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More or Less?: Implications from changes to statistical geographies for 'local' demographic research in the NT

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RESEARCH AIM

The primary source for understanding population changes at all levels in Australia is the Census of Population and Housing. For the 2011 Census a new statistical geography standard was in place, the Australian Statistical Geography Standard (ASGS).

In this research brief, we explore whether the new geographical standard reflects 'the local', particularly in relation to 'dynamic' Census variables such as migration and whether the spatial units become more or less reflective of 'the local' over time.

KEY FINDINGS

- Changes to the ABS geographical standards between 2006 and 2011 have altered the regions for which 'dynamic' Census variables (those that relate to residential migration, place of work and place of enumeration, for example) can be produced.
- The change to the 2011 standard has resulted in a reduced ability to discern local demographic changes in the Northern Territory (NT) over time with a net loss of 30 Statistical Local Areas (SLAs) for the NT, all of which mapped to discrete Indigenous communities in more sparsely populated areas including Lajamanu, Numbulwar, Borroloola, Angurugu and Yuendumu.
- There were 21 Statistical Districts (SDs) across Australia that experienced 'decreased localness' in the transition from 2006 to 2011, on average losing 6 Statistical Area Level 2s (SA2s) each (representing about one quarter of the number of SLAs they had contained).
- Whilst many urban areas saw an increase in 'localness' (an ability to discern local demographic trends) in the transition from SLAs to SA2s (if measured by the average size of spatial units within a region), the NT and many other rural and remote areas saw a decrease in localness, resulting in reduced spatial areas that trends in Census 'dynamic' variables can be described against.
- The changed statistical framework limits the capacity to produce research-based distinctions in trends between local and regional levels.

1. Introduction

Understanding local level demographic processes is important for settlement planning, social services delivery and, in countries like Australia, for the functioning of democratic governance systems. A key source of information about demographic change at all spatial levels is the Census of Population and Housing (Census). For the 2011 Census a new statistical geography standard was implemented, the Australian Statistical Geography Standard (ASGS) (ABS 2013). It replaced the previous standard, the Australian Standard Geographical Classification (ASGC), which had been the foundation for output for the five Censuses up to 2011.

The base spatial unit readily available under the ASGS is Statistical Area 1 (SA1), which replaces Collection Districts (CDs) from the ASGC. SA1s can be profiled according to a range of 'static' variables such as age, sex, relationship and socio-economic characteristics using tools such as TableBuilder Pro, which is the ABS online customisable Census database. The introduction of SA1s has however, reduced the granularity of analysis which is possible for Census 'dynamic' variables. These are the variables relating to residential migration, place of work, and place of enumeration (where people were actually counted on Census night, also known as the *de facto* population count). The base spatial unit for which full analysis of 'dynamic' variables (of particular importance are the migration variables which facilitate research on people who move in to and out of communities, and their characteristics) are possible for users is Statistical Area Level 2 (SA2), which replaces the geographical classification unit Statistical Local Area (SLA) from the ASGC. As the lowest level statistical unit for which 'dynamic' variables can be analysed, SA2s are now the primary spatial unit for research into what might be termed 'local' level demography in rural and remote areas.

The benefits of the ASGS have been predominantly for research in urban areas or more densely populated areas. These areas (for example, parts of the eastern coast of QLD; Sydney and the North East NSW coast; Melbourne and outer suburbs; Hobart area and north eastern Tasmania; and Perth) have benefited from the increased number of spatial units that can be described against 'dynamic' Census variables. In contrast, fewer core spatial units now exist in more sparsely populated areas, which are therefore increasingly represented as consisting of 'regional' rather than 'local' populations. In reality, however, sparsely populated areas are extremely 'local', with often more well-defined settlement borders than those in more densely populated areas. Individual settlements in sparsely populated areas are known to be demographically diverse, and the value of 'regional' analysis under conditions of high diversity in demographic characteristics is questionable (Carson et al, 2011, Carson & Koch, 2013).

In this research brief we explore the extent to which the new geographical standard reflects 'the local', particularly in relation to 'dynamic' Census variables and whether these spatial units have become more or less reflective of 'the local' over time.

