COMMUNICATION, ENGAGEMENT AND SOCIAL CHANGE BENCHMARKING

Final Report

Demographics and characteristics of the Corangamite people

Prepared for

Corangamite Catchment Management Authority

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URS

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Executive Summary

The report presents summary information about the demographics and characteristics of the communities in the Corangamite Region, and proposes how the communities can be defined according to their use of and impact on natural resources, their relative contribution to regional economic and social well-being, and their relative importance to the Corangamite Catchment Management Authority (CCMA).

This is the first of several reports to be completed within the **Communication, Engagement and Social Change Benchmarking Project** for the CCMA.

Demographics in the Catchment

The region's population is growing, ageing, and becoming more urban. Between 1996 and 2001, the population grew by 5.2 per cent from 309,000 to 325,000 between 1996 and 2001. Most of this growth occurred in the two major regional cities of Ballarat and Geelong, with their peri-urban areas and the coastal towns growing strongly. Populations are declining slowly in rural areas.

The increasing urbanisation has been identified in the *Regional Catchment Strategy* as one of six major forces affecting the Corangamite Region.

The people are mainly Australian by birth (88%), with the City of Geelong being the only centre that has a percentage not born in Australia (17%) that approaches the Victorian total of 23 per cent. The number and percentage of indigenous residents is very low, although their heritage is evident in the region.

Economic and social life in the Catchment

The economy and social life of the Corangamite Region is diverse and robust. Increasing socio-economic complexity is a major force for change – and has been identified as such in the *Regional Catchment Strategy*.

The region's economy is dominated by secondary and tertiary industries, which employ 61 per cent of the workforce – a total of 74,000. There are a number of very significant employers on a national scale, including Ford Motor Company, Alcoa World Alumina and Shell Petroleum. The port of Geelong is amongst the 10 most important in Australia.

Within the tertiary sector, tourism is a rapidly growing industry with a gross value of production of $940 million. Tourism activities focus on Ballarat, the coastal region and the Otway Ranges. The *Regional Catchment Strategy* has identified tourism growth as one of six major forces affecting the Corangamite Region.

Agriculture, fishing and forestry are declining in importance, with only 6 per cent (8,500 people) employed in the sector. The gross value of agricultural production is $770 million per annum, a figure that is exceeded by tourism alone. However, it is evident that agricultural land and water use is intensifying, with this trend identified in the *Regional Catchment Strategy* as one of six major forces affecting the region.

Unemployment is generally low throughout, except in Ballarat (9%), where it exceeds the Victorian average of 6 per cent.

All local authorities promoting economic and social opportunities and growth within their jurisdictions. Growth is particularly rapid in local authorities that include the peri-urban areas close to Geelong and Ballarat, and along the Great Ocean Road coast.

Use and management of natural resources

Pressures on the natural resources are increasing as a simple function of population increases, demands for higher levels of servicing, increased demand for water, increased access to the region and increased intensification of agriculture. Management of resource allocation for competing uses will be a growing activity for state and local governments in the area. Competition for water and appreciation of the natural environment have been identified as two of the six forces for change in the *Regional Catchment Strategy*.

Communities in the Catchment

Four approaches to defining separate 'communities' in the Corangamite Catchment are presented. These consider the region by:

- ***Local government areas***. Local government in Victoria has changed significantly over the last decade, with major rationalisation and amalgamation of local authorities. The Corangamite Catchment is included within the boundaries of nine local governments, all of which are active in natural resource management and in the pursuit of economic and social growth and development.
- ***Areas of common geography and human activity***. The diversity in landscape, human habitation and activity is high – from extensive open broad acre farming lands to the north west, to cities, and to coastal tourism attractions. The report defines eight geographical / human activity types. These are: major urban centres (Ballarat and Geelong), peri-urban settlements (e.g. Moriac, Bannockburn areas), coastal towns (e.g. Torquay, Apollo Bay), rural towns (e.g. Colac, Camperdown), Otway ranges, Otway foothills and slopes, Heytesbury dairy district, and broad acre farming areas.
- ***Occupations and industries*** - the various distinct socio-economic activities in the Corangamite Catchment. The selection of the separate categories has been influenced by an awareness of the involvement in and impact upon natural resource management. The categories are: major secondary and resource industries, service providers – the tertiary sector, water managers and providers, agricultural knowledge brokers, agricultural service providers, intensive agricultural industries, extensive agricultural industries, food processors, forestry, tourism, and property developers.
- ***The key drivers of natural resource management behaviour***, whose normal activities lead them to be considered as important influences of behaviour in natural resource management. The categories are: market and production influences, networks of relevance to natural resource management, NRM governance and regulation, local governance, and icons (e.g. the Great Ocean Road, the platypus).

'Mega-communities' for engagement by the CCMA

Viewed from the perspective of the CCMA's need for engagement, the definition of 'communities' must recognise the opportunities for the most effective and efficient way in which NRM outcomes across the region can be influenced. This is likely to occur through a blend developed by identifying the main occupations and industries and the key drivers of NRM behaviour. The ten 'mega-communities' defined below are shown with examples of their component parts and entities. In the next stage of the project, the values, attitudes and beliefs of these mega-communities will be researched and described.

Mega-community - Major resource and secondary industries

- Major companies
- Business Networks

Mega-community - Tertiary industries and service providers

- Health and education services
- Community development services

Mega community - Managers of land use change

- Shires
- State government agencies involved in land and water use and management

Mega-community - Support organisations for agricultural land and water use

- Food processors
- Agricultural knowledge brokers
- Agricultural service providers
- NRM networks in Ag areas

Mega-community – Rural industries and communities

- Rural towns
- Broad-acre croppers and grazers
- Intensive agriculture – dairy, horticulture, poultry, pigs

Mega-community – Forestry

- Native timber harvesting
- Agro-forestry
- Timber processing

Mega-community - Urban settlers in rural/coastal areas

- Otway communities
- Peri-urban communities associated with Geelong and Ballarat
- Coastal towns

Mega-community – Support organisations for environmental values

- Geelong Environment Council
- Ballarat Environment Council
- Environmental ‘ethics’ groups
- Indigenous groups

Mega-community – Urban populations

- Geelong
- Ballarat

Mega community - Tourism

- Tourism managers – public and private sectors
- Tourism developers

1 Introduction

This report describes the demographics of the population in the Corangamite Catchment (also referred to as Region), and describes their socio-economic and natural resource management (NRM) characteristics.

This Report will contribute to an engagement strategy for the Corangamite Catchment Management Authority (CCMA) to use in building mutually rewarding and sustainable relationships with its communities of interest. The ultimate value of the engagement strategy will be in working with people in a way that encourages day-to-day behaviour that leads to better natural resource management outcomes.

1.1 Methodology

1.1.1 The Demographics

Describing the regional demographics was done mainly as desktop exercise, principally using ABS statistics and other sources of secondary data available to the consultants and to the CCMA.

1.1.2 Characterisation

The raw demographic information has been used to define and then characterise segments of interest, with assistance from additional documentary sources held by the state government, shires, and community and industry groups. The consultants spent five days in the catchment interviewing key stakeholders who influence NRM outcomes in the region, to 'ground truth' the desk top information and to add richness to the description of the demographic and functional context for NRM.

1.2 About this Report

Section 1 introduces the report, and the data sources used.

Section 2 described population demographics and predictions, employment and education status, land use and housing details and perceived community safety.

Section 3 presents available statistics on trends in agricultural production, forestry, secondary industry and tourism.

Section 4 presents four approaches to categorising the Corangamite population according to regional socio-economic contribution, importance to the CCMA and reliance and impact on natural resource management.

Section 5 presents conclusions based on the information presented in preceding sections.

Section 6 acknowledges those who helped with information and data, and provides references.

The **Annexes** give the list of individuals and organisations interviewed, additional population demographics and address questions raised during the Regional Catchment Strategy Workshops.

2 Regional demographic analysis

The Corangamite Catchment (also referred to as the Corangamite Region) has a total area of 13,340 sq km[1] with a population of approximately 324,650. The Corangamite Catchment includes all of the Shires of Surf Coast, Golden Plains, Colac-Otway, and the Borough of Queenscliffe. Also included in the Corangamite Catchment are most of the Cities of Ballarat and Greater Geelong, and parts of the Shires of Corangamite, Moorabool and Moyne.

Data are presented in the greatest level of detail possible for each of the Shires which are generally down to a Statistical Local Area (SLA) level. For example, the Corangamite Shire is split into two SLA's, Corangamite North and Corangamite South. Where possible data are presented for both SLA's, otherwise for the Corangamite Shire as a whole. Where only a part of the SLA is included in the catchment, the appropriate proportion is presented, as described below.

- The City of Ballarat is divided into four SLA's: Ballarat Central, Inner North, South and North. Included in the Corangamite Catchment are Ballarat Central, South and Inner North.
- The Shire of Moyne is divided into Moyne South, North East and North West SLA's, however less than 5 per cent of Moyne South SLA is included in the Corangamite Catchment and therefore is not included in the demographic study.
- The Shire of Moorabool is split into three SLA's: Moorabool West, Ballan and Bacchus Marsh, of which approximately 90 per cent of Moorabool West and 10 per cent of Moorabool Ballan is included in the Corangamite catchment.
- Approximately 80 per cent of Corangamite North and South SLA's are included in the Corangamite Catchment.
- The Greater City of Geelong is divided into Greater Geelong A (Statistical Division – the city itself), Greater Geelong B (SLA, Bellarine Peninsula) and Greater Geelong C (SLA, north of the city including Lara). All of Greater Geelong A and B are in the Corangamite Catchment and approximately 80 per cent of Greater Geelong C.

2.1 Population analysis

2.1.1 Population trends

Between 1996 and 2001 there was 5.2 per cent increase in the population of the Corangamite Catchment, slightly lower than the State's increase of 6.2 per cent (see Table 1). The most densely populated areas, as to be expected, are Ballarat and Geelong, making up 24 per cent and 53 per cent respectively of the Catchment's total population. Half of the sixteen regions recorded an increase in population greater than the average (5.2 per cent), with Ballarat Inner North, Moorabool Ballan and Surf Coast East and West experiencing increases of 10 per cent or more. Surf Coast by far experienced the greatest change with a net increase in population of 17.4 per cent from 1996 to 2001. This can be attributed to the increase in population on and near the coast as a result of Surf Coast's close proximity to Geelong and the lifestyle and surroundings that make it a very

[1] CCMA website - http://www.ccma.vic.gov.au

attractive place for retirement or holidays. The high percentage (46 per cent) of unoccupied private dwellings during the census collection period in 1991 is indicative of a large temporary population.

Table 1: Population trends

Locality	1996	2001	Percentage Change (%)
Ballarat Central	33,601 (11)	33,602 (10)	+0.0
Ballarat Inner North	22,391 (7)	24,719 (8)	+10.4
Ballarat South	19,467 (6)	20,701 (6)	+6.3
Colac-Otway Colac	9,793 (3)	9,883 (3)	+0.9
Colac-Otway North	6,745 (2)	6,697 (2)	-0.7
Colac-Otway South	3,226 (1)	3,509 (1)	+8.8
Corangamite North	7,554 (2)	7,275 (2)	-3.7
Corangamite South	6,016 (2)	6,065 (2)	+0.8
Golden Plains North West	6,392 (2)	6,976 (2)	+9.1
Golden Plains South East	6,766 (2)	7,343 (2)	+8.5
Greater Geelong	163,130 (53)	171,427 (53)	+5.1
Moorabool West	3,054 (1)	3,182 (1)	+4.2
Moorabool Ballan	506 (0.2)	565 (0.2)	+11.6
Queenscliffe	3,193 (1)	3,078 (1)	-3.6
Surf Coast East	9,065 (3)	11,072 (3)	+22.1
Surf Coast West	7,649 (2)	8,557 (3)	+11.9
Total for Corangamite Catchment	**308,548**	**324,651**	**+5.2**
Victoria Total	*4,373,520*	*4,644,950*	*+6.2*

Source: ABS, Census of Population and Housing 2001

2.1.2 Gender analysis

The results of the gender analysis are shown in Table 2, and show that there was very little change in the proportion of males and females between 1996 and 2001. Although there was no trend over time, there is a difference between regional and metropolitan centres, with Ballarat, Geelong and Queenscliffe having 3 to 4 per cent more females than males and vice versa for the regional areas. This can perhaps be attributed to the large presence of farming in the rural parts of the Corangamite Catchment, which is traditionally a male dominated industry. The high percentage (54 per cent) of females in Queenscliffe could possibly be due to a large number of widowed females retiring in the area and hence creating an imbalance.

2.1.3 Ethnic and indigenous status

As shown in Table 3, the proportion of residents born in Australia varied throughout the catchment from 77 per cent (Greater Geelong C) to 90 per cent (Colac-Otway Colac and Corangamite North). The rural areas have a higher proportion of people born in Australia than do the city centres such as Geelong, which out of the 16 SLA's has the largest proportion of its population born overseas (15 per cent).

Table 2: Gender analysis

Locality	1996		2001	
	% Male	% Female	% Male	% Female
Ballarat Central	48	52	48	52
Ballarat Inner North	48	52	48	52
Ballarat South	48	52	48	52
Colac-Otway Colac	47	53	48	52
Colac-Otway North	52	48	52	48
Colac-Otway South	51	49	51	49
Corangamite North	50	50	49	51
Corangamite South	51	49	51	49
Golden Plains North West	52	48	51	49
Golden Plains South East	51	49	51	49
Greater Geelong	49	51	49	51
Moorabool West	52	48	52	48
Moorabool Ballan	50	50	51	49
Queenscliffe	47	53	46	54
Surf Coast East	50	50	50	50
Surf Coast West	50	50	50	50

Source: ABS, Census of Population and Housing 2001

Table 3: Proportion of the population born in Australia and overseas, 2001

Locality	No. born is Australia (%)	No. born overseas[1] (%)
Ballarat Central	29,285 (87)	2,430 (7)
Ballarat Inner North	21,762 (88)	1,755 (7)
Ballarat South	18,170 (88)	1,517 (7)
Colac-Otway Colac	8,904 (90)	537 (5)
Colac-Otway North	6,044 (90)	396 (6)
Colac-Otway South	2,837 (81)	429 (12)
Corangamite North	6,528 (90)	377 (5)
Corangamite South	5,346 (88)	346 (6)
Golden Plains North West	5,926 (85)	673 (10)
Golden Plains South East	6,042 (82)	854 (12)
Greater Geelong Pt A	118,784 (78)	25,488 (17)
Greater Geelong Pt B	24,337 (81)	4,039 (13)
Greater Geelong Pt C	1,610 (77)	334 (16)
Moorabool West	2,759 (87)	300 (9)
Moorabool Ballan	458 (81)	80 (14)
Queenscliffe	2,622 (85)	315 (10)
Surf Coast East	9,111 (82)	1,174 (11)
Surf Coast West	7,073 (83)	871 (10)
Total for Corangamite Catchment	**277,598 (82)**	**41,915 (12)**
Victoria Total	*3,277,054 (71)*	*1,080,344 (23)*

[1] Includes 'Inadequately described', 'At sea' and 'Not elsewhere classified'.

Source: ABS Census of Population and Housing, 2001

Ballarat and Greater Geelong C have the highest proportion of indigenous proportions with 1 per cent and 1.2 per cent respectively (see Table 4), while Queenscliffe has no indigenous people. On average 0.7 per cent of the Corangamite Catchment is made up of indigenous people, slightly higher than the Victorian average of 0.5 per cent.

Table 4: Proportion of Aboriginal and Torres Strait Islanders, 2001

Locality	Aboriginal	Torres Strait Islander	Both	No. of Indigenous persons (%)
Ballarat Central	262	21	14	297 (0.9)
Ballarat Inner North	229	20	0	249 (1.0)
Ballarat South	155	20	8	183 (0.9)
Colac-Otway Colac	43	3	0	46 (0.5)
Colac-Otway North	19	6	0	25 (0.4)
Colac-Otway South	26	0	0	26 (0.7)
Corangamite North	26	6	0	32 (0.4)
Corangamite South	16	2	0	18 (0.3)
Golden Plains North West	37	3	3	43 (0.6)
Golden Plains South East	33	0	0	33 (0.4)
Greater Geelong Pt A	984	74	47	1,105 (0.7)
Greater Geelong Pt B	111	7	8	126 (0.4)
Greater Geelong Pt C	20	2	2	24 (1.2)
Moorabool West	16	5	3	24 (0.8)
Moorabool Ballan	4	0	0	4 (0.7)
Queenscliffe	0	0	0	0 (0.0)
Surf Coast East	32	0	0	32 (0.3)
Surf Coast West	26	3	0	29 (0.3)
Total for Corangamite Catchment	**2,039**	**172**	**85**	**2,296 (0.7)**
Victorian Total	*22,325*	*1,706*	*1,047*	*25,078 (0.5)*

Source: ABS Census of Population and Housing, 2001

2.1.4 Population predictions

Population predictions for the eight Shires within the Corangamite Catchment for the years 2006 to 2021 in five year intervals are shown in Table 5. For a detailed analysis of trends amongst different age groups for each individual Shire, see Annex B.

Golden Plains, Surf Coast and Moorabool are all predicted to experience a rise in population of 13 per cent or greater (see Table 5). The large increase in population in the Surf Coast Shire aligns with the recent sharp increase in demand for housing and expansion in domestic and local tourism. Golden Plains and Moorabool Shires are both very well situated within the region, with Golden Plains being adjacent to Ballarat and Geelong and Moorabool situated between Ballarat, Geelong and Melbourne. Their close proximity to infrastructure, markets and employment opportunities combined with the availability of natural resources makes these two Shires an attractive location to establish businesses or for people to relocate for lifestyle reasons.

The Borough of Queenscliffe and the Colac-Otway Shire are predicted to have a minimal change in population over the 15 year period, and the Corangamite Shire is predicted to experience a 12 per cent decrease in population. The average household size in Queenscliffe in 1991 was 2.31, fell to 2.10 in 1996 and is expected to fall to 2.02 persons per household in 2021[2]. The falling household size is expected to offset most population growth related to infill development or conversions of holiday properties into permanent residences. The Corangamite Shire with agricultural production of over $270 million per annum is among the top four rural shires in terms of gross value of agricultural production, and the large expected decrease in population could be attributed to further structural change within the farming industry. Increasing efficiencies within the agricultural industry are leading to less reliance on manual labour (see comments about dairying in Annex C).

Table 5: Population projections for the Corangamite Catchment

Shire/City	2006	2011	2016	2021	15 yr Change	% Change
Ballarat	83,035	84,566	86,223	87,748	4,713	+5.7
Colac-Otway	20,631	20,643	20,794	20,836	205	+1.0
Corangamite	13,218	12,594	12,043	11,578	-1,640	-12.4
Golden Plains	15,340	16,248	17,316	18,478	3,138	+20.5
Greater Geelong	197,509	202,887	207,332	211,313	13,804	+7.0
Moorabool	8,337	8,684	9,054	9,443	1,106	+13.3
Queenscliffe	3,598	3,610	3,599	3,604	6	+0.2
Surf Coast	20,879	22,210	23,446	24,947	4,068	+19.5
Total for Corangamite Catchment	**362,546**	**371,442**	**379,807**	**387,947**	**25,401**	**+7.1**
Victoria Total	*4,946,688*	*5,099,070*	*5,235,983*	*5,359,116*	*412,428*	*+8.3*
Regional Victoria	*1,342,141*	*1,367,751*	*1,394,933*	*1,424,238*	*82,097*	*+6.1*

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

The predicted age structure in the region is shown in Table 6. The Corangamite Catchment's population is ageing with a predicted 54 per cent increase in the number of people aged between 60 and 79 and an 11 per cent decrease in the number of 0 to 19 year olds (see further comment in Annex C). However, the population of the Corangamite Catchment is not ageing as fast as regional Victoria as a whole. The predictions for regional Victoria as a whole indicate the 0 to 19 age group will decrease by 15 per cent and the 60 to 79 and 80 plus age groups will increase by 56 and 52 per cent respectively (see Annex B).

The Shires in the Corangamite Catchment expected to experience the greatest increase in aged residents are Colac-Otway, Corangamite and Queenscliffe. Queenscliffe is projected is have 27 per cent decline in the 0 to 19 age group and a 15 per cent decline in the 20 to

[2] Borough of Queenscliffe, www.queenscliffe.vic.gov.au

39 age group, combined with a 27 per cent increase in the 60 plus age group. The ageing population in Queenscliffe is due to the large number of retirees residing in the area.

Table 6: Population projections for the Corangamite catchment by age group

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	94,622	90,300	86,510	84,927	-9,695	-10.6
20 – 39	93,008	93,937	94,569	94,179	1,171	+1.3
40 – 59	98,616	99,626	98,456	96,850	-1,766	-1.8
60 – 79	59,349	68,145	79,031	89,624	30,275	+53.7
80 +	16,951	19,434	21,241	22,367	5,416	+29.4
Total for Corangamite Catchment	**362,546**	**371,442**	**379,807**	**387,947**	**25,401**	**+7.1**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

2.2 Income and employment

2.2.1 Income

In 1991 the median weekly income for people aged 15 and over was in the range of $200 to $299 in all of the SLA's in the Corangamite Catchment. This remained unchanged in 1996, expect for Surf Coast East where the median weekly income increased to $300 to $399. Income variance between SLA's in the Corangamite Catchment was also negligible in 2001 with all SLA's recording a median weekly income of $300 to $399 except for Surf Coast East continuing its upward trend, with the median income lying within the range of $400 to $499.

Table 7 illustrates the income range that individuals fall within throughout the SLA's in the Corangamite Catchment. Queenscliffe has the least proportion (11%) of residents in the $0/negative to $119 income range, followed by Corangamite North, Colac-Otway Colac and Ballarat Central (all 12%).

Surf Coast East (52%), Greater Geelong C (50%) and Corangamite South (48%) have the highest proportion of residents earning in excess of $400 per week. The higher income earners residing in Surf Coast East are attracted to the area by the lifestyle, environment and close proximity to Geelong. Housing prices have risen by 48 per cent between 1995 and 2000 (see Table 12) in the Surf Coast Shire as higher than average income earners buy property and take up residence.

