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ABS Views on Remoteness

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Dennis Trewin
Australian Statistician

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CHAPTER 1 INTRODUCTION

Many users of statistics and administrative data have expressed a need for a standard classification which defines metropolitan/regional/remote or urban/rural/remote or a variety of other terms which in general refer to the urban/rural dichotomy. Unfortunately these terms often mean very different things to different people and are either undefined or have conflicting meanings in different applications.

The Australian Standard Geographical Classification (ASGC) provides a standard classification of geographical areas for the collection and dissemination of statistics. This information paper describes how the ABS proposes to incorporate the concepts of:

- urban/rural; and
- remoteness

within the ASGC.

The ASGC already provides a delimitation of urban and rural areas in the Section of State (SOS) Structure. It is proposed, however, to extend the number of classes in the SOS Structure to provide aggregated statistics for more detailed groupings of Urban Centres.

Currently the Australian Bureau of Statistics (ABS) has no mechanism to reflect remoteness as a characteristic of an area. In the past various Metropolitan/Rural/Remote (or similar) classifications have been used by ABS clients either in conjunction with the ASGC or completely separate from it.

A number of recent consultative processes have established the need for inclusion of a remoteness concept in the ASGC. Following a review of the ASGC by the ABS during 1996–97, where the issue of remoteness was considered, the ABS invited interested organisations to take advantage of the work that had been done during the review and further progress the development of a classification of remoteness.

During 1997, the Commonwealth Department of Health & Aged Care (DH&AC) commissioned a project designed to measure and classify remoteness in a physical, geographic way. The result of this work is the Accessibility/Remoteness Index of Australia (ARIA), developed by the National Key Centre for Social Applications of GIS (GISCA).

The ABS has examined the definition and methodology developed in ARIA with a view to incorporating some or all of its concepts into ABS geographical classifications. The ABS has considered a number of options for incorporating these concepts into the ASGC, and the ABS-preferred option is presented in this paper.

Any geographical classification is only as useful as the data which can be published for its various spatial units. This has been a guiding principle in the development of the ABS preferred option. Data considerations are discussed in some detail in Chapter 5 p.21.

RESPONSES TO THIS PAPER

Comments on these proposed changes to the ASGC are welcome and are invited from all interested parties. Responses should be sent to reach the ABS prior to 28 February 2001.

Please address replies to:

Post: Director, Geography
Australian Bureau of Statistics
PO Box 10
Belconnen ACT 2616
Email: geography@abs.gov.au
Fax: 02 6252 8666

Additional copies of this Information Paper can be obtained by contacting ABS Geography on Canberra 02 6252 5888 or by email at geography@abs.gov.au. Based on the results of this consultation, the ABS will change the SOS Structure and implement a classification of remoteness in its geography, for inclusion in ASGC Edition 2001 (effective 1 July 2001).

CHAPTER 2 AIMS OF THIS PAPER

This paper is for the information of all users and potential users of ABS geographical classifications and aims to:

- inform users of how the ABS proposes to incorporate a concept of remoteness into ABS Geography;
- inform users of how the ABS proposes to increase the number of categories in the Section of State Structure; and
- seek views on these proposals.

The ABS proposes the following changes to the Australian Standard Geographical Classification (ASGC) for the 2001 Edition, to be implemented on 1 July 2001:

Proposal 1 **INCLUDE REMOTENESS AS A SEPARATE STRUCTURE IN THE ASGC**

Proposal 2 **USE ARIA AS THE UNDERLYING METHODOLOGY FOR DETERMINATION OF REMOTENESS**

Proposal 3 **ADOPT FIVE CLASSES OF REMOTENESS AS FOLLOWS:**

■ Highly Accessible	Areas with average ARIA index values greater than or equal to 0 and less than 0.2
■ Accessible	Areas with average ARIA index values greater than or equal to 0.2 and less than 2.4
■ Moderately Accessible	Areas with average ARIA index values greater than or equal to 2.4 and less than 5.95
■ Remote	Areas with average ARIA index values greater than or equal to 5.95 and less than 10.5
■ Very Remote	Areas with average ARIA index values greater than or equal to 10.5

Proposal 4 **USE THE CENSUS COLLECTION DISTRICT (CD) AS THE SPATIAL UNIT TO DEFINE THE CLASSIFICATION OF REMOTENESS**

CDs of the same Remoteness class will be aggregated into non-contiguous regions within each State or Territory. Note that Victoria and Tasmania have no Very Remote CDs.

Proposal 5 **INTRODUCE ADDITIONAL CLASSES INTO THE SECTION OF STATE (SOS) STRUCTURE**

The proposed new structure would appear as follows:

■ Major Urban	1,000,000 or more population
	250,000 to 999,999
	100,000 to 249,999

- Other Urban — 50,000 to 99,999; 20,000 to 49,999; 10,000 to 19,999; 5,000 to 9,999; 1,000 to 4,999
- Rural
  - Bounded Locality — 200 to 999
  - Rural Balance — Remainder of S/T
- Migratory — Off-shore, shipping and migratory

The ASGC 2001 Edition is the edition to be used for the 2001 Census of Population and Housing.

Proposals 1 to 4 are discussed in more detail in Chapter 5. Proposal 5 is discussed in more detail in Chapter 6.

CHAPTER 3 THE AUSTRALIAN STANDARD GEOGRAPHICAL CLASSIFICATION (ASGC)

The ASGC is a classification maintained by the ABS, for the collection and dissemination of geographically classified statistics. It is constructed on the basic classification principles that:

- members of a class are of the same type and clearly demarcated by precise boundaries;
- the classes are mutually exclusive;
- the levels in the hierarchy are uniquely identified by codes and names; and
- the classes within any level aggregate to cover the whole geographic area to which the classification structure applies.

The ASGC includes six separate classification structures see fig. 3, p.16. Each of these structures suits different statistical purposes. Four of these structures, Main, Statistical Region, Statistical District and Local Government Area, are updated each year, while the remaining two structures, Urban Centre/Locality and Section of State, are updated only in the years when a Census of Population and Housing is held.