2. Methods

The Australian Bureau of Statistics (ABS) Census of Population and Housing is the primary source of data for understanding population change and demographic trends at all levels in Australia. To understand how well the ABS geographical standards reflect 'the local' (in particular migratory movements at the local level), and whether these spatial units have become more or less reflective over time, changes to the geographical boundaries were analysed. Figure 1 shows a comparison of the geographical hierarchic levels for the ASGS and ASGC. The top two tiers in both classifications are 'Australia', then 'State/Territory', and then subsequently divided into smaller geographical areas, as indicated in the brackets.

Figure 1: Comparison of geographical levels for the ASGS and ASGC

2011 Census (ASGS)	2006 Census (ASGC)
Australia (1)	Australia (1)
State/Territory (9)	State/Territory (9)
Statistical Area Level 4 (106)	Statistical Division (69)
Statistical Area Level 3 (351)	Statistical Subdivision (217)
Statistical Area Level 2 (2,214)	Statistical Local Area (1,426)
Statistical Area Level 1 (54,805)	Collection District (38,704)
Mesh Blocks (347,627)	

Source: ABS (2012)

Census data was extracted using the 'Place of Usual Residence' (indicating where respondents had resided or anticipated residing for more than six months of the Census year) database within Census TableBuilder Pro. For the most part 2006 and 2011 Census data and 2006 ASGC and 2011 ASGS geographical boundaries were utilised. Using Statistical Divisions (SDs) to represent regional areas, a comparison of the number and analysis of the geographical boundaries of SA2s and SLAs was undertaken. These were mapped using QGIS (open source software) to edit, analyse and visualise the information in a geospatial environment.

Whilst SLAs are not in the main ASGS hierarchic structure for Census 2011, they were still produced but with significant changes to their numbers. There were 1,426 SLAs in the 2006 Census and 1,390 SLAs and 2,196 SA2s in the 2011 Census (excluding migratory and no usual address), covering all of Australia. We identified from this which States/Territories gained or lost SLAs between the two Census periods and the significance of the loss or gain for local demographic analysis within the State/Territory, with a focus on remote areas.

3. Results

3.1 Measuring the loss of 'localness' in the transition to the ASGS

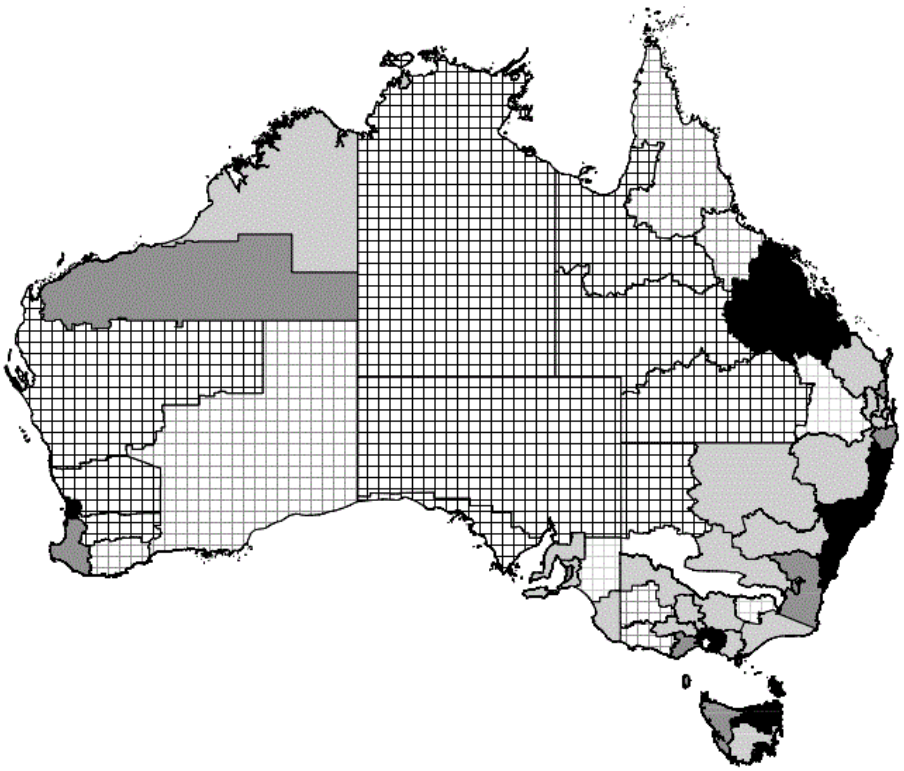
The period 2006-2011 saw both the transition from ASGC to ASGS and some changes in SLA boundaries. At the national level, the number of SLAs decreased from 1,426 in 2006 to 1,390 in 2011 (ABS, 2006; ABS, 2011). The largest losses were in the Northern Territory (NT), which lost thirty SLAs. All SLA losses in the NT represented discrete Indigenous communities in more sparsely populated areas. Examples of communities that were SLAs in 2006 but were not in 2011 included; Lajamanu, Numbulwar, Borroloola, Angurugu and Yuendumu. The changes in SLA boundaries between 2006 and 2011 had significant implications for local demographic research across sparsely populated rural and remote NT.