Table 7: Weekly individual income by region, 2001

Locality	$negative/0 - $119 (%)	$120 - $399 (%)	$400 - $799 (%)	$800 + (%)
Ballarat Central	2,952 (12)	11,742 (47)	7,078 (28)	3,363 (13)
Ballarat Inner North	2,617 (15)	7,264 (41)	5,341 (30)	2,503 (14)
Ballarat South	2,260 (15)	6,451 (45)	4,170 (28)	1,822 (12)
Colac-Otway Colac	844 (12)	3,455 (47)	2,253 (31)	727 (10)
Colac-Otway North	673 (14)	2,055 (43)	1,443 (31)	560 (12)
Colac-Otway South	343 (13)	1,152 (45)	743 (29)	341 (13)
Corangamite North	645 (12)	2,544 (49)	1,520 (29)	516 (10)
Corangamite South	505 (13)	1,568 (39)	1,265 (31)	692 (17)
Golden Plains North West	852 (18)	1,991 (41)	1,421 (29)	594 (12)
Golden Plains South East	880 (18)	1,813 (36)	1,459 (29)	874 (17)
Greater Geelong Pt A	15,858 (14)	47,917 (43)	30,349 (27)	17,452 (16)
Greater Geelong Pt B	2,968 (14)	9,531 (43)	5,846 (27)	3,487 (16)
Greater Geelong Pt C	225 (17)	424 (33)	374 (29)	272 (21)
Moorabool West	377 (17)	945 (41)	672 (30)	278 (12)
Moorabool Ballan	63 (16)	162 (42)	106 (27)	59 (15)
Queenscliffe	270 (11)	1,064 (45)	658 (27)	413 (17)
Surf Coast East	1,092 (14)	2,603 (34)	2,273 (30)	1,651 (22)
Surf Coast West	828 (14)	2,498 (41)	1,716 (29)	973 (16)
Total for Corangamite Catchment	**34,255 (14)**	**105,179 (43)**	**68,689 (28)**	**36,580 (15)**

Source: ABS Census of Population and Housing 2001

2.2.2 Employment data

Table 8 presents employment data for the Corangamite Catchment and the individual shires in 1996. The most obvious feature is that employment, and hence economic activity is dominated by manufacturing industry, wholesale and retail services and community services. Collectively, these sectors employ 61 per cent of the workforce in the region. Conversely the traditional sectors in the region – agriculture and forestry employed only 6 per cent of the region's workforce in 1996. Indeed, as shown in Table 18, the total workforce in this sector (8,440) equals the total employment in just five organisations / entities located in Greater Geelong – Ford Motor Company, Barwon Health, Department of Education, Deakin University, and Alcoa of Australia.

This preponderance of economic activity in non-rural pursuits is significant in how natural resources are regarded, used and managed, as discussed in Section 5.

Table 8: Employment by industry (percentage), 1996

Industry	Ballarat	Colac-Otway	Corangamite	Golden Plains	Greater Geelong	Moorabool	Queenscliffe	Surf Coast	*Corangamite Catchment total*	*Victoria*	*Regional Victoria*
Agriculture, forestry, fishing etc	539 (1.8)	1,611 (19.7)	3,178 (42.5)	791 (14.9)	1,009 (1.4)	752 (8.3)	21 (1.9)	539 (7.7)	*8,440 (6.1)*	*75,949 (3.9)*	*63,797 (12.7)*
Mining	117 (0.4)	12 (0.2)	24 (0.3)	7 (0.1)	129 (0.2)	94 (1.0)	3 (0.3)	14 (0.2)	*400 (0.3)*	*5,633 (0.3)*	*2,486 (0.5)*
Manufacturing	5,099 (17.1)	1,179 (14.4)	684 (9.2)	962 (18.1)	14,241 (20.2)	1,384 (15.3)	67 (6.1)	899 (12.9)	*24,515 (17.7)*	*327,637 (17.0)*	*70,517 (14.0)*
Electricity, gas and water utilities	273 (0.9)	81 (1.0)	44 (0.6)	47 (0.9)	599 (0.9)	58 (0.6)	8 (0.7)	100 (1.4)	*1,210 (0.9)*	*14,004 (0.7)*	*7,044 (1.4)*
Construction	1,648 (5.5)	435 (5.3)	304 (4.1)	359 (6.8)	4,779 (6.8)	671 (7.4)	78 (7.2)	628 (9.0)	*8,902 (6.4)*	*114,910 (6.0)*	*30,190 (6.0)*
Wholesale and retail trade	6,666 (22.3)	1,588 (19.0)	1,040 (13.9)	994 (18.7)	15,842 (22.4)	1,709 (18.8)	141 (12.9)	1,283 (18.3)	*29,233 (21.1)*	*410,535 (21.3)*	*101,906 (20.3)*
Transport and storage	896 (3.0)	272 (3.3)	193 (2.5)	189 (3.6)	2,536 (3.6)	594 (6.5)	39 (3.6)	184 (2.6)	*4,903 (3.5)*	*80,434 (4.2)*	*17,489 (3.5)*
Communication	536 (1.8)	92 (1.1)	78 (1.0)	98 (1.8)	1,137 (1.6)	175 (1.9)	16 (1.5)	68 (1.0)	*2,200 (1.6)*	*42,837 (2.2)*	*7,613 (1.5)*
Finance, property and business services	2,379 (8.0)	392 (4.8)	226 (3.0)	287 (5.4)	6,574 (9.3)	878 (9.7)	102 (9.4)	579 (8.3)	*11,417 (8.2)*	*244,053 (12.7)*	*35,528 (7.1)*
Public administration and defence	938 (3.1)	275 (3.4)	223 (3.0)	189 (3.6)	2,691 (3.8)	389 (4.3)	175 (16.1)	227 (3.3)	*5,107 (3.7)*	*75,937 (3.9)*	*21,616 (4.3)*
Community services	7,825 (26.2)	1,553 (19.0)	1,132 (15.2)	1,018 (19.2)	15,048 (21.3)	1,827 (20.1)	283 (26.0)	1,591 (22.8)	*30,277 (21.8)*	*372,275 (19.3)*	*101,518 (20.2)*
Recreational, personal and other services	2,985 (10.0)	720 (8.8)	354 (4.7)	370 (7.0)	6,096 (8.6)	546 (6.0)	156 (14.3)	884 (12.6)	*12,111 (8.7)*	*162,475 (8.4)*	*42,858 (8.5)*
Total (No.)	**29,901**	**8,180**	**7,480**	**5,311**	**70,681**	**9,077**	**1,089**	**6,996**	**138,715**	**1,926,679**	**502,562**

Source: ABS, CDATA 1996

Agriculture, forestry and fishing are the main industries of employment in only the Corangamite and Colac-Otway Shires and this sector is the fourth largest employer in the Golden Plains Shire. This comes as no surprise considering the high proportion of land allocated to agricultural activity in these three shires; Corangamite – 82 per cent, Colac-Otway – 50 per cent and Golden Plains – 70 per cent[3]. Agriculture, forestry and fishing forms a minor component in the other shires.

The two industries accounting for more than 30 per cent of employment across all shires are wholesale and retail trade and community services. The high proportion of people employed in community services in regional centres (Ballarat and Greater Geelong) and retiree centres (Queenscliffe and Surf Coast) aligns with the Australian trend over the last decade. The size of Greater Geelong's manufacturing industry is reflected in the high proportion of people it employs (20.2%), which is 3.2 per cent higher than the Victorian average (17%) and 6.2 per cent higher than the regional Victorian average. Moorabool has higher than average levels of employment in the transport and storage industries, employing 6.5 per cent of the employed labour force.

Table 9 shows the unemployment rates for each of the SLA's in the Corangamite Catchment from December 1997 to March 2002.

Table 9: Unemployment rates by region

Locality	Unemployment Rate (%)					
	Dec 97	**Dec 98**	**Dec 99**	**Dec 00**	**Dec 01**	**Mar 02**
Ballarat Central	14.3	12.3	10.5	9.1	9.6	10.2
Ballarat Inner North	11.3	9.9	8.9	7.8	8.6	9.0
Ballarat South	14.0	11.9	10.4	9.1	10.3	5.6
Colac-Otway Colac	10.5	8.3	9.6	8.2	5.4	5.8
Colac-Otway North	4.8	3.0	3.5	3.1	1.9	1.6
Colac-Otway South	8.9	6.8	8.7	8.5	5.5	6.1
Corangamite North	7.2	6.1	6.5	5.5	4.1	3.8
Corangamite South	4.3	3.7	4.0	3.6	2.3	2.3
Golden Plains North West	7.3	7.2	6.6	7.4	5.1	5.5
Golden Plains South East	6.1	5.8	5.0	4.9	3.7	3.1
Greater Geelong Pt A	8.4	6.3	6.5	5.2	4.9	5.1
Greater Geelong Pt B	9.2	7.5	8.0	6.0	5.0	4.9
Greater Geelong Pt C	4.5	3.2	4.2	2.4	2.1	2.0
Moorabool West	8.1	7.3	6.2	6.7	6.6	6.9
Moorabool Ballan	9.9	9.3	8.2	7.0	6.5	6.9
Queenscliffe	8.3	6.0	6.4	5.5	4.3	4.2
Surf Coast East	9.0	7.1	8.0	6.6	4.2	4.5
Surf Coast West	8.9	7.9	7.8	6.9	4.7	4.8
Victoria	*7.9*	*7.1*	*6.6*	*5.8*	*6.4*	*6.2*

Source: Department of Employment and Workplace Relations, http://www.dewrsb.gov.au

[3] National Land and Water Resources Audit 1996, www.nlwra.gov.au

There has been a decline in unemployment across all of the SLA's within the Corangamite catchment from December 1997 to March 2002, ranging from an 8.4 per cent decline in Ballarat South to a 1.2 per cent decline in Moorabool west.

Ballarat Central and Ballarat Inner North had the highest levels of unemployment as at March 2002, 10.2 and 9.0 per cent respectively. Two of the non-urban SLA's also had an unemployment rate higher than the Victorian average (6.2%) - Moorabool West (6.9%) and Moorabool Ballan (6.9%). Other rural SLA's showing comparatively high levels of unemployment include Colac-Otway South (6.1%), Colac-Otway Colac (5.8%) and Golden Plains North West (5.5%). The SLA's recording the lowest levels of unemployment are Colac-Otway North (1.6%), Greater Geelong C (2.0%) and Corangamite South (2.3%).

2.2.3 Centrelink customers

Table 10 shows the number of Centrelink customers per SLA within the Corangamite Catchment and what percentage they make up of the total population aged 15 or over. Thirty per cent or more of the population aged 15 and over were Centrelink customers in 8 out of the 18 SLA's. Colac-Otway North and Greater Geelong C recorded the lowest percentage of Centrelink customers at 17 and 13 per cent respectively. The main Centrelink benefits include: Youth Allowance, Newstart Allowance and Mature Age Allowance. Other Centrelink payments include: crisis payment, partner allowance, rent assistance, pharmaceutical allowance and telephone allowance.

Table 10: Number of Centrelink customers by region, 2000

Locality	No. of customers	As a % of persons aged 15 +
Colac-Otway Colac	3,518	45
Ballarat South	6,081	38
Ballarat Central	9,909	34
Greater Geelong Pt A	42,571	33
Ballarat Inner North	6,423	33
Corangamite North	1,913	33
Greater Geelong Pt B	7,815	32
Moorabool Ballan	121	30
Queenscliffe	812	29
Colac-Otway South	820	29
Surf Coast West	1,834	26
Moorabool West	571	23
Golden Plains South East	1,234	22
Surf Coast East	1,884	22
Golden Plains North West	1,207	22
Corangamite South	942	20
Colac-Otway North	900	17
Greater Geelong Pt C	217	13
Total for Corangamite Catchment	**88,772**	**32**

Source: ABS, www.abs.gov.au

2.3 Education

Throughout the Corangamite Catchment less than one per cent of people had never attended school (of those eligible), except in Colac-Otway North, where 2.1 per cent of the population had never been educated. SLA's with the greatest proportion of people to have left school before Year 12 are Colac-Otway Colac (74%), Corangamite North (73%), Corangamite South (73%) and Colac-Otway North (72%). Surf Coast East (46%), Queenscliffe (45%) and Surf Coast West (42%) had the highest proportion of the population who has reached Year 12.

Table 11: Highest level of primary or secondary schooling reached, 2001

Locality	Highest level of schooling reached					
	Yr 8 or below (%)	Yr 9 (%)	Yr 10 (%)	Yr 11 (%)	Yr 12 (%)	Did not go to school (%)
Ballarat Central	3,329 (13)	2,334 (10)	4,700 (20)	3,958 (17)	9,441 (40)	116 (0.5)
Ballarat Inner North	2,094 (13)	2,039 (12)	3,913 (23)	3,197 (19)	5,365 (32)	87 (0.5)
Ballarat South	1,712 (12)	1,637 (12)	3,081 (22)	2,542 (18)	4,867 (35)	55 (0.4)
Colac-Otway Colac	1,449 (21)	866 (13)	1,556 (23)	1,222 (18)	1,702 (25)	49 (0.7)
Colac-Otway North	729 (16)	587 (13)	1,045 (23)	906 (20)	1,186 (26)	95 (2.1)
Colac-Otway South	293 (12)	278 (11)	512 (21)	428 (17)	975 (39)	5 (0.2)
Corangamite North	1,186 (19)	766 (12)	1,380 (22)	1,261 (20)	1,611 (26)	32 (0.5)
Corangamite South	775 (16)	620 (13)	1,123 (23)	1,023 (21)	1,339 (27)	22 (0.4)
Golden Plains North West	549 (12)	686 (15)	1,149 (25)	922 (20)	1,347 (29)	14 (0.3)
Golden Plains South East	538 (11)	571 (12)	1,155 (24)	1,109 (23)	1,510 (31)	16 (0.3)
Greater Geelong	17,203 (13)	13,435 (10)	26,745 (21)	24,607 (19)	45,942 (36)	950 (0.7)
Moorabool West	304 (13)	279 (12)	613 (25)	471 (20)	726 (30)	13 (0.5)
Moorabool Ballan	460 (12)	470 (13)	868 (23)	726 (19)	1,196 (32)	18 (0.5)
Queenscliffe	247 (11)	172 (8)	406 (18)	392 (18)	1,009 (45)	8 (0.4)
Surf Coast East	470 (6)	526 (7)	1,362 (18)	1,623 (22)	3,427 (46)	14 (0.2)
Surf Coast West	573 (10)	481 (8)	1,193 (20)	1,118 (19)	2,490 (42)	11 (0.2)
Total for Corangamite Catchment	**31,911 (13)**	**25,747 (11)**	**50,801 (21)**	**45,505 (19)**	**84,133 (35)**	**1,505 (0.6)**

Source: ABS Census of Population and Housing, 2001

2.4 Housing

2.4.1 Median house prices

Illustrated in Table 12 are the median house prices and the percentage change by Shire for the years 1995, 1998 and 2000. The average house price was the highest in Queenscliffe at $235,000, also experiencing the greatest percentage increase over the 5 year period (61%). The other Shire that experienced high growth up until 2000 was the Shire of Surf Coast, with a 48 per cent increase in average house price. All regions within the Corangamite Catchment experienced an increase in the average value of housing, however the range was large (3 to 61 %).

There were three regions that recorded a less than 20 per cent increase in the average value of housing - Corangamite (3%), Colac-Otway (18%) and Golden Plains (18%). From 1995 to 2000, Ballarat, Colac-Otway and Corangamite continually recorded median house prices below the Victorian regional average. This could be attributed to Colac-Otway and Corangamite being relatively isolated from major employment centres and Ballarat having a high proportion of low value housing.

Table 12: Median house price by region

Locality	Median house price ($)			
	1995	1998	2000	% Change
Ballarat	82,500	86,000	100,000	+21
Colac-Otway	80,250	88,500	95,000	+18
Corangamite	68,250	65,000	70,000	+3
Golden Plains	100,000	110,000	118,000	+18
Greater Geelong	93,000	101,000	126,000	+35
Moorabool	95,000	105,000	126,500	+33
Queenscliffe	146,000	160,000	235,000	+61
Surf Coast	125,000	140,000	185,000	+48
Average for Corangamite Catchment	**98,750**	**106,938**	**131,938**	**+34**
Regional Average	*85,000*	*91,000*	*105,000*	*+24*

Source: Valuer General, A Guide to Property Values 1999 – 2000

The trends for median flat / unit prices by location between the years 1995, 1998 and 2000 are presented in Table 13. These data show greater variation than the house price data with a range of between – 3 to + 80 per cent change in property values over the full period.

Table 13: Median flat / unit price by region

Locality	Median flat / unit price ($)			
	1995	1998	2000	% Change
Ballarat	85,000	81,000	88,500	+4
Colac-Otway	97,500	82,000	115,000	+18
Corangamite	75,000	72,000	80,000	+7
Golden Plains	71,500	73,000	69,000	-3
Greater Geelong	87,500	87,000	109,950	+26
Moorabool	83,500	84,000	82,000	-2
Queenscliffe	130,000	100,000	184,250	+42
Surf Coast	95,000	120,000	171,000	+80
Average for Corangamite Catchment	**90,625**	**87,375**	**112,463**	**+24**
Regional Average	*83,000*	*83,000*	*95,000*	*+15*

Source: Valuer General, A Guide to Property Values 1999 – 2000

The average flat / unit price in Colac-Otway and Corangamite outperformed the average house price at $115,000 and $80,000 respectively. The average flat / unit price in the regions of Queenscliffe and Surf Coast was much higher than any of the other regions at $184,250 and $171,000 respectively. Only three out of the eight localities achieved growth of greater than 20 per cent over the five years and they were Surf Coast, Queenscliffe and Greater Geelong. Across the Catchment, the average flat / unit price increased at a greater rate then the Victorian average. As with the median price of houses and flat / units, Queenscliffe and Surf Coast Shires showed large increases of 24 and 33 per cent respectively (see Table 14).

Table 14: House block median price by region

Locality	Median house block price ($)			
	1995	1998	2000	% Change
Ballarat	33,250	38,000	47,000	+41
Colac-Otway	40,000	40,500	48,000	+20
Corangamite	36,750	25,500	20,000	-45
Golden Plains	32,750	31,500	36,000	+10
Greater Geelong	37,000	39,945	44,000	+19
Moorabool	32,725	36,000	34,000	+4
Queenscliffe	48,500	50,000	60,000	+24
Surf Coast	47,500	46,000	63,000	+33
Average for Corangamite Catchment	**38,559**	**38,431**	**44,000**	**+14**
Regional Average	*35,000*	*36,500*	*38,500*	*+10*

Source: Valuer General, A Guide to Property Values 1999 – 2000

Table 15 shows the turnover in housing by Shires in the Corangamite catchment.

Table 15: House sales by region

Locality	Number of houses sold			
	1995 (%)	1998 (%)	2000 (%)	% Change
Ballarat	1,418	1,586	1,743	+23
Colac-Otway	294	372	395	+34
Corangamite	178	184	165	**-7**
Golden Plains	229	241	308	+34
Greater Geelong	2,122	2,774	3,441	**+62**
Moorabool	114	161	165	+45
Queenscliffe	104	113	81	**-22**
Surf Coast	349	637	619	**+77**
Total for Corangamite Catchment	**4,808 (25)**	**6,068 (26)**	**6,917 (26)**	**+44**
Regional Victoria	*19,299*	*23,102*	*26,558*	*+38*

Source: Valuer General, A Guide to Property Values 1999 – 2000

The median price of a house block in the Corangamite Catchment has increased the most in Ballarat (41%). In stark contrast, is the decrease of 45 per cent in the median value of blocks sold in the Corangamite Shire.

All Shires with the exception of Corangamite (-7%) and Queenscliffe (-22%) have experienced increases in the number of houses sold from 1995 to 2000. The increase in the number of houses sold was greatest in Surf Coast (77%) and Greater Geelong (62%). Although the value of real estate in Queenscliffe is high, the number of sales per year is decreasing. The Borough of Queenscliffe has a lot less houses compared to the other regions (being only 841 ha in size).

2.5 Perceived community safety

Community perceptions of major crime problems in the Corangamite Catchment are shown in Table 16. The responses from residents indicate that more than 40 per cent of respondents felt that crime had increased over the last five years in Ballarat, Colac-Otway and Moorabool. Within the Corangamite Catchment, household burglary and car theft were deemed to be a major problem in Ballarat and Geelong, however community perception of drug problems in Ballarat was the lowest out of all Shires (8%). Community perception of property damage as a major crime problem was the highest in the Shires of Moorabool, Geelong and Surf Coast.

Table 16: Perceptions of community safety

Locality	Perceived trend to 'more crime over last 5 years	Community perceptions of major crime problems (%)				
		Household burglary	Drugs	Car theft	Property damage	Juvenile behaviour
Ballarat	**58%**	**80**	8	**30**	21	NA
Colac-Otway	**46%**	62	**23**	12	21	10
Corangamite	38%	57	13	16	18	4
Golden Plains	25%	67	7	13	19	9
Geelong	37%	**73**	15	**25**	**32**	6
Moorabool	41%	57	12	18	**39**	9
Queenscliffe	**11%**	60	17	19	27	NA
Surf Coast	32%	56	13	10	**30**	11
Non-metro Victoria	*NA*	***67***	***21***	***14***	***31***	***NA***
Victoria	*40%*	***73***	***23***	***20***	***23***	***NA***

Source: Crime Prevention Victoria: Local Safety Survey 2001

2.6 Accessibility / Remoteness Index of Australia

The ARIA is a standard approach to measuring remoteness and uses distances to population centres as the basis for quantifying service access and hence remoteness. The remoteness index was developed by the National Centre for Social Applications of Geographic Information Systems (GISCA) on behalf of the (then) Department of Health

& Aged Care, and a number of other Commonwealth departments. It uses GIS technology to combine road distance to population centres of various sizes, as a measure of service access, to develop a standard measure of remoteness. ARIA is categorised in the following way:

HA = Highly Accessible
A = Accessible
MA = Moderately Accessible
R = Remote
VR = Very Remote

Presented in Table 17 are the ARIA scores, categories and minimum and maximum values for each of the SLA's in the Corangamite Catchment. There are only three SLA's in the catchment that are categorised below HA, Colac-Otway South and Corangamite North and South, both being categorised as Accessible. The average ARIA score for the Corangamite catchment is 1.09 (HA) with the highest score being 2.66 (A) in Colac-Otway and the lowest in Ballarat (0.27).

