

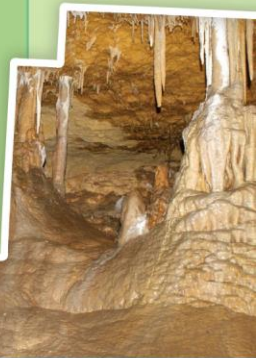


# LIMESTONE COAST

REGIONAL CLIMATE  
CHANGE ADAPTATION  
PLAN PROJECT

REGIONAL VALUES  
AND CLIMATE CHANGE  
REPORT

May 2015



# Regional Values and Climate Change Report

## Limestone Coast Regional Climate Change Adaptation Plan Project

**Lead Consultant** URPS

**In association with** Seed Consulting Services

**Prepared for** Regional Development Australia Limestone Coast, South East Local Government Association and the South East Natural Resources Management Board

**Consultant Project Manager** Nicole Halsey, Director  
Suite 12/154 Fullarton Road  
(cnr Alexandra Ave)  
Rose Park, SA 5067  
Tel: (08) 8333 7999  
Email: [nicole@urps.com.au](mailto:nicole@urps.com.au)  
Website: [www.urps.com.au](http://www.urps.com.au)

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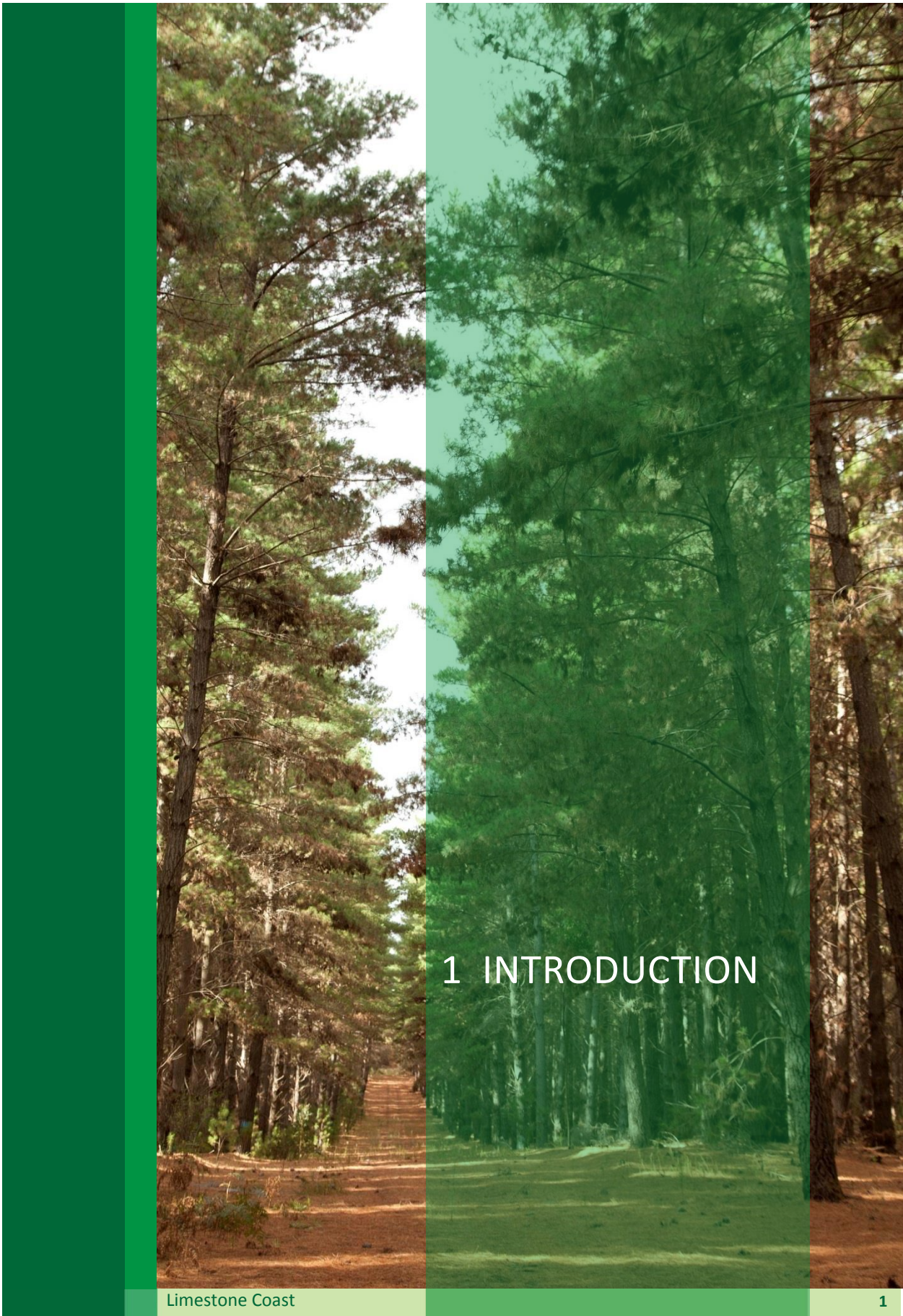
Limestone Coast (2015) Regional Values and Climate Change Report, prepared by URPS as part of the consultancy led by URPS for the Limestone Coast Regional Climate Change Adaptation Plan Project

## Contents

1	Introduction	1
1.1	Role of this report	3
2	Regional values for the Limestone Coast	4
2.1	The values based approach	5
2.2	Identifying the regional values	5
3	Climate change projections	8
4	Regional values and the changing climate	11
4.1	Overview of the Limestone Coast Region	12
5	Caring for the natural environment	15
5.1	Existing conditions	16
5.2	Sensitivity to climate factors	23
5.3	Adaptive capacity	23
6	Looking after our land	25
6.1	Existing conditions	26
6.2	Sensitivity to climate factors	30
6.3	Adaptive capacity	30
7	Management of water resources	31
7.1	Existing conditions	32
7.2	Sensitivity to climate factors	35
7.3	Adaptive Capacity	35
8	Community participation	37
8.1	Existing Conditions	38
8.2	Sensitivity to climate factors	40
8.3	Adaptive capacity	41
9	Quality of life, wellbeing and services	42
9.1	Existing conditions	43
9.2	Sensitivity to climate factors	55
9.3	Adaptive capacity	56

10	A diverse and productive regional economy	58
10.1	Existing conditions	59
10.2	Sensitivity to climate factors	64
10.3	Adaptive capacity	66
11	Regional identity and governance	68
11.1	Existing conditions	69
11.2	Sensitivity to climate factors	72
11.3	Adaptive capacity	73
12	Next steps	75
	References	77
	Appendix A	79





## Introduction

The Limestone Coast Regional Climate Change Adaptation Plan project (the project) is a collaboration between Regional Development Australia (RDA) Limestone Coast, the South East Local Government Association (SELGA) and the South East Natural Resources Management (SENRM) Board and the stakeholders and communities that live and work in the Limestone Coast Region to actively plan for changes in climate.

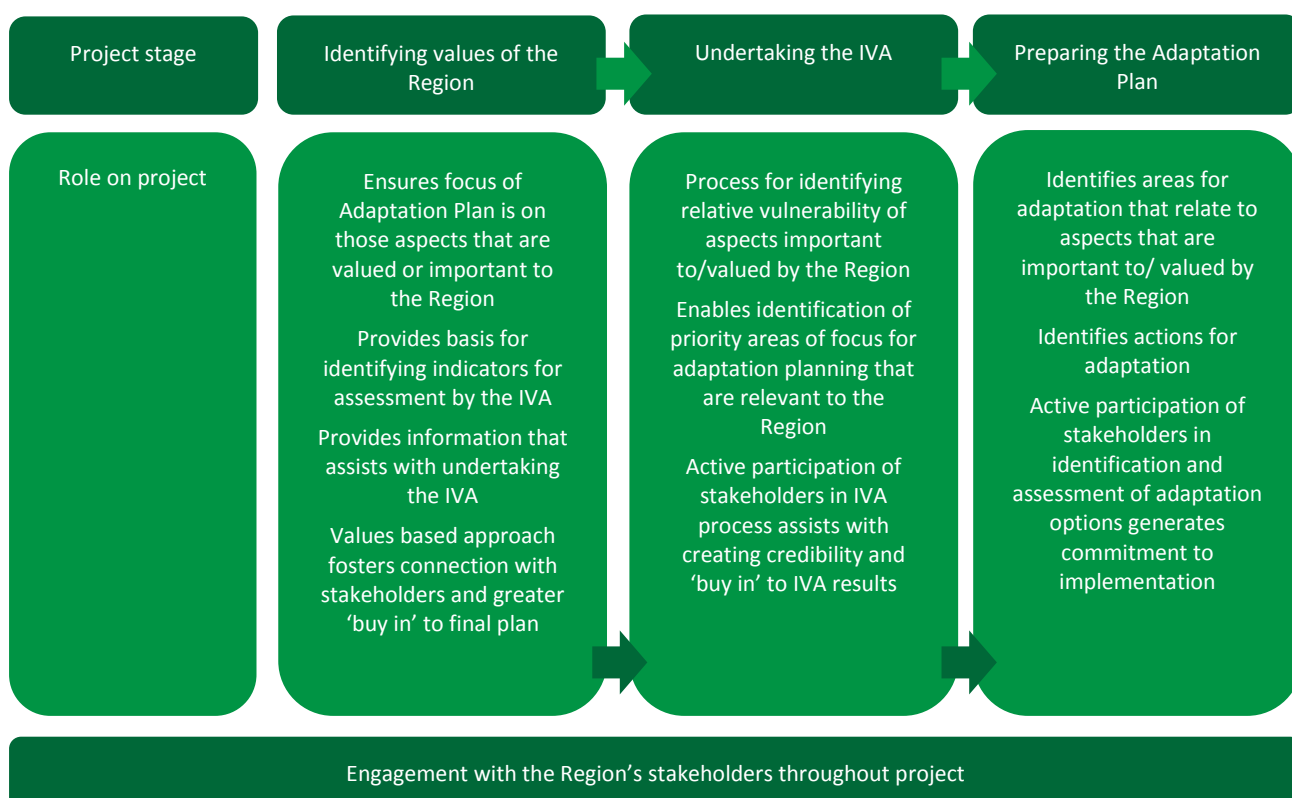
The Limestone Coast Region (the Region) comprises the seven Local Government Areas (LGAs or Councils) of Grant, Kingston, Mount Gambier, Naracoorte Lucindale, Robe, Tatiara and Wattle Range.

This project is being undertaken over the following three key stages:

- Identifying values of the Region - this stage involves identifying what is valued or important to the Region and documenting aspects or features that contribute to these values
- Undertaking the Integrated Vulnerability Assessment (IVA) - this stage involves considering the implications of climate change on what is valued in the Region and determining those aspects that are more vulnerable to a changing climate than others
- Preparing the Adaptation Plan - this stage involves identifying adaptation actions to respond to vulnerabilities of those aspects that are valued.

Figure 1.1 summarises the approach to the project and the role of each stage.

*Figure 1.1 Summary of approach to the project.*



## 1.1 ROLE OF THIS REPORT

This Regional Values and Climate Change Report is the culmination of the first stage of work and will underpin the subsequent IVA and Adaptation Plan stages.

This report sets out:

- The values that have been developed via the review and synthesis of a wide range of existing information relating to the Limestone Coast and tested and refined through targeted consultation with stakeholders from the Region (refer section 2)
- A high level summary of the future climate projections that will inform the assessment of the Region's vulnerability to climate change (refer section 3)
- A profile of the Limestone Coast's key characteristics relevant to the identified regional values, and preliminary consideration of sensitivity and adaptive capacity in relation to climate change.

This information regarding regional values, together with the climate projections and the profile of the Region will assist in the assessment of the Region's vulnerability in the next stage of the project. In particular it will be used to identify those aspects, or 'indicators' to be assessed by the IVA in stage two of the project and provide information that will assist in completing the assessment process.





## 2 REGIONAL VALUES FOR THE LIMESTONE COAST

# Regional Values for the Limestone Coast

## 2.1 THE VALUES BASED APPROACH

A values based approach has been used to frame this project to ensure that the Regional Adaptation Plan is focussed on those aspects that are valued or important to the Region. Supported by research and practice<sup>1</sup>, identifying and connecting with people around values supports both meaningful action and development of practical and relevant adaptation measures. It can also foster connection and greater 'buy in' to the Regional Adaptation Plan which in turn can aid effective implementation.

## 2.2 IDENTIFYING THE REGIONAL VALUES

As an initial stage of this project a set of regional values were identified. Recognising that there is already a wide range of information, reports and research relating to the Limestone Coast Region that articulates the characteristics of the Region, what is important and values and visions for the future, this existing information was reviewed and synthesised (refer Appendix A for list of documents reviewed).

Based on this review process, eight draft regional values were identified. To ensure that this set of regional values was robust and relevant to the Region, targeted stakeholder consultation was undertaken to test and refine the identified regional values. This consultation also provided the opportunity to identify what particular aspects or features contribute to the values.

As a result of the consultation, a number of changes were made resulting in seven regional values being identified for the Limestone Coast. These values, along with a list of the features and aspects that contribute to them, are shown in Table 2-1.

Table 2-1 *Regional values*

Regional Values	Features/Aspects that contribute to the achievement of the value	Description
<i>Caring for the natural environment</i>	Remnant vegetation Habitat diversity Water bodies and water dependent ecosystems Caves, sinkholes and limestone environments Coastal biodiversity and near shore environments Commercial fishing Coastal fishing and recreation Spiritual values of coastal areas Conservation and Marine parks Indigenous use of natural resources	We value the Region's natural environment and recognise their intrinsic, spiritual, economic, ecological and recreational value.
<i>Looking after our land</i>	Sustainable land management Soil fertility and productivity Primary production land uses	We value our fertile land and care for it because we understand how important it is to primary production in the Region.

<sup>1</sup> Resilient South (2013) Social & Institutional Mechanisms for Transitioning to Resilient Practices

Regional Values	Features/Aspects that contribute to the achievement of the value	Description
<i>Management of water resources</i>	Groundwater Wetlands, lakes, lagoons, swamps, floodplains Groundwater Dependent Ecosystems Habitat provision Irrigated agriculture, horticulture and viticulture Drainage and surface water Water quality Wastewater treatment Stormwater harvesting Iconic sites (e.g. Blue Lake, Bool Lagoon, Piccaninnie Ponds and Lake Bonney)	The Region's water resources are vital to our regional economy. We manage our water resources so we can sustain our natural environments and grow our Region's economy. We recognise the cultural and spiritual importance of water resources to many people in the Region.
<i>Community participation</i>	Empowered communities Active groups, clubs and organisations Structured support for community involvement Volunteer ethos Creativity, arts, festival and events Participation in decision making Participation in NRM	We value active participation in community life, which is a strength of small and large towns in the Limestone Coast.  We value involvement in decision making which leads to good interaction between the community and Governments.
<i>Quality of life, wellbeing and availability of quality services across the Region.</i>	Community wellbeing Quality of life Education Health services Community facilities Ability to access services Older people Youth Recreation Cultural diversity Vibrant town centres/ main streets Different towns with different character Heritage conservation Rural atmosphere	We value our high quality of life, the health and wellbeing of our community and the ability to access quality services locally.  We value the distinct character of different parts of the Region and the diversity of our people and communities.
<i>A diverse, modern and productive regional economy</i>	Diversity in the local economy Primary production and value adding activities Premium food and wine Fishing and aquaculture Tourism attractions-Blue Lake, caves and sinkholes, wetlands, coastal tourism (fishing, crayfish, diving) driving routes, (heritage and Pilgrimage tourism)	We value the range of activities we have undertaken historically in the Region such as agriculture, fisheries, forestry, food and wine and embrace new opportunities that will diversify and strengthen our economy into the future.  We value tourism that showcases our natural and cultural assets, and adds value to a range of industries.



Regional Values	Features/Aspects that contribute to the achievement of the value	Description
<i>Regional identity, collaboration, good governance and financial sustainability</i>	South East/Limestone Coast identity Regional spirit Regional projects Collaboration and partnerships Leadership Service levels Infrastructure/ asset management Community expectations Financial stability and sustainability	<p>We value our regional identity. We are proud of the way we use initiative and creativity, and how we work together as a Region.</p> <p>We value good governance, and the delivery and management of infrastructure and services in ways that are financially sustainable and meet community expectations.</p>



3 CLIMATE  
CHANGE  
PROJECTIONS

## Climate Change Projections

Stage two of this project involves undertaking an IVA to identify areas which are vulnerable to the impacts of climate change. A key input to the IVA is the set of climate variables which are used in this assessment process.

Climate variables describe various aspects of the future climate such as:

- Average annual maximum and minimum temperatures
- Temperature at different times of the year e.g. summer versus winter
- Frequency and intensity of heatwaves
- Quantity and seasonality of rainfall
- Intensity of extreme rainfall events
- Frequency and intensity of extreme fire danger days
- Sea level rise.

Climate variables will differ depending on a range of factors including which climate model, concentration pathway (previously referred to as emissions scenario) and timeframe for the concentration pathway are selected.

The Project Steering Group for this project considered the range of projections that could be used and has chosen to base the identification of climate variables on data from the median model outputs to 2070 under an intermediate (emissions) concentration pathway (RCP4.5). A full description of the climate projections developed for this project are documented in the Climate Projections Report<sup>2</sup> and will be used in undertaking the IVA in stage two.

The changes in climate projected for the Limestone Coast are summarised below and in Table 3-1:

- While there is natural variability in the climate of the Limestone Coast region, climate change will create a different future climate with warmer and drier conditions
- Median annual maximum temperature is projected to increase from baseline conditions by 1.1°C by 2050 and 1.4°C by 2070 under the intermediate concentration pathway, while extreme heat could increase from 21 days per year over 35 °C to 31 days per year by 2070 under the intermediate concentration pathway
- Rainfall is projected to decline by 4.8% and 6.8% compared with baseline conditions by 2050 and 2070, respectively, under the intermediate concentration pathway
- Fire risk and extreme rainfall events are projected to increase in intensity in the coming century
- Sea levels are projected to rise
- Keith will experience a climate more similar to Kadina or Streaky Bay by 2090 under an intermediate concentration pathway and Mt Gambier will be more similar to Penola or Wangaratta under the same condition.

