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Future Drought Fund

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GOVERNMENT OF WESTERN AUSTRALIA

GREAT SOUTHERN Development Commission

Regional Context

Coastal Great Southern Regional Drought Resilience Plan

Great Southern Development Commission

2025

Acknowledgement of Country

Ngala kattidj nidja Noongar moort boodja wer gorah-gorah wer yy-i wer mila. Ngala koort-kwab nidja boodja-k wer kattidj netingar wer bee-dee-eer wer gorah-gorah wer yy-i wer mila.

We acknowledge this is Noongar people's country from long, long ago to now to the future. We are happy to be on this country and acknowledge ancestors and elders from long, long ago to now to the future.

This report was prepared by Keston Economics Pty. Ltd. on behalf of the Great Southern Development Commission. This report supports the Coastal Great Southern Regional Drought Resilience Plan.

TABLE OF CONTENTS

1. Purpose of Document 4

2. Megatrends 6

3. Geographic Context 8

3.1 Location and Landscape 8

3.2 Climate 9

3.3 Distances and Connections 9

3.4 Traditional Ownership 10

3.5 Geographic Strengths, Challenges, Needs and Opportunities 11

4. Demographic Context 12

4.1 Current Population 12

4.2 Population Projections 14

4.3 Age Profile 15

4.4 Ethnicity 16

4.5 Income and Cost of Living 17

4.6 Employment 19

4.7 Demographic Strengths, Challenges, Needs and Opportunities 23

5. Economic Context 24

5.1 Gross Regional Product 24

5.2 Industry Output and Value Added 26

5.3 Imports and Exports 27

5.4 Wages and Salaries 29

5.5 Industry Concentration (Broader Great Southern Region) 30

5.6 Industry Sector Overview 31

5.7 Economic Strengths, Challenges, Needs and Opportunities 47

6. Infrastructure Audit 48

6.1 Transport Links 48

6.2 Water 52

6.3 Energy 63

6.4 Communications 66

6.5 Infrastructure Strengths, Challenges, Needs and Opportunities 67

Appendix A: Inventory of Public Water Supply Schemes in the Great Southern Region 68

Appendix B: Albany Hinterland Prospective Groundwater Resources Map 70

1. Purpose of Document

The Department of Primary Industries and Regional Development (DPIRD) and the Great Southern Development Commission (GSDC) have joined forces to deliver Regional Drought Resilience Plans (RDRPs) for the Great Southern region. These plans aim to provide an understanding of drought and its impacts and identify opportunities for building resilience in agriculture and related industries in the region.

The Coastal Great Southern Regional Drought Resilience Plan (RDRP) encompasses the City of Albany, Shires of Denmark and Plantagenet and the Frankland River subdivision of the Shire of Cranbrook. It provides a proactive roadmap for building drought preparedness and resilience in the coastal subregion.

This Regional Context component of the broader RDRP is one of five work packages, with the other four including Drought Vulnerability Assessment (DVA), Stakeholder Engagement, Action Planning, and Report Finalisation. This Regional Context is therefore not a standalone document but will be integrated with other work packages to form the final Coastal Great Southern Regional Drought Resilience Plan.

There are three core elements of this Regional Context work package:

- Regional contextualisation (geographic, demographic and economic contexts).
- Infrastructure audit.
- High level modelling exploring industry sectors of specialisation / growth and size.

2. Megatrends

Megatrends are macroeconomic and geostrategic forces that are shaping the world, representing some of society's biggest challenges and opportunities. Megatrends can change rapidly, through disruptive innovation (e.g. rapid advancements in robotics and artificial intelligence, the development of the sharing economy and increasing awareness and policy shifts around climate change).

CSIRO (2022)[1], Ernst and Young (2017)[2] and PwC (2016)[3] have all described these trends in detail, with parallels in technology, globalisation and demographics. Adapting observations from these studies, five current global megatrends impacting the region can be summarised as:

Table 1. Summary of global megatrends

Rapid Urbanisation	More than half the world's population live in urban areas and almost all of the new growth will take place in lesser-known medium-sized cities of developing countries. How cities evolve will be determined by the collective actions of governments, people and businesses. It is critical to focus interventions not just on the 'smart city', but on the smart town and the smart village, enabling an interdependent ecosystem that counters rapid organisation to the mega city. Urbanisation will increase cities' economic and public policy influence, even as it strains their ability to grow in sustainable ways. Migration and immigration will also have profound impacts on workforces and economic development. In turn, **increasing urbanisation in WA will present both challenges and opportunities for the Coastal Great Southern region, including a need for greater production / food security and greater demand for the construction and manufacturing industries.**
Climate Change & Resource Scarcity	As the world becomes more populous, urbanised and prosperous, demand for energy, food and water will rise. But the Earth has a finite amount of natural resources to satisfy this demand. Without significant global action, average temperatures are predicted to increase by more than two degrees Celsius, a threshold at which scientists believe significant and potentially irreversible environmental changes will occur. As demographic trends push the world's population to 9.7 billion by 2050, natural resource constraints (whether in availability or infrastructure) will challenge established modes of consumption, from the individual through to global corporate supply chains. For the Coastal Great Southern, **these trends will impact on farming practices as rainfall patterns shift and have consequences for energy options, particularly decarbonisation. There will also be resource and energy implications for the construction and manufacturing industries.**
Globalisation & Shifts in Global Economic Power	As a result of trade liberalisation (not withstanding recent re-emergence of trade tensions and protectionary measures such as those between the US and China) and emerging market growth, globalisation has accelerated in recent decades. This has the potential to disrupt existing business models by creating new competitors, reordering supply chains and lowering prices. The next waves (including the emergence of Africa and a more multipolar world) will increase complexity and require flexible business models to respond to global shifts. Globalisation includes the growing middle-class in Asian and Africa countries. Globalisation is also supporting an increasing trend for people to choose places to live based on quality of life, rather than traditional access to physical services, predominantly supported by advances in ICT, shifting employment perspectives and improved connection to global markets. These trends were accelerated by COVID-19. Similar effects are encouraging a revolution of digital nomads, enabling them to move from place to place whilst working for themselves or employers remotely. Geopolitical tensions, such as the Russo-Ukrainian war and Israel–Hamas war, also have significant impact on trade, access to resources, and resource pricing. For the Coastal Great Southern, **these trends represent global competitiveness challenges but also many opportunities, for example in demand for primary produce and food, Asian tourism and citizen consumers (demand for provenance in food products).**
Demographic & Social Change	By 2030, the world's population is projected to rise by more than 1 billion (to 8 billion) and age significantly as people live longer and on average have fewer children. All countries will need to implement bold policies to cope with these demographic changes. In the decades ahead, "hotspots" with relatively high birth rates will make Africa and India engines of economic opportunity. Aging populations will have a profound impact on a broad range of social and economic issues, from healthcare to real estate, and in developed economies, tech savvy millennial-dominated workforces may struggle to support a large ageing population. For the Coastal Great Southern, **the ageing population represents both a challenge and an opportunity in increased demand in health and aged care sectors but also requiring a skilled service sector workforce.**
Technological Breakthroughs	The digital revolution has changed behaviour and expectations as much as the tools used to deliver new services and experiences. Many of today's largest and leading organisations and businesses developed in an era of scarce, expensive and rigid technology. Delivering change for them is a complex proposition. Born digital businesses are change ready. In our lifetime, successive waves of the IT revolution (PC, online, mobile, social) have democratised data, empowered consumers and spawned scores of new industries. The Fourth Industrial Revolution[4] (Internet of Things, virtual reality, artificial intelligence (AI), robotics, automation) now underway has the potential for faster and more revolutionary changes in our economy. For the Coastal Great Southern, **technological advances will have consequences on competitiveness but also opportunities to attract "digital nomads" and improve productivity in many industry sectors, particularly in primary production and manufacturing.**

3. Geographic Context

3.1 Location and Landscape

The wider Great Southern region covers an area of 39,000 km2 on the southern coast of WA. The region's capital is Albany, with other principal towns being Mount Barker, Denmark, Kojonup and Katanning. Approximately 81% of the region's population live in the south west of the region, along the coast.

As illustrated in Figure 1, the localities covered by this Coastal Great Southern Regional Drought Resilience Plan (RDRP) include the largest regional population centres of the City of Albany, Shire of Denmark, and Shire of Plantagenet, as well as the Frankland River subdivision of the Shire of Cranbrook (the western expanse of the Shire of Cranbrook categorised under the Australian Bureau of Statistics (ABS) 'Suburbs and Localities' geography type).

Figure 1. Great Southern region and local government boundaries – Coastal Great Southern boundary highlighted yellow

The region has mountain ranges with rocks more than 570 million years old, jarrah, marri, karri and mallee woodlands, salt lakes and an ancient sandplain to the south, formed 40 million years ago when inundated by ocean flooding. Approximately 50-60% of the Coastal Great Southern is cleared for agricultural purposes. Key remaining vegetated areas include:

- Mount Lindsay National Park (north of the Denmark townsite).
- William Bay National Park (along the coast to the west of the Denmark townsite).
- Striling Ranges National Park (Western Australia's only mountain range, the southern half of the park sits within the Shire of Plantagenet).
- Porongurup National Park (east of Mount Barker within the Shire of Plantagenet).
- West Cape Howe National Park (situated along the coast within the western expanse of the City of Albany).
- Torndirrup National Park (situated upon Torndirrup Peninsula directly south of the Albany CBD).
- Gull Rock National Park (to the east of the Albany CBD).
- Various smaller nature reserves, such as Owingup, Quarram, Two Peoples Bay, Mount Manypeaks, and Tinkelup).

3.2 Climate

Southern WA is known for its Mediterranean climate, with hot and dry summers and most rainfall in winter. The entire region, including Coastal Great Southern LGAs, is within productive agricultural climate zones, with rainfall decreasing along the coast west to east and inland away from the coast. Primary production is fundamental to the regional economy. In contrast to the Inland Great Southern's smaller rural communities with a strong focus on grain and livestock production, the Coastal Great Southern has a cooler more temperate climate, stronger population growth and an economy based more on horticulture/poultry, seafood, timber and tourism.

3.3 Distances and Connections

Outside of relatively high-cost flights between Albany and Perth, Coastal Great Southern populations are largely connected and serviced by road networks, including Albany Highway (Perth to Albany via Mount Barker), South Coast Highway (west of Albany through Denmark and east of Albany towards Jerramungup), and Muir Highway (west of Mount Barker towards Manjimup in the South West). Frankland River townsite is accessed north off Muir Highway via Frankland-Rocky Gully Road or west off Albany Highway via Cranbrook-Frankland Road. The shortest road transport distances between primary cities and towns within the subregion are as follows.

Table 2. Road network distances (kms) between key cities and towns in the Coastal Great Southern subregion

Industry exploits on the same road network as the general population but is also serviced by rail transportation of

	Albany	Mount Barker	Denmark	Frankland River	Perth
Albany (City of Albany)	0	51	54	119	418
Mount Barker (Shire of Plantagenet)	51	0	54	69	368
Denmark (Shire of Denmark)	54	54	0	114	421
Frankland River (Shire of Cranbrook)	119	69	114	0	331
Perth (capital city of WA)	418	368	421	331	0

bulk commodities (predominantly grain and woodchips) or sea transport via Albany Port (predominantly exporting grain, wood chip, and minerals and importing fertiliser).

3.4 Traditional Ownership

The Noongar people are acknowledged as the traditional custodians of the lands of the Great Southern. The Wagyl Kaip Southern Noongar region refers to the Noongar dialectal groups, Ganeang, Goreng and Menang from the Great Southern area.

The Coastal Great Southern largely sits within the Menang dialectal boundary, though the northern expanses of the Frankland River subregion sit within the Ganeang dialectal boundary.

The Wagyl Kaip Southern Noongar region includes the entire Great Southern region, but also parts of the eastern expanses of the South West region and western expanses of the Goldfields-Esperance region. Wagyl Kaip Southern Noongar lays east of the South West Boojarah region and south of the Gnaala Karla Booja region. The approximate size of the Wagyl Kaip Region is 52,246 sq kms.[5]

Figure 2. Wagyl Kaip Southern Noongar boundary

3.5 Geographic Strengths, Challenges, Needs and Opportunities

In line with the above, the following geographic strengths, challenges, needs and opportunities have been identified for the Coastal Great Southern.

Table 3. Geographic strengths, challenges, needs and opportunities

Strengths	Challenges
1. Cooler and more temperate climate, providing more diverse primary production opportunities (e.g. fruit, nuts, vegetables, wine grapes, dairy, poultry, timber, nursery products, etc.). 2. Access to the coast to support diversified primary production and other industry opportunities, particularly associated with fishing and aquaculture. 3. Access to the coast and Port of Albany provides strong export opportunities to support primary production and other industries. 4. Coastal positioning provides additional energy and water production opportunities which continue to emerge through technological advances (e.g. wave/tidal energy, desalination, green hydrogen production, etc.).	1. The distance from the state's capital, Perth, creates several challenges, including road, water and energy infrastructure capital development and maintenance times and costs, industry transport times and costs, and community isolation. 2. Distance impacts all industries and sectors that are heavily reliant on export and/or import, particularly primary production, construction, and tourism (in the context of destination visitor import). 3. Distance also impacts the attraction and retention of residents, directly through access and isolation, and indirectly through industry challenges (e.g. materials transport, construction delays, and costs of goods and services relative to Perth or closer regional areas).
Needs	**Opportunities**
1. Attraction/retention of residents, businesses & visitors. 2. Greater support and channels for primary production exports. 3. Expanded port capacity is needed to support primary production, mineral and, potentially, container exports. 4. Improved & diversified tourism packages, infrastructure development and promotion, to overcome the barrier of distance from the metropolitan area. 5. Expansion of aviation services to/from Perth (and potentially elsewhere) is required for the growth of the tourism and events sectors. 6. Enhanced opportunities for domestic and international transport networks. 7. Investment is required in inter-regional transport routes, including east-west links to meet the needs of residents, tourists and industry.	1. Enhanced community assets and infrastructure will serve to attract and retain residents. 2. Enhanced industry infrastructure and networks will serve to attract, retain and support businesses/ encourage industry development and expanded output. 3. Enhanced transport, business and trade infrastructure can encourage private investment into regional industry. 4. Strong and informed tourism and economic development initiatives can stimulate key growth sectors, such as construction, retail trade, arts and recreation, rental, hiring and real estate services. 5. Enhanced assets and infrastructure, with consequent growth in population and visitation, will increase opportunities for private and/or public investment in transport infrastructure and networks.

4. Demographic Context

4.1 Current Population

Latest Australian Bureau of Statistics (ABS) data[6] (2021 Census) records the population of the Great Southern region as 61,880 (Figure 3), with a compound annual growth rate (CAGR) of 1.12% over the last decade. Most of this growth is attributable to Coastal Great Southern LGAs (a combined CAGR of 1.43%*), with the Inland Great Southern experiencing a 0.19% annual decline over the same period.

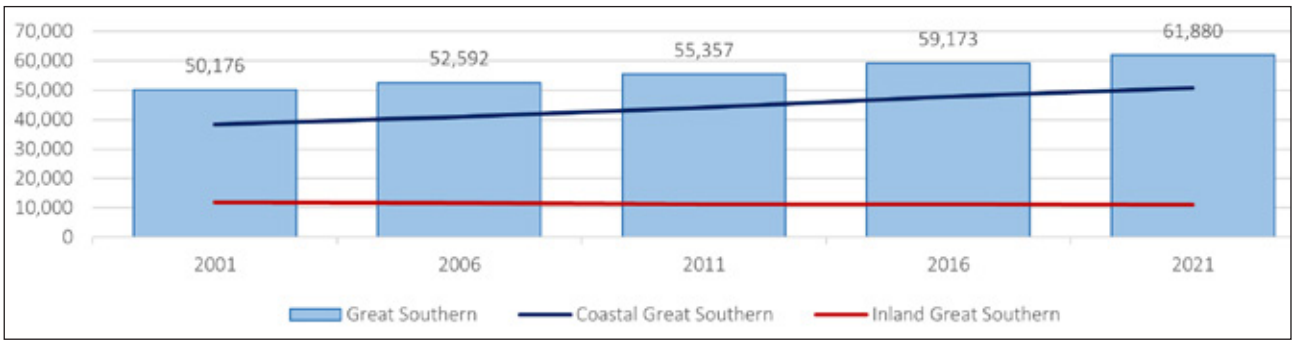


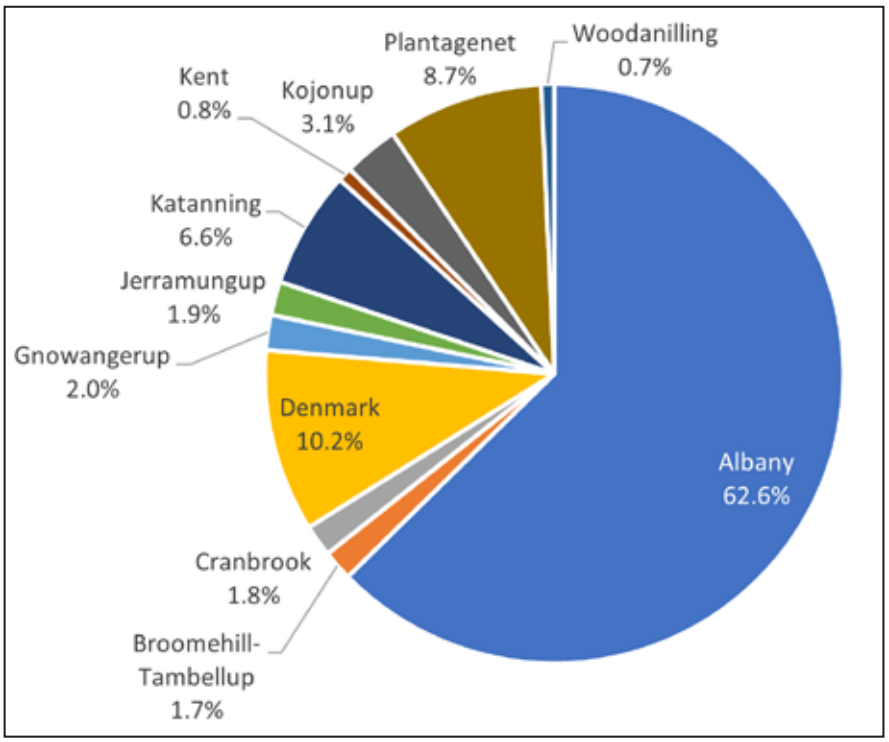
Figure 3. Great Southern population growth (ABS 2021)

* Data for the Frankland River subdivision is estimated for 2001 and 2006 as data does not exist at this level for 2001 and covers a different boundary line (Frankland) for 2006. The population of Frankland River is expected to have been relatively stable / stagnant over the past two decades, in line with data from the past decade.

The eleven LGAs in the region are identified in Table 4. 62.6% of the population reside in the City of Albany, with other notable areas including the Shires of Denmark (10.2%), Plantagenet (8.6%), and Katanning (6.6%). Coastal Great Southern LGAs (including the Frankland River subdivision) make up 82.1% of the total regional population.

Table 4. Great Southern Population distribution (ABS 2021)

LGA	2021 Population	CAGR 2011-21
Albany	38,763	1.42%
Broomehill-Tambellup	1,046	-0.85%
Cranbrook	1,100 †	0.19%
Denmark	6,310	1.97%
Gnowangerup	1,215	-0.45%
Jerramungup	1,160	0.95%
Katanning	4,057	-0.21%
Kent	491	-0.42%
Kojonup	1,901	-0.42%
Plantagenet	5,388	0.99%
Woodanilling	448	0.67%



The latest release[7] of regional population statistics from the ABS was in March 2024, showing that in 2022-23, Perth experienced the highest growth rate (3.6%) of any capital city across the country. Both Brisbane and Perth were the only state capitals to have net positive internal migration gains (i.e. migration from other domestic states). Strongest migration was from overseas (a 59,331 net increase in Perth). While Greater Perth grew by a total of 81,318 people in total, the rest of the state only grew by 8,115 (1.4%).

† Of which 353 residents were counted for the Frankland River subdivision (32.1%).

The datasets provide a closer look at migration by LGA. Despite only having 2.3% of the total state population at the time of the 2021 census, net migration in the Great Southern represented 9.6% of all net regional migration in the state between 2022 and 2023 (8.3% for Coastal Great Southern LGAs). The region grew at an average annual growth rate (AAGR) of 2.7% from 2021.

Interestingly, strongest growth was identified in Kent and Woodanilling (an AAGR of 3.3% and 3.4%, respectively). As regional centres, Albany and Katanning have also performed well (both with an AAGR of 2.8%). Strongest growth across the region is identified between 2021 and 2022. This is consistent with more anecdotal evidence for substantial growth from regional bankers (new accounts opened), mortgage brokers (loan applications) and real estate agents (house sales and rental demand).

Table 5. Estimated regional population growth 2021-2023

	2021 (Census)	2022	2023	AAGR
Albany	38,763	40,434	40,949	2.8%
Broomehill-Tambellup	1,046	1,087	1,095	2.3%
Cranbrook	1,100	1,141	1,149	2.2%
Denmark	6,310	6,539	6,618	2.4%
Gnowangerup	1,215	1,264	1,269	2.2%
Jerramungup	1,160	1,196	1,213	2.3%
Katanning	4,057	4,237	4,290	2.8%
Kent	491	510	524	3.3%
Kojonup	1,901	1,976	1,967	1.7%
Plantagenet	5,388	5,587	5,669	2.6%
Woodanilling	448	470	479	3.4%
Great Southern	**61,880**	**64,441**	**65,222**	**2.7%**
Coastal Great Southern	**50,814**	**52,560**	**53,236**	**2.4%**
Greater Perth	2,116,647	2,228,020	2,309,338	4.5%
Regional Western Australia	543,379	563,774	571,889	2.6%
Western Australia	2,660,026	2,791,794	2,881,227	4.1%

4.2 Population Projections

Denmark (1.97%) and Albany (1.42%) are the only LGAs which have registered annual growth in excess of the Great Southern average (in the ten years between the 2011 and 2021 Census), which itself is reduced overall by some shires experiencing negative growth. All Coastal Great Southern LGAs experienced growth over the past decade, though the Frankland River subdivision itself experienced a negligible -0.03% CAGR.

Population declines in the Inland Great Southern LGAs are likely to be associated with state-wide and national trends for agricultural regions, where large population bases are increasingly unnecessary for productive agriculture practices, together with farm consolidation and the application of technology to improve productivity. In contrast, Coastal Great Southern growth is likely reflective of both population transfer (e.g. from LGAs experiencing decline) and in-migration by lifestyle retirees (e.g. “sea-”, “tree-changers” and “climate refugees”). However, as above, all Great Southern LGAs, including inland, appear to have experienced considerable growth over the past two years, in line with the rest of the state.

Overall growth is expected to continue or accelerate, particularly as the population of WA is predicted to almost double by 2066, projected to 4.9 million[8]. This growth is likely to be dominant in the existing urbanised areas of WA, although regional communities will need to assume a portion of the growth.

It is projected that there will be continued growth in regional centres, such as Albany, and the towns in close proximity to them (e.g. Denmark and Mount Barker). Balancing the management of growth in coastal towns with improving the sustainability of northern and eastern rural communities represents a major challenge for the region. Current projections are for the total regional population to reach 68,980 by 2031; with Western Australian Planning Commission (WAPC) Band D most closely reflecting growth over the last decade (Figure 4). This represents a CAGR of 0.89%. For the Coastal Great Southern (Figure 5), growth is predicted with greater certainty and at a greater rate. Once again, Band D is most reflective of historic growth rates, with the WAPC data suggesting a population of 58,220 by 2031 (a CAGR of 1.22%).[9]

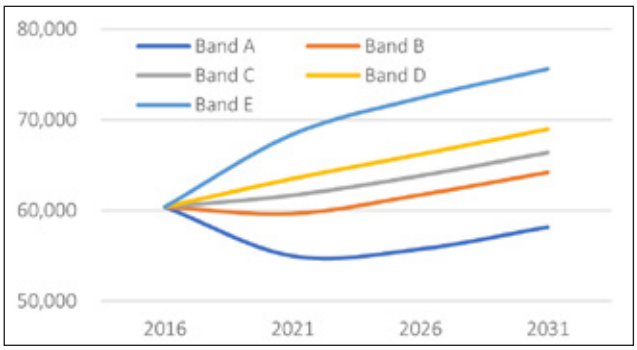


Figure 4. Great Southern population forecast

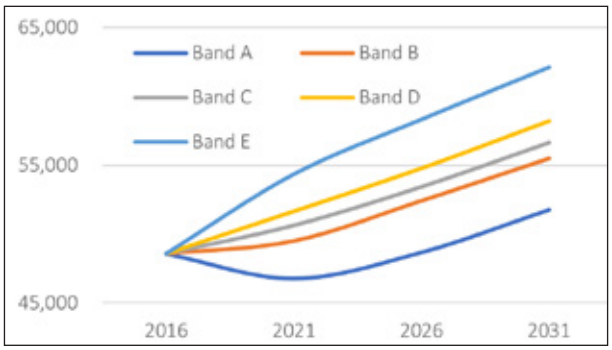


Figure 5. Coastal Great Southern population forecast

To date, these forecasts are aligning reasonably well with ABS population counts (albeit slightly lower than the 1.43% experienced in the decade before the latest census and much lower than recent post-COVID growth rates). It is difficult to predict if the expanded growth over the last two years will continue into the future, but if it does, it will place considerable pressure on existing infrastructure and services, necessitating investments far in excess of that planned or currently achievable (based on the contractor availability and development timeframes).

