

# Population estimates by Indigenous status, Queensland, methodology paper, 2015 edition

## Introduction

There is a significant demand within the Queensland Government and community for small–area time series population estimates by Indigenous status, age and sex. These estimates are required as denominators in rate calculations to measure social and economic temporal change within Aboriginal and Torres Strait Islander and non-Indigenous populations and to support more informed resource allocation and decision making. Furthermore, these estimates are required for detailed age and sex categories for small geographical areas, to enable the customisation of the data for a variety of purposes.

The Australian Bureau of Statistics (ABS) has released population estimates and projections by Indigenous status. However, these estimates do not always contain the level of geographical detail required to meet the purposes of Queensland Government and the broader community.

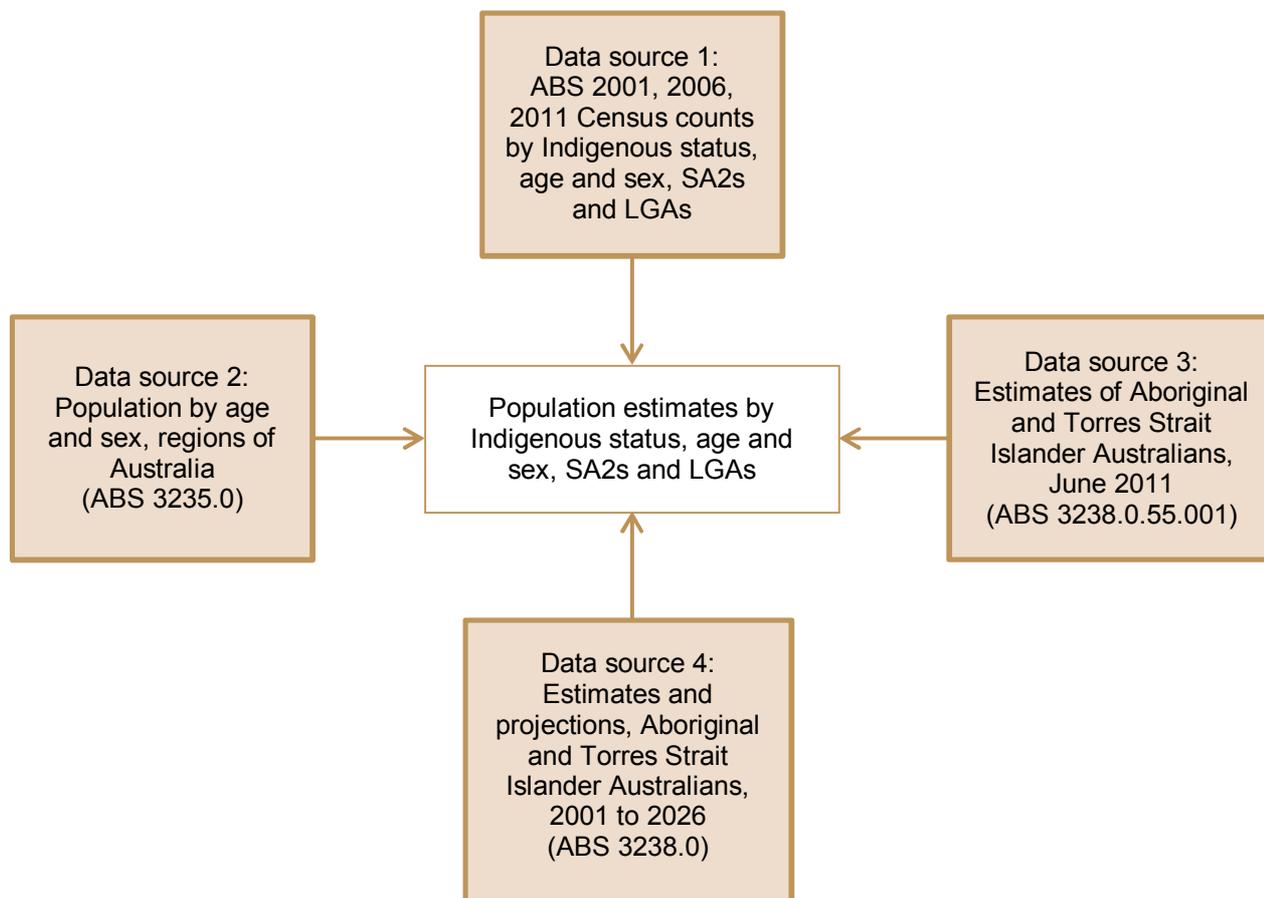
As a result, the Queensland Government Statistician's Office has developed detailed estimates (on a usual residence basis) by Indigenous status, by age and sex, for Queensland statistical areas level 2 (SA2s) and local government areas (LGAs). This 2015 edition includes estimates for SA2s for years 2006 to 2015 based on the 2011 Australian Statistical Geography Standard (ASGS). Estimates for LGAs for years 2001 to 2015 are based on the 2015 ASGS.