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<sup>2</sup> Limestone Coast (2015) Climate Projections Report, prepared by URPS and Seed Consulting Services as part of the consultancy led by URPS for the Limestone Coast Regional Climate Change Adaptation Plan Project

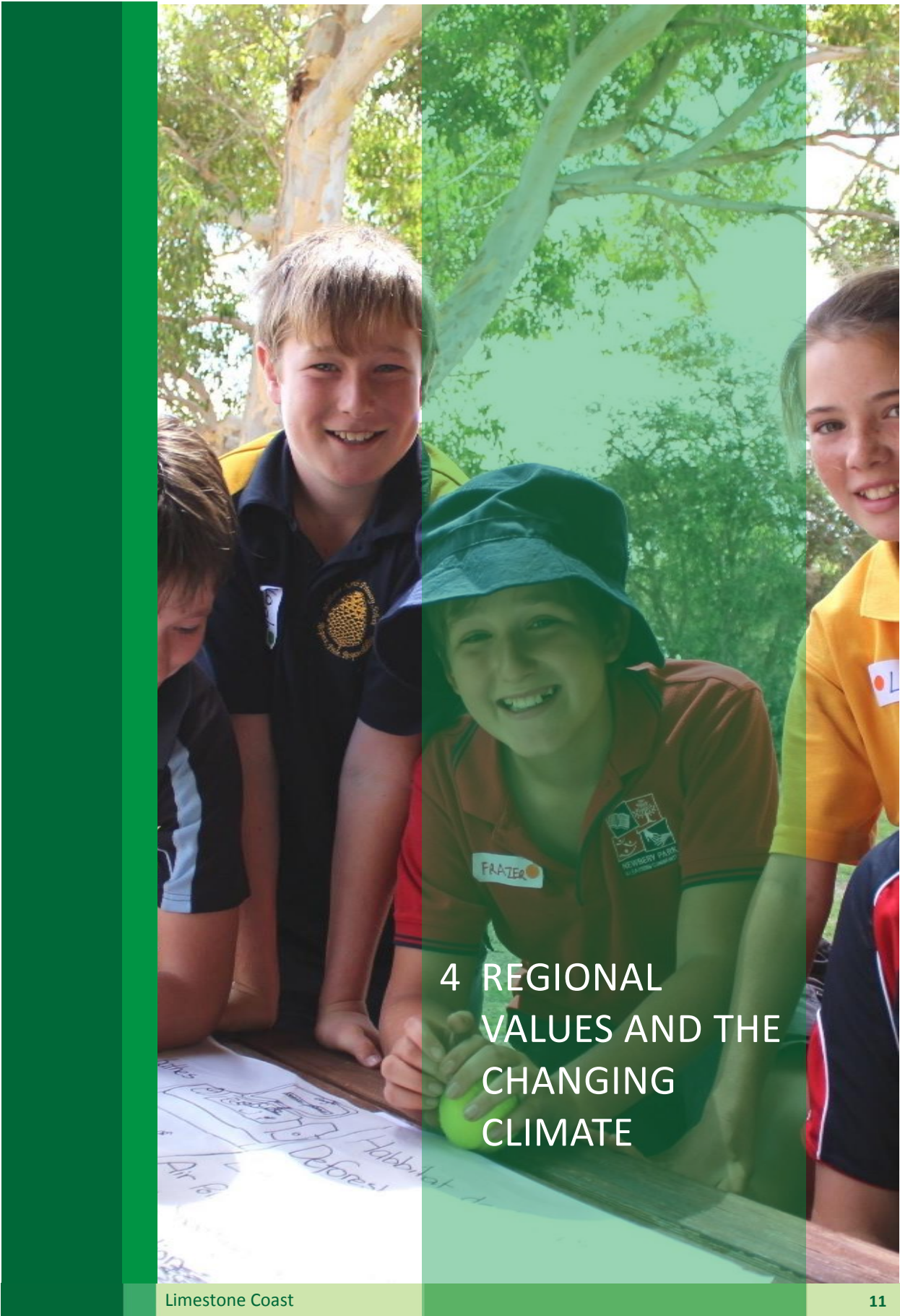
*Table 3-1 Exposure of the Limestone Coast to potential climate hazards based on an intermediate (emissions) concentration pathway (RCP4.5) to 2070<sup>3</sup>*

Climate hazard	Exposure of the Limestone Coast
Maximum temperature	1.4°C increase in annual median maximum temperature 1.1°C increase in annual median minimum temperature
Increasing frequency, intensity and duration of heatwaves	<u>Keith</u> 48% increase in median number of days over 35°C per year 113% increase in median number of days over 40°C per year <u>Mt Gambier</u> 75% increase in median number of days over 35°C per year 100% increase in median number of days over 40°C per year
Rainfall	6.8% reduction in median annual rainfall 17% reduction in median spring rainfall
Rainfall intensity	5% increase in annual maximum 1-day precipitation
Increasing fire risk	<u>Mt Gambier*</u> 36% increase in severe fire risk days 15% increase in general fire weather
Rising sea level	30-40 cm rise in sea level at Victor Harbor
Sea surface temperature	1.2°C increase*
Ocean pH	0.15-0.32 decline in pH units*

\*Based on 2090 projections

<sup>3</sup> Further details on the range of projections are contained in the Climate Projections Report. Unless stated otherwise, data are at the regional scale





## Regional Values and the Changing Climate

The following Sections 5 to 11 of this report have been developed as a source of information to assist with the completion of the IVA, which in turn will form the basis of the Regional Adaptation Plan.

Information within these sections will support key aspects of the IVA including the selection of indicators against which to assess vulnerability, and consideration of the sensitivity and adaptive capacity of the Region in relation to those indicators.

The following sections are structured around the following regional values that have been identified for the project (refer Section 2):

- Caring for the natural environment
- Looking after our land
- Management of water resources
- Community participation
- Quality of life, wellbeing and availability of quality services across the Region
- A diverse, modern and productive regional economy
- Regional identity, collaboration, good governance and financial sustainability.

Along with a description of the value, the following information is presented in relation to each of these values:

- A summary of existing conditions and key characteristics of the Region that contribute to the value
- Potential sensitivity of key regional characteristics to future climate factors (refer Section 3)
- Characteristics that contribute to adaptive capacity.

In this context, sensitivity describes how something is affected either adversely or beneficially by climate variability or change (as described in Section 3), and adaptive capacity describes the ability to adjust to climate change impacts, moderate potential damages, take advantage of opportunities, or cope with consequences.

Along with baseline data that describe key characteristics of the Region, the following sections provide discussion to inform more detailed consideration of sensitivity and adaptive capacity that will occur in collaboration with stakeholders in the next stage of the project.

### 4.1 OVERVIEW OF THE LIMESTONE COAST REGION

The Limestone Coast Region comprises the City of Mount Gambier, District Councils of Robe, Kingston, Grant and Tatiara, Naracoorte Lucindale Council and Wattle Range Council.

The Region is bounded by the Murray and Mallee Region to the north and the Victorian State border to the east.

Table 4-1 provides a summary of key aspects and features of the Limestone Coast Region which are more fully documented and discussed in sections 5 to 11 of this report.



Table 4-1 Summary of key aspects and features of the Limestone Coast Region

Key aspects and features	Limestone Coast Region
Total population (2011)	65,000 or nearly 4% of the State's total population and 22% of the State's regional population The City of Mount Gambier has the largest population with around 26,000 people or 40% of the Region's population The District Council of Robe is the smallest with 2% of the population
Township populations (2011)	Mount Gambier – 25,000 Naracoorte – 4,908 Millicent – 4,798 Bordertown – 2,549 Kingston – 1,612 Penola – 1,337 Keith – 1,069 Robe – 1,018 Port MacDonnell – 650 Beachport - 382
Total land area	2,135,000 hectares
Land uses	Predominantly Primary Production (88%), followed by Residential (2.6%)
Regional Economic Product	\$3.4 billion
Key economic sectors	Agriculture, forestry and fishing contribute 31% to gross regional product Manufacturing contributes 12% to gross regional product
Key employment sectors	Agriculture, forestry and fishing provides over 6,000 jobs (or 20% of jobs) in the Region Manufacturing sector provides 4,000 jobs Retail trade provides 3,800 jobs Construction 2,400 jobs Health and social assistance 3,100 jobs
Attractions, events and activities	Over 600,000 visitors to the Region each year Diversity of cultural activities, celebrations, events and festivals of local, regional and State significance Key tourism destinations such as the Blue Lake, Naracoorte Caves, Tantanoola Caves, Bool Lagoon, Coorong, Coonawarra, Wrattenbully and Padthaway wine regions, Penola and its association with Mary MacKillop, conservation parks Coastal towns such as Robe, Port MacDonnell and Beachport
Community health	Generally lower rates of fair or poor self-assessed health than for the State Mount Gambier and Wattle Range Councils have slightly higher rates of fair or poor self-assessed health
Income, higher education and socioeconomic disadvantage	Median household income varies across the Region All Council areas are below State average apart from District Council of Grant Levels of higher education are well below State average

Key aspects and features	Limestone Coast Region
Demographic characteristics	<p>Demographic diversity across the Region</p> <p>Median age is above State average</p> <p>Proportionally more children (especially aged 5-14 years)</p> <p>Proportionally fewer people aged over 75 years</p> <p>Proportionally fewer younger adults aged 20-25 and 25-34 years.</p> <p>The Region has proportionally more people in the age groups nearing early retirement (55-64 years) and retirement (65-74 years).</p>
Community participation	<p>There are a range of opportunities for community members to connect, contribute and participate including involvement in decision making via consultation processes, participating in community activities and events, volunteering, helping others and learning.</p> <p>28% of the community volunteer which is higher than for the State (20%)</p>
Mobility	<p>76% of households own two or more cars compared to Statewide figure of 52%. Mount Gambier has the lowest rate of car ownership, with 50% of households owning two or more vehicles, and Grant has the highest at 76%.</p> <p>The high rates of car dependency reflect the large distances between townships in the Region, and the relatively limited availability of public transport, both within and between urban centres and townships</p>
Infrastructure and services	<p>Diversity of infrastructure and services underpin the Region's community and economy. They are fundamental to the provision of essential services such as utilities, and contribute significantly to the creation of jobs, the facilitation of commerce and quality of life</p>
Water resources	<p>Surface water resources include creeks, wetlands and lakes</p> <p>Groundwater resources in shallow (unconfined) and deep (confined) aquifers support a range of water dependent ecosystems including swamps and wetlands and provide water for human consumption, industry and agriculture</p>
Remnant native vegetation	15% of the Region or 310,844 hectares
Coastal area	32,659 hectares of Coastal Conservation zoning
Features of international significance	<p>Bool and Hacks Lagoon and Coorong (RAMSAR listed wetlands of international significance)</p> <p>Naracoorte Caves (World Heritage site)</p>
Marine Parks	Upper South East and Lower South East Marine Parks





## 5 CARING FOR THE NATURAL ENVIRONMENT

## Caring for the Natural Environment

<b>Description</b>	We value the Region's natural environment which includes coastal systems, mallee scrubland, wetlands and woodlands and recognise their intrinsic, spiritual, economic, ecological and recreational value.
<b>Features/aspects of the natural environment we value in the Limestone Coast</b>	Remnant vegetation Habitat diversity (mallee, wetlands, woodlands, forest, heath, scrubland) Wetlands (coastal and inland) Groundwater dependent ecosystems Coastal and near shore marine environments Limestone caves and sinkholes Commercial and recreational fishing Amenity and recreation Spiritual and cultural values of natural areas Conservation and Marine Parks Community involvement Sustainable land management Pest management

### 5.1 EXISTING CONDITIONS

The diverse natural environment of the Limestone Coast Region includes wetland, mallee, woodland, forest and heath habitats within coastal and terrestrial settings as well as coast and marine environments. These environments provide habitat for a diverse range of plants and animals including many of State and National conservation significance.

The Region's natural features provides a range of ecosystem services including storage of carbon, pollination, support of people's cultural and spiritual needs, regulation of climate, water filtration, provision of shade and shelter and prevention of soil erosion. These crucial services support local industries in particular agriculture, and benefit the community.

Highly valued areas include:

- Coastal sites such as the lower Coorong, Little Dip, Beachport and Canunda Conservation Parks
- Limestone Sinkholes and Caves, such as Naracoorte Caves and Tantanoola Caves
- Wetlands and water bodies, including Piccaninnie Ponds, Ewen Ponds, Bool and Hacks Lagoons and Blue Lake
- Upper South East and Lower South East Marine Parks that protect endangered species and support the rock lobster and abalone industries
- Mallee scrub, such as that preserved in Ngarkat Conservation Park.

Biodiversity describes the range of plants, animals and micro-organisms and the ecosystems within which they occur. The Region is part of Australia's 15 National 'Biodiversity Hotspots'. With adjoining areas to the east (in Victoria), the coastal and inland wetlands provide habitat for numerous species of conservation significance. The internationally significant Ramsar listed Coorong and Bool Lagoons as well as numerous other wetlands are



significant sites for migratory waterbirds including a large number that are listed under international migratory bird agreements.

The Region is home to numerous bird, mammal, reptile, frog and fish species of conservation significance. Some of these species including the Red Tailed Black Cockatoo (*Calyptorhynchus banksii graptogyne*), Mallee fowl (*Leipoa ocellata*), Mallee Emu-wren (*Stipiturus mallee*), Southern Bell Frog (*Litoria raniformis*), and Southern Brown Bandicoot (*Isodon obesulus obesulus*) have Recovery Plans which aim to coordinate conservation efforts. Many wetlands and water bodies in the Region are significant sites for migratory water birds, many of which are listed under international agreements including the Japan Australia Migratory Bird Agreement (JAMBA) and CAMBA (China Australia Migratory Bird Agreement).

The high biodiversity of the region is attributed to its position in the landscape as a transition zone between the temperate climate of the south and the more arid landscape of the north. This means that many species of plants and animals that are adapted to one or other of these extremes are found at the western, southern or eastern limits of their natural range.

The habitat and biodiversity of the Region have been significantly altered from its pre-European state with 310,844 hectares of remnant native vegetation remaining, covering 15% of the Region's land area.

Vegetation communities in the Region range from woodlands and forests, dry heathlands and mallee, to open water swamps and wetlands and rising springs. Table 5-1 shows the general form of remnant vegetation that exists in the Region. As occurred across South Australia, native grasslands were preferentially cleared for agriculture and now comprise a very small proportion of remnant vegetation. The Biodiversity Plan for the South East of South Australia<sup>4</sup> describes 27 vegetation communities in the South East including the EPBC listed endangered *Eucalyptus microcarpa* (Grey Box) Grassy Woodland and *Allocasuarina luehmannii* (Buloke) Woodland. The most common remnant native vegetation communities across the Region are:

- Ridge-fruited Mallee (*Eucalyptus incrassate*) mallee heath
- Brown Stringybark (*Eucalyptus baxteri*), Sand Stringybark (*E. arenacea*) and Messmate Stringybark (*E. obliqua*) woodland
- Pink Gum or Hill Gum (*E. fasciculosa*) woodland

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<sup>4</sup> South East Natural Resources Management Board(2010) *SE NRM Plan Part One: Regional Description*

*Table 5-1 Vegetation Type (Source: Native vegetation (floristic) Statewide spatial dataset, DEWNR, 2014).*

General form	Area (ha)	% of all native vegetation
Shrubland >1m	116,683	37.5%
Woodland	103,978	33.5%
Mallee woodland	39,627	12.7%
Mallee forest	17,912	5.8%
Unclassified	14,255	4.6%
Sedgeland	12,703	4.1%
Shrubland <1m	2,671	0.9%
Fernland	1,686	0.5%
Forbland	828	0.3%
Grassland	487	0.2%
Forest	14	0.0%
<b>Grand Total</b>	<b>310,844</b>	<b>100.00%</b>

34% of remnant native vegetation is located within Department of Environment, Water and Natural Resources (DEWNR) parks and reserves and 13% occurs on land protected by Heritage Agreements, with the remaining 48% on roadsides and private land (see Table 5-2 and Map 1). With such a high proportion of the Region's native vegetation on road reserves and private land, the role of local government and private land owners is critical to the conservation of native vegetation. Native vegetation on private land or on road reserves is protected under the *Native Vegetation Act* but may not be managed with conservation objectives as the primary driver for action as on DEWNR Parks and Reserves.

*Table 5-2 Location of Native Vegetation (Source: Native vegetation (floristic) Statewide spatial dataset, DEWNR, 2014).*

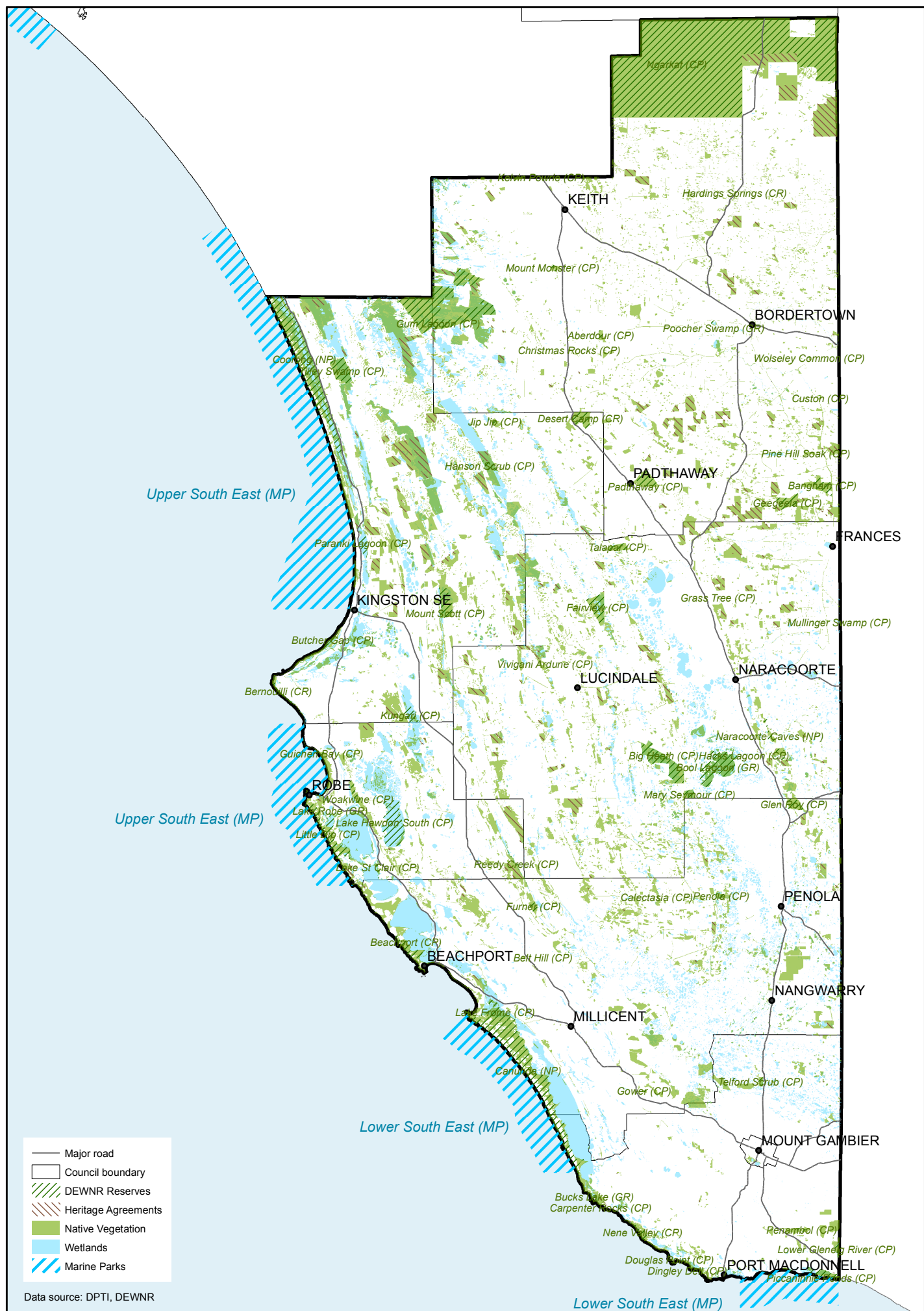
Location of native vegetation	Area (ha)	% of all Vegetation
DEWNR Parks and Reserves	105,236	34%
Other State government reserves	14,322	5%
Local Government land (not includes road reserves)	1525	0.5%
Heritage Agreements	41,752	13%
Road reserves and privately owned land	148,008	48%
<b>TOTAL</b>	<b>310,844</b>	<b>100%</b>



The 10 largest DEWNR Parks and Reserves in the Region are shown in Table 5-3.