4.3 Age Profile

It is notable that regional Australia is ageing faster than the national average. A higher proportion of adults aged over 45 live in regional areas; the need to access education, employment and other facilities may account for the larger proportion of younger and middle-aged adults in capital cities. In Greater Perth, 27.1% were 55 or over in 2021. In regional areas state-wide, this was 31.0% (and even higher across the Coastal Great Southern at 38.6%). The median age for the Coastal Great Southern is 46, up from 42 in 2011.

The higher old age dependency ratio in regional areas indicates that a great number of seniors migrate from cities to regional areas.[10] This trend is no different in the Coastal Great Southern, which has a much higher proportion of older residents and a significant shortfall of young adults when compared with Greater Perth and even the average across all regional areas of WA (Figure 6). The number of residents over 55 also rose significantly between 2011 and 2021, and at a far greater rate than any other age bracket (Figure 7).

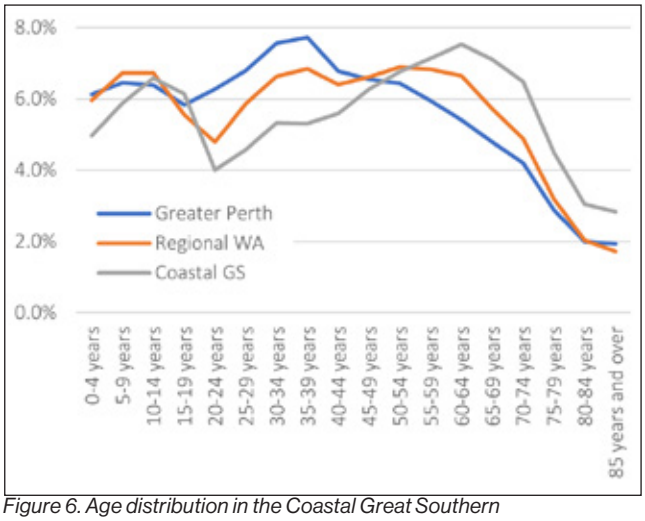


Figure 6. Age distribution in the Coastal Great Southern

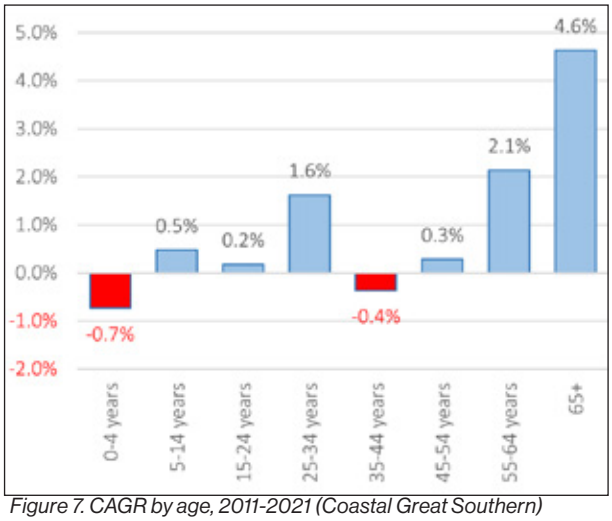


Figure 7. CAGR by age, 2011-2021 (Coastal Great Southern)

The WAPC expect this trend to continue throughout the region toward 2031 (Figure 8). Current and projected growth is consistent with other coastal areas in Australia that have experienced strong in-migration by retirees and lifestyle/'sea-changers' over recent years. For upper Great Southern LGAs, the effect is accentuated by continued population decline and outmigration of youth, coupled with current resident choices to age in place.

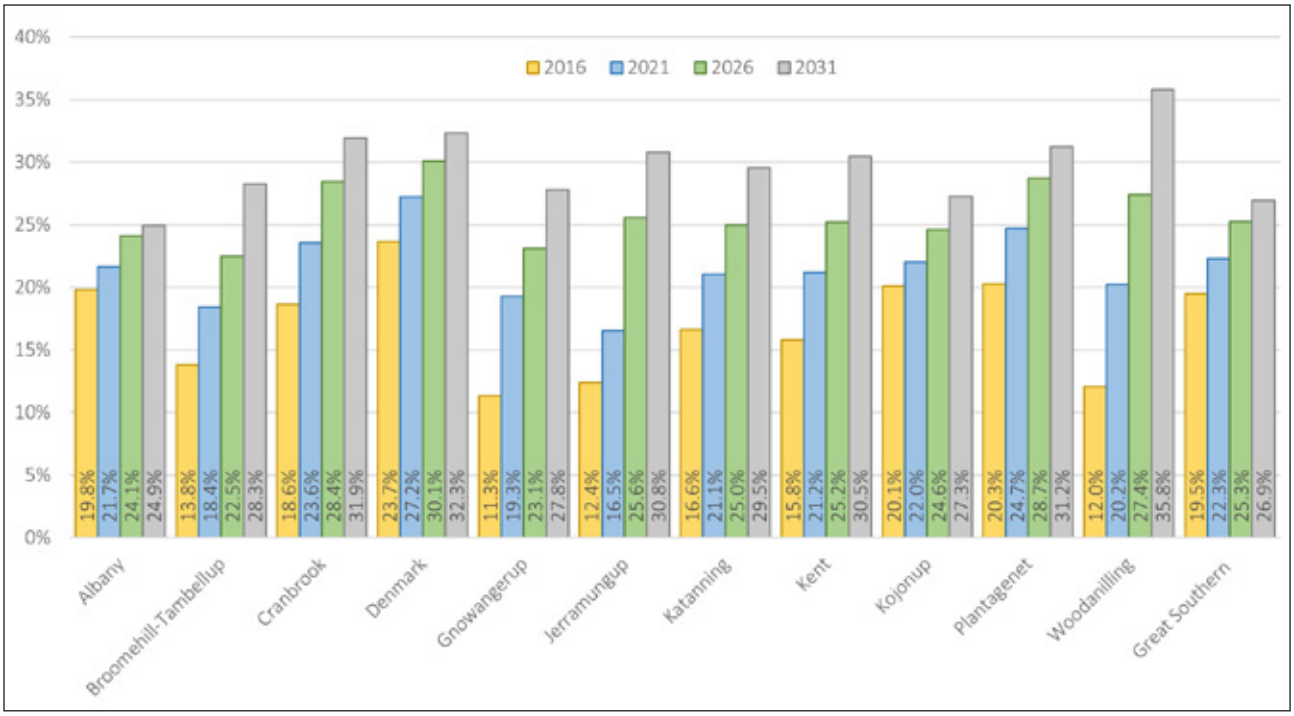


Figure 8. Estimated % of population aged over 65 – DPLH WA Tomorrow 2016

This age profile will lead to increased demand in the aged care, housing, retail, recreation and lifestyle industries. It will also require a skilled service sector workforce, drawn from existing unemployed or under-employed residents and from attracting additional workers to move into the region.

4.4 Ethnicity

As recorded in the 2021 census (ABS), over a quarter of the Coastal Great Southern's population (26.2%) were born overseas, with a general upward trend since 2001 (up from 21.9%).

The highest proportions of persons born overseas were recorded in Denmark (32.8%) and Plantagenet (30.7%). Immigration for employment in specific industries (e.g. agriculture and food production) or through humanitarian visa programs also contribute to multiculturalism. It is well recognised that immigration makes a net positive contribution to economic growth and provides a work force for several industries (e.g. the region's abattoirs and healthcare and social support).

Nevertheless, the increasing trends towards multiculturalism require the consideration of all members of the community when planning for the future.

Those identifying as Indigenous or Torres Strait Islander in 2021 have increased to 3.4% in the Coastal Great Southern, up from 2.5% in 2001. Denmark and Frankland River have a relatively low Indigenous population compared to the state average. In contrast, Albany and Plantagenet have slightly higher proportion of Indigenous residents than the state. While the region's Aboriginal workforce is employed across the full range of professions, trades and other occupations, they suffer a significantly higher overall level of disadvantage in terms of socioeconomic status and resources. Initiatives that will grow economic and employment opportunities for Aboriginal residents are therefore fundamental to the long-term prosperity of the region. The South West Native Title Settlement (SWNTS) can make a significant contribution to closing the gap and there is a need to ensure the best possible regional implementation and facilitate Indigenous-defined and led initiatives.

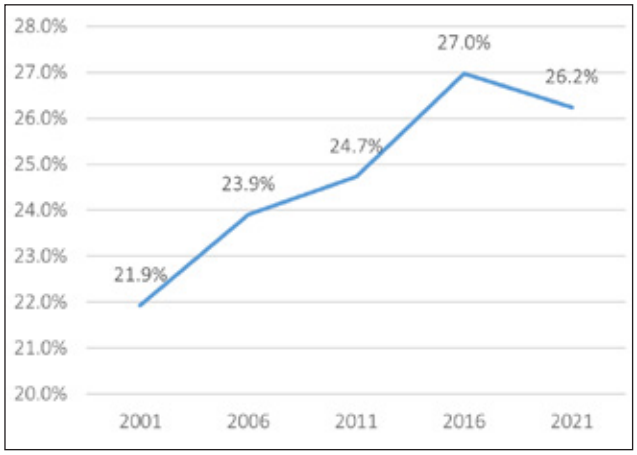


Figure 9. Persons born overseas (Costal Great Southern)

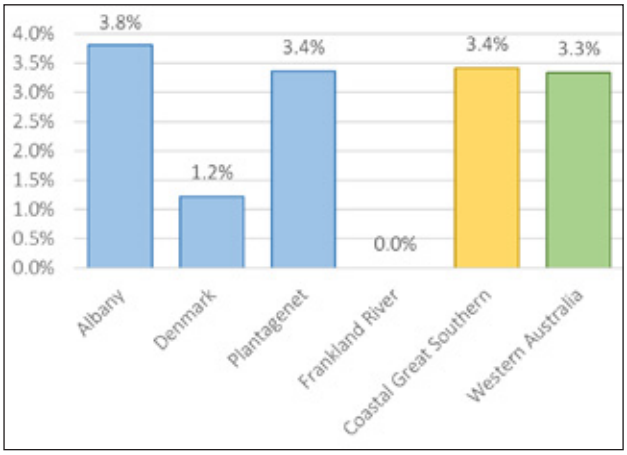


Figure 10.Indigenous proportion of population

4.5 Income and Cost of Living

As recorded by ABS in the 2021 census, median weekly income in Coastal Great Southern areas is lower than the state and national averages across all income measures. However, incomes have largely increased faster than the state average over the decade between 2011 and 2021. National income increase has been greater, however. Frankland River has a relatively high median income, and this has increased at a faster rate than all other local government areas, the state and national averages.

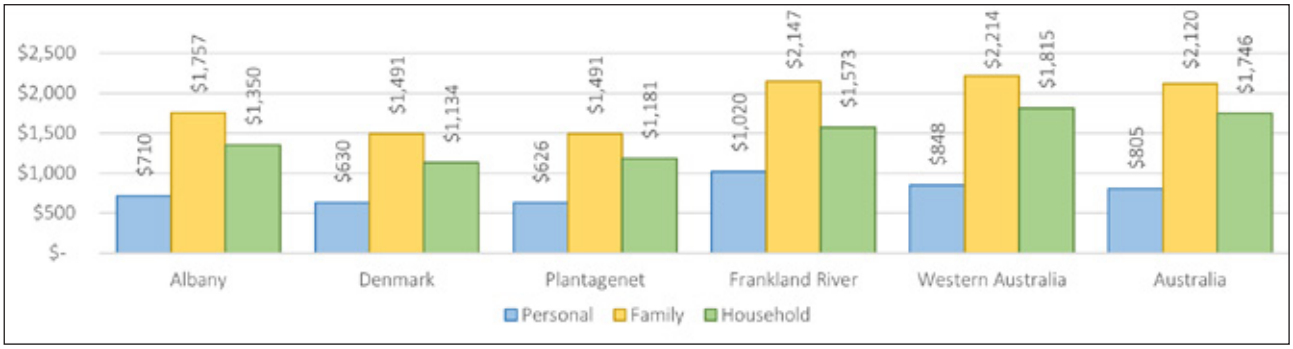


Figure 11. Median incomes across the Coastal Great Southern

Table 6. Growth in median incomes, 2011-2021

	Albany	Denmark	Plantagenet	Frankland River	Western Australia	Australia
Personal	36.0%	34.0%	33.2%	64.5%	28.1%	39.5%
Family	38.5%	43.1%	36.4%	74.3%	28.6%	43.1%
Household	34.6%	33.7%	33.0%	59.9%	28.3%	41.5%

Despite lower incomes in most areas, the cost of living for working families is either comparable or slightly higher than Perth. The 2023 Regional Price Index[11] is the eleventh state government Index contrasting the cost of a common basket of goods and services at various regional locations with the Perth metropolitan region. The Great Southern scores 102.6, Albany 102.9, and Denmark 102.3 (no other Coastal Great Southern LGAs or localities are individually identified in the report). The region fares better overall than the far remoter Gascoyne, Kimberley and Pilbara regions. Only the Mid West and South West have a lower overall cost of living than Perth, with Peel close to even.

Table 7. DPIRD regional price indices - cost of living (2023)

	Gascoyne	Goldfields-Esperance	Great Southern	Kimberley	Mid West	Peel	Pilbara	South West	Wheatbelt
Overall	105.5	102.0	102.6	108.9	99.3	100.1	115.0	99.3	101.1
Food	100.7	100.3	100.2	107.3	100.5	98.7	102.0	97.4	102.2
Clothing	106.8	101.9	101.7	104.8	100.3	101.6	102.4	100.5	101.5
Housing	110.7	101.9	104.8	113.0	97.1	99.6	140.6	100.4	99.1
Household Equipment & Operation	102.7	101.4	100.6	106.7	101.0	101.4	103.5	99.3	101.8
Transportation	105.7	103.9	103.6	109.4	100.2	101.6	108.7	98.6	102.1
Tobacco & Alcohol	106.7	100.9	100.5	107.0	98.1	101.9	106.7	100.1	104.5
Health & Personal Care	102.4	105.3	101.5	105.2	102.9	101.9	110.0	100.8	101.0
Recreation & Education	103.6	102.1	103.6	106.6	98.5	98.8	101.1	99.1	101.7

4.6 Employment

4.6.1 Industry of Employment

According to the 2021 Census, the majority of people in the Coastal Great Southern are employed in the health care and social assistance (16.0%), retail trade (10.9%), agriculture, forestry and fishing (10.8%), education and training (9.5%), and construction (9.0%) industries. This is largely skewed by the proportionally high population of the City of Albany, where the health care and social assistance industry employs 17.1% of the total workforce (in line with its role as a regional service centre). Construction and education and training are also large employers in Albany and Denmark. In Plantagenet and the Frankland River subdivision, agriculture, forestry and fishing dominates all other industries. The industry also makes a strong contribution to Albany and Denmark employment.

Table 8. Proportion of workforce employed by industry (2021)

Industry	Albany	Denmark	Plantagenet	Frankland River	Coastal Great Southern
Accommodation and Food Services	8.0%	9.0%	4.8%	3.8%	7.7%
Administrative and Support Services	2.7%	3.7%	2.0%	0.0%	2.7%
Agriculture, Forestry and Fishing	7.0%	9.7%	27.0%	60.2%	9.8%
Arts and Recreation Services	1.2%	1.5%	1.0%	0.0%	1.2%
Construction	9.5%	10.1%	6.2%	5.4%	9.2%
Education and Training	9.7%	11.4%	8.2%	8.6%	9.7%
Electricity, Gas, Water and Waste Services	1.2%	0.5%	0.5%	0.0%	1.0%
Financial and Insurance Services	1.4%	1.2%	0.8%	0.0%	1.3%
Health Care and Social Assistance	17.1%	12.6%	10.5%	0.0%	15.8%
Information Media and Telecommunications	0.7%	0.6%	0.0%	0.0%	0.6%
Manufacturing	5.3%	6.1%	7.4%	16.1%	5.7%
Mining	2.5%	4.9%	3.0%	1.6%	2.8%
Other Services	4.3%	3.4%	3.4%	0.0%	4.1%
Professional, Scientific and Technical Services	3.9%	5.4%	2.9%	0.0%	4.0%
Public Administration and Safety	6.4%	5.9%	6.6%	1.6%	6.3%
Rental, Hiring and Real Estate Services	1.4%	1.1%	0.8%	0.0%	1.3%
Retail Trade	11.7%	8.6%	7.3%	0.0%	10.8%
Transport, Postal and Warehousing	3.8%	3.0%	5.1%	2.7%	3.8%
Wholesale Trade	2.4%	1.2%	2.4%	0.0%	2.2%

Of employment within the agriculture forestry and fishing industry, 80% is associated directly with agriculture. Employment across sectors varies between locality, with greater diversity in Albany, as identified below.

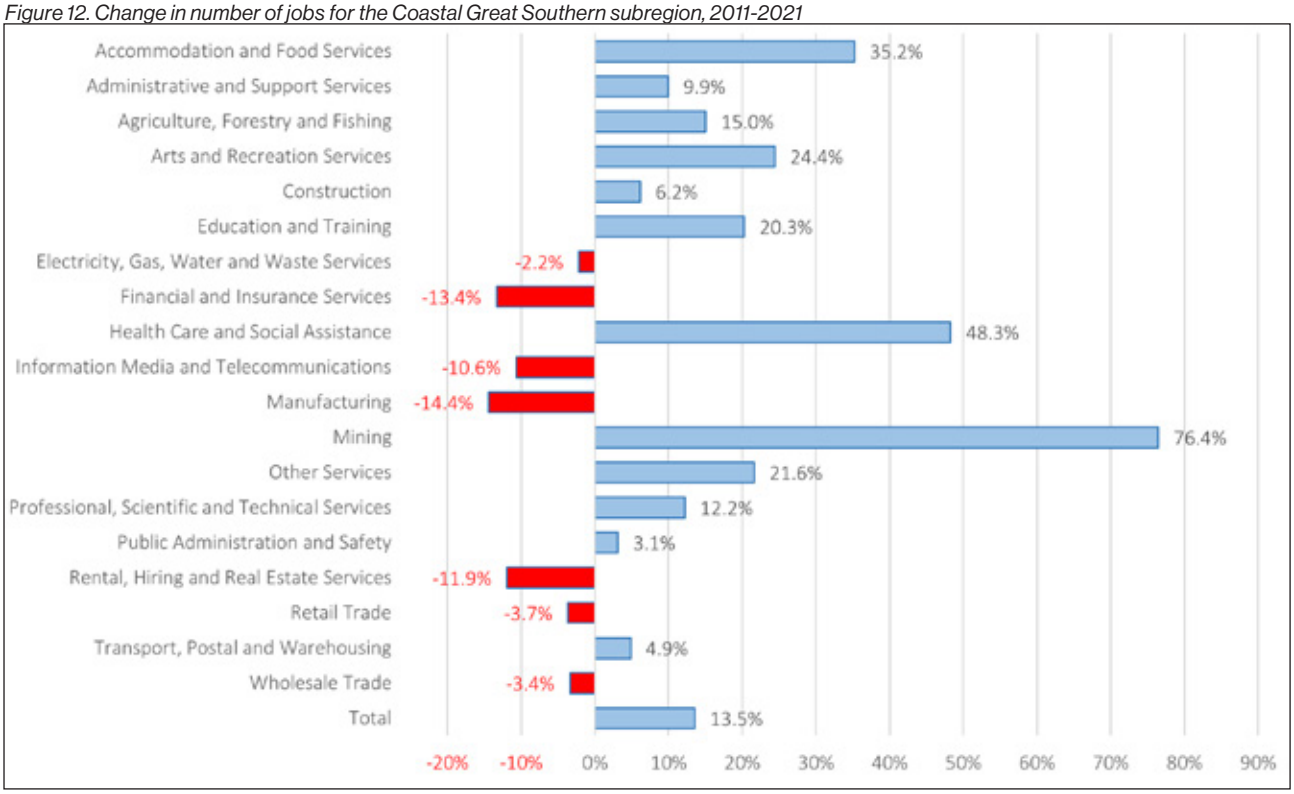
Table 9. Breakdown of employment by sector within the agriculture forestry and fishing industry

Industry Sector	Albany	Denmark	Plantagenet	Frankland River	Coastal Great Southern
Agriculture, Forestry and Fishing, nfd	1.4%	1.6%	1.5%	0.0%	1.4%
Agriculture	72.3%	88.1%	90.3%	90.2%	80.0%
Aquaculture	1.9%	2.1%	0.5%	0.0%	1.5%
Forestry and Logging	11.9%	1.6%	1.7%	0.0%	7.3%
Fishing, Hunting and Trapping	3.5%	1.6%	0.0%	0.0%	2.1%
Agriculture, Forestry and Fishing Support Services	8.0%	4.1%	5.9%	0.0%	6.6%

4.6.2 Industry Job Change

Coastal Great Southern employment has been steadily increasing, experiencing an average of 13.5% growth across all industries (an increase of 2,607 jobs) between 2011 and 2021. Greatest job declines were experienced in manufacturing (-14.4%), financial and insurance services (-13.4%), and rental, hiring & real estate (-10.6%). Growth was led by mining (+76.4%), health care & social assistance (+48.3%), and accommodation & food services (+35.2%). Agriculture, forestry and fishing also had strong jobs growth across the subregion (15.0%), with the highest level of growth in the City of Albany (23.7%). Albany and Denmark recorded the greatest job change in the subregion (15.1% and 14.2%, respectively, compared to 3.5% for Plantagenet). The Frankland River subregion experienced job decline (-1.6%).

Figure 12. Change in number of jobs for the Coastal Great Southern subregion, 2011-2021



4.6.3 Median Age by Industry

Across all industry, the median age is 44. Lowest median age is recorded in the accommodation, and food services industry (34), and the equal highest in the agriculture, forestry and fishing and transport, postal and warehousing industries (50). Whilst lowest median age is consistent in the accommodation and food services industry for each locality within the subregion, industries with the highest median age vary somewhat; for example, as the agriculture, forestry and fishing for Albany and Frankland River, arts and recreation services for Denmark, and financial and insurance services for Plantagenet.

Table 10. Median age by industry

	Albany	Denmark	Plantagenet	Frankland River	Coastal Great Southern
Agriculture, Forestry and Fishing	50	54	49	51	50
Mining	43	48	44	N/A	44
Manufacturing	41	39	41	40	41
Electricity, Gas, Water and Waste Services	45	42	N/A	N/A	45
Construction	41	43	47	43	42
Wholesale Trade	42	49	46	N/A	43
Retail Trade	38	43	40	N/A	39
Accommodation and Food Services	33	39	38	N/A	34
Transport, Postal and Warehousing	49	55	50	32	50
Information Media and Telecommunications	37	N/A	N/A	N/A	37
Financial and Insurance Services	44	47	63	N/A	45
Rental, Hiring and Real Estate Services	46	54	54	N/A	47
Professional, Scientific and Technical Services	46	51	45	N/A	47
Administrative and Support Services	45	49	47	N/A	46
Public Administration and Safety	48	52	52	N/A	49
Education and Training	47	49	48	41	48
Health Care and Social Assistance	46	48	49	N/A	46
Arts and Recreation Services	39	57	46	N/A	42
Other Services	42	43	46	N/A	42
All Industry	**43**	**46**	**44**	**44**	**44**

4.6.4 Unemployment

The currently reported Coastal Great Southern unemployment rate of 2.6% is considerably lower than 3.6% for WA and 3.7% across Australia (December 2023)[12]. The region's unemployment rate is the amongst the lowest rate in recorded history, recovering from a significantly high rate of 6.9% in the March quarter of 2017. Despite its current performance, the Coastal Great Southern region has experienced notable volatility compared to the state and national averages (Figure 13). Agriculture dominates the regional economy, is a major direct employer and a large indirect employer (e.g. services to the sector). The unpredictability of agricultural most likely contributes to this volatility, together with the relative freedom of movement between the metropolitan area and the region (to and from) as a response to job availability.

