ASGC Remoteness Classification: Purpose and Use

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1. INTRODUCTION

1. The Australian Standard Geographical Classification (ASGC) is used by the Australian Bureau of Statistics (ABS) for the collection and dissemination of geographically classified statistics. Until 2001, the ASGC consisted of six parallel structures that divided geographical Australia into different regions and hierarchies of regions for different analytical purposes. In the July 2001 Edition a new structure was added to the ASGC to divide Australia into regions based on relative remoteness - Remoteness Areas (*Statistical Geography: Volume 1—ASGC 2001*, cat. no. 1216.0). While the Remoteness classification has been in existence for over a year, due to normal time-lags in data collection, there have been little data collected and disseminated on the new classification to date. The 2001 Census of Population and Housing is the first major ABS collection to be disseminated on the ASGC Remoteness classification.

2. The aim of this paper is to demonstrate, using data from the 2001 Census, the purpose and appropriate use of the ASGC Remoteness classification. Users are also advised on options for classifying their own data to the Remoteness classification and how and when this may be appropriate.

3. The Remoteness classification was developed by the ABS in response to a demand for a statistical geography that allowed quantitative comparisons between 'city' and 'country' Australia where the defining difference between 'city' and 'country' is physical remoteness from goods and services. While other geographical and non-geographical classifications have included similar concepts, no such categorisation existed in the ASGC prior to 2001. The ASGC divided Australia into urban and rural areas (Sections of State, cat. no. 1216.0, p. 34), but it did not distinguish rural areas on the fringe of, say, Sydney from rural areas in the centre of Australia.

4. Further detail on the history of the Remoteness classification can be found in *Information Paper: Outcomes of ABS Views on Remoteness Classification, Australia 2001* (cat. no. 1244.0.00.001).

5. The Remoteness classification, like other statistical geographies, provides a framework for the collection, dissemination and analysis of data. It is not intended to be a 'stand alone' indicator of advantage or disadvantage. In fact while geographical remoteness may be seen to be a disadvantage in some studies, it may also be seen to be highly advantageous, for example when comparing air quality or noise pollution. Equally, no geographical classification can safely be used as a surrogate for other variables without extensive testing of assumptions. This paper uses data from the 2001 Census to illustrate how the ASGC Remoteness classification should be used as a framework for statistical analysis and seeks to discourage its use as a simplistic answer to complex questions.

2. THE ASGC REMOTENESS CLASSIFICATION

The Purpose of the Classification

1. The aim of the ASGC Remoteness classification is to divide Australia into broad regions for comparative statistical purposes.

2. The classification grew out of a demand for quantitative data on the 'country' versus the 'city'. There is a long held belief in Australia that 'city' people enjoy greater opportunities, have higher incomes and generally enjoy better outcomes than their 'country' colleagues. However, it is impossible to quantify any differences without a definition of what constitutes the 'city' versus the 'country' so that data can be classified and compared.

3. There are many ways in which 'city' and 'country' could be defined. For example 'country' people could be defined by the industry they work in regardless of where they live or people could be classified as 'city' if they work in a town. Alternatively the 'city' could be defined based on population density and everything outside the area of the 'city' be deemed 'country'. This latter approach is in fact already used in the ASGC (Sections of State, cat. no. 1216.0, p. 34) where Urban Centres are defined basically on a threshold population density and everything outside of Urban Centres is deemed to be Rural. This is a geographical approach that classifies areas and by default people are then classified according to where they live. A Steering Committee formed by the then (Commonwealth) Department of Health and Aged Care (DH&AC) in 1998, however, concluded that the ASGC concept of Urban/Rural, while useful in its own way, did not encompass all the factors which separate 'city' from 'country'. The terminology common at the time was 'urban', 'rural' and 'remote' but sometimes also included terms such as 'metropolitan' and 'regional' or even 'the bush' and 'the outback'. The Steering Committee concluded that the critical concept was 'remoteness' and that what defines 'city' and 'country' in this context is how far one travels to access goods and services.

4. With oversight by the above Steering Committee, DH&AC commissioned the National Key Centre for Social Applications of GIS (GISCA) to develop a methodology to quantify 'remoteness'. A basic premise for GISCA's work was to provide a geographical definition of the urban/rural/remote continuum. In deference to the existing ASGC Section of State classification, the terms urban and rural were not used and instead the continuum became accessible/remote/very remote. The index of remoteness developed by GISCA is now known as the Accessibility/Remoteness Index of Australia (ARIA).

From Index to Classification

5. ARIA has been adopted the Department of Health and Ageing (DHA), in a variety of forms for a variety of purposes. ARIA is described in detail in *Information Paper: ABS Views on Remoteness, 2001* (cat. no. 1244.0). It is primarily an index value (continuous variable) calculated for 1 kilometre square grids across all of

Australia. In the latest version of ARIA, commonly referred to as ARIA Plus, the index value is a number between 0 and 15. This number represents the remoteness of a point based on the physical road distance to the nearest town or service centre in each of five population size classes. While ARIA provided a method to quantify remoteness, the index itself does not provide a geographical classification. The 1 kilometre grids must be grouped together in some way to form the areas or regions which are intrinsic to a geographical classification. In developing its geographical classification (ASGC Remoteness Areas), the ABS adopted the ARIA methodology developed by GISCA to quantify remoteness but it did not adopt the classes of Accessibility/Remoteness recommended by the developers of ARIA.