*Table 5-3 DEWNR Parks and Reserves in the Limestone Coast*

DEWNR Parks and Reserves	Area (ha)
Ngarkat (CP)	63,771
Canunda (NP)	9571
Coorong (NP)	9014
Gum Lagoon (CP)	8907
Lake Hawdon South (CP)	3172
Bool Lagoon (GR)	3092
Big Heath (CP)	2487
Little Dip (CP)	2149
Tilley Swamp (CP)	1513
Fairview (CP)	1413



Map 1 Natural Environment - Limestone Coast

Table 5-4 shows native vegetation cover by Council area. This data shows that the Kingston and Tatiara Councils have the greatest proportion of native vegetation.

*Table 5-4 Native Vegetation by Council area (Source: Native vegetation (floristic) Statewide spatial dataset, DEWNR, 2014).*

Council area	Area of native vegetation (ha)	% of total Council area
City Of Mount Gambier	135	4%
DC Of Robe	15,577	14%
Kingston DC	68,714	21%
Naracoorte Lucindale Council	48,458	11%
Tatiara DC	128,244	20%
The DC Of Grant	9,685	5%
Wattle Range Council	40,029	10%
<b>Grand Total</b>	<b>310,844</b>	<b>15%</b>

The coast is an important component of the Region's natural environment, with the largely undeveloped coast valued for the social, economic and conservation significance. Key features of the coast include:

- Sandy bays
- Vegetated and actively mobile sand dune systems
- Cliffs, headlands and extensive offshore and nearshore reefs
- Sand and cobble beaches
- Low coastal plains backed by dune ridges and underground water and inland flood fed swamps, ponds and lakes
- Lagoon and saline mudflats backing the sand dunes of the southern Coorong.

The Region contains a number of coastal conservation parks that protect wetlands, dunes and coastal ecosystems of international significance, and provide a breeding area for a range of Australian and migratory birds. In addition, Council Development Plans protect land along the coast through Coastal Conservation Zoning, which covers an area of 32,659ha (refer Map 2). The Wattle Range Council has more than 13,000ha of land in Coastal Conservation Zones, with nearly 9,500ha in Kingston, 5,329ha in Robe and 4,630ha in Grant.

The coast is of high cultural significance to the Region's indigenous people, providing food, shelter, medicines and cultural items. The coast is also a major recreational destination, valued for fishing, diving, surfing and camping.

Offshore, the Upper South East and Lower South East Marine Parks protect marine biodiversity and breeding grounds for the economically important rock-lobster and abalone industries. The Marine Parks protect the feeding grounds for the endangered pygmy blue whale, thought to have only 1,200 left in the world and South Australia's only kelp forest.



Map 2 Coastal Zones - Limestone Coast

## 5.2 SENSITIVITY TO CLIMATE FACTORS

The Region's natural environment is sensitive to changes in climate and all of the projected climate changes including increased average annual and seasonal temperatures, increased frequency and intensity of heatwaves, reduced annual and seasonal rainfall, increased intensity of extreme rainfall events, increased number of days of extreme fire danger days and sea level rise, and are likely to result in changes in the condition of natural features.

Individual species will exhibit different sensitivities to different climate hazards, depending on their physiological sensitivities, habitat requirements, and movement abilities. Species that rely on a specific and less wide-spread habitat will be particularly sensitive to climate hazards, particularly if such hazards negatively impact the condition or extent of their required habitat or resources. For example, freshwater fish that are sensitive to changes in water depth or salinity may be more sensitive than fish that can withstand more saline conditions. Similarly different habitats will show different sensitivities to changes in climate, depending on their sensitivities to changes in hydrological regime and other disturbances including pest plants and animals, wind or water erosion and bushfire.

Changes in temperature, rainfall, fire, sea level and ocean conditions may result in the following:

- Altered breeding times and changed growth of native plants, changing ecosystem structure and the diversity and extent of suitable climate conditions (in particular where species are already occurring near the limit of their natural range)
- Increased bushfire intensity and frequency, altering vegetation community structure, capacity for natural regeneration, seed germination, habitat availability and water quality (surface and groundwater)
- Changes in rainfall and temperature patterns, making conditions more suitable for both existing and new incursions of pest plants and animals
- Altered rainfall and runoff, changing surface water flows, salinity of wetlands, reducing groundwater recharge and impacting water depending ecosystems
- Sea level rise and storm surge combining to increase the risk of coastal erosion, of particular concern where erodible limestone cliffs occur near coastal settlements
- Changes in ocean temperature and acidity impacting marine food webs and biodiversity.

The potential impacts of climate change on the natural environment are likely to have flow-on effects to the other sectors (social and economic) as a result of the ecosystem services they provide, their contribution to the regional economy, as well as aesthetics, amenity and lifestyle, making the Limestone Coast a desirable place to live.

## 5.3 ADAPTIVE CAPACITY

The adaptive capacity of the natural environment varies between features depending on their location and value placed on protecting and maintaining them. The inherent adaptive capacity refers to the natural ability of a feature to adapt, and can include evolutionary mechanisms and processes that allow species or processes to continue under different climatic conditions. Adaptive capacity relating to natural systems also refers to the planned human measures that may be undertaken and include management programs for pest control, water allocation or expansion of habitat conservation areas.

Some features, such as coastal shrubland or heath, have higher inherent adaptive capacity in some locations as a result of the relatively undeveloped environment they occur within and the ability of the vegetation to migrate inland without the barriers of urban development as occurs in more populated areas. The rate of climate change will be a key factor in determining how successful this adaptation may be. Landholders, both private and public will need to understand how migration might occur and what they can do to enable this natural adaptation to occur.

Other features such as species living in wetlands and water dependent ecosystems have lower inherent adaptive capacity as they rely on rainfall or recharge to maintain their environment in the condition they require for breeding.

Activities undertaken that contribute to the adaptive capacity of natural features across the Region include:

- A range of not for profit and volunteer based organisations such as Landcare and Friends of Parks groups that support on-ground works, such as revegetation, fencing and pest animal and plant control
- Management plans for DEWNR and Council parks and reserves that aim to maintain and improve their condition
- Regional Natural Resources Management Plan and sub-regional planning process
- Regional Action Plans for threatened species and ecological communities
- The South East Strategic Biodiversity Corridor Project which aims to reconnect isolated remnant vegetation in through revegetation of strategic corridors
- Research and knowledge regarding the Region's biodiversity, its threats and appropriate managements responses that can contribute to climate change adaptation
- Coastal conservation zones within Development Plans
- Fire management planning undertaken by DEWNR and local Councils.





## Looking after our land

<b>Description</b>	We value our fertile land and care for it because we understand how important it is to primary production in the Region.
<b>Features/aspects of our land that we value in the Limestone Coast</b>	Sustainable land management Soil fertility and productivity Primary production land uses

### 6.1 EXISTING CONDITIONS

The Limestone Coast Region contains some of South Australia's most productive and fertile soils, supporting agricultural, horticultural and livestock production.

The productive capacity of the Region's soils is dependent on their inherent fertility, sub-soil properties, water holding capacity and susceptibility to salinity and erosion. Since European settlement, farmers have been addressing limitations to agricultural production, some with unintentional adverse impacts on the natural environment. The development of drainage channels across the southern part of the Limestone Coast exemplifies this; whilst drainage allowed agriculture to be more productive, adverse impacts on wetland condition both upstream and downstream of the channels have occurred.

Dryland salinity is another major land management issue in the Region, resulting from historical clearing of deep-rooted native vegetation and its subsequent replacement with shallow rooted annual crops and pastures as well as changes in shallow groundwater levels.

In addition to threats to soil productivity, the expansion of urban areas across highly productive land, particularly around Mount Gambier and Penola, has been identified as a key threat to the Region.

The agriculture, forestry and fishing sector is the greatest contributor to Gross Regional Product, the greatest employer in the region and at 88%, primary production land uses account for the greatest proportion of the Region's land area.

Table 6-1 shows the breakdown of land uses across the Region and Table 6-2 shows the variation between Council areas. The City of Mount Gambier has a higher proportion of developed land uses including residential, recreational and commercial. The other Council areas show land for primary production of between 84 and 93%.

**Table 6-1 Land Use in the Limestone Coast.** (Source: Department of Planning, Transport and Infrastructure Generalised Land Use 2013 – Spatial Dataset)

Land Use	Area (ha)	% of total area
Residential	55,850	2.6%
Commercial	1,017	0.0%
Industrial	980	0.0%
Vacant Land	175,906	8.3%
Institutions	3,717	0.2%
Public Utilities	8,721	0.4%
Recreation	7,516	0.4%
Mining and Quarrying	846	0.0%
Primary Production	1,877,606	88.1%

**Table 6-2 Land Use in the Limestone Coast by Council area.** (Source: Department of Planning, Transport and Infrastructure Generalised Land Use – Spatial Dataset)

	Proportion of Council area						
	CITY OF MOUNT GAMBIER	DC OF ROBE	KINGSTON DC	NARACOORTE LUCINDALE COUNCIL	TATIARA DC	THE DC OF GRANT	WATTLE RANGE COUNCIL
Residential	38%	2%	1%	3%	1%	8%	4%
Commercial	9%	0%	0%	0%	0%	0%	0%
Industrial	6%	0%	0%	0%	0%	0%	0%
Vacant Land	12%	4%	7%	3%	14%	7%	8%
Institutions	6%	2%	0%	0%	0%	0%	0%
Public Utilities	6%	1%	0%	1%	0%	0%	1%
Recreation	12%	0%	0%	0%	0%	0%	1%
Mining and Quarrying	0%	0%	0%	0%	0%	0%	0%
Primary Production	12%	91%	92%	93%	85%	84%	86%

Table 6-3 and Map 3 show the breakdown of primary production land uses across the Limestone Coast, showing that:

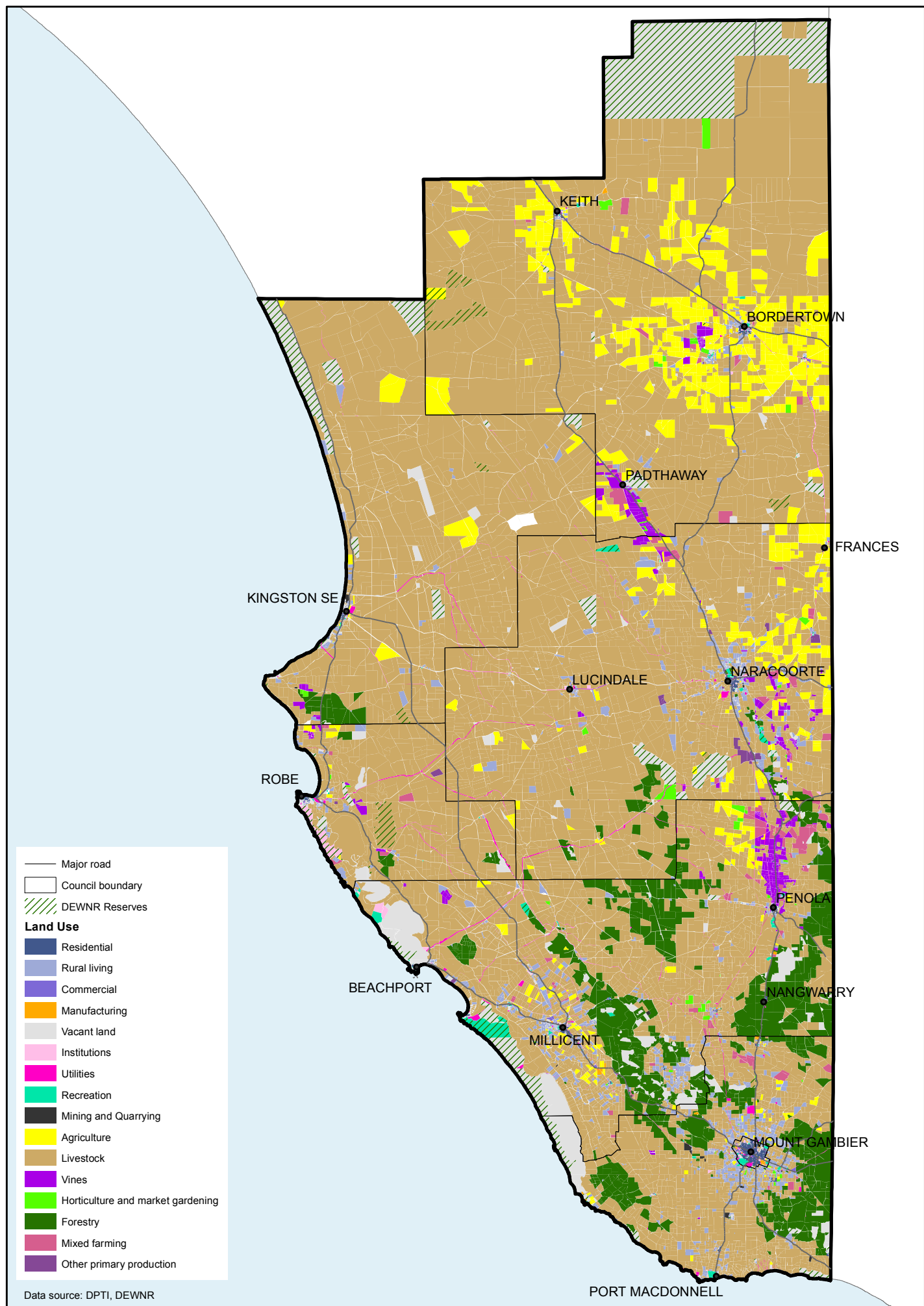
- Agriculture (cropping) is concentrated in the northern parts of the region, especially Tatiara (102,214 ha - 15% of Council area) and Naracoorte Lucindale (28,920 ha - 6% of Council area)
- Largest areas of livestock are in Tatiara (458,538 ha – 68% of Council area) and Naracoorte Lucindale (368,143ha - 82%)
- Large areas of forestry in the southern half of the region, especially Wattle Range (81,970ha – 21% of Council area) and Grant (44,547 ha- 24% of Council area)

- Horticulture, especially in those areas where there is reliable and good quality supply of water, such as Wattle Range which has 445 ha of horticulture
- Vines are concentrated around Padthaway and the Coonawarra, and also at Wrattenbully, Mount Benson, Robe, and Mount Gambier.

**Table 6-3 Primary Production Land Uses in the Limestone Coast.** (Source: Department of Planning, Transport and Infrastructure Detailed Land Use – Spatial Dataset)

PRIMARY PRODUCTION	CITY OF MOUNT GAMBIER		DC OF ROBE		KINGSTON DC		NARACOORTE LUCINDALE COUNCIL		TATIARA DC		THE DC OF GRANT		WATTLE RANGE COUNCIL	
	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%
Agriculture (cropping)	26.2	1%	1,295	1%	8,207	2%	28,920	6%	102,214	15%	1,786	1%	8,783	2%
Livestock	311	10%	93,507	86%	288,997	88%	368,143	82%	458,538	68%	108,840	58%	223,490	58%
Horticulture (excludes vines)			40	<1%			44	<1%	1,585	<1%	67	<1%	445	<1%
Vines			939	1%	804	<1%	5,381	1%	5,520	1%	121	<1%	7,595	2%
Forestry	30	1%	1,981	2%	5,531	2%	8,802	2%			44,547	24%	81,970	21%
Poultry							100.4	<1%	85	<1%			403	<1%
Mixed farming			907	1%			2,900	1%	3,443	1%	1,673	1%	5,852	2%
Market gardening									497	<1%	227	<1%	817	<1%





Map 3 Land Use - Limestone Coast



## 6.2 SENSITIVITY TO CLIMATE FACTORS

The condition of soils, land management and the activities that depend on the Region's lands are sensitive to climate changes, especially increasing average temperatures, declining average annual rainfall, increasing rainfall intensity and increasing fire risk.

Changes in temperature, rainfall and fire may result in the following:

- Changes to seasonal rainfall patterns with subsequent impacts on agricultural productivity particularly for sectors reliant on high rainfall such as horticulture and dairy
- Reduced rainfall may increase irrigation requirements, increasing costs and having negative economic impacts
- Reduced rainfall resulting in reduced recharge of groundwater and subsequent restrictions in extraction allocations
- Changes in temperature may result in shorter growing seasons for crops
- Increased temperatures may see fewer frost events, which could reduce costs and have a positive outcome
- Changes in rainfall and temperature patterns, making conditions more suitable for pest plants and animals
- Increased fire risk reducing days suitable for harvest (the Grain Harvesting Code of Practice requires grain harvesting operations to be suspended when actual Grassland Fire Danger Index exceeds 35)
- Increased bushfire risk increasing the risk of smoke taint on grapes, reducing the grape quality with subsequent economic impacts to the Limestone Coast grape industry
- Increased bushfire risk increasing the risk of damage to crops, livestock and farm machinery with consequences to farm profitability.

## 6.3 ADAPTIVE CAPACITY

There is little inherent adaptive capacity within land systems and primary production. Whilst water logging problems may decrease as rainfall reduces and frost susceptible crops may flourish as temperatures increase, reversing declining soil productivity generally requires human intervention. Activities undertaken that contribute to the adaptive capacity of natural features across the Region include:

- Good land management practices undertaken by a high proportion of farmers across the Region including liming to treat soil acidity, soil fertility enhancement through addition of fertiliser and natural organic matter, irrigation and grazing management
- Education and awareness raising programs for landholders regarding soil and land management
- Research and development into agricultural and horticultural production methods and technologies to address climate impacts
- Sector based climate change adaptation planning, including the wine industry
- Regional Natural Resources Management Plan and sub-regional planning process



## Management of Water Resources

<b>Description</b>	The Region's water resources are vital to our regional economy. We manage our water resources so we can sustain our natural environments and grow our Region's economy. We recognise the cultural and spiritual importance of water resources to many people in the Region.
<b>Features/aspects of our water resources we value in the Limestone Coast</b>	Groundwater Wetlands, Lakes, Lagoons, Swamps, Floodplains Groundwater Dependent Ecosystems Habitat provision Irrigated agriculture, horticulture and viticulture Drainage and surface water Water quality Wastewater treatment Stormwater harvesting Iconic sites (e.g. Blue Lake, Bool Lagoon, Piccaninnie Ponds, Lake McIntyre and Lake Bonney)

### 7.1 EXISTING CONDITIONS

Water resources in the Limestone Coast Region include surface water in creeks, wetlands and lakes and groundwater in shallow (unconfined) and deep (confined) aquifers that maintain water dependent ecosystems including swamps and wetlands. These water resources support Regional agriculture, horticulture and industry as well as contribute to conservation, character, amenity, spiritual and recreation values.

