1 Population Trends and Access to Essential Services

Population and socio-economic trends within the Avon River basin (ARB) provide insight into the capacity of the community to engage in effective natural resource management (NRM).

Presented below is an analysis of population trends in the ARB over 2000–2010 (based on Australian Bureau of Statistics data) highlighting spatial trends in population. Population thresholds for towns within the ARB were assessed based on access to selected essential social services, these being:

- *Health services*
- *Hospital*
- *District High School*
- *Police Station*
- *Football club.*

1.1 Background

Population dynamics within the ARB may result in an increase or decrease in demand for infrastructure and resources, including access to water, electricity and other essential services. Increasing urban and peri-urban populations will impact the local environment, including waterways and rivers, and in particular present risks to water quality and management of riparian vegetation (WNRM 2011).

Population predictions for the ARB display an uneven spatial pattern. The population of the Avon Arc is forecast to increase by approximately 20,000 people, from its current population of 23,400, over the next two decades. In contrast, populations are predicted to decline over the remainder of the ARB's agricultural areas (WAPC 2001).

Population analysis undertaken by Tonts (2004) indicates a 7–8% decline in population across 11 towns of the central Wheatbelt (Central and Eastern sub-regions) within the ARB between the 1980s and 1990s. Individual towns experienced reductions in population of up to 34% in the period 1981–2001 (Tonts 2004). Current trends suggest ongoing reductions in populations within the Central, Southern and Eastern sub-regions, reflecting underlying economic stressors related to agriculture.

Changes to population within the ARB are typically in response to economic pressures and employment trends. Approximately 48% of the region's residents are employed in the agricultural sector, with property and business services, retail trade and construction the region's other significant employment sectors (ABS 2006).

Employment fell within the ARB over 2001–2006, with a 12% reduction in the number of people employed in agriculture and further 14% and 10% reductions in employment in administration and support services and accommodation and food services respectively. This trend is probably a reflection of a contracting economy leading to a downturn across a range of support and service industries. A 44% reduction in employment in information media and telecommunications occurred over the same period, again reflecting the contracting economy throughout much of the region (ABS 2006).

The Wheatbelt is also characterised by an ageing workforce, with more than 30% of people involved in agriculture being over the age of 55. The proportion of people over the age of 55 employed in all sectors within the Wheatbelt is greater than the Western Australian average (with the exception of the finance and insurance services). The ageing population resulted in an increase in employment in the health and aged care sector of approximately 13% for the period 2001–2006 (ABS 2006).

1.2 Population Trends

Northam and Merredin are the largest towns in the region, with populations of approximately 6,000 and 2,650 respectively. Five other towns have more than 1,000 residents, including York (2,092), Toodyay (1,150), Beverley (1,060), Wongan Hills (1,060) and Cunderdin (1,133). Twenty-nine towns in the region have populations of fewer than 500 residents.

Population density varies significantly across the sub-regions of the ARB, from less than 0.05 individuals/km^2 in the Great Western Woodland (GWW) to more than 1.0 individual/km^2in the Avon Arc. The Eastern and Southern sub-regions have population densities of 0.05–0.1 individuals/km^2, and the central sub-region 0.1–0.2 individuals/km^2 (refer Figure 1). Figure 1 shows populations and densities across the ARB.

Changes in population within the region over 2001–2010 were dramatic, with reductions of up to 25% in some eastern sub-regional areas. Reductions of 5–15% occurred within the Southern and Central sub-regions over 2001–2010, while shires within the Avon Arc sub-region experienced increases of between 10 and 15%. The growth in population within the Avon Arc is reflective of an increase in services being provided, particularly through Northam, and in-migration from Perth due to higher land prices in the city and demand for “lifestyle” accommodation in a near-city location. Figure 2 shows changes in population and densities across the ARB between 2001 and 2010.

As a direct result of the increase in population within the Avon Arc, a 12–20% increase in employment within the retail (14%), real estate (20%) and administration sectors (13%) sectors occurred over the period from 2001 to 2006 (ABS 2006).