The ASGC is designed to meet user needs for social, demographic and economic statistics. Statistical data are classified to a geographical area in one of the six ASGC structures. The ASGC provides a set of common frameworks whereby statistics may be comparable and can be spatially integrated. Users can also define their own regions of interest using any level of the ASGC.

In a Census year, the Collection District (CD) is the smallest geographic unit of the ASGC and it is from this building block that all other levels of the classification are aggregated. In intercensal years, the Statistical Local Area (SLA) is the smallest geographic unit and there is no precise aggregation of CDs to SLAs.

The ASGC is widely used by the ABS and its clients. There is strong support for the concept of a single, standard geographic classification. It is very difficult, if not impossible, however, to develop a classification which includes all the spatial units and definitions that users desire. There has been some criticism of the ASGC in the past because it does not incorporate all the concepts which are percieved as important. However, the ASGC, in its current form, does produce spatially classified statistics in a useful, comparable and cost effective manner.

Following are brief descriptions of the ASGC spatial units. For further information about these spatial units or other aspects of the ASGC, please refer to the ABS publication, *Australian Standard Geographical Classification (ASGC)* (Cat. no. 1216.0).

THE SPATIAL UNITS

Census Collection District (CD)

CDs are designed for use in census years for the collection and dissemination of Census data. CDs only change in census years i.e. CDs are only defined with respect to a given census year. CDs, in aggregate, cover the whole of Australia with no gaps or overlaps.

The basic concept of a CD is that it defines an area that one census collector can cover for distribution and collection of census forms, in about a ten day period. In urban areas, this translates to approximately 200 dwellings. In rural areas, the number of dwellings per CD reduces as population densities decrease.

For the last (1996) Census, 34,500 CDs were defined throughout Australia. This will increase to approximately 37,200 for the 2001 Census.

Statistical Local Area (SLA)

The SLA is the base level spatial unit for the collection and dissemination of statistics other than those collected from Population Censuses. In non-census years, the SLA is the smallest unit defined in the ASGC. In census years, an SLA consists of one or more whole CDs. In aggregate, SLAs cover the whole of Australia with no gaps or overlaps.

The SLA is based on the administrative areas of local government. This is an important linking mechanism to the 'real world' as local governments are a useful source of data and an easily recognised dissemination unit for users of statistics. An SLA is equal to a whole local government area except where there is a statistical imperative to split the local government area into smaller areas. Where there is no incorporated body of local government, SLAs are defined to cover the unincorporated areas.

There were 1,336 SLAs in 1996. At the 2001 Census, there will be 1,353 SLAs defined.

Statistical Subdivision (SSD)

The SSD is a general purpose spatial unit of intermediate size. It is an aggregation of SLAs and defines socially and economically homogenous regions characterised by identifiable links between the inhabitants. Outside the capital cities and larger urban areas, an SSD is characterised by identifiable links between the economic units within the region, under the unifying influence of one or more major cities or towns.

Statistical Division (SD)

The SD is a general purpose spatial unit and is the largest and most stable unit within each State/Territory in the Main Structure. SDs consist of one or more SSDs. An SD is defined around each Capital City, to encompass the anticipated growth of that city for a period of at least 20 years. Elsewhere, SDs are defined as relatively homogenous regions characterised by identifiable links between the inhabitants and economic units within the region, under the unifying influence of one or more major towns or cities.

Local Government Area (LGA)

An LGA represents the geographical area of responsibility of either an incorporated Local Government Council, or, in the Northern Territory, an incorporated Community Government Council of sufficient size and statistical significance.

Statistical District (S Dist)

S Dists are generally defined around urban centres with a population of at least 25,000, which are not located within a Capital City Statistical Division. S Dists enable comparable statistics, including intercensal population estimates, to be produced for these areas. The boundary of a S Dist is defined to encompass the anticipated future growth of the urban area for a period of at least 20 years.

Statistical Region Sector (SRS), Statistical Region (SR), Major Statistical Region (MSR)

These spatial units are the regional groupings (smaller to larger) from the Statistical Region Structure of the ASGC. They are aggregates of SLAs and are mainly used to report statistics from the Labour Force Surveys.

Urban Centre/Locality (UC/L)

In broad terms, an Urban Centre represents a population cluster of 1,000 or more people and a Locality represents a population cluster of 200 to 999 people. For statistical purposes, people living in Urban Centres are classified as urban, while those living in Localities are classified as rural.

UC/Ls are aggregates of one or more contiguous CDs and are only defined in census years. Because UC/Ls can cross the boundaries of all other ASGC spatial units, they must be included in a separate ASGC structure. Detailed criteria for the delimitation of UC/Ls are set out in the *Australian Standard Geographical Classification* (Cat. no. 1216.0).

Sections of State (SOS)

Each State/Territory can be divided into five Sections of State, representing non-contiguous areas formed by the aggregation of CDs of a particular urban/rural type. The five categories of SOS in 1996 were:

- Major Urban — Urban areas (Urban Centres in UC/L Structure) with a population of 100,000 and over;
- Other Urban — Urban areas (Urban Centres in UC/L Structure) with a population of 1,000 to 99,999;
- Bounded Locality — Rural areas (Localities in UC/L Structure) with a population of 200 to 999;
- Rural Balance — The remainder of the State/Territory; and
- Migratory — Areas composed of off-shore, shipping and migratory CDs.

Note that rural in this context means non-urban. SOS is defined in census years only.

CHAPTER 4 ACCESSIBILITY/REMOTENESS INDEX OF AUSTRALIA (ARIA)

In response to an invitation from the ABS to progress the development work on a classification of remoteness, the Commonwealth Department of Health & Aged Care (DH&AC) commissioned a project in 1997 to measure and classify remoteness in a physical, geographic way. The result of this work is the Accessibility/Remoteness Index of Australia (ARIA), developed by the National Key Centre for Social Applications of GIS (GISCA).