Map 4 identifies surface water features including natural watercourses, drains and wetlands, as well as the boundaries of the Prescribed Wells Areas.

Natural watercourses across the Limestone Coast are mostly ephemeral, flowing only for short periods following rainfall. Watercourse flows when they do occur, play an important role in sustaining the ecological value of in-stream and downstream ecosystems, including swamps and wetlands. A number of watercourse pools or flows are fed by shallow groundwater, often contributing to the maintenance of water dependent ecosystems.

An extensive network of drainage channels across the Region has been constructed to alleviate inundation and enable agricultural development. The first drains were constructed during the mid-1800s to capture and drain surface water and groundwater. In recent years, the construction of additional drains has been required to lower saline groundwater levels.

Despite considerably altered hydrological regimes, drainage and agricultural development, and that only two percent of wetlands that were present prior to European settlement remain<sup>5</sup>, the Limestone Coast contains many wetlands of national and international significance. Table 7-1 shows the area of each of the wetland systems listed in the Directory of Important Wetlands in Australia.

<sup>5</sup> South East Natural Resources Management Board (2010) *SE NRM Plan Part One : Regional Description*, p128

**Table 7-1 Wetlands of International and National Significance in the Limestone Coast.** (Source: Environment Australia 2001 reported in South East Regional Natural Resources Management Plan 2010, Part One)

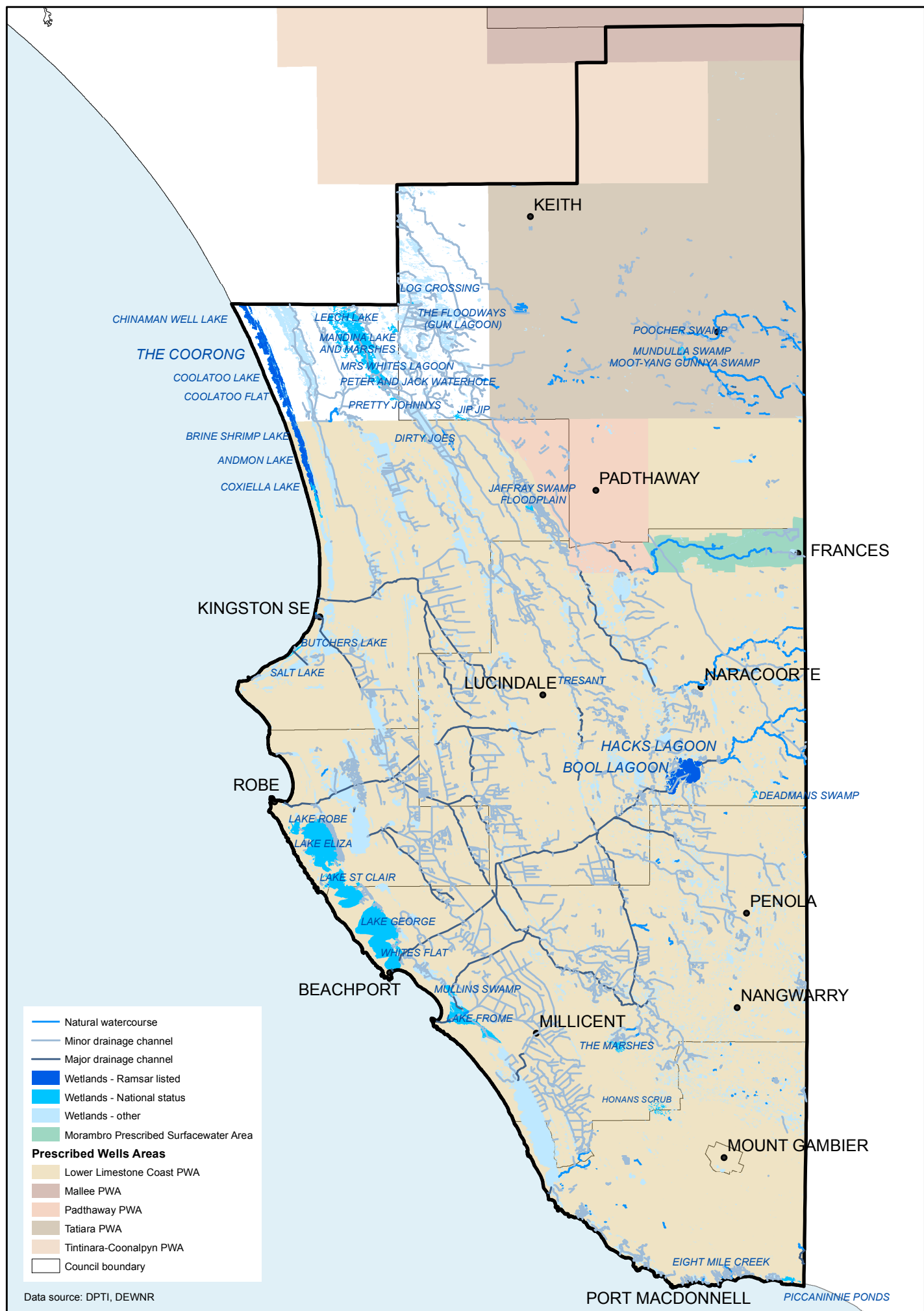
Wetland Name	Area (ha)
Bool and Hacks Lagoon*	3,221
Butchers and Salt Lakes	40
Deadmans Swamp	545
Ewens Ponds	5
Honan's Native Forest Reserve	842
Lake Frome and Mullins Swamp	3,216
Marshes Native Forest Reserve	665
Naen Naen Swamp and Gum Lagoon	335
Piccaninnie Ponds	300
Poocher and Mundulla Swamps	300
South East Coastal Salt Lakes	137,444
The Coorong	140,500 <sup>#</sup>
Watervalley Wetlands	5,660

\* also listed as Wetlands of International Importance as designated under the Ramsar Convention on Wetlands

<sup>#</sup> area includes the northern part of the Coorong, Lake Alexandrina and Lake Albert which are not within the Limestone Coast region.

Coastal and volcanic lakes in the southern part of the Region are valued for conservation, tourism, recreation and water supply. The South East Coastal Salt Lakes (also included as a coastal wetland and listed in the Directory of Important Wetlands in Australia (see Table 7-1) including Lake Bonney, Lake Eliza and Lake St Clair, are sites of global bird conservation importance. The volcanic lakes, located around Mount Gambier, intersect the unconfined aquifer and the Blue Lake is the primary source of water for the Mount Gambier area as well as a key tourist attraction.

The shallow (unconfined) aquifer provides the main source of groundwater used in the Region. These highly productive aquifers support the irrigation of primary production activities including cropping, vines and forestry. Recharge of shallow aquifers occurs via diffuse recharge influenced by the timing and intensity of rainfall and point source recharge from runaway holes that drain surface water. The deep (confined) aquifer is significant as it provides water to towns including Naracoorte, Kingston and Robe. Recharge of these deep aquifers is less well understood and as described in the Regional NRM Plan, the ancient nature of this underground water requires careful management. These aquifers are protected by the Padthaway, Tatiara, Tintinara and Lower Limestone Coast Prescribed Wells Areas with management provisions described in the relevant Water Allocation Plans.



Map 4 Water Resources - Limestone Coast





## 7.2 SENSITIVITY TO CLIMATE FACTORS

The water resources of the Limestone Coast are particularly sensitive to changes in rainfall however all of the projected climate changes are likely to result in changes in the condition of these resources.

Changes in temperature, rainfall, fire and sea level may result in the following:

- Increasing temperatures and reduced rainfall may lead to increased demand for irrigation (underground) water as irrigation seasons extend, placing additional stress on groundwater resources
- Reduced rainfall will mean reduced recharge for aquifers, with impacts likely to be noticed first in the shallow aquifers and subsequent adverse impacts on groundwater dependent ecosystems likely
- Reduced rainfall will reduce flows to wetlands, lakes and swamps, with changes in hydrology likely to impact water dependent ecosystems
- Increase temperatures with concurrent increases in evaporation may impact surface water quality, particularly in shallow water bodies
- Altered hydrological regimes may lead to changes in productivity of water bodies, with potential impacts on migratory birds that rely on the seasonal productivity of regional wetlands
- Changes in rainfall and temperature patterns, making conditions more suitable for pest plants and animals and subsequent adverse impacts on wetland condition
- Reduced water availability could lead to increases in the cost of water with flow on effects to primary production and industry
- Reduction in water available for irrigation of open space and recreational facilities
- Increased bushfire intensity and frequency, damaging filtering riparian vegetation and impacting water quality (surface and groundwater)
- Rising sea levels may increase the risk of salt water intrusion to groundwater.

## 7.3 ADAPTIVE CAPACITY

The long term impact of climate change on the confined aquifer and groundwater dependent ecosystems is not well understood and nor therefore is the inherent adaptive capacity of these systems. The ephemeral nature of wetlands, swamps and other surface water features means they are adapted to cope with periods of both extended drought and inundation however the longer term impact of more frequent drought and lower rainfall expected as a result of climate change is also not well understood.

Activities undertaken that contribute to the adaptive capacity of water resources across the Limestone Coast include:

- Management of water resources according to management plans including the various Water Allocation Plans, wetland management plans, Blue Lake Management Plan and stormwater management plans, some of which include provisions for environmental water requirements for water dependent ecosystems
- Regional Natural Resources Management Plan and sub-regional planning process
- The Restoring Environmental Flows to the Upper South East (REFLOWS) project that aims to partially reinstate flows along historic watercourses to the Upper South East wetlands.
- Research and monitoring of water resources to enhance understanding and improve management
- Good land and irrigation management practices undertaken by a high proportion of farmers across the Limestone Coast that enable irrigation efficiency to be maximised.



## Community Participation

<b>Description</b>	<p>We value active participation in community life, which is a strength of both small and large towns in the Limestone Coast.</p> <p>We value involvement in decision making which leads to good interaction between the community and Governments.</p>
<b>Features/aspects of community participation we value in the Limestone Coast</b>	<p>Empowered communities</p> <p>Active groups, clubs and organisations</p> <p>Structured support for community involvement</p> <p>Volunteer ethos</p> <p>Creativity, arts, festival and events</p> <p>Participation in decision making</p> <p>Participation in NRM</p>

### 8.1 EXISTING CONDITIONS

Community participation encompasses both involvement in everyday life of the Region's towns and communities, such as through sporting clubs, churches, organised groups and volunteering, as well as participation in decision making, for example contributing to the development of Local Government plans or natural resources management planning.

#### 8.1.1 PARTICIPATION IN COMMUNITY LIFE

People in the Limestone Coast are active in their communities, and by doing so, foster a sense of community and contribute to a range of local activities that would not occur without their participation. Community participation in the Region takes many forms, including:

- Local government initiatives such as volunteering programs, grants and sponsorship for community run events, arts and cultural activities, sporting clubs and community groups, and community service awards programs such as Citizen and Community Event of the Year
- Resident/town/progress associations in towns and suburbs across the Region
- Regional economic groups, such as the Limestone Coast Collaborative which is working to raise the profile and branding of the Region
- Local sporting clubs and recreation groups
- Special interest groups, such as Country Women's Associations, RSL Clubs, National Trust, Faith-based groups, and the Skilled Migrants Friendship Group
- Environment groups, such as Coastcare and Landcare groups and Friends of Parks groups
- Volunteer emergency services with the 80+ CFS Brigades and SES Units in the Region plus a Volunteer Marine Rescue service based at Kingston
- Not for profit organisations such as the Salvation Army, St Vincent De Paul, Uniting Care and the Limestone Coast Migrant Resource Centre

- Service clubs such as Rotary Clubs, Kiwanis and Lions Clubs with local chapters throughout the Region
- Local Philanthropic organisations such as Stand Like Stone Foundation which collects local donations and invests these to support charitable projects and educational scholarships
- Online networks such as the “Limestone Coast Community News” which has almost 11,000 followers on Facebook
- Involvement in the planning and delivery of community events, including
  - Country shows, field days and markets
  - Horse racing events and cup days (e.g. Bordertown Spring Races, Penola Cup, Millicent Cup Race Day)
  - Music events (e.g. South East Country Music Festival, Opera in the Caves, Generations in Jazz)
  - Special events (e.g. Mount Gambier Christmas Pageant, Saint Mary of the Cross MacKillop Feast Day)
  - Food and wine events (e.g. Cape Jaffa Seafood and Wine Festival, Taste the Limestone Coast, Fork and Cord)
  - Recreation events (e.g. Blue Lake Funrun, Triathlons, Port MacDonnell Tuna Fishing Tournament, Coonawarra Petanque Tournament)
  - Arts events such as the Penola Coonawarra Arts Festival, Southern Ocean Art Prize, John Shaw Neilson Acquisitive Art Prize etc
- Participation in NRM activities (described in more detail at 7.1.2).

Table 8-1 shows the percentage of persons in the Limestone Coast aged 15 years and over who undertake voluntary work. Across the Region the proportion of the community who volunteer is almost 28%, which is higher than the rate across the State at 20%. Within the Region, participation in volunteering is particularly high in Tatiara (38%), Naracoorte Lucindale (34%), Kingston (33%) and Robe (31%). These high rates of community participation, particularly in the more remote parts of the Region and those places that are more distant from the major population centres, can help to reduce social isolation and exclusion and contribute to the social fabric of the Region.

*Table 8-1 Persons aged 15+ undertaking voluntary work. (Source: ABS 2011 Census).*

Area	Number	Proportion of the population
Grant	1,715	28%
Kingston	642	33%
Mount Gambier	4,439	22%
Naracoorte Lucindale	2,188	34%
Robe	366	31%
Tatiara	1,970	38%
Wattle Range	2,606	28%
Limestone Coast	13,926	28%
South Australia	258,842	20%



### 8.1.2 PARTICIPATION IN DECISION MAKING

Community involvement in local decision making is often facilitated by local government, and each of the Region's Councils has a community engagement policy or strategy that forms a framework for opportunities for the community to be informed of, consulted about, and involved in Councils' strategic direction and decision making processes. Specific community engagement initiatives are implemented by the Region's Councils to obtain community input on a range of topics and themes relating to Council plans, services and activities.

Central to the operation of NRM Boards across the State is putting 'community at the centre' and ensuring opportunities are provided for community members to participate in natural resources management. The South East NRM Board therefore has a range of projects and initiatives that broadly seek to involve community members in activities such as:

- Involvement in the review of the Regional NRM Plan
- South East Drainage Network Community Panel
- South East Aboriginal Focus Group
- Displays at Field Days
- Landholder education programs
- Schools programs
- Involvement in maintaining native vegetation and revegetation programs
- Limestone Coastwatchers program
- Weed spotters program
- Recording frog sightings to contribute to the frog census
- Competitions (e.g. weed busters weed drawing competition, photo competition)

Similarly, RDA Limestone Coast facilitates engagement within the community to support regional economic activity. This includes providing advisory services and assistance to small businesses, career and workforce development to develop skills locally, grants programs, tourism industry development (e.g. developing customer service skills and branding) and regional planning.

## 8.2 SENSITIVITY TO CLIMATE FACTORS

As changes occur to the climate of the Limestone Coast, especially periods of extreme heat, heatwaves and intense rainfall, community participation including the ability to undertake a range of community events and activities in the Region may be impacted. For example:

- People may be less likely to volunteer and participate in community activities during periods of extreme heat, heatwaves, or intense rainfall events
- Regular sport and recreational events may be cancelled, postponed or relocated in periods of extreme heat, heatwave, bushfire or intense rainfall

- Outdoor community events may be cancelled or postponed in periods of extreme heat, intense rainfall or bushfire
- Community groups providing services to vulnerable members of the community may experience increased demand for their voluntary services
- Community groups, such as, Friends of Parks groups and sporting clubs may need to change their practices to ensure the welfare of staff and volunteers during extreme events
- People may be less likely to participate in community engagement activities.

These sorts of impacts may have wider consequences. For example, if outdoor sporting matches are regularly cancelled due to extreme heat, it may place additional pressure on the limited number of indoor facilities in the Region. Infrastructure upgrades to sport and recreation facilities such as ovals, tennis and netball courts, recreation centres and walking paths may be required to maintain their usability in hot and dry conditions. This may include lights to enable evening use if they cannot be used during the day, air conditioning of indoor facilities, heat tolerant playing surfaces, and shade structures for players and spectators.

As with other regions in the state, the Limestone Coast is reliant upon volunteer emergency management groups. More frequent and intense periods of extreme heat and bushfire, and more intense rainfall may see increased demand for volunteers in emergency management. However, the existing pool of volunteers may become stretched and less able to contribute as they themselves are increasingly required to assist their own families, property and businesses. While during extreme events such as floods and bushfires volunteers mobilise to respond to a crisis situation, after the event those who have experienced trauma, loss and damage may have less capacity to participate in the community. Such events can also damage or destroy infrastructure and facilities that support civic participation.

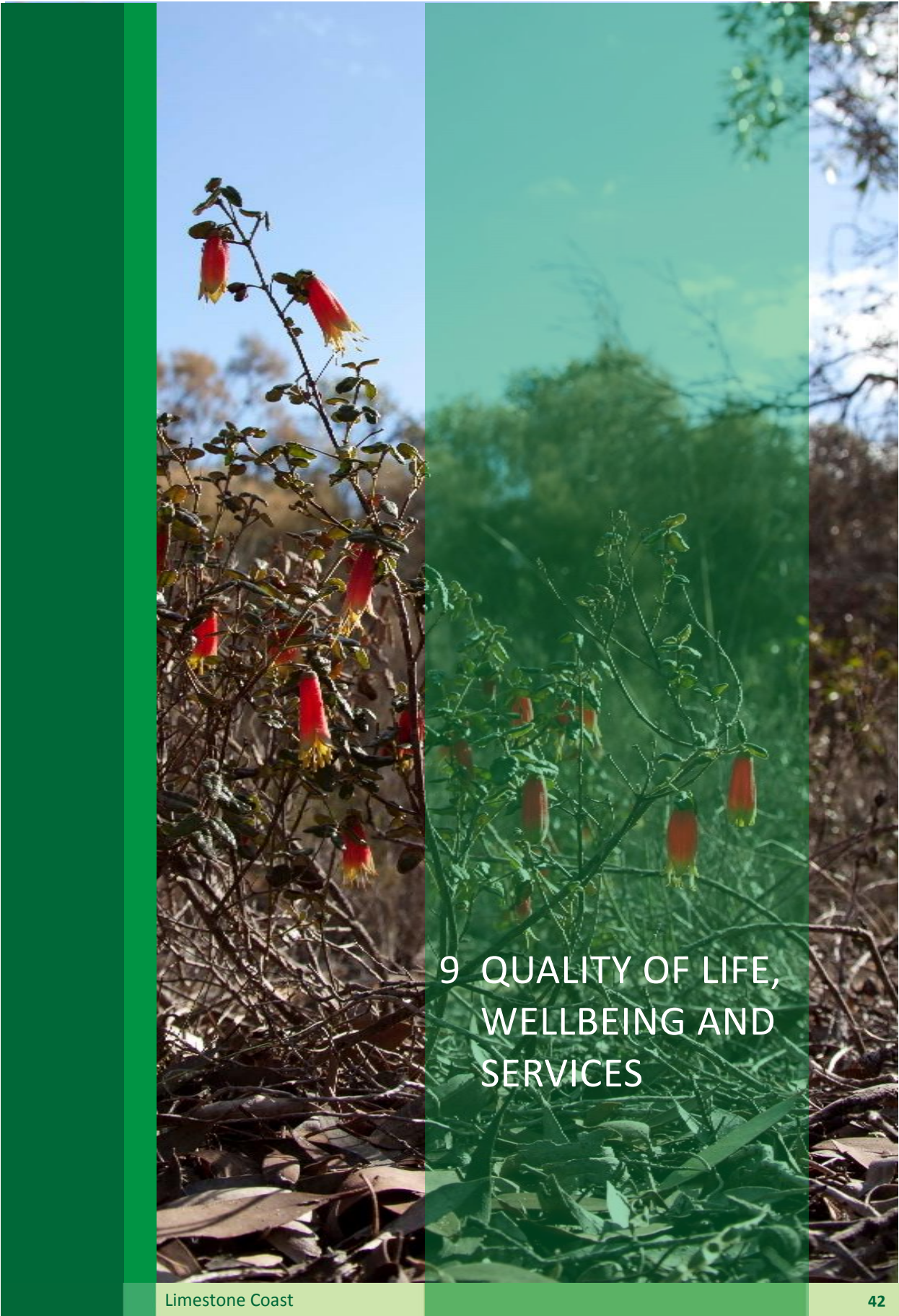
### 8.3 ADAPTIVE CAPACITY

The high levels of volunteering and community participation in the Limestone Coast supports its adaptive capacity. This includes:

- The activities of Councils, Natural Resources South East and other organisations to support volunteering, participation in community programs, and involvement in community engagement processes
- The activities of community groups and not for profit organisations to plan, coordinate and implement volunteering, participation and education programs.

