing and rainwater tanks.

7.8 Types of change

Building the resilience of the Outback SA region to drought will likely require change in practices and processes.

Severe and unpredictable events such as droughts, floods and extreme heat will impact Outback communities and the way they live and it likely that changes in current systems are needed. Three types of change are identified (Roggema et al, 2012):

- Incremental change – associated with slow processes and small adjustments, which modify the landscape only slightly. They are often associated with ongoing improvements in current practice. For the Outback SA region, strategies to change support structures to Progress Associations would be an example of incremental change.
- Transition change – associated with moving from one way of doing things to another in a deliberate way.
- Transformation change – associated with a fundamental shift in the system. They are usually multi-actor, multi-scale processes, where the change is highly non-linear. Examples may be initially controversial or cause wide-spread apprehension, for example if the Outback SA region was to propose a restriction on grazing.

The type of change of each strategy and opportunity identified in the Drought Resilience Plan will be considered in the final Plan.

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Appendix A – Engagement summary report

Outback SA Drought Resilience Steering Committee
Project Reference
22 April 2024

Regional Engagement Summary Report

Outback SA Regional Drought Resilience Plan

SHAPING GREAT COMMUNITIES

URPS

Regional Engagement Summary Report

22 April 2024

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Prepared for	Outback SA Drought Resilience Steering Committee
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Document history and status

Revision	Date	Author	Reviewed	Details
V1	17.4.24	E. Mansfield,	A. Pannell	Draft for client review
V2				

We acknowledge the Kaurna People as the Traditional Custodians of the land on which we work and pay respect to their Elders past, present and emerging.

https://urpsau.sharepoint.com/sites/Synergy/Shared Documents/Projects/23ADL/23ADL-0865 - Outback SA Drought Resilience Plan/Reports/240319_R4_v1_Regional Engagement Summary Report.docx

Contents

Acknowledgement of Country

The Outback SA Drought Resilience Steering Committee acknowledge Aboriginal people as the First Peoples and Nations of the lands and waters we live and work upon. We pay our respects to Elders past, present and emerging. We acknowledge and respect the deep spiritual connection and the relationship that Aboriginal and Torres Strait Islander people have to Country and commit to working with the First Nations People of the region to maintain and enhance drought resilience.

Executive Summary

The Outback SA Drought Resilience Steering Committee is currently preparing a Regional Drought Resilience Plan for the Outback SA region.

Regional engagement including 16 face-to-face workshops, drop-in sessions and dinner conversations were undertaken with stakeholders and communities in 13 outback towns throughout March and April 2024. Opportunities for online engagement were also provided through an online survey, online workshop and phone calls to individuals. 114 individuals took part in the engagement.

The regional engagement helped the project team to understand:

- How is the Outback SA region impacted by drought?
- What makes individuals, communities and regions resilient to drought?
- How can the resilience of the Outback SA region to drought be maintained and enhanced?

Community members and stakeholders shared a wide diversity of perspectives, experiences and priorities. These have been summarised in this report and will be used as the foundation of the draft Regional Drought Resilience Plan.

Some of the comments which were heard most frequently through the engagement included the following:

How does drought impact the Outback SA region?

- Impacts on people from drought are profound. The impacts on mental health and wellbeing were highlighted again and again. Exhaustion, heat stress, degradation of the natural environment and loss of income impact all parts of the community.
- Droughts have had a major financial impact on pastoralists. Impacts on tourism have been minor, although an abundance of water draws more tourists.
- Vegetation cover, native wildlife, surface water, groundwater (excluding the Great Artesian Basin) and soil are majorly impacted by drought, with large loss of life and environmental condition.
- In areas without access to the Great Artesian Basin, bores, rainwater tanks and dams run dry affecting the capacity to maintain stock.

What makes people, communities and regions resilient to drought?

- Social connection and good relationships/support.
- Strong volunteer base and a community that contributes.
- Diverse sources of household income.
- Long term financial planning that accounts for good and bad years.
- Managing total grazing pressure and understanding your country.
- Low populations of pest/overabundant native animals.
- Reliable access to water, power, energy and digital connectivity.

- Pastoralists having land outside of drought affected areas to agist their stock.
- Experience from previous droughts.

How can the resilience of the Outback SA to drought be enhanced?