ARIA has been developed as an index (continuous variable with values between 0 and 15), based on a purely geographical methodology in which remoteness is defined on the basis of road distance from any point to the nearest town (service centre) in each of five population size classes. The population size of the service centre is used as a proxy for the availability of a range of services and road distance is used as a proxy for the degree of remoteness from those services.

ARIA is being used for a variety of policy, administrative and statistical purposes. It is increasingly being used by government agencies as a definition of remoteness and is emerging as a defacto standard. This is, in itself, an important step forward because the debate on how to define remoteness has gone on for many years and without the emergence of a generally accepted methodology it would not be possible to propose a broadly acceptable classification. ARIA is based solely on physical geography and is not, by itself, intended to be a socioeconomic index.

This chapter gives a brief overview of the concepts and methodology behind ARIA.

CONCEPTS

Remoteness

The ARIA project settled on a specific definition of remoteness based upon the distance people must travel along a road network to get to Service Centres (areas where they can access goods, services and opportunities for social interaction). It is a geographical concept and does not attempt to define the broader concept of accessibility which is influenced by many factors such as the socioeconomic status or mobility of a population.

Populated Localities—where people journey from

These are mapped places, across Australia, from where people might need to travel to obtain services. The network of points used by GISCA consisted of 11,340 places mapped by the national mapping agency (AUSLIG) and defined in cartographic terms as 'Populated Localities'. These places may or may not have permanent population and should not be confused with ABS Urban Centres and Localities.

Service Centres—where goods and services are

These are the places that people travel to in order to access goods and services. The number and range of goods, services and interaction opportunities available in Service Centres will vary depending upon the size (population) of the Service Centre. The Service Centres used in ARIA are ABS 1996 Urban Centres that have a population equal to or greater than 1,000.

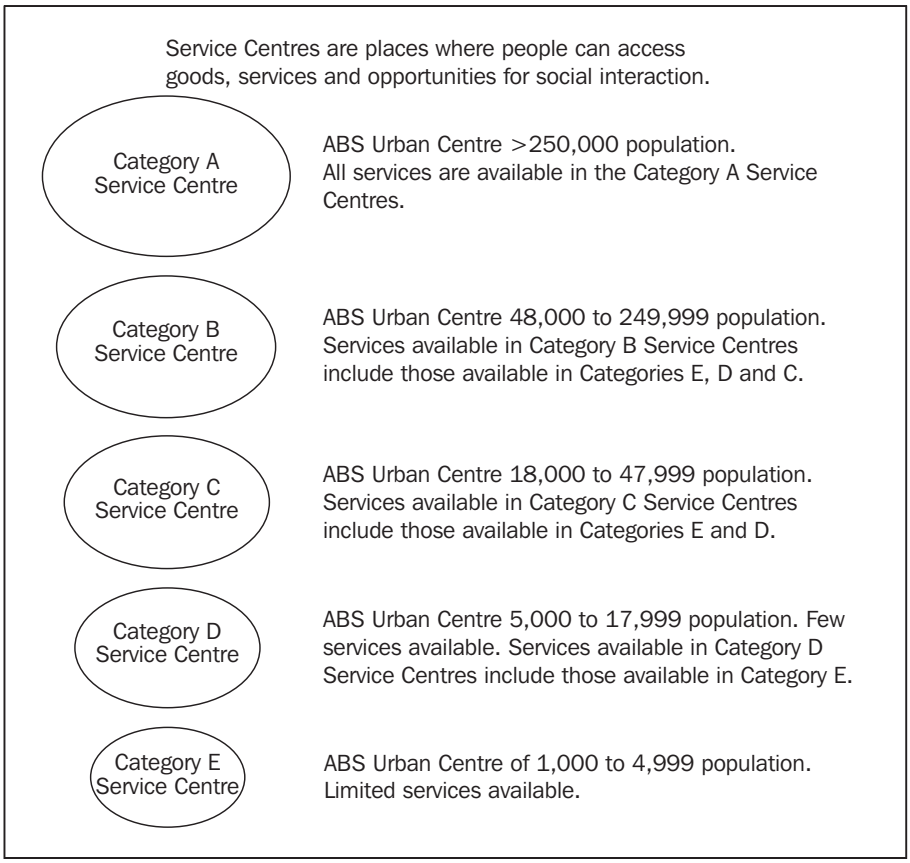
The Service Centres were categorised on the basis of a number of factors:

- on research concerning the relationship between size of centres and service provision (Scott 1964, Smailes 1969, Dick 1971, Holmes 1988);
- a research analysis of the relationship between population size of service centres and the availability of services; and
- on the clustering of population size of Australian towns and cities.

For analysis of service provision levels, a group of services (see Appendix B) was selected from the Australian and New Zealand Standard Industrial Classification 1993 (ANZSIC). A search was then done for these services in Telstra White Pages, Yellow Pages and the Universal Business Directory for towns of various sizes. Towns of 1,000 to 4,999 population usually provided only a subset of services from the selected group. Towns of 5,000 or more population were found to provide all services to at least some extent. The number, choice and level of services then increased with the size of the centre.

The main discriminator in terms of the differences between the levels of service centre was revealed in the education and health services. Category A service centres provide specialist qualifications and the widest range of choices at the tertiary level. Category B centres such as Darwin and Hobart tend to offer less choice at the tertiary level, with students often moving interstate in order to commence their degree. Category C centres tend not to offer university qualifications but show a strong TAFE presence, with Level D centres offering less choice again in terms of education services. Similarly, the most advanced medical procedures are offered in Level A centres, with patients travelling from less well serviced areas in order to access specialist care. As the size of the population centres becomes progressively smaller, in general the degree of choice in terms of hospital care, general practitioners and specialists decreases. Some of the differences between service centres are also revealed in the entertainment arena, with large population centres reflecting the ability to bring high profile, high cost acts to the area.