3.2 'Localness' at the SA2 level

The transition from ASGC to ASGS (SLAs to SA2s) was equally damaging to the prospects of local demographic research in the NT with only Wadeye (Thamarrurr), a remote town in the north-west of the Territory, classified as an SA2. At the national level, there were 2,196 SA2s (compared to 1,390 SLAs) for the 2011 Census (excluding migratory and no usual address SA2s), however the additional national coverage from the introduction of SA2s did not occur uniformly across Australia. While concordances are not exact, an analysis of the number of SA2s (2011) compared with SLAs (2006) at the broad regional level (corresponding to 2006 SDs) reveals a pattern of increased 'localness' (if measured by the average size of spatial units within a region) in more densely populated areas, and decreased localness in more sparsely populated areas (see Figure 2). Figure 2 shows SDs where there was increased localness arising from the transition from SLAs to SA2s as solid colours ranging from grey to black depending on the strength of increase, and SDs where there was a 'decreased localness' as hatched colours ranging from grey to black depending on the strength of the decrease.

There was 'increased localness' in 39 SDs in the transition from ASGC to ASGS. These 39 SDs contained 65% of all SLAs (924 out of 1,418) in 2006, and 83% of all SA2s (1,824 out of 2,196) in 2011. On average, these SDs 'gained' 23 SA2s each, nearly doubling the number of SLAs they had contained. There were 21 SDs with decreased localness in the transition from ASGC to ASGS. On average, these SDs 'lost' 6 SA2s each, representing about one quarter of the number of SLAs they had contained.

Figure 2: Changes in 'localness' (solid colouring from grey to black shows increased localness, and hatched colouring from grey to black shows decreased localness)



The broad spatial scale at which this analysis has been done hides some further regional nuances. Three areas are illustrative of this – the North Western SD in New South Wales, and the Pilbara and Kimberley SDs in Western Australia. The eastern parts of the North Western SD 'gained' SA2s while the western parts had fewer SA2s than SLAs. In the Western Australia cases, the additional SA2s were mainly along the coast.

The relatively sparsely populated areas that gained 'localness' were in Tasmania, the north of Western Australia, the central west of New South Wales, and the north west and north east of Victoria. The Western Australian and New South Wales cases (along with the dramatic increase in Central Queensland) are likely explained by the increase in mining activity and political attention associated with that. That increased 'localness' in mining areas (and possibly in drought areas, which might explain the desire for more local data in some of the south eastern regions) has occurred whilst discrete Indigenous communities experienced a loss of 'localness' is interesting. Experiences and expectations of population growth are not sufficient explanations for this dichotomy as both mining proximate regions and regions with large numbers of Indigenous communities experienced relatively high population growth leading up to the 2011 Census, and some drought affected regions in South Australia, New South Wales, Victoria and Tasmania experienced relatively low population growth and even decline in some cases.

4. Discussion and Conclusion

Sparsely populated areas have become increasingly viewed as consisting of 'regional' rather than 'local' populations, while the opposite has been the case in more densely populated areas. However, in reality sparsely populated areas are extremely 'local', with often more well-defined settlement borders than those in more densely populated areas. Where we need good local information because of the clear distinction between local and regional, we have little information, and the situation appears to be worsening over time.

The significant loss of localness, which is particularly evidenced in the changes to the geographic boundaries for the NT, seems remarkable in light of the intense focus on the NT, and particularly its Indigenous population living in more remote communities, that occurred between 2006 and 2011. Key national initiatives during this time, such as the *Northern Territory Emergency Response (NTER)*, *Closing the Gap in Indigenous Disadvantage*, *A Working Future*, and *Stronger Futures in the NT* emphasised the need for evidence based policy and programs, monitoring of indicators and evaluations of demographic change. *A Working Future* in particular had a focus on 'place based' programs and monitoring (Taylor et al 2012; NTG 2009), including specific identification by the Australian Government of 15 communities in the NT (out of 29 across Australia) to be a focus of new approaches to planning and program management. At the same time, the NT Government identified around 20 communities to be 'growth towns' (including all 15 of the communities identified by the Australian Government).