Figure 1. Avon River Basin Sub-Regional Population Density in 2010 (source: ABS 2011)

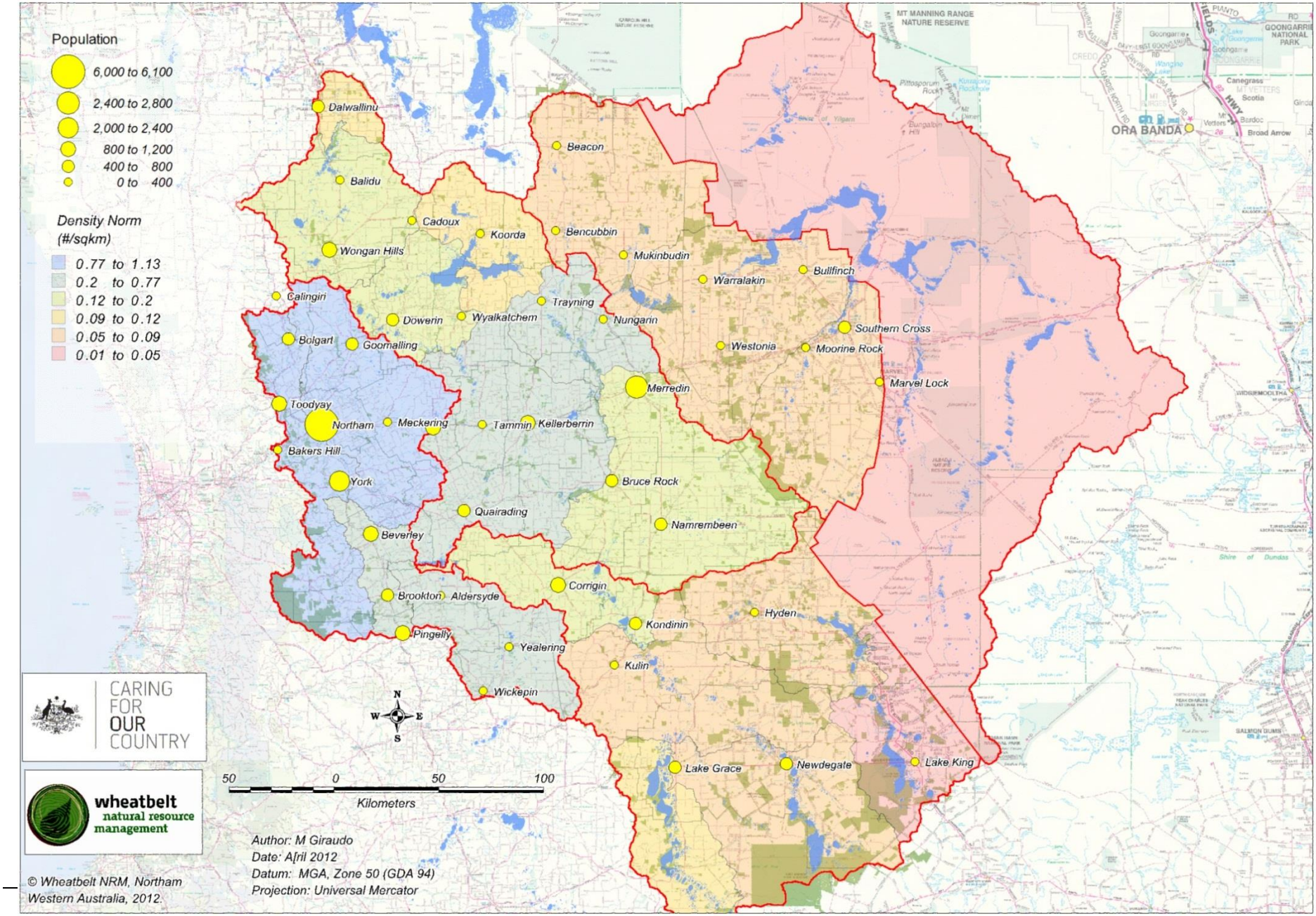
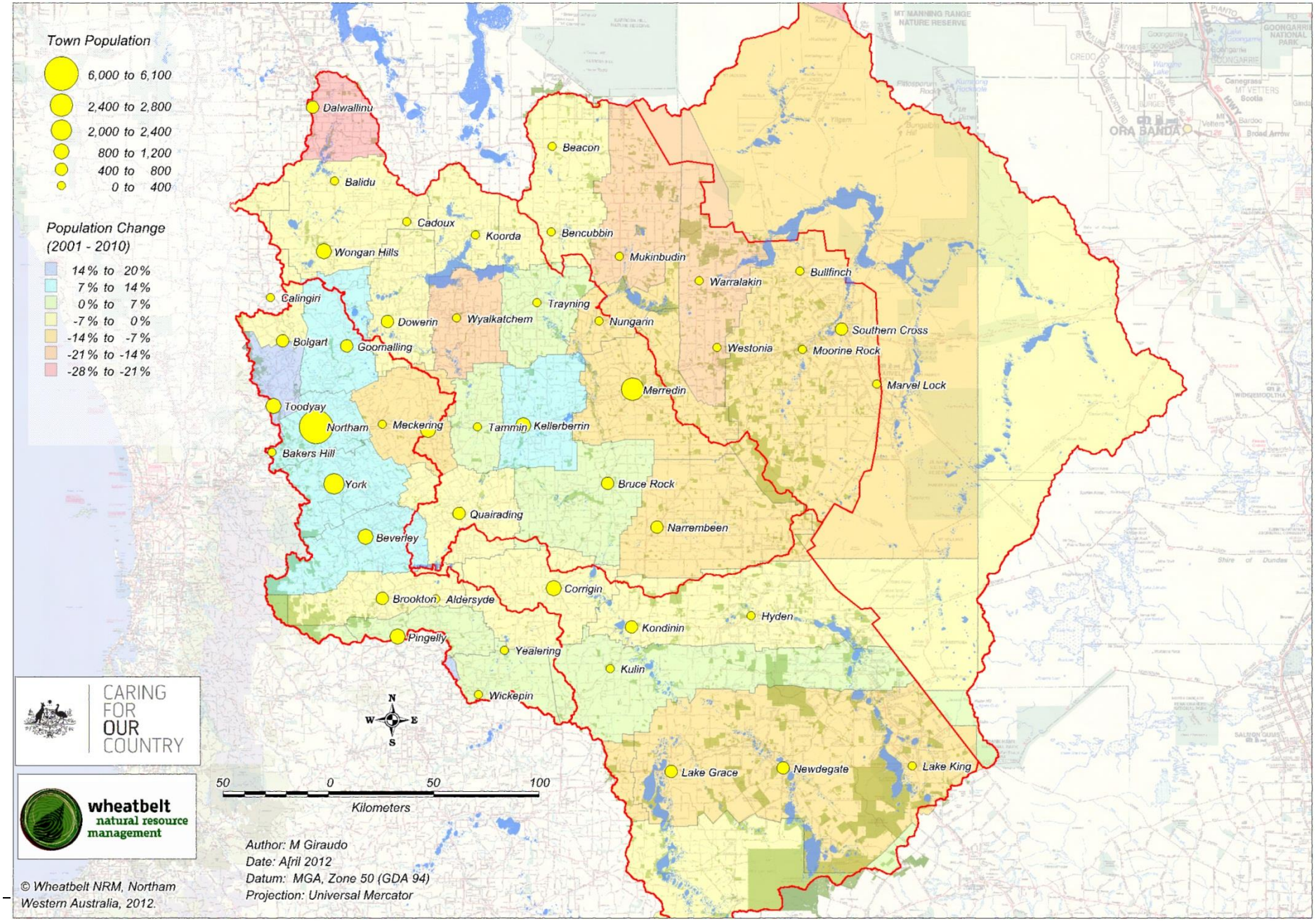