The low ARIA scores across the regions in the Corangamite Catchment are expected given the Catchment's close proximity to Melbourne, inclusion of Ballarat and Geelong and the large number of highly populated centres. The region showing the most variation in ARIA value across the SLA's was the Colac-Otway region, ranging from 1.20 (HA) in Colac-Otway Central to 2.08 (A) in Colac-Otway South.

Table 17: ARIA values, 1999

Region	ARIA Score	ARIA Category	Minimum ARIA Value	Maximum ARIA Value
Ballarat Central	0.27	HA	0.27	0.27
Ballarat Inner North	0.55	HA	0.27	0.92
Ballarat South	0.46	HA	0.27	0.68
Colac-Otway Central	1.20	HA	1.20	1.23
Colac-Otway North	1.43	HA	1.16	1.81
Colac-Otway South	2.08	A	1.57	2.66
Corangamite North	1.89	A	1.23	2.28
Corangamite South	2.00	A	1.56	2.51
Golden Plains North West	1.06	HA	0.38	1.71
Golden Plains South East	1.08	HA	0.36	1.51
Greater Geelong	0.60	HA	0.31	1.03
Moorabool West	0.74	HA	0.31	1.10
Moorabool Ballan	0.94	HA	0.68	1.24
Queenscliffe	0.66	HA	0.66	0.67
Surf Coast East	0.63	HA	0.36	0.91
Surf Coast West	1.18	HA	0.57	1.64

Source: Commonwealth Department of Health and Ageing, http://www.health.gov.au

3 Industry analysis

3.1 Secondary and tertiary industry sectors

As shown in Table 8, secondary and tertiary sectors dominate economic activity in the region. Despite this, there has been little work done to aggregate data for the secondary and tertiary industry sectors that are specific to the Corangamite Catchment. The best available information is employment and economic statistics for the two major urban centres, Ballarat and Greater Geelong. This information is published by the local authorities in these centres. Selected information is presented in Table 18.

Table 18: Economic activity in Geelong and Ballarat

Industry sector	Selected employment information	
	Ballarat	**Geelong**
Manufacturing / processing	Food processing (23 locs) - 1680 Machinery and engineering (55 locs) – 2,210 Wood and paper products (14 locs) - 450 Metal products (53 locs) - 690 Mineral processing (17 locs) - 420 Textile, clothing and footwear (21 locs) – 690 4,800 total	Ford (automotive components) – 2,500 Alcoa (mineral processing) - 753 Aerospace (Avalon) - 690 Godfrey Hirst (carpets) – 550 Barrter Enterprises (poultry) – 467 Shell (petroleum products) 458 KAAL Australia (aluminium coil) - 446
Shipping	Not applicable	Imports – 5.9 million tonnes Exports – 6.9 million tonnes 542 vessels
Wholesale and retail services	6,200 total	Target/Fosseys (head office) – 650 Coles Supermarkets (336)
Health and infrastructure	Ballarat Health Services – 2,500 St John of God – 800 4,900 total	Barwon Health – 2,300 Police – 389 Barwon Water – 330 St John of God Health Care - 300
Education and research	University of Ballarat Australian Catholic University 3,220 total	Department of Education – 2,100 Deakin University – 1,034 Catholic Education Department – 589 TAFE – 430
Government	900	City of Greater Geelong – 1,092
Total workforce	**45,000**	**70,000**

Sources: City of Greater Geelong and City of Ballarat websites

3.1.1 Secondary and tertiary industry – Geelong

Geelong's secondary industry is based on automotive manufacture, mineral and petroleum processing, chemical production, textiles manufacture and food processing. It is a major port, being amongst the 10 most important in Australia. The city's economy is linked

with Melbourne's and transport facilities between the two centres are excellent. Geelong is a regional centre for the southern half of the Corangamite Catchment for the delivery of utility services (power and water), health, education, other community services and government. Through its economic strategy the City of Greater Geelong is encouraging investment and employment growth in the area.

3.1.2 Secondary and tertiary industry - Ballarat

Ballarat has a mixed economy based on a large number of medium and small secondary and tertiary businesses. Food processing, machinery, textile, footwear and clothing manufacture and mineral processing are important activities. The city's economy is linked with Melbourne, with excellent road and rail facilities between them. Ballarat is a regional centre for the Northern half of the Corangamite Catchment for the delivery of retail, health, and education services. The City of Ballarat is promoting further development of the city's economy.

3.2 Agriculture

As indicated in Section 2.2.2, agriculture is of minor overall importance as a contributor to economic outcomes in the Corangamite Catchment, employing only 6.1 per cent of the workforce. However, it is likely that perceptions of a higher level of importance have resulted in a continuing high level of effort in the collection and analysis of information on the performance of agriculture, some of which is presented in this report.

Some of the data presented in this section have been taken from 'Agricultural Production across the Corangamite Region', a publication by the Department of Natural Resources and Environment. These data are compiled from a combination of the Agricultural Censuses that were conducted by the Australian Bureau of Statistics (ABS) until 1996/97 and the five yearly Censuses now conducted by the ABS. Key measures include the total value of agricultural commodities produced in the Corangamite Catchment, number of animals on farms, area and yields of crops and gross value of agricultural produce. These data show broad patterns across the region over time and should be treated as indicative only.

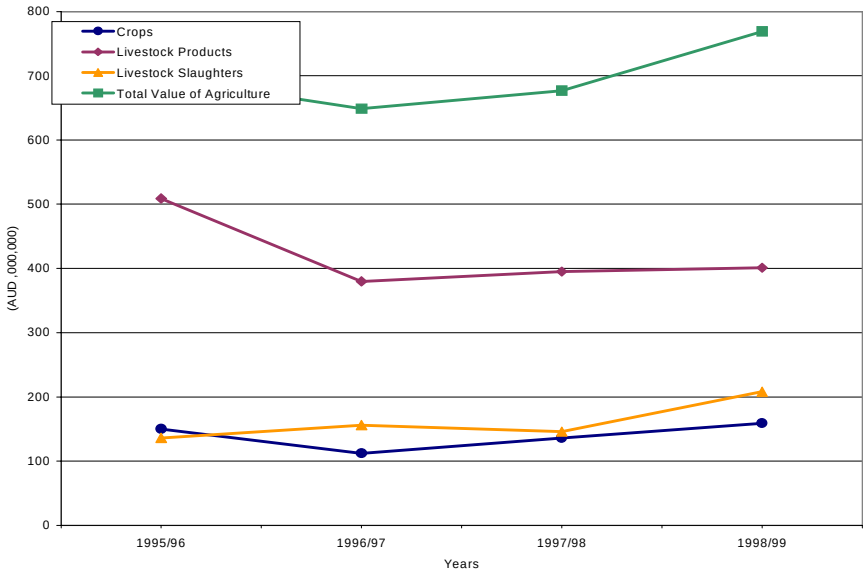
The data presented graphically covers all of the Corangamite Catchment, however where the data are presented in tabular form, Surf Coast East and West SLA's have been omitted as data were not available. There are no agricultural data sets for the Borough of Queenscliffe due to the lack of agricultural activity. The Borough of Queenscliffe is only 841 hectares in size and consists of mainly residential properties and some nature reserves.

Corangamite's Value of Agricultural Commodity Production (VACP)[4] totalled almost $770 million in 1998/99, representing approximately 12 per cent of total VACP for

[4] Value of Agricultural Commodities Produced (VACP) is an estimate derived by ABS, a component of which is Gross Value of Production (GVP). While not a farm receipts / turnover / sales figure, GVAP can be used as an indicator of agricultural value.

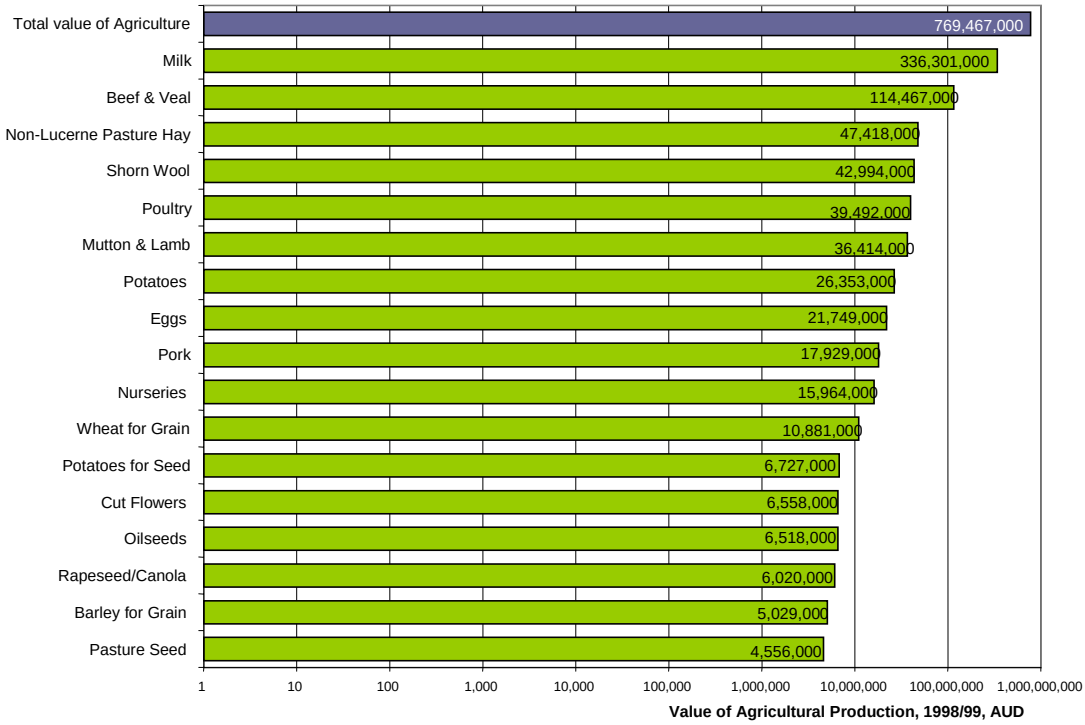
Victoria[5]. Corangamite's VACP has been steadily increasing from $650 million in 1996/97 after taking a $50 million dive between 1995/96 and 1996/97 (Figure 1 and Figure 2).

Figure 1: VCAP for Major Commodity Groups, 1995/96 to 1998/99



Source: Agricultural production across the Corangamite Region, 2001

Figure 2: VACP 1998/99 for individual commodities



Source: Agricultural production across the Corangamite Region, 2001

[5] Agricultural Production across the Corangamite Region 2001, Department of Natural Resources and the Environment.

Over half (57%) of Corangamite's VACP is derived from Livestock Products, with dairy and wool accounting for 49 per cent. Livestock Slaughterings account for 27 per cent of total VCAP and Crops 21 per cent. In a State-wide context, Corangamite produces approximately 19 per cent of Victoria's Livestock Products VACP, 12 per cent of the State's VCAP from Livestock Slaughters and 6 per cent of Victoria's Crop-derived VCAP[6].

3.2.1 Land used for agriculture

The area of land utilised for agricultural activity in the Corangamite Catchment increased by 2.1 per cent between 1991 and 1996 (Table 19). Colac-Otway South and Moorabool West showed the most significant increases in the area of land utilised for agricultural activity recording 63 per cent and 37 per cent increases respectively, presumably occurring as land formerly left idle is brought into production. Ballarat Central and South both recorded a decrease of greater than 70 per cent, which could largely be attributed to urbanisation. Between 1995/96 and 1999/00 the area of land under production of potatoes and potatoes for seed has remained relatively constant at approximately 2,500 ha and 1,000 ha respectively. The area of wheat grown for grain has increased by 550 per cent, growing from 5,000 ha in 1995/96 to 32,500 ha in 1999/00.

Table 19: Area of land utilised for Agriculture

Locality	Area of Agricultural land (ha)		
	1991	1996	% Change
Ballarat – Central	3,032	885	-71
Ballarat – Inner North	236	1,977	+738
Ballarat – South	3,507	983	-72
Colac-Otway – Colac	53	490	+818
Colac-Otway – North	130,087	118,478	-9
Colac-Otway – South	34,079	55,492	+63
Corangamite – North	211,381	217,991	+3
Corangamite – South	129,543	124,039	-4
Golden Plains – North West	55,637	51,775	-7
Golden Plains – South East	133,222	137,405	+3
Greater Geelong A	19,003	7,325	-61
Greater Geelong B	13,453	15,213	+13
Greater Geelong C	29,064	32,288	+11
Moorabool – West	32,570	44,670	+37
Moorabool – Ballan	38,745	42,496	+10
Total for Corangamite catchment	**833,611**	**851,507**	**+2.1**

Source: NLWRA website, www.nlwra.gov.au

[6] Agricultural Production across the Corangamite Region 2001, Department of Natural Resources and the Environment.

Land values for dryland agriculture are high in the Corangamite Catchment and are being influenced by the proximity to urban centres. In Table 20, median prices per hectare are shown for cereal, sheep and cattle properties for the years 1995-1997.

Of particular interest is the rapidly growing Golden Plains Shire, where broad-acre land prices are between 50 and 100 per cent higher than similar land in more remote locations in Corangamite (formerly Camperdown) and Colac-Otway Shires. The additional value attached by the market to land located close to major population centres will be impacting on the ability of farming businesses to expand through land purchase.

Table 20: Median land prices for dryland faming land (1995-1997)

Local authority	Median land prices (per hectare)
Ballarat	$2,000 - $2,999
Camperdown	$3,000 - $3,999
Colac-Otway	$2,000 - $2,999
Golden Plains	More than $4,000
Greater-Geelong	More than $4,000
Moorabool	More than $4,000
Moyne	$1,000 - $1,999
Surf Coast	$3,000 - $3,999
Queenscliffe	More than $4,000

Source: Department of Natural Resources and Environment

3.2.2 Agroforestry

The ABS farm surveys do not take account of agroforestry, however data obtained through the National Land and Water Resources Audit indicated that in 1996 there were 593 ha of seedlings / seeds sown which was followed by a 13 per cent increase in 1997 to 669 ha sown. The majority of seedlings / seeds sown in 1997 were in the Corangamite (64%) and Golden Plains South East (26%).

Previous studies undertaken as a part of the Regional Forestry Agreement indicate that a large part of the Corangamite Catchment (approximately 35%) is moderately suitable for pine plantations and small, scattered sections in the southern region are highly suitable. The Central Victorian region is located to the immediate west of Melbourne, stretching to just west of the Grampians and includes all of the Corangamite catchment. The majority of plantations (hardwood and softwood) are centred around Ballarat and in the southern part of the Corangamite catchment. Within the Central Victoria region, the area planted to hardwood plantations (mainly blue gums) increased from 6,000 ha to 8,000 ha from 1995-1999 to 2000. The area planted to softwoods (mainly pines) decreased from 3,400 ha to 500 ha over the same period.

There is a relatively even split between hardwood and softwood farm forest plantations, with 49 per cent hardwood and 51 per cent softwood. *P. radiata* (pine) remains a good

option as a farm forestry species, due to mainly a well-developed softwood timber industry.

3.2.3 Perennial horticulture

The area of land allocated to perennial horticulture decreased by 32 per cent between 1996 and 1997 (Table 21). Horticultural activities that have been included in this analysis are apricots, peaches, nectarines, cherries, pears, apples and nuts.

Table 21: Area of land allocated to perennial horticulture

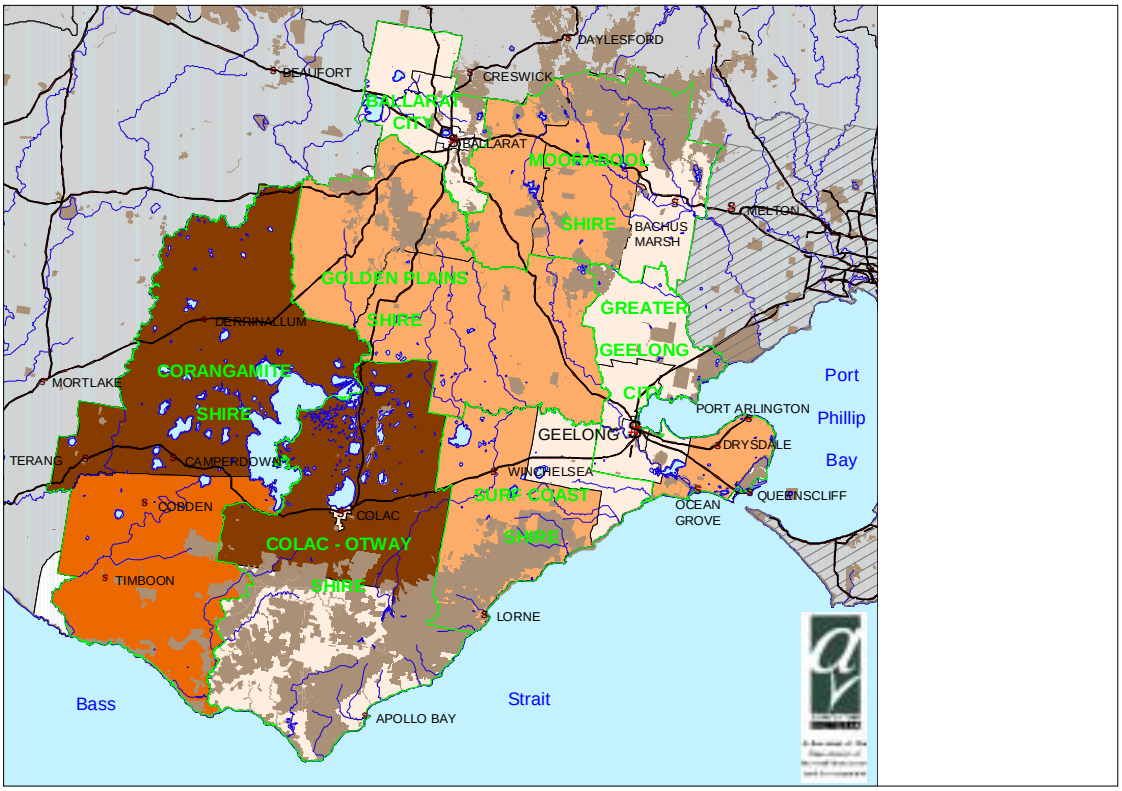
Locality	Area under perennial horticulture (ha)		
	1996	1997	% Change
Colac-Otway – South	0.3	0.5	+66
Corangamite – South	1.4	0.6	-57
Greater Geelong A	114	82	-28
Greater Geelong B	714	450	-37
Moorabool – West	3,658	2,516	-31
Total for Corangamite catchment	**4,488**	**3,049**	**-32.1**

Source: NLWRA website, www.nlwra.gov.au

3.2.4 Meat Cattle

In 1998/99 the beef and veal industry constituted 15 per cent of Corangamite's total VACP. In dollar terms the beef and veal industry was worth $114 million in 1998/99 (Figure 2), an increase of approximately $34 million since 1996/97 (Figure 5). The increase in value of the beef and veal industry has occurred even though the total number of meat cattle in the region has declined from approximately 280,000 in 1995/96 to 248,000 in 1999/00 (Figure 4). Shown in Figure 3 are the 1998/99 values for number of meat cows through out the Corangamite Catchment.

Figure 3: Number of Meat Cows, 1998/99



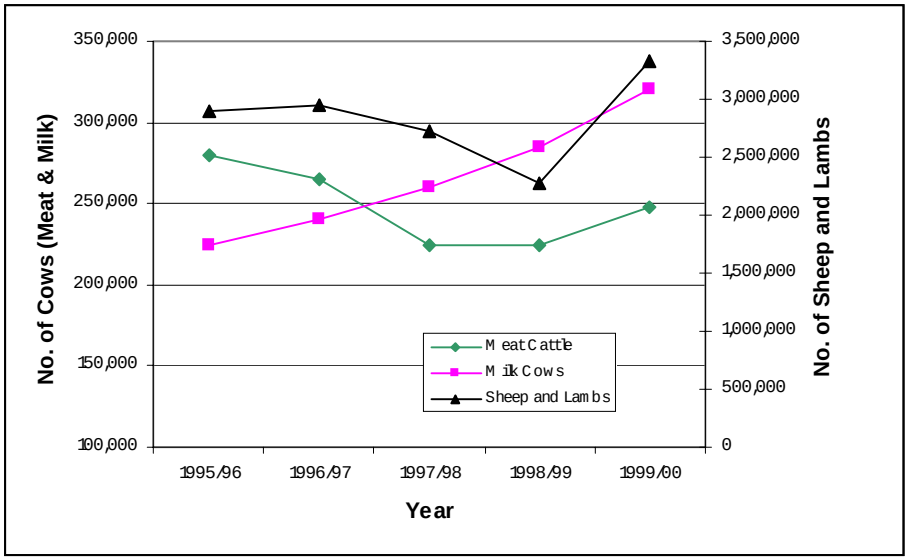
Source: Agricultural Production across the Corangamite Region, 2001

The meat industry in concentrated in the north of the Shires of Corangamite and Colac-Otway and also on the Bellarine Peninsula.

