

## POPULATION STATISTICS AND THE NUMBER OF HOUSE OF REPRESENTATIVES SEATS FOR THE NORTHERN TERRITORY

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*The number of seats in the Australian House of Representatives allocated to each state and territory is determined largely by population size, with periodic re-calculations made to allow for the changing geographical distribution of the nation's population. This paper describes how the calculations are made and presents the results of the Australian Electoral Commissioner's November 2005 seat determination. It focuses mostly on the case of the Northern Territory (NT). In the 2000 determination, for the first time, the NT was allocated a second seat, which would have been lost in the 2003 determination had there not been an inquiry and subsequent legislative changes. In the most recent determination the second seat was retained by a small margin. The paper explains the calculations which decided this matter and goes on to discuss the prospects for future representation of the Territory.*

### INTRODUCTION

Official population estimates or census counts are used in many countries to determine local and regional political representation. Australia is one such country, making use of Australian Bureau of Statistics Estimated Resident Population (ERP) figures to determine the allocation of House of Representatives seats to the six states and two major territories. The Commonwealth Electoral Act 1918 (hereafter, the Act) requires the number of House of Representatives seats for each state and territory to be — as far as possible — proportional to the size of its population. This facilitates the democratic process by attempting to ensure that all voters have the same opportunity to be heard through their elected political representative. To allow for shifts in the geographical distribution of the nation's population between the states and territories over time, the Australian Electoral Commissioner recalculates seat entitlements a year after the House of Representatives first sits following an election.

The case of the Northern Territory (NT) has been particularly interesting and topical. Prior to the 2001 election it had just one member in the House of

Representatives. In the 2000 seat determination a second seat was allocated to the NT for the first time in its history. However, slower population growth relative to that of the six states led to the loss of this second seat in the 2003 determination. This decision halved the NT's representation in the House of Representatives. Considerable public discussion and political lobbying followed. An inquiry by the Joint Standing Committee for Electoral Matters was conducted which, after much consideration, resulted in a novel amendment to the Electoral Act in 2004. This acknowledged uncertainty in the official population estimates and explicitly introduced into the Act the concept of a confidence interval in NT and Australian Capital Territory (ACT) population estimates. The 2003 determination was set aside and the NT was allowed to retain its two seats until the subsequent determination. The outcome of the most recent determination, made on 17th November 2005, proved difficult to predict given the volatility in the NT's estimated population growth.

This paper describes the way in which ERP figures are used to calculate House of Representatives seat entitlements for the states and territories, focusing mostly

on the NT. It discusses the change in calculation procedure enacted for the NT and the ACT in 2004 and how this impacted on the November 2005 seat entitlement calculations. It goes on to discuss possible changes to the NT's representation in the future.

#### **HOW ARE HOUSE OF REPRESENTATIVES SEAT ENTITLEMENTS CALCULATED?**

##### **The states**

The Act requires the number of House of Representatives seats to be determined 12 months after the first sitting of the House following an election. Results from this determination then apply for the next election. In order to perform the calculations the Electoral Commissioner must ascertain the populations of the states and territories that 'the Australian Statistician has, most recently before the reference day, compiled and published in a regular series under the Census and Statistics Act 1905'.<sup>1</sup> The most recent determination took place on 17th November 2005; the latest population figures were the March 31st 2005 ERPs published by the Australian Bureau of Statistics (ABS).<sup>2</sup> For seat determination purposes the Act in fact defines the population of a state to be not just its ERP but also any 'resident of Norfolk Island who is one of the people of a State'.<sup>3</sup>

There are two steps in the calculation of state seat entitlements. The first step is to calculate the population quota, the number of people required per seat in the House of Representatives. This is defined as:

$$\text{quota} = \frac{\text{total population of the 6 states}}{2 \times \text{number of state senators}}$$

The denominator stems from the constitutional requirement for the number of House of Representatives members to be as far as practicable twice the number of

senators. Each state returns 12 senators so there are 72 state senators. Given the six states' combined March 31st 2005 ERP of 19,751,803 plus the number of Norfolk Islanders in the six states, 262, the quota is calculated as:

$$\frac{19,752,065}{144} = 137,167.118$$

The seat entitlement for each state is then calculated in the second step as:

$$\text{Seat entitlement} = \frac{\text{state population}}{\text{quota}}$$

The result is rounded up if the fraction is greater than 0.5 and down if it is less than or equal to 0.5. However, this seat entitlement calculation does not apply if it allocates fewer than five seats for a state because all states are guaranteed a minimum of five representatives. Tasmania is allocated five seats in this way.

