

## **SUBMISSION BY THE AUSTRALIAN BUREAU OF STATISTICS**

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### **Introduction**

This submission provides details about the Remoteness Structure from the Australian Standard Geographical Classification (ASGC) to assist Committee members' understanding of the design, purpose and uses of the classification.

The role of the ABS is to provide high quality statistical information for use in informed decision making, research and discussion within governments and the community. In undertaking this role, the ABS develops an extensive range of classifications, standards, frameworks and methods which underpin the conceptual rigour and quality of the data that it produces.

The Australian Standard Geographical Classification (ASGC) is used by the Australian Bureau of Statistics (ABS) for the collection and dissemination of geographically classified statistics. It was first published in 1984

The ABS publishes the ASGC to inform users of ABS statistics about its design and purpose, and to facilitate its use by other organisations to support the comparability and usefulness of statistics generally. It is an essential reference for understanding and interpreting the geographical context of statistics published by the ABS.

The ASGC contains seven interrelated classification structures, which serve specific purposes. The Remoteness Structure is one of these. It was added to the classification in 2001 in response to a need expressed by statistical users for a standard classification which defined a remoteness concept as a characteristic of an area.

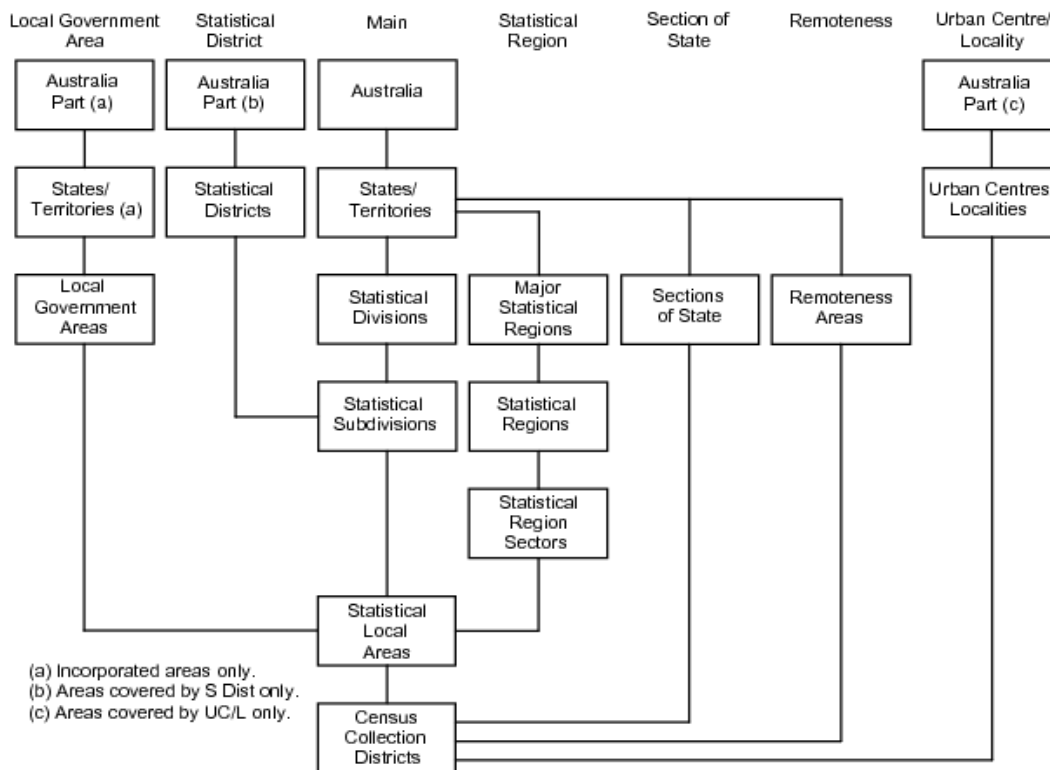
After wide consultation, the Accessibility/Remoteness Index of Australia (ARIA+) was chosen as the basis for the remoteness structure. ARIA+ is designed, constructed and maintained by the National Centre for the Social Applications of Geographical Information Systems (GISCA) which is part of the University of Adelaide. The director of GISCA is Professor Graeme Hugo.

The Australian Bureau of Statistics (ABS) interprets ARIA+ values to create the remoteness structure.

## 2. The ASGC and the Remoteness Structure – Purpose and History

The ASGC was first published by the ABS in 1984 and it is used for the collection and dissemination of geographically classified statistics. Diagram 1 provides an illustration of the components of the ASGC.