- Supporting the delivery of community events which promote community connection and wellbeing.
- Engaging with communities to understand what they need and want, and delivering projects in partnership with the community
- Timely and localised government declaration of drought which unlocks funding and support.
- Improved roads and roadside infrastructure for stock agistment, local travel and tourism.
- Accessible, quick, easy, streamlined financial support such as community grants, long-term low interest business loans, freight subsidies etc. with minimal red tape.
- Funding of infrastructure that benefits the whole community in the long term eg community halls, sporting facilities, irrigated green space etc.
- Support for volunteers.
- Increased water security for town water supplies.
- Supporting landowners with pest/overabundant native animal control.

1. Introduction

1.1 What we wanted to know

The Outback SA Drought Resilience Steering Committee is currently preparing a Regional Drought Resilience Plan for the Outback SA region. The Regional Drought Resilience Plan will identify opportunities to enhance the region's ability to prepare for, respond to and recover from drought, which will also help them be more resilient to other stresses or pressures.

Community and stakeholder engagement is an integral part of the Plan's preparation.

Engaging with local communities and stakeholders has:

- Enabled people and organisations to contribute their own knowledge, expertise and experience to the plan.
- Built capacity of people to think, plan and act proactively to build resilience to drought.
- Provided the foundation for an ongoing and enduring process that empowers people to activate the Plan developed by this project and drive the implementation of actions.

This phase of engagement aimed to understand:

- How is the Outback SA region impacted by drought?
- What makes individuals, communities and regions resilient to drought?
- How can the resilience of the Outback SA region to drought be maintained and enhanced?

1.2 How we engaged

16 face-to-face workshops, drop-in sessions and dinner conversations were undertaken with stakeholders and communities in 13 towns across the region throughout March and April 2024. Opportunities for online engagement were also provided through an online survey, online workshop and phone calls to individuals. 114 individuals took part in the engagement.

The number of participants identified in the table below excludes URPS staff, and Steering Committee staff at their subsequent engagements following the internal stakeholder workshop.

Table 1 – Regional engagement undertaken to inform the draft Outback SA Regional Drought Resilience Plan

Location	Engagement format	Number of participants	Date (2024)
Port Augusta	Internal stakeholder workshop	14	Tuesday 12 March
	Workshop	3	Wednesday 12 March

Location	Engagement format	Number of participants	Date (2024)
	First Nations drop-in session	2	Wednesday 12 March
	Drop-in session	1	Wednesday 12 March
Yunta	Workshop	7	Thursday 14 March
Andamooka	Workshop	4	Monday 18 March
William Creek	Dinner conversation	4	Monday 18 March
Marree	Workshop	10	Tuesday 19 March
Copley	Workshop	6	Tuesday 19 March
Parachilna	Workshop	5	Wednesday 20 March
Innamincka	Dinner conversation	6	Wednesday 20 March
Oodnadatta	Workshop	2	Thursday 21 March
Marla	Workshop	1	Thursday 21 March
Coober Pedy	Workshop	3	Friday 22 March
Penong	Workshop	6	Tuesday 9 April
Gawler Ranges	Workshop	4	Wednesday 10 April
Online	Workshop	8	Tuesday 2 April
	Survey	27	Friday 23 February – Friday 12 April
	Phone calls	1	Thursday 11 April
Total		**114**	

Participants included the following groups:

- Staff from the Steering Committee organisations including Outback Communities Authority, SA Arid Lands Landscape Board, Regional Development Association Far North, PIRSA (Primary Industries and Resources South Australia) and SA Drought Hub
- Other government staff including representatives from SA Health, PIRSA Family and Business (FaB) mentors, Department for Environment and Water / National Parks and Wildlife Service
- Pastoralists and farmers (station/farm owners, families of station owners, and employees)
- Members of progress associations or other community organisations/clubs
- General community members
- Tourism and hospitality operators including pub, hotel and homestay owners, airline operators, and general store owners
- Members of peak bodies and boards including Livestock SA, SA Drought Hub
- Miners
- Truck drivers
- Teachers.

Most participants had experienced a drought before, either in the Outback SA region or elsewhere.

NOTE - a number of key informant interviews with local subject matter experts and drought planners from other regions in Australia have also been undertaken. The results from this engagement have been reported through the literature review and are not captured in this engagement summary report.

1.3 Our key findings

The following sections summarise the key themes of the workshops, drop-in sessions, dinner conversations, survey and phone conversations. Verbatim workshop notes can be found in Appendix A.

2. How does drought impact the Outback SA region?

Community and stakeholders were asked how drought impacts the Outback SA region. A wide range of negative impacts on the community, economy, agricultural sector, environment, infrastructure and culture were identified. A small number of positive impacts from drought were also identified.