Such activities contribute positively to the skills and capacity of those involved, and create formal and informal connections between individuals and organisations that play a role in the community's resilience and capacity to adapt. The rates of volunteering by the people of the Region indicates a willingness to contribute to the community, which will be important as the Region experiences more frequent and intense weather events. This participation and community spirit may also help the region to bounce back after extreme events.

The outdoor nature of so many of the Region's community activities and events reduces adaptive capacity. Some events, such as weekly sport, may be able to be relocated to a more suitable location or rescheduled to a different time of day or even year. However, this type of rescheduling may not be possible for those 'one off' events in the Region, whose organisation and investment is focussed on a particular day in a particular location.



## Quality of life, wellbeing and availability of quality services across the region

<b>Description</b>	<p>We value our high quality of life, the health and wellbeing of our community and the ability to access quality services locally.</p> <p>We value the distinct character of different parts of the Region and the diversity of our people and communities.</p>
<b>Features/aspects of quality of life, wellbeing and availability of services we value in the Limestone Coast</b>	<p>Community wellbeing</p> <p>Quality of life</p> <p>Education</p> <p>Health services</p> <p>Community facilities</p> <p>Ability to access services</p> <p>Older people</p> <p>Youth</p> <p>Recreation</p> <p>Cultural diversity</p> <p>Vibrant town centres/ main streets</p> <p>Different towns with different character</p> <p>Heritage conservation</p> <p>Rural atmosphere</p>

### 9.1 EXISTING CONDITIONS

Quality of life and wellbeing in the Region relates to individuals' physical and mental wellbeing and opportunities to maintain and increase that wellbeing.

Quality of life and wellbeing depend upon the capacities and vulnerabilities of the population and the ability to access facilities and support services. Across the Limestone Coast, while the Region performs above average on some demographic indicators, there are significant differences within the Region. In addition, geographic distance means that providing the facilities and services that people need to support their health and wellbeing can be difficult, costly and in some cases impossible to provide locally.

#### 9.1.1 DEMOGRAPHY

The total population of the Limestone Coast is almost 65,000, or 3.9% of the State's population. Table 9-1 shows the population of each Council and the different proportions of each, with the City of Mount Gambier having the largest population of around 26,000 and home to 40% of the Region's population, and the District Council of Robe the lowest with 2% of the population.

*Table 9-1 Limestone Coast population by Local Government Area. (Source: ABS Estimated Resident Population 2015).*

	Population Estimate (2014)	Proportion of total Limestone Coast Population
DC of Grant	8,174	13%
Kingston DC	2,368	4%
City Of Mount Gambier	26,246	40%
Naracoorte Lucindale Council	8,449	13%
DC of Robe	1,431	2%
Tatiara DC	6,667	10%
Wattle Range Council	11,578	18%
Limestone Coast	64,913	
South Australia	1,685,714	

The age of a population can indicate particular needs amongst the community, particularly relating to children and older people who may be more vulnerable and require particular support, services and infrastructure.

Figure 9-1 shows that the Region's population, has proportionally more children (especially aged 5-14 years) and proportionally fewer people aged over 75 years than for the State. The Region also has proportionally fewer younger adults aged 20-25, and 25-34 years. The Region has proportionally more people in the age groups nearing early retirement (55-64 years) and retirement (65-74 years).

Table 9-2 provides the age profile of each Council in the Region and shows that:

- Tatiara and Grant have the highest proportions of school aged children (5-14 years)
- Mount Gambier has significantly higher proportions of young people aged 20-24 years compared with all other Councils in the Region
- Grant has the highest proportion of working aged people in the 35-44 years and 45-64 years age groups
- Kingston and Robe have the highest proportions of people nearing early retirement (55-64 years) and retirement (65-74 years).



Figure 9-1 Limestone Coast Age Profile. (Source: ABS 2011 Census)

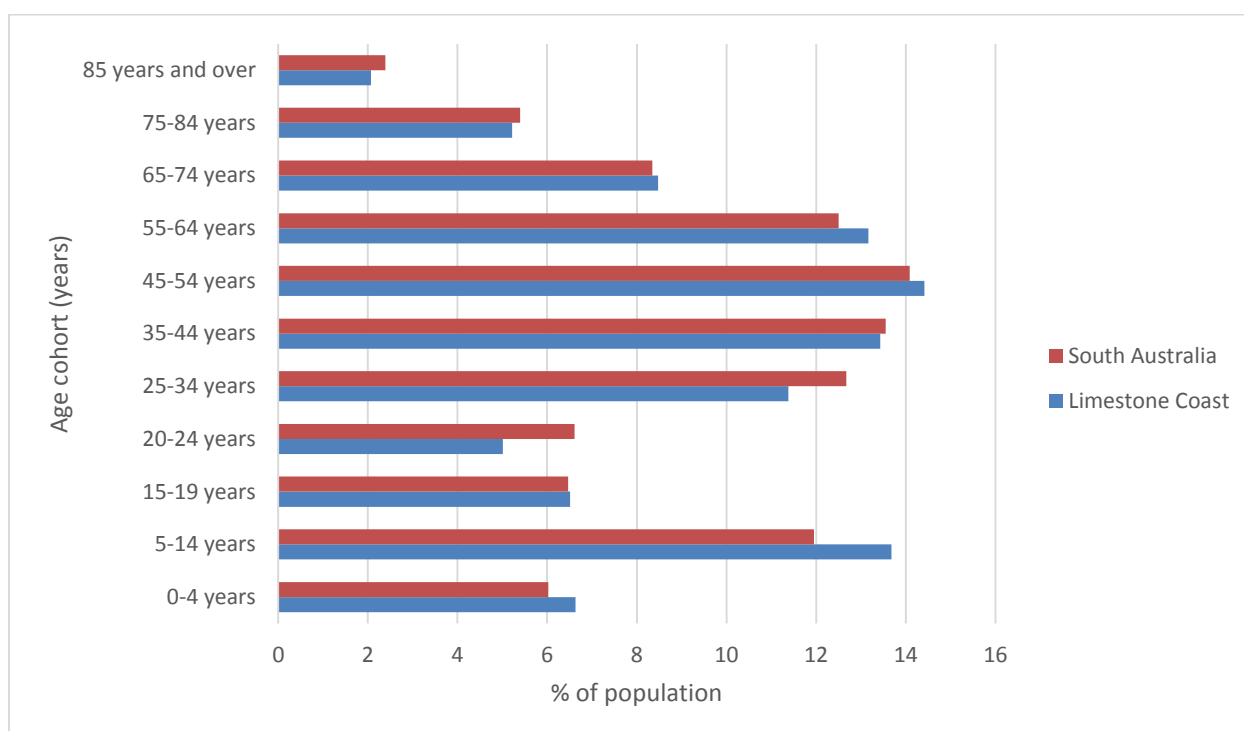


Table 9-2 Limestone Coast age profile. (Source: ABS 2011 Census)

	Grant (%)	Kingston (%)	Mount Gambier (%)	Naracoorte Lucindale (%)	Robe (%)	Tatiara (%)	Wattle Range (%)
0-4 years	6	5	7	7	6	7	6
5-14 years	15	11	14	13	11	15	14
15-19 years	7	6	7	6	5	7	6
20-24 years	4	4	6	5	5	5	4
25-34 years	9	10	13	13	10	11	10
35-44 years	15	11	13	13	14	14	14
45-54 years	17	14	14	15	14	14	15
55-64 years	15	17	12	13	17	13	14
65-74 years	8	12	8	8	12	8	9
75-84 years	3	8	5	5	5	5	6
85 years and over	1	2	2	3	2	3	2

Table 9-3 shows that across the Region, the median age is above the State median of 39 in all Council areas except Mount Gambier City, where it is 37. The highest median age is in Kingston (46 years).

Income and education are indicators of socio-economic status that can impact on health and wellbeing. Amongst the Region's Councils, median household income varies considerably. With a median weekly household income of

\$1,184 per week, Grant is the only Council with incomes above the State average. Naracoorte Lucindale has the second highest median housing income at \$1,017 per week while Kingston has the lowest at \$819 per week.

Levels of higher education in the Region are well below State average. Across the Region, 8% of the population has a bachelor degree or higher qualification. The proportion is lowest in Kingston and Wattle Range (7%) and highest in Robe (10%).

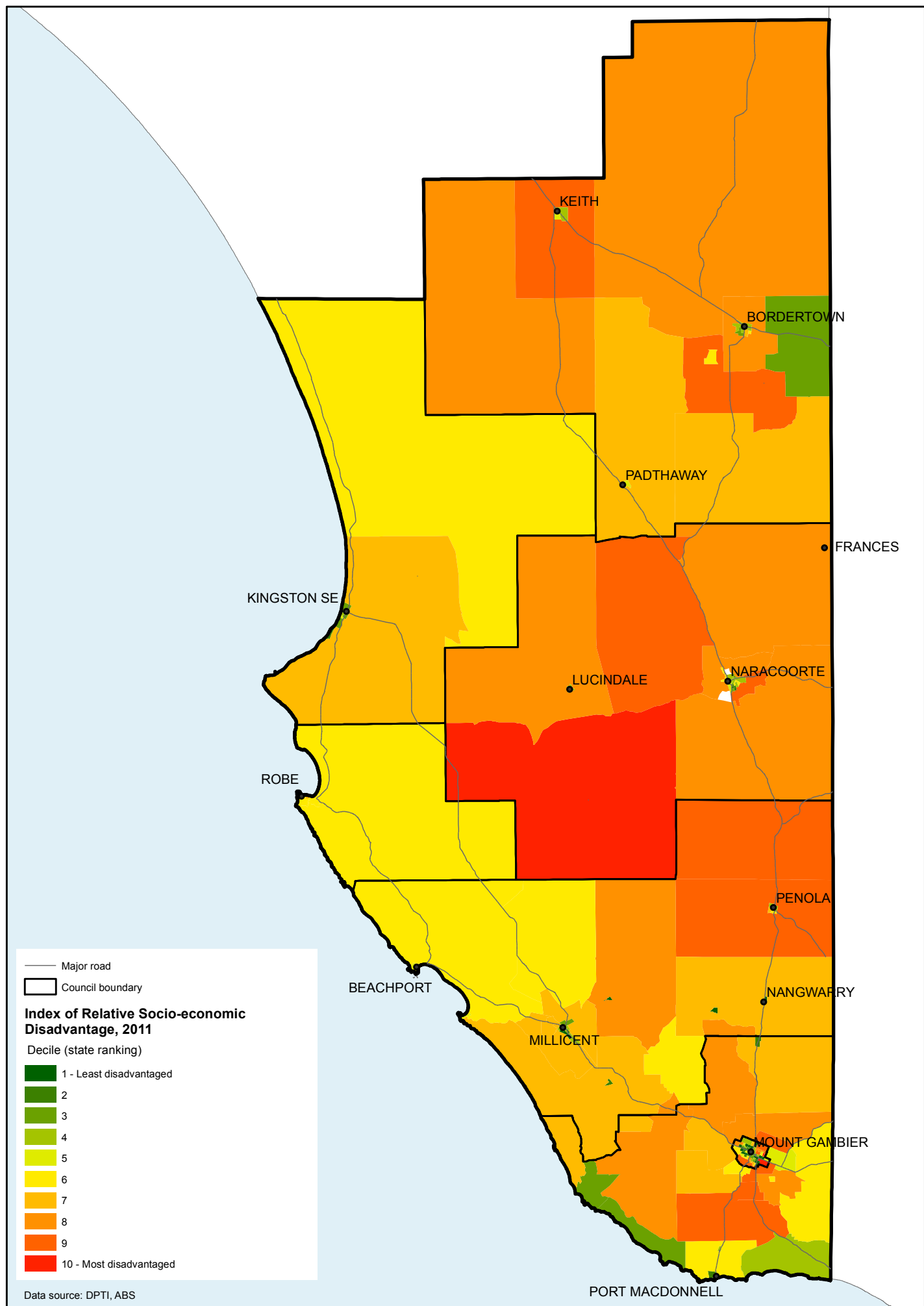
*Table 9-3 Age, income and education highlights. (Source: ABS 2011 Census)*

	Median age (years)	Median weekly household income (\$)	Bachelor or higher degree (%)
DC of Grant	41	1,184	8
Kingston DC	46	819	7
City Of Mount Gambier	37	899	9
Naracoorte Lucindale Council	40	1,017	9
DC of Robe	45	846	10
Tatiara DC	40	946	8
Wattle Range Council	42	884	7
Limestone Coast	not available	not available	8
South Australia	39	1,044	16

The SEIFA Index of Disadvantage measures the relative level of socio-economic disadvantage based on a range of characteristics such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations. Table 9-4 and Map 5 provides SEIFA information for each Limestone Coast Council, showing that Grant and Robe are the least disadvantaged, and Mount Gambier and Wattle Range are the more disadvantaged Councils in the Region.

*Table 9-4 SEIFA Index of Disadvantage. (Source: ABS Census of Population and Housing 2011)*

DC of Grant	Kingston DC	City of Mount Gambier	Naracoorte Lucindale Council	DC of Robe	Tatiara DC	Wattle Range Council
1018	975	927	996	1013	996	946



Map 5 Index of Disadvantage - Limestone Coast

Table 9-5 and Table 9-6 provide an indication of the Region's cultural diversity. In the context of quality of life and wellbeing, people from diverse cultural and linguistic backgrounds may require different types of services and support, and have different needs, lifestyles, and relationships within the Region. In addition, cultural diversity can enrich the quality of life and wellbeing of a community through the sharing of different perspectives, cultural traditions and ways of life.

The Region is home to proportionally fewer people born overseas (9.5%) when compared with South Australia as a whole (22.1%). Naracoorte Lucindale has the largest proportion of its population born overseas at nearly 11%. Around 4% of people in the Limestone Coast speak a language other than English. This proportion is highest in Naracoorte Lucindale and Tatiara, both at 5.6%.

Anecdotally, it has been identified that the Region contains a small population of new Australians who have migrated to the Region to work in industries with skills shortages, such as meatworks. Recent arrivals often have particular needs for services and support, especially during their first few years in the Region.

*Table 9-5 Birthplace. (Source: ABS 2011 Census)*

Area	Overseas Born	Most common birthplaces other than Australia				
	%	1	2	3	4	5
DC of Grant	7.2	UK	New Zealand	Netherlands	Germany	Italy
Kingston DC	6.1	UK	New Zealand	Netherlands	Philippines	Germany
City Of Mount Gambier	10.3	UK	New Zealand	Italy	Netherlands	Germany
Naracoorte Lucindale Council	10.7	UK	New Zealand	China	Germany	Vietnam
DC of Robe	6.9	UK	New Zealand	USA	Vietnam	South Africa
Tatiara DC	10.1	UK	New Zealand	Philippines	India	China
Wattle Range Council	9.1	UK	New Zealand	Netherlands	Italy	Germany
Limestone Coast	9.5	Not available				
South Australia	22.1	UK	Italy	India	China	New Zealand

Table 9-6 Languages other than English spoken at home. (Source: ABS 2011 Census)

Area	People who spoke a language other than English		Most popular languages spoken				
	Number	%	1	2	3	4	5
DC of Grant	163	2.1	Italian	Dutch	German	Croatian	Polish
Kingston DC	27	1.2	German	Dutch	French	Hindi	Italian
City Of Mount Gambier	1,283	5.1	Italian	Dutch	Greek	German	Mandarin
Naracoorte Lucindale Council	456	5.6	Dari	Persian	Vietnamese	German	Korean
DC of Robe	21	1.5	Cantonese	French	German	Hindi	Korean
Tatiara DC	365	5.6	Filipino	Mandarin	Punjabi	German	Khmer
Wattle Range Council	267	2.3	Italian	German	Filipino	Dutch	French
Limestone Coast	2582	4.1	not available				
South Australia	229,548	14.4	Italian	Greek	Mandarin	Vietnamese	Cantonese

In the Limestone Coast, there are 1,094 Aboriginal and Torres Strait Islander people or 1.7% of the population. This compares with 1.9% for South Australia. The highest number of Aboriginal and Torres Strait Islander people live in Mount Gambier (576 people – 2.3%), which is well above the proportion for the State. The smallest proportion is in Tatiara, where an Indigenous population of 50 represents 0.8% of the total population.

The traditional owners in the Region come from the Ngarrindjeri (Coorong area), Buandig (much of the Lower Limestone Coast), Bindjali (much of the upper South East) and Ngargad (far north of the region) groups. Within the region, however, there are a range of language groups and family groups, as shown in Table 9-7.

Table 9-7 Aboriginal Language and Family Groups and Organisations (Source: South East Natural Resources Management Plan 2010, Part One)

Language Groups	Family Groups recognised by the South East Aboriginal Focus Group	Aboriginal Organisations
Tanganekald Meintangk Potaruwutj Ngarkat Bunganditj	Cameron Whyrimpi Owen Wilson Hunt Pinky Watson Bonney Campbell Trevorrow Gibson A'Hang Nicholls Casey Hartman	South East Aboriginal Focus Group Kungari Aboriginal Inc Murapeena Heritage Association Inc. Ngarrindjeri Regional Authority Burrundies Aboriginal Corporation



People who require assistance with core activities may have differing needs and challenges that impact their ability to enjoy a high quality of life. For these people, the ability to access quality services locally is particularly important. Table 9-8 shows that around 5% of the Limestone Coast's population require assistance with core activities, slightly below the Statewide percentage of 5.5%. Amongst Limestone Coast Councils, the rate is highest in Mount Gambier (5.7%) and lowest in Robe (3%).