6. When developing the ASGC Remoteness classification, the ABS incorporated some fundamental adaptations to the original ARIA. The ABS:

    - adopted ARIA Plus rather than the original ARIA to reflect the impact on remoteness of small centres with population between 1,000 and 5,000;
    - did not adopt the original classes of remoteness recommended by GISCA and DH&AC; and
    - excluded all reference to 'accessibility' because some experts in the field had a particular view on the meaning of the word 'accessibility'.

7. While using ARIA Plus as the underlying measure, these changes or adaptations mean that the ASGC Remoteness classification has a life and purpose of its own, independent of ARIA. There has been considerable discussion on the merits of ARIA as a quantitative measure of remoteness but one purpose of this paper is to take the discussion beyond ARIA and to focus on the ASGC Remoteness classification itself.

8. The method by which remoteness is measured has, of course, a major impact on any geographical classification derived from it but, if applied consistently across the whole country, the measure of remoteness does not need to be particularly precise to produce a useful classification. An analogy would be classifying Australia into highlands and lowlands. For such a classification it is not necessary to know the height of Mt Kosciuszko to the nearest millimetre or even that Mt Kosciuszko is higher than Bellenden Ker. They are both obviously 'high' by Australian standards. Only a coarse measure of elevation is needed to develop a classification and form meaningful classes of height. Such a classification might look something like:

Highlands	> 1,000 metres above sea level
Slopes and Plains	> 200 metres and < 1 000 metres above sea level
Lowlands	< 200 metres above sea level

9. The above classification could then be used to gather data on comparative rain fall, vegetation types or population distribution. It might well be found after suitable analysis that rainfall is higher in the Highlands or that most of Australia's population lives in the Lowlands but the classification itself makes no qualitative assumptions

about whether high is good or low is bad. Furthermore, all the places within one class of this theoretical classification are not at the same height. Some places in the Highlands class for example might be twice as high as others. The intent of the classification is simply that all places in the Highland class are higher than any place in the Slopes and Plains class, etc.

10. Similarly, the ASGC Remoteness classification groups locations together into comparative classes of remoteness so that data can be collected, analysed and disseminated for broad regions which are more or less remote. Locations within a given remoteness class are not necessarily equally remote but those in the Very Remote Australia class should be more remote than those in the Remote Australia class, etc. To be useful, the classes must be broad enough to allow for the publication of statistics. This means that data published on the classification must meet ABS confidentiality requirements and the areas defined should preferably contain sufficient population to allow for the collection of data by sample surveys. There is an obvious tension between more and finer classes of remoteness and the availability of data.

11. The maps at Appendixes A and B are important to understanding and using the Remoteness classification as a set of geographical regions. Some understanding of the underlying measure of remoteness is important for the correct use of the classification but the classification should also withstand intuitive examination. The data user's first question should be 'Does the area shown in the map agree with my perception of remote, very remote, regional, etc ?'. If not, perhaps the classification is not defining what the user thinks it is, or what they need for their particular analysis. There are many geographical classifications to choose from (seven in the ASGC alone) and the data user should look beyond the semantics to find the best classification for their purpose or indeed to decide whether a geographical analysis is even appropriate.

12. There are 7.7 million values in the ARIA Plus 1 kilometre grid and these can be used to determine an average score or index value for any area. However the larger the area the greater will be the range or variance of index values within the area. The smaller the area the more homogeneous it will be in terms of remoteness. When developing the geographical classification, it would have been very convenient, for statistical purposes, to calculate an average ARIA score for each whole Statistical Local Area (SLA) and then group SLAs together to form Remoteness Areas (RAs). However it was found that no matter how SLAs were grouped there was always a significant number of SLAs which contained areas and populations which did not belong in the class of remoteness dictated by the average score. It was necessary therefore to define RAs as aggregates of a spatial unit smaller than an SLA. This has implications for users of the classification that are discussed later in this paper. Currently, the smallest building block of ABS geography is the Census Collection District (CD). The ABS, therefore, developed a classification based on the average score of a CD and grouped CDs into the classes shown in Table 1.

1 REMOTENESS AREA CLASSES

Remoteness Area Class	*ARIA Plus Score Range in the Class*
Major Cities of Australia	CDs with an average ARIA index value of 0 to 0.2
Inner Regional Australia	CDs with an average ARIA index value greater than 0.2 and less than or equal to 2.4
Outer Regional Australia	CDs with an average ARIA index value greater than 2.4 and less than or equal to 5.92
Remote Australia	CDs with an average ARIA index value greater than 5.92 and less than or equal to 10.53
Very Remote Australia	CDs with an average ARIA index value greater than 10.53
Migratory	Areas composed of off-shore, shipping and migratory CDs

13. Obviously CDs are not equally remote within any of the above ranges and even within a CD there will be a range of index values. However, the purpose of the Remoteness classification is not to compare one CD to another but to group CDs together into regions which reasonably represent Remote Australia, Inner Regional Australia, etc. A relatively small number of classes was chosen specifically to allow for the collection and dissemination of statistical data by sample survey and methods of data gathering other than the Census of Population and Housing.

14. One immediate implication of using CDs rather than whole SLAs to define RAs is that CDs are only defined in the year of the Census of Population and Housing. This means that the ASGC Remoteness classification, regardless of any further development of ARIA in the meantime, can only be revised at the next Census (2006).