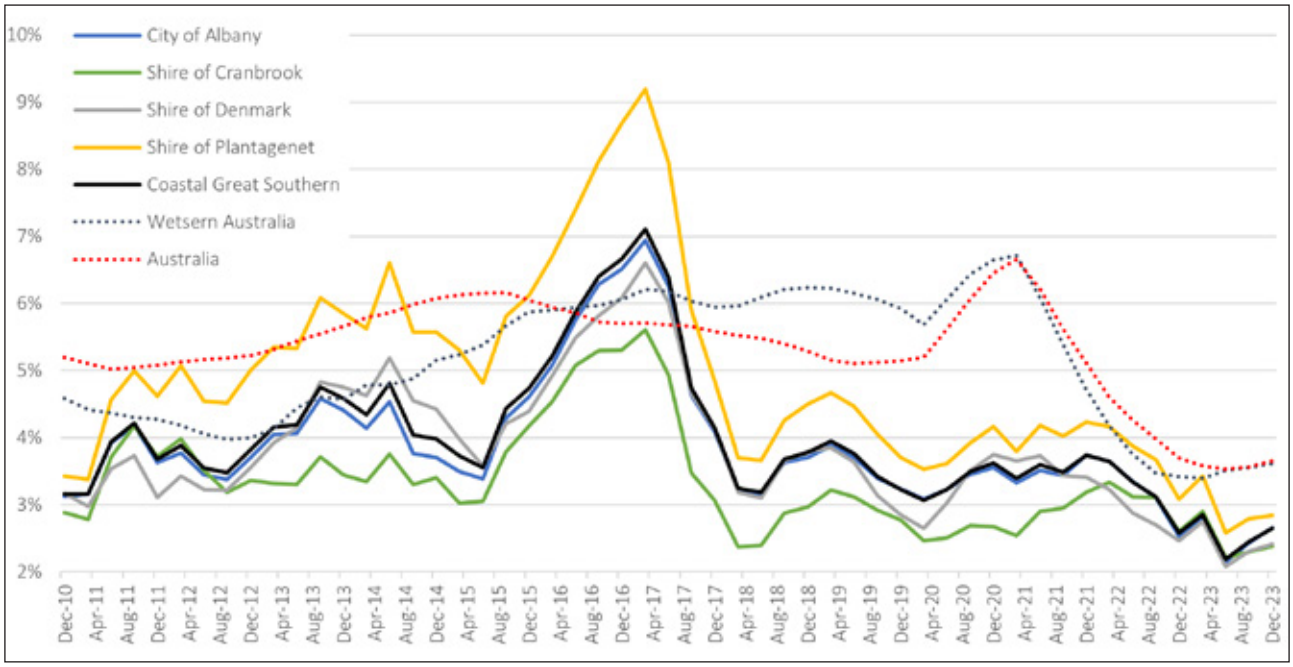


Figure 13. Great Southern unemployment rates over time‡

‡ Breakdown not available at Frankland River level (local government area only).

4.7 Demographic Strengths, Challenges, Needs and Opportunities

In line with the above, the following demographic strengths, challenges, needs and opportunities have been identified for the Coastal Great Southern.

Table 11. Demographic strengths, challenges, needs and opportunities

Strengths	Challenges
1. Reasonably strong resident attraction / retention and steady growth across Coastal Great Southern LGAs. 2. Strong future population growth prospects, supporting industry development and regional socio-economic development. 3. Strong and growing multiculturalism, adding new knowledge and skills, expanding and diversifying cultural experiences, and supporting industry development. 4. Strong historic median income growth, catching up to state and national incomes to reduce cost of living pressures. 5. Strong historic jobs growth, including in agricultural sectors, leading to industry output growth and overall regional socio-economic development. 6. Relatively low unemployment rates across all localities, demonstrating strong industry demand for workers.	1. Balancing the management of growth in coastal towns with well-planned infrastructure development, including addressing notable challenges associated with the availability of dwellings. 2. An ageing population, leading to increased demand in the aged care, housing, retail, recreation and lifestyle industries. It will also require a skilled service sector workforce. 3. The outmigration of youth, reducing the availability of worker capital to support ageing populations and future skills needed for future growth and innovation. 4. Increasing multiculturalism, where some immigrant cohorts are poorly skilled and have minimal English, continuing to health issues and limiting capacity to become active members of the community, and/or where discrimination can cause isolation. 5. Indigenous people continue to face higher levels of discrimination and disadvantage than the broader community. 6. Lower personal incomes than WA and Greater Perth averages, but comparable costs of living; contributing to disadvantage. 7. Volatile rates of unemployment compared to state and national averages; creating uncertainty that may exacerbate disadvantage and outmigration of youth.
Needs	**Opportunities**
1. Continued growth in the region requires concomitant growth in the economy, supporting infrastructure development (including affordable housing and social services), and employment prospects to cater for the growth, together with social development. 2. An ageing population demands differing levels of infrastructure and services compared with a younger demographic, such as recreational needs, seniors housing, aged care services, and healthcare. 3. There is a strong need to attract and retain youth, not only to refresh an ageing workforce, but also to provide ongoing critical support services to an ageing population. This requires appropriate infrastructure and services. 4. Initiatives that will grow economic and employment opportunities for Aboriginal residents are fundamental to the long-term prosperity of the region. 5. Infrastructure and services also need to cater for increasing multiculturalism, with diversified cultures presenting differing needs and desires and to reduce community discrimination. 6. Existing industry resilience and diversification is required to improve income prospects and offset cost of living challenges.	1. An ageing population presents new opportunities for employment and income, for example in recreational fields and healthcare. 2. Diversified infrastructure and assets could serve to attract and retain a younger age demographic, acting to reduce youth outmigration and cater for a multicultural community. 3. Diversification of the region's economy, stimulation and resilience building of sectors such as agriculture, construction, manufacturing, and education could help address comparative disadvantage in incomes and improve unemployment volatility. 4. With the further development of agriculture, construction, manufacturing, and supporting industries, there will be significant opportunities for Aboriginal people who have the skills to secure permanent jobs in these areas of the economy. 5. Significant opportunities exist associated with worker attraction and multicultural diversity, provided they can be suitably accommodated.

5. Economic Context

Core economic data is sourced from REMPLAN[13]. No economic data are available at the Frankland River subdivision level. Therefore, all economic context provided for the Coastal Great Southern is for the broader Shire of Cranbrook.

5.1 Gross Regional Product

The estimate of Gross Regional Product (GRP)§ for the Coastal Great Southern subregion was $4.6 billion in 2023; 80.0% of the broader Great Southern GRP and 1.0% of Gross State Product (GSP). Both per capita and per worker GRP are relatively strong in the subregion compared to the national average, but weaker in comparison to the state average. However, the state average is driven up by extensive mining activity in the Pilbara region.

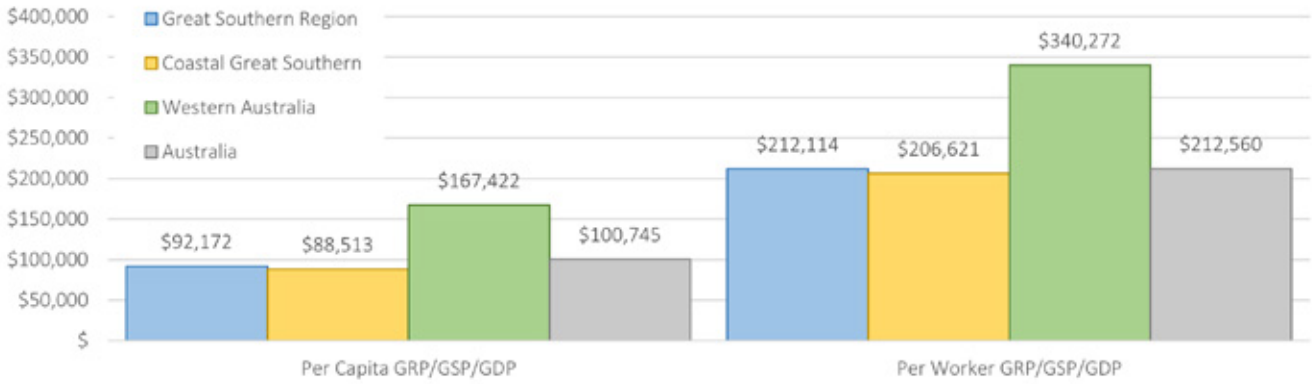


Figure 14. Per capita and per worker GRP (Great Southern, WA, and Australia)

The greatest share of GRP is contributed by Albany at $3.5B (76.7%). Plantagenet (10.6%) and Denmark (9.6%) are also notable contributors.

§ GRP is the net measure of wealth generated by the region - all forms of final expenditure, including consumption by households, consumption by governments, additions or increases to assets (minus disposals) and exports (minus imports) are added together.

Table 12. LGA contributions to Gross Regional Product in the Great Southern region¶

Great Southern LGAs	GRP	Per Capita GRP	Per Worker GRP	% Total Coastal Great Southern
Albany	$3,501,072,165	$90,320	$202,831	76.7%
Cranbrook	$142,762,531	$129,784	$260,516	3.1%
Denmark	$436,571,222	$69,187	$210,904	9.6%
Plantagenet	$483,428,932	$89,723	$218,845	10.6%
Total Coastal Great Southern	**$4,563,834,850**	**$88,513**	**$206,621**	**80.0% (total GRP)**
Total Great Southern	**$5,703,524,195**	**$92,172**	**$212,114**	**-**

Nominal subregional GRP has increased with an average annual growth rate of 5.4% (between 2008 and 2023) and rose by 10.4% and 9.4%, respectively, in the last two years alone.

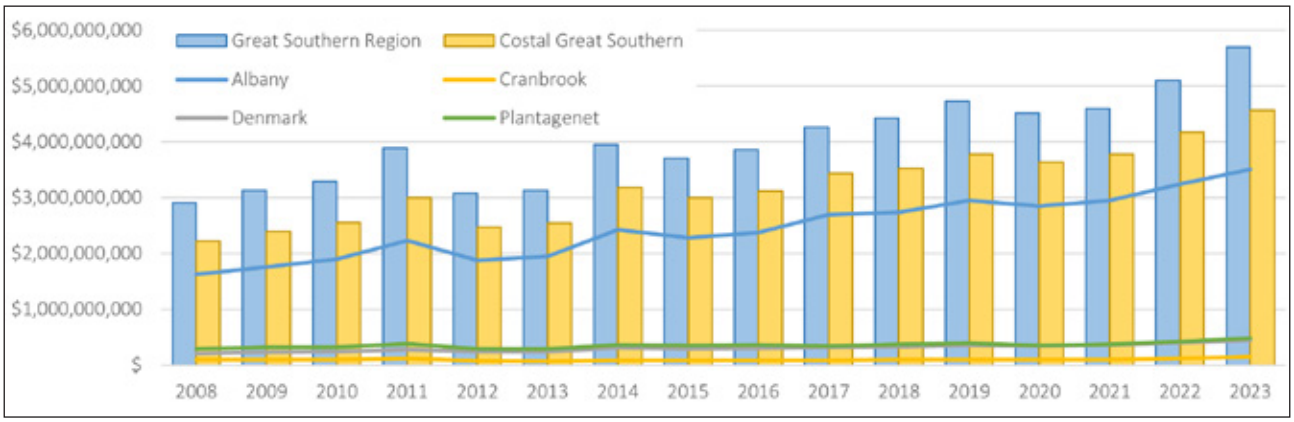


Figure 15. Great Southern Gross Regional Product (2008-2023)

¶ Breakdown not available at Frankland River subdivision level.

5.2 Industry Output and Value Added

The total direct output** of the Coastal Great Southern was $8.96 billion (79.6% of total regional output and 1.1% of total state output). The highest output industries were agriculture, forestry and fishing ($1.3B or 14.7%), manufacturing ($1.3B or 14.4%), and construction ($1.2B or 13.8%). Primary production output is proportionately slightly lower than the wider region and construction slightly higher.

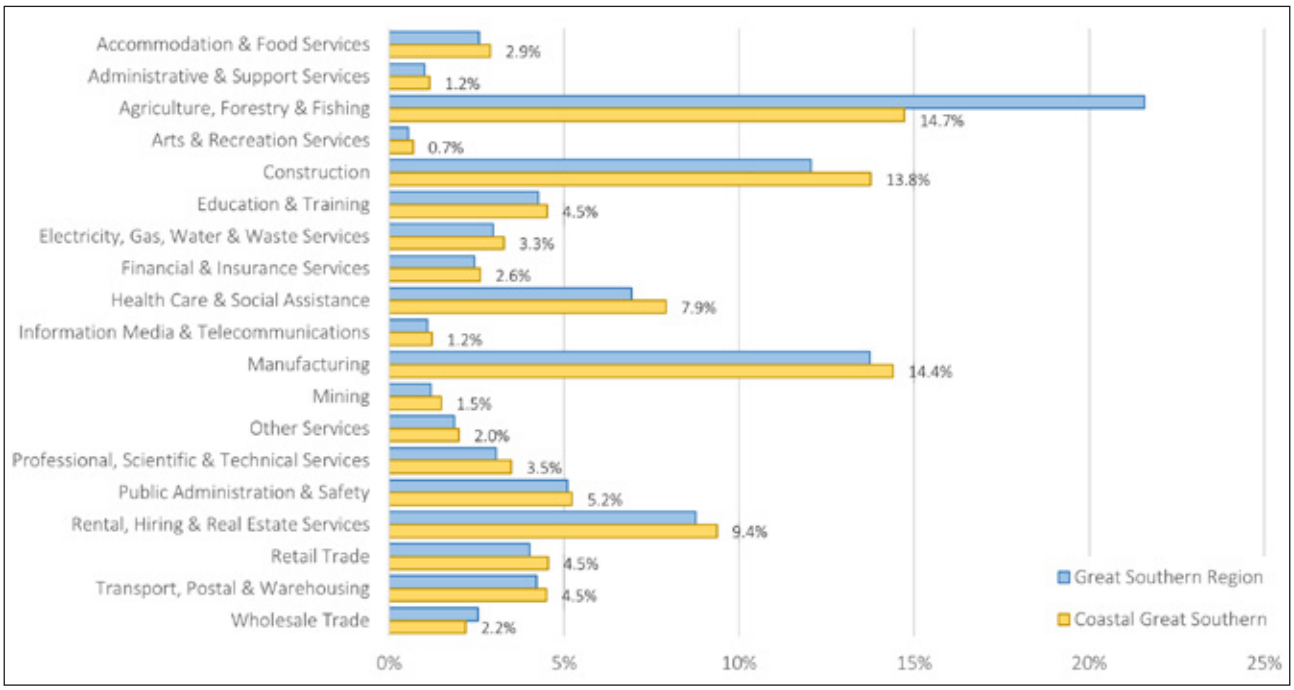


Figure 16. Industry proportions of total subregional and regional output

When looking at industry value-added†† the rental, hiring and real estate services industry leads ($635.5M or 15.1%), followed closely by agriculture, forestry and fishing ($624.4M or 14.8%). The health care and social services industry also performs well, contributing 11.7% of the subregion's value-added ($490.7M).

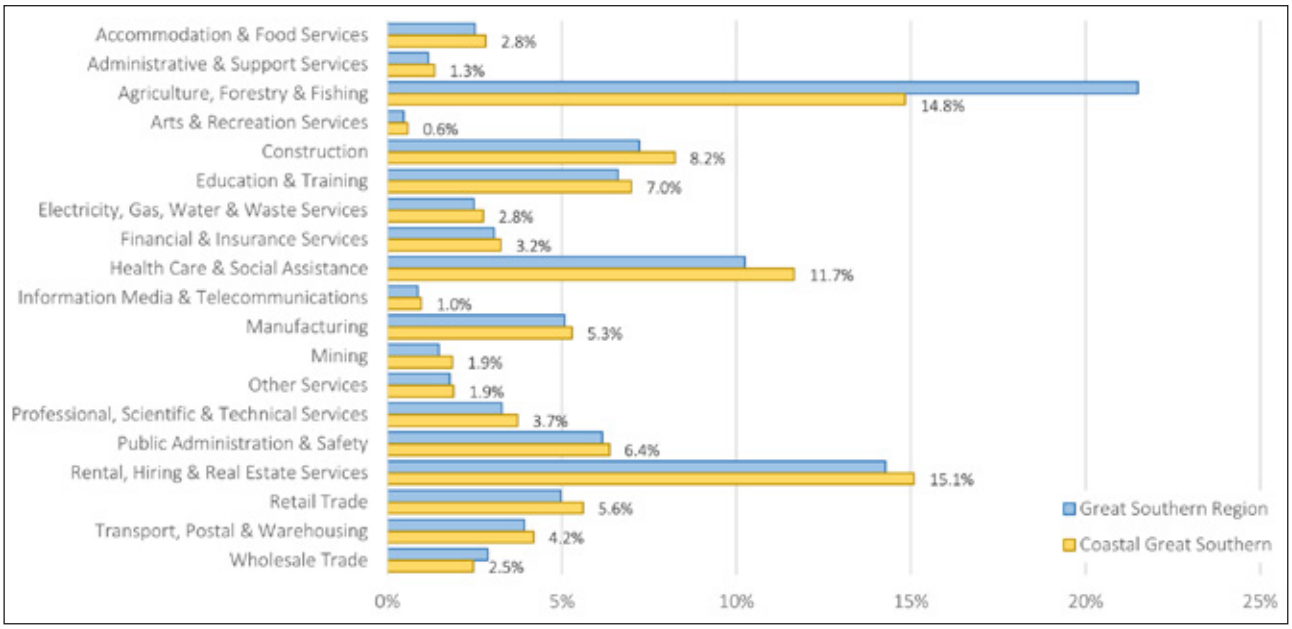


Figure 17. Industry proportions of total subregional and regional value-added

** Output data represent the gross revenue generated by businesses/organisations in each of the industry sectors in a defined region. Gross revenue is also referred to as total sales or total income.

†† Value-Added represents the marginal economic value that is added by each industry sector in a defined region. Value-Added is calculated by subtracting local expenditure and expenditure on regional imports from the output generated by an industry sector. Value-Added by industry sector is the major element in the calculation of Gross Regional Product (GRP).

5.3 Imports and Exports

The Coastal Great Southern and all LGAs within are net exporters, with total subregional net exports of $620.2M. In contrast to Western Australia as a whole, which is heavily reliant on mining for net export performance, the Coastal Great Southern is largely reliant on the agriculture, forestry and fishing industry. The subregion is most heavily reliant on imports from the professional, scientific and technical services and construction industries.

Agriculture, forestry and fishing is the highest net export industry for Albany, Cranbrook, and Denmark. However, Plantagenet's highest net export industry is manufacturing (with agriculture forestry and fishing still contributing strongly).

Table 13. Coastal Great Southern net exports by industry

	Albany	Cranbrook	Denmark	Plantagenet	Coastal Great Southern
Accommodation & Food Services	$7,271,152	-$467,994	$6,034,489	-$1,106,841	$11,730,806
Administrative & Support Services	-$13,907,117	-$335,480	-$420,819	-$1,306,492	-$15,969,908
Agriculture, Forestry & Fishing	$272,655,894	$95,313,410	$66,893,751	$75,284,352	$510,147,407
Arts & Recreation Services	-$7,196,615	$7,229	$1,358,352	$-	-$5,831,034
Construction	-$27,675,524	-$1,167,381	-$8,014,535	-$18,455,406	-$55,312,845
Education & Training	$49,381,808	-$240,433	$9,194,440	-$372,495	$57,963,320
Electricity, Gas, Water & Waste Services	$40,641,020	$-	$-	$-	$40,641,020
Financial & Insurance Services	-$41,675,457	$-	-$3,789,060	-$4,142,123	-$49,606,640
Health Care & Social Assistance	$46,685,384	-$180,417	-$8,276,432	-$6,252,401	$31,976,134
Information Media & Telecommunications	-$3,644,406	$-	$288,541	$-	-$3,355,865
Manufacturing	-$128,999,569	$5,140,998	$24,177,921	$181,415,628	$81,734,978
Mining	$65,107,666	$-	$8,992,441	$3,537,019	$77,637,125
Other Services	$18,197,382	-$6,455	-$2,101,072	-$3,081,514	$13,008,341
Professional, Scientific & Technical Services	-$49,103,031	$-	-$4,284,849	-$4,836,168	-$58,224,048
Public Administration & Safety	-$608,470	-$1,682,023	$1,831,678	-$5,808,435	-$6,267,251
Rental, Hiring & Real Estate Services	-$31,297,342	-$1,990,425	-$6,066,379	-$6,742,336	-$46,096,482
Retail Trade	$35,662,341	$-	-$4,237,004	-$5,309,248	$26,116,090
Transport, Postal & Warehousing	$4,723,675	-$1,430,771	-$2,399,408	$2,239,860	$3,133,356
Wholesale Trade	$9,830,792	$-	-$595,193	-$2,502,688	$6,732,911
Total	**$246,049,584**	**$92,960,259**	**$78,586,860**	**$202,560,710**	**$620,157,413**

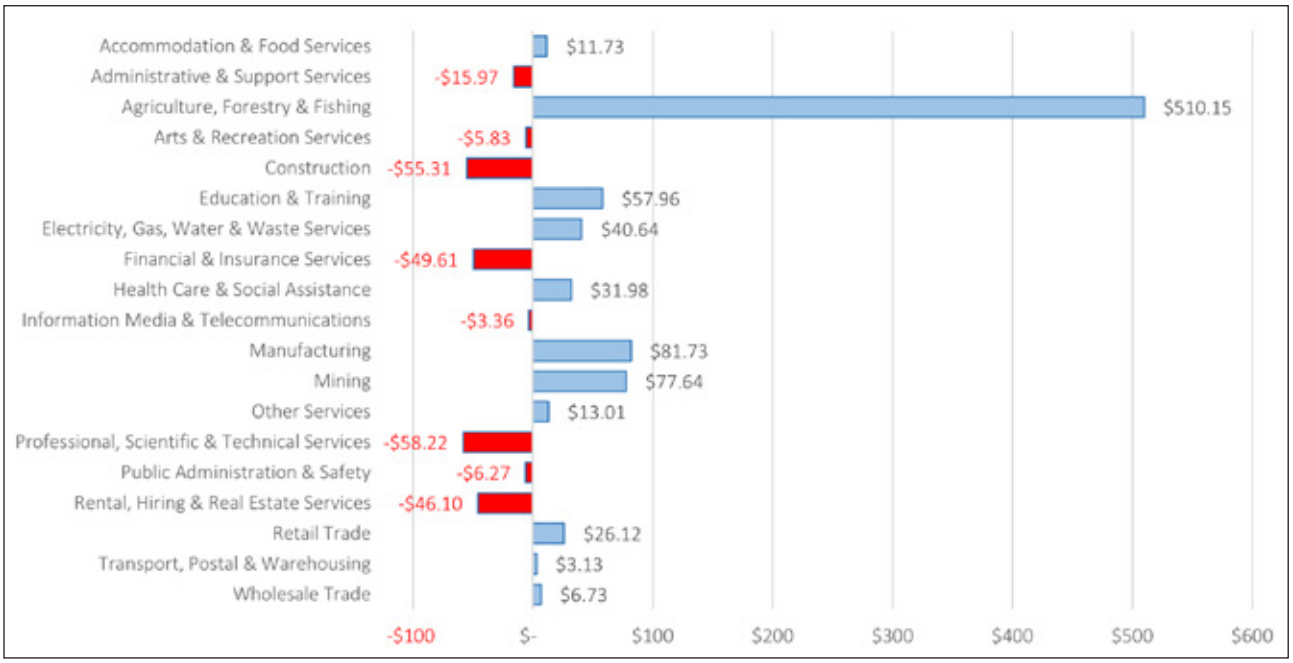


Figure 18. Coastal Great Southern net imports and exports ($M)

5.4 Wages and Salaries

Coastal Great Southern industry paid a total of $2.1 billion in wages and salaries, with greatest performance in the healthcare and social assistance (20.0%), education and training (12.6%), and public administration and safety (10.8%) industries. Albany and Denmark followed the subregional trend, but the highest contributors to total wages and salaries in Cranbrook was agriculture, forestry and fishing (37.5%), and in Plantagenet was manufacturing (24.2%).

Highest paying industries per employee were mining ($189,335), information media and technology ($188,618), and electricity, gas, water and waste services ($184,685). Lowest paying industries were arts and recreation services ($56,250), accommodation and food services ($46,343), and agriculture, forestry and fishing ($39,949). This is likely associated with the more part time and/or seasonal nature of these industries. Total wages and salaries per employee were highest in Albany ($98,052) and lowest in Cranbrook ($57,302).

