

## Towns in time – methodology

### Introduction

#### About Towns in Time

*Towns in Time* is a compendium of Census statistics covering 25 years from 1981 to 2006, enabling analysis of data over time. The 2006 version covers 406 towns in Victoria, 47 “rural balance” Local Government Areas (LGAs)(1996-2006).

The data in *Towns in Time* is sourced from the 1981, 1986, 1991, 1996, 2001 and 2006 Census of Population and Housing, which remains the copyright of the Australian Bureau of Statistics (ABS). The Census is undertaken by the ABS every five years and the most recent was held on 8<sup>th</sup> August 2006. It aims to measure the key characteristics of people and dwellings in Australia, as well as provide a wealth of data at a number of geographic levels, from the smallest (Census Collection Districts, or CDs), to the largest (Australia).

Data in *Towns in Time* is presented in a number of ways. Detailed data is available for towns with more than 500 persons (in 2006) and rural balances. This includes total population, age structure, income, household size, dwellings, labour force, industry of employment, birthplace and language spoken. Summary data, covering the key demographic variables, are available for the smaller towns of between 200 and 500 persons, while basic population figures are presented for “tiny towns”, ie those with less than 200 persons.

There are two population counts from the Census released by the ABS – enumerated and usual residence. The enumerated count is the number of people counted in a particular area on Census night, including visitors. The usual residence count is based on the geographic area in which people normally live, and so removes the artificially high populations that can occur with enumerated counts. For example, the Alpine areas have a large enumerated count on Census night due to the large number of visitors. Conversely, some coastal areas have lower than expected counts due to the large number of holiday and second homes. Users of *Towns in Time* should note that the data presented is the enumerated count. This is because the ABS has consistently coded enumerated data to the CD level, whereas usual residence, until 2001, was only coded to Statistical Local Areas (SLAs).

Discrepancies in totals can occur in *Towns in Time* for the following reasons:

- i. In order to preserve confidentiality, the ABS randomises small data cells where they consider an individual may be able to be identified. As a general rule, data cells with values of 0, 1, 2, or 3 are randomised to 0 or 3. This means that totals calculated by summing figures for smaller areas may not exactly match figures published for larger areas. For example, summing all CDs within an LGA may not produce the same totals.
- ii. Some rounding of concorded data to whole numbers was necessary simply because applying the splits does not always result in exact numbers being obtained.

## Methodology

This section explains the process by which Census geographic areas were concorded in order to produce comparable Census data for the period 1981 to 2006. The base unit used for concording was the CD, which is the smallest geographic unit for which the complete range of Census data is available. CD boundaries are devised by the ABS and cover all of Australia, containing on average approximately 220 households. They are designed so that a Census collector can distribute and gather Census forms within a two week period. In an urban area, they may cover a few suburban blocks, while in rural areas they are larger in area due to the dispersed nature of settlement.

## Geographic concordances

2006 CDs were used as the base unit for devising town boundaries, and hence, CDs from previous Censuses were concorded to these boundaries. The concordances produced are based on change in dwellings, as this provides a more accurate measure of population change than an area-based concordance. CD boundaries can change (or be created) between Censuses for a variety of reasons, such as urban growth, realignment to suburb or LGA boundaries, or to correct inappropriate boundaries. While the majority of CD boundaries remain the same from one Census to the next, overall it is difficult to keep them static because of changes in the real world, many of which the ABS has no control over. An example of this was the restructure of the LGA boundaries in Victoria in the mid 1990s, which significantly reduced the number of municipalities. CDs which previously aligned to the old boundaries were no longer necessarily appropriate, and large scale boundary revisions were made for the 1996 Census.