How Remote is Remote?

15. There is no widely accepted standard which determines just exactly where the 'city' becomes the 'country', i.e. how remote is remote. The boundary between RA classes is therefore relatively arbitrary. The ASGC Remoteness classification simply groups areas into classes where all members of a class have similar, but not identical, characteristics of remoteness. The underlying measure of relative remoteness is also an all of Australia view. Thus remote parts of Tasmania are remote because of their location in the context of Australia not their location within Tasmania.

16. The break points between classes at the remote end of the spectrum were chosen largely based on the following criteria:

    - Contiguity. An attempt was made to minimise discontinuities in the boundaries of regions.
    - Broad agreement with the Rural Remote and Metropolitan Areas (RRMA) classification . While the ASGC Remoteness classification is conceptually different to RRMA and there is no direct concordance between the two, break points were chosen which generally recognised differences between areas previously identified in RRMA. For example both classifications single out areas in the south west of Western Australia, western Victoria and far eastern Victoria as being more remote than adjacent areas.
    - Minimum population. An assumption was made that Very Remote Australia should encompass approximately the most remote 1% of the population and that Remote Australia and Very Remote Australia together should represent approximately the most remote 3% of the population (see Table 2).

17. At the least remote end of the spectrum the ARIA index value of 0.2 was chosen to define the Major Cities of Australia/Inner Regional Australia boundary. All points within an Urban Centre of population greater than 250,000 have an ARIA score of zero. CDs with an average score of less than 0.2 therefore represent the areas in very close proximity to these large Urban Centres. The label Major Cities of Australia was chosen to distinguish this region from Major Urban Centres which are defined in a separate parallel structure of the ASGC (Sections of State, cat. no. 1216.0, p. 34).

2 TOTAL PERSONS(a), by Remoteness Area (RA)

	Major Cities of Australia	*Inner Regional Australia*	*Outer Regional Australia*	*Remote Australia*	*Very Remote Australia*	*Migratory*	*Total Persons*
New South Wales	4,488,788	1,299,238	475,047	38,278	8,360	1,457	*6,311,168*
Victoria	3,390,393	966,552	248,713	5,744	..	695	*4,612,097*
Queensland	1,864,376	919,872	645,002	96,672	58,332	1,385	*3,585,639*
South Australia	1,044,307	179,626	173,003	44,944	16,462	570	*1,458,912*
Western Australia	1,277,012	217,003	176,451	96,585	63,152	1,805	*1,832,008*
Tasmania	..	289,070	153,803	8,504	2,547	917	*454,841*
Northern Territory	..	..	106,476	43,956	50,200	2,097	*202,729*
Australian Capital Territory	308,456	728	..	..	..	..	*309,184*
Other Territories(b)	..	604	..	..	2,067	..	*2,671*
Australia	*12,373,332*	*3,872,693*	*1,978,495*	*334,683*	*201,120*	*8,926*	*18,769,249*
Proportion of Total Population (%)	*65.92*	*20.63*	*10.54*	*1.78*	*1.07*	*0.05*	*100.00*

.. not applicable

(a) Census place of enumeration counts, 7 August 2001. Excludes overseas visitors.

(b) Includes Jervis Bay Territory and the Territories of Cocos (Keeling) and Christmas Islands.

Source: 2001 Census of Population and Housing.

3. USING THE ASGC REMOTENESS CLASSIFICATION TO INFORM DECISION-MAKING

1. The Remoteness classification is designed to provide for statistics that compare, on the one hand, the major cities to, at the other extreme, very remote areas. Such statistics allow decision makers to quantify the differences and similarities. It is data collected on the geographical classification that should inform decision-making, not the classification itself.

The Role of the ABS and Statistical Geography

2. ABS statistical geography provides an infrastructure for collecting, disseminating and analyzing geographically classified statistics. Statistical geography is not designed to provide simplistic answers to complex questions. For example, the ASGC tells us nothing about the characteristics of the population except that it lives or works in a particular area. In the case of the ASGC Remoteness classification there will be wealthy people, poor people and indigenous people living in each of the geographical areas defined by the classification. They may or may not be employed and they may work in any sort of industry. To determine whether the population of one area is significantly different to another, the available data must be analysed. The geographical classification is designed to facilitate this analysis. It is not an answer in itself.

The General Limitations of Statistical Geography

3. The geographical classification only provides the framework upon which to classify and compare data, whether it be characteristics of the population, cost of service provision, relative uptake of services or policy outcomes. The value of a statistical geographical classification must therefore be tested against its true role, i.e. facilitating the collection, dissemination and analysis of data, not on its appropriateness as a 'stand alone' indicator. Equally, no geographical classification can safely be used as a surrogate for other variables without extensive testing of assumptions. For example, as Table 3 shows, remoteness does not equate to low income.

4. If a government policy is targeted at low income earners it would obviously be foolish to allocate all the expenditure to Very Remote Australia. On the other hand if the policy is aimed specifically at the disadvantages of geographical remoteness, regardless of the socio-economic characteristics of the population, then the ASGC Remoteness classification may be very useful for identifying the target population.