3.2.5 Dairy

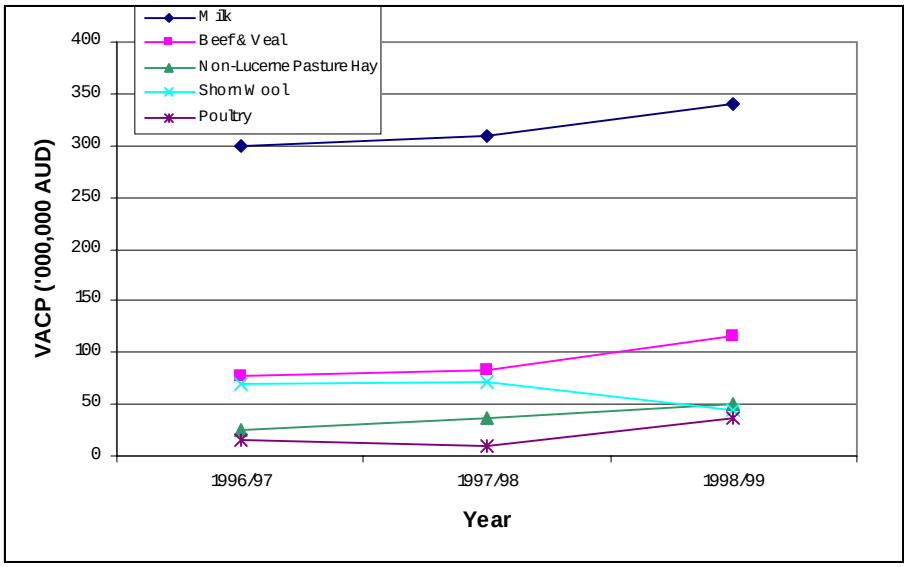
The number of milking cows in the Corangamite Catchment has been increasing steadily from approximately 225,000 in 1995/96 to 320,000 in 1999/00, a 42 per cent increase (Figure 4). Dairy has been a dominant source of VACP in the Corangamite Catchment, accounting for 44 per cent of total VACP (Figure 2), a trend that is expected to continue. The majority of the dairy industry is concentrated in the North of the Colac-Otway shire (Figure 6). However, milk cows are found across most of the Corangamite Catchment, particularly to the south and west.

Figure 4: Number of Sheep, Lambs and Cows



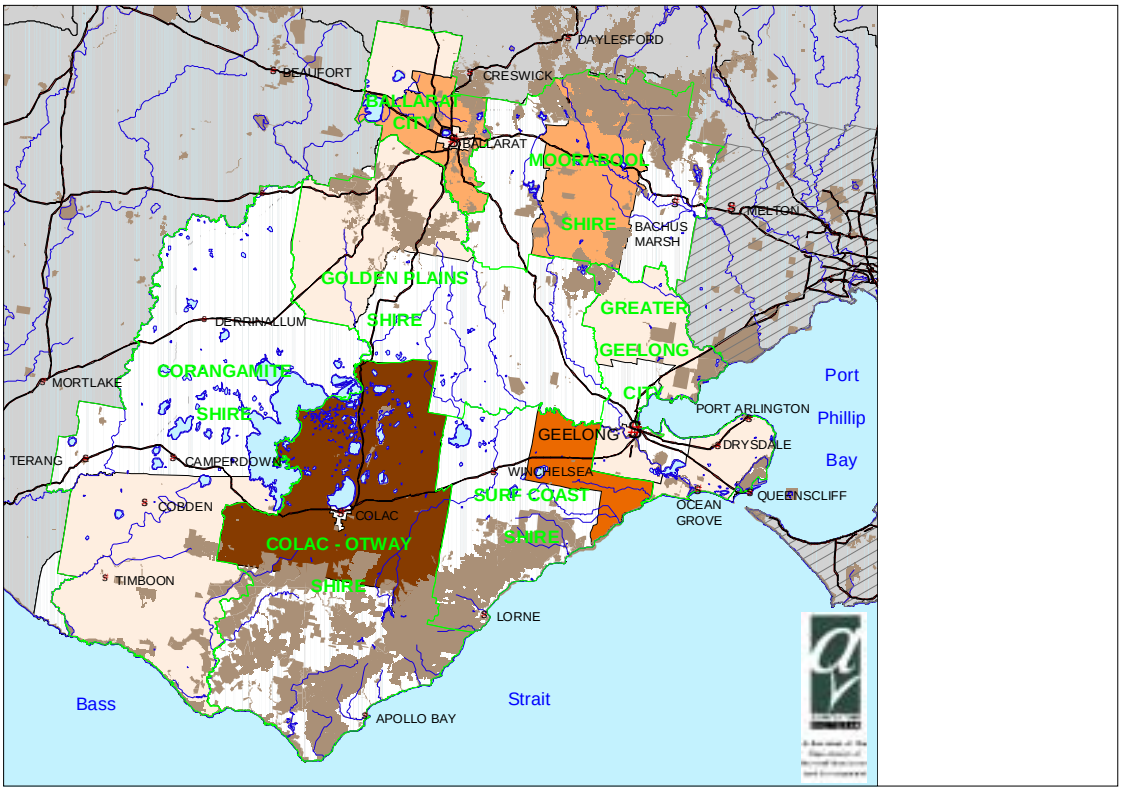
Source: Agricultural Censuses and Surveys, ABS

Figure 5: VACP for Selected Commodities



Source: Agricultural Censuses and Surveys, ABS

Figure 6: Number of Milk Cows, 1998/99



Source: Agricultural Production across the Corangamite Region, 2001

3.2.6 Viticulture

The total area within the Corangamite Catchment planted to grapes is relatively small (201 ha in 1997), however it is an industry that achieved considerable growth over the five years (106% increase). Golden Plains south east and Greater Geelong B showed the largest increase in area of planted to grapes with a 327 and 203 per cent increase respectively (Table 22).

Table 22: Area planted to grapes

Locality	Area of grapes (ha)		
	1991	1997	% Change
Colac-Otway – North	1.5	5.2	+254
Corangamite – North	0.4	0.3	-25
Golden Plains – North West	13.7	4.9	-64
Golden Plains – South East	23.7	101.3	+327
Greater Geelong A	15.8	0	-100
Greater Geelong B	23.9	72.5	+203
Greater Geelong C	18.5	17.0	-8
Moorabool – Ballan	0.3	0	-100
Total for Corangamite Catchment	**97.8**	**201.2**	**+106**

Source: NLWRA website, www.nlwra.gov.au

3.2.7 Cereals, legumes, oil seeds and potatoes

The areas planted to cereal, legume and oil seed crops and potatoes are shown in Table 23. Cereal crops consist of wheat, oats, barley, triticale, maize and sorghum; legumes include lupins, field peas and faba beans; and oil seeds include canola and sunflower.

A significant increase in area planted to crops between 1991 and 1997 was evident in Corangamite North (22%), Greater Geelong C (15%) and Moorabool West (15%). Over all there was a 6 per cent increase in the area planted to cereal, legume and oil seed crops and potatoes. Potato yields are the highest in the south of the Colac-Otway Shire and to the East of Ballarat, yielding between 25.1 and 35 tonnes per hectare. The area of land allocated to wheat for grain has risen sharply over the recent years, increasing from 5,000 ha in 1995/96 to 32,500 ha in 1999/00, a 550 per cent increase[7].

Table 23: Area of potatoes and cereal, legume and oil seed crops

Locality	Area of crops (ha)		
	1991	1997	% Change
Ballarat – Central	142	5	-96
Ballarat – Inner North	7	25	+257
Ballarat – South	374	214	-43
Colac-Otway – Colac	0	343	+
Colac-Otway – North	4,127	2,592	-37
Colac-Otway – South	10	53	+430
Corangamite – North	13,084	15,898	+22
Corangamite – South	414	565	+36
Golden Plains – North West	2,852	2,941	+3
Golden Plains – South East	12,161	12,714	+5
Greater Geelong A	1,410	540	-62
Greater Geelong B	1,689	1,465	-13
Greater Geelong C	4,412	5,071	+15
Moorabool – West	2,625	3,014	+15
Moorabool – Ballan	880	1,229	+40
Total for Corangamite Catchment	**44,187**	**46,669**	**+6**

Source: NLWRA website, www.nlwra.gov.au

3.2.8 Vegetables

The area planted to vegetables in the Corangamite Catchment is shown in Table 24.

[7] Agricultural Production across the Corangamite Region, 2001.

Table 24: Area planted to vegetables

Locality	Area of vegetables (ha)		
	1991	1997	% Change
Colac-Otway – North	56	62	+11
Corangamite – North	8	11	+38
Golden Plains – South East	74	84	+14
Greater Geelong A	23	28	+24
Greater Geelong B	2	17	+657
Greater Geelong C	31	51	+65
Moorabool – West	2	1,502	+74,975
Moorabool – Ballan	12	9	-25
Total for Corangamite Catchment	**207**	**1,764**	**+750**

Source: NLWRA website, www.nlwra.gov.au

Vegetables included in this analysis are carrots, celery, lettuce, brown and white onions, green peas, cabbages, broccoli, zucchini, mushrooms, pumpkins and brussel sprouts. There was an enormous increase in the area of vegetable planted in Moorabool West, increasing from 2 ha in 1991 to 1,502 ha in 1997. Overall there was a 750 per cent increase from 207 ha to 1,764 ha over the five years.

3.2.9 Pasture

Pastures that are included in the statistics in

Table 25 are lucerne, sown grasses, native or naturalised pasture, mixed perennials, mixed annuals, sown pastures, pasture cut for hay and pasture legumes. Between 1991 and 1997 there was a 20 per cent increase in the total area of land allocated to pasture, with Corangamite North, Greater Geelong B and Moorabool recording the most significant increases of 50, 45 and 30 per cent respectively, presumably due to intensification in land management. Ballarat South recorded a 69 per cent decrease in the area of pasture from 2,879 ha in 1991 to 888 ha in 1997, perhaps attributed to urbanisation.

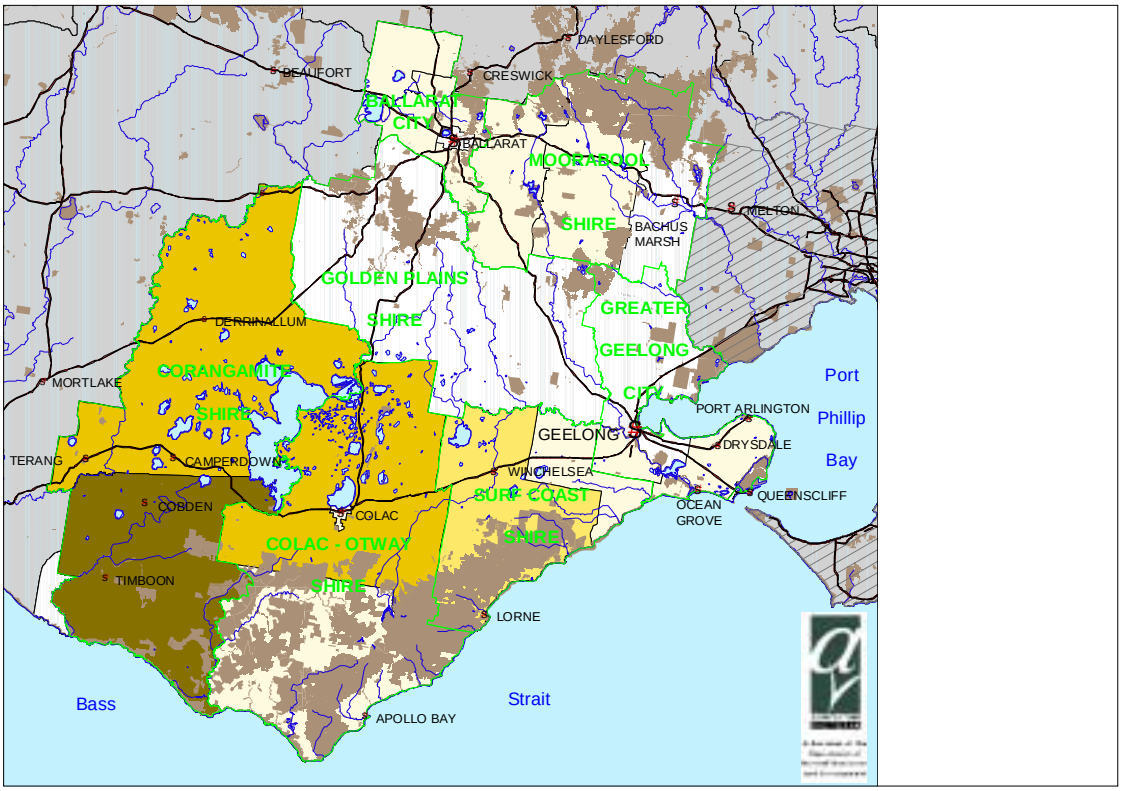
Table 25: Area of pasture

Locality	Area of pasture (ha)		
	1991	1997	% Change
Ballarat – Central	1,707	1,453	-15
Ballarat – Inner North	55	746	+1,256
Ballarat – South	2,879	888	-69
Colac-Otway – Colac	83	11,497	+13,752
Colac-Otway – North	116,760	115,635	-1
Colac-Otway – South	30,413	34,145	+12
Corangamite – North	152,318	228,970	+50
Corangamite – South	179,079	193,714	+8
Golden Plains – North West	38,371	44,686	+16
Golden Plains – South East	72,063	85,935	+19
Greater Geelong A	6,487	4,460	-31
Greater Geelong B	7,457	10,809	+45
Greater Geelong C	15,108	11,995	-21
Moorabool – West	24,679	32,696	+32
Moorabool – Ballan	22,783	29,003	+27
Total for Corangamite Catchment	**670,242**	**806,632**	**+20**

Source: NLWRA website, www.nlwra.gov.au

Non-lucerne pastures cut for hay yielded between 4.01 and 5 tonnes per hectare in the north of Corangamite and north west of Golden Plains shires, and the majority of the remaining land allocated to non-lucerne pastures yielded between 3.01 to 4 tonnes per hectare (Figure 7).

Figure 7: Yield of Non-lucerne Pastures for Hay, 1998/99



Source: Agricultural Production across the Corangamite Region, 2001

3.2.10 Pigs

Pig production in the Corangamite Catchment has grown from a total of 12,235 in 1991 to 16,087 in 1997, a 31 per cent increase. The largest percentage increases have occurred in Greater Geelong B, Moorabool Shire and Golden Plains south east.

Table 26: Number of pigs

Locality	No. of pigs		
	1991	1997	% Change
Colac-Otway – Colac	0	911	+
Colac-Otway – North	2,556	996	-61
Colac-Otway – South	984	2,179	+121
Corangamite – North	5,758	9,108	+58
Corangamite – South	1,895	1,036	-45
Golden Plains – North West	809	205	-75
Golden Plains – South East	196	658	+236
Greater Geelong B	18	665	+3,594
Moorabool – West	11	59	+436
Moorabool – Ballan	8	270	+3,275
Total for Corangamite Catchment	**12,235**	**16,087**	**+31**

Source: NLWRA website, www.nlwra.gov.au

3.2.11 Egg production

Egg production in the Corangamite Catchment increased by 21 per cent between 1992 and 1997 with Greater Geelong B and Golden Plains south east recording the greatest percentage increases of 51 per cent and 85 per cent respectively. The 8.3 million dozen eggs produced in the region in 1997 accounted for approximately 5 per cent of the total number of eggs produced in Australia. In recent years there has been a trend in poultry farmers moving west to ensure closer proximity to the grain that is used for feed, hence reducing overheads. Ballarat south and Greater Geelong A both registered large decreases in egg production as a result of industry being displaced with growth of residential areas.

Table 27: Volume of eggs produced

Locality	Eggs produced (dozen)		
	1992	1997	% Change
Ballarat – Central	140,000	158,000	+13
Ballarat – South	450,708	250,000	-45
Colac-Otway – North	ND	31,564	+
Corangamite – North	2,373,528	2,824,750	+19
Golden Plains – South East	2,166,666	4,004,800	+85
Greater Geelong A	1,535,304	398,376	-74
Greater Geelong B	182,100	275,000	+51
Moorabool – West	ND	324,000	+
Total for Corangamite Catchment	**6,848,306**	**8,266,490**	**+21**

Source: NLWRA website, www.nlwra.gov.au

3.2.12 Meat chickens

The number of meat chickens in the Corangamite Catchment decreased by 6 per cent between 1991 and 1997, with significant decreases occurring in Greater Geelong B and C (Table 28). Urbanisation is a possible explanation for the decline in number of meat chickens in these two localities. This would also explain large increase in the numbers in Golden Plains south east, as the broiler industry is displaced by growth of residential areas, hence forcing industry further out.

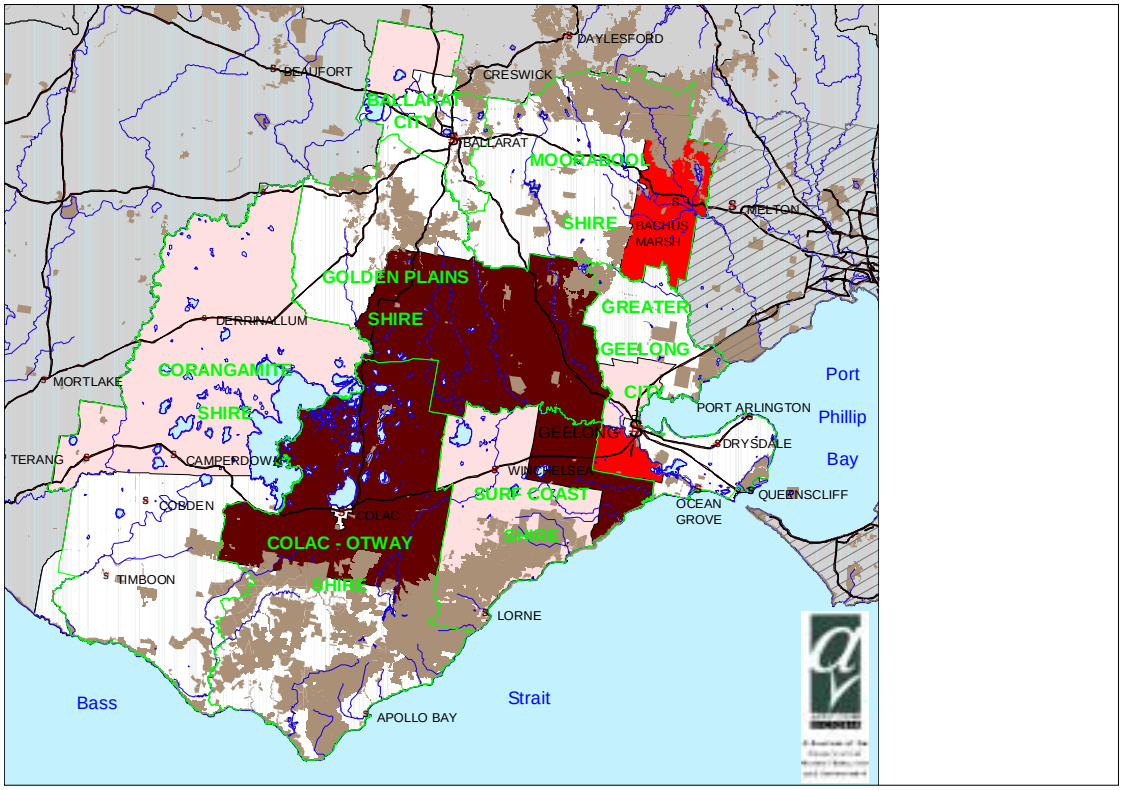
Table 28: Number of meat chickens

Locality	No. of meat chickens		
	1991	1997	% Change
Colac-Otway – North	228,953	156,500	-32
Golden Plains – South East	111,800	312,000	+179
Greater Geelong A	42,662	48,000	+13
Greater Geelong B	89,241	45,000	-50
Greater Geelong C	188,000	60,000	-68
Total for Corangamite Catchment	**660,656**	**621,500**	**-6**

Source: NLWRA website, www.nlwra.gov.au

Poultry contributed 5.1 per cent ($39 million) to regional VACP in 1998/99 (Figure 2) and the dollar value of poultry increased by approximately 300 per cent from $9 million to $37 million between 1997/98 and 1998/99 (Figure 5). Poultry fowl are raised principally in the central part of the Corangamite Catchment, that is in the north of Colac-Otway Shire and the majority of Golden Plains Shire, where between 1,250,001 and 2,000,000 poultry fowl per SLA are kept (Figure 8).

Figure 8: Number of Poultry Fowl, 1998/99



Source: Agricultural Production across the Corangamite Region, 2001

3.2.13 Sheep and lambs

Included in the statistics in Table 29 are breeding ewes one year and over, lambs and hoggets under one and other sheep and lambs. Between 1991 and 1997, there was an overall decrease of 19 per cent, with decreases occurring across all SLA's except for Ballarat Inner North and Greater Geelong C.

Figure 4 depicts the number of sheep and lambs in the Corangamite Catchment from 1995/96 to 1999/00. The number of sheep and lambs gradually declined from approximately 2.9 million in 1995/96 to 2.3 million in 1998/99 and then experienced a 46 per cent increase in numbers to 3.3 million in 1999/00. The sheep and lambs for meat contributed 4.7 per cent (or $256 million) towards regional VACP in 1998/99 (Figure 2).