The purpose of this paper is to provide an overview of the method used to generate these estimates.

## Methodology

### Data sources

The following figure shows the data sources used to compile the estimates:





## The method

The estimates were constructed using the above data sources as follows:

### Step 1: Develop final population estimates by Indigenous status for census years

- For LGAs: 2001, 2006 and 2011 Census usual residence counts by Indigenous status, age<sup>1</sup>, sex and LGA (data source 1) were adjusted to sum to the following data sources using iterative proportional fitting techniques:
  - population estimates by Indigenous status, age<sup>1</sup> and sex, as at 30 June 2001, 2006 and 2011 for Queensland (data source 4)
  - total population by age<sup>1</sup> and sex, as at 30 June 2001, 2006 and 2011 (data source 2)
  - total population by Indigenous status as at 30 June 2011 (data source 3, only used for scaling 2011 Census counts<sup>2</sup>).
- For SA2s: Final estimates were produced for 2006 and 2011 only<sup>3</sup>.

### Step 2: Calculate Indigenous proportions<sup>4</sup> for census years

- Using the data sets created in Step 1, Indigenous proportions were calculated for each age<sup>1</sup> and sex category, for LGAs (2001, 2006 and 2011) and SA2s (2006 and 2011)<sup>3</sup>.

### Step 3: Estimate Indigenous proportions<sup>4</sup> for non-census years

- Indigenous proportions were calculated for each age<sup>1</sup> and sex category for non-census years, using linear interpolation and extrapolation techniques, based on the assumption that Aboriginal and Torres Strait Islander age and sex cohorts move through the overall population between census years.
  - For example, proportions for each age<sup>1</sup> and sex category for each year from 2007 to 2010 were based on the interpolation of the proportions in 2006 and 2011 (as generated in Step 2 above).
- To model cohort movement, the linear interpolation accounted for age movement over time.
  - For example, the Indigenous proportions for males aged 12 years in 2006 and aged 17 years in 2011 are used to calculate Indigenous proportions for males aged 13 years in 2007, 14 years in 2008, 15 years in 2009, and 16 years in 2010.
- Proportions for years beyond 2011 were based on the extrapolation of the change in the proportions between 2006 and 2011.

### Step 4: Preliminary estimates of the Aboriginal and Torres Strait Islander population for non-census years

- The proportions calculated in Step 3 were multiplied by estimates of the total population by age<sup>1</sup> and sex category (data source 2), for each non-census year.

### Step 5: Preliminary estimates of the non-Indigenous population for non-census years

- The estimates from Step 4 were subtracted from population estimates of the total population by age<sup>1</sup> and sex category (data source 2), for each non-census year.

### Step 6: Final population estimates by Indigenous status for non-census years

- For each non-census year, data by single year of age from 20 to 64 years from the preliminary estimates (Steps 4 and 5 above) were aggregated into five-year age groups. Data for persons aged less than 20 years were retained as single years of age, and the 65 years and over age group was retained.
- These preliminary estimates for single years of age under 20 years, five-year age groups from 20 to 64 years, and 65 years and over, were then adjusted to sum simultaneously to the following data sources using iterative proportional fitting techniques:
  - population estimates and projections<sup>5</sup> by Indigenous status, single year of age and sex, for Queensland (data source 4)
  - total population by single year of age and sex (data source 2).

<sup>1</sup> By single year of age from 0 to 64 years, then 65 years and over.

<sup>2</sup> The first release of these data was based on the results of the 2011 Census. Results are not available from the 2001 and 2006 Censuses.

<sup>3</sup> SA2 level data from the 2001 Census was not of sufficient quality to be used in the compilation of the estimates.

<sup>4</sup> Defined as the number of Aboriginal and Torres Strait Islander persons as a proportion of the total (Aboriginal and Torres Strait Islander, and non-Indigenous) population.

<sup>5</sup> In *Estimates and Projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026* (ABS 3238.0), figures for years to 2011 are classified as estimates while figures from 2012 onwards are projections.