Community and stakeholders consistently noted that the severity of drought has a major influence on the impacts experienced. Many participants identified that the most recent 2017-2019 drought experienced in eastern parts of the region, while short, was very severe and had consequences far greater than previous longer droughts of a lower severity.

It was also commonly recognised that the impacts of drought do not end with drought-breaking rains. It can take many years for the vegetation and soil to recover, pastoralists to restock, and businesses to build back. Mental health and community impacts can be ongoing. The impacts of drought also cannot be examined without considering the impact of associated weather patterns including drought breaking rains, heat and dry thunderstorms.

Key impacts identified through the regional engagement have been summarised by theme below.

2.1 Social impacts

Participants identified the following impacts of drought on the community and individuals:

- Reduced mental health and wellbeing, having significant impacts on individuals and families resulting in suicide in extreme cases. High feelings of stress and loss of control.
- Exhaustion and stress from an increased workload when farm workers may have been laid off and there is increased demand to feed and water stock , loss of income and the need to make big business decisions.
- Reduced social connection – pastoralists are too busy and do not come into towns as often, less interaction with others, reduced volunteer base, less time spent with family.
- Dust, causing and exacerbating health conditions such as asthma, increasing need for cleaning and reducing surface water quality.
- High temperatures resulting in heat stress, loss of sleep, increased power bills and general discomfort. Miners and pastoralists may work at night to avoid the hotter temperatures.
- Decline in condition of the natural environment (loss of trees and reduced cover, dead animals etc.) leading to reduced amenity and personal wellbeing.
- Reduced regional population, especially young people employed on farms and in small businesses, and people tending not to come back after the drought.
- Intergenerational impacts with children and young people affected by their parents' stress, lack of money for education, environmental impacts and sometimes a reduced desire to stay in the region or take on the family businesses.

- Poorly planned or managed support programs resulting in a sense of disconnection and feel that 'city bureaucrats' are not listening to what locals need.
- Less water for personal use and gardens.

Workshop participants were invited to share their personal experiences of drought. Several quotes that reveal the real toll of drought on individuals are provided below:

> *"It was difficult to watch the community struggle with financial and social impacts of drought. I felt very helpless."*
>
> *"It's very hard to get up and face the same everyday."*
>
> *"I worked with farmers that had gone broke and some took their own lives."*
>
> *"As a primary producer the biggest impact is on your well-being and finances. It takes years to recover both financially and mentally from drought."*
>
> *"It impacted my mental health seeing our country in severe stress and as a young person how it impacted on my parents"*
>
> *"Terrible to watch the land deteriorate and see the animals and native wildlife be decimated."*

2.2 First Nations cultural impacts

First Nations participants identified the following impacts of drought

- Reduced condition of natural cultural heritage sites associated with surface water and groundwater dependent ecosystems.
- Reduced ground cover leading to exposure of cultural sites following wind or rain, and other sites being impacted by dust or sediment.
- Reduced ground cover leading to dust impacts and later erosion and channel deepening when it rains.
- Pest animals taking away feed from native species and damage soil and vegetation.
- Many weed species can survive lower rainfall and are often the first plants to recover when it rains
- Reduction in numbers of culturally significant plants and animals, which impacts on ability to undertake cultural activities such as hunting and collection of bush tucker.

2.3 Economic impacts

Participants identified the following impacts of drought on the economy:

- Reduced income for pastoralists, farmers and local business owners, which results in reduced spend in the local economy. Some employees are let go during drought, and it can be hard to find new employees after drought.
- Changing market conditions negatively impacting pastoralists as fodder and freight prices increase and stock prices decrease. High stock prices following drought can inhibit recovery. Greater financial

support for pastoralists in other states can result in more unfavourable market conditions for South Australians.

- While tourism numbers don't seem to be affected by drought, local communities have less capacity to manage the negative impacts of tourism such as overuse of water, vandalism, search and rescue etc. Tourism numbers increase when there is water in the landscape, particularly Lake Eyre and wildflowers.
- Running out of water resulting in the need to cart in water, drill additional bores or install other water infrastructure at a very high cost.
- Difficulties in paying boarding school fees or other ongoing costs.

2.4 Agricultural impacts

Participants identified the following impacts of drought on agriculture:

- Lack of feed and water to support stock means pastoralists need to destock or move stock to agist in areas less affected by drought.
- Stock often sold at a lower price, and bought back following drought at a higher price.
- Lower capacity of pastoralists and farmers to plan for and develop their business as their time is taken up by an increased work load, particularly when staff have been laid-off.
- Increases in costs including transportation of stock and purchase of water and fodder.
- Reduced crop yields.
- Increased grazing pressure from native species (eg kangaroos) that may graze in protected areas (National Parks etc) during normal conditions when there is water available but move out to pastoral areas when there is no water in parks.