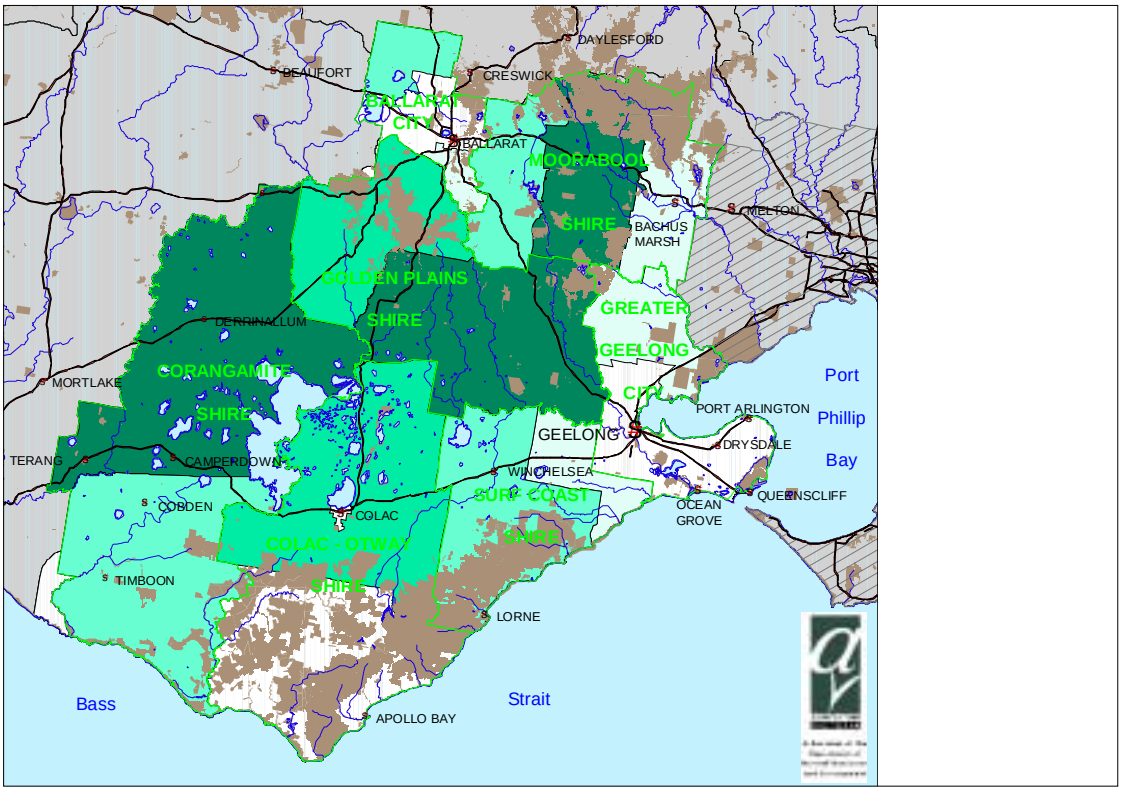
Table 29: Number of sheep and lambs

Locality	No. of sheep and lambs		
	1991	1997	% Change
Ballarat – Central	14,112	3,887	-72
Ballarat – Inner North	1,565	4,065	+160
Ballarat – South	22,904	3,321	-86
Colac-Otway – Colac	ND	20,767	ND
Colac-Otway – North	367,533	181,254	-51
Colac-Otway – South	37,069	31,896	-14
Corangamite – North	1,107,802	987,817	-11
Corangamite – South	181,302	68,602	-62
Golden Plains – North West	381,586	340,770	-11
Golden Plains – South East	804,284	724,927	-10
Greater Geelong A	75,892	23,029	-70
Greater Geelong B	44,491	27,070	-39
Greater Geelong C	120,259	125,824	+5
Moorabool – West	205,644	182,080	-11
Moorabool – Ballan	204,514	180,171	-12
Total for Corangamite Catchment	**3,568,957**	**2,905,478**	**-19**

Source: NLWRA website, www.nlwra.gov.au

Figure 9 shows the number of sheep and lambs for meat in the Corangamite Catchment, where the majority of sheep and lambs are grown across the north-central areas, but like sheep grown for wool, can be found right across the region.

Figure 9: Number of Sheep and Lambs for Meat

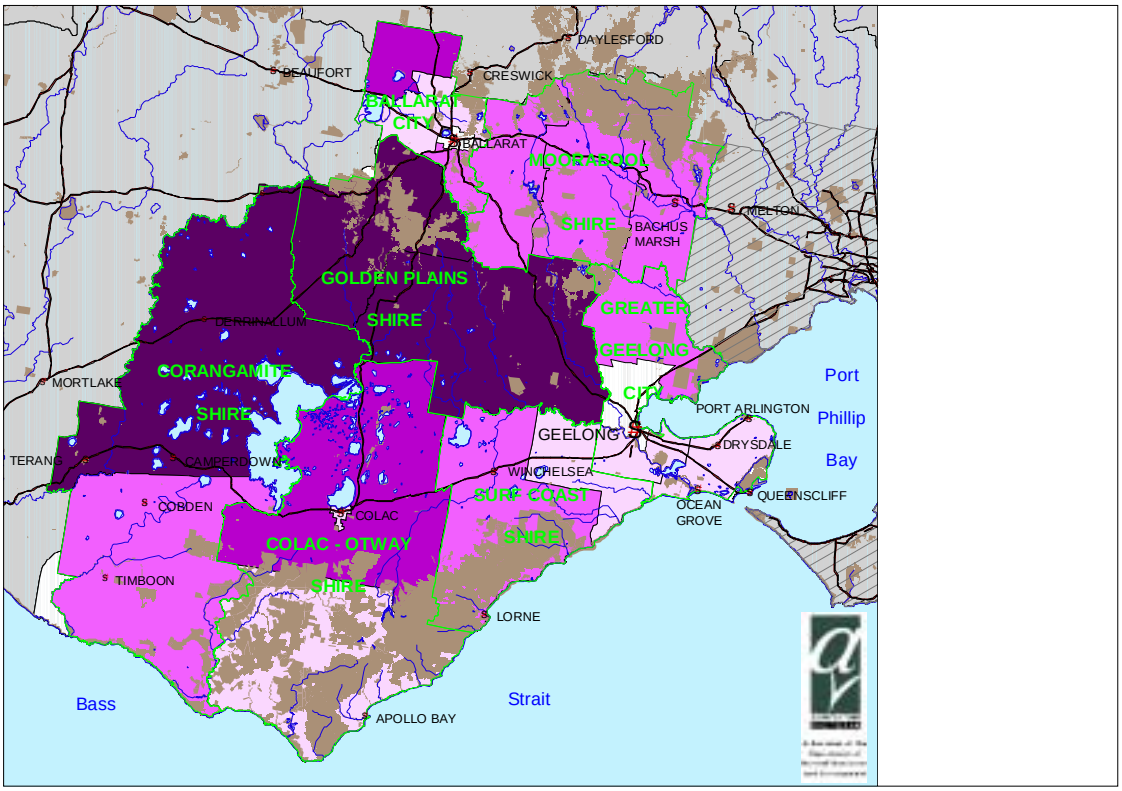


Source: Agricultural Production across the Corangamite Region, 2001

3.2.14 Wool

Wool made up 5.7 per cent of regional VACP, or $43 million, in 1998/99 (Figure 2). Figure 5 shows that the absolute contribution of shorn wool to regional VACP has declined by approximately $27 million between 1997/98 and 1998/99. Wool is produced across the north-central parts of the Corangamite Catchment, but sheep are grown for wool right across the region (Figure 10).

Figure 10: Production of Wool, 1998/99



Source: Agricultural Production across the Corangamite Region, 2001

3.3 Tourism

The Corangamite Catchment offers a diverse range of attractions, from popular surf and protected beaches to diverse hinterland features in scenic and rural forested environments. Tourism in the Great Ocean Road Region, which covers the southern half of the Corangamite Catchment is worth $940 million, this is more than what agriculture is worth. In 1996, tourism in the towns and rural areas along the Great Ocean Road provided 14.7 per cent of the total employment. In 1998, this region attracted 2.7 million overnight visitors and 5.4 million day visitors.

Inland, the major attraction is 'Sovereign Hill' at Ballarat, with 1.2 million day visitors. Geelong and the Bellarine Peninsula including Queenscliffe is also an important destination with 2.4 million day visits in 2000. Surf Coast is the gateway to the Great Ocean Road and is a significant destination for international and domestic visitors and also accommodates weekend visitors who regularly stay in their holiday houses, where the majority are located in the coastal areas.

The number of overnight trips and visitor nights for selected regions in the Corangamite Catchment in 2000 are illustrated in Table 30. The greatest number of overnight trips occurred in Ballarat, Geelong and Surf Coast. Ballarat and Geelong are the major regional centres and as a result overnight trips would be expected to be high.

Local government in the region estimates the annual growth in visitor numbers to be 15 per cent per annum. International visitation to the area was 75,000 in 1991, 140,000 in 2000 and is predicted to be 250,000 in 2110.

Table 30: Overnight trips and visitor nights for selected regions in the Corangamite Catchment, 2000

Locality	Overnight Trips ('000)	Visitor Nights ('000)
Ballarat	608	1,230
Colac-Otway	335	942
Corangamite	111	234
Greater Geelong Pt A	*511*	*1,160*
Greater Geelong Pt B	*262*	*902*
Greater Geelong Total	773	2,062
Queenscliffe	196	404
Surf Coast - East	*183*	*493*
Surf Coast - West	*507*	*1,341*
Surf Coast Total	685	1,834
Total for Corangamite Catchment	**2,708**	**6,706**

Source: Bureau of Tourism Research, 2002

4 The communities in the Corangamite Catchment

Four approaches to defining separate 'communities' in the Corangamite Catchment are presented. These consider the region by:

- local government areas;
- areas of common geography and human activity;
- the various distinct socio-economic activities in the Corangamite Catchment, and
- the key drivers of natural resource management behaviour.

4.1 Local government areas

Local government in Victoria has changed significantly over the last decade, with major rationalisation and amalgamation of local authorities. The Corangamite Catchment is included within the boundaries of nine local governments.

City of Ballarat – the urban centre and the peri-urban areas to the west and south are included in the Corangamite Catchment. The uplands in the shire contain the headwaters of the Leigh and Yarrowee Rivers which run into the Barwon River and the Woady Yaloak River which drains into Lake Corangamite. The city's population is 79,000 and has grown by 4.7 per cent in the period 1996 to 2001. Of the total population, it is estimated that 54,000 people actually live within the Corangamite catchment. The city's economy is based on a range of secondary and tertiary industries, but unemployment amongst the urban population at 9 per cent is higher than desirable. An unknown percentage of the city's residents commute daily to work in Melbourne.

City of Greater Geelong. The city is wholly within the Corangamite catchment, and contains a major urban-industrial centre on Corio Bay, a large number of smaller towns on the Bellarine Peninsula and at Lara, with the remainder being used for agriculture, which is under pressure from demands for land for rural residential living. The city's population in 2001 was 184,000, which is a 5 per cent increase over the 1996 figure. The city's economy is dependent on a number of large industrial enterprises, including car manufacture, petroleum refining, mineral processing and textile manufacture. An unknown percentage of the city's residents commute daily to work in Melbourne. The economy is currently robust with low unemployment, high industrial growth and investment in urban renewal.

Shire of Colac-Otway. This shire is wholly within the Corangamite catchment and was formed by amalgamating the Shires of Colac and Otway. South of Colac, it includes coastal communities, the forested Otway ranges and the foothills and slopes of the Otway's, used principally for grazing and dairying. The northern third of the shire is open farming land on the basaltic plains, with occasional lakes and bordered to the west by Lake Corangamite. The shire's population is 20,000 and has grown by 1 per cent in the period 1996 to 2001. The diversity in the shire is reflected in varying population trends across the shire over the same period. The population of Colac itself has grown by 0.9 per cent , while the population in the northern broad acre areas has declined by 0.7 per cent.

In contrast the Otway and coastal population has grown by 8.8 per cent, with significant development pressures in Apollo Bay and adjacent coastal settlements.

Shire of Corangamite. The eastern three-quarters of this shire is within the Corangamite catchment. It was formed by amalgamating three shires. It includes four quite distinct landscape-habitation types. The tourist attractions on the coast – principally the 'Twelve Apostles' are backed by the Heytesbury dairy district. The area around Camperdown and Lakes Bullen, Merri and Purrumbete are important for recreation, nature conservation and rural residential living. North of Camperdown the landscape opens out into broad-acre farming centred on the smaller towns of Lismore, Derranillum and Skipton. The shire's population is 16,700 and has not changed over the period 1996 to 2001. This statistic obscures within-shire trends, which show that while the southern part has grown marginally over this period (0.8 per cent growth), the population in the northern broad acre areas have declined significantly – by 3.7 per cent. Pressures for further coastal development and industrial development (gas extraction and processing) will encourage further population growth.

Shire of Golden Plains. This shire, which is wholly within the Corangamite Catchment has been formed from parts of three shires with boundary changes with others. The major land use is broad-acre cropping and grazing, and there are a number of very large farms in the area – up to 3,000 hectares. Intensive agriculture is becoming more important, with pigs and poultry enterprises being established in the peri-urban areas between Bannockburn and Geelong. It is the most 'rural' shire in the region, although changes to land use and demographics are being heavily influenced by its large urban neighbours in Ballarat to the north west and Geelong to the south east. The demand for rural lifestyles with access to these urban centres is reflected in the population trends, with a 9 per cent increase over the period from 1996 to 2001, to a current population of 14,500. Principal urban centres are Bannockburn which is experiencing a residential boom, Meredith and Inverleigh. A range of smaller per-urban settlements occur in the highlands near Ballarat – such as Smythesdale and Scarsdale, with a number of rural settlements across the middle of the shire – such as Shelford and Rokewood.

Shire of Moorabool. About a third of the Moorabool Shire, from Ballan to the west is included in the Corangamite Catchment. This area covers the headwaters of the Moorabool River, which is an important tributary of the Barwon River. This part of the shire is an important area for intensive horticultural production. Its proximity to Ballarat and Melbourne is increasing the demand for land use changes to accommodate more people, although planning processes are in place to ensure the retention of prime agricultural land. Population growth has been modest, with a 4 per cent increase to 3,500 over the period 1996 to 2001. Ballan, which is on the catchment border, has experienced stronger growth, with a 12 per cent increase in population to 5,600 over the same period.

Shire of Moyne. Very little of the shire is included in the Corangamite Catchment, with a small area adjacent the estuary of the Curdies River near Peterborough included.

Shire of Surf Coast. This shire is wholly within the Corangamite Catchment, and was formed through an amalgamation of two shires – one coastal and one inland. The shire consists of three very different landscape –habitation areas. The inland broad acre

farming areas, centred on the town of Winchelsea support grazing and cropping enterprises. East of Winchelsea, there is significant growth of rural residential land use in the Moriac area. Many residents in this area commute to Geelong for work, with some travelling further afield. The eastern third of the Otway ranges lies in the shire, flanked to the north by well established farming communities centred on Deans Marsh. These farming communities have traditional links with the holiday coastal towns, although these relationships are being diluted and strained by strong migration into coastal communities from outside the shire. The coastal area, with the world-famous Great Ocean Road and major population centres at Torquay, Angelsea, Aireys Inlet and Lorne are experiencing very large population growth and strong demands for residential land to support part-time of full time residence. In the period between 1996 and 2001, the population in the Surf Coast shire grew from 16,700 to 19,600, a 17 per cent increase. Approximately half of the residences in the coastal towns are not permanently occupied.

Borough of Queenscliffe. This small mainly urban municipality supporting 3,100 people occupies a strategically significant location in the region and has a long tradition as an important holiday destination. The population figures do not reflect total human activity as many Melbourne people own holiday residences in Queenscliffe.

4.2 Geographic - based communities

4.2.1 Major urban centres

Geelong and Ballarat are the major urban centres in the region, and both are significant regional cities in the Australian context. In 2001, Ballarat had a population of 79,000, up from 75,000 in 1996. The population is predicted to grow to 88,000 by 2021. In 2001, the City of Greater Geelong, which includes peri-urban areas mainly to the north and on the Bellarine Peninsula had a population of 184,000, up from 175,000 in 1996. The population of the city is predicted to grow to 211,000 by 2021. Collectively, these two cities have 80 per cent of the total population of the Corangamite catchment, and as such will exert significant pressure on the natural resources of the region. The secondary and tertiary industries in the cities dominate the overall regional economy. Local governments in both cities are pursuing strong economic growth strategies.

The cities differ in some important characteristics. Unemployment is about 9 per cent in Ballarat, and municipal management of environment values is faced with considerable costs from public anti-social behaviour such as chronic vandalism. In Geelong, with its aggregation of major industries managed by multi-national corporates, unemployment in 2001 was an acceptable 4 per cent. Those interviewed suggested that investment in urban renewal in Geelong is improving the social ‘character’ of the city. Anecdotal opinion is that day-to-day environmental attitudes and behaviour are improving.

4.2.2 Peri-urban and rural residential environments

The appeal of rural living is enticing people to invest in land and houses within a 40 km of Geelong – the peri-urban fringe. This fringe is relatively new and extends from Geelong though to the Otway’s at Deans Marsh. This community is generally referred to as the ‘lifestyle community’. The life stylers are investing in small acreages, anywhere from less than a hectare to 40 hectares. Towns such as Deans Marsh, Winchelsea and Moriac are some of those whose population has increased as a result of people moving to

these small rural holdings. Typically, the people moving to the peri-urban fringe have young families where one member of the family travels on a daily basis to another centre such as Geelong or Colac for employment. The peri-urban fringe is also attracting people in their 50s or 60s who are either in early retirement or are looking for a change in employment.

Surrounding Ballarat is another peri-urban fringe attracting people looking for lifestyle changes or, in some cases, to establish niche industries such as berries, grape vines, piggeries, rose farms etc. These holdings are typically two hectare blocks and their value is increasing substantially due to a policy that now requires that land zoned rural is now more than 40 hectares effectively bringing to a halt the release of these smaller blocks within most of this region.

There are a number of NRM issues emerging within these geographic communities including water use and water allocation, weed and pest management and soil erosion. While the negative issues are significant, there are a number of positive features that contribute to NRM management including a strong sense of community in many of the towns, strong links with the local schools and a desire by those who have invested in the area to protect the qualities that brought them there in the first place. Activities include biodiversity restoration, maintaining water quality and a desire to minimise negative impacts on the natural resources.

4.2.3 Rural towns

The major rural towns are Colac, Camperdown, Winchelsea. Less significant towns include Lismore, Derranillum, Cobden, Timboon and Birregurra. Beyond these communities there are about 30 small townsites and hamlets throughout the region.

The rural towns are largely supported by traditional agricultural industries such as grains, meat and wool around towns such as Colac and Lismore, and dairy in towns within the Corangamite region such as Camperdown, Timboon and Cobden. Unlike most of the towns and communities on the coastal fringes of the Corangamite region, these rural towns recorded minimal change in population movement over the last five years, with Colac and Colac-Otway recording less than one per cent change in population although Colac-Otway south recorded a nine per cent growth, reflecting the number of people moving to live along the coast. The Golden Plains shire has recorded a nine per cent population growth across the shire, with most of the rural towns remaining viable. Many towns, including the majority of those in the Golden Plains and Corangamite shires have townscaping and community development plans, with a strong focus on economic development.

Issues affecting rural towns across Australia are also a feature of many of the rural towns in the Corangamite – including loss of rural youth, declining farm populations and reduced services in smaller towns. Local governments are responding with strategic and marketing plans developed by local government to attract new industries to the area, and investment in local community capacity building. Natural resource management issues concern many of the rural towns. Lake Colac has become a feature issue for the Colac community; the Corangamite shire is managing planning pressures surrounding key

volcanic lakes and the Golden Plains shire has an environment strategy to manage water allocation and other pressures.

4.2.4 Coastal towns

The coastal towns within the Corangamite region are rapidly growing with a 22 per cent population growth in the eastern region of Surf Coast shire and 12 per cent in the west. Towns showing strong population and economic growth include Torquay, Lorne and Angelsea. There has been a 77 per cent turnover in house sales in Surf Coast shire over the last 3 years and house prices have increased by 48 per cent over the same time. Typically, the people coming to the area are well financed and very often will travel to Geelong or Melbourne for work. The shire is also attracting retirees to buy homes and live in the coastal towns. There is some community disquiet in the coastal communities, particularly amongst the more longer-term established residents about this influx of 'new people and new money'. The nature of these once quiet coastal communities is seen to be changing as more people arrive.

Environmental issues are of greater concern to small coastal towns than small rural towns. Coastal towns are concerned with ensuring limited development to ensure protection of the natural surrounds, and the planning and balancing of tourism development with preservation of the local areas environmental characteristics. Another factor that can impact on coastal towns is the huge fluctuations in populations during holiday seasons. The population in some instances can double which has an impact on infrastructure, local amenities and quality of life of the local residents. Small coastal towns also tended towards the perception that their community had a distinctive characteristics.

There are a number of significant environmental issues influencing planning and development within the Surf Coast Shire. These issues include:

- The impact of major industries, such as Alcoa's power station in Angelsea, on local river systems has instigated considerable community consultation and planning;
- The commitment by this shire to have all towns sewered and effluent treated before it is pumped out to sea. Having completed this process, the shire is now looking to increase its utilization of treated water;
- The recent announcement of a marine park off the Port Addis coast is a major environmental decision for the community.
- The planning pressures and rapid population growth on water allocation.

What are people saying about living in small towns?

Small towns are considered to have a high quality of lifestyle that includes being a pleasant, peaceful and safe place to live. Other qualities extend to the friendliness of the people, the easy-going 'country' lifestyle and low crime rate. Further, local friendships, families and facilities lead to a 'sense of place' (ISR 2002), which are also important aspects of living in a small rural or coastal town.

Living in a rural or coastal small town community is also synonymous with clean air, birds, bees, clean water and fresh food. History and heritage also plays a role in identifying that which is uniquely 'community'.

There are differences in the factors that affect small rural towns against those that affect coastal towns. Generally though, the key issues that may impact on both include:

- Education and employment opportunities for local youth, which leads to an exodus of young people to regional and city centres.
- Centralisation of government and private sector services to regional towns and the resultant lack of development and employment opportunities. This also promotes permanent residency in these centres rather than in the small towns.
- Rising pressure for local government and communities to put into action environmental and catchment management strategies.
- Development and maintenance of local infrastructure including roads, parks, public transport, car parking and telecommunication services. The difficulty in addressing issues related to road infrastructure in particular may be attributed to the low rate base of local shires and the area that the shires need to cover.
- Decline and aging of the population, wherein the population of small towns tends to be declining in relation to people under the age of 24 whilst the number of people of 60 are increasing (Ochre, 2001).
- Increased pressure on community and volunteer based organisations due to membership decrease.
- Lack of business growth as a result of population decline and centralisation of services.

4.2.5 Otway Ranges

The Otway Ranges (the 'Otways') are a significant range running across the south of the region. They lie within the Shires of Corangamite, Colac-Otway and Surf Coast. They remain largely forested, with parts of the south west receiving up to 1.8 m of rain per annum and supporting temperate rain forests. The Otways have economic value as the backdrop to the tourist industry focused on the Great Ocean Road communities, as a source of potable water for Barwon and South West Water Authorities and for timber production. Tourism alone in the area centred on the Otways and Great Ocean Road is worth $940 million per annum.

The native forest has been heavily modified as a result of 150 years of timber extraction, and suppression of fire, and weed ingress. Current arrangements restrict logging to 33 per cent of the native forest estate, with areas of high conservation protected. The level of log extraction has been reduced over the last 20 years and in the opinion of government, the industry is sufficiently regulated. Further, recent research has shown that current logging practice will have only marginal impact on potable water yield from the area.