**Diagram 1 The ASGC Structure.**



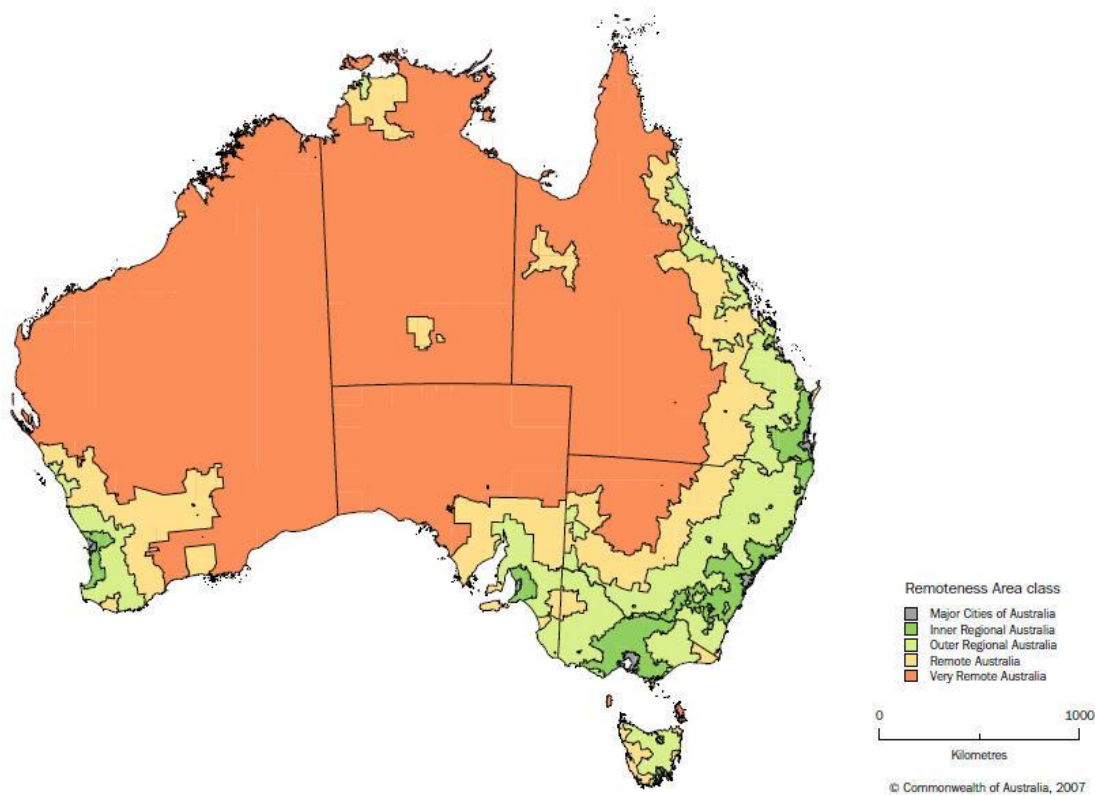
The remoteness structure is one of the seven structures defined within the ASGC. It was added to the ASGC in 2001 and is composed of six classes;

**Table 1. ABS Remoteness Classes**

RA Code	RA Name
0	Major Cities of Australia
1	Inner Regional Australia
2	Outer Regional Australia
3	Remote Australia
4	Very Remote Australia
5	Migratory

The following map illustrates the geographical boundaries of the present remoteness structure as defined by the 2006 ASGC.

**Diagram 2 Remoteness Area Boundaries for 2006**



The remoteness structure is defined only in Census years. The first edition of the ASGC to include a structure describing Australia in terms of a measurement of Remoteness was the 2001 edition of the ASGC using data from the 2001 Census of Population and Housing.

After the 2006 Census the National Centre for the Social Applications (GISCA) recalculated ARIA+ and the ABS recalculated the remoteness boundaries for 2006 based on these data.

### **3. Creation of the Accessibility/Remoteness Index of Australia (ARIA)**

During 1997 the Commonwealth Department of Health and Aged Care commissioned a project designed to measure and classify remoteness in a physical, geographic way. The result of that work was the initial version of the Accessibility/Remoteness Index of Australia (ARIA) developed by the National Centre for the Social Applications of Geographical Information Systems (GISCA). In 2001 an updated version was calculated called ARIA+. The remoteness structure is based on ARIA+.

ARIA+, is an unambiguously geographical approach to defining remoteness. ARIA+ is a continuous varying index with values ranging from 0 (high accessibility) to 15 (high remoteness), and is based on road distance measurements from 11,879 populated localities to the nearest service centres in five categories based on population size. The five distance measurements, one to each level of service centre, are recorded for each populated locality and standardized to a ratio by dividing by the Australian mean for that category. After applying a threshold of three to each of the ratios are summed to produce the ARIA+ score for each populated locality across Australia. An interpolation procedure was used to derive the index values for each of the localities to a 1 km grid so that all areas of Australia recorded an index value. Using the interpolated grid, average scores for CCDs were derived.

