

### The Western Australian Small Area Population Projections (ABS)

This report outlines the method used for producing population and enrolment projections for all Statistical Area 1s (SA1s) in Western Australia, spanning from June 2013 to June 2017.

#### Projection Method

The main technique employed for the projections down to Statistical Area 2s (SA2s) level was the cohort-component method, widely accepted as the best way of producing age/sex population projections. It involved applying annual fertility and mortality rates and internal migration and overseas migration by age and sex to the base population to produce a projected population, which then became the base for projecting the next year. This cycle was repeated until the projection horizon was reached.

A four-tiered approach was taken in projecting resident population aged 18 years and over for all SA1s and SA2s in Western Australia.

1. The Western Australian population was projected by age and sex.
2. Perth/Rest of Western Australia populations were projected by age and sex (constrained to 1).
3. The population of all Western Australian SA2s was projected by age and sex (constrained to 2).
4. The SA2 projected population aged 18 and over was extracted from 3.
5. The SA2 projected population aged 18 and over (in 4) was split into SA1s.

Finally, the SA1 projected population aged 18 and over was combined with enrolment data to produce projected enrolments.

#### 1. State/Territory Projections

The base population for the Western Australian cohort-component projections was preliminary age/sex Estimated Resident Population (ERP) as at 30 June 2013, incorporating results from the 2011 Census. Assumptions for the projections were based on both short and long-term trends for each component of population change. These fertility, mortality, overseas migration and interstate migration assumptions were based on those used in the latest *Population Projections, Australia, 2012 (base) -2101* (ABS Cat. No. 3222.0), but adjusted to reflect more recently available data. All States and Territories were independently projected, then constrained to sum to the Australian-level projection.

#### 2. Capital City/Rest of State Projections

As per the State/Territory level, the capital city and rest of state projections used assumptions updated from the *Population Projections* publication. 30 June 2013 ERP base population was used, with assumptions reflecting historically observed region-specific patterns of fertility, mortality, overseas migration and internal migration. The Western Australian projections acted as control totals.

### **3. SA2 Projections**

The base population for the SA2 cohort-component projections was also 30 June 2013 SA2 age/sex ERP. The fertility, mortality and migration assumptions were based on SA2-specific levels observed during the past five years, constrained to the assumed capital city/rest of state levels and trends. SA2 age/sex migration profiles were derived from 2011 Census data on place of usual residence one year ago.

The ABS regularly collects demographic information down to the SA2 level, which means that SA2 projections (in contrast to smaller areas) are firmly based on a series of known data. At each yearly cycle in this process, the resulting SA2 projections were constrained to sum to the capital city/rest of state projections, helping to produce more reliable SA2 figures. SA2s with a population of ERP less than 1,000 persons were generally held constant for the projection duration as assumptions for the accompanying tiny age/sex cells are too unreliable.

From the 30 June SA2 projections, projected population aged 18 and over was derived by subsetting the total population for each SA2.

### **4. SA1 Projected population aged 18 and over**

SA1 projected population aged 18 and over were calculated by extrapolation using 2011-2013 SA1 ERP.

SA1 projections were formed using extrapolations from 2006-2013 SA1 ERP constrained to the SA2 projections. Projected population aged 18 at 8 February 2017 was derived by interpolation using the 30 June projections.

The final process calculates projected enrolments (for SA1s) using the 1 December 2014 relationship between each SA1's enrolments and its ERP (see Appendix III).

The lack of demographic data collected regularly at SA1 level makes it necessary to use such a conversion method as outlined above. While the process is quite complex, it should be reiterated that the basic concept of splitting SA2s to SA1 level cannot be expected to give projections as reliable as those for SA2s. However, as the goal is to support the redrawing of Commonwealth Electoral Division boundaries which are aggregates of large numbers of SA1s there is a high likelihood that any random errors or inconsistencies will be statistically offset in the aggregation process.

#### **Boundaries**

Previous redistributions have used Census Collection Districts (CCDs) as the base unit, however in 2011 CCDs were superseded by the new SA1 unit.

SA1 and SA2 boundaries are from the *Australian Statistical Geography Standard (ASGS) Volume 1 – Main Structure and Greater Capital City Statistical Areas, July 2011* (ABS Cat. 1270.0.55.001).

#### **Disclaimer**

It is important to recognise that the projection results given in this report reflect the assumptions made about future fertility, mortality and migration trends. While these assumptions are formulated on the basis of an objective assessment of historical demographic trends and their likely future dynamics, there can be no certainty that they will be realised.

ABS takes responsibility for the method employed, however in accordance with ABS policy regarding small area population projections, the assumptions used are the final responsibility of the client, and the projections are not official ABS population statistics.

The projections may be referred to as "...projections prepared by the ABS according to assumptions reflecting prevailing trends agreed to by the Australian Electoral Commission...".

No liability will be accepted by the ABS for any damages arising from decisions or actions based upon this population projection consultancy service.