The new seat entitlements for each state as of November 2005 are given in Table 1. Reflecting the changing geographical distribution of the nation's population, New South Wales loses one seat, Queensland gains one, and the other states remain unchanged. Clearly, the growth of a state/territory's population relative to the growth of all states combined is crucial to the outcome.

##### **The territories**

How are seat entitlements for the NT, the ACT and other territories calculated? Norfolk Islanders who are enrolled to vote are included in the NT and ACT populations for seat determination purposes (a subtle difference from the states where all Islanders are included whether they are enrolled or not). The populations of the Territory of Cocos (Keeling) Islands, the Territory of Christmas Island and Jervis Bay Territory are too small to entitle them to a member in the House of Representatives. The Act

**Table 1: House of Representatives seat entitlements for the states, November 2005 determination**

| State         | 31st March 2005 ERP | Norfolk Islanders | Population | Population quota | No. of seats | Change from 2003 |
|---------------|---------------------|-------------------|------------|------------------|--------------|------------------|
| NSW           | 6,764,563           | 127               | 6,764,690  | 49.3171          | 49           | -1               |
| Vic           | 5,012,680           | 9                 | 5,012,689  | 36.5444          | 37           | 0                |
| Qld           | 3,945,845           | 95                | 3,945,940  | 28.7674          | 29           | +1               |
| SA            | 1,540,212           | 11                | 1,540,223  | 11.2288          | 11           | 0                |
| WA            | 2,003,764           | 14                | 2,003,778  | 14.6083          | 15           | 0                |
| Tas           | 484,739             | 6                 | 484,745    | 3.534            | 5            | 0                |
| States' total | 19,751,803          | 262               | 19,752,065 | -                | 146          | 0                |

Source: Commonwealth of Australia Gazette, No. S201, 17 November 2005, Attorney-General's Department, <http://www.ag.gov.au/portal/govgazonline.nsf>

therefore counts the Cocos Islands and Christmas Island as part of the NT, and Jervis Bay Territory as part of the ACT. Apart from these additional populations the seat entitlements of the NT and the ACT were, until recently, determined in exactly the same way as for the states (subject to a minimum of one seat guaranteed for both territories).

However, when calculations were made in the Electoral Commissioner's February 2003 determination the NT's seat entitlement was 1.4978 (and thus rounded to 1), resulting in the loss of the Territory's second seat by a very small margin.<sup>4</sup> In fact, just another 295 people would have been sufficient to push the seat entitlement above 1.5, and thus maintain the NT's representation at two seats.

Considerable public discussion ensued, and the MP for Solomon, David Tollner, introduced a private Member's Bill in the House of Representatives to provide for a minimum of two seats each for the NT and ACT. The Special Minister for State then asked the Joint Standing Committee for Electoral Matters to look into this issue.<sup>5</sup> In its report the Committee observed that the two Territories' population estimates contained a higher degree of uncertainty than those of the states.<sup>6</sup> It recommended