*Table 9-8 Need assistance with core activities. (Source: ABS 2011 Census)*

Area	Number	total	% of total
DC of Grant	269	7,855	3.4
Kingston DC	116	2,279	5.1
City Of Mount Gambier	1,427	25,248	5.7
Naracoorte Lucindale Council	321	8,116	4.0
DC of Robe	42	1,396	3.0
Tatiara DC	281	6,555	4.3
Wattle Range Council	616	11,624	5.3
Limestone Coast	3,072	63,073	4.9
South Australia	87,120	1,596,572	5.5

Table 9-9 shows estimates of health amongst people within the Region based on self-reported data collected by the Australian Bureau of Statistics. Amongst the Limestone Coast Councils, rates of fair or poor self-assessed health are generally lower than across the State, especially in Naracoorte Lucindale. Mount Gambier and Wattle Range Councils, however, have higher rates of fair or poor self-assessed health.

*Table 9-9 Self assessed health (Source: Social Health Atlas of Australian Local Government Areas 2015)*

Area	Estimated population, aged 15 years and over, with fair or poor self-assessed health (rate per 100)
DC of Grant	15.4
Kingston DC	15.2
City Of Mount Gambier	16.2
Naracoorte Lucindale Council	14.4
DC of Robe	15.2
Tatiara DC	15.2
Wattle Range Council	16.6
South Australia	15.6

Table 9-10 shows the rates of preparation of Mental Health Care Plans by General Practitioners (GPs) in the Limestone Coast, which with the exception of Wattle Range Council, are well below the State average. Rates are particularly low in Kingston and Robe.

*Table 9-10 Rates of Mental Health Care Plans (Source: Social Health Atlas of Australian Local Government Areas 2015)*

Area	Preparation of Mental Health Care Plan by GPs (rate per 100,000)
DC of Grant	5,492.6
Kingston DC	859.5
City Of Mount Gambier	7,318.0
Naracoorte Lucindale Council	2,992.2
DC of Robe	2,121.0
Tatiara DC	5,984.0
Wattle Range Council	9,531.3
South Australia	7,906.9

### 9.1.2 FACILITIES AND INFRASTRUCTURE

Community facilities and infrastructure support the health and wellbeing of the Limestone Coast community, and a high quality of life. These include:

- Hospitals and primary health services, including the Mount Gambier and Districts Health service, Bordertown Memorial Hospital, Keith Community Health, Kingston Soldiers Memorial Hospital, Lucindale Community Health, Millicent and Districts Hospital and Health Service, Naracoorte Health Service and Penola War Memorial Hospital
- Community centres, libraries, town halls, art galleries and museums that provide meeting places, opportunities for learning, and venues for delivery of services and support
- 1,704 hectares of parks and reserves in towns that provide opportunities for social connection and formal and informal recreation and connection with nature
- 46 childcare centres and preschools, 47 primary and secondary schools and 5 tertiary institutions that provide education, social and recreational opportunities for children, young people and families
- Indoor sports and recreation facilities such as the Mount Gambier Aquatic Centre, Mount Gambier Basketball Stadium, Beachport Recreation Centre and the Millicent Squash and Fitness Centre
- Public and open spaces that are used for a variety of community and cultural events and celebrations
- Coastal infrastructure used for public recreation, such as jetties and boat ramps.

### 9.1.3 SUPPORT AND SERVICES

Availability and use of community, educational, recreational, arts and cultural services and programs contributes to health, wellbeing and quality of life across the Limestone Coast Region.

Throughout the Region, these services are delivered primarily by local governments and not for profit organisations and community, faith and culture based groups. Examples of these services include:

- Programs for children and their families, such as the Big Play Day Out organized by the Mount Gambier Charter for Children Initiative
- Events to promote active ageing, such as the Every Generation Festival, Meals on Wheels and Library Book Delivery Services
- Grants programs that assist community groups providing services to the community, and sporting grants
- Financial and legal services, family and personal support, youth services, and employment services and housing and homelessness support provided by not for profit organisations with offices in the Region such as Uniting Communities and The Salvation Army
- Social connection and support for young people such as Youth Advisory Committees and through various initiatives such as the youth directory and the Geared to Drive program.

#### 9.1.4 MOBILITY

Residents in the Limestone Coast are highly car dependent, with more than 76% of households owning two or more cars. This is much higher than the Statewide figure of 52%. Mount Gambier has the lowest rates of car ownership, with 50% of households owning two or more vehicles, and Grant has the highest at 76%.

The high rates of car dependency reflect the large distances between townships in the Region, and the relatively limited availability of public transport, both within and between urban centres and townships. Public transport in the Region includes the Mount Gambier City Bus Service, Premier Stateliner bus services between various townships and Adelaide, connecting Mount Gambier and Adelaide by both the Princess and Riddoch Highways. There are also V-line bus services from Mount Gambier to Melbourne via Warrnambool and Ballarat.

The dependency on private vehicles for travel can have a major impact on quality of life, both due to the time and expense of travelling long distances to access services, but also for those in the community who are unable to drive or do not have access to a private vehicle. These impacts do not just relate to accessing primary services such as healthcare and education, but also make it more difficult for people to participate in community life more generally, which can lead to social isolation in more remote parts of the Region.

Table 9-11 provides data on people who had difficulty accessing services and shows people in all parts of the Region reported higher rates of experiencing difficulty accessing services, when compared with other parts of the State. This rate was highest in Kingston and Tatiara.

**Table 9-11 Difficulty accessing services.** (Source: ABS Survey data 2010 reported in 2015 Social Health Atlas of Local Governments).

	Persons aged 18 years and over who had difficulty accessing services (rate per 100)
DC of Grant	36.2
Kingston DC	37.6
City Of Mount Gambier	33.7
Naracoorte Lucindale Council	36.6
DC of Robe	36.6
Tatiara DC	37.0
Wattle Range Council	36.7
South Australia	28.5

### 9.1.5 EMERGENCY MANAGEMENT

State and local governments in the Region undertake planning and programs relating to emergency preparedness and response, and a range of State and Commonwealth Government and not for profit emergency management initiatives are delivered within the Region including:

- Emergency response services such as the Country Fire Service, State Emergency Service, MFS in Mount Gambier and the Red Cross
- Emergency communications and information provision services, such as Alert SA, Disaster Assist and local government programs
- Regional Zone Emergency Management Plan and Local Government Emergency Response Plans
- Extended Care Paramedic service aimed at improving appropriate utilization of ambulances from Mount Gambier, avoiding emergency department presentations and increasing the number of residential aged care facility clients being treated in situ
- Multi-agency emergency services/incident control centre in Mount Gambier, jointly managed by Forestry SA, CFS and SES.

### 9.1.6 SETTLEMENTS IN THE REGION

The Limestone Coast contains a range of settlements, from large cities to small country townships. Each settlement in the Region has a unique character and function which contributes to quality of life.

Mount Gambier is the second largest urban centre in South Australia and the largest settlement in the Region, home to more than 25,000 people. Mount Gambier provides a range of city level services, including university and TAFE campuses, a regional hospital and a number of large shopping areas. It also contains the Blue Lake and other caves and sinkholes, and is a gateway for tourism in the Region.

Mount Gambier is the key economic centre of the Region home to a range of manufacturing, processing/value adding businesses, as well as hospitality, retail, professional services and government administration. Mount Gambier is a growing town, with new residential housing and industry earmarked for the north, west and east of the town.

Other significant towns in the Region are Naracoorte (population 4,908), Millicent (population 4798), Bordertown (population 2,549), Kingston (population 1,612), Penola (population 1,337) and Keith (1,069). These towns play an important service role to their respective rural hinterlands, with services such as supermarkets, local hospitals and banks and high schools. They also contain important industries which provide significant local employment, such as the Kimberly Clark paper mill near Millicent and the Bordertown meatworks.

Naracoorte plays an important role in tourism for visitors accessing the Naracoorte Caves, Bool Lagoon and the Coonawarra, Wrattenbully and Padthaway wine regions. Penola also provides access to the Coonawarra, and draws pilgrims because of the town's association with Mary MacKillop.

Smaller towns in the Region include Robe (population 1,018), Port MacDonnell (population 650) and Beachport (population 382), which are popular holiday destinations. The population of these town increases dramatically in summer months, which presents a servicing challenge for those local governments.

The population of each part of the Region is expected to change in the years ahead. The State Government's planning strategy for the Region, the Limestone Coast Region Plan, explains that the Limestone Coast grew by 0.35% per annum between 1996 and 2008. In 2008, the Region accounted for 22% of the State's regional population. For the Limestone Coast to maintain this share, the Region needs to grow to 87,152 people by 2036, at a rate of 806 persons per year. Table 9-12 provides population projections by Council area for 2026, showing that Grant, Naracoorte Lucindale and Wattle Range are expected to experience the highest growth rates.

**Table 9-12 Population Projections for 2026** (Source: Department of Planning Transport and Infrastructure 2011 based on ABS data)

Area	Current Population (ABS 2014 Estimate)	2026 Population Projection	Projected growth (% per annum)
DC of Grant	8174	9,838	1.7
Kingston DC	2368	2,559	0.7
City Of Mount Gambier	26246	28,926	0.9
Naracoorte Lucindale Council	8449	9,541	1.1
DC of Robe	1431	1,466	0.2
Tatiara DC	6667	6,790	0.2
Wattle Range Council	11578	12,898	1.0



## 9.2 SENSITIVITY TO CLIMATE FACTORS

The quality of life, wellbeing and access to services across the Limestone Coast is sensitive to increased overall temperatures, extreme heat, heatwaves, bushfire and intense rainfall events. There are also particular sensitivities for some members of the community, and in particular places.

Climate hazards such as extreme heat, heatwaves, increased rainfall intensity and bushfire have potential to limit the community's access to facilities, services and programs and services that support their wellbeing and quality of life. Buildings such as town halls, community centres, libraries, arts facilities, recreation centres, schools and hospitals could be damaged by flooding, coastal inundation and bushfire events. Increased heat, reduced rainfall, or more intense rainfall events may also reduce the life of these assets or require more frequent maintenance regimes or replacement.

Members of the population living in remote parts of the Region are particularly vulnerable during extreme weather such as heat waves and bushfire due to their physical location, especially if they have limited mobility or lack financial resources. During an emergency, it may not be safe or possible for these people to evacuate to a safer location, for example, if roads become blocked by fire.

The higher proportions of older people in Kingston and Robe indicate a greater degree of vulnerability, since their older populations may be more sensitive to periods of extreme heat, being at higher risk of dehydration and heat exhaustion, and as a result, have a greater need to access support services to ensure their wellbeing. The vulnerability of older people is increased if they are concerned about electricity costs and therefore less likely to use air conditioning. Older people may also be less able to undertake works to prepare their property for intense rainfall such as cleaning of gutters or for bushfire by reducing fuel loads around their homes.

Extreme heat and heatwave has a relationship to higher presentations at hospital including for renal health and mental health conditions, as well as increased mortality rates. Physical discomfort caused by extreme heat has the potential to increase mental stress, as do extreme events such as bushfire that may require emergency response or damage/threat of damage to property and personal safety. Children are particularly vulnerable to psychological distress after exposure to extreme events such as bushfires.

Throughout the Region, there are high proportions of children in the population. This is particularly true in Mount Gambier, Grant and Tatiara. Children may be more susceptible to heat stroke, dehydration and sunburn, which means that outdoor activities involving children, such as organised sport, may require different scheduling. It also means that schools, community facilities and parks and playgrounds may need to provide additional shade.

More frequent and intense periods of extreme heat and bushfire, and more intense rainfall may see increased demand for volunteer emergency management. However, the existing pool of volunteers may become stretched and less able to contribute as they themselves are increasingly required to assist their own families, property and businesses.

The climate impacts will effect settlements in the Region, especially as they grow. Towns in the Region that are close to the coast and/or have a climate that is more amenable than other parts of the State may attract new residents. This growth may impact upon their township character and place pressure on natural resources such as

productive land and water. This growth may present particular challenges in coastal towns as they experience sea level rise or more frequent storm surge and coastal inundation. Sea level rise may also impact existing development, damaging or permanently inundating infrastructure.

The desire to conserve built heritage in some parts of the Region, such as Robe and Penola, may present difficulty for those wanting to improve the energy efficiency and thermal comfort of their buildings and adapt/update them to the changing climatic conditions.

### 9.3 ADAPTIVE CAPACITY

Adaptive capacity may vary throughout the Region at Council or even more localised levels due to diversity across a range of key demographic characteristics which are indicators of quality of life and wellbeing. For example:

- Grant and Naracoorte Lucindale have high household incomes
- Grant and Robe and small populations of their population that require assistance with core activities
- Low levels of educational attainment across the region
- Higher proportions of poor self-assessed health in the region than the rest of South Australia
- Mount Gambier and Wattle Range have low rankings on the SEIFA index of disadvantage
- Kingston has incomes well below State averages
- Mount Gambier, Grant and Tatiara have high proportions of children
- Grant has the highest proportion of 'working age' people
- Kingston and Robe have large populations of older people.

Each of these and other demographic indicators impacts on the ability to adjust to climate change impacts, cope with consequences and take advantage of opportunities. For example, those people who are better off in terms of household income and educational attainment may generally have greater capacity than low income households to make individual decisions regarding climate change adaptation, and the resources to draw upon in responding to climate hazards such as intense rainfall leading to flooding, heatwaves, extreme heat and bushfire.

On the other hand, communities with high proportions of children and older people may experience greater difficulty in adjusting to heat waves of increased duration and intensity. Similarly, those with poor health levels may find it harder to maintain their wellbeing during periods of extreme heat or if there is smoke associated with a bushfire.

While in comparison with the rest of South Australia the Limestone Coast does not contain high proportions of non-English speakers, some places in the Region have large numbers of new Australians and migrant workers. While these relatively new communities enrich many aspects of the Region's cultural life, they can present challenges for information provision and communication in an extreme event.

The community services delivered in the Limestone Coast by public and not-for profit organisations play a critical role in supporting individuals, families and communities experiencing vulnerability, disadvantage and inequality.

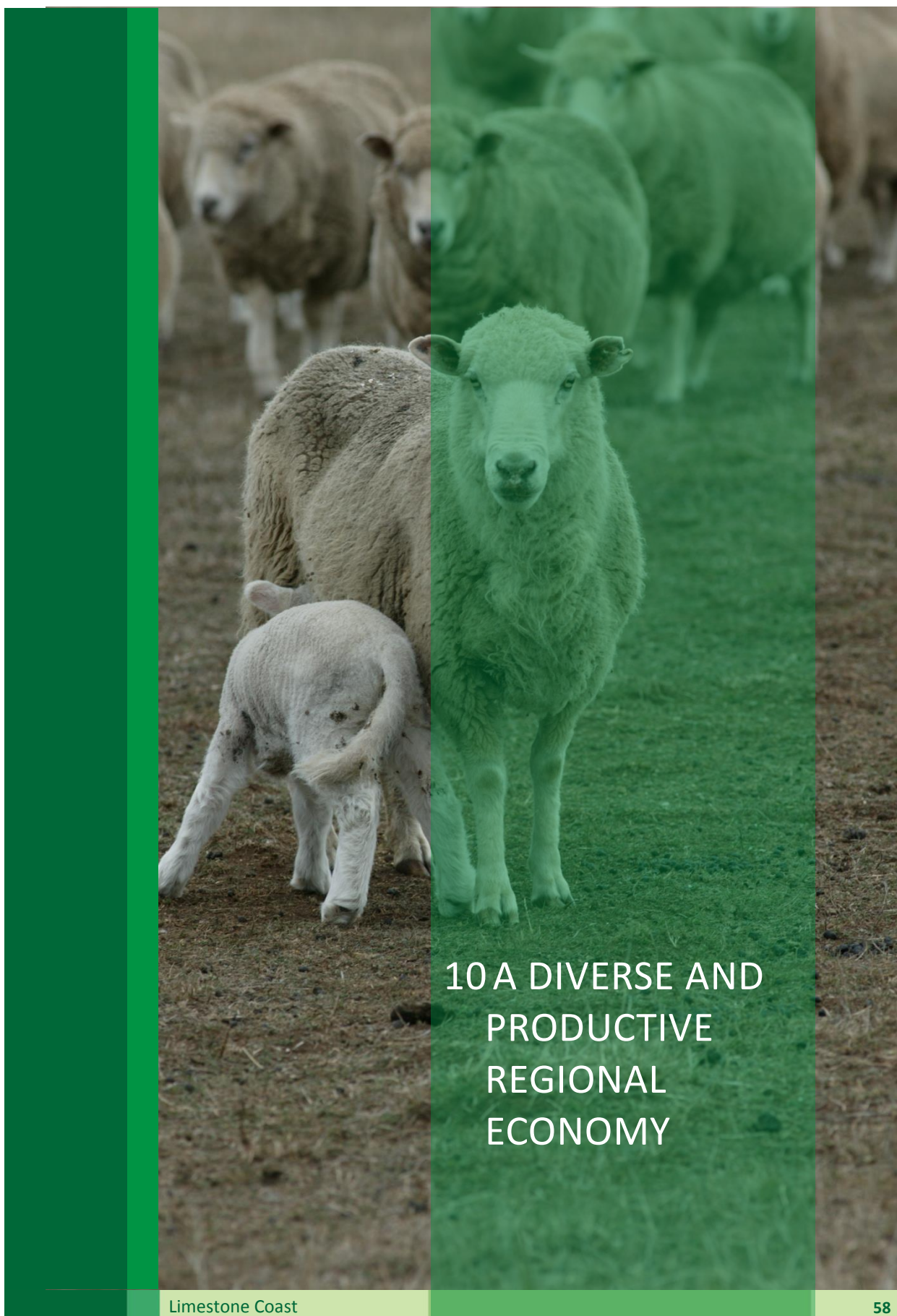
The Region contains the Community Services Round Table, a self-organised group where service provider stakeholders meet to talk about service delivery gaps and coordinate their activities. The support provided by these organisations, and the way they work together, contributes to the Region's resilience and the ability of these sections of the community to respond to change.

However, community services throughout the State are subject to resourcing constraints and service providers in the Region struggle to provide outreach services outside of the larger towns. In addition, the short term nature of funding regimes in the community sector creates uncertainty and difficulties in planning for the long term. This reduces adaptive capacity within the Limestone Coast.

Similarly, the significant amount of community infrastructure in the Region that provides space for service and program delivery and opportunities for informal connection and learning contributes to the community's capacity to adapt. Local governments in the Region who own and maintain a range of community facilities and infrastructure are facing increased resource constraints, along with continuing demand. This context has potential to reduce the adaptive capacity of this infrastructure, which if not maintained, in turn impacts the adaptive capacity of the Region's population in relation to health, wellbeing and safety.