Table 14. Industry wages and salaries per employee

	Albany	Cranbrook	Denmark	Plantagenet	Coastal Great Southern
Accommodation & Food Services	$45,651	$51,515	$49,649	$48,677	$46,343
Administrative & Support Services	$78,978	$45,490	$60,367	$53,813	$74,870
Agriculture, Forestry & Fishing	$48,611	$32,031	$35,693	$32,219	$39,949
Arts & Recreation Services	$56,979	$53,541	$50,297	N/A	$56,250
Construction	$97,110	$145,377	$91,328	$110,067	$97,850
Education & Training	$118,840	$113,872	$114,704	$111,348	$117,790
Electricity, Gas, Water & Waste Services	$184,685	N/A	N/A	N/A	$184,685
Financial & Insurance Services	$154,609	N/A	$153,206	$155,435	$154,550
Health Care & Social Assistance	$113,931	$140,601	$108,689	$103,590	$113,200
Information Media & Telecommunications	$186,269	N/A	$217,327	N/A	$188,618
Manufacturing	$107,005	$84,528	$88,151	$83,374	$95,653
Mining	$190,936	N/A	$209,208	$171,070	$189,335
Other Services	$65,985	$107,714	$71,569	$63,808	$66,353
Professional, Scientific & Technical Services	$137,340	N/A	$138,863	$138,986	$137,615
Public Administration & Safety	$158,239	$179,634	$173,678	$160,470	$160,329
Rental, Hiring & Real Estate Services	$112,327	N/A	$120,766	$120,766	$113,025
Retail Trade	$60,014	N/A	$60,014	$60,014	$60,014
Transport, Postal & Warehousing	$100,338	$85,082	$83,454	$87,448	$97,044
Wholesale Trade	$132,270	N/A	$132,270	$132,270	$132,270
Total	**$98,052**	**$57,302**	**$88,493**	**$74,869**	**$93,826**

5.5 Industry Concentration (Broader Great Southern Region)

One factor that may be relevant to economic development and resilience is the notion of "Industry Concentration". To look at this, it is possible to define an arbitrary "Industry Concentration Index", Ic:

Ic = (number of significant industry segments) / (% of total output of the largest segment(s))

For example, if we define "10% of a region's total economic output" as being "significant", a region that is 100% one industry would have an Ic of 1 (1/100%), while a region with exactly ten equally sized segments would have an Ic of 100 (10/10%). That is, the lower the value of Ic, the more a regional economy is concentrated in a few industry sectors.

Applying this to each region leads to the results in Table 15. Here N is the number of industry segments with output >10% and P is the percentage of total regional output from the top industry segment (based on % total regional output). The Industrial concentration Index Ic = N/P.

Table 15. "Industry Concentration Index" for each region.

Region	N	P	Ic	No. sectors with output >4%
Gascoyne	3	22%	14	8
Goldfields - Esperance	1	56%	2	4
Great Southern	**4**	**18%**	**22**	**9**
Kimberley	2	13%	15	10
Mid-West	3	30%	10	6
Peel	4	22%	18	5
Pilbara	2	68%	3	2
South West	3	21%	14	8
Wheatbelt	3	27%	11	6

Regions with Ic ≥ 15 are:	Great Southern, Kimberley, Peel	**More diversified economy**
Regions with 15 ≥ Ic ≥ 5 are:	Gascoyne, Mid West, South West, Wheatbelt	
Regions with Ic ≤ 5 are:	Goldfields-Esperance, Pilbara	**More concentrated economy**

In terms of the "Industry Concentration" index (Table 15), the Great Southern has the most diverse economy in regional WA. This is perhaps somewhat surprising as common perceptions are that the region's economy is agriculture-centric. However, the largest industry in the region only accounts for 18% of output (compared with 68% in the Pilbara and 56% in Goldfields – Esperance). Also, there are more sectors that account for greater than 4% share of total output than any other region except for the Kimberley.

It is important to note that a region's industry sectors are not necessarily independent – one of the Great Southern sectors (manufacturing) does service the agricultural sector, as do many of the other businesses in the region; however, it still represents a local value-add activity and an industry base that can be leveraged into non-agricultural sectors.

5.6 Industry Sector Overview

5.6.1 Primary Food Production

In 2020/21 (latest available statistics at regional / LGA level), the Coastal Great Southern contributed approximately $571.2 million of WA's total agricultural production gross value (5.6%)[14].

Broadacre crops and livestock are the main commodities produced and represent comparative advantages for the subregion. In the Costal Great Southern, horticulture (defined as nursery, turf, fruit and nut, and vegetable commodities) has emerged in recent decades as a significant contributor to the region's food production (5.3% of total gross value). The future expansion of horticulture in the subregion will depend on sufficient rainfall and access to groundwater supplies for irrigation.

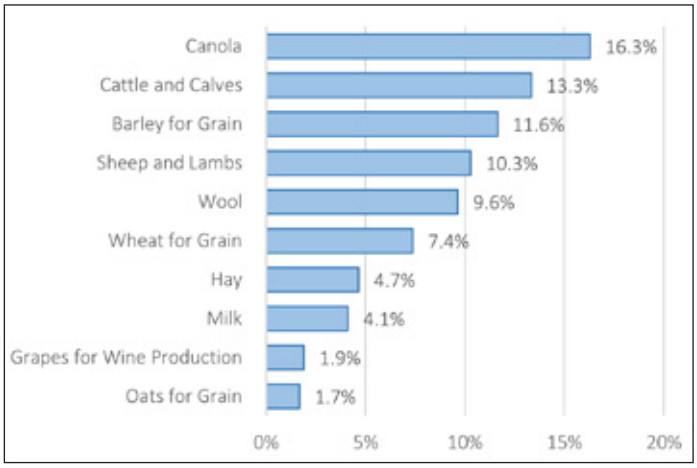


Figure 19. Proportion of Coastal Great Southern agricultural production by gross value, 2020-21 (top ten commodities)

In 2020/21, livestock disposals and products were respectively valued at $220.0 million and $78.7 million. The region's sheep flock is continuing to grow (approximately 1.23 million head across the subregion), and cattle numbers are estimated to be ~182,700 head[15]. Major livestock management infrastructure in the region includes the Katanning Regional Saleyards (sheep) and the Mount Barker Regional Saleyards (cattle), together with abattoirs in Katanning and Narrikup (sheep only).

Table 16. Animal counts in the Coastal Great Southern subregion (Australian Agricultural Census 2020–21)

	Albany	Cranbrook	Denmark	Plantagenet	Coastal Great Southern
Meat Cattle	79,978	21,837	27,156	39,957	168,928
Dairy Cattle	6,399	-	2,730	4,630	13,759
Sheep and Lambs	254,739	502,302	19,723	451,413	1,228,177
Pigs	23,769	20,207	166	61,339	105,481
Poultry	-	182,427	-	411,690	594,117
Other Livestock	416	77	77	267	837

Livestock diversification in recent decades has resulted in a relative increase in the production of poultry and pork which, with innovative operational models in place, presents considerable export opportunities and complements traditional cattle and sheep farming. The Plantagenet district has a growing reputation for free range chicken, and chicken consumption is one of the fastest growing meat markets in Australia[16].

Significant levels of new private investments in the primary production industry are occurring or are under consideration. At the farm level, corporations are investing in agricultural land for a range of reasons including rising valuations (capital gains), efficiency-driven improved returns from production, positioning to realise the benefits of economies of scale, favourable tax treatments or opportunities to capitalise on strategic global trends associated with food security. Foreign interests in WA farmland increased to 12.8% of the state's total agricultural land in 2022 (11.1 million hectares)[17].

The primary production and food sector is also in the process of responding to the opportunities created by global developments. Food-related commodities are expected to experience a broad and sustained growth in demand, in response to rapid population and income growth, particularly in Asia. Downstream processing of agricultural products has the potential to increase greatly. The income, employment and value-added multipliers for secondary agricultural industry are notably higher than those for primary agriculture. Value-adding challenges associated with live export industry competition will subside alongside the Australian Government's announcement that the export of live sheep by sea will end on 1 May 2028[18].

Post COVID-19 Chinese tariffs on various Australian products, including barley, beef, wine and timber have had a considerable impact on state and subregional export capacity and industry output. However, associated tariffs were lifted in 2023 or 2024, suggesting strong market recovery is likely in coming years.

5.6.2 Viticulture

Wine Australia provide detailed statistics of all Australian wine regions, which are used to inform the following assessment[19]. The Great Southern region is the state's largest wine region by total area (Geographical Indication) and second largest wine grape producing region by total area under vine, with wine product receiving international recognition. As can been seen in Figure 20, all primary grape growing subregions sit within the Coastal Great Southern (City of Albany, Shires of Denmark and Plantagenet, and the Frankland River subdivision of the Shire of Cranbrook).

Viticulture is a mature industry in the region, and approximately 23% percent of the state's total land area under vine is located in the Coastal Great Southern, with Frankland River and Mount Barker accounting for the majority of current production. The region also produces the second largest crush by weight (16.1% of the state total). Table 17 provides a breakdown of all WA growing regions.

Table 17. Wine grape planting areas in WA

Region	Total Area of Geographical Indication (Region) - km2	Total Vineyard Area (2020) - Ha	Average Crush (2019-2023) - tonnes	Average Annual Rainfall - mm	Growing Season Rainfall (Oct - Apr) - mm	Mean January Temperature - oC
Blackwood Valley	5,920	309	1,055	696	187	21.4
Geographe	5,561	790	2,032	824	182	22.3
Great Southern	**17,131**	**2,545**	**6,705**	**670**	**251**	**20.1**
Manjimup	2,246	153	113	799	233	20.5
Margaret River	2,137	5,725	27,059	946	202	20.9
Peel	7,864	52	16	727	160-280	23.2
Pemberton	2,054	466	1,750	1,092	276	20.2
Perth Hills	3,282	119	119	800	183	24.2
Swan District	3,593	890	2,737	654	151	24.7
Total	**49,788**	**11,049**	**41,586**			

The Coastal Great Southern climate ranges from the coastal, maritime subregions of Albany and Denmark to the inland, continental subregions of Mount Barker, Porongurup and Frankland River. As one moves north and inland from the strongly maritime-influenced climate of Denmark, the Continental influence and temperature variability increase significantly. Elevation, aspect and sites vary widely, but in general terms the climate of these northern areas is slightly warmer on the higher sites. Though rainfall is greater and relative humidity increases in the south around Denmark, heat summation and sunshine hours do not change greatly, so careful site selection allows the production of virtually every wine style.

Figure 20. Primary Great Southern wine grape growing areas

The predominant soils are similar to those of the Margaret River region; either lateritic gravelly sandy loams (marri country) or sandy loams deriving directly from granite and gneissic bedrocks. They are typically brown to grey-brown in colour, with the percentage of clay varying from one location to another. Fertility is moderate, as are typical yields.

By weight of crush, top varieties grown in the region are Shiraz (29%), Cabernet Sauvignon (21%), Chardonnay (12%), Semillon (11%), and Sauvignon Blanc (11%).

Regional wine producers and grape growers have traditionally focused on production, with only minor involvement in tourism and hospitality developments. The quality of the environment and the productive capacity of the region are nationally recognised and are key areas of comparative advantage, but producers have identified some challenges in their industry including labour supply, water and telecommunications.

Great Southern wineries are ideally located for cool-climate viticulture and produce distinctive regional wines in a wide range of red and white varieties. For example, 9 Great Southern wines feature among the 21 top rated of Australia's Rieslings, with Duke's Vineyard Magpie Hill Reserve Riesling noted as the best, as identified by James Halliday in the most recent varietal award winners list[20]. Previously, an unprecedented 17 of 27 Great Southern Rieslings have been identified as the best in Australia (2017). These achievements are all the greater when it is considered that Halliday is assessing wine drawn from Australia's 63 formal wine regions, plus a further seven areas he identifies as potential wine regions.

Great Southern wineries are noted as strong tourism attractors in the *Diversify WA strategy*[21] and in the Wines of Western Australia's *Wine Tourism Strategy*[22]. However, Australia's wine industry is expected to continue to face strong competition in generating sales in both the domestic and export markets.

5.6.3 Timber

From the early 1990s, the plantation timber industry expanded strongly to become a significant sector in the regional economy. The establishment of plantations and value adding capacity was driven mainly by buoyant final demand for high quality woodchips and taxation benefits that flowed to investors through managed investment schemes. Even with the 2009-10 rationalisation of the sector, a large area of the region is still committed to plantation forestry.

Plantation forestry in the Great Southern is estimated to cover more than 90,000 hectares and be worth $162 million. Woodchips for biofuel are gaining momentum, with several local governments powering community amenities such as heated swimming pools. The majority of the output is exported as woodchips to the fine paper industry in Japan and China and the sector produced some 1 million tonnes of woodchip exports in 2023 (down from a peak of 1.75 million tonnes in 2017[23]).

Woodchip producers face challenges in remaining competitive. In general, the delivered wood cost in Australia tends to be higher than international benchmark levels, although processing and infrastructure costs are usually in line. This higher production cost could affect Australian producers' capacity to compete against international suppliers of feedstock for manufacture and processing in final markets. However, Australia's *Eucalyptus globulus* is regarded as a better-quality woodchip resource compared to species grown in the tropics. This quality advantage and the Great Southern's proximity to South-East Asia, low sovereign risk and political stability are strong positives for the industry.

Following the cessation of operations of an Albany biomass facility by Plantation Energy Australia, there are currently no timber value add option in the region, though various other options have been planned or are being planned, such as investigations into the establishment of a cross laminated timber industry. DPIRD have noted a re-emergence of interest in the production biomass pellets, including Gilmac, specialising in hay, straw and pellet products for animal feed to export and domestic markets, and with pelletising infrastructure and access to biomass.

5.6.4 Fishing and Aquaculture

The commercial fishing industry on the south coast is an important contributor to the socioeconomic health of the region. There is a wide diversity of products including pilchards, salmon, crabs, herring, estuarine species, deep sea table fish, sharks, rock lobster and aquaculture species such as oysters and mussels. The products provide seafood availability and food security for local residents and are keenly sought by tourists visiting the region. The benefits flow to local restaurants and fish and chip shops throughout the Great Southern, and to discerning metropolitan markets, thereby creating jobs and value-added opportunities.[24]

Great Southern aquaculture took a step change in 2017 with the opening of the Albany Shellfish Hatchery. The hatchery supplies shellfish spat to aquaculture operations around Western Australia's coastline, and to operations elsewhere in Australia. Strict attention to biosecurity and access to the clean waters of the Southern Ocean make the hatchery's products reliable and sought-after. After five years in operation, the enterprise is set for expansion to meet rising demand. Following the establishment of the Albany Shellfish Hatchery, a staged aquaculture development is being undertaken by Harvest Road Oceans in Albany. Its production sites in Miaritch / Oyster Harbour produce Leeuwin Coast brand rock oysters, Akoya oysters and mussels. The company boasts carbon neutral certification for its shellfish products. Nine (9) species re produced under licence in the Albany Shellfish Hatchery. The production goal for Harvest Road is 1.5 million dozen Rock Oysters per annum and 18 million Akoya Oysters per annum.[25]

Fishing and aquaculture contribute 53.8 million in total output ($23.3 million value added and export value of $37.3 million). The sector pays $6.7 million in regional salaries and wages.[26]

The sector faces challenges and risks associated with climate change and supply chains. Climate change has the potential to create significant risk to fishing and aquaculture industries throughout the world, particularly through aquatic heatwaves. DPIRD is working with industry to develop species that are better able to cope with warmed waters. Supply chain disruptions caused by the COVID-19 pandemic are still affecting multiple industries. DPIRD has considerable experience in collaborating with primary producers to realign supply chains in order for fresh produce to reach market prime condition, even during times of intense disruption.

Aquaculture has significant growth potential in the Great Southern and the public sector is encouraging and supporting development in the sector. The GSDC has an oversight role in the establishment of the South Coast Aquaculture Development Zone. Aquaculture zones are designed to reduce development approval times from several years to several months, cutting costs and red tape and providing investment-ready areas for large-scale projects. The south coast zone encompasses the South West, Great Southern and Goldfields-Esperance regions and comprises multiple areas near regional centres, producing native shellfish and finfish species.

Albany hosted the 2019 WA Shellfish Aquaculture Forum, which included representatives from both the private and public sector and considered a broad range of topics including biosecurity and fish health, policy and regulations, research and development, species selection, industry development, production, operations and compliance, marketing and promotion, and many others. WA is set to experience a significant boom in aquaculture, and the Great Southern is well placed to build on its existing industry and attract additional public and private investment.

There is a large global potential for aquaculture. For example, global mussel production is increasing steadily: growth in consumption is already at 8% CAGR, outstripping supply which is growing at a rate of only 3%. Oyster production is also increasing steadily. Australia is a net importer of both mussels and oysters, with exports not currently significant in terms of production. This means that there is capacity for increased supply without supply demand issues and a clear export potential. WA has the most isolated primary production industry in the world, and this provides a competitive advantage (for example, as a provenance story for clean and pristine waters and growing climates). Harvest Road Group's market research in Asia shows a 30% premium on WA shellfish produce compared to competitors[27].

Figure 21. Albany Aquaculture Development Zone

5.6.5 Manufacturing

The manufacturing industry makes a valuable contribution to the region's economy with the majority of business establishments based in Albany. The sector employs about 5.7% of workers in the Coastal Great Southern and contributes approximately 14.4% to subregional turnover (a $1.3 billion output). The industry is focused primarily on supplying equipment and machinery to the primary production sector and to the processing of commodities. Meat processing through the region's export abattoirs is measured as a manufacturing output.

With the future potential development of the region's mineralised zones (e.g. Badgebup and Wellstead), or neighbouring region's mining industries (e.g. Ravensthorpe), the engineering and fabrication sectors should be well positioned to provide goods and services locally and at competitive rates.

5.6.6 Construction

Despite a spike in the number and value of building approvals in 2020-21 (associated with COVID-19 industry stimulus), the general trend for number of new houses and other residential buildings is decline (Figure 22). The past five year average (296 buildings) is substantially lower than the five years prior (385). In contrast building approval value has generally increased over the last decade (Figure 23), in line with steep growth in materials and contractor pricing and the associated cost of construction. The 2022-23 value of approvals was $186.4 million. The majority of the regional building activity, averaging 74% of volume and 80% of value over the last decade, takes place in the City of Albany.

Figure 22. Number of buildings approved

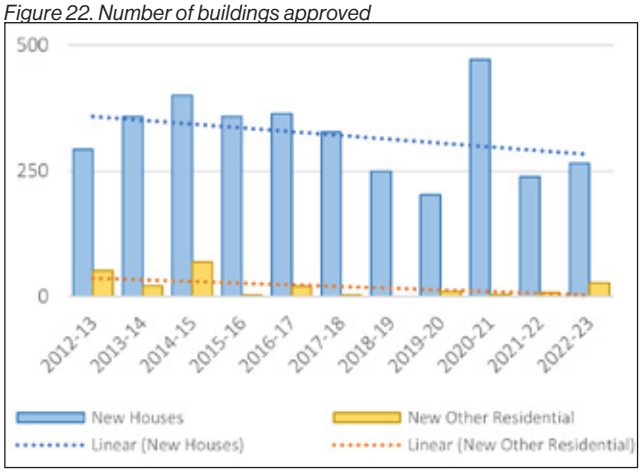
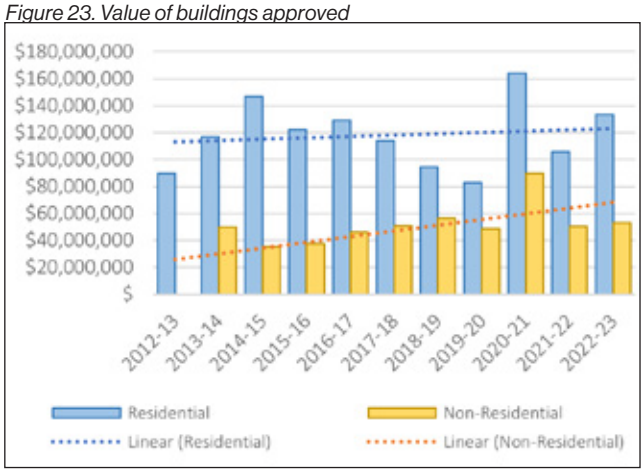


Figure 23. Value of buildings approved



Strong population growth over the past few years and steady growth prior, coupled with the trend for a reduction in new buildings approved and built, has created an accommodation crisis (i.e. where existing homes are being purchased or rented at a greater rate than new homes are being built). The entire region is experiencing record low rental vacancy rates, record low median selling days and number of listings, and record high median rental and house sales prices. This is exacerbated by a national shortage of construction companies and contractors, as well as delays in building completions associated with the COVID-19 stimulus, that has seen the median build time increase from 18 months to 24-36 months.

Where most industries are suffering worker accommodation shortages (driving the development of the Great Southern Worker Accommodation Strategy) and social housing demand has increased 52% over the last two and a half years (622 homes required), there will be considerable pressure on the construction industry for some time. It is noted that these challenges are not unique to the region but are emerging Australia-wide and globally.

5.6.7 Mining

Mining currently contributes a relatively small proportion of total Coastal Great Southern industry output at $133.8 million (1.5%). The region has a small mining sector producing silica sand and lime sand. However, the value of mining to the region has the potential for growth, with two mineral deposits awaiting investment decisions: Grange Resources' Southdown magnetite mine north-east of Albany (Wellstead) and Ausgold's gold mine near Katanning (Badgebup).

Additional mining activity is increasing around Ravensthorpe, which borders the Great Southern within the Goldfields-Esperance region. Key mining projects include ACH Minerals' Ravensthorpe Gold Project, First Quantum Minerals' Ravensthorpe Nickel Project, Galaxy Resources' Mt Cattlin Spodumene, and Mineral Commodities' Munglinup Graphite. These projects include a combined projected workforce of 857 and capital expenditure over $130 million. Given its proximity to Coastal Great Southern regional services and infrastructure, it is expected that many flow-on benefits for the region will result from the projects, including new employment opportunities.

There are also other undeveloped mineral deposits in the Great Southern, including heavy mineral sands and copper, that may contribute to the future of the region. At some level, there is mineral exploration taking place in every LGA in the Great Southern. The recent *Diversify WA* strategy also notes that the Peel, South West and Great Southern regions contain reserves of mineral sands and will be home to the state's three lithium processing facilities.

5.6.8 Small Business

The Coastal Great Southern has one of the most dynamic small business communities in the state. In 2023, there were 102.4 small businesses (0-19 employees) per 1,000 residents in the region, well above the state average of 90.0 (REMPLAN 2024). The wider Great Southern count of 114.5 per 1,000 residents is higher than any other region in the state. This reflects the region's strong commercial and entrepreneurial culture, the creation of small business for lifestyle reasons and exposure to industries dominated by small businesses. Because of this strength, the region is not structurally reliant on a few large employers. Small business represents 97.6% of all business activity in the Coastal Great Southern. A 67.7% share of business within the subregion is in the City of Albany (Figure 24). Of this, 97.1% are small businesses, with 91.8 small businesses per thousand residents, lower than the regional average but still higher than the state average.

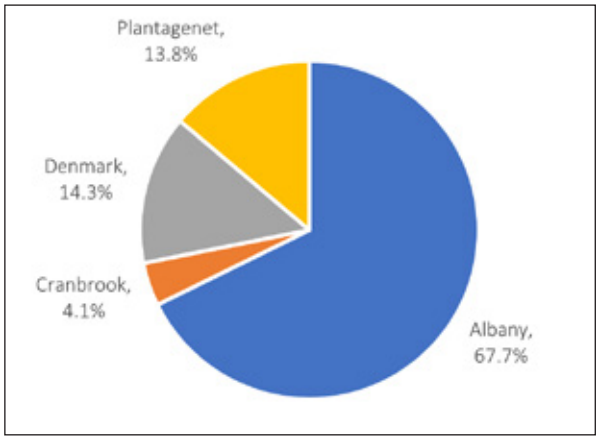


Figure 24. Share of business in the Coastal Great Southern

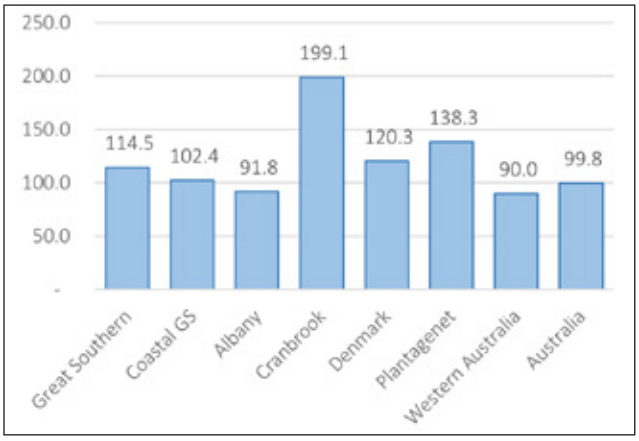


Figure 25. Small businesses per 1,000 residents

Of Coastal Great Southern small businesses, 27.8% are in agriculture, forestry and fishing, followed by construction at 16.6% and rental, hiring and real estate services at 10.7%.