There are a number of towns affected by boundary changes between 1981 and 2006. Many of these changes are consistent with outward expansion of urban areas, while others have resulted from the creation of new boundaries for settlements that were not previously bounded. Of the 406 towns included in *Towns in Time*, 162 were completely comparable over the six Censuses, in that there were no boundary changes, or those that occurred had no impact on population or dwellings. A further 94 towns had boundaries created from former rural areas between 1986 and 2006. For these towns, it is only possible to produce data for the Censuses for which they were bounded. For example, if a town was bounded in 1996, it will only have data for that Census onwards. This is because there is not enough data to estimate population change for the previous years. For the remaining towns, it was necessary to calculate the degree of change, based on dwellings, in order to produce the geographic concordances.

Rural Balances are calculated by aggregating the balance of CDs not assigned to a town within an LGA boundary. Like towns, LGAs are concorded to their 2006 boundaries. It should be noted that the area covered by the rural balance can differ from Census to Census due to the creation (and deletion) of Urban Centres/Localities by the ABS. For example, a CD for the town of Arcadia Downs was created in 2001, therefore, no data for the town is available before this time, and the area is assumed to be part of the rural balance.

There were two main ways in which the concordances were produced. Firstly, the concordance files published by the ABS were used to determine the degree of change. This allows CDs to be matched up between Censuses based on an index of comparability. Each CD is given a comparability code between zero and nine to denote the extent to which the boundary has changed, as follows:

Comparability code	Description
0	Perfectly comparable
1	Although there has been a boundary change, there is no change to population or dwellings
2	A boundary change has occurred, but within a 2% change to dwellings
3	A boundary change has occurred, but within a 10% change to dwellings
4	A boundary change has occurred through the CD being split into two, with the previous boundary retained around the two new CDs
5	A boundary change has occurred through the CD being split into three or more CDs, with the previous boundary retained around the new CDs
6	A boundary change has occurred, to the extent that the new boundary is incomparable with the previous one
7	A boundary change has occurred through the amalgamation of two CDs with the outer boundary being retained
8	A boundary change has occurred through the amalgamation of three or more CDs with the outer boundary being retained
9	A minor boundary change has occurred through the supply of more accurate base map data, with no impact on dwellings or population

For the purposes of *Towns in Time*, CDs with comparability codes of 0,1,2 or 9 were deemed to be comparable. For other CDs, the degree of dwelling change needed to be calculated. This was done using the following methods:

- i) investigation of electronic aerial photographs (where available)
- ii) use of address point data
- iii) examination of planning scheme data
- iv) examination of cadastral parcels
- v) field visits

The favoured method was the aerial photographs, since these enabled sound estimates of dwelling changes. However, since these are not readily available for all of Victoria across all time periods, the other methods listed above were employed. CDs which had a comparability code of 6 were the most difficult to work with, particularly where the boundaries bore little resemblance to previous years.

Validation of the concordances was undertaken to ensure that they were consistent with known population and dwelling change in an area. Comparison with ABS estimates was not always possible, especially where major boundary changes had occurred.

### Changes to towns

As indicated above, CD boundary changes can result in the creation of new towns, or the abolition of others. The table below details these changes for the 2006 version of *Towns in Time*.

<b>New towns for 2006</b>	<b>2001 towns not included in 2006 Towns in Time</b>
Barmah	Branxholme
Batesford	Cororooke
Beveridge	Eskdale
Dales' Creek	Huntly*
Eldorado	Hurstbridge*
Golden Beach-Paradise Beach	Melton*
Greendale	Officer*
Katandra West	Pakenham*
Katunga	Sunbury*
Kiewa	St Andrews Beach*
Longwood	Watchem
Myrniong	Werribee South
Napoleons	Yarrawonga East
Nilma	
Pioneer Bay	
Sandy Point	
Scarsdale	
Shepparton East	
Skenes Creek	
Tarrington	
Toolamba	
Traralgon South	
Wandiligong	

Towns marked with an asterisk are included in the publication *Suburbs in Time*.

## Data

Questions asked in the Census can change over time, and as such, it was necessary to choose variables that were consistent over time, or were able to be concorded easily. The basis for selecting variables for inclusion in *Towns in Time* was therefore a compromise between what data was useful versus what data was able to be included over the 25 year time period.