State and Local Public Health Plans under the *Public Health Act 2011* identify preparing for climate change as a priority public health issue. The Tatiara, Kingston, Robe, Naracoorte Lucindale, Wattle Range and Grant Councils collaborated to prepare a regional wellbeing and public health plan. 'Preparing for Climate Change' is one of four themes of the Action Plan, containing actions about extreme weather events, plan for longer term weather change (e.g. shade, green space) and sea level rise. Mount Gambier is preparing its plan and will consult on it in the months ahead. There is opportunity for the Limestone Coast Regional Adaptation Plan to align with strategies in this plan to build on existing adaptive capacity in the Region around managing public health.

Emergency management planning that is underway in relation to emergency preparedness and response also contributes to adaptive capacity, particularly in relation to extreme events such as flooding, storm surge and bushfire. Community based emergency management programs play an important role in preparing vulnerable people for disasters such as bushfire and extreme heat and also contribute to adaptive capacity.



## 10 A DIVERSE AND PRODUCTIVE REGIONAL ECONOMY

## A diverse, modern and productive regional economy

<b>Description</b>	We value the range of activities we have undertaken historically in the Region such as agriculture, fisheries, forestry, food and wine and embrace new opportunities that will diversify and strengthen our economy into the future. We value tourism that showcases our natural and cultural assets, and adds value to a range of industries.
<b>Features/aspects of a diverse, modern and productive regional economy we value in the Limestone Coast</b>	South East/Limestone Coast identity Regional spirit Regional projects Collaboration and partnerships Leadership Service levels Infrastructure/ asset management Community expectations Financial stability and sustainability

### 10.1 EXISTING CONDITIONS

The Limestone Coast has a strong and diverse regional economy built upon a range of primary production and value adding activities. Agriculture, forestry and the fishing industry are significant industries for the Region, accounting for 20% of all direct employment compared with 5% for South Australia. Value adding industries such as timber, wine and potato processing as well as manufacturing and associated services provide considerable economic contribution to the Limestone Coast. The Region is also a popular tourism location with over 600,000 visitors a year.

In 2011/12, the regional economic product for the Limestone Coast was estimated to be \$3.4billion. **Table 10-1** summarises key regional economic data and shows that:

- Agriculture, forestry and fishing is the most significant economic sector, accounting for 31% of gross regional product and 20% of household income and 20% of jobs
- Manufacturing contributes more than 4,000 jobs and around 12% of regional output
- Construction is the third most significant sector in terms of regional product, but fifth in terms of jobs
- Retail trade is the fourth largest contributor to regional product, but the third largest sector for jobs, accounting for around 3,900 jobs.



**Table 10-1 Regional Economic Overview for the Limestone Coast, 2011/12** (Source: Department of Premier and Cabinet via data.sa.gov.au)

	Household Income		Gross Regional Product		Total Employment	
	(\$m)	(%)	(\$m)	(%)	(jobs)	(%)
Agriculture Forestry Fishing	350.6	20.20%	1,068.80	31.00%	6,032	19.6%
Mining	1.4	0.10%	1.8	0.10%	33	0.1%
Manufacturing	257	14.80%	428.2	12.40%	4,155	13.5%
Electricity Gas Water Waste	16.5	1.00%	40.2	1.20%	268	0.9%
Construction	192.8	11.10%	233.2	6.80%	2,396	7.8%
Wholesale Trade	100	5.80%	162.8	4.70%	863	2.8%
Retail Trade	128	7.40%	189	5.50%	3,871	12.6%
Accommodation Food Service	58.4	3.40%	98.2	2.90%	1,906	6.2%
Transport Postal Warehousing	87.3	5.00%	136.4	4.00%	1,266	4.1%
Info Media Telecom	13	0.80%	38.5	1.10%	236	0.8%
Finance Insurance	56.1	3.20%	137.7	4.00%	438	1.4%
Rental Hiring Real Estate	16.3	0.90%	30.8	0.90%	269	0.9%
Ownership of Dwellings	0	0.00%	175.6	5.10%	0	0.0%
Professional Scientific Technical Services	38	2.20%	54.9	1.60%	734	2.4%
Administrative Support Services	38.5	2.20%	40.7	1.20%	625	2.0%
Public Administration Safety	64.4	3.70%	78.9	2.30%	1,093	3.6%
Education Training	112.4	6.50%	124.5	3.60%	1,994	6.5%
Health Social Assist	145.9	8.40%	160.6	4.70%	3,094	10.1%
Arts Recreation Services	7.9	0.50%	10.1	0.30%	152	0.5%
Other Services	46.8	2.70%	55	1.60%	1,305	4.2%
<b>Total</b>			<b>3,443.90</b>	<b>100.00%</b>	<b>30,727</b>	<b>100.0%</b>

### 10.1.1 KEY ECONOMIC SECTORS

Primary production in the Region is highly diverse and closely relates to the different soil types and climate zones across the Region, and availability of water. Primary production in the Region includes:

- Cropping
- Seed production
- Livestock
- Dairy
- Horticulture, including potatoes and onions
- Viticulture
- Forestry
- Poultry.

Across the Region the typical cropping areas extend throughout the upper part of the Region. While all common grain types are grown in the Region, the higher rainfall and cooler climate permits many specialty grains and seed crops to be grown. Stocking rates for livestock increase with increasing rainfall in the general direction from the Upper Limestone Coast to the Lower Limestone Coast.

Horticulture, especially potato and onion production, exist in the Region where water quality and quantity and soil conditions are favourable. While once concentrated in and around Mount Gambier, horticulture now also exists in the upper Limestone Coast.

The Limestone Coast is known for its grape growing and wine production. There are six wine regions with nearly 300 growers covering a total area of nearly 16,000 hectares (see **Table 10-2**). The Limestone Coast wine grape production in 2012 vintage exceeded 89,000 tonnes or 12.7% of South Australia's wine grape production.

**Table 10-2 Wine production areas in the Limestone Coast** (Source: PIRSA Limestone Coast Region Development Potential For Agriculture, Forestry And Premium Food And Wine From Our Clean Environment November 2013)

Location	Area (ha)	Number of growers
Bordertown	1259	6
Coonawarra	5747	129
Mount Benson	505	18
Padthaway	3986	34
Robe	745	12
Wrattonbully	2660	57
Other	598	23
Limestone Coast Total	15743	299

Plantation forestry is a major contributor to the regional economy and together with the western districts of Victoria forms the Green Triangle Region. Softwood plantations have existed across the Limestone Coast for over 100 years, while the hardwood estates began from the 1980s. The sector is associated with around 10,000 direct and indirect jobs in the Region. A number of towns in the Region, especially Mount Gambier, Millicent and Penola have businesses servicing the forestry sector.

The Region contains significant crayfish industries, with commercial harvests of rock lobster and abalone contributing \$80M to the regional economy, and associated with around 400 fulltime jobs. The creation of the Upper and Lower South East Marine Parks protects the environment in which these species grow.

The Region's tourism sector is highly diverse, with tourists drawn to the Region's caves, lakes and sinkholes, conservation parks, premium food and wine, fishing, diving and surfing, and cultural experiences associated with, for example, Mary Mackillop. A range of organisations support tourism in the Region, including local Councils who run visitor information centres.

The South Australian Tourism Commission reports the value of tourism to the Region as follows:

- Annual tourism expenditure of \$285M
- 535,000 overnight visitors per year
- 59% of visitors from SA, 33% from interstate at 8% overseas
- 922 tourism businesses as of June 2012
- 1,087 hotel rooms as of June 2013.

### 10.1.2 ECONOMIC DIVERSIFICATION

The South Australian Centre for Economic Studies identifies that for the Limestone Coast:

- The typical worker is male and aged over 45 years a fact which is likely to contribute to skills shortages as baby boomers retire
- Structural and cyclical challenges in the agricultural and manufacturing sectors include an oversupply of wine grapes, milk price reductions
- Unemployment across the Region is consistently below the state average but varies within the Region
- The Upper South East typically has lower unemployment than the Lower South East
- The Region has lower levels of educational attainment in terms of high school completion rates and university qualifications and higher proportions of mature aged workers not participating in the labour force
- A priority of the Region is to provide skills training and development to build skills that are mobile and easily transferrable between industries
- Water is less a constraint on agricultural output than in other Regions of the State
- Energy production through geothermal and wind farms is contributing to a diversification of the economy and new employment opportunities
- The general climate, rainfall and greater water security position the Region for growth and strengthen its “food bowl” reputation, which is critical to establishing an international reputation as a guaranteed supplier
- The regional economy is far more diversified than other regions of the State, a fact that needs to be highlighted to strengthen the “supply capability and reputation” of the Region.

Although the regional economy is strong and already somewhat diverse, there is a strong local push to further diversify the economy to ensure lasting employment and growth for the Region. With this in mind, the Limestone Coast Economic Diversification Group has been established. The membership of the Group includes representatives from the South East Local Government Association, Regional Development Australia Limestone Coast and the South East Natural Resources Management Board. The group seeks to drive regional prosperity and has experienced success with projects linked to the State Government’s strategic priorities of ‘Premium Food and Wine from our Clean Environment’, and ‘Growing Advanced Manufacturing’.

These support the priorities from the RDA Limestone Coast Regional Roadmap, as follows:

- Increasing value adding to agricultural, marine and horticulture production of premium food and wine
- Increasing advanced manufacturing particularly in the forest and forest products industry
- Increasing exports and expansion of markets for regional products
- Maximising alternative energy production (wind, wave, biomass and geothermal)
- Developing industry clusters to maximise economic development within the Region
- Increasing Research and Development relevant to the Region's industries
- Providing support for Small Business development and sustainability.

### 10.1.3 REGIONAL INFRASTRUCTURE

Infrastructure underpins the community and the economy of the Limestone Coast, and contributes significantly to the creation of jobs, facilitation of commerce and the attraction of investment and new business to the Region.

The Region has a range of infrastructure which supports economic and community life, including:

- Water supply which in the Region comes from a combination of surface and ground water
- Wastewater distribution, supply and treatment infrastructure
- Stormwater assets, such as pipes, culverts, pits, channels, pump stations, basins (retention and detention), wetlands and biofiltration systems
- Waste transfer systems in each Council area
- Drainage that facilitates farming on waterlogged agricultural land
- Regional Road network, which includes national roads such as the Dukes, Princes and Riddoch Highways, State Government arterial roads and local streets, shared paths and footpaths
- Mount Gambier Airport, which has recently been upgraded
- Railways, such as the Adelaide-Melbourne line which stops in Bordertown, and currently unused railway corridors
- Coastal infrastructure such jetties and boat ramps and coastal paths
- Wind farms at Kongorong and Mt Benson
- SA Power Networks electricity distribution network, which delivers electricity to properties from the high voltage lines through substations and distribution lines, with six main transmission substations, located at Keith, Kincaid, Snuggery, Mount Gambier, Blanche and Penola Wes
- ElectraNet electricity transmission network
- Gas network in the Lower Limestone Coast associated with the Katnook/Ladbroke/Mount Gambier pipeline
- Telecommunications infrastructure.

Major infrastructure priorities for the Region, as articulated in the RDA Regional Roadmap, are:

- Championing the implementation of the Green Triangle Freight Action plan and road upgrades.
- Advocating for investment for the maintenance and upgrade of infrastructure associated with the South East Drainage and Watercourse network
- Influencing the upgrade of waste water treatment facilities.
- Promoting increased power availability and reliability, especially in the Upper South East.
- Promoting mobile phone coverage and high speed broadband availability.
- Supporting improved marine infrastructure to support the commercial fishing sectors and to boost tourism and recreational fishing.

A diverse, modern and productive economy requires sustained development of the Region's human capital, skills development, and a culture of research and development. The RDA Limestone Coast is championing the concept of an innovation hub for the Region to form the basis of research and development linked to key industries, such as forestry, agriculture and alternative energy.

## 10.2 SENSITIVITY TO CLIMATE FACTORS

Much of the Region's economic activity is dependent upon natural resources that will be directly impacted by reduced rainfall, increased temperatures, extreme heat, heatwaves, bushfire, increased intensity of rainfall events and sea level rise. For example:

- Cropping and livestock production may experience reduced crop yields and production of feed because of declining rainfall and increased temperatures, as well as reduced crop biomass to protect soils from erosion
- Irrigated agriculture, such as dairying and vegetable production, is highly vulnerable to changes to the hydrological regime and periods of extreme heat, with possible impacts including greater incidence of pests, fruit and vegetable sunburn, pollination failure, changes to optimum growing periods and locations, reductions to water licenses and increased costs of pumping water
- Wine industry may experience reduced yield and quality of wine grapes because of changed timing in the annual cycle of growth and greater reliance on irrigation
- Plantations forests are vulnerable to bushfire, greater water usage as warmer temperatures increase evapotranspiration, slower growth rates associated with reduced rainfall, increase risk of pests, tissue damage and tree mortality during periods of extreme heat
- Commercial fishing may experience a changed timing of life-cycle events such as spawning in abalone, and increased growth rates of some species as a result of warmer ocean temperatures.

Bushfire may impact a range of primary production activities in the Region. The Ash Wednesday Bushfires of 1983 burnt out more than 100,000 hectares of land in the Region – not only native vegetation or plantation forests, but also other forms of primary production. For example, vines, grain crops, stock and farming equipment can all be destroyed by fire. Bushfires can also result in smoke taint on wine grapes.



There are economic opportunities associated with some climatic changes. Some horticultural crops, such as frost-intolerant crops may benefit from a warmer climate as this may increase yields. Other crops may benefit from earlier ripening. Increasing average temperatures may reduce the susceptibility of parts of the Region to waterlogging, and increase rates of photosynthesis for plantation forestry, increasing growth rates.

Beyond direct primary production, secondary economic activity such as processing and manufacturing may experience a range of impacts including:

- Disruption to essential services such as electricity and telecommunications during extreme events
- Difficulties for movement of people and goods around the Region due to disruptions associated with extreme events, such as roads blocked by bushfire or flooding
- Infrastructure and buildings may be damaged during extreme events requiring shut down periods
- Increased costs, such as higher operating costs associated with power usage and insurance excesses, capital costs associated with retrofitting and additional maintenance, and disruptions to supply chains
- Accelerated depreciation of assets
- Ensuring occupational health and safety of employees working outdoors during extreme heat, heatwaves and extreme rainfall.

The tourism sector is sensitive to extreme events such as heatwaves, intense rainfall and bushfire as it may reduce opportunities to participate in outdoor activities and events. While some special events may be able to be rescheduled, others cannot, and many tourism experiences cannot take place during extreme heat or bushfire. A major bushfire could have a significant impact on the tourism industry, particularly if major assets and access infrastructure are affected.

The relatively amenable nature of the Region's climate compared with the rest of the State may see an increased demand for coastal tourism experiences. Jetties and tourism infrastructure such as Beachport and Port MacDonnell jetties, and the boat ramps scattered along the coast are at risk from coastal inundation due to sea level rise and accelerated deterioration from more frequent storms and inundation.

Development and infrastructure in the Region is vulnerable to flooding, extended heatwaves, bushfire and sea level rise. Increased temperatures and fluctuating hydrological patterns may cause the drying of land and ground movements which may result in the accelerated deterioration of the Region's extensive road and drainage infrastructure. Infrastructure located in bushfire prone areas is very sensitive to bushfire and can result in infrastructure being damaged or destroyed. Existing development located in close proximity to the coast will be sensitive to sea level rise and coastal inundation as a result of storm surges.

Stormwater infrastructure comprises assets such as pipes, culverts, local and main drains, pits, open channels, junction boxes, pumping stations, wetlands and trunk drains. These infrastructure elements provide protection to homes and infrastructure from major flooding, storm events and coastal inundation, and may not be effective due to increased rainfall intensity or storm surge/coastal inundation.

Increased strain on electricity transmission and distribution infrastructure may be experienced due to higher temperatures and increased use of air conditioning. The additional pumping of water to irrigate in periods of high temperatures may add to this demand. This has the potential to result in network capacity issues and failures.

Planning for underground infrastructure may also need to change, as impacts from sea level rise causes issues such as saline intrusion of aquifers. Changes to groundwater quality may accelerate the deterioration of underground infrastructure.

### 10.3 ADAPTIVE CAPACITY

The diversity of the Limestone Coast's economic structure, particularly diversity within the primary production sector contributes to the Region's adaptive capacity. The range of primary production activities in the Region means that there is a diverse knowledge base about different approaches to land and water management approaches, which underpins the Region's ability to adopt new approaches as the climate changes. It also means that there is knowledge about many different forms of primary production, which may assist the transition to different primary production activities.

The Limestone Coast has a strong history of sustainable land management in a range of areas, such as weed control, revegetation and soil management. These proactive approaches to land management may help the Region adapt to climate changes. A recent study by DEWNR<sup>6</sup> regarding the climate change impacts on South Australia's cropping zone found that adaptation responses are largely consistent with current 'best practice', such as good land management to reduce erosion and prevent soil moisture loss.

In addition, the strong history of research and development in a range of primary production sectors may assist the transition to different climatic regimes. For example the wine sector is already undertaking considerable research about approaches to manage possible climate impacts through delayed pruning to change levels of shading and different irrigation practices.

Likewise, a range of options are known that underpin the forestry sector's adaptive capacity, such as changing the spacing of trees, increasing use of firebreaks and fuel reduction activities, growing species that are better suited to different climatic environments and retaining biomass after harvest.

The adaptive capacity of the fisheries sector is closely linked to existing resource management strategies, which can be adjusted in response to climate impacts. For example, it is possible to adjust size limits if 'size at maturity' changes, review catch limits or incorporate climate change projections into stock assessment modelling.