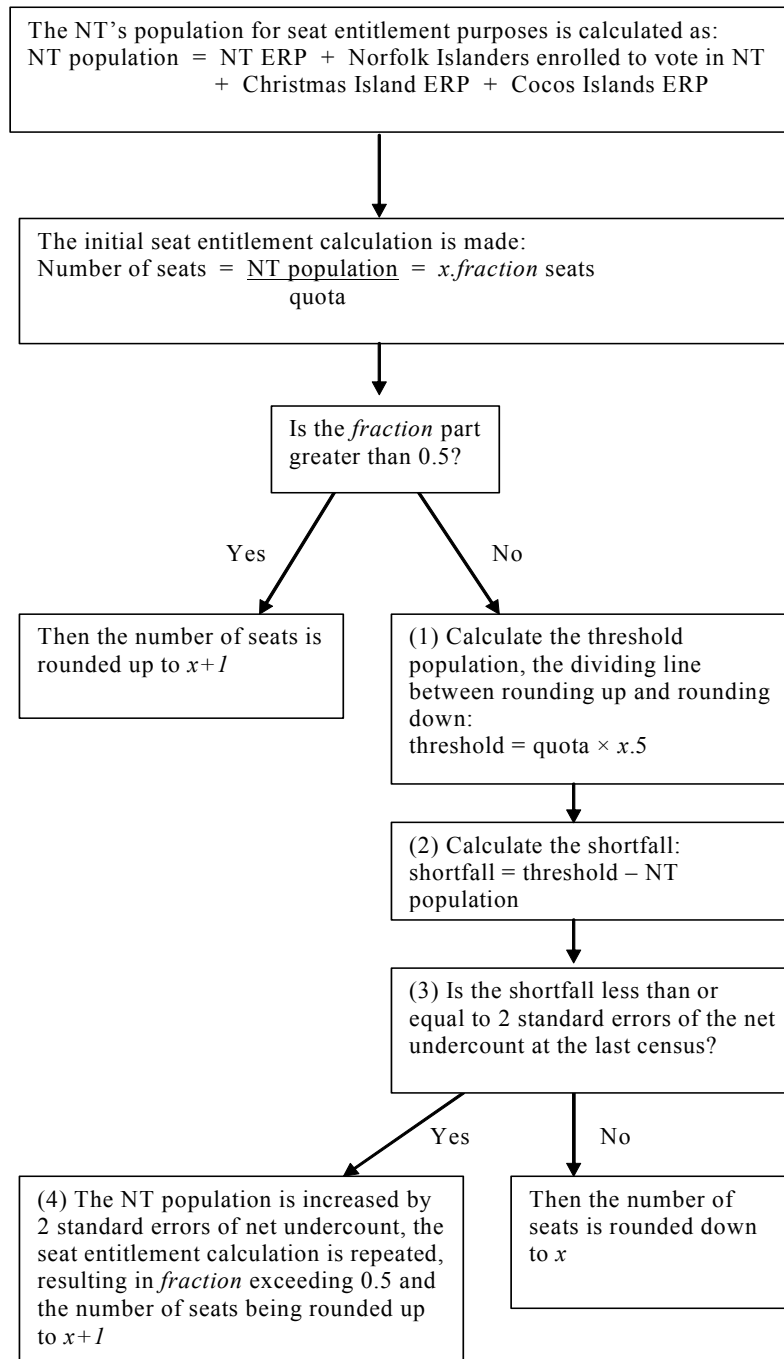
the Electoral Commission take into account possible error in the NT and ACT populations when determining seats. Specifically, it advised that:

The margin of error for the ACT and the NT be incorporated into the determination of seats for the Territories when a Territory falls short of a quota. If the shortfall is within the margin of error acknowledged by the ABS, the Australian Electoral Commissioner is to use the ERP figure at the top of the margin of error to determine the Territory's entitlement.<sup>7</sup>

As a result the Act was amended in April 2004 with the Commonwealth Electoral Amendment (Representation in the House of Representatives) Act 2004. The Electoral Commissioner's February 2003 determination that would have reduced the NT's representation to one seat was revoked. The procedure for calculating seat entitlements for the NT and ACT was also changed in line with the Joint Standing Committee's recommendations. The amendments were made with the intention of largely removing the possibility of Territories being disadvantaged due to uncertainty in the official estimates of their populations.

The new procedure for calculating the NT's seat entitlement is summarised in Figure 1. The process begins by adding to

**Figure 1: How the NT's House of Representatives seat entitlement is calculated**



Source: based on Commonwealth Electoral Act 1918

the NT's ERP any Norfolk Islanders enrolled to vote in the NT plus the ERP of Christmas Island and the ERP of the Cocos (Keeling) Islands to give the NT's population as defined for these purposes. The preliminary seat entitlement is then calculated in the same way as for the states:

$$\text{Initial seat entitlement} = \frac{\text{NT population}}{\text{quota}} = x.\text{fraction seats}$$

If the result contains a fractional part greater than 0.5 then it is rounded up.