The major advantages of ARIA over other methods of measuring remoteness are that;

- it is a purely geographic measure of remoteness, which excludes any consideration of socio-economic status, rurality and population size factors (other than the use of natural breaks in the population distribution of Urban Centres to define the service centre categories);
- it is flexible and can be aggregated to a range of spatial units, used as a continuum or classified;
- its methodology is conceptually clear and applicable nationally;
- it is precise; and
- is relatively stable over time.

As a comparable index of remoteness that covers the whole of Australia, ARIA+ provides a measure of remoteness that is suitable for a broad range of applications including assisting in service planning, demographic analysis and resource allocation.

**Table 2 ARIA+ National Mean Distance to Service Centres**

<b>ARIA+ Service Centre classes</b>	<b>Population range</b>	<b>National average distances (kms)</b>
Class A	> 250,000	415
Class B	48,000 to 249,999	228
Class C	18,000 to 47,999	133
Class D	5,000 to 17,999	84
Class E	1000 to 4999	43

#### 4. Creation of the Remoteness Structure Boundaries

ARIA+ is published as a 1 kilometre grid or matrix that covers the whole of Australia. Average ARIA+ values are calculated for each of the 34,704 Census Collection Districts that form the base level of the remoteness structure for 2006. Each CCD is classified and aggregated into remoteness areas based on the following classification;

**Table 3 ARIA+ value ranges for ABS Remoteness Classes**

CCD Average ARIA+ value ranges	Name
0 to 0.2	Major Cities of Australia
greater than 0.2 and less than or equal to 2.4	Inner Regional Australia
greater than 2.4 and less than or equal to 5.92	Outer Regional Australia
greater than 5.92 and less than or equal to 10.53	Remote Australia
greater than 10.53	Very Remote Australia
Off-shore, migratory and shipping CCDs	Migratory

The resultant shape of the boundaries is dependent on the CCD design. As CCDs are designed for the collection and dissemination of Census data, they often follow roads. This can sometimes lead to CCDs on one side of a road having a different Remoteness class than CCDs on the other side of a road. No matter where a boundary line is drawn, there will always be boundary issues.

#### 5. Demarcation between Inner Regional and Outer Regional

The determination of the class boundaries was done to provide categories of areas that had similar access to services. The choice of 5 classes (plus a class for migratory) was seen as providing a reasonable differentiation on the continuum from highly accessible to least accessible (or very remote), while having enough population in each class to enable distribution of statistics, ie meeting ABS confidentiality requirements, and containing sufficient population to allow data from the sample surveys to be published.

The breakpoints between the classes were chosen based on the following criteria:

- At the least remote end of the spectrum, the ARIA value of 0.2 was chosen to define the Major Cities of Australia / Inner Regional Australia boundary. CCDs with an average score of less than 0.2 therefore represent the areas in very close proximity to these large Urban Areas.
- At the remote end of the spectrum, the breakpoints were set to ensure that a minimum population of 1% was Very Remote and 2% was Remote (based on the 1996 Census). This was to ensure there was enough population to distribute statistics for these regions.

- The boundary between Inner Regional and Outer Regional was based on exploration of "natural breaks", minimising discontinuities and ensuring that Inner Regional had more people than Outer Regional.

## **6. Implications of Changes to the New Australian Statistical Geography Standard (ASGS) Remoteness Structure for the 2011 Census.**

ABS has undertaken a review of the ASGC, and will be implementing a new replacement for the ASGC, known as the ASGS from July 2011. The ASGS will be the basis for the 2011 Census of Population and Housing.

The implications for the remoteness structure are relatively minor. The concepts will remain the same; however a new base unit, the Statistical Area Level 1 will replace the CCD as the building block unit for the remoteness structure.

The effects of these changes will not be fully known until after the Census data is processed and a new remoteness structure is released towards the end of 2012. From preliminary investigations there will be less instances of the boundary line of Inner Regional and Outer Regional bisecting towns.

## **7. References**

The Australian Standard Geographic Classification (ASGC) July 2010 (cat no. 1216.0), Australian Bureau of Statistics, 2010.

<http://www.abs.gov.au/ausstats/abs@.nsf/mf/1216.0>

ABS Views on Remoteness, 2001 (cat. No. 1244.0), Australian Bureau of Statistics, 2001.

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<http://www.abs.gov.au/ausstats/abs@.nsf/mf/1244.0.00.001>

ASGC Remoteness Classification: Purpose and Use (Census Paper No 03/01), Australian Bureau of Statistics, 2001.

<http://www.abs.gov.au/websitedbs/D3110122.NSF/0/f9c96fb635cce780ca256d420005dc02>

About ARIA +, Adelaide University Web Site

[http://gisca.adelaide.edu.au/projects/category/about\\_aria.html](http://gisca.adelaide.edu.au/projects/category/about_aria.html),

DoctorConnect web site produced by the Department of Health and Ageing  
<http://www.doctorconnect.gov.au/internet/otd/Publishing.nsf/Content/locator>