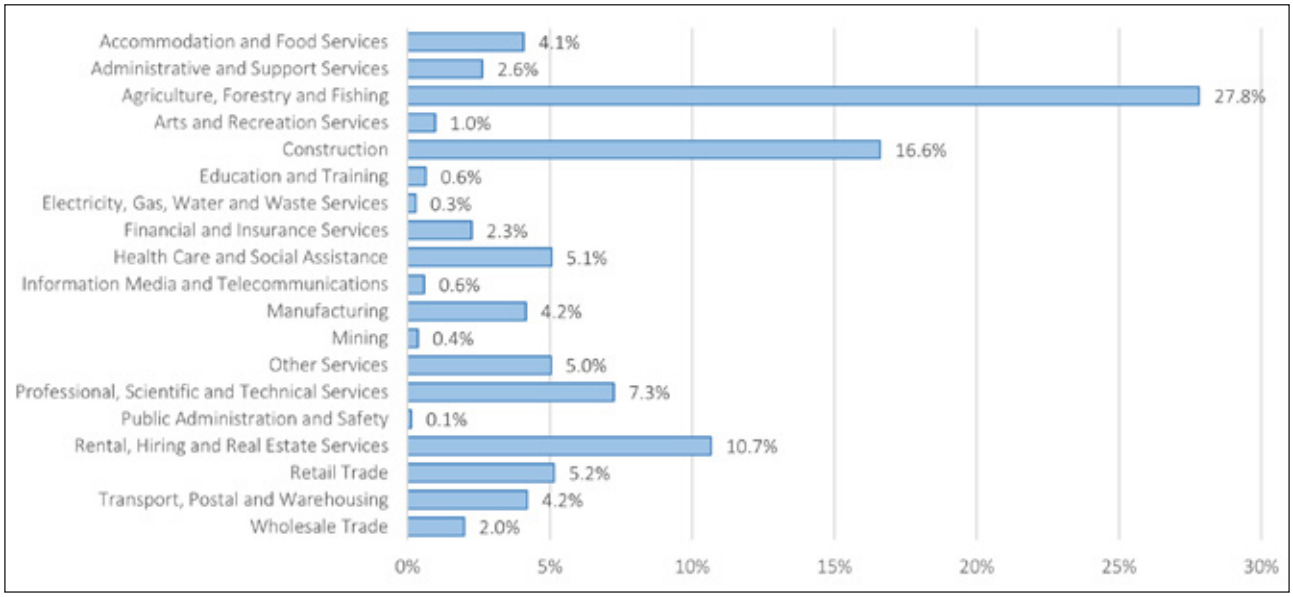
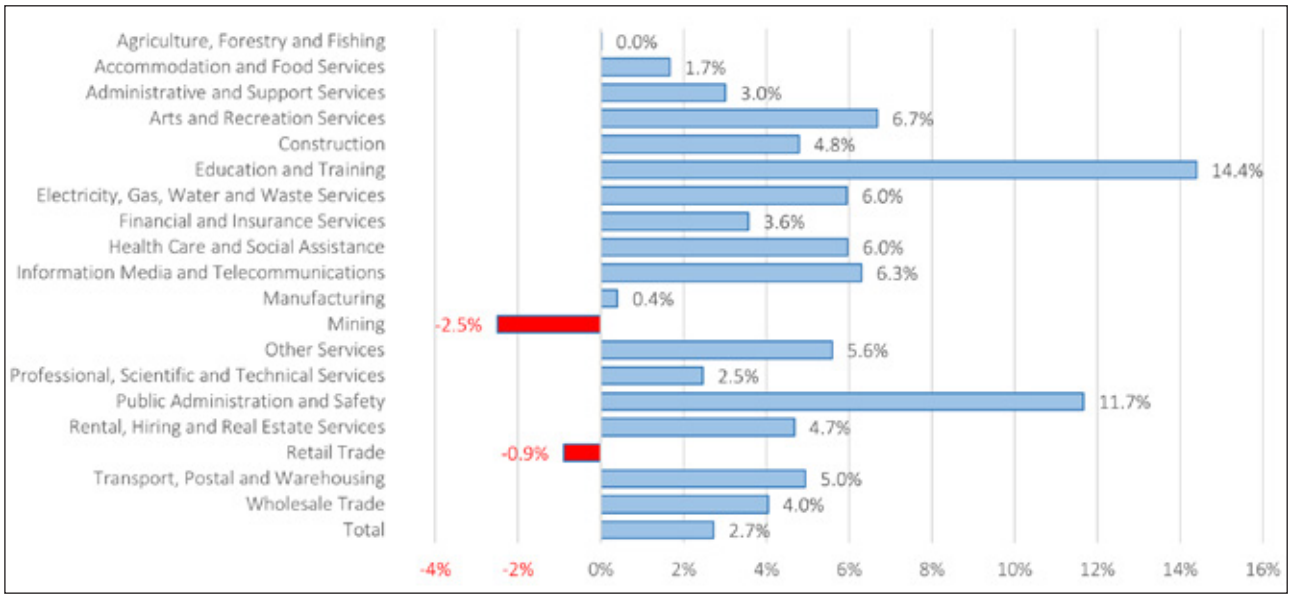


Figure 26. Proportion of Coastal Great Southern small businesses by industry

It is interesting to note the growth in small businesses in industries such as education and training (AAGR of 14.4% between 2021 and 2023), public administration and safety (+11.7%), arts and recreation services (+6.7%), and information media and telecommunications (6.3%), which may help to alleviate the regional export deficit in some of these sectors. Decline in the number of small businesses between 2021 and 2023 was only recorded in the retail



trade (-0.9%) and mining (-2.5%) industries.

Figure 27. Change in number of Coastal Great Southern small businesses by industry, 2021-2023

5.6.9 Local Government Industry Focus

In addition to the regional view, it is important to recognise that industry focus and values vary significantly between LGAs within the region. In terms of output, the following table identifies the top five industries for the region's LGAs.

LGA	Top Five Industries and Value in Output
Albany	**Construction ($1.03B)**; manufacturing ($791.0M); rental hiring and real estate services ($666.1M); health care and social assistance ($635.0M); agriculture, forestry and fishing ($594.2M).
Cranbrook	**Agriculture, forestry and fishing ($201.0M)**; manufacturing ($36.1M); construction (20.5M); rental hiring and real estate services ($15.1M); public administration and safety ($9.1M).
Denmark	**Agriculture, forestry and fishing ($149.8M)**; construction ($121.5M); manufacturing ($102.4M); rental hiring and real estate services ($87.6M); public administration and safety ($53.1M).
Plantagenet	**Agriculture, forestry and fishing ($373.5M)**; manufacturing ($359.6M); rental hiring and real estate services ($70.6M); construction ($59.9M); transport, postal and warehousing ($45.9M).

Table 18. Top five industries for the region's LGAs

To determine localised and subregional industry strengths, Location Quotient (LQ) calculations are applied across three core measures: (i) employment; (ii) output; and (iii) value add. An LQ is a simple ratio used to determine the concentration or dominance of a particular industry in a given area in comparison to a larger reference or benchmark (in this case against Western Australia as a whole).

Across the Coastal Great Southern, agriculture, forestry & fishing has the highest LQ for employment, followed by retail trade, healthcare and social assistance, and accommodation and food services industries (Table 19). This is largely driven by Albany as the largest employer in the subregion. In Cranbrook, manufacturing and arts and recreation services have the second and third highest LQs, the only industries greater than 1.0 (i.e. contributing to employment at a higher rate than for WA as a whole). Primary production in Cranbrook has the greatest LQ by a very large margin. In Denmark, the second and third highest LQs are for manufacturing and education and training.

For Plantagenet, they are manufacturing and transport, postal and warehousing, again as the two industries beyond

	Coastal Great Southern	Albany	Cranbrook	Denmark	Plantagenet
Agriculture, Forestry & Fishing	**4.56**	**2.62**	**28.19**	**5.31**	**13.08**
Retail Trade	**1.23**	**1.36**	-	1.14	0.61
Health Care & Social Assistance	**1.17**	**1.33**	0.05	0.78	0.48
Accommodation & Food Services	**1.17**	1.23	0.19	1.67	0.52
Manufacturing	1.12	0.71	**1.59**	**1.38**	**3.95**
Education & Training	1.10	1.13	0.64	**1.34**	0.74
Other Services	1.04	1.13	0.14	0.80	0.81
Public Administration & Safety	1.02	1.05	0.68	1.10	0.82
Construction	0.93	1.00	0.55	0.99	0.43
Wholesale Trade	0.84	0.99	-	0.19	0.51
Transport, Postal & Warehousing	0.82	0.81	0.77	0.53	**1.23**
Administrative & Support Services	0.81	0.84	0.28	1.03	0.52
Rental, Hiring & Real Estate Services	0.81	0.95	-	0.62	0.09
Electricity, Gas, Water & Waste Services	0.79	1.01	-	-	-
Arts & Recreation Services	0.69	0.77	**1.08**	0.66	-
Information Media & Telecommunications	0.68	0.80	-	0.54	-
Financial & Insurance Services	0.58	0.63	-	0.50	0.39
Professional, Scientific & Technical Services	0.53	0.56	-	0.73	0.25
Mining	0.04	0.04	-	0.02	0.04

primary production that score greater than 1.0.

Table 19. Location Quotient - employment

The picture is slightly different when looking at industry output (Table 20). Primary production still dominates across all LGAs. Top three industries for output across the Coastal Great Southern and Albany are agriculture, forestry and fishing, accommodation and food services, and retail trade (though the latter two are reversed for Albany). Only the financial and insurance services, arts and recreation services, professional, scientific and technical services, and mining industries scored below 1.0 for subregional output. In Cranbrook, the second and third highest LQs are for manufacturing and arts and recreation services, but with both scoring below 1.0. Primary production was the only LQ greater than 1.0 (at 33.43) in Cranbrook. in Denmark, second and third highest output LQs are identified for accommodation and food services and education and training. In Plantagenet, they are manufacturing and transport, postal and warehousing.

Table 20. Location Quotient - output

	Coastal Great Southern	Albany	Cranbrook	Denmark	Plantagenet
Agriculture, Forestry & Fishing	**7.33**	**4.39**	**33.43**	**9.23**	**16.82**
Accommodation & Food Services	**2.01**	**2.13**	0.28	**3.33**	0.79
Retail Trade	**1.90**	**2.19**	-	1.83	0.77
Health Care & Social Assistance	1.81	2.16	0.07	1.25	0.59
Education & Training	1.62	1.76	0.65	**1.96**	0.81
Other Services	1.59	1.80	0.11	1.17	0.99
Rental, Hiring & Real Estate Services	1.56	1.65	0.84	1.81	1.06
Public Administration & Safety	1.40	1.46	0.81	1.76	0.91
Construction	1.37	1.53	0.68	1.50	0.54
Wholesale Trade	1.30	1.58	-	0.30	0.64
Electricity, Gas, Water & Waste Services	1.21	1.61	-	-	-
Manufacturing	1.17	0.96	**0.98**	1.03	**2.65**
Transport, Postal & Warehousing	1.17	1.27	0.59	0.61	**1.07**
Administrative & Support Services	1.14	1.25	0.24	1.36	0.51
Information Media & Telecommunications	1.02	1.24	-	0.91	-
Financial & Insurance Services	0.87	0.98	-	0.80	0.45
Arts & Recreation Services	0.86	1.00	**0.96**	0.84	-
Professional, Scientific & Technical Services	0.81	0.88	-	1.17	0.31
Mining	0.04	0.05	-	0.04	0.03

For value add (Table 21), subregional strengths are identified again in agriculture, forestry and fishing, accommodation and food services, and retail trade. This is the same for Albany, but with the order reversed again for accommodation and food services and retail trade. In Cranbrook and Plantagenet, second and third highest value-add LQs are in manufacturing and rental, hiring and real estate services. In Denmark, they are accommodation and food services and education and training.

Table 21. Location Quotient – value add

	Coastal Great Southern	Albany	Cranbrook	Denmark	Plantagenet
Agriculture, Forestry & Fishing	**8.16**	**4.83**	**38.01**	**9.82**	**21.76**
Accommodation & Food Services	**2.17**	**2.27**	0.31	**3.37**	0.97
Retail Trade	**2.11**	**2.38**	-	1.95	0.99
Health Care & Social Assistance	2.02	2.37	0.08	1.32	0.74
Education & Training	1.83	1.94	0.79	**2.17**	1.09
Rental, Hiring & Real Estate Services	1.78	1.81	**1.08**	2.03	**1.51**
Other Services	1.77	1.95	0.26	1.42	1.26
Public Administration & Safety	1.59	1.64	0.91	1.85	1.20
Manufacturing	1.51	1.13	**1.49**	1.76	**4.02**
Electricity, Gas, Water & Waste Services	1.49	1.93	-	-	-
Construction	1.48	1.60	1.00	1.50	0.73
Wholesale Trade	1.44	1.72	-	0.32	0.83
Transport, Postal & Warehousing	1.38	1.49	0.71	0.67	1.39
Administrative & Support Services	1.20	1.31	0.23	1.30	0.57
Information Media & Telecommunications	1.08	1.29	-	0.95	-
Financial & Insurance Services	1.01	1.11	-	0.93	0.60
Arts & Recreation Services	1.00	1.12	1.21	1.11	-
Professional, Scientific & Technical Services	0.89	0.95	-	1.25	0.40
Mining	0.04	0.04	-	0.05	0.02

5.6.10 Upstream and Downstream Industry Requirements

For the Coastal Great Southern's three largest industries by output, there are differing levels of requirements for upstream and downstream industry/sectors and infrastructure. The following provides a snapshot of these requirements and interdependencies.

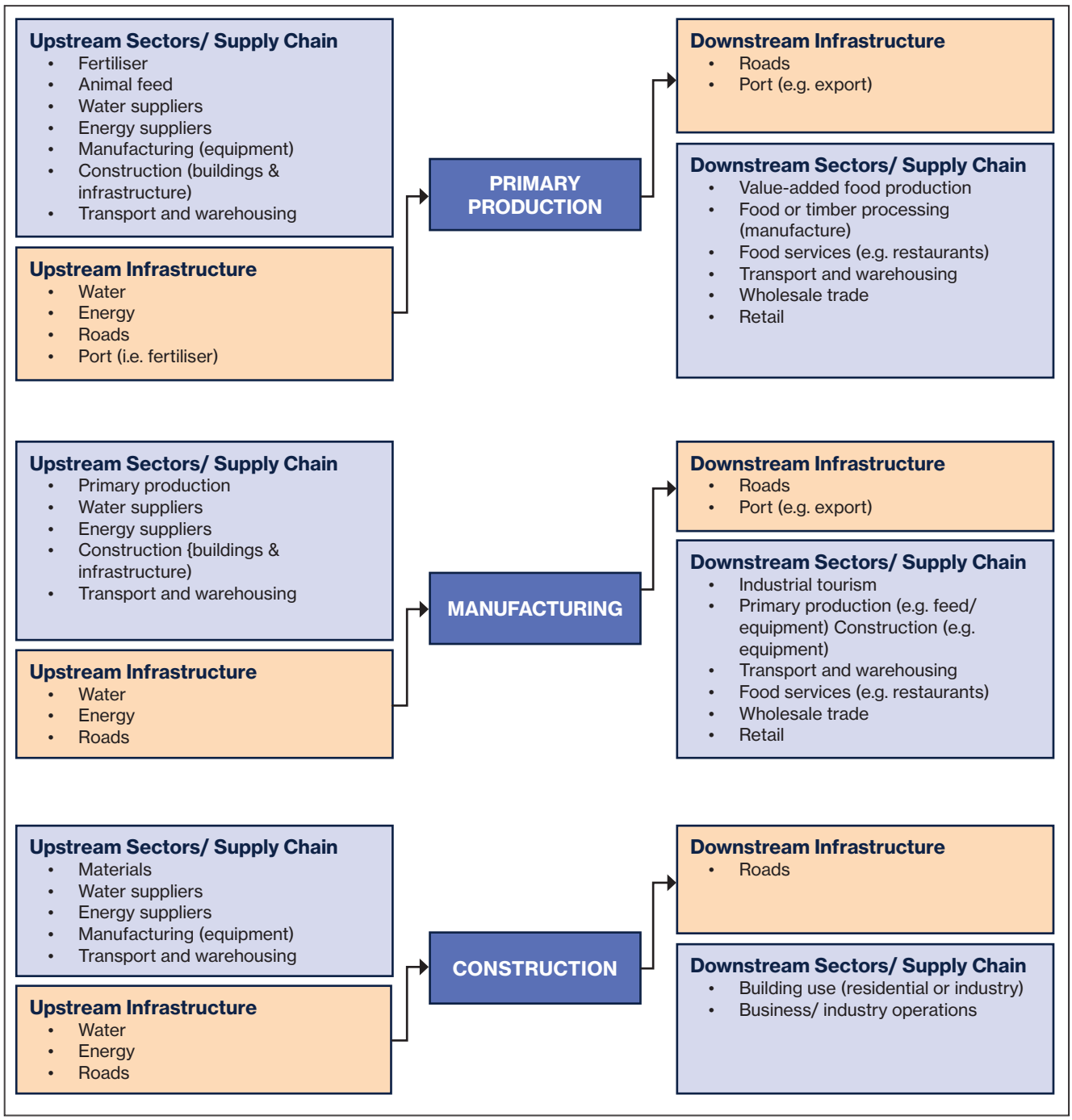


Figure 28. Upstream and downstream interdependencies for top three Coastal Great Southern output industries

5.6.11 Industry Exposure to Global Megatrends

In the context of the global megatrends outlined in Section 2, all industries have been rated in Table 22 based on their level of exposure (i.e. the amount of growth and/or adaptation that will be required to respond to the megatrend).

Table 22. Industry exposure to global megatrends

	Rapid Urbanisation	Climate / Resources	Geopolitics / Trade	Demographic Change	Technological Advances
Accommodation and Food Services	VH	MH	M	M	M
Administrative and Support Services	VH	L	LM	M	M
Agriculture, Forestry and Fishing	VH	VH	VH	M	VH
Arts and Recreation Services	VH	L	M	MH	MH
Construction	VH	M	MH	MH	VH
Education and Training	VH	L	VL	LM	MH
Electricity, Gas, Water and Waste Services	VH	H	M	VL	VH
Financial and Insurance Services	H	M	LM	MH	H
Health Care and Social Assistance	VH	LM	VL	VH	VH
Information Media and Telecommunications	H	VL	LM	M	VH
Manufacturing	VH	MH	VH	M	VH
Mining	H	H	H	L	VH
Other Services	H	M	M	M	M
Professional, Scientific and Technical Services	H	L	L	M	H
Public Administration and Safety	H	M	L	M	H
Rental, Hiring and Real Estate Services	VH	L	M	M	M
Retail Trade	VH	L	M	M	MH
Transport, Postal and Warehousing	VH	M	LM	M	H
Wholesale Trade	VH	M	M	M	H

NB: L = Low; LM = Low-Medium; M = Medium; MH = Medium-High; H = High; VH = Very High

Based on the above, scores between 0.0 (very low) and 1.0 (very high) have been applied evenly between the ratings. The average of these values provides a final score for evaluation, enabling industries to be ranked in order of their exposure to all megatrends. Results are displayed as follows in Figure 29.

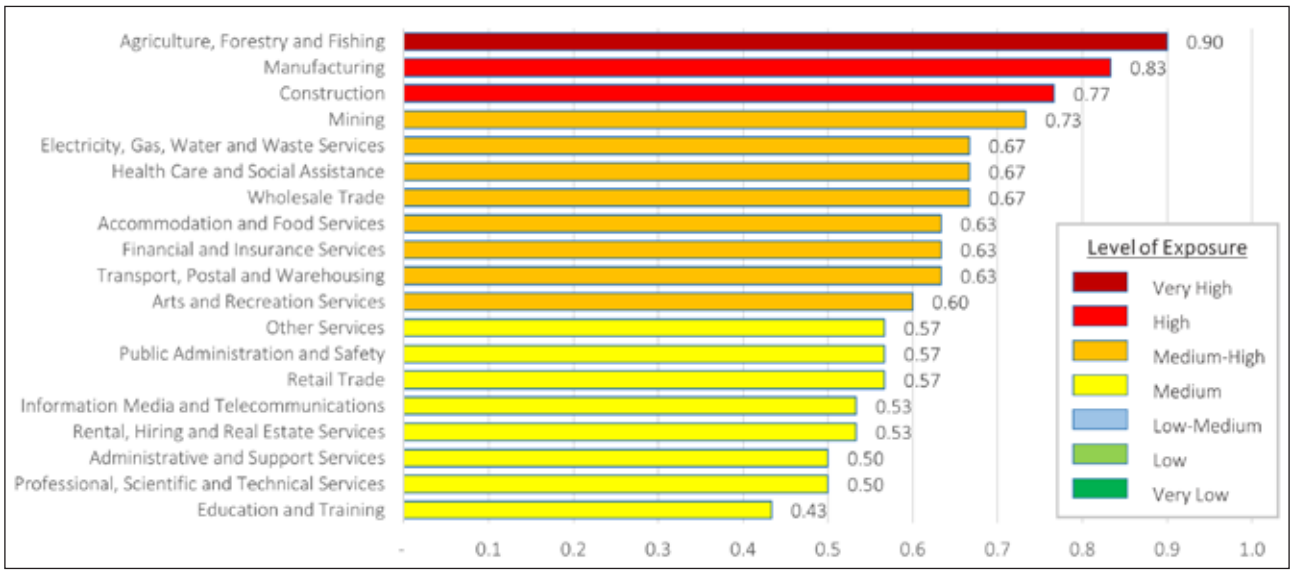


Figure 29. Final industry scoring based on level of exposure to megatrends

As can be seen, the top three highest exposure industries are agriculture, forestry and fishing, manufacturing, and construction. Given these are the Coastal Great Southern's highest performing industries in terms of output, it is imperative that supporting industry and infrastructure keeps pace with global megatrends. Without sufficient investment and development, these industries would be at risk of increased import competition and reduced export demand or value from domestic and global markets.

5.6.12 Propulsive Sectors

Economic growth in the Coastal Great Southern is strong. Primary production is the backbone of the region's economy through agriculture, horticulture, timber and, to a lesser degree, fishing. Continued growth brings demand for skilled people to fill positions in the professional, trades and services sectors. The manufacturing and fabrication sectors are driven by the requirements of primary production, but also have the capacity to respond to the demands of a diversifying economy.

Retail trade, construction and tourism also make significant contributions to the economy. Quality wine grapes produced in the Great Southern's five wine subregions and the high level of technology available to wine producers, have generated a need for specialist skills and opportunities in a growing sector.

REMPLAN has identified key propulsive sectors that drive the region's economy in terms of regional exports, employment, value-added and local expenditure on goods and services (backward linkages). The industry sectors identified in Table 23 are amongst the top 5 (of 19 sectors) contributors to economic activity in the region in relation to backward linkages, exports, employment, and value-added‡‡.

‡‡ Note that tourism is also likely to be a key propulsive sector. It is not included in this analysis as it isn't recognised by ABS as a distinct industry sector, rather an amalgam of several sectors.

Table 23. Key propulsive sectors

	Backward Linkages	Exports	Employment	Value-Added	Total
Accommodation & Food Services		✓			**1**
Administrative & Support Services					**0**
Agriculture, Forestry & Fishing	✓	✓	✓	✓	**4**
Arts & Recreation Services	✓				**1**
Construction	✓	✓	✓	✓	**4**
Education & Training		✓	✓	✓	**3**
Electricity, Gas, Water & Waste Services	✓				**1**
Financial & Insurance Services					**0**
Health Care & Social Assistance			✓	✓	**2**
Information Media & Telecommunications					**0**
Manufacturing	✓	✓			**2**
Mining					**0**
Other Services					**0**
Professional, Scientific & Technical Services					**0**
Public Administration & Safety					**0**
Rental, Hiring & Real Estate Services				✓	**1**
Retail Trade			✓		**1**
Transport, Postal & Warehousing					**0**
Wholesale Trade					**0**

To examine the relative potential contributions to the future regional economy of these propulsive sectors, a "Propulsive Growth index" (PGi) can be defined. This index is the product of an industry's: (i) propulsive index; (ii) current proportion of the regional economic output; and (iii) assumed 'growth factor'. In the absence of published regional growth estimates for each sector, the growth factor is related to the average industry job growth rate between 2001 and 2021, for which data are available. A factor of 1.1 applies to industries with jobs growth, 1.0 for those with a roughly stable position and 0.9 for sectors that have experienced a decline. Eleven industries (including the tourism sector) have been ranked in order of their PGi to identify which are likely to make the greatest contribution to regional economic growth in future. The analysis is summarised in Table 24.