Figure 2. Changes to Population Density by LGA in the Avon River Basin, 2001–2010 (Source: ABS 2011)



1.3 Essential Social Services

An analysis of access to secondary education, health services and local police, and the capacity of the local community to support a football club, was undertaken to determine a critical town population threshold at which communities experienced significant reductions in access to essential social services.

Whilst a football club is not an essential service per se, the existence of sporting clubs and football clubs in particular are considered a strong indicator of a community's capacity to maintain effective social networks (Tonts 2005). Almost all towns in the ARB of more than 250–300 residents support a football club.

Police stations are fairly evenly distributed throughout the ARB. All towns of more than 450 residents have a local police station, as do some smaller towns.

In the ARB, access to local hospitals and primary health services occurs only in towns with more than 500 residents; few towns of less than 500 residents have their own health services.

The location of district high schools in the ARB is not strongly related to the numbers of students enrolled or town size, but few towns of fewer than 500 residents have secondary schools.

The data above suggest that the threshold for the capacity of a town to maintain essential social services is 500 residents. Eleven towns within the ARB have populations greater than 500 and fewer than 1000 residents; seven towns have populations of between 460 and 600 residents and currently have access to essential social services, but population trends suggest they are at risk of losing those services (refer Table 1). Three towns – Bruce Rock, Brookton and Southern Cross – have 600–700 residents so have a buffer to loss of services. Southern Cross has a stable population due to local industry opportunities within the mining sector, and Brookton has an increasing population due to an influx of new "lifestyle" residents.

Koorda and Mukinbudin are examples of smaller towns (264 and 281 residents respectively) that maintain some essential social services, most likely due to their remoteness and the need to service the agricultural communities in their hinterlands.

Table 1. Towns at or Approaching Population Threshold

Town	Residents
Narembeen	468
Wyalkatchem	345
Goomalling	500
Lake Grace	503
Kondinin	556
Quairading	594
Dalwallinu	595

Appendix A contains a list of the ARB's towns, their populations, essential health services and school enrolments. The spatial distributions of essential social services are presented in Appendix B. A 40 km radius from towns containing the various essential social services was used to identify areas within an approximate 30 minute drive to the centre. This is considered to be a reasonable distance for effective access to essential services.

The Eastern and Southern sub-regions are currently under-serviced with respect to access to essential social services. The Figures in Appendix B show that the at-risk towns of Lake Grace, Kulin/Kondinin, Narembeen and Mukinbudin are strategic in terms of maintaining coverage of essential social services within the ARB. Continuing population decline, in association with ongoing state government rationalisation of services, strongly suggests that large areas of the Eastern and Southern sub-regions are at risk of being without essential social service in the near future.

1.4 School Enrolments

School enrolments provide an indication of the change in the demographics of sub-regions within the ARB. Enrolments for the sub-regions of the ARB for the period 2008–2011 were sourced from the Australian Curriculum Assessment and Reporting Authority website (ACARA 2012) and are presented in Table 2 .

Table 2. Change in Number of School Enrolments 2008–2011

	2008	2009	2010	2011	Change 2008–2011
Avon Arc	2,440	2,348	2,272	2,277	-6.7%
Central	1,900	1,817	1,805	1,804	-5.1%
Eastern	310	312	304	307	-1.0%
Southern	717	737	717	635	-11.4%

Trends in school enrolments do not mimic sub-regional population trends. School enrolments were slightly down for all sub-regions for the period 2008–2011, regardless of general sub-regional population trend. The increase in population within the Avon Arc of 5% for over 2008–2011 was accompanied by a 7% reduction in school enrolments for the same period (ACARA 2012). This indicates that new arrivals either don't have children or are sending their children to school outside the region.

A lower proportion of students are enrolled in the Eastern sub-region than in other sub-regions, and the Southern sub-region has the highest proportion of the population enrolled at school (refer Table 3).

Table 3. Sub-Regional Population and School Enrolment Changes

	Population, 2011	School Enrolments, 2011	Proportion of Pop'n enrolled at school, 2011	Enrolment Trend, 2008–2011	Population Change, 2008–2011	Population Change, 2001–2011
Avon Arc	22,815	2,277	10.0%	-7%	5%	10%
Central	20,925	1,804	8.6%	-1.6%	0%	0%
Eastern	4,837	307	6.3%	-1%	-2%	-9%
Southern	4,634	635	13.7%	-13%	0%	-4%
Total	**53,211**	**5,023**	**9.4%**	**-7%**	**2%**	**2%**

Differences in the proportions of children enrolled in schools within sub-regions do not follow general population distribution trends within the region. The Eastern and Southern sub-regions have almost identical age distributions (see Table 4), yet vastly different proportions of students enrolled in schools. This may reflect the lack of local education opportunities within the Eastern sub-

region. The apparent anomaly may also reflects a larger 5–9 age cohort within the Southern region, but this age cohort was not reported in the Davies and Tonts (2009) study.

Table 4. Age Distribution for Sub-Regions (Adapted from Davies & Tonts 2007).

	Age 10–14	Age 15–19	Age 10–19
Avon Arc	7.2%	4.3%	11.5%
Central	8.3%	5.0%	13.3%
Eastern	7.2%	3.2%	10.4%
Southern	7.1%	3.4%	10.5%

1.5 Summary

School enrolments are falling across all subregions of the ARB, regardless of general population trends. The difference between general population trend and school enrolments is most marked within the Avon Arc sub-region, with a 12% disparity.