1 ARIA SERVICE CENTRES (ABS 1996 URBAN CENTRES)



Remoteness—distances people must travel to access services

Underlying the concept of remoteness in the ARIA project is the measurement of the physical road distance between where people live and the places those people travel to in order to obtain goods and services, and to enjoy opportunities for social interaction. Socioeconomic factors are deliberately not included so no assumptions are made about the availability of public versus private transport. Nor is actual time taken to travel included in the definition. While road distance is a better indicator for travel time than say direct, as the crow flies distance, it is still an imperfect indicator of remoteness. It would be impossible to compute actual travel time for all populated places across Australia. The data about road conditions needed for such calculations are not available and, if they were, maintenance of a remoteness index based on travel time would be a daunting task with conditions changing with, among other things, the seasons. Such a volatile index would not be suitable for incorporation in a national geographical classification.

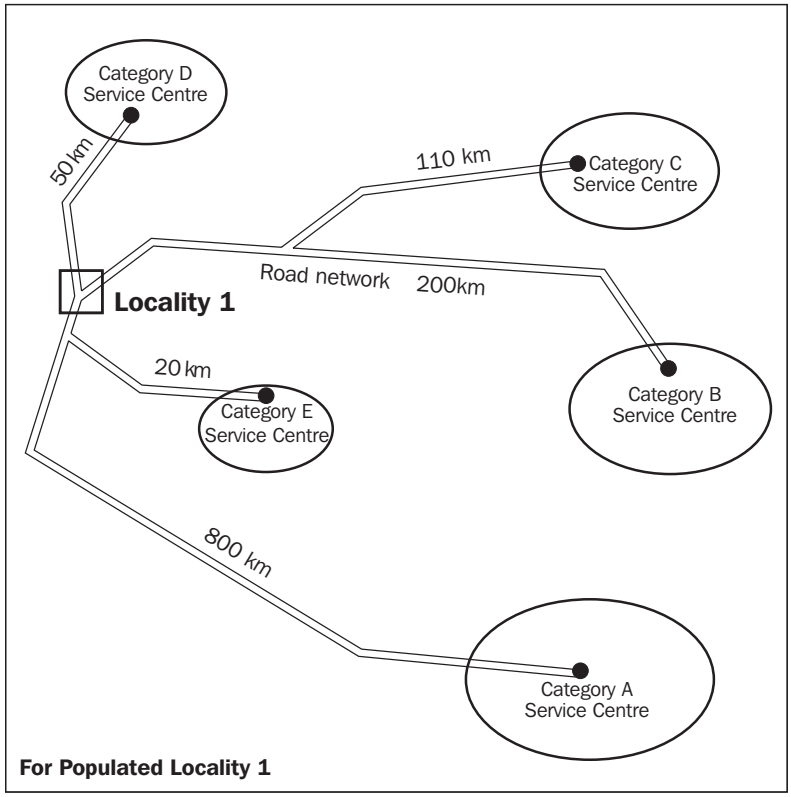
METHODOLOGY

ARIA Scores

The calculation of an ARIA Score involves measuring the shortest road distance between a Populated Locality and five categories of Service Centre. The distance is adjusted for islands. The ratio of the shortest distance to the mean shortest distance, for each category of Service Centre, is calculated. The maximum value for this ratio is capped at

three. The five individual values are then summed to arrive at a single ARIA Score for the Populated Locality. The highest ARIA Score a Populated Locality can have for any of its Service Centre categories is 3 and the lowest it can have for any of its Service Centre categories is 0 (zero). The highest total ARIA Score a Populated Locality can have therefore is 15 and the lowest total ARIA Score it can have is 0 (zero). For example, Brisbane has a score of zero while Lajamanu in the Northern Territory has a score of 15.

2 ARIA SCORE



$$\text{Category A Score} = \frac{\text{Distance Loc 1 to SC A}}{\text{Mean Shortest Distance}} = \frac{800\text{ km}}{413\text{ km}} = 1.93$$

$$\text{Category B Score} = \frac{\text{Distance Loc 1 to SC B}}{\text{Mean Shortest Distance}} = \frac{200\text{ km}}{239\text{ km}} = 0.84$$

$$\text{Category C Score} = \frac{\text{Distance Loc 1 to SC C}}{\text{Mean Shortest Distance}} = \frac{110\text{ km}}{139\text{ km}} = 0.79$$

$$\text{Category D Score} = \frac{\text{Distance Loc 1 to SC D}}{\text{Mean Shortest Distance}} = \frac{50\text{ km}}{88\text{ km}} = 0.57$$

$$\text{Category E Score} = \frac{\text{Distance Loc 1 to SC E}}{\text{Mean Shortest Distance}} = \frac{20\text{ km}}{44\text{ km}} = 0.45$$

$$\text{Total ARIA Score} = 4.58$$

In this way, each of the 11,340 Populated Localities across Australia has been assigned an ARIA Score which aims to describe its remoteness from goods, services and opportunities for social interaction. If a point is located within a Service Centre then the road distance to the Sevice Centre is zero and the ARIA score for that category is zero.

Having each Populated Locality with its ARIA Score means that an indicator of remoteness can be derived for a person or facility with the Populated Locality name as part of their address. The network of 11,340 points does not, however, cater for people who live outside these Populated Localities. To provide a blanket coverage for all of Australia, a 1km grid was constructed. Each 1 km by 1 km grid cell has been given an ARIA Score. The score for each grid cell was calculated based upon the ARIA Scores of the six Populated Localities nearest to each grid cell (Inverse Distance Weighted method). The grid can be used to determine a score for any point on the map of Australia. It can also be used to generate an average ARIA Score for any geographical area by overlaying the boundaries of the area onto the grid, and calculating an average from the scores of grid cells that fall within the area.

Development of ARIA

ARIA was initially published in March 1999 but is currently being improved and expanded. Some minor inconsistencies in the allocation of Service Centres to categories are being corrected and road distances will be calculated to the edge of a Service Centre rather than to a theoretical point inside the centre. These improvements will resolve some minor anomalies in the index at the 1 km grid level.