Despite these arrangements, and evidence that current levels of extraction are sustainable, native timber harvesting in the Otways is contentious. The Surf Coast Shire is keen to see logging in the Otways stopped and has resolved to discourage the purchase of Otway timber by its constituents. Local disputes between 'pro-' and 'anti-loggers' are conducted with some ferocity.

Ultimately, the industry's future is likely to be governed by its economic importance. The reduced activity is lessening its contribution to regional employment and economic activity. Current licences for sawlogs are worth about $30 million per annum in timber sales. The native timber industry supports 60 to 80 people of the 550 in total who are employed in timber products and processing.

4.2.6 Otway foothills and slopes

The Otway foothills and slopes occur as a distinct area of cleared and farmed land immediately to the north of the Otway Ranges. This area is bounded to the north by the Princes Highway, and includes settlements such as Birregurra and Deans Marsh. The dominant land uses are grazing and dairying, with the slopes generally being too steep for broad-acre cropping. The land is held in small holdings and its is seen as a 'traditional' farming area. The area is within the catchment for Barwon Water Authority. Its proximity to the coast has meant here have always been links between inland and coastal communities, and long-time residents are resenting the disruption of these traditional relationship patterns by increased population growth along the coast.

4.2.7 Heytesbury dairy district

This clearly defined area lies south of Cobden and west of the Otways and is wholly included in the Corangamite Shire. The geology and geomorphology of this area are very different to other parts of the region, with a series of parallel ridges lying roughly NW-SE, separated by steep valleys. Rainfall is very high – up to 1,000 mm per annum.

The Heytesbury area was mostly cleared in the 1950s to 1970s, and now supports a vigorous and productive dairying industry, with about 900 producers. Several of the area's farming businesses were included in the 100 leading dairy farmers in Australia in 2002. Important townships include Timboon and Cobden. The area has significant natural resource problems. Steep slopes and high rainfall have increased the frequency of land slippage. Poor effluent management is a major issue which is receiving attention by industry and government bodies. Increased dairy production is putting stresses on roads in the area used for milk collection.

4.2.8 Broad acre farming areas

Broad acre farming dominates the Golden Plains and the northern part of the Corangamite and Colac-Otway shires. Approximately 190,000 ha in Golden Plains and 218,000 ha in Corangamite north are utilised in broad-acre production. Like broad-acre agricultural businesses across Australia, farms in the Corangamite region are characterised by an aging farming population, an asset base increasing in value and declining annual profit margins, succession planning difficulties, fewer youth returning to the area and an increasing engagement of consultants.

Broad-acre agriculture in the Corangamite supports landcare groups and grower networks, some of which are leading entities in terms of innovation and achievement. Of note is the Woady Yaloak catchment group, a landcare group that has negotiated a successful partnership with Alcoa World Alumina, the Golden Plains shire and the government agency, Natural Resources and Environment. Within Golden Plains there is the more recently established Leigh Catchment group.

4.3 Occupation - based communities

In the following sections, occupation- based communities have been defined. The selection of the separate categories has been influenced by an awareness of the involvement in and impact upon natural resource management.

4.3.1 Major secondary and resource industries

The Corangamite Catchment's economy is dominated by its secondary and tertiary industries, and resource extraction and processing. These activities are conducted by relatively few, large entities, most of which are part of national and international corporate entities. Prominent entities include:

- power generation at Anglesea (Alcoa);
- hydrocarbon processing at Geelong (Shell);
- vehicle manufacture at Geelong (Ford);
- proposed natural gas extraction near Port Campbell (BHP Billiton);
- aluminium refining at Point Henry, Geelong (Alcoa), and
- textile manufacturing, Geelong (Godfrey Hurst).

These industries are large and significant at national scale. For example, Shell's Geelong Refinery employs 460 people and provides about 50 per cent of the fuel used in Victoria and also exports to New Zealand and the South Pacific. The refinery processes about six million tonnes of crude oil and other feedstock per year to produce vehicle fuels, lubricating oil, and other products. As the larger of Shell's two Australian refineries, it is also the home of Shell Australia's Supply Chain and is responsible for the movement of primary products around the Asia-Pacific region. The refinery also incorporates the Supply and Finance arms of the Manufacturing and Supply business and so provides an array of challenges both locally and internationally for a range of disciplines.

These major companies are active in environmental management on their sites and through support for community ventures. For example, at Ford in Geelong, the Community Liaison Group has developed an Environmental Improvement Plan for the site. Following the publication of the EIP, Ford Geelong received an Accredited Licence from the Environment Protection Authority of Victoria. Specific initiatives have been established in waste reduction and recycling. At Shell, there is an Employees Environment Group which works on environmental programs both on and off-site.

A significant new player in resource extraction will be the BHP Billiton investment of $250 million in the development of the Minerva Gas field, immediately off-shore from Port Campbell in the Corangamite Shire. In recognition of the high environmental and tourism values in the area, BHP Billiton have formed an Environmental Review Committee (ERC) as the prime consultation mechanism for the Minerva project. The ERC has representatives of all local stakeholders. Production will commence in 2004 and the field has a life of 10 years.

4.3.2 Service providers – the tertiary sector

The Corangamite Catchment has a mature economy in that employment in the tertiary sectors is high, with significant numbers employed in retail services, research and development, transport and utilities. There is considerable investment by local and state governments in community development within the Corangamite region. Health and education services are very large employers (2,300 at Barwon Health in Geelong), with important tertiary education facilities at Geelong and Ballarat. All state government services are represented in the region. Most local governments within the region have invested in capacity building and community development strategies. Typical of most rural towns in Australia, rural towns in the Corangamite region are recording a steady decline in population and have an aging population. While these trends are well regarded, there is in fact relatively little information held by the resource management organisations such as the CCMA as to the community development profiles and needs of rural towns across the region. The Department of Human Services however does have a considerable amount of this information.

In addition to the Government organisations such as Human Services and Youth Affairs, another community development organisation well established within the Corangamite is Community Connections Victoria. This organisation has 100 paid staff and 350 volunteers and has a budget in excess of $4.0 million. Community Connection Victoria is currently linked with a Community Capacity Building Consortium, which also involves West Vic Dairy. This programme is currently working out of Terang in the Corangamite shire and is focused on rural health and accessing specialist medical services.

4.3.3 Water managers and providers

The Corangamite catchment is an important producer of potable water for domestic, industrial and agricultural use. Water harvesting, storage, selling and distribution of potable water is managed by five corporate Water Authorities, owned by the State government. These same organisations are also involved in 'grey' and 'black' water recycling and reuse, and in promoting water use efficiency. Of relevance to NRM is the influence that Water Authorities can have over land use and management within the catchment areas. The three main Water Authorities affecting the region are:

- Barwon Water, which harvests and distributes 40 GL across the Barwon region each year. The water comes from the Barwon and Moorabool Rivers together with the Barwon Downs bore field near Gerangamite. Although per capita domestic use has reduced by 30 per cent over the last 20 years to an average household use of 210 kL per annum, the Authority is planning for a 15 per cent increase in total demand over the next 50 years.
- Central Highlands Water, which harvests water east of Ballarat. A major focus for the Authority is land use and management in the catchment, 95 per cent of which is in private hands and used for farming, including intensive horticulture. Relationships with the farming communities is improving, with programs in place to encourage the adoption of practices that enhance water quality.
- South West Water, which harvests water on the western slopes of the Otway Ranges for use mainly outside the Corangamite Catchment. About 50 per cent of the catchment is privately owned, and the Authority is commencing engagement processes with landholders.

4.3.4 Agricultural knowledge brokers

Private sector

Significant players are presented below.

- Southern Farming Systems. This grower led organisation established in 1995 has 930 members, mainly in Victoria, with some in South Australia and Tasmania. In the Corangamite, there are branches at Geelong, Shelford, Winchelsea and Ballarat. The drivers for the organisation were declining wool returns in the mid 1990s, and growing interest in high yielding cropping as an alternative land use. External funding from GRDC, and establishment of partnering relationships with DNRE and chemical firms has allowed investment in R&D into cropping technology, especially raised bed cropping. Current activities include development of an EMS for broad-acre farmers, and the establishment of a high rainfall agronomic package. Approximately 10 to 20 per cent of the broad-acre farmers in the Corangamite area will be members of SFS, and they may control up to 40 per cent of the area farmed, particularly in the drier areas to the north west.
- Sustainable Grazing Systems. This learning network in grazing management has been funded by Meat and Livestock Australia and has used grower-led R&D and on-farm extension to improve management skills and performance in grazing management. One of the core principles established in SGS had been the importance of maintaining adequate levels of pasture biomass and ground cover in grazing systems to maximize water use by pastures, and minimise run-off (cause of erosion and nutrient loss) and deep drainage (cause of salinity). Key practices have included: the importance of pasture assessment and monitoring; maintaining adequate levels of dry matter and ground cover; increasing growth and utilisation of perennial pastures rather than annuals in high rainfall zones and; the use of rotational
- West Vic Dairy. This locally-based R&D group is funded by Dairy Research and Development Corporation to work with the western dairy industry to improve its economic and environmental performance and social health. An important focus is on improved effluent management, and meeting standards for food safety and dairy hygiene. West Vic Dairy is working on the development of an EMS for dairy farmers. One innovation is an investment in a health program, where people in the industry can dial a 1800 number as a single access point into the health system.
- Agriwest Inc. (Western Plains Agribusiness Forum) – a network encouraging investment in agricultural industries in the area immediately west of Melbourne, including Moorabool Shire. Eleven potential industries have been identified for the area including: hydroponics; viticulture; agro-forestry; herbs, berries and aquaculture.
- Private agri-business consultants. Although the farming businesses have not been large users of external professional advice in the past, this is changing. Drawing on experiences in other states, it is reasonable to assume that up to 30 to 40 per cent of the region's broad-acre businesses will employ consultants within the next 10 years, with these businesses likely to control about 50 per cent of the region's farming land. Already one consultancy firm active in the region has clients that collectively farm 140,000 hectares across Western Victoria. Accountancy firms in the Heytesbury region are now employing financial planning consultants specialising in agriculture and dairy businesses.

Public sector

Research, extension and regulation services are provided by the Department of Natural Resources and Environment which has offices throughout the region. Its roles and functions are generally well understood in the Region.

4.3.5 Agricultural service providers

Broad-acre agricultural production and dairying are the dominant agricultural industries in the Corangamite region. Historically, these industries have been well supported by private agricultural service providers. This is largely attributed to the relatively small distances providers are required to travel between the rural towns and properties. Fertiliser and chemical orders are typically delivered within a few days of an order being placed.

4.3.6 Intensive agricultural industries

Dairying

The dairy industry in the Corangamite Catchment has undergone significant growth over the past decade and has the potential for further growth in the future. Significant investment has been made in processing and input supply infrastructure to accommodate for the large increases in milking cows. Ninety eight per cent of the dairy industry within the Corangamite catchment resides in the Shires of Colac-Otway (29 per cent) and Corangamite (69 per cent). From 1991 to 1997 there was a 23 per cent increase in the number of milking cows from 187,862 to 231,594 with six out of the thirteen regions showing a greater than 30 per cent increase. In 1997, the dairy industry within the Corangamite catchment made up 20 per cent of Victoria's total. There are currently 1,400 producers in the Corangamite catchment.

By October 2000, all states had conducted National Competition Policy reviews of their drinking milk arrangements and while a number of states were able to justify their regulations, Victoria could find no justification and began the process of becoming deregulated. Apart from increased competition, dairy producers in the region are faced with the challenge of environmental issues, and price pressures. The region has natural advantages in the high rainfall which enables high production to be achieved without irrigation. Expert opinion suggests that this comparative advantage will allow the industry in Western Victoria to grow at the expense of irrigated regions further north.

Pigs and Poultry

Growth in these intensive industries has been rapid. The characteristics of these industries are few, large enterprises, and generally a higher level of regulation than occurs in other forms of agriculture. These industries are involved with government in establishing codes of practice, particularly for waste management.

Between 1991 and 1997 there was a 31 per cent increase in numbers, and advice is that the rate of increase has accelerated, especially in areas near major centres. There is a trend to free-range pig production, which while economically attractive has environmental impacts in terms of nutrient pollution of water bodies. This issue is increasing in importance for shire and state government administrators and regulators.

Intensive poultry is also increasing in importance, both for egg and meat production, with the industry consolidating in fewer larger enterprises towards the eastern end of the catchment closer to markets.

Horticulture

Horticulture is a small land user in the Corangamite Catchment, but projections are for rapid growth given the quality of the natural resources in the area and the access to markets. Perennial horticulture is declining in importance, and is being replaced by higher value vegetable growing. Viticulture is expanding rapidly, although the total hectares under vines remains relatively small. Potato growing is locally significant near Ballarat, where growers supply a chip manufacturing plant owned by McCain's. This area is in the catchment for the Central Highlands Water Authority and programs are in place involving stakeholders in promoting practices that lead to more favourable water quality outcomes.

4.3.7 Extensive agricultural industries

While broad-acre agriculture is a significant industry with a number of industries and employment supporting the sector, it is not a growth industry in the region compared to secondary and tertiary sectors, resource extraction and processing, intensive agriculture, tourism and property development. Its absolute and relative contribution to regional economic life is likely to decline further in the future.

The need for business management and planning, and quality assurance and environmental management systems, occur alongside the social pressures of an aging farming population and declining terms of trade as significant issues in broad-acre production throughout the region.

4.3.8 Food processors

The most important food processors in the Corangamite catchment are the manufacturers of dairy products, vegetable processors and abattoirs. Given the strength of the dairy industry, the former are the most important, with processing plants at Cobden, Colac, Timboon and Camperdown. The linkages between producers and the factories are of necessity very close with rapid exchange of information about milk quality and pricing. In the event that the marketplace for dairy products begins to reward on-farm environmental performance, particularly in the area of effluent management, dairy factory pricing policies could be very powerful drivers of NRM behaviour. These differential pricing policies are already beginning to have an impact in the dairy industry.

4.3.9 Forestry

Forestry in Crown Lands. In the last twenty years, forestry in public lands and State Forests has shifted to sawlogs to pulpwood. In 1980, 80,000 m^3 of sawlogs were extracted; today, there is a licence for 27,000 m^3 p.a. of sawlogs and another for approximately 60,000 m^3 p.a. of pulpwood. 27,000 m^3 of these licences were not harvested in 2001. It is estimated that the logging sector in the Otways employs 60 to 80 people.

Logging of *native forest on private land* is controlled by Local Governments, working to a Code of Forest Practice, but compliance is patchy and enforcement under-resourced.

Softwood plantation forestry on public land of around 4,000 hectares was privatised in the mid-90's. Activity is strongly regulated by the Code of Forest Practice.

Softwood plantation forestry on private land is made up of sawlog plantations (around 6,000 hectares), but about two thirds of this is being swung over to blue gum wood chip production.

Blue Gum fibre plantation forestry on private land. Midway, Timbercorp, Treecorp/EBFL have had various forms of investment / leasing arrangements operating over the last 8 years. These have funded establishment of Blue Gum fibre plantations on properties on appropriate land within approximately a 140 km radius from the Port of Geelong or Portland.

Sawlog plantations on private lands. The West RFA Private Sawlog Farming Project is seeking to invest State funds in either establishing hardwood sawlog plantations or changing management regimes on current blue gum fibre plantations. They hope to replace the current native forest industry over the next 25 years. Sugar Gum plantations / shelterbelts on the Basalt Plains area legacy form the 1890's onwards. They have traditionally been used for firewood but have recently been recognised as a potential sawlog resource. Management practices would need to change to produce a long term sawlog resource. The Corangamite Farm Forestry Project has focused on this potential resource.

Agroforestry. Integration of farming and forestry, - with commercial and environmental benefits – for sawlogs, veneer logs, high quality furniture timbers and fibre. Currently expanding with strong promotion for Otway Agroforestry network and Corangamite Farm Forestry network.

The Government has identified 614,000 hectares as suitable for agro-forestry in the Corangamite (45 per cent of the total region). Hardwood processing plants for sawn timber are located at Colac and Geelong (2 mills). The Geelong plants also produce woodchips. Softwood processing plants for sawn timber are located at Cobden, Colac (two mills), Barongarook, Forest, Lorne, Geelong, Buninyong and Ballarat (3 mills). Plants at Ballarat also produce particle board and treated / preserved timber. The Geelong land also produces woodchips and pulp / paper; and the treated / preserved timber and pulp/ paper is produced at Colac.

4.3.10 Tourism

Tourism plays an important part in the economies of the Shires within the Corangamite catchment and is a viable and fast growing industry. The Surf Coast Shire is the gateway to the Great Ocean Road, a favourite destination for families (28%) and younger solos (23%). 2.2 million people visit the Great Ocean Road annually and the 12 Apostles is the most popular Victorian tourist attraction outside Melbourne. Apart from being a significant destination for international and domestic visitors, Surf Coast also accommodates a regional influx of weekend visitors who regularly stay in their holiday houses.

In 2000 Geelong received the most visitor overnight trips at 773,000, followed closely by Surf Coast, receiving 685,000. Seventy five per cent of overnight trips in the Surf Coast Shire were made in the Surf Coast West SLA. Other regions showing a high volume of tourists visiting include Ballarat (608,000 overnight trips) and Colac-Otway (355,000).

4.3.11 Property developers

Given the desire for economic and population growth amongst all of the shires in the region, property developers will be important partners in achieving desired growth outcomes. These organisations can have significant impacts on the structure, character and function of urban and rural residential developments. Favourable impacts will include retention and protection of remnant vegetation and wetlands, commitment to water sensitive urban design and encouragement of low water use parks and gardens. Conversely, less desirable impacts will be poorly designed drainage, destruction of habitat and encouragement of high resource-intensity settlements.

The CCMA has little contact with or links through to these organisations, although indirect links will occur through shire planners and water authorities.

4.4 Drivers of NRM behaviour

This final definition of discreet communities in the region, focuses on those entities or social and economic sectors whose normal activities lead them to be considered as important influences or 'drivers' of behaviour in natural resource management. This analysis relates to some of the social and economic assets and threats identified in the *Regional Catchment Strategy*.

4.4.1 Market and production influences

The uses of land and water resources in the production of commodities for economic gain are important drivers of NRM thinking and behaviour. Most of the existing and growing industries in the Corangamite Catchment are very natural resource-dependent, in either consumptive or non-consumptive terms. Increased industrial development and sophistication in production systems, driven by tighter operating margins, increased regulation and higher quality standards in the marketplace will impact how the natural resources affected by these industries are used.

These world-wide trends will result in both positive and negative impacts on the natural resources in the Corangamite catchment. It is important that these trends which are influencing thinking and behaviour from 'board-room to shop floor', and from 'plate to paddock' are clearly understood by those responsible for NRM outcomes. In the tables below, suggested deliberative actions, or likely trends are considered for possible positive and negative NRM outcomes. The objective in engaging with these industries will be to encourage positive outcomes and discourage negative outcomes

Suggested impacts through these influences are specified for the major sectors.

Major resource and secondary industries

Action/trend	Positive NRM outcomes?	Negative NRM outcomes?
Strategic and business planning	Environmental outcomes can be addressed in structured way	Environmental outcomes may not receive sufficient prominence
Actions to improve business efficiency and profit	Reduced resource use (water, power, land) is consistent with increased profit	Non-profit activities (e.g. environment) ignored in favour of profit-creating activities
Implementation of Environmental management systems, environmental training	Increased staff understanding and commitment, which spills over into the wider community	Lowest common denominator performance may be enshrined in practice
Establishment of performance targets	e.g. targets for reduced water and power use, and waste and greenhouse emissions	nil
Commitment to external programs through government and industry	Commitment to programs such as Greenhouse Challenge, indigenous employment	Environmental programs compete with social programs for company attention
Assistance to regional stakeholders	Assistance to community groups with environmental programs	Over-emphasis on high profile 'icon' activities to the detriment of more important needs

Water managers and providers

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Increased focus on water quality in water harvesting activities	Improved land and nutrient management practices in water catchments	Possible overuse of available supplies
Water storage and distribution activities	Flood mitigation through storage	Loss of environmental assets near storages and distribution lines
Water marketing activities	Pricing mechanisms can encourage more efficient water use efficiency	Over-use of water by some users, resulting in negative environmental impacts
Encouragement of water use efficiency	Reduced demand on region's water supplies, more water available for EWPs	nil
Water re-use and waste disposal	Reduced demand for 'first-time' water use	Possible impacts of nutrient-rich re-used water on environmental assets

Agricultural knowledge brokers

Action/trend	Positive NRM outcomes	Negative NRM outcomes
On-farm production R&D	If NRM outcomes are considered, may result in practices with less environmental impact	If only production outcomes considered, may result in practices with greater environmental impact
Encouragement of more intensive production	Improved focus by management on the production process will increase NRM awareness	High input/output agriculture may contribute to increased emissions to the environment
Encouragement of improved business management on-farm	Will improve financial capability to address NRM needs on- and off-farm	Inability to 'cost' NRM impacts will lead them to be ignored Structural adjustment will reduce the number of operating units
Encouragement of EMS/QA adoption	Improved on-farm environmental management	nil
Encouragement of better marketing of commodities	Feedback from customers requiring improved environmental management	Possible tension between market requirements and NRM best practice on-farm
Increased engagement of agri-business consultants	Structural adjustment as 'winners' purchase additional land will lead to improved capacity for NRM investment	Increased focus on high return practices may not address NRM needs

Intensive agricultural industries

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Increased output from pig, poultry, feedlot and horticultural industries	More efficient food production from available resources (water, carbohydrate)	Increased environmental burden from emissions and effluent
Actions to improve efficiency and profit	More efficient management of inputs and outputs	Temptation to short-cut on environmental management
Industry consolidation into fewer large enterprises	Improves ability for effective regulation and engagement around NRM issues Opportunity for use of improved waste management technologies	Increased intensity of emission and effluent production increases risk of damage from systems failure
Development of industry standards and codes of practice	Improved input and output management	May over-emphasise activities over outcomes
Increased focus on quality of products	Improved management standards can spill over into NRM management	Requirements for quality management may not be consistent with best practice NRM

Food processors

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Increased focus on food safety and quality	Improved chemical practices on-farm	On-farm management needs to meet quality standards may not be consistent with NRM needs
Focus on export markets increases price risk	Will encourage more professional and capable farm management	Increased price pressures may reduce commitment to NRM investments
Increased reward for consistent quality of inputs from farm suppliers	Will encourage better farm management practices, and will discourage poor production practices	On-farm management needs to meet quality standards may not be consistent with NRM needs
Increased specification of production requirements on-farm	Opportunity for best practice NRM to be captured in specified farming systems	NRM needs may not receive sufficient attention in farming systems design
Encouragement of structural adjustment in the farm sector	Increased financial and managerial capacity will encourage investment in better NRM on-farm	Reduced number of farms reduces community 'critical mass'

Forestry and Agro-forestry

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Withdrawal of logging from the Otways under political pressure	Very marginal increases in water supply	nil
Encouragement for plantation industry development by government	Increased native fauna habitat Increased economic diversity Employment opportunities	May put pressure on some groundwater supplies
Industry consolidation	More stable social environment	nil

4.4.2 Networks of relevance to NRM

Throughout the Corangamite region are a number of established and communicative networks. These networks represent professional services, research and development and industry-based groups. Across the region are 13 network groups representing a total of 65 landcare groups and up to 105 ethic-based groups. Network coordinators have been appointed to each of the network groups.