The difference with the process for calculating state seat entitlements comes only if the fractional part is less than or equal to 0.5. It could be that the NT's population falls only just short of the number required to get the fraction above 0.5, and thus have the seat entitlement rounded up. Providing that the shortfall is within an officially defined margin of error then the legislation allows for the number of seats to be rounded up to  $x+1$ .

The precise calculations required by the Act if the fractional part is less than or equal to 0.5 are as follows:

- (1) A 'threshold' population, the dividing line between rounding the number of seats up or down, is found. This is calculated as:  
 $\text{threshold} = \text{quota} \times x.5$
- (2) The amount by which the NT population falls short of the threshold, the shortfall, is calculated as:  
 $\text{shortfall} = \text{threshold} - \text{NT population.}$
- (3) The official uncertainty of the NT population is ascertained. The value of 'twice the standard error of the measure of the Australian Statistician's estimate of the net undercount for that Territory at the last Census'<sup>8</sup> is obtained. (Note that because a post-enumeration sample survey is used to estimate net undercount, this is a *sampling* standard error. Whether this is the most appropriate measure is an interesting

point as non-sampling errors may also be significant.) If the shortfall is less than, or equal to, two standard errors then the NT population is 'taken to be increased by a number equal to twice the standard error'<sup>9</sup> as defined above.

- (4) The seat entitlement calculation is then repeated using this increased population figure.<sup>10</sup>

Whilst these calculations are required by law, they do seem to be a rather complicated way of approaching the issue. A more intuitive calculation procedure might consist of:

- (a) Calculating the threshold population in the same way as above
- (b) Calculating the official 95 per cent confidence interval of the NT population, which has a lower limit of the NT population minus two standard errors of the net undercount estimate, and upper limit of the NT population plus two standard errors, and then
- (c) Establishing whether the upper confidence limit exceeds the threshold. If it does, the number of seats is rounded up to  $x+1$ .

Essentially this is saying 'given the uncertainty of the NT's officially estimated population, its "true" population could lie anywhere within the confidence interval. If the top of the confidence interval exceeds the threshold we will give it the benefit of the doubt'.

#### **THE NOVEMBER 2005 SEAT ENTITLEMENT FOR THE NT**

So how did the NT fare in the November 2005 seat determination? The calculations and results are set out in Table 2, showing that the NT keeps its second seat — for now. The population figures in these calculations are also usefully presented in graphical form. Figure 2 shows the NT population and the 95 per cent confidence interval, ranging  $\pm$  two standard errors of

**Table 2: Seat entitlement calculation, Northern Territory, November 2005 determination**

|   |   |
|---|---|
| <b>Initial seat calculation</b>   |   |
| NT ERP 31st March 2005  | 201,767                                       |
| +Norfolk Islanders enrolled to vote in NT <sup>a</sup>                        | 1   |
| +Cocos (Keeling) Islands <sup>b</sup>   | 592   |
| +Christmas Island <sup>b</sup>  | 1,520   |
| =Population for seat calculation purposes (NT population)                     | 203,880                                       |
| Quota (state ERPs/144) <sup>c</sup>   | 137,167.12                                    |
| Seat entitlement (NT population/quota) <sup>d</sup>                           | 1.4864  |
| Result  | Entitlement < 1.5 i.e. falls short of 2 seats |
| Action  | Check size of population shortfall            |
| <b>(1) Calculation of threshold population</b>                                |   |
| Threshold population (quota × 1.5) <sup>e</sup>                               | 205,750.68                                    |
| <b>(2) Calculation of shortfall</b>   |   |
| Shortfall (Threshold population — NT population)                              | 1,870.68                                      |
| <b>(3) Official uncertainty</b>   |   |
| 2 standard errors of net undercount from 2001 Census (2 × 1,306) <sup>f</sup> | 2,612   |
| Result  | Shortfall < 2 standard errors                 |
| Action  | Add 2 standard errors to the population       |
| <b>(4) New seat calculation</b>   |   |
| New population for seat calculation (NT population + 2 standard errors)       | 206,492                                       |
| Seat entitlement (Increased NT population/quota)                              | 1.5054  |
| Result  | NT entitled to 2 seats                        |

the census net undercount either side of the NT population total. Also shown is the threshold population, quota × 1.5, which must be surpassed if the seat entitlement is to be rounded up to two seats. The threshold population can be seen lying clearly within the confidence interval.