2.5 Environmental impacts

Participants identified the following impacts of drought on the environment:

- Loss of vegetation cover as a result of grazing pressure andheat/water stress leading to dust storms. Native species are often replaced by weeds. Once thresholds are reached, vegetation may never recover without intervention. Associated loss of leaf litter habitat.
- Loss of native wildlife (kangaroos, birds, emus, fish, frogs, snakes etc.) and introduced animals (cattle, sheep, goats, camels, horses, rabbits etc.). Native animals which would previously travel to find water are stopped by fencing. Hot weather exacerbated by climate change can be especially deadly.
- Reduced surface water runoff and recharge of shallow groundwater, increased groundwater extraction, and increased salinity of groundwater.
- Reduced soil health and increased wind erosion of =.
- Loss of gardens and community green spaces.

- Drought breaking rains resulting in soil erosion, flooding or removal of vegetation, and salt flush killing trees and other vegetation.
- Increased biosecurity risks as stock and fodder are transported across the region.

2.6 Infrastructure impacts

Participants identified the following impacts of drought on infrastructure:

- Drying of bores, rainwater tanks and dams requiring installation of additional water infrastructure (eg new bores) or carting in water.
- Degradation of community infrastructure as populations and volunteer capacity decreases. For example, schools are closed, community halls are not maintained, funding for upgrades is not applied for etc.
- Reduced road surface condition with reduced water and funds for grading and more trucks on the roads transporting stock.
- Increase in power outages on hot days and during dry lightning storms resulting in no telecommunications and inability to pump water, run fridges and freezers and run air conditioners.
- Kangaroos seeking water and food damaging irrigation infrastructure and eating gardens.
- Lack of sufficient water supplies for fighting fires.
- Drought breaking rains damaging roads, bores, solar panels, fences and tanks.

2.7 Beneficial impacts

Some participants identified that in some instances drought can have some beneficial impacts including:

- Reduction in the number of feral animals such as goats, camels, horses and rabbits.
- Reduction in the number of overabundant kangaroos and emus (considered by pastoralists in some areas to be a benefit due to the reduction in total grazing pressure).
- Provision of grants and other funding for community projects and community infrastructure which can have a lasting benefit.
- Encouragement of economic diversification.
- Improved community resilience, connection and sense of community support when times are tough.
- Increased water use efficiency.
- Innovation in land management practises.
- Attraction of tourists or film companies in some places known for their arid, barren landscapes such as the Breakaways near Coober Pedy.
- Improvement in gypsum and salt mining conditions due to increased evaporation.

3. What makes individuals, communities, and regions resilient to drought?

Community and stakeholders were invited to explore the characteristics which make individuals, communities and regions resilient to drought. Each of these scales of resilience are important to consider in a Regional Drought Resilience Plan. Commonly identified characteristics have been summarised in the following sections.

3.1 Individuals

Participants identified that characteristics that help individuals to be resilient to drought include:

Social characteristics	• Social connection and strong relationships with friends and family • Sharing your struggles with others, being willing to accept support and understanding that others are also doing it tough and that you are not alone • Good relationships with staff from support organisations including the Landscape Board, PIRSA, OCA, banks, counsellors etc. • A sense of purpose – employment, education, volunteering, family etc. • Experience from previous droughts, including passing this knowledge onto the next generation • Self sufficiency
First Nations cultural characteristics	• Being able to live and work on Country, access cultural heritage sites and share knowledge between generations • Landholders and communities having access to drought relief funding
Economic characteristics	• Good long-term business and financial planning and decision-making – ability to 'play the long game' and use the profits from good years to get through the bad years • Diverse sources of household income • Access to and awareness of financial support available
Environmental characteristics	• Managing total grazing pressure and undertaking sustainable land management
Agricultural characteristics	All economic and environmental characteristics as well as: • Innovation and implementation of new techniques, tools and technology • Understanding your country, your business and the local climate including the cyclic occurrences of drought

	• Having land outside of drought affected areas to agist stock • Infrastructure that reduces workload eg telemetry for stock water monitoring, grates instead of gates etc.
Assets and infrastructure characteristics	• Access to good education, healthcare and digital connectivity • Reliable water infrastructure that maximises water capture and minimises water loss • High quality housing with large rainwater tanks or bores and good thermal insultation

