

## FEATURE ARTICLE – Population measures: A case study

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### INTRODUCTION

This article aims to demonstrate the application of census and other population measures using the Goldfields region of Western Australia as a case study. It builds on a previous article, *Understanding Population Measures*, in the June 2002 edition of this publication. The data provided relate to both the resident and working populations of the Goldfields region which, for the purposes of this article, comprises the contiguous Local Government Areas (LGAs) of Kalgoorlie/Boulder, Coolgardie, Laverton, Leonora, Menzies and Wiluna.

### CENSUS COUNTS

The Census of Population and Housing, which is conducted every five years by the Australian Bureau of Statistics (ABS), seeks to accurately measure the number of people in Australia at a point in time and obtain details about their key characteristics and the dwellings in which they live. Key data items collected include place of usual residence, place of employment, method of travel to work, employment status, occupation and industry.

Since 1971, the Census has provided two population counts:

- The 'place of enumeration' count is a count of all persons (including all visitors except foreign diplomats and their families) who spent Census Night in Australia, based on where they spent that night.
- The 'place of usual residence' count is a count of all persons, excluding overseas visitors, on the basis of where they usually live, rather than where they were on Census Night.

The ABS aims to select a census date which minimises the proportion of the population who are not at their usual place of residence. Nevertheless, place of enumeration counts will be affected in some areas by the inclusion of seasonal tourists, transient workers or other overnight visitors.

While the ABS asks people to report their usual residence as the residence in which they live, or intend to live, for six months or more of the census year, perceptions of usual residence may vary according to other factors. For example, 'fly-in, fly-out' (FIFO) workers employed at mine sites in the Goldfields on a 'two weeks on/one week off' basis would expect to spend approximately eight months of the year in the Goldfields region. However, many FIFO workers, who have a residence and family elsewhere in Australia, report this other location as their place of usual residence.

### ESTIMATED RESIDENT POPULATION

The Census provides a basis for the estimation of the resident population of each of the states and territories, and for smaller geographic areas including LGAs and Statistical Local Areas (SLAs).

For census years, the estimated resident population (ERP) as at 30 June for each LGA is based on usual residence counts, to which are added adjustments for net census undercount and the number of Australian residents estimated to have been temporarily overseas at the time of the Census. The estimates are backdated from Census Night to 30 June by subtracting the estimated increase in the population due to natural increase (births minus deaths) and net migration.

For post-census years, ERPs at the small area level are updated using a mathematical model, based on the relationship between changes in population size and changes in other indicators (eg. dwelling approvals, Medicare enrolments) occurring between the two most recent censuses.

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### ESTIMATED RESIDENT POPULATION *continued*

ERPs are used by various organisations and government departments in planning and public policy. For example, the Commonwealth Grants Commission uses ERPs in determining local government grants each year. In recent years, some Local Government Authorities in Australia have expressed concern about the use of ERP to determine funding, particularly where the ERP does not represent the whole of the population for which they must supply services. This 'service population' may include tourists, FIFO, short term or seasonal workers, or daytime visitors (eg. commuters and shoppers) who do not regard themselves as usual residents of the area.

### WORKING POPULATION

For the working population, 'Journey to work' data, including place of employment and method of travel to work, have been produced from Australian censuses since 1971. Historically, these data were restricted to major urban areas in each state or territory, and information was available only for people who lived and worked in the same urban area.

For the 2001 Census, the ABS coded the workplace address to SLA level for all employed persons in Australia. The characteristics of the working population are available in *Working Population Profiles* for all SLAs, LGAs and broader geographic areas.

Data on the working population of an area, when used in conjunction with other population counts, shed light on the number of people who report their usual residence as being outside the LGA in which they work. These data are particularly useful in understanding population measures in areas such as the Goldfields with large service populations, including FIFO and temporary workers.

### THE GOLDFIELDS REGION

The Goldfields region, comprising the LGAs of Kalgoorlie/Boulder, Coolgardie, Laverton, Leonora, Menzies and Wiluna, covers just under one quarter of the area of the state and accounts for around 2% of the Western Australian population. The economy of the region is based largely on gold and nickel mining and manufacturing, and makes an important contribution to the economy of Western Australia as a whole.