3 MEDIAN WEEKLY INDIVIDUAL INCOME(a), by Remoteness Area (RA)

	Major Cities of Australia	*Inner Regional Australia*	*Outer Regional Australia*	*Remote Australia*	*Very Remote Australia*	*Migratory*
	$	$	$	$	$	$
New South Wales	$400-$499	$300-$399	$300-$399	$300-$399	$300-$399	$800-$999
Victoria	$400-$499	$300-$399	$300-$399	$300-$399	..	$1,000-$1,499
Queensland	$300-$399	$300-$399	$300-$399	$300-$399	$300-$399	$500-$599
South Australia	$300-$399	$300-$399	$300-$399	$300-$399	$200-$299	$300-$399
Western Australia	$300-$399	$300-$399	$300-$399	$400-$499	$400-$499	$1,000-$1,499
Tasmania	..	$300-$399	$200-$299	$200-$299	$300-$399	$500-$599
Northern Territory	..	..	$500-$599	$400-$499	$160-$199	$800-$999
Australian Capital Territory	$500-$599	$400-$499	..	..	..	..
Other Territories(b)	..	$400-$499	..	..	$400-$499	..
Australia	*$400-$499*	*$300-$399*	*$300-$399*	*$300-$399*	*$300-$399*	*$800-$999*

.. not applicable

(a) Census place of enumeration counts, 7 August 2001. Persons 15 years of age and over. Includes overseas visitors.

(b) Includes Jervis Bay Territory and the Territories of Cocos (Keeling) and Christmas Islands.

Source: 2001 Census of Population and Housing.

5. Even where there is a strong correlation between geography and a particular characteristic of the population, an additional overlay of information will usually be required. Table 4 shows that there is a higher proportion of Indigenous persons in Very Remote Australia compared to other RAs.

6. However even in the Northern Territory, where 64% of the total population in the Very Remote Australia class are Indigenous, 36% are not. Remoteness cannot safely be used as a proxy for Indigenous persons. It must also be remembered that while 26% of Indigenous persons live in Remote Australia and Very Remote Australia, 31% live in the Major Cities of Australia class.[1]

[1] Figures reported in this paragraph exclude overseas visitors.

4 INDIGENOUS PERSONS(a), by Remoteness Area (RA)

	Major Cities of Australia	*Inner Regional Australia*	*Outer Regional Australia*	*Remote Australia*	*Very Remote Australia*	*Migratory*	*Total Indigenous persons*
New South Wales	50,685	39,016	22,823	5,320	1,993	31	*119,868*
Victoria	12,334	8,668	4,017	56	..	—	*25,075*
Queensland	28,423	20,553	37,379	9,923	16,474	21	*112,773*
South Australia	10,883	2,026	5,329	1,080	4,092	16	*23,426*
Western Australia	19,198	4,630	8,438	9,370	16,840	19	*58,495*
Tasmania	..	8,103	7,119	358	180	13	*15,773*
Northern Territory	..	..	9,497	8,918	32,285	85	*50,785*
Australian Capital Territory	3,568	8	..	..	..	..	*3,576*
Other Territories(b)	..	213	..	..	18	..	*231*
Australia	*125,091*	*83,217*	*94,602*	*35,025*	*71,882*	*185*	*410,002*
Proportion of total population of RA (%)	*1.01*	*2.15*	*4.78*	*10.47*	*35.74*	*2.07*	

.. not applicable

— nil

(a) Census place of enumeration counts, 7 August 2001. Excludes overseas visitors.

(b) Includes Jervis Bay Territory and the Territories of Cocos (Keeling) and Christmas Islands.

Source: 2001 Census of Population and Housing.

7. ARIA has some specific weaknesses. Some of these acknowledged weaknesses were addressed in the development of ARIA Plus, for example with the inclusion of a sub-index for small service centres of population 1,000 to 5,000. Some, however, remain and are more or less critical depending on the purpose for which ARIA is used.

   The remaining weaknesses of ARIA are that it:

   - understates the relative remoteness of parts of northern Australia because it truncates index values to a maximum of 15 (for ARIA Plus); and
   - does not make allowance for roads which are impassable in the wet season.

8. Both of the above will have an impact where ARIA is used as a measure of the remoteness of a specific place or community. However, this is not an issue when ARIA is used as the basis of a broad geographical classification, i.e. index values are grouped together into classes. Communities affected by truncation of the index value and/or impassable roads are invariably grouped into the highest class of remoteness anyway. A higher score would not change their class unless a new class of, say, Extremely Remote Australia was introduced. Such a class would have a very small population for which data gathering and dissemination would be extremely limited.

9. Truncation of sub-index values at a maximum of 3, and consequent truncation of the total index valuation at a maximum of 15, means that the index is non-linear. This in turn means that not all communities with an index value of 15 are equally remote and that a community with an index value of 10 is not twice as remote as a community with a value of 5. This feature of ARIA has no impact on the ASGC Remoteness classification that, like the theoretical classification of height, only requires that areas in the Very Remote Australia class are more remote than areas in the Remote Australia class, etc. The ABS acknowledges, however, that this feature does make ARIA susceptible to misuse and the ABS does not therefore disseminate average ARIA scores for any ABS spatial units.

10. There has also been debate about other features of ARIA such as:
    - The size of the Urban Centre within which all services are assumed to be available (the Class A Service Centre). ARIA uses a minimum population size of 250,000. Some commentators have argued that this threshold should be raised to 1,000,000 while others argue that all services are available in all capital cities regardless of their population size.
    - Whether distance to service centres should be calculated across state/territory borders.