3.2 Communities

Participants identified that characteristics that help communities to be resilient to drought include:

Social characteristics	• Strong, connected, caring communities that help each other • Strong community organisations and volunteer base who are willing and able to put in the work for the benefit of their community • Proximity to regional centres with health, education and support services
First Nations cultural characteristics	• Good relationships between First Nations peoples, wider communities, and government agencies • Local employment opportunities that enable First Nations employment
Economic characteristics	• Diversification of local economies into tourism, mining, workers accommodation, goats, renewable energy etc. • Access to community grants and other funding • Investment in projects that give good return to the community and employ local people • Local employment opportunities that support people to stay in the community
Agricultural characteristics	• Pastoralists and farmers who are aware of how to minimise their environmental impacts • Uptake of new and improved technology and practises
Environmental characteristics	• Low populations of pest/overabundant animals through proactive management before drought • Maintainable public green spaces which improve amenity, wellbeing and tourism attraction

	• Good baseline native vegetation cover
Assets and infrastructure characteristics	• Local services including shops, medical facilities (including mental health and preventative health), tradespeople etc. • Reliable access to water, power, energy, digital connectivity and food • Community spaces that enable people to come together
Governance characteristics	• Support from external agencies in ways that meet the unique needs of each community

3.3 Regions

Participants identified that characteristics that help regions to be resilient to drought include:

Infrastructure characteristics	• Road and roadside infrastructure to support movement of stock, local travel and tourism (including sealed roads, toilets, rubbish bins, parking bays, showers etc.)
Economy characteristics	• Strong agricultural commodity market conditions
Governance characteristics	• Timely and localised government declaration of drought which can unlock funding and support. • Good communication and provision of information about available community grants and programs • Strategic and proactive preparation for drought - investing in good times to increase resilience during bad times • Coordinated services • Permanency of support staff to provide a sense of continuity and allowing trusted relationships to be built

4. What would help enhance drought resilience?

Community and stakeholders were asked to identify opportunities to help Outback SA people, communities and regions to enhance their resilience to drought. Commonly raised opportunities have been summarised by theme below.

4.1 Social and community opportunities

Community-centred opportunities were the most commonly raised at engagements across the region. It was felt that events, services, training and infrastructure that support the whole community and promote connection, wellbeing and positivity were among the best ways to improve drought resilience.

One participant from the Parachilna workshop shared that the *"highlight of the hay drop was the opportunity to come into town and talk with others"*. The opportunity to come together whatever the reason and socialise is highly valued by community during tough times and can provide benefits for townspeople as well as pastoralists.

Community focused drought resilience opportunities identified by participants included:

- Delivering or supporting free community events. This can include a mix of drought/mental health focused events and general events which promote positivity and community connection. Events across the year should be diverse with something to suit everyone. Examples include comedy, music, BBQs, sport events, training/counselling sessions, circus for kids, service fairs, Tasting Australia, quiz nights, kayaking, cricket and conversations, Christmas shows etc. It was emphasised that some communities prefer grants which allow them to run events their own way, while other communities prefer having events run for them to reduce burden on volunteers.
- Continuing to provide free mentoring, counselling, financial advice, training, and support services such as PIRSA Family and Business (FaB) mentors, Centrelink representatives, Mental Health First Aid Course, Are you Bogged Mate etc. Promote continuity of quality staff where possible to enable the formation of trusted relationships.
- Funding of infrastructure that benefits the whole community in the long term and is maintainable eg community halls, sporting facilities, irrigated green space etc.
- RFDS continuing to provide their services, including mental health (for men and women) and allied/preventative health, and preferably with continuity of staff who get involved in the local community.
- Training for volunteers on skills such as preparing grant applications, writing minutes, financial management, what resources are available, event management, digital literacy etc. Many participants identified that rather than general trainings, communities would benefit from tailored support that meets local needs and can help with answering individual questions. It was noted that upskilling community volunteers on a range of topics would help to combat overreliance on individual community members.

- Providing local jobs and education that allow local people to diversify their work and stay in the local community.
- Promote country life to encourage people to move to remote communities.

4.2 First Nations opportunities

First Nations participants identified the following opportunities for enhancing drought resilience:

- Engaging with First Nations peoples to understand what they need and what would help them.
- Support for land management including pest plant and animal control, water and erosion management
- Enhance the Outback community's awareness of cultural heritage values and support programs that build generational knowledge of cultural land management.