Table 24. Propulsive growth index for industry sectors

Sector	Propulsive index, P	% GS output (x 100), O	Growth Factor, G:	Propulsive growth index, PGi
Agriculture, Forestry & Fishing	4	17.8	1.1	78
Construction	4	13.4	1.0	54
Manufacturing	2	11.9	0.9	21
Education & Training	3	4.7	1.1	16
Health Care & Social Assistance	2	5.3	1.1	12
Tourism §§	1	4.1	1.1	5
Retail Trade	1	4.1	0.9	4
Electricity, Gas, Water & Waste Services	1	3.1	0.9	3
Rental, Hiring & Real Estate Services	1	2.5	0.9	2
Accommodation & Food Services	1	1.2	1.1	1.3
Arts & Recreation Services	1	0.5	1.1	0.6

Table 24 shows that the growth of the primary production, construction, manufacturing, education & training and health care & social assistance industries will have a disproportionately large impact on the future regional economy, and that sustaining or increasing growth in these sectors is an imperative for the region. The mapping of major projects from the project inventory against these sectors indicates that there is considerable innovation and development activity in each sector (taking into account the projects that are excluded from the inventory in the health, education and welfare sectors).

§§ As an amalgam of other sectors, this is taken to be an average for Accommodation & Food Services, Arts & Recreation Services and Retail Trade.

5.7 Economic Strengths, Challenges, Needs and Opportunities

In line with the above, the following economic strengths, challenges, needs and opportunities have been identified for the Coastal Great Southern.

Table 25. Economic strengths, challenges, needs and opportunities

Strengths	Challenges
1. A cooler and more temperate climate provides more diverse primary production opportunities (e.g. fruit, nuts, vegetables, wine grapes, dairy, poultry, timber, nursery products, etc.). 2. The region is a net exporter, with particular strengths in primary production and manufacturing. 3. Livestock diversification in recent decades has resulted in a relative increase in the production of poultry and pork, particularly in Plantagenet. There are considerable ongoing export opportunities associated with sector development. 4. The Coastal Great Southern is one of the state's top performing wine producing regions. There is strong potential for expansion of sector output and associated tourism. 5. The subregion is a strong plantation timber grower. Woodchopping is a strong sector with established export market and port throughput. Additional value is gained through the existence of the Albany biomass plant. 6. A strong manufacturing base provides opportunities to capitalise on and adapt to growth in other industries and sectors (e.g. mining)	1. Per capita GRP is lower than for WA as a whole, and the lowest of all other regions apart from Peel. 2. Industry is dominated by agriculture, manufacturing and construction. A lack of diversification creates risks, particularly where industry is exposed to external geopolitical or climate forces. 3. The region's population is ageing, with potentially profound and far-reaching impact on the longer-term outlook, including productivity declines as the workforce retires, increased costs of health and welfare services, and possibility for a long-run population decline. 4. Current energy, water and transport infrastructure limits industry and business growth. 5. Rapid changes in technology will require concomitant upgrades to infrastructure to support them, particularly for advances in primary production, manufacturing and construction technologies that could make or break future performance of these top Coastal Great Southern industries. 6. The construction industry is lagging behind demand, particularly for residential dwellings, which is in turn impacting the attraction and retention of workers and the broader population.
Needs	**Opportunities**
1. Diversification of industry is required to boost performance, to provide support in times when certain industries experience downturns, and to reduce exposure to global megatrends. 2. There is a need to encourage new investment and expenditure throughout the Coastal Great Southern, where subregion tends to circulate existing capital or leak it to other regions and states. 3. Energy, water, transport and telecommunications / technology infrastructure must keep pace with industry demand and changing geopolitical, climate, and technology megatrends, or our top performing industries will suffer. 4. Primary production, manufacturing and construction industries in the Coastal Great Southern need to keep pace with global megatrends, in terms of both adaptation to climate, technological and geopolitical changes and increased volume output to support rapid urbanisation and demographic change. 5. The construction industry in particular needs to boost volume output to meet resident and worker demand, in turn supporting other industry growth and development (including through the attraction and retention of workers and through non-residential building development to support various industries).	1. Stimulation of the primary production, construction, manufacturing and related industries can boost performance in these sectors, including improvements to net export capabilities. 2. New job opportunities can provide enhanced economic outcomes for Great Southern residents, including persons experiencing disadvantage, and provide additional incentive to attract and retain younger residents. 3. The Great Southern has a wealth of untapped potential in local produce and niche primary production or manufacturing opportunities for international export markets, particularly to service growing Asian markets such as China, Indonesia, Malaysia and India. There are additional opportunities associated with global food security and land as a resource (e.g. niche products for global markets such as carbon sequestration credits). 4. There are opportunities for value-adding industries and to diversify the economy. For example, the end to live sheep export by sea could create new value-adding opportunities for the subregion. 5. An end to post-COVID Chinese tariffs on Australian produce provides opportunity for the Coastal Great Southern to capitalise on renewed market availability (particularly for barley, beef, and wine). 6. Hardwood plantations in the area are mostly chipped or pulped, as for wider WA. There are opportunities to add greater value (e.g. through biomass or cross laminated timber sector establishment).

6. Infrastructure Audit

Rockcliffe Vineyards

Infrastructure quality has a major effect on the capacity of a regional economy to grow, to remain resilient in the face of challenges, and to quickly leverage opportunities. Infrastructure is fundamental to the future success of the Great Southern.

6.1 Transport Links

6.1.1 Road

The region has several strategic freight, tourist and inter-town routes that include Albany Highway (the main route to and from Perth), South Coast Highway (Hassell Highway) and Chester Pass Road. Other main roads are mainly used as haulage routes for the agro-forestry, agriculture and mining industries (Figure 30).

Figure 30. Major roads, South West WA

Characteristics of the key road routes are as follows:

- Albany Highway – road train route that carries grain, woodchips, wool, livestock (14,370 trailers per year[28]), fuel and general freight. It is also a significant route for the tourism industry. Continued investment in additional passing and dual lanes would improve safety and operational efficiency.
- South Coast Highway (west of Albany) and Hassell Highway (east of Albany) together comprise the major east-west inter-regional and heavy haulage route for the forestry, agriculture and mining sectors. The out-loading task associated with the plantation timber and grain sectors is characterised by seasonal peaks and places significant pressure on road infrastructure and access to the Port of Albany.
- Great Southern Highway is a strategic freight, tourist and inter-town route running north-south in the central part of the region. As a road train route, it carries grain, wool, livestock, fuel and general freight. Traffic volumes are lower than on the Albany Highway but investment in more passing lanes would improve safety and operational efficiency.
- Chester Pass Road links the south/central Wheatbelt to the Port of Albany and provides access to the port for agricultural producers in the Gnowangerup, Kent and Lake Grace LGAs. While there is a progressive investment program in place for Chester Pass Road, the age of the pavement, seal width, limited passing opportunities and the structure of some curves present constraints to its safe and efficient use. The road is also a significant tourist route, linking a wide range of nature-based tourism products that are set to increase in popularity.

The quality and efficiency of the road network directly impinges on the competitiveness of the region's primary producers in global markets, and upgrades are widely regarded as essential for the economy (e.g. the recently completed Albany Ring Road project, additional passing lanes, upgrade of ratings to cater for larger vehicles, etc.). Cross-regional benefits could also result from improved east-west connections between the Great Southern and neighbouring regions.

The *Revitalising Agricultural Region Freight Strategy - Responding to Change*[28] document was released in February 2024. The strategy focuses only on the movement of agricultural freight over the next 10-15 years and presents a list of infrastructure and non-infrastructure priorities to support improved efficiency of the state's agriculture supply chains. Although not offering significant detail of the nature of projects, key infrastructure developments within the Great Southern are noted as:

- Roads to Albany Port – targeted road network investment, increased heavy vehicle access.
- Albany to Hyden/Newdegate Rail – rail improvements, establish intermodal terminal.
- Great Southern local roads – targeted road network investment.

Public road transportation to and from Perth and throughout the southwest is provided by TransWA coach lines, but services within and between towns in the Great Southern are limited.

6.1.2 Air

The main airport in the region is Albany Regional Airport and the only one with scheduled passenger services, operated by Rex Saab 340 aircraft and a minimum of 24 weekly return services, currently carrying over 60,000 passengers per year to and from Perth (Figure 31). Including the effects of COVID-19, the average annual growth since 1985 was 4.3% per annum. Over the past 5 years, growth has only been at 0.8% per annum. Another airstrip is located in Denmark for emergency and private use.

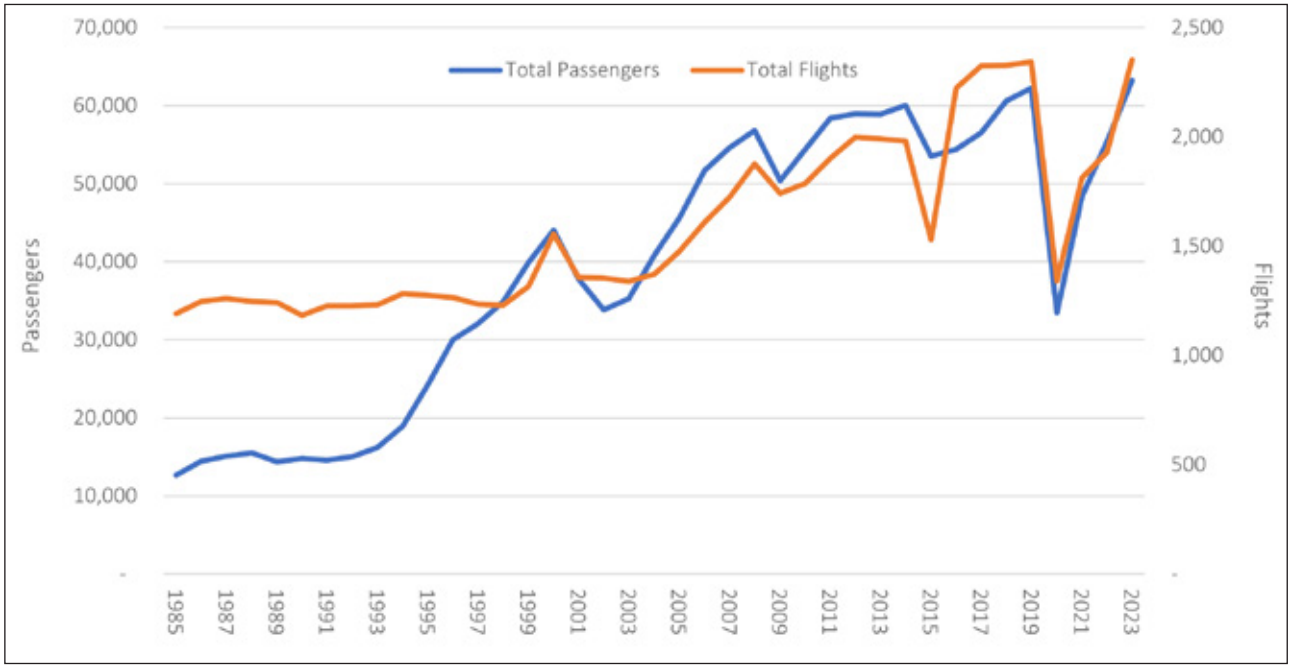


Figure 31. Albany Regional Airport passenger throughput 1985 - 2023 (inbound and outbound)[29]

However, **the high cost of passenger flights is widely considered to be a barrier to significant expansion in, for example, the tourism and events sectors**. Attraction of direct flights from the eastern states would require upgrades to Albany Regional Airport. Rio Tinto operates a fly-in fly-out (FIFO) service from Albany to Boolgeeda, with around 200 FIFO workers based in Albany.

6.1.3 Rail

The region is well-serviced by rail transportation of bulk commodities, predominantly grain (from a network of CBH receival bins at Cranbrook, Broomehill, Katanning and Wagin) and woodchips. The Great Southern Rail line provides a link to the Perth metropolitan area, including Kwinana, and the Port of Albany.

With additional investment, there is the **potential to expand the rail service**. The *Western Australian Regional Freight Transport Network Plan* also identifies opportunity for future consideration of a spur line extension to connect industry at the Mirrambeena Industrial Estate to the Port of Albany[30]. Further, the *Revitalising Agricultural Region Freight Strategy* (2024) outlines objectives for improvements for the Albany to Hyden/Newdegate Rail line through establishment of an intermodal terminal.

There is no passenger rail service available within the Great Southern. Although having been a discussion point for many years, there are no plans to reintroduce rail services between Perth and Albany because of the high costs involved with upgrading existing track and rolling stock.

6.1.4 Sea

The Port of Albany provides a strong connection to global markets for primary produce and plays a secondary tourist visitation role, through hosting cruise ships. It is located in one of the three best natural harbours in the Southern Hemisphere, with safe natural anchorage, location to major shipping routes, road and rail access and the capacity for expansion for new industries.

The Port of Albany is primarily an export-oriented port, providing a channel for the flow of agricultural products from the Great Southern to global markets. Exports through the port include woodchips, wheat, canola, barley and silica sand. Imports include fertiliser and petroleum products. Woodchips and wheat are currently the largest export commodities by throughput tonnage. This mix may change in the future with the potential establishment and operation of major mining investments in the region. A range of port capacity expansion investments would be required to facilitate this commodity diversification.

The port currently does not have a containerisation facility, and this limits its role in relation to manufacturing and other containerised export opportunities, potentially constraining market access for some sectors.

Export throughput exceeded 5.3 million tonnes in the year in June 2024, compared with an import throughput of 0.2 million tonnes. Throughput has seen an average annual growth rate (AAGR) of 4.9% since 2011.

A major advantage of the Port of Albany is that it has spare capacity in terms of the shipping channel, berths and land. However, the port also has capacity constraints in the efficiency of loading operations, particularly in its road/rail mix and its capacity to deal with deliveries of bulk and break-bulk commodities. The capacity of the port is critical for capitalising on potential export opportunities, including iron ore and secondary processing industries. Investment in infrastructure to address operational capacity constraints would enable the port to leverage further export-related growth and respond quickly to trade opportunities that emerge.

With the exception of cruise ships, there are no passenger services.

6.2 Water

The Great Southern has multiple town potable water schemes: the Lower Great Southern Towns Water Supply Scheme (LGSTWSS), which sources its water from the South Coast bore field and Angove Creek, and the Great Southern Towns Water Supply Scheme (GSTWSS), which services towns in the north of the region from Harris Dam near Collie. The remaining settlements in the region, including Frankland River, receive their water supplies from a variety of local sources. Due to the issues with water quality and maintaining local catchments, the Water Corporation is seeking to extend the integrated water networks to several of the inland towns.

As described in the draft *Great Southern Regional Water Supply Strategy – Evaluation*[31] ¶¶, surface water is the primary water source for towns, agriculture and industry in the Great Southern, with groundwater playing an increasingly important role. **An increase in water demand is projected,** driven by population growth, an increase in visitor numbers and agricultural production.

The climate in the region is continuing to dry, which means the long-term sustainability of water abstraction is a key challenge for regional development. In many parts of the Great Southern region, average annual rainfall has declined significantly since 1975. As a consequence, the south-east agricultural area of the region has experienced several water deficiency declarations in recent years. The sources for some small, independent town water supply schemes have not always been able to provide the required volumes and additional water had to be carted in.

The Great Southern region is leading wastewater recycling in Western Australia, with many successful projects. On average, the Water Corporation recycles 70 per cent of its wastewater flows across the region; however, in Albany, Mount Barker, Tambellup and Walpole the rate is 100 per cent.

The trend towards drier and hotter climate conditions is expected to continue in the Great Southern region and will result in decreasing water availability. Use of existing groundwater and surface water sources has reached sustainable limits, and at the same time, water demand is projected to increase for all water use sectors to 2050.

The major challenges to achieving water security in the Great Southern region are:

- Climate change causing continued decline in rainfall and consequently decreasing runoff into dams and reduced recharge of aquifers.
- Increasing demand for potable and non-potable water.
- Increased water losses through evaporation as temperatures rise.
- Contamination risks from surrounding land uses.
- Rising salinity due to seawater intrusion into aquifers in coastal areas, and soil salinity and saline groundwater in inland areas.
- Carting of water to supply small town schemes and for community supply during times of water deficiency.

6.2.1 Water Demand

The current total water demand for the region is approximately 35 gigalitres per year (GL/year), with the agriculture sector continuing to be the largest water user, as it was in 2014. Irrigated agriculture accounts for 44 per cent of water used and 28 per cent is used for stock and domestic purposes in rural areas. Households are the next biggest user at 19 per cent, followed by industry at 4 per cent, and parks and gardens at 2 per cent (Figure 32). Mining water use remains unchanged since 2014 as projects proposed at that time did not go ahead as planned.

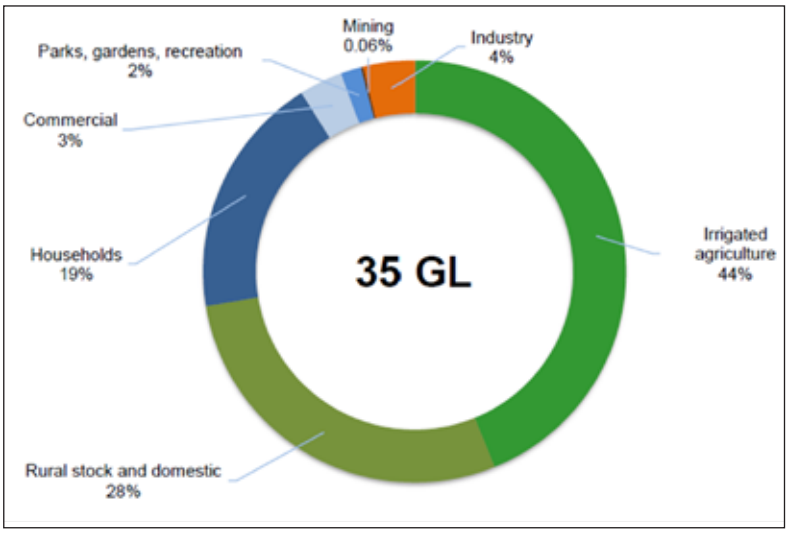


Figure 32. Water use by sector in the Great Southern region during 2020-21

¶¶ Unless referenced otherwise, all information, tables, charts and figures related to water in the subsections that follow are sourced from the Great Southern Regional Water Supply Strategy – Evaluation.

The Water Corporation operates the public drinking water supply schemes in the Great Southern region, including two regional schemes. The Great Southern Towns water supply scheme (GSTWSS) provides drinking water to towns in the northern part of the region (as well as towns outside the region). The Lower Great Southern Towns water supply scheme (LGSTWSS) services Albany, Kendenup, Mount Barker, Narrikup, and Denmark when needed. Please refer to Appendix A for more information about town water supply schemes in the region.

The 2014 *Great Southern Regional Water Supply Strategy*[32] reported a total use of 31 GL, and the evaluation reports a total water use of 35 GL. Although this appears to be an increase of almost 4 GL, the methods used to estimate water demand were updated since the release of the strategy. It is now estimated that demand was higher than was published in 2014, so the actual increase is not as high as the numbers suggest.

The significant increase in urban water use is likely due to a change in methods for estimating unlicensed water use rather than an actual increase. Since the 2014 strategy was released, an urban bore study was conducted (DWER 2020). This provided an estimate of an additional 2.3 GL of urban water use, which likely existed in 2014 as well, but was not accounted for in the original strategy.

In 2014, the Department of Water and Environmental Regulation (DWER) predicted that water demand would increase to about 39.4 GL by 2021 under a medium-growth scenario. The 2021 actual total water use of around 35 GL is comparable to the low-growth scenario identified in 2014. Agricultural water use increased in line with our low-growth scenario and industrial water use is comparable to the medium-growth scenario projection.

Water demand estimates (Table 26) for agriculture in the Great Southern region for 2030 and 2050 assume water use will grow at the same rate as the annual growth in the gross value-added of agricultural commodities produced in the region. However, this approach to modelling does not consider local impediments such as the availability of water, land, labour, capital and infrastructure or other market forces and government policies that influence the growth of irrigated agriculture. Scenarios therefore represent a future where demand for water is unconstrained, and the region achieves its full economic potential.

Table 26. Total actual (2021) and projected (2035 and 2050) water use for the Great Southern region***

Sector	Water use (GL per year)						
	2021 actual	2035 projected			2050 projected		
		Low	Med	High	Low	Med	High
Agriculture	25.0	29.9	31.2	32.5	34.9	38.2	41.7
Urban	8.2	8.6	9.3	10.1	8.8	10.8	13.1
Industry	1.3	1.9	2.1	2.3	2.8	3.4	4.1
Mining	0.1	0.1	0.1	0.1	0.2	0.3	0.4
Total	**34.6**	**40.6**	**42.8**	**45.1**	**46.7**	**52.7**	**59.3**

Note: Table does not include trend-breaking growth for mining projects.

There are insufficient water resources available to support the projected growth of agriculture in the Great Southern region, so strategies would instead be needed to increase the industry output per unit of water input or develop alternative water supplies.

*** The low, medium and high scenarios are estimated using DWER's Water Supply and Demand Model.

6.2.2 Water Supply

Climate

Western Australia is experiencing the effects of climate change. Over the past 50 years, average temperatures have increased across the state and rainfall has decreased in the state's south-west. For many parts of the Great Southern region, average annual rainfall has declined significantly since 1975.

Since 1975, annual average rainfall has declined by more than 12 per cent in Denmark, by almost 8 per cent in Albany, by 8.6 per cent in Katanning and by 1 per cent in Ongerup compared to the 1910-1974 average (Table 1). Over the past 10 years, this decline has remained similar for many parts of the Great Southern region and steadied for Ongerup; however, it has worsened for Denmark (rainfall had declined by 9 per cent in 2014).

Albany and Denmark received below average rainfall in 2023 (Table 27), despite a particularly wet June for both sites. For Katanning and Ongerup, rainfall tracked well-below average.

Table 27. Rainfall statistics for selected towns in the Great Southern region

Location	Annual rainfall (mm)			Change in average annual rainfall (%)
	Average 1910-1974	Average 1975-2023	2023	
Albany	29.9	31.2	34.9	38.2
Denmark	8.6	9.3	8.8	10.8
Katanning	1.9	2.1	2.8	3.4
Ongerup	0.1	0.1	0.2	0.3

Between November 2023 and April 2024, the region experienced the driest summer period on record, combined with the hottest summer period on record. This combination is an example of the conditions we can expect in the future.

Figure 33 shows the rainfall outlook for four sites in the Great Southern region (Albany, Denmark, Katanning and Ongerup) using rainfall data from 1 January to 12 May 2024.