## Other adjustments

- Indigenous status remains unknown where responses to the census question on Aboriginal and Torres Strait Islander origin were not stated. For the purposes of the construction of the population estimates by Indigenous status, these records are allocated for each age, sex, and geographical level (LGA or SA2) category to being either Aboriginal and Torres Strait Islander or non-Indigenous, using iterative proportional fitting techniques (see Step 1 above).
- The Indigenous proportions calculated in the method are bounded and kept within the 0 to 1 range.
- The application of interpolation and extrapolation techniques to the calculation of Indigenous proportions for non-census years is based on the assumption that Aboriginal and Torres Strait Islander cohorts move through the overall population over time. However, there may be cases where these cohorts may remain relatively stationary within a population over an extended period of time. This may occur, for example, in predominantly Indigenous communities which experience ongoing migration inflows of non-Indigenous persons aged 20-24 years. As a result, for each LGA and SA2, an age profile was calculated for each census year showing the Indigenous proportion in each age and sex category. An analysis was undertaken on these profiles to detect peaks and troughs which were consistently evident for all census years. These constant features were retained in the population estimates by Indigenous status.

## Results

Detailed population estimates by Indigenous status have been compiled by:

- Indigenous status (Aboriginal and Torres Strait Islander origin, and non-Indigenous)
- Queensland SA2s (based on the ABS 2011 ASGS) and LGAs (based on the ABS 2015 ASGS)
- age (single year under 20 years, five-year age groups from 20 to 64 years, and 65 years and over) and sex
- years 2001 to 2015 (for LGAs) and 2006 to 2015 (for SA2s).

These estimates supersede the 2014 edition *Population estimates by Indigenous status*, published in late 2015.

Estimates from 2001 to 2011 are final, and from 2012 to 2014 are revised. 2015 estimates are preliminary and are therefore subject to change. The final, revised or preliminary status of these estimates is consistent with the status of small area population estimates in *Population by age and sex, regions of Australia, 2015* (ABS 3235.0).

## Data quality

There are a number of data quality issues inherent in the four data sets used to compile the population estimates by Indigenous status, and these have an impact on the overall quality of the estimates. More detailed information can be found in the accompanying [data quality statement](#).

These estimates have been made available for individual cross tabulations of age, sex, Indigenous status, and LGA and SA2 categories, but a high degree of accuracy at this level of disaggregation should not be assumed.

It is strongly recommended that the estimates be aggregated before being used. However, caution should still be exercised when using the results at more aggregated levels because the estimates will still retain a level of error.

The SA2 and LGA estimates have been modelled independently. As such, it is recommended that SA2 estimates not be aggregated to LGA level or compared directly to LGA figures, as results may be inconsistent.

## Glossary

### Indigenous status

The Aboriginal and Torres Strait Islander population comprises people who are of Aboriginal origin, Torres Strait Islander origin or both Aboriginal and Torres Strait Islander origin.

An Aboriginal or Torres Strait Islander person, according to the widely accepted Commonwealth definition, is a person who:

- is of Aboriginal and/or Torres Strait Islander descent who
- identifies as being of Aboriginal and/or Torres Strait Islander origin and who is
- accepted as such by the community with which the person associates.

The ABS Standard Indigenous Question is based upon the Commonwealth working definition but does not include the third element of the Commonwealth definition. Collecting information on the basis of community acceptance is often impractical in a survey or administrative data collection setting and can lead to inaccuracies.

For these reasons, it is not included in the ABS Indigenous status standard. The definition of Indigenous status is therefore operationalised as whether or not a person identifies as being of Aboriginal or Torres Strait Islander 'origin'.

The term 'origin', when used in the context of the operational definition, is considered to relate to a person's Australian Aboriginal and/or Torres Strait Islander descent and for some, but not all, their cultural identity.

The 2011 Census of Population and Housing (Household form) asked the following question of each person:

<p><b>7 Is the person of Aboriginal or Torres Strait Islander origin?</b></p> <ul style="list-style-type: none"> <li>• For persons of both Aboriginal and Torres Strait Islander origin, mark both 'Yes' boxes.</li> </ul>	<p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes, Aboriginal</p> <p><input type="checkbox"/> Yes, Torres Strait Islander</p>
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The data in this publication are reported according to the ABS Indigenous status standard.

### Iterative proportional fitting

A procedure for adjusting a table of data cells such that they add up to selected totals for both the columns and rows (in the two-dimensional case) of the table.