The ACT also received two seats. Its seat entitlement worked out as 2.3751, and, because its threshold population for rounding up, 2.5, does not lie within its 95 per cent confidence interval, this is rounded down to two.

#### **FUTURE PROSPECTS FOR NT REPRESENTATION**

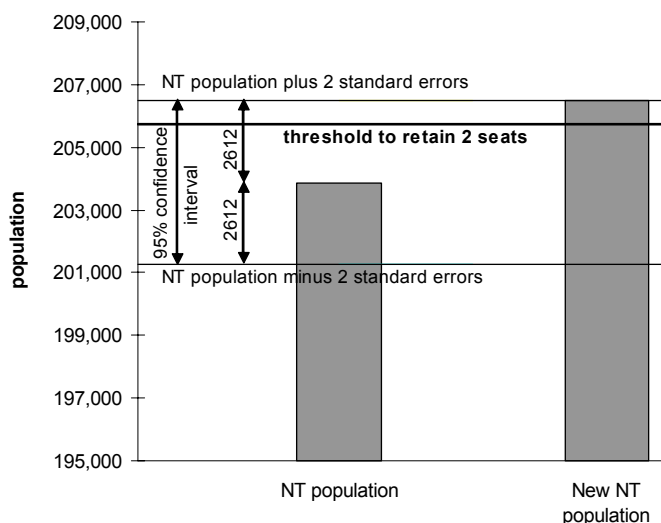
What are the future prospects for the retention of two seats in the NT? This depends on a number of factors, including:

- The growth of the NT population relative to the six states
  - New net undercount sampling error standard errors in the 2006 Census and subsequent censuses
  - The timing of elections
  - Possible legislative changes to the seat entitlement calculations.
- These are considered in turn.

#### **Relative population growth of the NT**

An indication of future long-term NT population growth relative to the six states can be gleaned from published population projections. The most recent ABS set<sup>11</sup> provide projections for the states, the NT and the ACT, as well as Australia as a whole. The Australia-wide projections include Christmas Island, the