ABS randomises certain figures to ensure the privacy of individuals. Thus different tables may have different totals. *Towns in Time* assumes the 'basic' tables such as total population, labour force and dwellings are the most accurate (least randomised) tables. Where relevant, other tables were adjusted on a pro-rata basis (at CD level) to equal the 'basic' tables, thereby providing a consistent set of figures for users.

In contrast to previous versions of *Towns in Time*, the tables now include the "not stated" category in order to provide a complete set of data. Another reason for their inclusion is that they may also include "imputed" responses. This occurs when the ABS cannot determine whether a dwelling was occupied on Census night, and this is resolved by imputing people into a dwelling (based on the average characteristics for the CD), as well as their age, sex and marital status. All other Census responses are coded to "not stated" as it is not possible to determine these characteristics. Hence, if there is a high degree of imputation in an area, it can result in a high proportion of "not stated" responses. Inclusion of these enables the user of *Towns in Time* to consider these in their analysis of the data.

For variables relating to counts of persons, the ABS excluded overseas visitors from 1996 onwards, but included them prior to this. To maintain consistency between years, all tables have therefore been adjusted to a total excluding overseas visitors.

In some cases, variables also had to be adjusted to account for changes to Census questions and reporting. A list of notes on these manipulations follows.

### Education

- Changes in system used to classify qualifications make comparing data across years difficult, particularly in the 'diploma or certificate' category. ABS documentation and advice was used to concord variables, but it should be noted that differences in the scope of the classification systems could not be adjusted for.
- The category 'no post school qualification' is derived from 1996 onwards, and therefore includes people with a qualification out of the scope of the classification system used in that Census year.

### Language spoken at home

- In 1986 and 1996 the raw data applies to persons aged 5+ only. This is dealt with by adjusting totals back to total persons on a pro-rata basis.
- 1986 data does not include a 'speaks English only' variable. Therefore, this has been derived as a difference between the total population and the number of non-English speakers.

### Industry of employment

- Various industry classifications have been in use between 1981 and 2006. For *Towns in Time 2006*, all data have been converted into ANZSIC 2006, using an internally developed concordance.

### Tenure

- The published data for 'rented – other' includes both private rentals and not-stated tenure types in 1986. Therefore, not-stateds are included in the 'rented – other' category in future years also.
- 1981 is the only year to include a not-stated category for owned homes. This was apportioned between 'fully owned' and 'being purchased' categories on a pro-rata basis.

### Household Income

- Household income was adjusted into quartiles of income to make the income category comparable over time without the need to adjust for inflation. Estimates of quartiles were generated by dividing household income groups for all Victorian CCDs into an even four groups. A list of the approximate quartile limits used for the different years is given in the table below.
- Note that the introduction of a negative income category at the 1996 Census has not been adjusted for. In previous censuses, there was not a specific category for negative income and therefore respondents are likely to have either used the 'no income response' or to have not responded at all.

<b>Annual income</b>	1981	1986	1991	1996	2001	2006
First quartile (lowest income)	Nil to \$8,678	Nil income to \$12,687	Nil income To \$16081	Nil income to \$17,719	Nil income to \$22,173	Nil income To \$28,080
Second quartile	\$8,679 to \$15,419	\$12,688 to \$23,048	\$16,082 to \$29,977	\$17,720 to \$33,335	\$22,174 to \$42,246	\$28,081 to \$53,146
Third quartile	\$15,420 to \$24,080	\$23,049 to \$36,519	\$29,978 to \$48,739	\$33,336 to \$55,918	\$42,246 to \$71,777	\$53,147 to \$87,528
Fourth quartile (highest income)	Greater than \$24,080	Greater than \$36,519	Greater than \$48,739	Greater than \$55,918	Greater than \$71,777	Greater than \$87,528