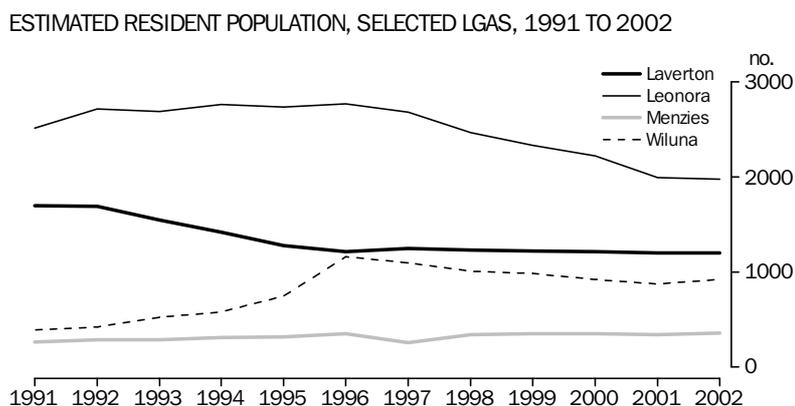
### Population growth (ERP)

In post-census years, the estimated resident population (ERP) provides the best measure of population growth and decline at the regional level. In 2002, the ERP of the Goldfields region was just over 38,100, over three quarters (77%) of which resided in the City of Kalgoorlie/Boulder. The population of the region increased by more than 3,000 persons between 1991 and 1996 at an average rate of 1.6% per year. This growth was particularly significant in the Shire of Wiluna which experienced an average annual increase of 24% between 1991 and 1996. However, in the period 1997–2002, the population of the Goldfields declined at an average annual rate of 1.4%, almost returning to the 1996 figure.

Over the last decade, this pattern of population growth followed by decline occurred in all the Goldfields LGAs except Menzies, where the ERP has remained fairly constant at around 350 since 1991. Wiluna's estimated resident population peaked at 1,200 in 1996 but then declined to 920 persons by 2002. Leonora and Coolgardie experienced the fastest decline in population between 1997 and 2002, with average annual falls of 5.9% and 5.4 % respectively. Over that period, the ERP dropped from 2,700 to 2,000 in Leonora and from 5,500 to 4,000 in Coolgardie. However, the population decline in Laverton and Kalgoorlie/Boulder over the same period averaged less than 1% per annum, falling to 1,200 and 29,500 respectively.

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These trends are shown in the graph below for the four Goldfields LGAs with the smallest resident populations.



Difference between census counts

Table 1 presents population counts from the last two censuses for the Goldfields region. For every LGA, the place of enumeration count was higher than the usual residence count in both census years. The difference between the two counts was most significant in the more remote LGAs of Leonora, Laverton and Wiluna, where a large proportion of the workforce did not consider themselves to be usual residents. In 2001, the workforce of these LGAs was large in relation to their usual resident population. This was particularly true of Leonora, where the workforce was 68% higher than the usual resident population and 10% higher than the number of people counted in the LGA on Census Night.

TABLE 1: CENSUS COUNTS, 1996 AND 2001

Statistical Local Area	1996.....			2001.....		
	Place of enumeration Persons	Place of usual residence Persons	Place of employment Persons	Place of enumeration Persons	Place of usual residence Persons	Place of employment Persons
Coolgardie (S)	5 652	5 470	n.a.	4 241	4 074	1 748
Kalgoorlie/Boulder (C)	29 683	28 701	n.a.	28 818	28 352	13 537
Laverton (S)	1 569	1 177	n.a.	2 077	1 293	1 063
Leonora (S)	3 511	2 683	n.a.	2 950	1 941	3 255
Menzies (S)	521	345	n.a.	496	336	244
Wiluna (S)	1 879	1 105	n.a.	1 644	938	970

Source: Census of Population and Housing; Data available on request.

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Difference between census counts *continued*

Table 2 presents the proportion of persons enumerated in each LGA on Census Night 2001 according to their usual place of residence. More than 90% of the people counted in Kalgoorlie/Boulder and Coolgardie were usual residents of those LGAs. The comparable proportion was less than 60% in the LGAs of Laverton, Leonora and Wiluna. More than one quarter of the population counted in each of these LGAs reported a usual residence within the Perth Statistical Division (SD). Wiluna also recorded the highest proportion of persons whose usual residence was outside Western Australia (6%). Given the large distances to be travelled, it seems likely that many of these people were FIFO or temporary workers.