**Figure 2: Key population numbers in the House of representatives seat determination for the NT**

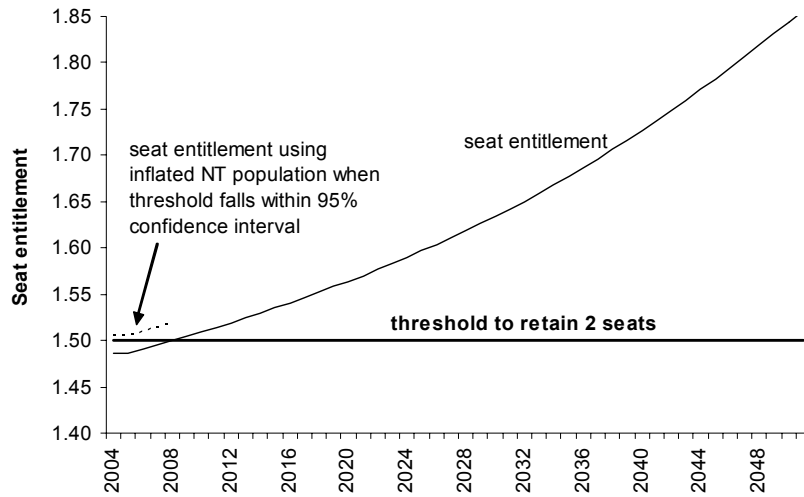


Cocos Islands and Jervis Bay Territory. Making the bold assumption of no population change in the Jervis Bay Territory, the Christmas plus Cocos Islands population can be determined indirectly. According to the medium series of these projections the NT population (including the two sets of islands) is set to grow to 270,000 by 2026 and 353,000 by 2051. What do these projections suggest for the NT's representation? Figure 3a provides the answer. For the years 2005 to 2008 the seat entitlement calculation produces figures just under 1.5. However, the threshold is within the 95 per cent confidence interval for all of these years. A recalculation of the seat entitlement using the increased NT population (the NT population plus twice the standard error from the 2001 Census) raises the seat entitlement above 1.5, as shown by the dotted line in Figure 3a. In future years the NT's two seats look increasingly safe.

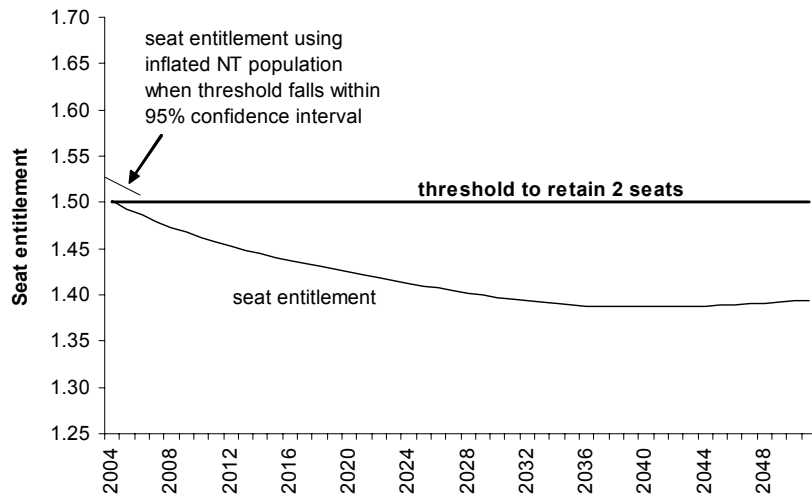
However, the ABS medium series projection is just one of an infinite number of plausible population futures for the NT.

Recently an interesting projection for the NT was produced as part of the Productivity Commission's report *Economic Implications of an Ageing Australia*.<sup>12</sup> The very different population dynamics of the Indigenous and non-Indigenous populations were modelled separately and, crucially, an assumption of Indigenous fertility falling below replacement in coming decades was made. The ABS does not project the population by Aboriginality. However, there is an implicit assumption of above-replacement Indigenous fertility in their medium series projections, because the all-NT fertility rate is assumed to exceed replacement throughout the 2002 to 2051 projection horizon. Not surprisingly, the Productivity Commission projections are quite different. The NT population is projected to reach 235,000 by 2026 and 264,000 by 2051 (these figures include the populations of Christmas Island and the Cocos Islands derived from the ABS projections). If

**Figure 3a: Projected House of representatives seat entitlements for the NT, using ABS 2004-based medium series projections: two seats retained**



**Figure 3b: Projected House of Representatives seat entitlements for the NT, using Productivity Commission NT projections: loss of second seat**





seat entitlement calculations are repeated using the ABS medium series projections for the six states (so the quotas are the same) what is the outcome for the NT? Figure 3b presents a very different picture to Figure 3a. By 2007 the seat entitlement has fallen to 1.4792 and the threshold population is no longer within the 95 per cent confidence interval. If the NT follows this population trajectory it will lose a seat before the end of the decade.

#### **New confidence intervals**

The sampling standard error of net undercount in the 2001 Census was estimated by ABS to be 1,306 in the NT. This will almost certainly have been replaced by the time the next seat determination is made by the 2006 Census net undercount standard error. Changes in the method for estimating the undercount may result in larger or smaller estimates of the standard error of the undercount and, even if no changes of method are used, some differences will occur due to sampling variation. Clearly a smaller standard error will require the NT population to be even closer to the threshold should it fall below it. Say, for example, the 2006 Census standard error turns out to be half the 2001 figure. How would this affect the seat entitlements using the two sets of projections mentioned above from 2006? The ABS medium series projections have the seat entitlements just below 1.5 until 2008, and above it thereafter. With the smaller standard error the threshold for rounding up to two seats lies within the 95 per cent confidence interval for 2006-2008. With the Productivity Commission projections the threshold lies outside the confidence interval from 2006 onwards.