11. A change to either of these two rules in ARIA would profoundly change the ASGC Remoteness classification. Categorising all capital cities as Class A Service Centres would make all of Tasmania and most of the NT considerably less remote and would change the Remoteness classification beyond recognition, while imposing State/Territory borders as an absolute barrier to access to services would considerably increase the remoteness of Albury, Broken Hill, Tweed Heads and other border communities. The Steering Committee which oversighted the development of ARIA felt strongly that all capital cities do not provide an equal number of services and that people do cross State/Territory borders to access many services. However, the ABS is prepared to review these impacts of the ARIA methodology for future editions of the ASGC Remoteness classification.

Geographical Remoteness vs Accessibility

12. As referred to earlier, the ASGC Remoteness classification was developed to provide a geographical definition of urban/rural/remote/city/country/regional/bush/outback and the plethora of terms which have been used for the city/country dichotomy. The names of the Remoteness Areas (RAs) were chosen, after initial consultation with users, to provide the most succinct description without conflicting with other established classifications such as Urban Centres/Localities and Sections of State. Remoteness was seen as the defining element of the city/country dichotomy and ARIA was used as a method to quantify that remoteness.

13. When naming ARIA, its developers settled on the word 'accessibility' to mean the opposite of 'remote'. However, there is an existing methodology for quantifying access disability, the Griffith Service Access Frame (GSAF) developed by Dr Dennis Griffith in the Northern Territory and fairly widely used in a number of government service sectors.

    Use of the word 'accessibility' in the title of ARIA led to some confusion about whether ARIA is a geographical index or whether it attempts to measure other problems of service access. ARIA measures only one component of service accessibility, that of remoteness, as determined by road distance. GSAF, which is an index that includes other variables of accessibility such as time, cost and socio-economic capacity, might be a very useful policy tool but GSAF does not, and cannot, provide a geographical classification of 'city' versus 'country'. ARIA (and the ASGC Remoteness classification) differ conceptually and in purpose and use. GSAF is designed to quantify the level of disability, with remoteness as one of the measures of disability, of a particular community. The ASGC Remoteness classification is designed for the collection of data about five broad sectors of the population.[1]

14. Table 5 shows how data for RAs can be used to compare these broad sectors of the population but it does not provide information about individual communities.

ASGC Remoteness Classification as a Policy Tool

15. The ASGC Remoteness classification is designed for the collection and analyses of data about 'city' versus 'country' people. In itself it provides no information about the nature of ‘city’ or ‘bush’ populations. While this is the stated aim of the classification, it is well known that some policy makers use ABS definitions, both geographical and others, to directly target policy. For example, some organizations paid an additional allowance to staff stationed in 'rural' areas based on the definition found in the ASGC Section of State classification. The validity of using the ASGC in this way depends entirely on the relevance of the geographical concept to the desired policy outcomes. It is vitally important that anyone developing policies, funding formulae or intervention strategies understands the alignment, or lack of alignment, between a particular geographical classification and their business objective. No geographical classification should be used as a simplistic answer to complex questions. In most cases a variety of data overlays will be required to target a particular population.

[1] The ASGC Remoteness classification actually has six classes, the sixth one being Migratory. This class covers people who were in transit, i.e. traveling, on census night (not the same as homeless). The Migratory category is not a geographical region as such but is made up of the non-areal Migratory CDs. The class is included only for completeness, so that all CDs are included in the classification.

5 PROPORTION OF PEOPLE(a) COMPLETED YEAR 12(b), by Remoteness Area (RA)

	Major Cities of Australia	*Inner Regional Australia*	*Outer Regional Australia*	*Remote Australia*	*Very Remote Australia*	*Migratory*	*Persons completed Year 12*
	%	%	%	%	%	%	%
New South Wales	43.85	28.85	25.13	24.55	23.77	40.30	*39.30*
Victoria	44.64	29.30	26.02	25.79	. .	38.48	*40.53*
Queensland	43.95	31.55	32.63	28.79	28.08	34.79	*38.14*
South Australia	38.46	29.34	23.09	26.13	22.61	34.21	*35.05*
Western Australia	43.52	29.04	31.07	31.26	27.71	28.99	*39.48*
Tasmania	. .	32.67	20.08	22.07	25.75	28.09	*28.23*
Northern Territory	. .	. .	39.15	33.13	17.63	42.42	*32.85*
Australian Capital Territory	60.21	60.08	. .	. .	. .	. .	*60.21*
Other Territories(c)	. .	48.66	. .	. .	29.44	. .	*34.01*
Australia	*43.98*	*29.94*	*28.41*	*29.00*	*24.88*	*35.96*	*39.07*

. . not applicable

(a) Census place of enumeration counts, 7 August 2001. Excludes overseas visitors.

(b) Persons over 15 years of age, excluding those that are still at school.

(c) Includes Jervis Bay Territory and the Territories of Cocos (Keeling) and Christmas Islands.

Source: 2001 Census of Population and Housing.

16. An aim of this paper is to focus discussion on the correct use of the ASGC Remoteness classification as opposed to ARIA. However some consideration must also be given to the correct use of ARIA. Being an index (continuous variable), ARIA can be used in ways which the ASGC Remoteness classification cannot. However most of these uses are subject to the same limitations discussed in the previous chapter and ARIA indexes can also be inappropriately used, examples are:

    - The use of average ARIA score for a large area as a surrogate for the remoteness of an individual who may be located anywhere within that area.
    - ARIA index scores are non-linear and may understate the relative remoteness of places with an index value of 15 (ARIA Plus) or 12 (ARIA).
    - ARIA makes no allowance for temporary or seasonal closure of roads. If seasonal isolation is important then an additional weighting should be applied to such communities.