The new version of ARIA will also introduce the fifth category of Service Centre to include the influence on remoteness of towns in the 1,000 to 4,999 population range. The original ARIA published in March 1999 used only four categories of Service Centre, the smallest being towns of 5,000 to 17,999. Thus the new version will have five individual scores (sub-indices) rather than the original four and these are then summed to give an ARIA score ranging from 0 to 15.

GISCA's analysis of service availability in towns of various sizes showed that towns of larger than 5,000 population generally provided at least a basic level of all selected categories of services and the number and level of services increased with size. While a town of less than 5,000 people may not have the full range of services available, even at a basic level, it was felt that the distance to these small centres was, none the less, important. In particular the addition of this fifth category of Service Centre helps to differentiate between centres at the extreme range of remoteness.

While there is still some work to be done, in general terms, the ABS view is that the ARIA methodology, with the recent improvements, is a suitable means to determine the remoteness of any part of Australia. Throughout this publication wherever the term ARIA is used it refers to the new edition with these improvements incorporated.

CHAPTER 5 PROPOSED IMPLEMENTATION OF A CONCEPT OF REMOTENESS INTO THE ASGC

In the past various Metropolitan/Rural/Remote (or similar) classifications have existed and have been used by ABS clients either in parallel with the Australian Standard Geographical Classification (ASGC) or completely separate from it. A number of recent consultative processes have, however, established the need for inclusion of a remoteness concept in the ASGC.

DEMAND FOR A CONCEPT OF REMOTENESS IN THE ASGC

A concept of remoteness for the ASGC was first suggested in the 1980s. It was also included in the recommendations to the 1996 Review of the ASGC (Ref Monograph Series 3/1997 *Rethinking the ASGC: Some Conceptual and Practical Issues* Graeme Hugo et al.). This report recommended that there should be a concept of remoteness and suggested three diferent approaches. ARIA is largely a development of one of these three approaches.

ARIA Steering Committee

The steering committee convened by DH&AC to oversight the development of ARIA felt that it would be more useful if it were incorporated into standard statistical geography. Some members felt that the methodology would be more widely accepted by the community, thus making administrative decisions more easily defensible, whilst others felt that there would be increased availability of comparative statistics for the remote population if ARIA was incorporated in the ASGC.

Review of the ABS Household Survey Program

One of the issues consistently raised during these very extensive consultations was the need for data about specific groups within the population and for regional data. Some of the population groups of particular interest are closely linked to geographical variables e.g. 'the bush', 'regional Australia', 'non-metropolitan' and the indigenous population.

While sample surveys such as the Monthly Population Survey (MPS) are not a suitable platform for the collection of regional statistics in the 'small areas' sense of the word, it may indeed be possible to produce data for large aggregated areas such as 'remote Australia' if a suitable geographical classification existed and could be utilised at the sampling stage.

Census Output Products User Consultation

These consultations addressed the full range of census output needs. Summary statistics on some form of urban/rural/remote classification were raised by several clients. The policy area driving this need is the increasing concern for the social and economic well being of non-metropolitan Australia.