In the least populous LGA of Menzies, almost two thirds (64%) of the 500 persons counted on Census night stated they were usual residents and a further 12% reported the adjacent LGA of Kalgoorlie/Boulder as their place of usual residence. It is likely that some of these people were travelling from Kalgoorlie/Boulder for work purposes.

TABLE 2: PLACE OF ENUMERATION BY PLACE OF USUAL RESIDENCE: ALL PERSONS, 2001

<i>Place of enumeration.....</i>						
	<i>Kalgoorlie/Boulder</i>	<i>Coolgardie</i>	<i>Laverton</i>	<i>Leonora</i>	<i>Menzies</i>	<i>Wiluna</i>
<i>Place of usual residence</i>	%	%	%	%	%	%
Same as place of enumeration	94.1	91.8	56.4	59.0	63.9	53.8
Perth SD	2.3	3.4	27.1	25.5	11.1	28.9
Balance of Western Australia	2.0	3.7	12.1	11.6	19.6	11.2
<i>Total Western Australia</i>	<b>98.4</b>	<b>98.9</b>	<b>95.6</b>	<b>96.1</b>	<b>94.6</b>	<b>93.9</b>
Interstate	1.3	0.8	4.2	3.4	3.6	5.8
Overseas	0.3	0.3	0.2	0.6	1.8	0.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: 2001 Census of Population and Housing; Data available on request.

Working population of the Goldfields region

Place of employment and industry data shed further light on the number of persons who are FIFO workers or long distance commuters to the Goldfields region. Table 3 shows the proportion of employed people in each LGA who resided inside and outside that LGA in 2001.

In the Goldfields region, the LGA with the highest proportion of workers who also resided in that LGA was Kalgoorlie/Boulder (90%), followed by Coolgardie (71%). Leonora and Wiluna recorded the lowest proportion (both 30%). These differences are partially explained by the economic activities in each LGA, its relative remoteness and the presence or absence of an urban centre. As the City of Kalgoorlie/Boulder contains a major urban centre with a range of industries, workers and their families are more likely to live locally. Leonora, Wiluna and Laverton, on the other hand, are remote, predominantly mining areas, with a greater proportion of FIFO and temporary contract workers.

Almost half (49%) the working population of Wiluna reported a usual residence in the Perth SD, closely followed by Leonora (46%). Laverton recorded the third highest proportion (41%) of workers who gave Perth as their place of usual residence.

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TABLE 3: PLACE OF EMPLOYMENT BY PLACE OF USUAL RESIDENCE: ALL EMPLOYED PERSONS, 2001

Place of usual residence	Place of employment.....					
	Kalgoorlie/Boulder	Coolgardie	Laverton	Leonora	Menzies	Wiluna
	%	%	%	%	%	%
Same as place of employment	90.0	71.2	38.0	29.9	43.0	30.3
Perth SD	4.5	10.1	41.0	46.4	27.0	49.2
Balance of Western Australia	4.5	17.7	18.1	21.4	27.1	18.9
<b>Total Western Australia</b>	<b>99.0</b>	<b>99.0</b>	<b>97.1</b>	<b>97.7</b>	<b>97.1</b>	<b>98.4</b>
Interstate	1.0	1.0	2.9	2.3	2.9	1.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: 2001 Census of Population and Housing; Data available on request.

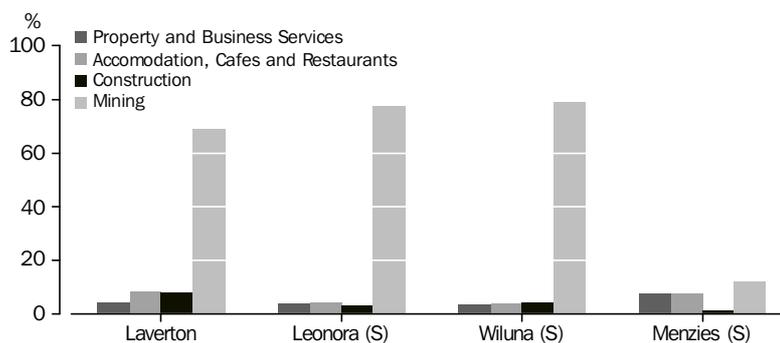
Across the region, non-usual resident workers were mainly concentrated in the Mining industry. A significant number were also employed in the Construction, Catering and Other service industries. These industries generally have a more transient workforce and are highly dependent on contract labour.