What if the standard error doubled? With the ABS projections there would be

two seats throughout the projection horizon. With the Productivity Commission projections, the threshold would lie within the confidence interval until 2009. After this the second seat would be lost for at least a generation.

#### **Timing of elections**

The timing of federal elections will determine the date of any future determinations and electoral redistributions. The Act requires the Electoral Commissioner to use the most recently available published ABS ERPs for calculating seat entitlements. Volatility in the NT's population growth, particularly in the interstate migration figures, can affect population estimates substantially from one quarter to the next. Therefore, the particular quarter's estimates to be used for a determination may prove favourable or otherwise for Territory representation. For example, during the March quarter 2005, interstate migration to the NT was positive for the first time since December 1999, providing a boost to population growth so that it surpassed Australian population growth for the quarter. And in the 2003 seat determination, the NT would have retained its second seat had the population figures for the June quarter, rather than the September quarter, been used.<sup>13</sup>

#### **Changes to the rules**

In addition to relative population growth, the timing of elections and changes to the standard errors, the seat entitlement rules could be re-written. One possibility is for the NT and ACT to be guaranteed a minimum number of seats. One suggestion of the NT Government, noted in the report by the Joint Standing Committee on Electoral matters,<sup>14</sup> is for the two Territories to be guaranteed two seats each, in the same way that the states have a five seat guarantee.

A change to the total number of House of Representatives seats could also be considered. Although Australia is often said to be over-governed with its three levels of government, at the Commonwealth lower-house level, the 150 members are considerably fewer than in many lower houses of parliament around the world. This number has remained roughly constant since 1984<sup>15</sup> even though Australia's population has grown by about 30 per cent since that date. A greater number of seats would reduce the impact of losses or additions of one seat on the representation of the NT and ACT. The number of House of Representatives seats cannot be changed easily, of course, due to the constitutional requirement that it be twice the number of state senators (or as close as possible to this). It might be easier, therefore, to alter the size of the House of Representatives by increasing the number of senators.

#### **CONCLUSION**

Two House of Representatives seats were contested in the NT for the first time in the 2001 election following the Electoral Commissioner's 2000 determination. In the 2003 seat determination the legislation existing at the time resulted in the NT's entitlement falling back to one seat, by a margin of just 295 people. However, a change to the Act in 2004 set aside this determination, allowing the NT to retain its two seats for the next election. Significantly, the 2004 legislative change explicitly introduced the concept of uncertainty in population estimates into the Act — a major shift in thinking with respect to official statistics. This paper has demonstrated how it was only due to the legally-defined confidence interval surrounding the NT's population that it managed to retain its two seats in the recent November 2005

determination. Had the old (pre-2004) legislation applied the NT would have been entitled to only one seat.

Will the Territory manage to retain its two seats over coming years and decades? This will largely depend on the population growth of the NT relative to the six states. Any sustained slippage in NT population growth from the Australian norm of the day could result in the loss of the second seat. Whether this will happen is impossible to predict with certainty. Because of the recent changes to the Act in respect of the NT, the precision with which ABS is able to estimate the undercount of the NT's population following future censuses may also influence the retention of the second seat. Ironically, greater precision on behalf of ABS may increase the prospect of losing the second seat.

#### **Note**

Mary Beneforti writes in a personal capacity. Any views expressed are not necessarily those of the Northern Territory Treasury.

#### **Acknowledgement**

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- <sup>6</sup> Joint Standing Committee on Electoral Matters, op. cit.
- <sup>7</sup> Joint Standing Committee on Electoral Matters, op. cit., page 66
- <sup>8</sup> Commonwealth Electoral Act, op. cit., section 48, paragraph 2E (b)
- <sup>9</sup> Commonwealth Electoral Act, op. cit., section 48, paragraph 2F (b)
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