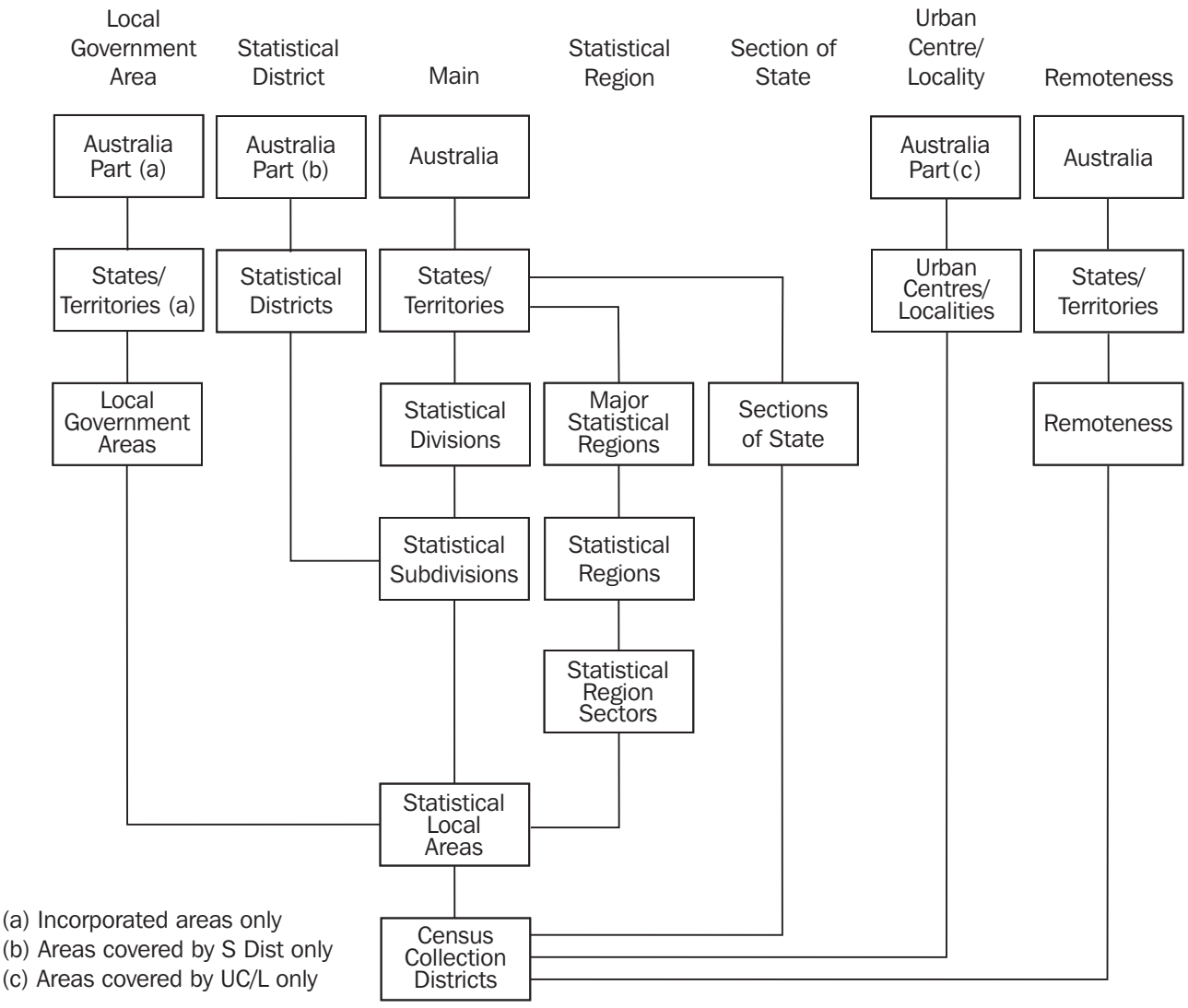
PROPOSED CHANGES TO THE ASGC

In accepting ARIA as a methodology for defining remoteness, the ABS is presented with several options for incorporating this index into a classification. Each of these has been considered and the ABS has concluded that the simplest and most flexible approach is to include Remoteness as a separate structure in its own right, with Census Collection Districts (CDs) given their associated ARIA score and then grouped into classes of remoteness.

Proposal 1 **INCLUDE REMOTENESS AS A SEPARATE STRUCTURE IN THE ASGC (2001 EDITION)**

While many users are only familiar with the Main Structure of the ASGC, it actually has six parallel structures, each designed to meet a particular need for statistics. A simple and effective way to incorporate remoteness into the ASGC is to treat it as a separate variable with its own structure, i.e. introduce a seventh parallel structure.

3 EXISTING ASGC STRUCTURES WITH POSSIBLE NEW SEVENTH STRUCTURE



(a) Incorporated areas only
(b) Areas covered by S Dist only
(c) Areas covered by UC/L only

In this arrangement the base spatial units, CDs, are classified to all structures, including both the current SOS and Remoteness, independently of each other. Ubanity and Remoteness are not seen as mutually exclusive. A CD can be classified as both Urban and Remote.

Why separate Remote from Urban and Rural?

While it is acknowledged that some users would prefer a classification which describes some sort of an Urban/Rural/Remote continuum, the developers of ARIA maintain, and most commentators agree, that remoteness and urbanity are not mutually exclusive so such a classification would at best be simplistic and at worst misleading. Few would argue for example that quite large urban centres like Alice Springs and Mt Isa are not remote in terms of access to the full range of services provided in the metropolitan areas.

In practice no town of population 25,000 or more has an ARIA score higher than 3.9 ('Moderately Accessible' according to the proposed classes see p.18) and only three other towns of population 10,000 or more have an ARIA Score above this value. Thus most larger urban centres are simply not remote but this does not change the underlying premise that urban areas can be remote just as rural areas can be very accessible. Using the ARIA definition of remoteness, urban centres can also grow considerably in size but remain remote. Thus there is no simple Urban/Rural/Remote continuum.

The ABS did consider a single structure with large urban centres at one extreme and remote at the other. In such a structure each town of less than 25,000 population and each rural (non-urban) area would be classified as either remote or not remote. If we also attempt to classify urban centres by size (see Proposal 5 Chapter 6 p.23), the combined structure becomes quite complex and the classes small. If a single structure is used for urban/rural and remoteness we would probably have to forgo some classes of small and medium towns to enable data to be published. Such a structure would be similarly restricted in the classes of remoteness. It would be difficult to cater for more than two degrees of remoteness. The ABS proposes, therefore, a separate structure addressing only remoteness.

A separate structure addressing only remoteness, independent of urban/rural status is conceptually simpler and more flexible as it allows cross tabulation at the CD level of any combination of urbanity and remoteness where statistics at CD level are available.

Proposal 2 **USE ARIA AS THE UNDERLYING METHODOLOGY FOR DETERMINATION OF REMOTENESS**

Remoteness is not like the topographic or administrative boundaries which are used to define other geographical areas in the ASGC. It is a relatively subjective concept which can mean different things to different people. Until now, a single broadly acceptable method of defining remoteness has not been available. Without agreement on how to define remoteness it is not possible to take the next step of defining a geographical classification of remoteness.

ARIA provides a clear definition and methodology to describe and represent remoteness from goods and services for any part of Australia. It relies on road distance as a surrogate for remoteness and on the population size of a Service Centre as a surrogate for the availability of services. Such assumptions can always be challenged but the ARIA index is simple and maintainable. It is also sufficiently generic for inclusion in a national geographical classification.

A standard geographical classification should not include socioeconomic characteristics of the population in the delimitation criteria. To do so could make analysis of data collected on the areal units meaningless as it becomes impossible to unravel the characteristics being analysed from those embedded into the geography. ARIA is based on a single geographical variable and does not include any socioeconomic characteristics of the population.

How does ARIA compare to other models?

There have been other attempts to define, measure and classify the concept of remoteness. Some of these applied the concept only for part of Australia or incorporated socioeconomic factors. Others used terminology such as urban, rural, remote, metropolitan, non-metropolitan and regional which are often inter-changeable in different models. All models for remoteness have recognised that distance is involved and that people must travel to access goods and services and that centres of larger population size will have a wider range of goods and services available.

The Rural, Remote and Metropolitan Areas Classification (RRMAC) 1994 is one of the more widely used classifications of remoteness. The RRMAC model uses the ASGC Statistical Local Area (SLA) as its basic building block. SLAs are classified into metropolitan and non-metropolitan zones. The non-metropolitan zones are further divided into rural or remote after an Index of Remoteness Score has been calculated for each of these SLAs.