4.3 Governance and advocacy opportunities

Participants identified the following governance and advocacy-based opportunities for enhancing drought resilience:

- Delivering earlier and more locally nuanced official declarations of drought in South Australia was frequently identified across the region as critical to drought resilience for pastoralists. Participants identified that official drought declarations (which can unlock additional support) often come much too late in South Australia. Communities noted that New South Wales and Queensland properties have in the past received assistance earlier, while in the same or even better conditions than their South Australian counterparts. Participants emphasised the importance of ensuring drought declarations accurately reflect the conditions on the ground rather than being based on lines on a map.
- Engaging with communities to understand what they need and want, and delivering this in partnership with the community.
- Reducing red tape for community organisations and volunteers where possible. Consider providing funds to cover volunteer hours for community works, or providing greater OCA support for community organisations.
- Investing when times are good, including more grants and support for resilience building actions.
- Increasing visibility and accessibility to government agencies (eg PIRSA, OCA, RDA) in on-ground work in the regions, including more personal contact and relationships in the regions (not just in Port Augusta) and supporting continuity of staff where possible.
- Ensuring more long-term funding, review and improvement processes to ensure governance agencies learn from past experiences.
- Ensuring that money hits the ground in the regions/with community organisations, rather than being used up in government departments before it reaches local people.
- Better coordinating programs and funding from different agencies in the regions.
- Encouraging city-based volunteer groups to come into regional communities and help during drought times through for example running social events, assisting with weed management etc.

- Defining drought as a hazard in the State Emergency Management Plan.
- Developing a clear vision for the Outback SA region and each outback town.
- Partnering with mining companies to increase support for local communities in region.
- Providing more emergency services.

One participant from the Copley workshop said that "we *need the systems put in place by Government so that WE don't need to be so damn resilient*". This participant highlighted that the unique governance and infrastructure setting of the Outback makes it much more challenging for Outback SA residents to maintain high resilience as compared to other parts of SA and Australia. The lack of 'council' services, red tape associated with community organisations accessing many grants/support, lower energy, telecommunications and water security and ouitback road infrastructure are major barriers to drought resilience. Addressing these gaps and providing more services and infrastructure (or making it easier for Outback communities to do this for themselves) will reduce the burden on individuals to maintain a high level of individual resilience.

4.4 Economic opportunities

Participants identified the following economy-based opportunities for enhancing drought resilience:

- Providing community members with more accessible, quick, easy, streamlined personal/business financial supports during drought such as long-term low interest business loans, freight subsidies, fodder subsidies, water infrastructure rebates, supports similar to Job Keeper etc. with minimal red tape. Town residents may also need financial support, not just pastoralists, for example with cost of living (power and water costs).
- Providing more accessible, quick, easy, streamlined community grant opportunities. Where possible, provide grants that allow allocating funds for project management. Improve communication and awareness of available grants. Support community organisations with grant application writing.
- Continuing financial support after the drought breaks to help the region to recover and rebuild.
- Supporting households to diversify their incomes prior to drought, especially into industries that are not reliant on water (eg historical tourism, dark sky tourism, station stays, fossil tourism, cultural tourism, government based jobs or other work from home jobs).
- Mentoring/training to help individuals and businesses to understand their finances and businesses and what support is available.
- Increasing promotion and signage of outback tourism (separate from Flinders Ranges)
- Providing in-kind support such as hay drops, water truck donations etc.
- Better advertising of local jobs (eg health, education, NRM) to local people to enable people to diversity and stay in the region.

4.5 Infrastructure opportunities

Participants identified the following infrastructure-based opportunities for enhancing drought resilience:

- Improving road and roadside infrastructure for stock agistment, local travel and tourism. This may include sealing roads, better maintaining unsealed roads, and installing parking bays, toilets, showers and rubbish bins.
- Improving water security, including in Andamooka (certainty of water-carting service from the Roxby Downs-Andamooka pipeline to individual properties), Innamincka (back up groundwater bore for town water supply), Gawler Ranges (plastic lining catchments and bore drilling) Yunta and Copley.
- Funding upgraded or new community infrastructure that is maintainable, sustainable and provides a place for community connection and diverse uses (including community halls, sporting facilities, irrigated green space, community facilities with backup power generation etc.)
- Increasing local production and storage of renewable energy or otherwise improve energy security and reduce power outages (which also cut out water pumps, fridges, air conditioners, telecommunications etc.).
- Providing incentives for household solar generation and storage, energy and water efficient housing and rainwater tanks.
- Building more infrastructure to support tourism in towns including public toilets, showers, water (can be pay for use), shaded outdoor tables and chairs, campground facilities etc.
- Providing safe community spaces with backup power sources for community to go when the power goes out – with good thermal insulation, drinking water supply, air conditioning, fridges/freezers etc.