At the time *Stronger Futures in the NT* (Australian Government, 2014) was a $3.4 billion investment over 10 years 'to support Aboriginal communities, families and children in the Northern Territory to live independent, safe and healthy lives'. Many of the critical indicators documented by these various initiatives were demographic indicators or had direct demographic implications – improving life expectancy, reducing infant mortality rates, promoting the mobility of people between towns through 'hub and spoke' service delivery models. Using the 2006 version of SLAs, full dynamic data were available for ten of the NT Government identified towns. Under the 2011 version of SLAs 'dynamic' Census data was available for just one of the NT Government identified towns (and even that combined the town of Wadeye with surrounding 'outstation' communities). In other words, as the demand increased for more detailed understandings of social and demographic change at the local level in remote NT, the capacity to build such understandings from Census data decreased.

It is important to recognise that the ABS does output Census data for an Indigenous Geography in the form of ILOCs (*Indigenous Locations*, aggregates of one or more SA1s to generally represent Aboriginal and Torres Strait Islander communities with a minimum population of 90 Aboriginal and Torres Strait Islander usual residents), IAREs (*Indigenous Areas,* aggregates of one or more Indigenous Locations to provide a medium sized geographical unit) and IREGs (*Indigenous Regions,* loosely based on the former Aboriginal and Torres Strait Islander Commission boundaries) (ABS 2013). These geographies however are not described against 'dynamic' Census variables (of

particular importance are the migration variables which facilitate research on people who move in to and out of communities, and their characteristics).

The ABS also undertook significant user consultation during the design phase of the ASGS, conducting consultation sessions in all capital cities. The ASGC Review Committee had 8 external contributors: representatives from universities, the local government association and government departments; including a representative from the NT Government, Department of Business, Economic and Regional Development (ABS, 2007). It is likely (hoped) that there would have been greater lobbying concerning the inclusion of SA1s for 'dynamic' variable data, and potentially stronger opposition to the loss of SLAs had it been known that ABS would not be releasing the full range of 'dynamic' variables at the SA1 level.

4.1 Strategies to address the issue

The most obvious way to address the issue of reflecting the 'local' within the existing statistical geography is to include mobility and migration data at more levels. There is no technical reason why these data cannot be available at SA1 level, although there may be concerns within the ABS about 'small number cells'. The ABS already has a method for managing small cells – which is to randomise output in small cells to prevent individuals being identified. The randomisation process is a detailed one, but in essence, cells which return values of 1,2 or 3 (e.g. 2 people indicated that they lived in SA2 'X' but worked in SA2 'Y') are randomly set to values of 0 or 3. The ABS proclaims that 'no reliance should be placed on small number cells' (ABS, 2013a), which would certainly be the case if the Census were interpreted as a literal Census (i.e. having complete coverage of the population). Data users, however, are either already fully aware, or can easily be made aware, that the Census is an imperfect collection, affected by enumeration errors (people not being counted or being counted multiple times) and respondent errors (people not answering questions or answering them 'incorrectly').

For those interested in local demography, small cells are extremely important as indicators rather than specific counts of particular phenomena. Tables with small cells can be produced for all of the Census 'static' variables at SA1 level, so it is not entirely clear why 'dynamic' variables need to be treated differently. This is particularly the case for more recent Censuses (and especially 2011) where sophisticated computer-based geocoding procedures have reduced the need for manual coding of address data. Making mobility and migration data available at SA1 level would also allow analysis at non-standard geographic scales, including postcodes, local administrative areas, and other geographic units which are not always derived from SA2s. For example, if analysis of 'dynamic' variables were possible at ILOC level this would provide greater understanding into local demography, particularly mobility and migration at the local level (discrete Indigenous communities). In the NT it is understood that there is considerable local level mobility (from community to community; or community to regional town, for example), however understanding the extent and potential impacts of this is not possible when analysis is only available at SA2 or Local Government Area (LGA) level.

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