The RRMAC model was considered unsuitable for adoption as a standard for several reasons. The classification of entire SLAs as rural, remote or metropolitan is considered by some to be flawed because, conceptually, remoteness can vary greatly from one side of a large SLA to another. Problems also exist with measuring distance 'as the crow flies' and with using the centroids of SLAs and population centres as the reference points for distance measurement.

Proposal 3 **ADOPT FIVE CLASSES OF REMOTENESS**

The ABS proposes the following five classes in the new Remoteness Structure:

- Highly Accessible — Areas with average ARIA index values greater than or equal to 0 and less than 0.2
- Accessible — Areas with average ARIA index values greater than or equal to 0.2 and less than 2.4
- Moderately Accessible — Areas with average ARIA index values greater than or equal to 2.4 and less than 5.95
- Remote — Areas with average ARIA index values greater than or equal to 5.95 and less than 10.5
- Very Remote — Areas with average ARIA index values greater than or equal to 10.5

These classes maintain broad compatibility with the DH&AC classes *(DH&AC Occasional Papers Series No. 6, Accessibility/Remoteness Index of Australia)* except that, after allowing for the difference in the new edition of ARIA:

- the DH&AC Highly Accessible class has effectively become two classes to differentiate the very large urban concentrations from the rest of the country;
- the area covered by the DH&AC Accessible class has, as a result, moved into the Moderately Accessible class; and
- the lower limit of the ARIA score for the Remote class has been lowered to increase the percentage of the population classified as remote.

How were the classes determined?

The purpose of a Remoteness classification is to define broad regions which share common characteristics of remoteness. Remoteness is a relative not an absolute concept and the main difficulty in determining the boundary between classes is the lack of any strict criteria on which to base the definition. DH&AC (Occasional Papers Series No. 6) recommended that ARIA Scores greater than 5.8 of a possible 12 be classed as Remote. The ABS proposes that this boundary should be lowered to 4.8 to give greater comparability with RRMAC, both in terms of the remote areas and the size of the remote population. ARIA 4.8 was then adjusted to 5.95 in the new edition of ARIA which has an extended index range of 0 to 15.

Assuming that aggregated data are to be produced for remote areas from ABS household surveys, consideration must clearly be given to the sample selection and reporting options. It is highly desirable that the population of remote areas be large enough to be adequately represented in ABS household surveys. The cut-off point of ARIA 5.95 has been chosen to maximise the population size of remote areas. Even then it will not be possible to publish data from sample surveys for remote areas in some states and it will not be possible to publish all variables even for remote areas aggregated to the national level.

1 PROPOSED FIVE CLASSES OF REMOTENESS

Classes	ARIA Score Range in the Class	Percentage Population (1996 Census)	Definition for the Class
HIGHLY ACCESSIBLE	0 to 0.19	60.7%	Geographic distance imposes minimal restriction upon accessibility to the widest range of goods, services and opportunities for social interaction.
ACCESSIBLE	0.2 to 2.39	24.6%	Geographic distance imposes some restriction upon accessibility to the widest range of goods, services and opportunities for social interaction.
MODERATELY ACCESSIBLE	2.4 to 5.94	11.7%	Geographic distance imposes a moderate restriction upon accessibility to the widest range of goods, services and opportunities for social interaction.
REMOTE	5.95 to 10.49	2.0%	Geographic distance imposes a high restriction upon accessibility to the widest range of goods, services and opportunities for social interaction.
VERY REMOTE	10.5 to 15	1.0%	Geographic distance imposes the highest restriction upon accessibility to the widest range of goods, services and opportunities for social interaction.

Because work is not yet complete on the new edition of ARIA, population figures are preliminary only and will change slightly in the final implementation in ASGC 2001 Edition. The intention is, however, to keep the total population of the Remote and Very Remote classes above 3% of the population and preferable around 3.5%.

The 0 (zero) ARIA Score has particular significance because, by definition, it represents Urban Centres larger than 250,000 persons and accounts for nearly 60% of the Australian population. If adopted as a class in its own right this ARIA=0 region would include the larger capital cities, and the large Urban Centres of Gold Coast-Tweed Heads, Canberra-Queanbeyan and Newcastle, but exclude Darwin and Hobart. It was initially proposed, therefore, to make ARIA=0 a separate class representing the most accessible areas. However, it was felt that the urban areas of the New South Wales Central Coast, Maitland and Wollongong as well as Geelong in Victoria should also be included in the most accessible category. An ARIA score of 0 to 0.2 was therefore adopted for the Highly Accessible class.

The class ranges recommended by GISCA/DH&AC were not adopted because their Highly Accessible class groups at least part of what some people call 'regional' Australia with the larger capital cities. While there is no single understanding of what 'regional' means, it is obvious that it does not include these very large urban concentrations. While the new Remoteness Structure does not attempt to define 'regional', ABS has chosen classes of Remoteness which are broadly compatible with at least one common interpretation of 'regional'.

Proposal 4 **USE THE CENSUS COLLECTION DISTRICT (CD) AS THE SPATIAL UNIT TO DEFINE THE CLASSIFICATION OF REMOTENESS**

The proposed standard classification will be applicable to CDs defined at Census times only. CDs will aggregate to a particular Remoteness class and then directly to States/Territories in the ASGC. The classification will not be applicable to SLAs or any other higher level spatial units of the Main Structure of the ASGC, e.g. SSDs or SDs.

ARIA in itself does not have a spatial unit. The ARIA index has been interpolated to a 1 km grid covering the whole of Australia. In concept this is similar to a topographic map of say elevation, except that the variable is remoteness. An average ARIA Score can be calculated for any region, although the larger the spatial unit (in area) the greater the variance of ARIA score from one part of the area to another.

In selecting a base spatial unit to define a classification of Remoteness in the ASGC, the ABS had two main options; the Census Collection District (CD) and the Statistical Local Area (SLA). The CD is the smallest building block of the ASGC and was therefore attractive in terms of providing the most precise definition of regions of relative remoteness. The SLA, on the other hand, is the smallest unit of the ASGC in intercensal years and the level by which a lot of data are collected and disseminated.