The Mining industry has a particularly high incidence of FIFO and temporary contract workers, while the Construction industry uses contractors to undertake relatively short term building projects. In addition to tradespersons and plant and machine operators, both these industries employ contract professionals, such as engineers, surveyors, geologists and assayers.

The Catering industry also employs contract workers to service the Mining and Construction industries, as well as cafes, restaurants, hotels and other accommodation establishments.

An industry profile of the four Goldfields LGAs with the largest proportion of non-usual resident workers is presented below.

NON-RESIDENT WORKERS USUALLY RESIDENT IN PERTH SD, 2001, Selected LGAs and Industries



Laverton

In 2001, the working population of Laverton was nearly 1,100. Half (50%) of these were employed in the Mining industry and another 9% in Construction.

Of the 660 workers who did not live in Laverton, two thirds (440) gave the Perth SD as their usual residence. The majority of these (almost 70%) were employed in the Mining industry, with a further 16% involved in either Construction or Catering.

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Leonora	<p>The working population of Leonora in 2001 was about 3,300. Two thirds (67%) of these were employed in the Mining industry.</p> <p>Of the 2,300 workers who did not live in Leonora, two thirds (1,500) gave the Perth SD as their usual residence. More than three quarters of these (78%) were employed in the Mining industry, with the Manufacturing, Catering, Property and business services and Construction industries each accounting for about 4%.</p>
Wiluna	<p>The working population of Wiluna in 2001 was close to 1,000, of which two thirds (65%) were employed in the Mining industry and 6% in Construction.</p> <p>Of the 700 workers who did not live in Wiluna, 71% gave the Perth SD as their usual residence. The vast majority of these (almost 80%) were employed in the Mining industry and a further 4% in Construction.</p>
Menzies	<p>In 2001, the working population of Menzies (250) had a significantly different profile due, in part, to the Shire's proximity to the City of Kalgoorlie/Boulder. Of the 140 employed persons who did not live in Menzies, over one quarter (27%) gave the City of Kalgoorlie/Boulder as their usual residence.</p> <p>Only 24% of the total working population were employed in the Mining industry. Other significant industries included Government administration and defence (21%), Retail trade (14%), and Health and community services (7%).</p>
CONCLUSIONS	<p>The dominance of the Mining industry in the Goldfields region, particularly in the more remote LGAs of Laverton, Leonora and Wiluna, has created a working population that includes a large number of FIFO and temporary contract workers. Some of these do not report as usual residents of the region in the Census even though they may have spent more than six months of the census year living in that region. As a result, they are not included in the annual estimates of resident population (ERPs) in the post-census years.</p> <p>Place of employment data from the Census provides a more complete picture of the working population of each area at a particular point in time. The working population includes people who were counted outside the area on Census Night as well as some 'non-usual residents' who were counted inside. Data on the working population can therefore add significantly to our understanding of other census-based population measures.</p>
RELATED PUBLICATIONS	<p><i>Australian Demographic Statistics</i> (cat. no 3101.0)</p> <p><i>Population by Age and Sex, Australian States and Territories, June 1997 to 2002</i> (cat. no 3201.0)</p> <p><i>Population by Age and Sex, Western Australia</i> (cat. no 3235.5.55.001)</p> <p><i>Regional Population Growth, Australia</i> (cat. no 3218.0)</p> <p>Cook, T., 1996, <i>When ERPs aren't enough: a discussion of issues associated with service population estimation</i>, ABS Demography Working Paper 1996/4, &lt;<a href="http://www.abs.gov.au">http://www.abs.gov.au</a>&gt;</p> <p>Lee, S., 1999, <i>Service Population Pilot Study: An investigation to assess the feasibility of producing population estimates for selected LGAs</i>, ABS Demography Working Paper 1999/3, &lt;<a href="http://www.abs.gov.au">http://www.abs.gov.au</a>&gt;</p>
REFERENCES	<p><i>Understanding Population Measures</i>, Western Australian Statistical Indicators, June 2002, (cat. no 1367.5)</p> <p><i>Working Population Profiles</i> (cat. no 2006.0)</p>