The networks of note include the following.

- Business and Environment Network – Members of this network are primarily involved in private industry in and around the Geelong region, including Shell, Alcoa and Ford. This network meet regularly usually invite a guest speakers to present research and recommendations for environmental management in the region.
- Upper Barwon Network Group - this group brings to attention the NRM and conservation issues affecting the Upper Barwon Region. This is a well regarded

group that has very good communication links and is known for asking pertinent and challenging questions.

- Heytesbury Landcare Network – this network is principally involved in the process of sharing information and issues as they affect the Heytesbury region.
- The Environmental Advisory Committee, Torquay – this group is a community-based group whose aim is to provide ideas for environmental projects appropriate for the community to the Surf Coast shire. Members of this committee are drawn from across the shire.
- Rural Development Committee, Torquay – the aim of this committee is to increase the profile of rural issues and people. The membership is predominately farmers and they provide an important link between the issues adversely the rural landscape in the Torquay shire and the Surf Coast Shire.
- Within the Golden Plains shire there are two well established and resourced catchment groups, Woady Yaloak and Leigh catchments. Both these groups have efficient communication processes and very high participation rates (90 per cent and 80 per cent respectively).
- Established throughout the Corangamite region are over 100 'Friends of' ethic-based Groups. These groups are mostly located around the major cities and rural towns. Geelong for example has Friends of Groups representing the environmental interests of the Barwon River as well as various parks and gardens.
- Ballarat Environment Council –supports 'Friends of' Groups representing the interests of the Lake Wendouree as well as other natural features in the region.
- Geelong and Environment Council – this peak body has developed an environmental management strategy addressing key environmental issues in the shire, including water management and greenhouse. The Council has the responsibility of bringing to the attention of the Shire of the City of Greater Geelong.
- A number of schools, particularly throughout the Otways and Moriac are committed to establishing Environment Centres whereby school children have the opportunity to remain aware of the health of the environment and ways in which they can work to improve and maintain environmental health.
- Companies and individuals who may regularly appreciate the environment, but not necessarily have formal commitment to its management include the golfing clubs, eco-tourist operators, B&B operators, bushwalking and regaining clubs.

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Growing sophistication in network operation	Leveraging investment in NRM from individuals, government and corporations	Temptation for government to shift responsibility to community groups
Increased contribution to public policy and strategy development	Government's actions more acceptable and supported locally	May make it hard for government to take 'tough' decisions based on considerations outside the region
Strategic alliances with production groups	Closer alignment between management of natural resources for production and conservation	nil

4.4.3 NRM governance and regulation

The nature of NRM relevant regulation, and the manner in which it is used differs widely across industries. At the one extreme, heavy industry is quite closely regulated - for example through environmental impact assessment, licensing of activities, monitoring of emissions, regular reporting and occasional audits. Prosecutions for performance breaches are not uncommon, and most large industries employ specialist environmental staff to ensure compliance with regulations. Significantly, the native timber harvesting industry also operates in this type of environment.

At the other extreme, environmental regulators have little involvement in day-to-day broad acre agricultural production. Only the most flagrant of breaches in areas such as illegal clearing, soil erosion and water pollution attract attention. Monitoring and reporting requirements are not normally relevant at farm scale.

Between these two extremes are the water industry, intensive animal industries (including dairying) and horticulture and the food processing industry. Dominated initially by needs for environmental safety, these industries which increasingly are made up of fewer larger operations must meet environmental standards for on-site processes and waste and emissions management. Given the visibility of these industries and growing public concern about their potential environmental impacts, it is reasonable to assume that the requirements for sound environmental performance will be 'ramped up' with sanctions imposed on those unable to comply. This compliance is likely to be self-imposed at industry scale and subject to occasional audit by the regulatory authority.

However, given fiscal constraints, it is unlikely that broad-acre agriculture will, within the foreseeable future be subject to increased regulation. The structure of these industries, with their many thousands of individual operations mitigates against centralised regulation.

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Increased Commonwealth interest in NRM	Increased Commonwealth investment in NRM outcomes	Potential for miss-allocation of investment
Reduced budgets for state NRM agencies	May lead to more shire-based activity under pressure from local communities	Reduced capacity for audit, regionally relevant R&D, support for community networks
Increased focus on off-site impacts on public goods	Focus on water quality and biodiversity will increase	Less investment placed on on-site NRM issues (e.g. soil acidity, soil structure decline)
Promotion of standards and Codes of Practice in industry	Improved NRM management by all land and water users Export licenses address environmental performance	Standards my enshrine lowest common denominator in management

4.4.4 Local governance

The descriptions of the local government areas provided in Section 4.1 show that most are growing in population and socio-economic diversity, with growth heavily driven by the natural attractions of coast and range, and through diffusion from the major population

centres of Melbourne, Geelong and Ballarat. Local governance has a critical role to play in managing these demographic and land use changes, through their planning roles and development strategies. All Councils have active policies to encourage growth in economic activity and desire more people and services. They are actively involved in land use planning and encouragement of development. At the same time Councils are also using planning provisions to restrict the conversion of prime agricultural land to rural residential use and protect locally and regionally important environmental values. However, anecdotal experience suggests that the desire for socio-economic growth is likely to be putting some environmental values at risk.

Suggested implications for NRM outcomes are shown below

Strategy development and implementation

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Strategies for socio-economic growth	Increased resources for environmental management from greater economic activity	Increased pressure on environmental values and depletion of natural resources
Support for landcare and environmental groups	Activity in protecting and restoring environmental assets	'responsibility shifting' to volunteers, dependence on external funding support
Planning for land use change	Opportunity to secure environmental assets	Loss of environmental assets to rural residential/ industrial land use
Support for community social development	Building social capital and available for NRM	Nil

Land use planning and property development

Action/trend	Positive NRM outcomes	Negative NRM outcomes
Increased demand for land and water resources for residential and rural residential needs	Increased private and public sector investment into the region including into environmental management	Loss of productive agricultural land, increased pressure on water resources, increased entry costs, weeds etc
	More appropriate use of land and water resources	Pressure from developers for relaxed standards
Growth philosophies in shires result in changed land use and demographic change	Shires have increased economic capacity to invest in NRM	Environmental considerations may be overlooked in pursing growth philosophy
	Incoming residents may have a more 'NRM-sensitive' ethic	Resentment of change by long-term residents reduces community cohesion
Planning rules specify habitation requirements	Environmental requirements can be specified before land use change occurs	Pressure from developers for relaxed standards

4.4.5 Icons

The Corangamite region has a number of important natural icons that have the capacity to 'connect' people with their environment. Five that stand out are the Barwon River, the Great Ocean Road, the Otway ranges, 'the Twelve Apostles' and the platypus. The

Barwon River is a feature of the City of Geelong. Residents often use the river for recreational and leisure purposes. There has been a recurring of Blue-green algae and siltation in the river that is drawing the attention of residents.

The Great Ocean Road is one of the most magnificent and scenic journeys in Australia. For this reason it attracts an enormous amount of traffic on a daily basis. A strategy for the future management and protection of the road and surrounding environment, as well as road safety is almost complete. In Ballarat, Lake Wendouree is central to many residents. The Lake is used for boating, has walking and cycling tracks. Many residents use the resource for leisure, exercise, research and enjoyment. Most rural towns and centres focus on local features whether they be geographic, such as the Volcanic Lakes in the Corangamite shire or a particular species such as the Yellow-bellied parrot in the Moorabool shire.

5 Conclusions

5.1 The Corangamite population is growing and aging

The 2001 census data show that the region is growing in population at similar rates to that occurring nationally. Further, in line with national trends, the population is aging, with a significant increase in the number of people aged 60 or more predicted.

The population increase is unevenly spread. The cities of Ballarat and Geelong are obviously growing organically, with their peri-urban areas growing faster. The Coast is experiencing very rapid growth, despite statistics showing that only half the residences in some towns being permanently occupied. Where the statistical information allows examination trends in rural areas, it is clear that the population is at best stable or falling – particularly in the broad-acre areas in the north of Corangamite and Colac-Otway Shires.

5.2 The importance of secondary and tertiary industries

While the popular perception, particularly amongst rural dwellers, is of a region dependent upon rural industries for its livelihood, this perception is illusory. The statistics for employment presented in Table 8 show that the majority of the region's workforce are employed in the secondary and tertiary sectors of the economy. While over 60 per cent of the workforce are employed in these sectors, only 6 per cent work in agriculture and those parts of the region with high local dependence on agriculture are the only parts of the region with declining populations. Furthermore, although it is difficult to obtain quantitative data, it is clear that the secondary and tertiary sectors are expanding. Much of this activity is centred on the urban centres of Ballarat and Geelong, with a spread in neighbouring towns. Tourism, and important separate component of the tertiary sector is growing very rapidly along the coast.

5.3 The Corangamite population is urbanising

As a corollary of the previous conclusion, the focus of the Corangamite population is becoming more urban in its employment orientation, its identification with place and people and in its thinking about natural resources. Although the growth of rural residential settlements and towns close to the cities is putting people into the rural settings, the people generally work in the urban economy, and in their home lives are creating their own cultures and 'stories'. Surveys show that urban dwellers have different aspirations and concerns in NRM to those held by rural people. The other area of distinct growth is in coastal development, which owes little to the rural heritage and landscapes of the Corangamite and is focused on tourism, coast, sea and forests. While these influences are growing, structural adjustment in the broad-acre agricultural industries is reducing the number of people engaged in these activities on a day-to-day basis. It is likely that growth industries in agriculture like dairying, cropping and horticulture will intensify, become more capital than labour dependent, will be more sophisticated in management and more closely tied into production and marketing networks.

5.4 Use of natural resources is diversifying

Natural resources are being 'used' in the following ways in the Corangamite

Economic gain through consumption

- In transforming inputs to outputs – such as in resources extraction and processing, forestry and agricultural production.
- In assisting in production activities – such as Shell using 2GL water per annum (5 per cent of Barwon Water's allocation) to assist in its refining activities.

Economic gain through non-consumptive use

- Tourism and recreation – the Great Ocean Road, Otway Ranges.
- Cultural heritage – historical connections.

Day-to-day life support

- Water and energy for domestic use

Cultural enrichment through non-consumptive use

- Indigenous land values and cultural heritage
- Wilderness experiences – Otway Ranges
- Rural residential living – peace solitude, quiet.
- Intrinsic valuation – the existence value of physical and biological diversity.

5.5 Pressures on natural resources are high and increasing

Pressures on the natural resources are increasing as a simple function of population increases, demands for higher levels of servicing, increased demand for water, increased access to the region and increased intensification of agriculture. Management of resource allocation for competing uses will be a growing activity for state and local governments in the area.

These pressures can be ameliorated by improved intensity of resource use – such as Barwon Water's objective to implement measures to improve water use efficiency, reduced resource use per unit of output in secondary industry and the growth of economic activity that relies on non-consumptive use of resources – such as tourism. In other situations, activities that can have 'win-win' economic and NRM outcomes are being encouraged, such as agro-forestry.

5.6 Spatial diversity in natural resource use and impacts is high

The spatial use and management of natural resources is very diverse. A geographical approach to defining 'NRM communities' will only be useful at the coarsest scale – such as separating the cities (Geelong and Ballarat), the coast and the Otways and the farming lands. The flaws in this approach are that the developments in cities and the coast are now affecting land use and management far beyond their boundaries. Conversely, management of agriculture is affecting water quality and availability in the cities. Finally, the diversity within the socio-economic make-up of these three coarse 'mega-communities' is likely to be at least as great as that between them. For example, while it

is reasonable to assume that rural residential areas are a distinct community, it is likely that trying to address these people as a homogenous group will ignore enormous differences in the values, views and behaviours in NRM. Spatial diversity is only likely to increase through time, except perhaps in the broad-acre areas to the middle and north west of the region and in the Heytesbury area where use, culture and NRM behaviour is likely to reasonably homogenous.

5.7 Segmentation should recognise mainly occupation and NRM drivers

In Section 4, four types of segmentation are proposed – by local government, by geographical location, by occupation and by their capacity to influence or drive NRM behaviour. All approaches have advantages and disadvantages in a strategic sense. Viewed from the perspective of the CCMA's need for engagement, the suggested definition of 'communities' must recognise the opportunities for the most effective and efficient way in which NRM outcomes across the region can be influenced. This is likely to occur through a blend developed by identifying the main occupations and industries and the key organisational drivers of NRM behaviour.

5.7.1 Selected 'communities' in the region

The ten 'mega-communities' defined below are shown with examples of their component parts and entities. In the next stage of the project, the values, attitudes and beliefs of these mega-communities will be researched and described.

Mega-community - Major resource and secondary industries

- Major companies (Ford, Shell, Alcoa, BHP Billiton etc)
- Geelong Business Networks (Environment Network, Chamber of Commerce etc)
- Utilities (electricity, gas)

Mega-community - Tertiary industries and service providers

- Health services
- Education services
- Community development services

Mega community - Managers of land use change

- Shires (CEOs, planners, economic and community development people etc)
- State government agencies involved in land use and management (DNRE, DOI etc)
- Private sector developers
- Water managers and providers

Mega-community - Support organisations for agricultural land and water use

- Food processors (e.g. Regal, Steggles, Bonlac)

- Agricultural knowledge brokers (e.g. consultants, SFS, West Vic Dairy)
- Agricultural service providers (e.g. Pivot, Summit)
- NRM networks in Ag areas (Heytesbury, Leigh etc)

Mega-community – Rural industries and communities

- Rural towns (e.g. Colac and Camperdown)
- Heytesbury dairy farms
- Broad-acre croppers and grazers
- Intensive agriculture – horticulture, poultry, pigs

Mega-community – Forestry

- Native timber harvesting
- Agro-forestry
- Timber processing

Mega-community - Urban settlers in rural/coastal areas

- Otway communities
- Peri-urban communities associated with Geelong and Ballarat
- Coastal towns

Mega-community – Support organisations for environmental values

- Geelong Environment Council
- Ballarat Environment Council
- Environmental 'ethics' groups
- Indigenous groups

Mega-community – Urban populations

- Geelong
- Ballarat

Mega community - Tourism

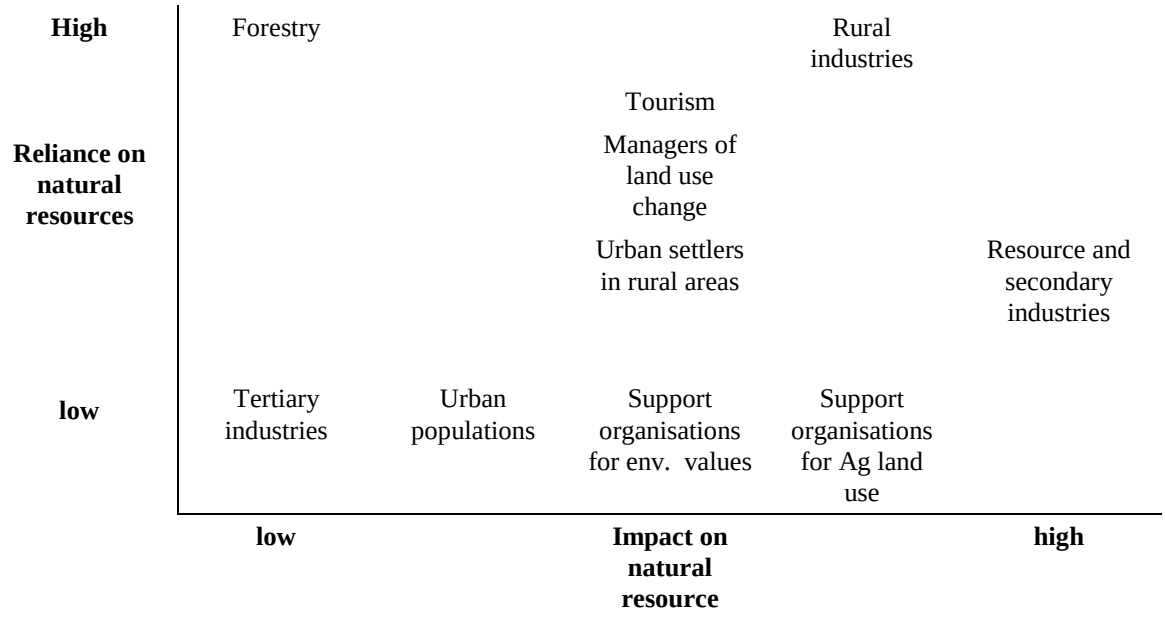
- Tourism managers – public and private sectors
- Tourism developers

5.7.2 Ranking the communities for importance

In the following figures, the mega-communities defined above are ranked on the Y-axes for their reliance on natural resources, their socio-economic contribution to the region, and finally their importance to the CCMA, and on the X-axis for their relative impact on NRM outcomes.

Figure 11 presents the mega-communities according to their use of natural resources and impact on natural resources. 'Use of' natural resources includes a direct reliance on natural resources for production as in agriculture or forestry, or a reliance on natural resources as a source of satisfaction, such as for tourism or rural lifestyle living, or a reliance on natural resources as criteria for decision making about economic development – as in land use planning. This analysis ignores the natural resources consumed by people in maintaining their day-to-day lives (water, power).

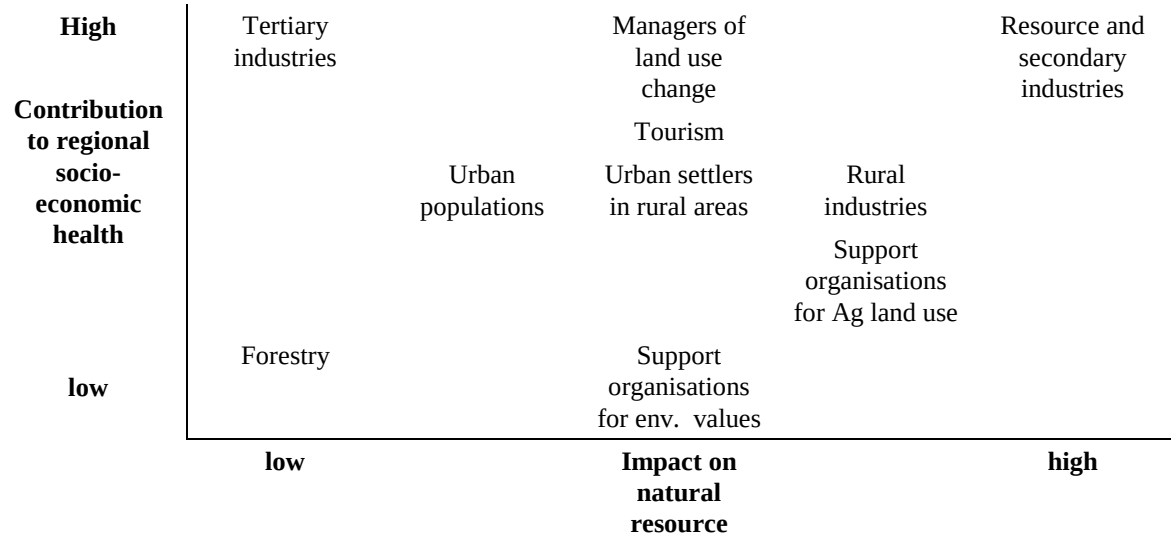
Figure 11: Relating reliance on and impacts on natural resources



This simplistic analysis proposes that the resource impacts of the major industries, principally located in Geelong, Ballarat and along the south coast will be highest, followed by more observable impacts of the rural industries, whose decisions will be driven increasingly by the support organisations. Both are also high users of the natural resources of land and water. At the other end of the scale, the tertiary industries are low users and low impactors. In between, tourism, which is mainly a non-consumptive user of resources, is reliant on natural resources in good condition, and can have moderate impacts overall and high in some specific locations.