4.6 Agricultural opportunities

Participants identified the following agriculture-based opportunities for enhancing drought resilience:

- Providing greater support for agistment or destocking to assist moving stock off the land and preventing overgrazing.
- Support uptake of adaptive management practises to keep land in a good condition.
- Training pastoralists on new technology, land management processes, financial management and property planning etc. to increase their sustainability and resilience.
- Installing infrastructure that reduces workload eg telemetry to monitor water levels, stock grids to replace gates
- Providing a one-stop-shop website for pastoralists seeking information during/after drought, with registered stockists or providers for eg hay/stock etc.
- Delivering an individual farm assessment program which supports pastoralists to assess their drought preparedness and develop an improvement plan.
- Promoting the sustainability of red meat (green/blue tick or similar certified marking) to provide financial benefit for pastoralists using sustainable practises and increase recognition of pastoralists.

- Providing awareness raising, training and support for uptake of carbon farming, particularly in pastoral areas.
- Supporting long-term business/property/financial planning to help the benefit of good years allow farmers to get through bad years.
- Researching and trialling new and improved grazing and cropping land management practices.

4.7 Environmental opportunities

Participants identified the following environment-based opportunities for enhancing drought resilience:

- Managing total grazing pressure by controlling feral animals and over-abundant native species and stock access.
- Supporting landowners more with pest/overabundant native animal control.
- Undertaking landscape scale planning and management to support the condition and extent of native flora and fauna.
- Improving long-term monitoring of groundwater, native flora and fauna including during drought to increase knowledge of the impacts of drought on keystone species.
- Focusing conservation efforts during drought in areas which naturally have greater water flows.
- Supporting uptake of carbon farming through awareness raising and training.

4.8 Local opportunities

In each location where engagement was undertaken, key opportunities for the district were identified by participants.

Township	Key opportunities for enhancing local drought resilience
Yunta and district	• Low interest loans for pastoralists and farmers during drought. • Support with goat control. • Early declaration of drought. • Support that is easy and quick to apply for.
Andamooka and district	• Enhancing water security. • Support with grant writing.
William Creek and district	• Community events. • Growing tourism.

Township	Key opportunities for enhancing local drought resilience
Marree and district	• Supporting mental health through community events including ones run for them. • Better infrastructure in particular roads and roadside infrastructure. • Low interest long term loans. • Early and localised definitions of drought.
Copley and district	• Simple and quick community grant application processes, including grants that allow funding for project management time. • Better backup systems for power outages. • Training for community organisations to apply for and manage grants, events etc. • Genuine community engagement with all outback communities.
Parachilna and district	• Support with both time and money for community events. • Individualised training for communities to build their skills in their required skills eg grant applications, financial management, Centrelink applications etc. • Supporting people to stay in the region through better promotion of government jobs, local training opportunities, supporting kids through drought etc.
Innamincka and district	• Increased security of town water supply, for example a backup bore for emergency water supply. • Community events run for the community. • Greater support for landholder management of pest plants and animals. • Upgraded town tourism infrastructure including an outdoor table and chairs, upgraded campground facilities, upgraded septic system.
Oodnadatta and district	• • Support for community organisations • More community events and facilities for entire town.
Marla and district	• More SA Arid Lands Landscape Board events/support in the region including with pest control. • Support for pastoralists to implement technology such as telemetry.
Coober Pedy and district	• Addressing cost of living pressure to support people's resilience to drought, including support for housing insulation, power and water bills, energy efficient appliances etc.

Township	Key opportunities for enhancing local drought resilience
	• Community events for both townspeople and pastoralists. • Improving community facilities to be better equipped for hot weather.
Penong and district	• Continue to support community organisations to reduce workload on a small number of individuals, deliver benefits to the community and visitors, and maintain a sense of township vibrancy
Gawler Ranges district	• Advocacy for local wind farm to proceed. • Support with pest/overabundant native animal control (kangaroos, goats, emus). • Support for time involved in running community events. • Training programs/support for better land management practises, property management planning and carbon farming.

5. Regional characteristics

Through the engagement at each town throughout the region, it was clear that there are some strengths, weaknesses, challenges and opportunities that are consistent across Outback SA. However, it was also clear that each town has their own perspectives, priorities and needs. The vastness of the region means that there is significant regional variation.

It is important that the Outback SA Regional Drought Resilience Plan considers and works with the regional characteristics that are consistent across the region. It will also need to acknowledge and cater to regional differences where possible.