17. More appropriate data and policy tools should be used where geographical remoteness alone may not fully address the policy issues.

4. CLASSIFYING DATA TO REMOTENESS AREAS (RAs)

1. In order to collect and analyse data for the RA classes, many organisations will not only need access to ABS data but will need to aggregate their own data to the ASGC Remoteness classification. Most organisations use a variety of methods to aggregate data to regions. Some may use an address coder to code their clients to Statistical Local Areas (SLAs) while others simply aggregate clients by post code. Because the ASGC Remoteness classification has been defined on CDs, both these approaches are problematical as many SLAs and post codes will fall in two or more RAs.

2. Aggregating data not specifically related to the address of a client may be even more difficult. For example a theoretical organisation wishing to investigate whether their costs are higher per capita in remote areas must be able to report costs for remote versus non-remote areas. The primary cost centre for reporting may be an organisational region or network of offices that is entirely unrelated to the ASGC RAs.

Homogeneity of Reporting Units

3. Figure 1 shows a theoretical set of cost centres overlaid with ASGC RAs. For a single large cost centre such as Darling River, the ARIA Plus grid value varies from 14.0 in the north west of the cost centre to 6.0 in the south east. This cost centre is therefore not homogeneous in terms of its remoteness. If we were to attempt to allocate this whole cost centre to a single RA we could do so based on the cost centre's average ARIA Plus score. In this case the average score is 9.5, which would place the whole cost centre in the Remote Australia class. Most of the area of the cost centre is in fact classified as Very Remote Australia. The cost centre of Barrier is even less homogeneous. The ARIA Plus grid value varies from 14.0 in the north east to 3.2 in the centre of Broken Hill. The average score for the cost centre is 5.8 which would place it in the Outer Regional Australia class, just below the cut off score for Remote Australia. Furthermore, 83% of the population of the Barrier cost centre lives in Broken Hill, where the ARIA Plus grid value is down around 3, normally classified as Outer Regional Australia. Classifying all of Barrier as Outer Regional Australia would slightly overstate the population of the Outer Regional Australia class and effectively overstate the per capita cost in that class, because in fact some Remote Australia and Very Remote Australia (where costs are assumed to be higher) have been included.

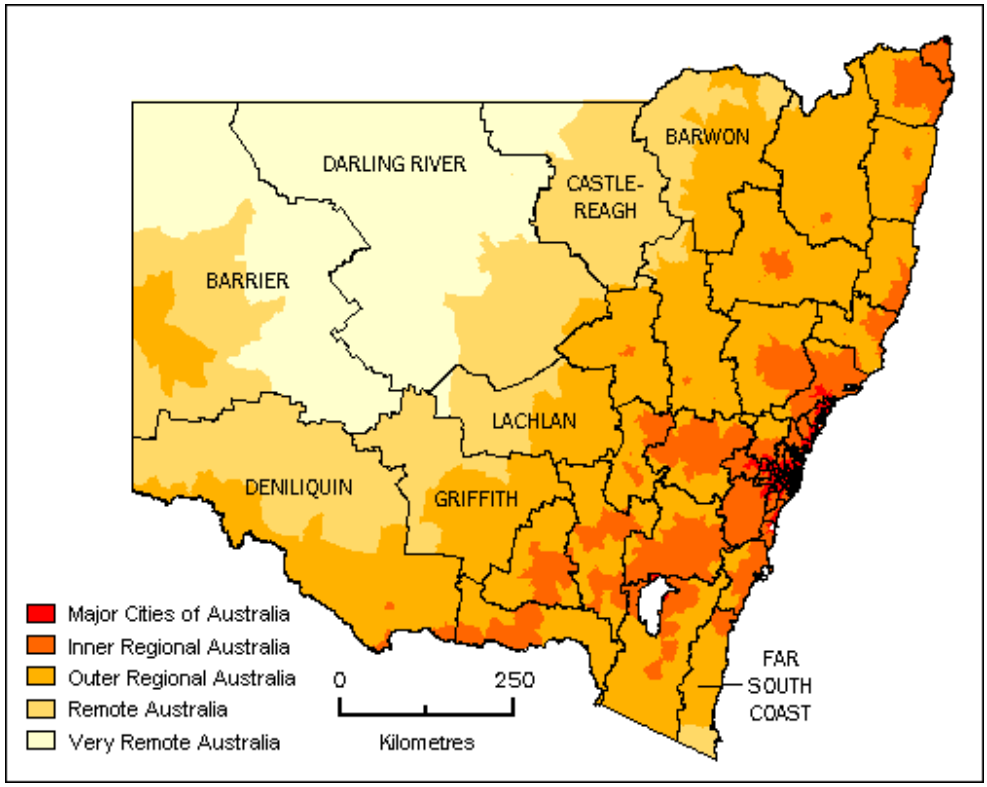

Figure 1
Hypothetical cost centre regions and ASGC Remoteness Areas (RAs)

Aggregating and Disaggregating Data

4. From Figure 1 it can be seen that Castlereagh is entirely Remote Australia and Very Remote Australia. Darling River is mostly Remote Australia and Very Remote Australia with a small area of Outer Regional Australia (mostly the town of Warren), while Barrier, Deniliquin, Griffith, Lachlan, Barwon and Far South Coast are split between three or more classes. All the other theoretical cost centres are split between Inner Regional Australia, Outer Regional Australia and Major Cities of Australia. Where costs can only be collected and aggregated by cost centre, data will need to be divided into its various RA classes and then re-aggregated by Remoteness class. There are several means by which data could be disaggregated:

    - adopt a smaller reporting unit or cost centre;
    - realign reporting units or cost centres to fit with the remote/non-remote boundary;
    - code data directly to RAs; or
    - concord data from reporting units or cost centres to RAs.