There is a relatively low proportion of school enrolments within the Eastern sub-region and a higher proportion of enrolments within the Southern sub-region which presumably reflects local educational opportunities and/or differences in local demographics.

General population trends are most pronounced in the Eastern and Avon Arc sub-regions, with the population of the Central sub-region remaining almost static over the period 2001–2011.

1.6 References

ABS 2006 *Census Tables by Location (various regions) 2006*. Australian Bureau of Statistics, Canberra. http://www.abs.gov.au/websitedbs/D3310114.nsf/home/Census+data

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Davies A, Tonts M 2009 *Economic Diversity and Regional Socioeconomic Performance: An Empirical Analysis of the Western Australian Grain Belt*. Institute of Australian Geographers.

Tonts 2004 Spatially Uneven Development: Government Policy and Rural Reform in the Wheatbelt of Western Australia. *Anthropological Forum*, Volume 14, Number 3, pp. 237–252.

Tonts 2005 Competitive Sport and Social Capital in Rural Australia. *Journal of Rural Studies*, Volume 21, pp. 137–149.

WAPC 2001 *Avon Arc Sub-Regional Strategy*. Western Australian Planning Commission, Perth.

Appendix A

Table 5. Town Population and Access to Essential Social Services.

Town	***Population***	***Community health*** *services*	*Hospitals*	*Police Station*	*Football club*	*Schools*	***# of enrolments 2011***
Cadoux	>40					P-7	20
Trayning	>40					P-7	49
Warralakin	>40					-	
Yealering	>40					-	
Bullfinch	42					-	0
Balidu	83					-	0
Marvel Lock	94					-	0
Calingiri	111				TRUE	P-7	52
Meckering	119					P-7	44
Nungarin	140				TRUE	P-7	23
Kununoppin	151					-	
Bencubbin	161			TRUE	TRUE	P-7	41
Tammin	170					P-7	65
Beacon	179				TRUE	K-7	
Dudlakine	193					-	
Westonia	212					-	
Lake King	225					P-7	28
Koorda	264	TRUE		TRUE	TRUE	P-7	41
Hyden	279					P-7	102
Mukinbudin	281		Nursing Post	TRUE	TRUE	k - 12	91
Wickepin	342				TRUE	K-7	52
Wyalkatchem	345	TRUE	TRUE	TRUE	TRUE	P-11	95
Kulin	354			TRUE		P-10	133
Newdegate	409				TRUE	P-7	51
Narembeen	468	TRUE	TRUE	TRUE	TRUE	P-10	125
Dowerin	475			TRUE	TRUE	P-10	104
Bolgart	484					P-7	45
Goomalling	500	TRUE	TRUE	TRUE	TRUE	P-7	60
Lake Grace	503	TRUE	TRUE	TRUE	TRUE	P-12	153
Kondinin	556	TRUE	TRUE	TRUE	TRUE	P-7	51
Quairading	594	TRUE	TRUE	TRUE	TRUE	P-12	169
Dalwallinu	595	TRUE	TRUE		TRUE	P-12	134

Bruce Rock	680	TRUE	TRUE	TRUE	TRUE	P-10	144
Brookton	690	TRUE	TRUE	TRUE		K-12	139
Southern Cross	709	TRUE	TRUE	TRUE	TRUE	P-11	132
Kellerberrin	868	TRUE	TRUE	TRUE	TRUE	P-10	186
Corrigin	905	TRUE	TRUE	TRUE	TRUE	P-10	117
Pingelly	993	TRUE	TRUE	TRUE	TRUE	P-7	173
Beverley	1061	TRUE	TRUE	TRUE	TRUE	P-10	190
Wongan Hills	1063	TRUE	TRUE	TRUE	TRUE	P-12	232
Cunderdin	1133	TRUE	TRUE		TRUE	P-10	142
Toodyay	1147	TRUE	TRUE	TRUE	TRUE	P-10	445
York	2092	TRUE	TRUE	TRUE	TRUE	P-12	474
Merredin	2667	TRUE	TRUE	TRUE	TRUE	K-12	275
Northam	6006	TRUE	TRUE	TRUE	TRUE	K-12	589

Appendix B

Figure 3. 40 km Radius to Centres Containing Hospitals

Figure 4. 40 km Radius to Centres Containing Year 12 High Schools