5.1 Consistent characteristics

Consistent characteristics that were identified across the Outback SA region included:

- A strong sense of community, identity and family.
- Recognition that living in the Outback means living with hot dry conditions and at times drought.
- High reliance on volunteers to "run" towns, with few traditional government services provided.
- Limited or unreliable provision of infrastructure and services compared to all other parts of South Australia, including infrastructure such as roads, telecommunications, town water supply, town power supply, community facilities etc. and services including health and education.. Reducing numbers of volunteers, and volunteer burnout – '*less and less people doing more and more*'.
- Ageing demographic and decreasing population (except in towns near regional centres).
- High vulnerability to changing commodity prices.
- Variability of rainfall – rainfall can be very localised, falling on only parts of a property or not on its neighbour.

5.2 Unique characteristics

While the majority of impacts, resilience characteristics and opportunities to enhance resilience were reflected across the region, each location in which workshops were undertaken identified particular aspects that were unique to their district. It is acknowledged many of these may also apply to other districts or towns.

Catering to local conditions is critical to effective drought resilience programs.

	Unique elements that emerged through the engagement
Yunta and district	• Water supply to the town is undrinkable (although currently being upgraded). • Limited tourism opportunities as Yunta is a 'pass through' town. Most tourism impacts are negative, including vandalism and stealing of water.

	Unique elements that emerged through the engagement
	• Close proximity to border – have often seen townships in NSW under similar drought conditions receive greater support and funding than them. • Currently high goat populations. • Medium population size. • Shallow aquifers on properties which have caused bores used for stock water to run dry in previous droughts.
Andamooka and district	• Potable town water supply through Roxby Downs – Andamooka pipeline, which is then carted to individual properties and into two town water tanks. • Close access to Roxby Downs services and infrastructure (downside of this has been the closure of local services such as a general stores and pubs). • Large town population (relative to other Outback SA towns). • Higher proportion of new residents than most other Outback areas. • Greater diversity of employment than many outback towns.
William Creek and district	• Reliable GAB bore water access. • Good town infrastructure (water, power, bituminised road, irrigated town trees, new RFDS facility with unique equipment such as dental equipment). • Strong tourism offering with large accommodation offering, aviation tourism, proximity to Lake Eyre, high amenity township. • Very small population base.
Marree and district	• Strong tourism offerings – close to Lake Eyre, Marree Man. • Medium population. • SA Water desalination plant currently being constructed to provide town water.
Copley and district	• Close access to services and facilities in Leigh Creek. • Desire to maintain unique persona as a separate town to Leigh Creek. • Medium population. • SA Water supplies treated groundwater to town.
Parachilna and district	• Small town and population. • Close to Flinders Ranges Council and associated services and facilities.

	Unique elements that emerged through the engagement
	• Popular tourism offerings (Prairie Hotel, Nilpena Ediacara National Park, station stays). •
Innamincka and district	• Causeway can cut access to township from Queensland when high flows in Coober Creek. • Coober Creek and associated planted greenery provides amenity and tourism opportunities. • Only fuel stop in vicinity so most tourists and trucks stop. • Very small population. • Town water supply from Creek when flowing and from town local aquifer at all other times.
Oodnadatta and district	• Medium population. • New SA Water desalination plant from GAB water. • Large Aboriginal population, governed by Dunjiba Community Council who provide a range of services and infrastructure.
Marla and district	• Small population. • Limited volunteer base. • New SA Water desalination plant.
Coober Pedy and district	• Very large population. • High levels of socio-economic disadvantage Opal mining supports industry and tourism. • Strong tourism operations, including access through public airport. • High cost of water and power, large proportion of poorly quality housing.
Penong and district	• Larger population. • Marginal cropping and sheep country • Relatively unimpacted by drought in recent years • Economic diversity, cash flow in good years and long-term business planning results in high baseline resilience to drought.

	Unique elements that emerged through the engagement
	• Range of water sources including rainwater tanks, shallow groundwater, and SA Water mains piped to 8km away from town (piped into football club and caravan park and carted to some other properties) • Proximity to Ceduna and associated services, facilities and employment.
Gawler Ranges region	• Very small, dispersed population. • More vegetation cover than the Far North, but less secure water, making lack of water a more influential driver for destocking. • Range of water sources including rainwater, dams, and shallow bores. • Proximity to Kimba and associated services and population. • Proximity to National Park results in high numbers of pest/overabundant native animals.

SHAPING
GREAT
COMMUNITIES

URPS