5. Figure 2 below illustrates how a remote/non-remote boundary can be much better approximated using smaller units, in this case by dividing the hypothetical cost centres into sectors and allocating them to RAs based on their average ARIA Plus score. Within the Barrier Cost Centre, Sectors 3 and 5 could be allocated to Very Remote Australia. Sector 4 could be allocated to Remote Australia and Sector 1 to Outer Regional Australia. If data are available at this level then a more accurate aggregation can be made to RAs.

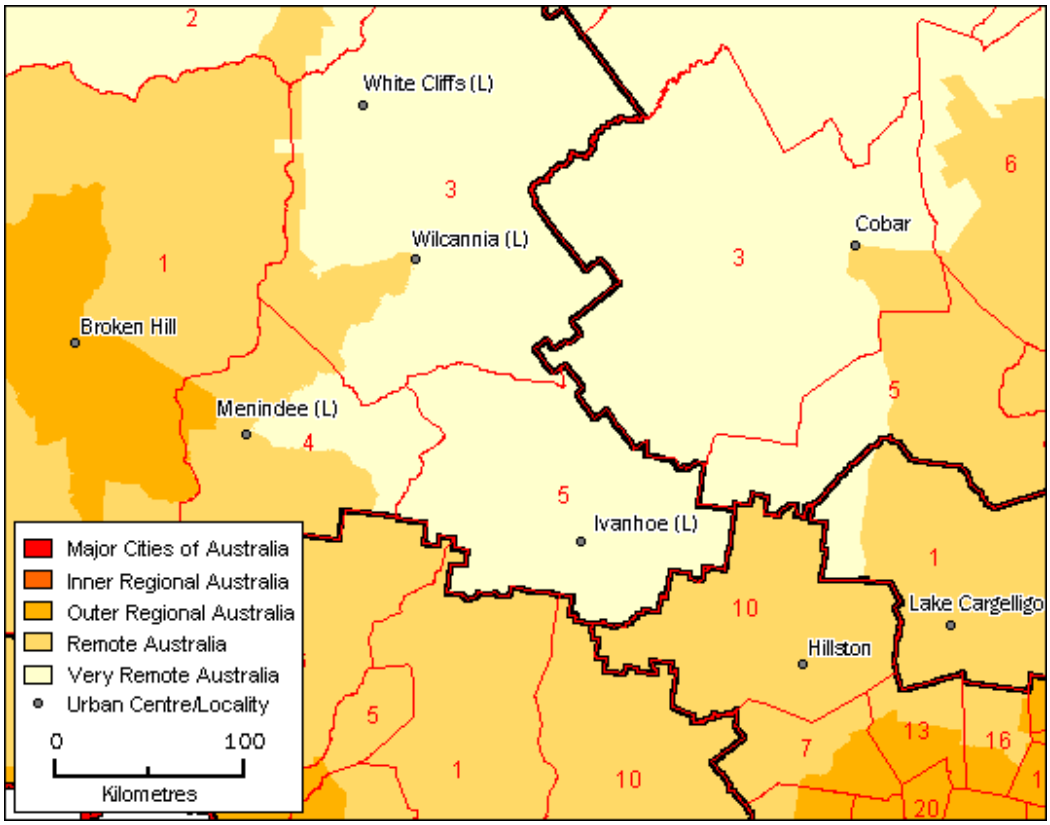

Figure 2
Hypothetical cost centres divided into smaller reporting units—sectors—and ASGC Remoteness Areas (RAs)

6. Some data can be coded directly to RAs without first allocating it to cost centres or some other unit such as SLA or post code. For example, data about service outlets are often recorded by the location at which they occur. These locations can then be coded to RAs and aggregated accordingly. ABS has extended the capability of its National Localities Index (NLI) to do this type of coding and the Remoteness classification version of the NLI is now available as a special data service. However, not all data can be coded in this way and some data will already have been aggregated to other geographical regions and the original, unit record, or transaction level data may no longer be available.

7. The standard practice for converting data gathered on one geography to an alternative geography is to use a concordance. Where the two geographies, as in this case, are substantially incomparable, a population weighted concordance can be used to proportion data for the primary geographical unit (in this case cost centre) across the alternative units (RAs) which share its area. A population weighted concordance for the above theoretical cost centres to RAs would look like:

Barrier	Very Remote Australia	4%
Barrier	Remote Australia	5%
Barrier	Outer Regional Australia	91%
Darling River	Very Remote Australia	27%
Darling River	Remote Australia	60%
Darling River	Outer Regional Australia	13%
Castlereagh	etc	

8. The percentage figure represents the percentage of the population of the cost centre that lies in each RA. The population weighted concordance would then be used to proportion costs to the RAs. However, the assumption is that costs are in fact not proportional to population but are higher per capita in low population, remote areas. Thus, using a population weighted concordance to distribute costs conflicts with the original assumption and would skew data towards understating costs for the remote part of a cost centre.