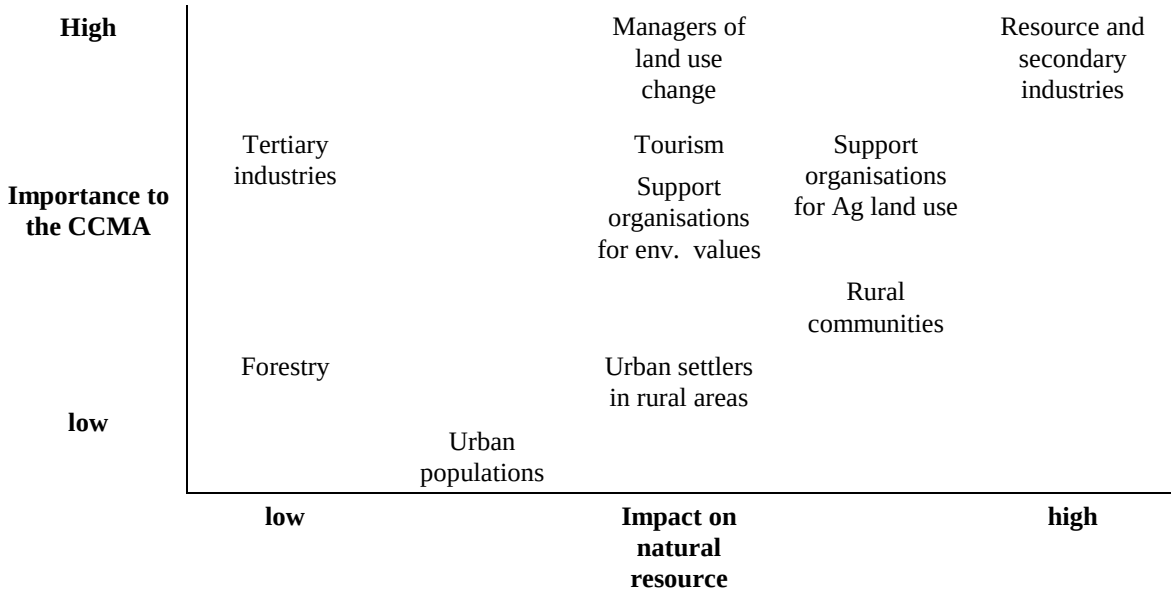
In Figure 12, the pattern changes when the Y-axis is changed from reliance on natural resources to contribution to regional socio-economic welfare. As argued in previous sections, the major contributors to socio-economic health in the region are the secondary and tertiary industries, with tourism a specialist tertiary industry that has been singled out because of its rapid current and predicted growth. The rural industries, and forestry, while locally important in parts of the region are making a small, and declining contribution to regional performance. Managers of land use change are able, through their decision-making to have significant impacts on how the regions develops in both economic and social terms.

Figure 12: Relating regional socio-economic importance and impact on natural resources



In Figure 13, the focus is shifted to the importance of each mega-community to the CCMA by changing the Y-axis. The analysis in the previous two figures is used to locate the mega-communities on the Y-axis.

Figure 13: Relating importance to the CCMA and impact on natural resources



It can be surmised that the mega-communities that contribute most to regional welfare but which have high impacts should be an important point of engagement. These high return-

high impact communities have the capacity to direct resources into NRM. Conversely, relatively low return-high impact occupations will require attention to encourage closer alignment between these two outcomes. Clearly high return-low impact occupations can be encouraged, while low return-low impact occupations are already sufficiently benign.

This analysis suggests that the major resource and secondary industries and the managers of land use change are very high priority for engagement. They impact natural resources, either directly or indirectly and contribute substantially to social and economic outcomes. At the next level, support organisations for agricultural land use will be increasingly important drivers of agricultural decision-making, particularly those that provide market signals that have NRM implications. Engagement with this sector provides the avenue into the rural industries.

Tourism which is a major growth industry has impacts on natural resources, but also relies on these resources to attract visitors. Finally, the important tertiary industries have limited impact, but are important generators of socio-economic well-being. The support organisations for environmental values have a beneficial impact on natural resources, but are probably not as important for CCMA to engage with as those organisations with a greater reach into economic activities.

Below these layers, the mega-communities are either largely benign as in forestry, or too dispersed for direct engagement as in the rural industries and urban and peri-urban populations.

6 Acknowledgements and References

6.1 Acknowledgements

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- Staff at the Department of Natural Resources and Environment and the Australian Bureau of Statistics for information used in this report.
- Interviewees for their hospitality and willingness to share their knowledge and opinions with the consultant team, often at relatively short notice.
- Ted Rowley and Ross Colliver for their helpful comments and suggestions on content and presentation.

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Annex A

Organisations and people consulted

Organisation	People interviewed
Corangamite Catchment Management Authority	Bob Carraill, Chairman CCMA Don Forsyth, Chief Executive Officer, CCMA Peter Codd, Program Manager, National Action Plan Tony Overman, Program Manager, Biodiversity Sally-Anne Mason, Program Manager, Land David May, Program Manager, Water Resources Tim Corlett, Senior Catchment Officer
Shire of Surf Coast	Mark Harwood, Senior Statutory Planner Di Mahoney, Community Development Officer, Sustainability Unit
Shire of Golden Plains	Andrew Bishop, Manager, Environment
Shire of Colac-Otway	Wendy Briggs, Coordinator, Environment
Shire of Corangamite	Neil Haydon, Manager, Planning, Environment and Building Services
Shire of Moyne	Bruce Couch, Mayor
City of Greater Geelong	Bernie Cotter, Manager, Environment and Natural Resources
Shire of Moorabool	Allan May, Manager, Environment
City of Ballarat	Hedley Thomson, Manager, Environment and Natural Resources
Central Highlands Water Authority	John Barnes, Chairperson Judith Coull, Director
Barwon Region Water Authority	Paul Northey, Senior Planner, Water Resources and Environment
South West Water Authority	Doug Gardner, Chief Executive Officer
West Vic Dairy	Tim Nelson, Executive Officer
Southern Farming Systems	Colin Hacking, Executive Officer
Department of Natural Resources and Environment	Amanda May, Project Officer, Social Capacity Lyneve Whiting, Manager, Social Capacity

Annex B

Population projections by shire

Population projections for Ballarat, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	22,627	21,685	20,838	20,411	-2,216	-10
20 – 39	22,578	22,482	22,579	22,350	-228	-1
40 – 59	21,486	21,742	21,607	21,074	-412	-2
60 – 79	12,625	14,375	16,630	18,886	+6,261	+50
80 +	3,719	4,282	4,569	5,027	+1,308	+35
Total	**83,035**	**84,566**	**86,223**	**87,748**	**+4,713**	**6**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Colac-Otway, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	5,197	4,704	4,402	4,254	-943	-18
20 – 39	4,795	4,761	4,690	4,553	-242	-5
40 – 59	5,948	5,966	5,897	5,683	-265	-4
60 – 79	3,689	4,060	4,620	5,126	+1,437	+39
80 +	1,002	1,152	1,185	1,220	+218	+22
Total	**20,631**	**20,643**	**20,794**	**20,836**	**+205**	**+1**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Corangamite, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	3,333	2,754	2,325	2,069	-1,264	-38
20 – 39	2,823	2,562	2,367	2,209	-614	-22
40 – 59	3,613	3,412	3,102	2,758	-855	-24
60 – 79	2,808	3,149	3,468	3,670	862	+31
80 +	641	718	782	872	231	+36
Total	**13,218**	**12,594**	**12,043**	**11,578**	**-1,640**	**-12**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Golden Plains, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	4,629	4,499	4,457	4,577	-52	-1
20 – 39	3,237	3,411	3,660	3,888	+651	+20
40 – 59	5,292	5,489	5,602	5,671	+379	+7
60 – 79	1,996	2,616	3,324	3,994	+1,998	+100
80 +	186	233	273	348	+162	+87
Total	**15,340**	**16,248**	**17,316**	**18,478**	**+3,138**	**+20**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Greater Geelong, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	47,508	45,832	44,016	43,144	-4,364	-9
20 – 39	49,044	49,950	50,521	50,028	985	+2
40 – 59	49,160	49,427	48,974	48,048	-1,112	-2
60 – 79	29,712	34,138	39,594	44,983	15,272	+51
80 +	8,260	9,337	9,714	10,318	2,058	+25
Total	**183,683**	**188,685**	**192,819**	**196,521**	**12,838**	**+7**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Moorabool, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	2,489	2,358	2,238	2,191	-298	-12
20 – 39	1,918	1,908	1,958	2,008	90	+5
40 – 59	2,525	2,572	2,549	2,499	-26	-1
60 – 79	1,218	1,624	2,053	2,439	1,221	+100
80 +	187	223	255	306	120	+64
Total	**8,337**	**8,684**	**9,054**	**9,443**	**1,106**	**+13**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Queenscliffe, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	644	564	498	473	-171	-27
20 – 39	686	648	610	583	-103	-15
40 – 59	1,023	1,062	1,009	972	-51	-5
60 – 79	983	1,045	1,185	1,288	+305	+31
80 +	262	291	297	288	+26	+10
Total	**3,598**	**3,610**	**3,599**	**3,604**	**+6**	**+0**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Surf Coast, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	5,195	4,904	4,746	4,809	-386	-7
20 – 39	4,927	5,215	5,373	5,560	+633	+13
40 – 59	6,570	6,956	7,106	7,146	+576	+9
60 – 79	3,318	4,138	5,157	6,237	+2,919	+88
80 +	869	997	1,064	1,195	+326	+38
Total	**20,879**	**22,210**	**23,446**	**24,947**	**+4,068**	**+19**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for Victoria, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	1,238,749	1,197,963	1,157,408	1,134,506	-104,243	-8.4
20 – 39	1,436,344	1,440,239	1,445,120	1,446,466	10,122	+0.7
40 – 59	1,360,856	1,409,474	1,442,879	1,440,260	79,404	+5.8
60 – 79	731,954	848,488	974,857	1,100,453	368,499	+50.3
80 +	910,739	1,051,394	1,190,576	1,337,884	427,145	+46.9
Total	**5,678,642**	**5,947,558**	**6,210,840**	**6,459,569**	**780,927**	**+13.8**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Population projections for regional Victoria, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	356,065	332,956	313,195	304,034	-52,031	-14.6
20 – 39	315,133	311,502	312,256	311,974	-3,159	-1.0
40 – 59	382,655	386,770	382,401	369,755	-12,900	-3.4
60 – 79	230,679	270,080	315,906	359,577	128,898	+55.9
80 +	288,288	336,523	387,081	438,475	150,187	+52.1
Total	**1,572,820**	**1,637,831**	**1,710,839**	**1,783,815**	**210,995**	**+13.4**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

Annex C

Questions raised in the Regional Catchment Strategy workshops

What is the planned pattern of residential development in each shire, to 2020?

Population predictions for the eight Shires within the Corangamite catchment for the years 2006 to 2021 in five year intervals are shown in Table 5 (repeated below). The trends are obvious – either no growth or even population loss in the more rural shires of Colac-Otway and Corangamite, with steady growth in Ballarat and Geelong, and rapid growth in the neighbouring shires to these cities. In short, it is clear that the Corangamite catchment will become increasingly urbanised and urban-focused, with a smaller percentage of the population identifying with the traditional rural industries on a day-to-day basis.

Population projections for the Corangamite Catchment, 2006 to 2021

Shire	2006	2011	2016	2021	15 yr Change	% Change
Ballarat	83,035	84,566	86,223	87,748	4,713	**+5.7**
Colac-Otway	20,631	20,643	20,794	20,836	205	+1.0
Corangamite	13,218	12,594	12,043	11,578	-1,640	**-12.4**
Golden Plains	15,340	16,248	17,316	18,478	3,138	**+20.5**
Greater Geelong	197,509	202,887	207,332	211,313	13,804	**+7.0**
Moorabool	8,337	8,684	9,054	9,443	1,106	**+13.3**
Queenscliffe	3,598	3,610	3,599	3,604	6	+0.2
Surf Coast	20,879	22,210	23,446	24,947	4,068	**+19.5**
Total	**362,546**	**371,442**	**379,807**	**387,947**	**25,401**	**+7.1**
Victoria Total	*4,946,688*	*5,099,070*	*5,235,983*	*5,359,116*	*412,428*	*+8.3*
Regional Victoria	*1,342,141*	*1,367,751*	*1,394,933*	*1,424,238*	*82,097*	*+6.1*

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

What is the trend in population growth in each part of the region? The trend in ageing of the population? What are the implications for health and community services?

In common with the rest of Australia, the Corangamite has a steadily aging population. The Shires in the Corangamite catchment expected to experience the greatest percentage increase in aged residents are Colac-Otway, Corangamite and Queenscliffe.

As shown below, the trend to increased age is significant. Whereas there are predicted to be 76,000 people older than 60 in 2006, there will be 112,000 in that age group in 2015.

Providing facilities and care for this increase in the older age classes will stress shires and health and social security providers.

Population projections for the Corangamite catchment by age group, 2006 to 2021

Age Group	2006	2011	2016	2021	15 yr Change	% Change
0 – 19	94,622	90,300	86,510	84,927	-9,695	-10.6
20 – 39	93,008	93,937	94,569	94,179	1,171	+1.3
40 – 59	98,616	99,626	98,456	96,850	-1,766	-1.8
60 – 79	59,349	68,145	79,031	89,624	30,275	+53.7
80 +	16,951	19,434	21,241	22,367	5,416	+29.4
Total	**362,546**	**371,442**	**379,807**	**387,947**	**25,401**	**+7.1**

Source: Department of Infrastructure, "Victoria in Future 1996 – 2021"

What are the aspirations of urban dwellers for the environment?

The level of overall environmental concern in the Australian community seems to vary quite considerably over time, with some inverse relationship suggested between the strength of the economy and level of environmental concern. However the percentage of people concerned about environmental problems is relatively stable at about 70 per cent.

There are differences between urban and rural people's environmental concerns. More urban people (72 per cent) than rural people (68 per cent) are concerned about environmental problems, with the average level of concern significantly higher amongst urban folk. Pollution prevention, destruction of trees/ecosystems and waste recycling were the dominant environmental concerns for urban residents, and they had little concern for land degradation issues. Conversely, rural residents were more concerned about land-based issues such as erosion, salinity and degraded catchments and rivers.

In summary, it would appear that urban people's aspirations for the environment are focused on clean air and water, resource conservation (recycling) and retention of trees and ecosystems.

(Source: Agriculture Victoria (2001). *Community attitudes to environmental issues: Statewide and regional overview*. Monitoring Report 44, Centre for Land Protection Research).

What is the dairy industry's scenario for 2020?

The dairy industry in the Corangamite catchment has undergone significant growth over the past decade and has the potential for further growth in the future. Significant investment has been made in processing and input supply infrastructure to accommodate for the large increases in milking cows. Ninety eight per cent of the dairy industry within the Corangamite catchment resides in the Shires of Colac-Otway (29 per cent) and Corangamite (69 per cent). From 1991 to 1997 there was a 23 per cent increase in the number of milking cows from 187,862 to 231,594 with six out of the thirteen regions showing a greater than 30 per cent increase. In 1997, the south west dairy industry produced 20 per cent of Victoria's total production. There are approximately 1,400 producers in the Corangamite catchment.

The industry in western Victoria is poised for further growth, with most commentators predicting that dairying will be 'priced out' of the northern irrigation areas in Victoria, with a shift in the locus of activities to rain fed pastures. Regional milk production has been increasing by 10 per cent per annum through increased herd size and production per cow, with slightly declining farm numbers. There is significant potential for growth in production, through improved productivity per hectare and with conversion of current wool and beef grazing land to dairying. It is predicted that average herd size will increase to 200 milking cows by 2005.

The industry will continue to experience market pressures that will encourage larger herd sizes and structural adjustment as less efficient operators leave the industry. It is predicted that while production could double over the next 10 years, the number of businesses could be halved. Because economies of scale require producers to ramp up from 250 to 400 cows, there will be an increasing number of large dairies with highly sophisticated production and milking systems.

The industry faces enormous environmental challenges which are the focus of much R&D and extension. For example, West Vic dairy is pursuing programs to reduce nutrient loss from farms, to improve soil structure, to fence riparian and riparian habitats and to meet EPA standards for dairy management.

(Source – West Vic Dairy)

What is the past and likely growth rate of tourism across the region? How have these figures been arrived at?

Tourism in the Great Ocean Road Region, which covers the southern half of the Corangamite Region is worth $940 million. In 1996, tourism in the towns and rural areas along the Great Ocean Road provided 14.7 per cent of the total employment. In 1998, this region attracted 2.7 million overnight visitors and 5.4 million day visitors. Although the data are not available for the same years, comparing these numbers to those in Table 30 suggests that this part of the Corangamite region captures nearly all the overnight stays and about 70 per cent of the day visits.

Local government in the region estimates the annual growth in visitor numbers to be 15 per cent per annum. International visitation to the area was 75,000 in 1991, 140,000 in 2000 and is predicted to be 250,000 in 2110. Traffic along the Great Ocean Road is forecast to grow at 4 per cent per annum. Assuming these growth rates suggests that the value of tourism to the region will double every 6 to 10 years.

(Source – Great Ocean Road Discussion Paper 2001)

Where are the hotspots for tourism growth in the region?

It is clear from the statistics in the previous section that the Great Ocean Road region dominates tourist activity in the Corangamite catchment. In 1998, the Great Ocean Road region which runs from Geelong to the SA border attracted 2.7 million overnight visitors and 5.4 million day visitors. A total of 120,000 vehicles annually visit the Port Campbell area to see the 'the Twelve Apostles'. In 2000/01, 1.95 million people visited the Port Campbell National Park. Inland, the major attraction is 'Sovereign Hill' at Ballarat, with

1.2 million day visitors. Geelong and the Bellarine Peninsula including Queenscliffe is also an important destination with 2.4 million day visits in 2000.

(Source – Great Ocean Road Discussion Paper 2001; and Table 30)

Is Landcare the only mechanism to achieve social development and better environmental outcomes? What mechanisms can support people who don't join groups?

Landcare is active in the Corangamite catchment, with 40 per cent of properties in the Corangamite catchment represented in a Landcare group. The City of Greater Geelong has identified over 90 organisations within its jurisdiction that have environment as either their main focus or as part of their agenda. In Ballarat, the LINCS program is active and there are a number of urban environmental groups.

Activity in these groups seems to be maintained at an acceptable level, although anecdotal opinion suggests that this is still a legacy of NHT funding. Further the potential for 'burn out' in Landcare groups is a concern. However, loss of members is tolerable and seems to be being replaced by people new to the area who are an important source of new members. In summary, the networks of environmentally-focused groups are an important contributor to environmental outcomes.

Diversity in avenues for individuals and groups to engage in NRM activities is important. For example, a recent initiative in Surf Coast shire to provide small amounts of funding to assist individuals with biodiversity conservation prompted a large response – over 100 interested persons many of whom had no involvement in Landcare.

At the macro-scale, it is also clear from the analysis in Section 4.4 that there are other drivers of social development and behavioural change that can potentially make a large contribution to positive NRM outcomes. Industry programs in Geelong can reduce resource use and encourage NRM thinking amongst their workforces, which will spill over into the wider community. They may get their employees directly involved in NRM projects outside their operating domain. Local government strategies can emphasise environmental outcomes and enshrine community aspirations in planning rules and through direct investments in environmental outcomes. Imperatives such as the need for improved dairy effluent management can direct people's thinking toward larger NRM needs.

(Source: Alan Curtis and Marike Van Nouhuys (1999). *A summary of Landcare group support needs in South West Victoria*, Charles Sturt University.

How will the changing make-up of the region's communities affect willingness by farmers to include land management as a basic element of their business?

The findings in the study undertaken by Agriculture Victoria are that rural residents concern for environmental problems is less than and different to those expressed by urban residents. However the data also show that the gap in concern is narrowing, as the level of rural concern increases. The difference in emphasis is interesting. The urban focus on pollution, waste management and ecosystem condition suggests concerns about personal health, matched with non-utilitarian concerns about 'nature'. The rural focus on land and

water degradation and salinity suggests a greater concern for the economic impacts of environmental problems – which is hardly surprising.

It is difficult to speculate how the increased urban identification of the Corangamite community will impact farmers' land management behaviour. Based on occurrences elsewhere, it is possible that some conflicts may occur over issues such as odour, chemical use and dust. Conversely, increased rural residential living may result in these new communities adopting current farming norms in respect of land management. Given the attention being paid by shires to careful planning to ensure retention of agricultural land and enterprises, a third possibility is that the two communities will impact little upon one another on a day-to-day basis.

It is likely that the impacts will occur through secondary influences – such as the changing make-up of local governance in 'urbanising' shires such as Golden Plains, Surf Coast and Moorabool. These trends are already evident with examples provided from one shire where rural residents resent what they perceive as a takeover of local government by non-rural councillors who implement policies that are regarded as too 'green' by the farming community. Given population predictions, a trend to a more urban style of local government will be irresistible and could result in farmers being required to address NRM issues that the community judges to be important. This scenario is occurring in many peri-urban areas in Australia. One common response from farmers who are uncomfortable in these situations is to relocate away from the encroaching urbanisation influences.

(Source: Agriculture Victoria (2001). *Community attitudes to environmental issues: Statewide and regional overview*. Monitoring Report 44, Centre for Land Protection Research).

How do cohesive innovative communities change behaviour?

Cohesive communities change behaviour by establishing norms for how people should behave towards each other, their community and in day-to-day activities. Strong value-based cultures develop in communities that 'inform' their members by a range of means how the members of that community should think and behave. Where a community possesses a series of norms that govern behaviour, newcomers will buy into these patterns of behaviour. The unspoken rules of behaviour are subtly rewarded by the community and breaches may be 'punished' – sometimes not subtly. The important point is not whether communities can be cohesive, but what norms they adopt and pursue. Cohesive communities can have thinking and behavioural standards that are sympathetic to NRM outcomes, or directly opposed to them. At the same time that communities are investing in processes to build cohesion, they also need to identify and encourage values and norms that are sympathetic to NRM outcomes. Clearly, some desired norms for NRM include:

- commitment to long-term thinking about environmental outcomes (as opposed to short-term thinking).
- commitment to leaving the environment is a better state that it was found
- greater acceptance of personal responsibility for one's actions (e.g. in water and power use, waste management)
- willingness to suspend judgement on new ideas, matched with enthusiasm for testing them.
- acceptance of diversity in thinking and practice.

- preparedness to 'punish' poor NRM behaviour regardless of other considerations.

How do we engage the 90 per cent of rural communities not involved in Landcare groups? Do local champions work? What's the psychology of change in attitude and behaviour?

Firstly, the study done in 1999 (*A summary of Landcare group support needs*) states that 40 per cent of rural properties are represented in a Landcare group.

Secondly, the question above may not be the right one to ask. Instead it may be better to ask whether the rural communities not involved in Landcare groups should be engaged directly (primary contact) or indirectly through a third party (secondary contact). The analysis of the geographical and industry based communities and the key NRM drivers suggests that indirect engagement is likely to be more sensible strategically and a more effective use of scarce resources. Apart from Landcare groups, suggested points of contact will occur through:

- market and production drivers – Agricultural knowledge brokers, food processors, agricultural service providers, intensive agriculture production groups, and water authorities.
- planning mechanisms at state and local government level who are involved in managing land use change and establishing standards for land management and industry performance.