Kalgan River

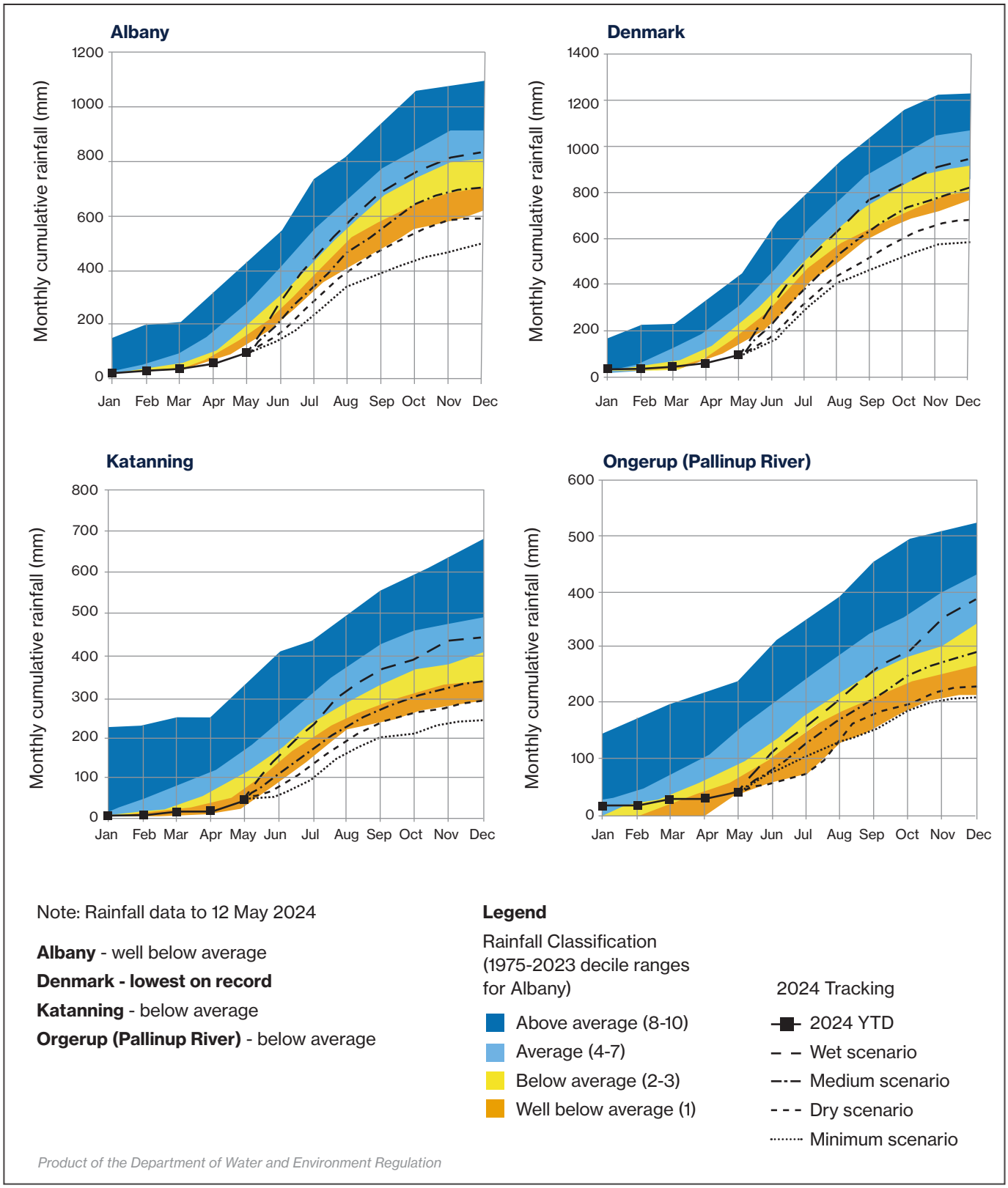


Figure 33. Rainfall scenarios for Albany, Denmark, Katanning and Ongerup, modelled in May 2024

The outlook for each of these sites may change as the season progresses. As of 12 May 2024, rainfall at Katanning and Ongerup was tracking below average, Albany is experiencing well below average rainfall conditions, while Denmark is facing record low rainfall conditions (year to date).

Water Sources

The Great Southern region is heavily dependent on surface water resources, which account for 61 per cent of total water use in 2021. About 31 per cent of water used comes from groundwater sources and 8 per cent from recycled water (Figure 34).

The Water Corporation can transfer water from sources for the Perth Integrated Water Supply Scheme (IWSS)3 to supplement the GSTWSS in periods of low storage. In 2021, 4.5 GL of water was transferred to the GSTWSS, which supplied a total of 5.6 GL that year. It is estimated that about 1.5 GL of this was supplied to towns within the Great Southern region.

There are four proclaimed surface water areas††† in the region (Bolganup Creek, Limeburner's Creek, Two People's Bay and a portion of the upper reaches of the Warren River and Tributaries), and two proclaimed groundwater areas (Albany and Bremer Bay), see Figure 35. A licence to take water is required in these areas. **The majority of the water resources in the region are not proclaimed, which means that a licence is not required to take water in these areas,** unless abstracting from an artesian groundwater source.

DWER receives information from licensed water users about how much water they take, but water use in unproclaimed areas needs to be estimated. As the majority of the Great Southern region is unproclaimed, a lot of water demand data for this region has to be estimated. Since the release of the 2014 strategy, DWER have updated and refined methods for estimating unlicensed water demand or use. **It is estimated that 80 per cent of water use in the region is unlicensed**, and most of that is abstracted from surface water sources (Figure 36). In 2021, 6.3 GL of licenced surface water and groundwater was used, and more than 90 per cent of this was for town water supply schemes.

Individual town water supply schemes in the region mostly depend on surface water resources. Some are reliant on small, local, artificial catchments, and others rely on carting water from other schemes (see Appendix A).

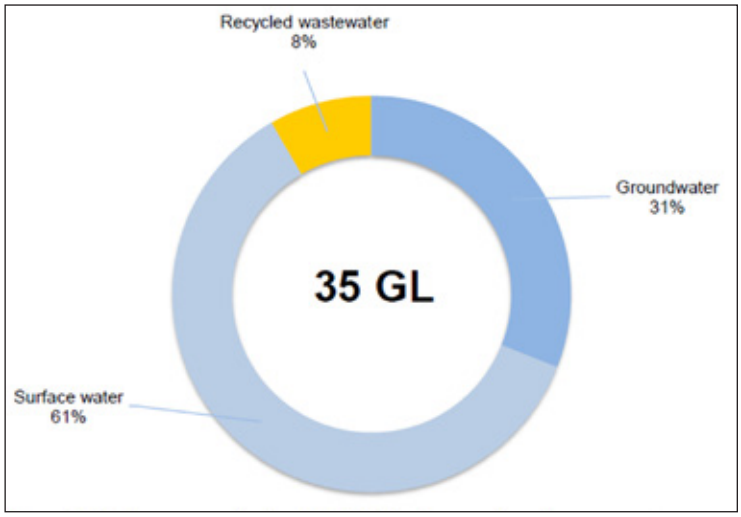


Figure 34. Water use during 2020-21 in the region, by source type

Figure 35. Proclaimed groundwater and surface water resources in the region

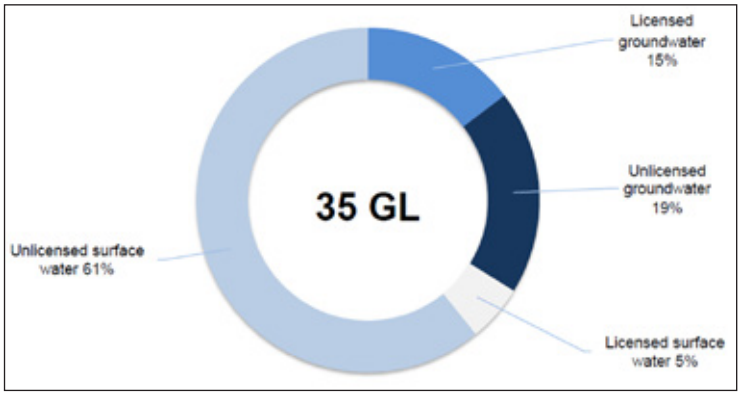


Figure 36. Proportion of licenced and unlicensed water use in the Great Southern region during 2020–21

††† Proclaimed under the Rights in Water and Irrigation Act 1914.

Reduced rainfall in the region means that both surface water and groundwater resources are not being replenished at the same rates as in the past. The impact of this varies across the region and from year to year, but the general trend is reduced water availability. Groundwater levels have declined in some areas and dams may not fill up every year. In addition, water quality issues such as increasing salinity are reducing the suitability of some resources for uses requiring good quality water.

Shallow groundwater resources and small dams with correspondingly small catchments are the most vulnerable to these risks. Combined with water losses through evaporation, these sources are not always available and water supplies are carted in, both for schemes (see Appendix A) and community purposes.

Potable Supply

The Great Southern potable water supply is managed by the Water Corporation[33]. The region has a number of local independent town water supply schemes. There are also 2 integrated networks – the Lower Great Southern Towns Water Supply Scheme (LGSTWSS), which supplies Albany, Mount Barker, Kendenup and nearby areas. The main source of water for the LGSTWSS is the Albany borefield.

In recent years, the Water Corporation has worked on several strategies to help secure drinking water supplies for Coastal Great Southern LGAs, including:

- In 2021, the LGSTWSS Scheme was expanded to include Denmark. This secures the town's supply when the local Quickup River Dam can't meet demand.
- The Water Corporation is investigating new groundwater sources in the Manypeaks and Angove areas.
- Feasibility studies have included a possible seawater desalination plant at our existing South Coast Water Treatment Plant in Torndirrup.

As part of the Water Corporation's investigations into new water source options, environmental and Aboriginal Heritage surveys and site assessments are being conducted. Marine investigations are taking place to support the potential desalination plant. Water Corporation also implemented alternative non-drinking water supplies for local community use. This includes irrigating public open spaces to help reduce the demand on high quality drinking water supplies.

Low rainfall coupled with ongoing hot and dry conditions have impacted on-farm storages, shire dams and Department of Water and Environmental Regulation strategic community water supplies. To secure water supplies in these areas, Water Corporation utilises water carting when needed and shire fixed standpipes.

Water Corporation operate and maintain 20 wastewater schemes in the region. To cater for community development and growth, there have been significant upgrades to the wastewater treatment plants at Denmark and Albany. The Water Corporation is committed to recycling as much of the Great Southern's wastewater as possible. On average 70% of the region's wastewater flows are recycled for beneficial community re-use across the region. There is 100% re-use in Albany, Boddington, Kulin, Mt Barker, Tambellup, Walpole and Williams. The region's recycling is contributing towards the statewide target of 35% by 2035. In Albany, around 2,000 million litres of treated wastewater is used to irrigate an Albany tree farm each year. Over a million trees on the farm captures some 70,000 tonnes of carbon from the environment.

Responding to Climate Change – Water Corporation[34]

Public drinking water supply schemes have been affected by the same climatic conditions as those impacting farming and other businesses in the Great Southern area. As a result, Water Corporation are undertaking measures to secure water supplies into the future.

Water Carting: Carting occurs across the State when needed for small towns where the local water scheme relies heavily on rainfall. When water sources reach a low level, water carting is considered the most cost-effective solution, as often there are only a small number of properties, and the cost to connect to a larger scheme far exceeds the cost of temporary carting. Once the town's own water supply begins to recover, carting will stop and the town is again supplied through its own local scheme.

Fixed Standpipes: Farming businesses that require stock water as a replacement for depleted on-farm supplies are encouraged to seek water from local strategic community water resources in the first instance. Some supplies require swipe cards to be issued by the Shire to enable access.

Where on-farm and strategic community water resources are not available, stock water can be obtained from regional Shire fixed standpipes.

Water for spraying and other purposes can also be made available through Shire standpipes. Due to the high volumes required, and the potential impact on other users connected to our schemes, access must only be via high capacity standpipes.

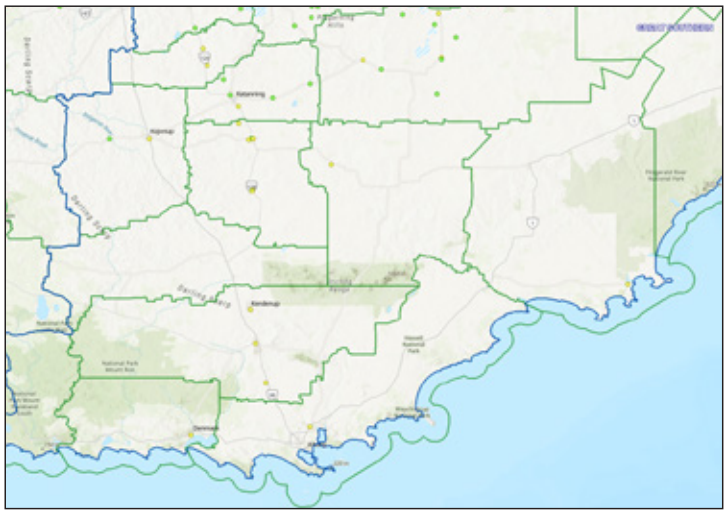


Figure 37. Water standpipes map

Water is made available through Shire standpipes/tanks connected to our schemes for short-term emergency use. Water Corporation may temporarily restrict standpipes to preserve the safety and integrity of public drinking water supply schemes. In this instance, Shires will be provided with as much notice as possible so they can advise their standpipe users.

6.2.3 Rural Water Planning

The National Water Grid's *Western Australia Connections* package (DCCEEW 2024) is jointly funded by the Australian and Western Australian governments and other partners. The package includes a number of projects in the Great Southern region that have been completed or are underway. The *Community Water Supplies Partnership Program* with local government aims to improve or develop new non-potable water sources for farming communities to access when needed.

The Department of Water and Environmental Regulation is currently developing strategic community water supply plans for several shires in the Great Southern region. The plans provide information for local government authorities and farmers on the locations of strategic, non-potable community water sources, and how to access them for emergency stock watering and firefighting purposes. This includes details on what facilities are available at each site. The plans will be available on the department's website when completed.

6.2.4 Improving Water Knowledge

Since the 2014 strategy, the following initiatives have been running to improve our understanding of water resource availability in the Great Southern region.

State groundwater investigation program

As part of the state-funded South Coast groundwater investigation, the department completed two projects in the Great Southern region to improve our understanding of groundwater resources.

The first project was to build the Albany Aquifer Modelling System, a 3D digital conceptual model of the Albany Groundwater Area. Modelling efforts were informed by 8,810 square kilometres of airborne electromagnetic data, water samples from the ocean and 58 groundwater bores, and rainfall site information across the Albany Groundwater Area and surrounding hinterland.

The second project was to map water resource information of the Albany hinterland, where there is interest in water for new or expanded agriculture and other businesses. Here, the department defined four potential palaeochannel resources in the King River, Kalgan River, Manypeaks and Nanarup areas. The department produced the SHM12: Albany hinterland prospective groundwater resources map (see Appendix B) and HM12: Albany hinterland prospective groundwater resources explanatory notes outlining prospective zones, depth to water, expected quality and potential quantity of these palaeochannels.

The model and mapping were used to inform allocation planning for the Albany Groundwater Area and the Albany hinterland.

CSIRO brackish groundwater investigation

Focusing initially on Western Australia, this CSIRO project is developing methods for identifying and characterising currently untapped brackish groundwater resources, predominantly for irrigated agriculture and remote communities water supply.

Funded by the National Water Grid, the project addresses key challenges facing brackish groundwater desalination including:

- brackish groundwater resource characterisation
- inland brine (desalination waste stream) management
- energy availability in remote regions.

The project, expected to be finalised in 2025, will be delivered through a knowledge integration platform to support decision-making processes for desalination implementation projects in agriculture. It will be underpinned by a state-wide assessment of existing data, supported by a high-level literature review focusing on the critical issues listed above (Taylor et. al 2023).

WaterSmart Industries - Beaufort Palaeochannel Pilot

The Department of Primary Industries and Regional Development has secured four-years of funding (2023–27) to extend the WaterSmart Farms program, with the aim of locating and developing water resources for agri-industries in partnerships with industry and government. The new WaterSmart Industries initial pilot is the Beaufort Palaeochannel project.

6.2.5 Great Southern Region's Water Outlook

Future Climate

In the Great Southern region, climate change effects will continue to place more pressure on surface and groundwater resources, affecting town water supplies, agricultural production and ecosystems. Over the next few decades some of the predicted changes for the state's south-west, including the Great Southern region, are:

- Sea levels are projected to rise by about 24 cm by 2050. However, if Antarctic ice sheets melt faster than currently predicted, sea level rises could be higher.
- The frequency and temperature of very hot days is expected to increase, and heatwaves will be longer and more intense. By 2030, average annual warming is estimated to be 0.5 to 1.1°C above the climate of the period 1986–2005.
- Average annual rainfall is projected to continue to decrease and become more variable from year to year. In particular, decreases in winter and spring rainfall are expected.
- Despite the projected reduction in total annual rainfall, the intensity of heavy rainfall events will probably increase. This could result in more very wet and very dry years, with more time spent in drought conditions.
- Generally, drier and hotter conditions will result in decreasing soil moisture levels and surface water runoff. This is due to increased water losses from evapo-transpiration by plants and soil, which in turn could exacerbate drought and bushfire conditions.
- Declining rainfall results in reduced inflows to surface water storages as well as reduced groundwater recharge, especially for shallow, unconfined aquifers.
- Under a high-emissions scenario, Albany's climate is projected to be more like the current climate of Busselton.
- A case study is projecting a 50 per cent decrease in springtime soil moisture and a 40 per cent decrease in winter precipitation for the Wheatbelt. The larger decrease in soil moisture may be related to projected increases in potential evapotranspiration causing additional drying in catchments on top of the projected precipitation decline over the cool season months. This is likely to result in reduced yields.

Predicted Water Availability

In combination, the climate change effects outlined above (i.e. reduced rainfall, greater rainfall variability from year to year, more dry years, increased temperatures) are expected to result in a reduction in water availability into the future as streamflow and groundwater recharge continue to decline.

Further reductions in streamflow will increase pressure on existing water sources, particularly for independent town water supply schemes that draw on local dams and catchments. Some of those local dams are already performing less reliably from year to year in terms of water volumes produced, and this effect is likely to intensify in the future.

As less water is recharged to aquifers, groundwater levels fall, affecting ecosystems that depend on groundwater and reducing the volume of water that can be abstracted sustainably.

With long-term droughts projected to increase in frequency and in the areas affected, water-dependent industries, agriculture and water managers need to prepare for drier conditions and variable year-to-year water availability. In particular, this drier landscape could have implications for bushfire fuel loads, potentially worsening the severity of bushfires in the future (Bureau of Meteorology (BoM), 2022).

The Albany Groundwater Area is fully allocated. The allocation limit for the semi-confined aquifer in the Grasmere subarea, where the Water Corporation's Werillup borefield is located, was increased from 1.5 to 3 GL/year. To meet future demand, the Water Corporation is currently investigating potential groundwater resources in the unproclaimed Albany hinterlands (no allocation limits set) as well as seawater desalination as potential future sources for the LGSTWSS.

Projected Demand

The department has developed high-, medium- and low-growth scenarios to estimate future water demand using a water supply and demand model. For the Great Southern region, water use is projected to increase steadily for most water use sectors over the next three decades (Figure 38 and Table 26). Under a medium growth scenario, total water demand is estimated to be 43 GL by 2035 and 53 GL by 2050.

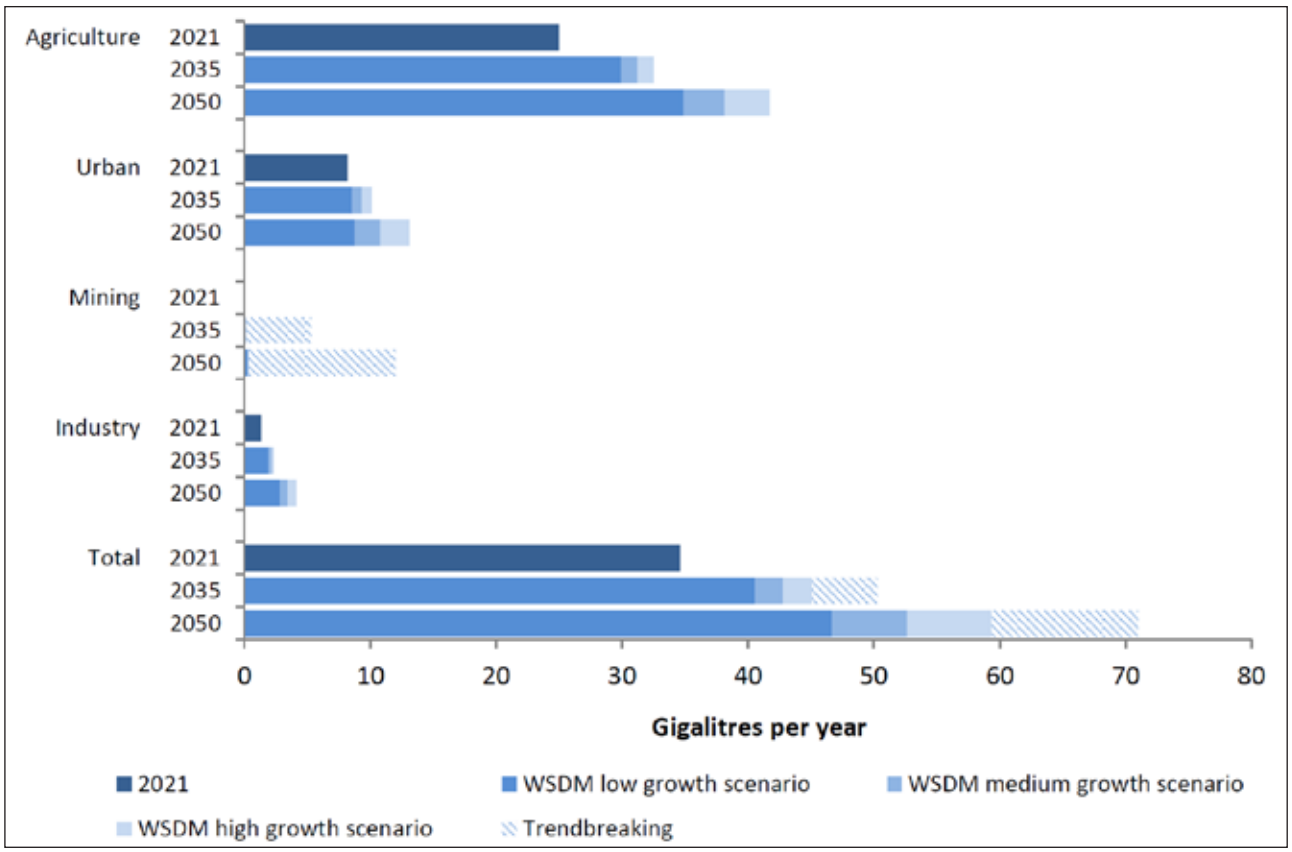


Figure 38. Current and projected water demand by sector for the Great Southern region to 2050

Agriculture: The Great Southern region is the second-largest agricultural producer in Western Australia, with about 2.2 million hectares of arable land supporting a range of primary industries. The main sectors include broadacre crops and livestock, plantation timber, woodchip processing, fishing, aquaculture, viticulture and horticulture. Crops like barley, oats, canola, wheat and hay generate more than half of the region's annual production value of $1.2 billion, with livestock (sheep, cattle, pigs and chickens) generating about 40 per cent. The remainder is generated primarily from fruits, nuts and grapes. The Great Southern region's agriculture industry generally performs consistently, with any variability from year to year due to seasonal conditions and world markets.

DWER modelling assumes growth in water demand will follow historical trends, where water demand increased at the same rate as growth in the productive output of irrigated agriculture in the region. However, the same growth in water demand cannot be supported in the future while maintaining sustainable groundwater and surface water abstraction. Under all three water projection scenarios, the agriculture sector continues to have the highest water demand in the region. If significant growth occurs, alternative water sources and strategies to increase the industry output per unit of water input would need to be developed.

Urban and Commercial: Urban water use is expected to remain the second largest water user in the region. Demand is projected to increase by at least 2.5 GL/year (medium-growth scenario) by 2050. Since 2014, most of the Great Southern region's population growth occurred in the City of Albany and the shires of Denmark and Plantagenet.

Albany has a significant supply of land zoned for urban development for housing to accommodate projected population growth. Business expansion can be catered for in several areas zoned 'Light industrial' and 'Industrial' in the City of Albany's recently gazetted Local Planning Scheme No. 2. With urban growth comes an increased demand for non-potable water for irrigation (public open space). This will need to be met by local groundwater (if available) or an alternative source such as recycled wastewater.

Denmark is experiencing a housing shortage. The shire aims to consolidate growth within the existing townsite, and to encourage increased density and diversity of housing, while maintaining the town's character.

Mount Barker has experienced steady growth in recent years. The population of the Shire of Plantagenet increased by around 4.6 per cent since 2014. Land for residential development is available.

Some smaller townsites are serviced by non-potable water supply schemes. For example, the Shire of Denmark operates the Peaceful Bay scheme and has flagged a need for water supply planning.

Water requirements for road construction projects in the region have sometimes been supplied from local farm dams. However, with climate change and the reduction in surface water flows into small dams, water for road construction is becoming increasingly constrained.

Mining: The mining sector is a comparatively small contributor to the Great Southern region's economy. Existing mining operations include industrial minerals like dolomite, limestone, lime sand and silica sand. Mines provide their own water supply from local sources; for example, the silica sand mine in Mindijup obtains water from its local bore, dam and rainwater.

Proponents should note that accessing artesian groundwater in unproclaimed areas requires a licence under the *Rights in Water and Irrigation Act 1914*.

Estimated increases in future mining water use are dependent on the following currently planned projects going ahead as anticipated, and this is shown in Figure 38 as a 'trend-breaking' scenario. Any additional projects would increase the projected water demand volumes.