9. As indicated earlier, one way to aggregate cost centre based data to RAs would be to allocate whole cost centres to a single class of Remoteness based on their average ARIA Plus score, making allowance for where the majority of the population is located. Barrier, for example, could be classified as Outer Regional Australia without any major distortion of cost data, while Darling River could be classified as Remote Australia even though it includes some less remote (lower cost) area and some more remote (higher cost) area.

10. Which of these methods is the most appropriate depends largely on the relative size and orientation of the regions being concorded. Given that there will be a considerable range in cost of services across the Remoteness classes, and very likely overlap between classes, all methods discussed would be adequate. The population weighted approach maintains the original RA boundaries and approximately splits the costs data to fit these boundaries. This has the advantage that denominators such as total population can easily be obtained from Census data. Approximating the boundaries of RAs by aggregating whole cost centres to each class means the cost centre data does not have to be split between RAs but denominators such as total population

are considerably harder to determine because, for example, the area representing Very Remote Australia is no longer identical to the ABS Very Remote Australia area.

11. On balance, the ABS recommends the population weighted concordance method.

Available Concordances

12. Data coded to SLA or aggregated on post codes are two variations on the theoretical set of cost centre boundaries used in the illustration above. The ABS has created population weighted concordances for both ASGC 2001 Edition SLAs to RAs. These concordances are not based on average ARIA score for an SLA or Postal Area but on the percentage of the population of the SLA which lies within the various RAs as in the above example. SLA level data can thus be aggregated with reasonable accuracy to RAs.

13. In addition a listing of ASGC 2001 Edition Urban Centres and Localities by their RA is available.

Cross-classifying with other ASGC Structures

14. This paper has concentrated on the ASGC Remoteness classification as a broad classification dividing the country into five sectors or regions. This is the way the classification should normally be visualised and used. However, because the ASGC Remoteness classification is built up from CDs, it is possible to cross-classify CDs by their RA and other otherwise unrelated ASGC structures. For example, CDs can be cross classified between Remoteness and Section of State so that aggregated data can be compared for urban/rural population and remote population at the same time (see Table 6 below). Table 6 shows, for example, that 62.66 % of the population—excluding overseas visitors and persons in off-shore, shipping and migratory CDs—were enumerated in areas that are classified as both Major Urban (SOS) and Major Cities of Australia (RA). Such a cross-classification adds another dimension to the analysis and is also a good demonstration of how, in the ASGC, urbanity and remoteness are not mutually exclusive.

6 DISTRIBUTION(a) OF AUSTRALIA'S POPULATION(b), by Remoteness Area (RA) and Section of State (SOS)

	REMOTENESS AREA					
SECTION OF STATE	*Major Cities of Australia* %	*Inner Regional Australia* %	*Outer Regional Australia* %	*Remote Australia* %	*Very Remote Australia* %	*Total* %
Major Urban	62.66	1.82	0.63	0.00	0.00	*65.11*
Other Urban	2.33	12.72	5.66	0.97	0.38	*22.06*
Bounded Locality	0.06	1.05	0.94	0.24	0.27	*2.56*
Rural Balance	0.92	4.96	3.36	0.59	0.44	*10.27*
Total	*65.97*	*20.55*	*10.59*	*1.80*	*1.09*	*100.00*

(a) Described using two classifications of CDs, Sections of State (SOS) and Remoteness Areas (RAs).

(b) Census place of enumeration counts, 7 August 2001. Excludes overseas visitors and persons in off-shore, shipping and migratory CDs.

Source: 2001 Census of Population and Housing.

5. CONCLUSION

1. The ABS has adapted the original ARIA methodology to develop its own geographical classification, the ASGC Remoteness classification. This classification makes use of ARIA Plus as the underlying measure of remoteness but does not use the class names or class break points recommended by the developers of ARIA. Users wishing to compare/relate their own data sets with ABS data from the Census of Population and Housing and other collections are advised to adopt the ASGC Remoteness classification rather than the classes of remoteness associated with the original ARIA.

2. The underlying measure of remoteness (ARIA Plus) in the ASGC Remoteness classification is less than perfect but this only affects the index value, or score, for localities at the extreme end of the remoteness scale. When scores are aggregated to only a few classes these localities all lie within Very Remote Australia, regardless of any understatement of their relative remoteness.

3. The suitability, or otherwise, of the ASGC Remoteness classification for developing policy and monitoring outcomes depends very much on the policy issue. For example, if the primary issue is higher costs in remote areas then the ASGC Remoteness classification provides a robust geographical classification for collecting and analysing data on costs.

4. ASGC Remoteness is a purely geographical classification. As a first principle, non-geographical variables, such as socio-economic profile, should not be incorporated in a geographical classification. To do so would make it very difficult to unravel cause and effect in any subsequent analysis. Conversely, any reporting or evaluation of performance should be very wary of using geography as a surrogate for other variables which may not be closely bound to location.

5. Where it is difficult to code reporting units to RAs, the ABS recommends a population weighted concordance approach to disaggregating data.