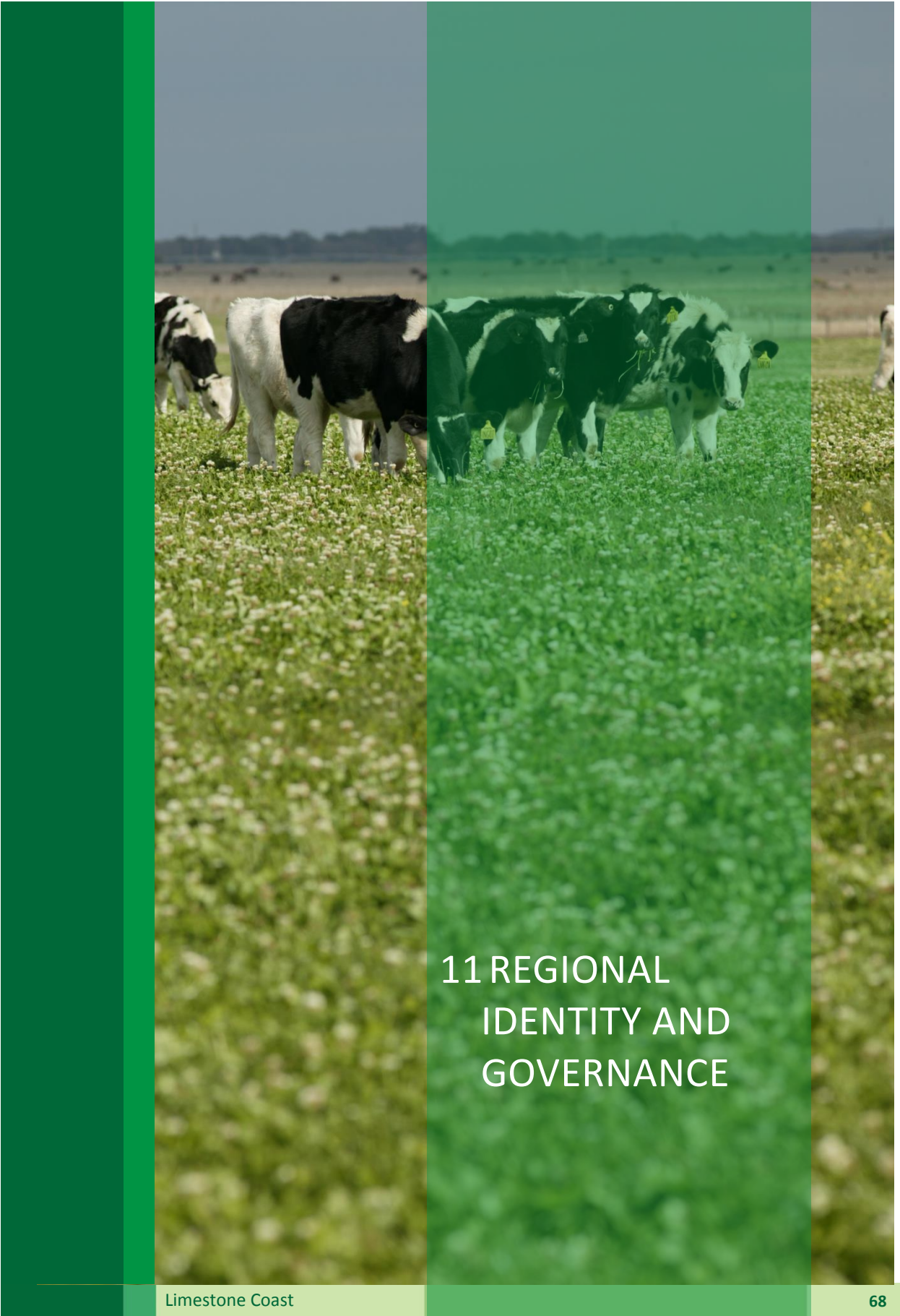
Ongoing efforts around research and development, skills training and innovation will develop the region's adaptive capacity and will help to diversify the economy. Similarly, emerging industries such as renewable energy are already diversifying the Region's economic and jobs base.

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<sup>6</sup> Department of Environment, Water and Natural Resources (2013) *Investigating Climate Change Impacts in South Australia's Cropping Zone*

For the manufacturing, processing and value-adding sectors of the regional economy, the adaptive capacity of many private enterprises is likely to be linked with the ability to maintain power during extreme events and the ability to access transport and supply chains.

Nature based tourism businesses and outdoor events have lesser adaptive capacity as they are more vulnerable to cancellation and/or rescheduling. Current event planning practices already include measures which aim to reduce impacts of heat for example, provision of free water and attendance of first aid officers which contribute to adaptive capacity.



## Regional identity, collaboration, good governance and financial sustainability

<b>Description</b>	<p>We value our regional identity. We are proud of the way we use initiative and creativity, and how we work together as a Region.</p> <p>We value good governance, and the delivery and management of infrastructure and services in ways that are financially sustainable and meet community expectations.</p>
<b>Features/aspects of regional identity, collaboration, good governance and financial sustainability we value in the Limestone Coast</b>	<p>South East/Limestone Coast identity</p> <p>Regional spirit</p> <p>Regional projects</p> <p>Collaboration and partnerships</p> <p>Leadership</p> <p>Service levels</p> <p>Infrastructure/ asset management</p> <p>Community expectations</p> <p>Financial stability and sustainability</p>

### 11.1 EXISTING CONDITIONS

There are three key structures or institutions that are central to governance in the Region. These are:

- Local government (via individual Councils as well as the South East Local Government Association)
- Regional Development Australia (RDA) Limestone Coast
- South East Natural Resources Management (SENRM) Board.

These three major regional bodies support a range of other regional partnerships, such as the Limestone Coast Economic Diversification Group, the Limestone Coast Collaborative that is working on regional branding, and the Human Services Round Table.

Local government, RDA Limestone Coast and the South East NRM Board regularly partner on a range of projects to work together and advance regional objectives. The Limestone Coast has a strong regional identity which is based on the Region's:

- Natural resources (e.g. highly productive land, access to reliable rainfall and groundwater, natural environments such as wetlands, mallee scrub, coastal areas, caves and diverse landscapes)
- Diverse economy (e.g. agriculture, forestry, fishing, manufacturing, construction and retail)
- Quality of life (e.g. attractive place to live and work).

The Limestone Coast Region is made up of seven Local Government Areas (LGAs or Councils): Grant, Kingston, Mount Gambier, Naracoorte Lucindale, Robe, Tatiara and Wattle Range. Each Council is governed by an Elected Member body under the Local Government Act 1999, supported by an administration that implements the Council's functions and responsibilities day to day.



Under the Local Government Act, local government's role includes to:

- Provide and coordinate various public services and facilities and to develop their communities and resources in a socially just and ecologically sustainable manner
- Encourage and develop initiatives within their communities for improving the quality of life within them
- Exercise, perform and discharge the powers, functions and duties of Local Government in relation to their areas, as contained in the Local Government Act 1999 and other Acts.

These responsibilities are realised in a large number of activities undertaken by the Limestone Coasts Councils in the provision of infrastructure and services including but not limited to:

- Provision and maintenance of physical assets such as roads, footpaths, open and public space, formal and informal recreational facilities, and buildings for community use
- Planning and development strategy, policy, and regulation
- Public health activities ranging from immunisations to food hygiene inspections to programs to support active lifestyles and healthy eating
- Community development and education including library services, education, social and cultural programs, and community support programs
- Community engagement and education and the encouragement of civic participation in community life and Council decision making
- Economic development including initiatives to support local business
- Waste collection and management
- Environmental management.

Each Council is required by legislation to prepare a Strategic Management Plan every 4 years that identifies its objectives, the activities it will undertake, and measures to assess its performance. The Strategic Management Plan must be accompanied by a 10 year financial plan and 10 year infrastructure and asset management plan. Along with the requirements of various legislation (for example the Development Act 1993 and Disability Discrimination Act 1992) form the corporate framework for other documents that guide Councils' activities such as:

- Annual business plans and budgets
- Strategic Directions Reports that outline a vision for development in the Council area and a program of planning policy change
- Service specific plans and strategies such as Open Space Strategies, Ageing Strategies, Emergency Management Plans, and Disability Discrimination Act Action Plans.

The South East Local Government Association (SELGA) undertakes a coordinating, advocacy and representational role on behalf of its Constituent Councils (Grant, Kingston, Mount Gambier, Naracoorte Lucindale, Robe, Tatiara and Wattle Range). It is a regional subsidiary representing its Constituent Councils and is established pursuant to Section 43 of the *Local Government Act 1999* by the Constituent Councils.

As a regional body, SELGA provides an important role in regional planning and its involvement ranges from:

- Initiating projects of relevance to the region such as the 2030 Transport Strategy and investigations regarding the future infrastructure needs of airports owned and operated by regional Councils
- Participating in regional projects such as the Green Triangle Freight Action Plan and the Limestone Coast Economic Diversification Forum and Reference Group
- Collaborating with other organisations/ bodies to develop and deliver projects such as the
- Providing local government representation on regional projects such as the development of the Regional Development Australia Limestone Coast Roadmap and Integrated Land Use and Transport Strategy
- Providing or administering funding to projects of relevance to the region such as the South East Resource Information Centre, engagement of a STARCLUB field officer
- Advocacy on key regional issues, for example leading a state-wide campaign to strengthen quarantine restrictions to protect the potato industry and advocating for regional mental health services.

RDA Limestone Coast is an important coordinating body for economic activity within the Region. RDA Limestone Coast supports informed regional planning, engages with the community on regional development issues, liaises with Governments and communities around services, grants and initiatives that support regional development, and contributes to business growth plans, investment strategies, environmental solutions and social inclusion strategies.

RDA Limestone Coast has a modest funding base and negotiates to attract additional funding to the region to deliver business and community development programs in partnership with various state and federal government agencies. Examples of projects or activities undertaken by RDA Limestone Coast include:

- Tourism Industry Development program
- Skills for Jobs in Regions Program
- TradeStart Program support
- Mid to Upper Limestone Coast Small Business Advisory Service
- Apprenticeship Traineeship Advisor program
- Providing regional intelligence to various stakeholders and Government agencies
- Cellulose Fibre Value Chain Project

The Limestone Coast Region forms part of the South East Natural Resources Management Region, within which the *Natural Resources Management Act 2004* is administered by the South East Natural Resources Management Board and Department of Environment, Water and Natural Resources (DEWNR) staff. The Board works with government agencies, local governments and the community to deliver projects across the Region which help achieve the targets identified in the Region's NRM Plan.

The SENRM Board is currently reviewing its Regional NRM Plan which includes developing sub-regional plans for the following sub-regions:

- Mallee Region
- Tatiara Region
- Lower South East Region
- Dunes and Flats.

A wide range of projects and programs are undertaken by the Board in the Region including:

- Land management and biodiversity projects, including landscape planning and habitat restoration
- Community education programs
- Aboriginal partnerships
- Water allocation planning for the prescribed water resource areas
- Coast and Coorong action planning
- Pest plant and animal management

The Board is comprised of a group of community, state and local government members who make decisions about regional investment in NRM, derived from the NRM Levy in conjunction with the Regional NRM Plan. In addition to resourcing by DEWNR staff to undertake NRM work in the Region, volunteers provide assistance via organized programs such as Friends of Parks groups (11 in the Region) and Weed Spotters which is a network of members for surveillance of new weed species in the region.

Other State Government services, plans, and legislative responsibilities (for example transport, health, and education services) are delivered in the Region through local agencies and facilities, for example bus services, schools, and Child and Family Health Centres.

## 11.2 SENSITIVITY TO CLIMATE FACTORS

Governance has a role in all aspects of service delivery and meeting community expectations across the Region, and in all of the Limestone Coast regional values identified by this project. Each value (caring for the natural environment, looking after our land, management of water resources, community participation, quality of life, wellbeing and services, diverse and productive regional economy) has a relationship to aspects of governance such as leadership, financial sustainability, agreement on service levels, infrastructure provision, achievement of community expectations, and coordination, collaboration and partnering amongst regional stakeholders.

Accordingly, where aspects of these values are sensitive to climate factors, the implementation of governance arrangements in relation to that value will potentially be affected.

Under future climate conditions (e.g. increased extreme heat, heatwaves, more frequent extreme events such as flood and bushfire), delivery of services by individual Councils and regional partnerships may be impacted by increasing demand at the same time as static or decreasing resources. For example people may rely heavily on Council buildings and services to seek refuge during extreme events such as bushfires and extreme heat may see increased numbers of vulnerable people seeking assistance. These and a number of similar scenarios are expected to be more frequent than currently experienced.

From a governance perspective, the impacts of climate change on the community will create pressure for the Region to do more with less. This has the potential to place strain on financial and human resources, test existing service delivery arrangements, and impact on the achievement of strategic objectives and service level agreements. As demands increase on local governments, servicing of partnership agreements may become more challenging. There may be a need for changes to strategic objectives as priorities shift, and for more responsive and adaptable planning and implementation practices to support service delivery. Community expectations will play a role in how organisations can and will respond under future climate conditions in delivery of routine services and in response to extreme events.

In terms of the Region's identity, economic activity and quality of life are significantly dependent upon natural resources that will be impacted by projected climate changes related to reduced rainfall, increased temperatures, extreme heat, bushfire and increased intensity of rainfall events. Each of these aspects are inextricably linked to each other and as changes occur in one, effects will be felt by the others. The effects however, may not all be negative. For example, as temperatures change in other areas of the South Australia and Australia, the Limestone Coast may become a more desirable place to live due to comparatively lower average temperatures.

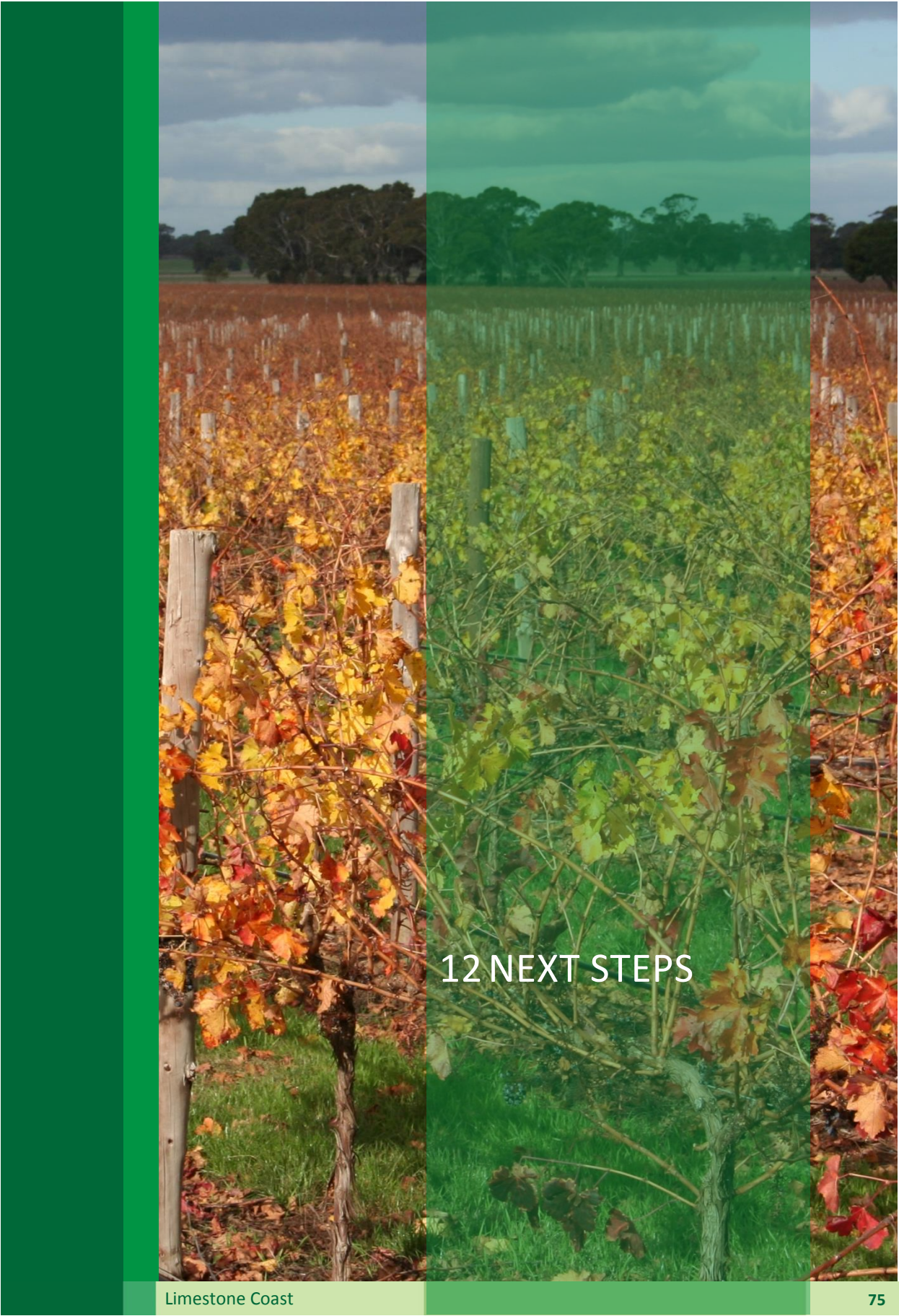
### 11.3 ADAPTIVE CAPACITY

In this context that governance and the Limestone Coast's values are linked, features and aspects of governance within the Region also contribute to the Region's adaptive capacity.

The large number of strategies, plans, policies and procedures in place that support the Region's values provide tools with which the Region addresses current objectives and challenges – for example natural resources management, emergency management, asset management, urban development, economic development and community health and wellbeing. Implementation of such documents and practices strengthens the Region in their area of focus, contributing to its adaptive capacity, but also forms a mechanism that can be adapted and built upon in responding to future climate challenges. For example, current maintenance regimes and budgets associated with community buildings in the Region support ongoing sustainable use of the infrastructure, and it is easier to adjust the current regime to account for the impacts of hotter and drier weather than attempt to adapt with no current regime in place and where strategic maintenance of buildings has not occurred.

The Region's stakeholders' existing partnership arrangements such as those between the SELGA, RDA Limestone Coast and the SENRM Board demonstrate cooperative approaches that deliver community benefit and efficiencies that contribute to financial sustainability in the Region. These cooperative structures contribute to the Region's adaptive capacity by providing mechanisms for a coordinated and integrated approach to issues and goals experienced at a regional scale – which climate conditions will be. The experience of the Region's stakeholders of participating in these partnerships constitutes experience and 'corporate knowledge' that will benefit a collaborative response to future climate challenges.





## Next steps

The information collated in this report provides the framework and key point of reference moving into the next stage of the Limestone Coast Regional Climate Change Adaptation Plan project.

This report is a key source of information to assist in completion of stage two which involves undertaking an Integrated Vulnerability Assessment (IVA), which in turn will form the basis of the Limestone Regional Climate Change Adaptation Plan.

Information within this report such as the values and regional profile supports key aspects of the IVA including the selection of indicators against which to assess vulnerability, and consideration of the sensitivity and adaptive capacity of the Region in relation to those indicators.

The discussion of sensitivity and adaptive capacity provided in sections 5 to 11 will inform more detailed consideration of sensitivity and adaptive capacity in collaboration with stakeholders in the IVA stage of the project.

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## Appendix A

Documents reviewed to identify the Regional Values



Documents that were reviewed to identify the Regional values comprised the following:

- Strategies for a Prosperous and Resilient Mount Gambier: A Futures Paper for City Development
- City of Mount Gambier Strategic Plan-Beyond 2015
- District Council of Grant, Strategic Management Plan 2012-2016
- District Council of Robe, Strategic Plan 2014-2018
- Kingston District Council, Strategic Plan 2012-2016
- Community Survey on Natural Resources Management in the South East NRM Region, General Public CATI Survey
- Naracoorte Lucindale Council, Strategic Plan 2013-2023
- Limestone Coast Regional Roadmap 2013-2016
- Limestone Coast Economic Diversification: Building a more prosperous future
- South East Regional Natural Resources Management Plan
- South East Natural Resources Management Board Values, Field Day Posters, Survey Fact Sheets and Community Survey on NRM
- Development of Conceptual models for major social and ecological systems in the South East NRM Region
- Summary Report: Development of socioecological subregional boundaries for Natural Resources Management in the South East NRM Region
- Tatiara District Council, Shaping Our Future Strategic Management Plan 2012 to 2016
- Limestone Coast Region Plan: A Volume of the South Australian Planning Strategy
- Limestone Coast Region: Development Potential for Agriculture, Forestry and Premium Food and Wine from Our Clean Environment