Proposed mining projects and their water supply:

- The Southdown Magnetite Project is a proposed open pit mine approximately 90 km east-north-east of Albany, producing 5 mtpa of magnetite concentrate to be exported internationally via Albany Port. Estimated to start operations in 2026 with a projected mine life of 28 years, it is currently in the assessments and approvals phase. The project is expected to need about 5.3 GL of water per year, proposed to be met by self-supply from local sources, including rainwater harvesting, recycled water from the Water Corporation's Albany Water Resource Recovery Facility, and two local borefields drawing from the confined, saline Lower Werrilup aquifer (Grange Resources 2023). In addition, the company has approval for a 12 GL/year seawater desalination plant at Cape Riche to cater for potential future scaling up of the project (Grange Resources 2022).

- The Katanning Gold Project is a proposed open pit mine about 40 km north-east of Katanning, with a plant capacity of 5 mtpa and an estimated mine life of 10-11 years. Water needs are expected to be supplied from local groundwater sources (Ausgold Ltd 2023). A Definitive Feasibility Study for this project is expected to be completed in 2024. The company is investigating additional projects in the Great Southern region at Kojonup, Lake Magenta and Woodanilling.

Industry: Industrial water use could double by 2050 (medium-growth scenario). The Great Southern Development Commission identified improvements to power, water, transport and digital service infrastructure as a priority to support economic development in the region in its current strategic plan.

The manufacturing industry in the Great Southern region produces a number of key products such as meat, wine, spirits, beer, specialised agricultural equipment, chemicals, and processed seafood.

The main commodities shipped through the Port of Albany are grain, woodchips and silica sand exports, as well as fertiliser and fuel imports. The port's total cargo trade volume for 2021 was around 3.7 million tonnes. Over the next 30+ years, this is expected to increase to around 8 mtpa, and possibly more, if magnetite exports become part of the mix.

A number of renewable energy projects are being proposed across the region. Water demand for these projects can be significant during the construction phase and would need to be supplied from local sources or by carting. Proponents need to identify water sources early in the project planning stage, prior to approvals.

Water Supply-Demand Risks

The major risks faced by water resources and water users in the Great Southern region are:

- Increasing demand for water as the population grows, economic activities expand and temperatures increase.
- Continued decline in rainfall and consequently in runoff into dams, for self-supply users and town water supply schemes.
- Reduced recharge of aquifers and falling groundwater levels due to decline in rainfall.
- Increased water losses through evaporation from dams as temperatures rise due to climate change.
- Risks to the quality of surface water and groundwater sources from contamination from surrounding land uses such as agriculture, industry and residences, and activities such as recreation.
- Rising salinity from seawater intrusion into groundwater aquifers and bores in coastal areas, and soil salinity and saline groundwater in inland areas.
- Carting of water to supply small town schemes (extra pressure on the sources water is being carted from, cost of carting) and for community supply during times of water deficiency.

6.3 Energy

Currently, baseload power to the region is provided from the South West Interconnected System (SWIS), with generation from coal-fired power stations in the Collie area. The SWIS has two key medium to longer term capacity and operational issues: (i) to continue to improve the reliability of the power supply; and (ii) to plan for capacity increases that will address growth in industry demand. In this regard, Western Power also has the task of managing the ongoing safety and efficiency of power infrastructure and the cost of upgrades and maintenance. Providing regional energy security is an essential support for economic growth in the region.

There are considerable concerns about the level, age, safety, and efficiency of the current power infrastructure in the Great Southern and the cost of upgrades and maintenance. The two primary issues are power supply unreliability and a lack of capacity to meet growing population and industry demand. Population growth will lead to increasing peak demand within the SWIS, which is forecast to increase at an average annual rate of 1.4% over the next 10 years, resulting in the need for upgrades and expansion of capacity, unless alternative solutions are implemented or other factors mitigate. Prospects for economic growth, from anticipated diversification of the economy into the minerals sector‡‡‡ and further downstream processing of agricultural product will also result in increasing demand on infrastructure.

Underpinning economic diversification and population growth in the Great Southern is the ability to secure reliable power sources with the capacity to meet the growth anticipated. The Western Australian Planning Commission has stated that *"development of strategic industry [in the Great Southern] is limited due to the unreliability of power"*[35]. Local (distributed) power generation may be able to help meet some of the projected demands and overcome capacity constraints.

The capacity of the existing power infrastructure and the cost of upgrading feeder lines have the potential to limit development in the region, particularly at edge-of-grid locations including Gnowangerup, Jerramungup, Frankland, Amelup and Albany to Walpole.

The Dampier to Bunbury Natural Gas Pipeline (DBNGP) extends from Dampier to Capel with a lateral to Busselton. The lower southwest areas of the state are not currently serviced with natural gas, although a proposal for the extension of the DBNGP to Albany has been under consideration for many years. The extension of the gas pipeline has the potential to provide significant flow-on benefits across both the Great Southern and South West regions with the selected route running from Bunbury to Albany via Manjimup and Mount Barker. Further stages could include the construction of a lateral from Bridgetown to Katanning via Boyup Brook and Kojonup, a lateral north from Katanning through Woodanilling to Wagin and Narrogin and south to Tambellup and Cranbrook, and a lateral west from Albany to Denmark. However, the possibility of the extension of the DBNGP is increasingly remote.

In 2024, 33.6 percent of electricity delivered by the SWIS was from renewable sources (including generation from solar PV systems)[36]. WA has seen a high penetration in terms of solar installations, with a decade of strong growth. Collectively, rooftop solar is the largest generator in the SWIS. It is currently installed in more than one-in-three households.

According to 2024 Australian Government Department of the Environment and Energy statistics[37], WA as a whole now has an 17.2% share of renewables, up from 9.0% in 2018-19, and from only 3.2% in 2008/09. Renewable energy sources are accelerating at a greater rate (AAGR 18.4%) than that of non-renewables (3.0%).

‡‡‡ Proposed infrastructure support for the Southdown mining project includes a 330 kV transmission power line from Muja to Wellstead.

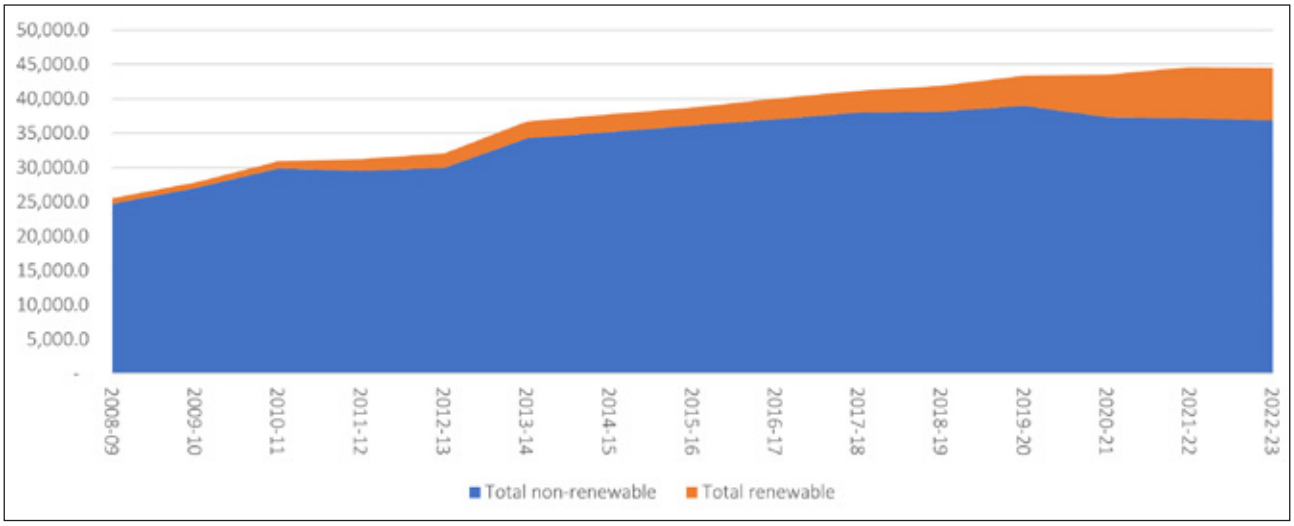


Figure 39. Growth in non-renewable and renewable energy sources 2008/09 to 2016/17

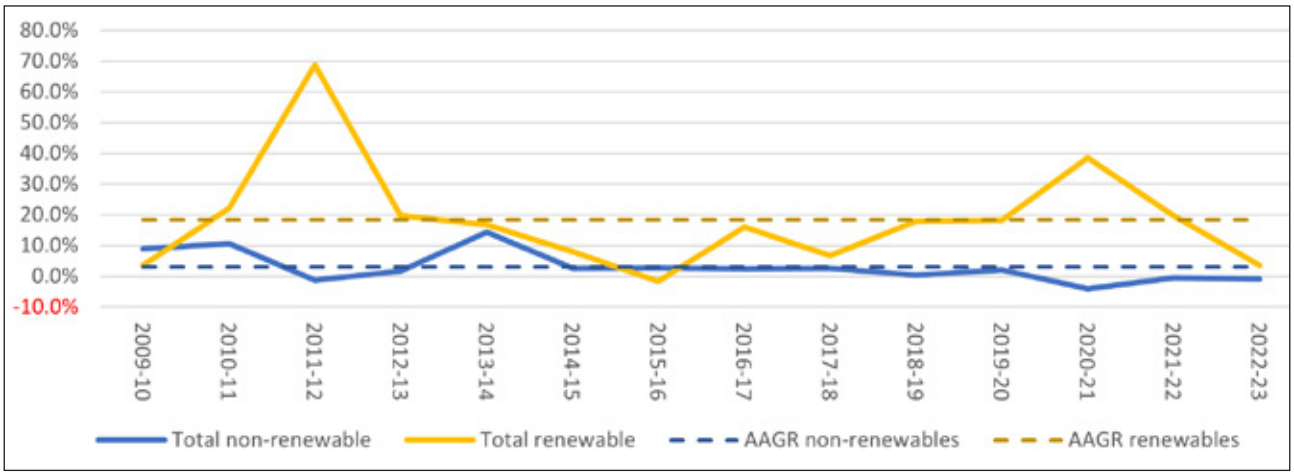


Figure 40. Annual Growth Rate for renewables and non-renewables in WA

Table 28. 2024 share of non-renewable and renewable energy generation

Non-renewables	GWh	Share of non-renewables	Share of Total Energy Generation
Black coal	7,340	19.9%	16.5%
Natural gas	27,303	74.1%	61.4%
Oil products	2,198	6.0%	4.9%
Total non-renewables	**36,841**	**100%**	**82.8%**
Renewables	**GWh**	**Share of renewables**	**Share of Total Energy Generation**
Biogas	120	1.6%	0.3%
Wind	3,379	44.2%	7.6%
Hydro	71	0.9%	0.2%
Large-scale solar PV	908	11.9%	2.0%
Small-scale solar PV	3,159	41.4%	7.1%
Total renewables	**7,637**	**100%**	**17.2%**

Wind power has a relatively long history in the region, with the Albany Wind Farm opening in 2001. Recent developments include the extension of the Albany Wind Farm (Sandpatch/Grasmere) and wind turbines at Mt Barker and Denmark. There is also a well-advanced project from the private sector for a 150 MW wind farm at Flat Rocks (near Kojonup). The wind power developments in the region have generally been contentious, with concerns over visual impact and (generally unfounded) concerns over infrasound and impact on fauna.

Both as a response to the issues of unreliability and capacity, and as a driver to change, is the move towards greater decentralisation of energy supply. To some extent, this can mitigate the projected increase in demand on the SWIS (as can be seen through the influence that growth in solar PV generation is already having). For example, Western Power is trialling Standalone Power Systems (SPS) comprising solar panels, a battery, an inverter (to convert DC to AC) and a backup diesel generator. 57 SPS are being implement with 26 of them in the Great Southern[38].

However, the needs of the Great Southern in addressing capacity and reliability constraints remain. Developments in technology in the provision of gas, solar, wind and wave energy solutions and the potential they present for more localised generation present opportunities for meeting the needs of the region, as well as delaying, or avoiding, upgrades of the current transmission supply.

The City of Albany wish to go further and has an ambition to be 100% renewable in terms of energy by 2026. This will require expansion in solar and wind energy generation but will also require the ability to generate baseload power (currently 15 MW requirement), which is not possible with wind and solar. A current project by WA Biofuels is investigating the possibility of a 15 MW Energy from Waste and Biomass plant. The concept is to utilise gate fees from municipal waste to purchase sustainable biomass feedstock to co-feed (with waste) a biomass power generation plant. This has the potential for wide ranging regional development and environmental benefits, driving investment and stability in the region's agricultural and forestry sectors whilst also reducing landfill and meeting regional energy demand.

6.4 Communications

All of the Great Southern's towns have access to some form of digital telecommunications. However, there are serious gaps in access to electronic and digital infrastructure which impose economic and social constraints on rural enterprises and communities. **Broadband and mobile phone coverage are patchy across the rural areas of the Great Southern.** The need to improve the connectivity of these rural communities is essential to enable them to survive and grow in the modern economy and is therefore a high priority. Meeting this challenge requires improved IT support and the capacity to utilise technologies appropriate to the particular needs and challenges of rural and remote regions. In response, the state government has implemented initiatives such as the Regional Telecommunications Project (RTP) for improved mobile phone coverage and digital farm grants for Superloop fixed wireless network and the Mt Barker Pivotel Ecosphere.

Although telecommunications services have generally improved across the region, bandwidth and quality concerns continue to impact numerous sectors, including, but not limited to:

- E-commerce.
- Access to eLearning and peer coaching in schools.
- Tele and video conferencing.
- Ambulance on-line despatch systems.
- E-health services.

The need to 'future proof' the rural communities of the Great Southern is a high priority and requires improved IT support and the capacity to utilise technology. In the current and future business and community services environment, high levels of telecommunications will be required for all business, including professional and community services. High quality, consistent broadband is essential to attract new businesses to the region and digital awareness is essential for existing operators to stay competitive.

Truffle Hunting WA

6.5 Infrastructure Strengths, Challenges, Needs and Opportunities

In line with the above, the following infrastructure strengths, challenges, needs and opportunities have been identified for the Coastal Great Southern.

Table 29. Economic strengths, challenges, needs and opportunities

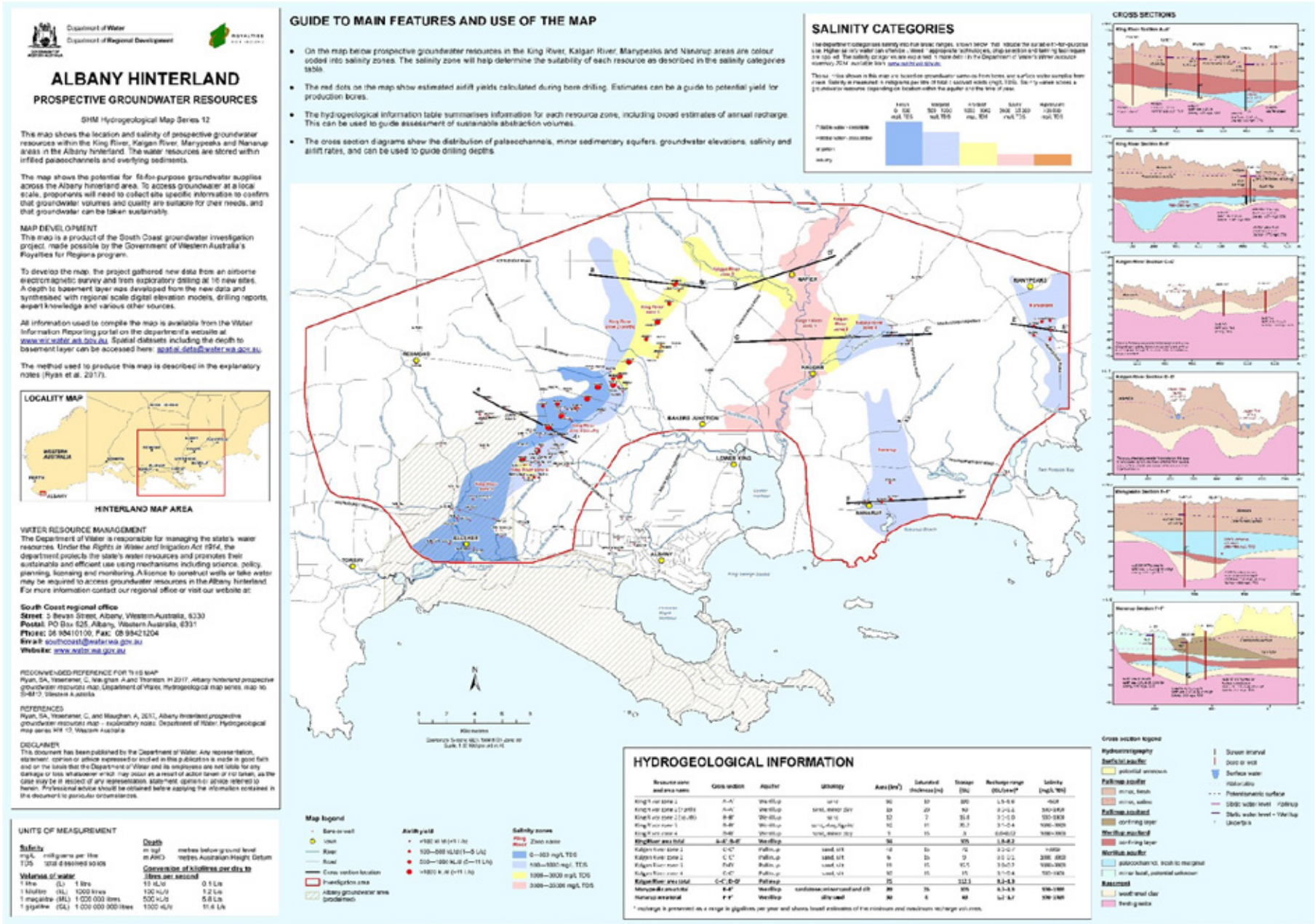
Strengths	Challenges
1. The Port of Albany is an extremely valuable asset with strong grain and woodchip export capacity. The port is well serviced by road and rail networks. 2. Coastal Great Southern water systems are relatively well mapped and understood. New sources are being investigated and implemented and procedures are in place to provide water in times of need. 3. The Coastal Great Southern has a relatively strong renewable energy mix.	1. Coastal Great Southern road networks are experiencing increasing volumes of traffic from resident, visitors and heavy haulage. Many roads are narrow or in poor condition, presenting both safety and productivity risks for road users. 2. The port currently does not have a containerisation facility, and this limits its role in relation to manufacturing and other containerised export opportunities, potentially constraining market access for some sectors. 3. Water security, changing weather patterns and other climate-related factors threaten the future of traditional industry within the Coastal Great Southern, particularly with a heavy reliance on conventional agricultural produce and production. Each of these factors has significant infrastructural implications. 4. It is difficult to estimate the use of unproclaimed water supply and the amount of water drawn in these areas cannot be regulated. The vast majority of the Coastal Great Southern is unproclaimed, and thus unregulated. 5. There is not enough water supply to meet projected demand from the agricultural sector. 6. Energy supply is key challenge for the region. Whilst the proportion of renewable energy is increasing, there are several challenges associated with maintaining baseload power, particularly when wind and solar are not available. 7. Rapid changes in technology will require concomitant upgrades to infrastructure to support them (including energy and communications).
Needs	**Opportunities**
1. Ongoing road infrastructure upgrades are required to keep pace with population, visitor and industry growth. 2. Expanded port capacity is needed to support primary production, mineral and, potentially, container exports. 3. Providing regional energy and water security is an essential support for economic growth in the region. 4. There is a need to better regulate non-potable water supply / increase proclaimed areas, providing more control and better monitoring capacity, particularly in times of drought. 5. Continued investment in water and energy infrastructure is required to keep pace with projected population and industry growth. 6. Continued enhancement of technology and communication infrastructure is required to support growth in diverse demographic groups. 7. Agriculture and manufacturing sectors will need to adapt to technological advances, particularly those that increase productivity, such as AI, automation and robotics.	1. Enhanced road infrastructure will improve safety and productivity for road users. 2. Enhanced port infrastructure, such as containerisation facilities, could provide new export opportunities. 3. Climate change should be viewed as an opportunity, as well as a challenge – providing a driver for increased innovation in a sustainable, more diverse, and resilient primary industry sector, and developing a regional knowledge base that can contribute to the knowledge economy. However, this requires adaptation, updating and innovating current practices and technologies, upskilling the workforce, and overcoming barriers such as the perceived risks of regional innovation. 4. Improved water infrastructure and better regulation of water sources can improve industry resilience. 5. Enhanced energy infrastructure and systems could reduce reliance on inefficient energy networks spread over long distances, reducing energy costs and improving reliability and hence lowering barriers to existing industry growth as well as attracting new businesses. 6. Adaptation to and adoption of technological advancement in primary industry and manufacturing sectors can improve competitiveness and provide new growth opportunities.

Appendix A: Inventory of Public Water Supply Schemes in the Great Southern Region

Scheme	Towns supplied	Current sources	Residential connections avg water use per service (2022)	Risks	Source development planning
Great Southern Towns water supply scheme (GSTWSS)	Broomehill, Gnowangerup, Katanning, Kojonup, Muradup, Nyabing, Pingrup, Tambellup, Woodanilling.	Harris Dam Transfers from Perth's IWSS	n/a	Additional demand from carting to supplement smaller schemes and support dry season response. Low storage levels in Harris Dam.	Since 2018, water can be transferred from Perth's IWSS via a pipeline from Stirling Dam to Harris Dam for security of supply.
Lower Great Southern Towns water supply scheme (LGSTWSS)	Albany, Kendenup, Mount Barker, Narrikup. Denmark (when needed).	• Prison, Racecourse, Sandpatch and Werillup (Grasmere) borefields • Angove Creek pipehead dam	15,716 167 kL/y	Constrained abstraction from Angove Creek due to varying water quality and environmental flow requirements. Increasing reliance on groundwater, future demand exceeding supply.	Werillup borefield entitlement increased by 0.5 GL in 2022. Water Corporation is investigating new sources (local groundwater and desalination).
Walpole TWSS	Walpole	• Butler's Creek Dam • Swann Road borefield • Walpole trial borefield • Carting from Denmark or LGSTWSS.	302 106 kL/y	Water quality issues with local surface water sources. Peak summer demand exceeding available supply. Continued water carting to meet peak summer demand.	Water Corporation has a borefield trial underway for new, deeper groundwater. If successful, the Walpole trial borefield could become the scheme's main source.
Denmark TWSS	Denmark	• Denmark pipehead dam • Quickup Dam • LGSTWSS pipeline	1,970 136 kL/y	Water quality and quantity issues with local surface water sources.	In 2021, a 43 km pipeline from the LGSTWSS to Denmark was completed to supplement supply.
Bremer Bay TWSS	Bremer Bay	• Gnornbup borefield • Southern borefield	331 107 kL/y	Water may be carted to Jerramungup. 2021 water use is >80% of entitlement. 24.5% change in demand since 2013-14.	
Borden	Borden	• Two small, local dams	29 101 kL/y	The source is not protected as a PDWSA.	Local sources and carting are expected to meet demand.

Scheme	Towns supplied	Current sources	Residential connections avg water use per service (2022)	Risks	Source development planning
Cranbrook	Cranbrook	• Small, local dam(s) • Carting from LGSTWSS	130 188 kL/y	Water quality and variable dam volumes. The source is not protected as a PDWSA.	Local sources and carting are expected to meet demand.
Frankland	Frankland	• Small, local dam • Carting from LGSTWSS	49 153 kL/y	Water quality. The source is not protected as a PDWSA.	Local sources and carting are expected to meet demand.
Jerramungup	Jerramungup	• Two small, local dams • Carting from Bremer Bay	132 137 kL/y	Water quality due to dam accessibility, dam volume. The source is not protected as a PDWSA.	Local sources and carting are expected to meet demand.
Ongerup	Ongerup	• Small, local dams • Carting from LGSTWSS, GSTWSS (Tambellup) or other suitable location	69 121 kL/y	Water quality risks from surrounding agriculture and residential development. The source is not protected as a PDWSA.	Local sources and carting are expected to meet demand.
Porongurup (Township)	Porongurup	• Carting from LGSTWSS	19 –	Bolganup Dam is no longer used for potable water supply. It now supplies the non-potable farmland scheme (Porongurup-Mt Barker area).	The former Porongurup scheme has been separated into a potable scheme for the township and a non-potable scheme for adjoining farmlands.
Rocky Gully	Rocky Gully	• Carting	34 140 kL/y		Carting is expected to meet demand. Local dam is no longer used.
Wellstead	Wellstead	• Carting from LGSTWSS	12 62 kL/y		Carting is expected to meet demand. Trial of HexaCovers on unused local dam to reduce evaporation rates and support dam for non-potable supply.

Appendix B: Albany Hinterland Prospective Groundwater Resources Map



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Regional Context
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