The ABS proposes to use the CD as the base unit of its classification of Remoteness. The structure will be similar to the SOS Structure in that classes of Remoteness will cross SLA boundaries. SLAs, or any other higher level spatial units of the Main Structure of the ASGC will not aggregate to the Remoteness classes.

Why a CD based classification?

To achieve reasonable homogeneity in Remoteness the CD was the obvious choice of spatial unit, being the smallest available, although it should also be remembered that, unlike SOS where CDs are designed to be generally homogeneous in terms of urban/rural, remoteness does vary considerably from one part of a large CD to the other.

Many users want to compare the remoteness of SLAs or aggregate SLA level data to classes of remoteness. An average ARIA Score can be determined for SLAs but there are more than fifty SLAs which have a range of 4 or more in their minimum to maximum ARIA index values. This creates arguably the greatest difficulty with the implementation of Remoteness in the ASGC. Defining Remoteness regions by whole SLAs would create anomalies whereby a considerable part of the SLA would be much less or much more remote than the average score. To limit the definition of Remoteness in this way would negate many of the advantages of ARIA and give rise to criticisms similar to those made against the RRMA Classification.

An alternative approach to achieve reasonable homogeneity but retain large spatial units is to determine the average score for an area such as an SLA, based on population weighting i.e. give the whole area the ARIA Score which applies to the majority of the population of the area. However, this approach requires moving away from the concepts of physical geography on which ARIA is based and leads to anomalies where at least some population in an area is much more, or less, remote than the classification implies. This in turn creates difficulties for survey sampling where a CD might be selected for its Remoteness characteristics when in fact it is less remote than the rest of the SLA. Further, the ASGC has no existing structures which are population weighted.

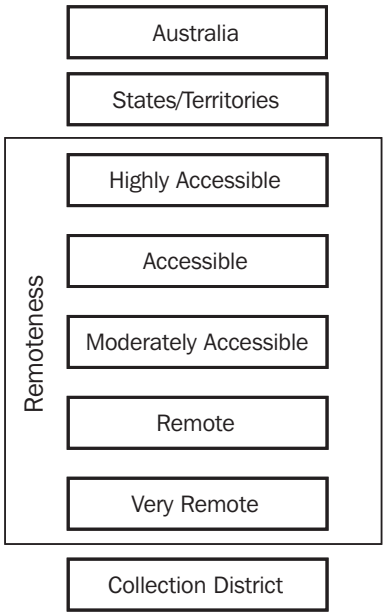
While a CD based classification is the obvious choice for homogeneity of Remoteness, this decision will affect the availability of statistics for the resulting classification. All data from the Census of Population and Housing which are available at CD level will also be available on the new classification. Data from ABS household surveys will potentially be available because the CD of the sampled household is known and the data can be aggregated accordingly. The limitation on availability of data from this source will be the sample size of the survey and the resulting Relative Standard Error (RSE). It is anticipated that at least some variables will be published for aggregates of the five classes of Remoteness. For example it will be possible to publish some variables for 'Highly Accessible', 'Accessible' and 'Moderately Accessible' Australia but 'Remote' and 'Very Remote' may need to be combined.

The data which are not available at CD level and therefore cannot be precisely aggregated to classes of Remoteness are some, mostly economic, ABS data and data from administrative systems which are currently coded to either SLA or post code. At some time in the future, as CD coding and geocoding become more readily available, it will be possible to code this data to Remoteness classes. In the meantime the ABS will calculate and publish a population weighted average ARIA Score for each SLA. This will allow users to approximate data collected on SLAs to classes of Remoteness and to compare the relative Remoteness of SLAs. This file will not be part of the classification itself but will be similar to the population weighted concordances which the ABS provides for comparison of data collected on incompatible areal units such as SLAs and post codes.

CONCLUSION

The proposed new ASGC structure of Remoteness consists of five classes and will be defined on CDs.

4 FIVE CLASSES OF REMOTENESS FORMED BY AGGREGATING CDs



CHAPTER 6 PROPOSED CHANGES TO THE SECTION OF STATE (SOS) STRUCTURE

As well as incorporating Remoteness (refer to Proposals 1 to 4 presented in the previous chapter), it is proposed that the number of classes in the Section of State (SOS) Structure in the ASGC be substantially increased to provide increased statistics for aggregations of towns of varying sizes regardless of their Remoteness status.

Although not immediately apparent from its title of 'Sections of State' (SOS), this ASGC structure is designed to identify CDs which are intrinsically urban or rural and to provide, in aggregate, statistics for urban concentrations (Major Urban and Other Urban) and for rural (non-urban) localities and balance areas (refer to Chapter 3 or the *Australian Standard Geographical Classification (ASGC) 2000* Cat. no. 1216.0 p.34).

The structure is defined on CDs because larger statistical units, such as SLAs, can and do contain both urban and rural areas within the same bounded area.

This urban/rural classification is based on the premise that people living in close proximity to others in clusters of 1,000 or more are town dwellers. The ASGC, in the SOS Structure, currently makes no distinction between people living in a rural environment on the fringes of a capital city and those living in rural areas far from government or commercial services. The proposals in Chapter 5 for a separate Remoteness Structure are designed to redress this shortcoming.

Proposal 5 INTRODUCE ADDITIONAL CLASSES INTO THE SECTION OF STATE (SOS) STRUCTURE

The proposed new urban classes of SOS are:

- Major Urban
  - 1,000,000 or more population
  - 250,000 to 999,999
  - 100,000 to 249,999
- Other Urban
  - 50,000 to 99,999
  - 20,000 to 49,999
  - 10,000 to 19,999
  - 5,000 to 9,999
  - 1,000 to 4,999

These classes were recommended to a review of the ASGC by Professor Graeme Hugo of Adelaide University some years ago. More recent work done for the ARIA project suggests that, at least in terms of services available, not all these classes are required. For example ARIA uses only five classes of service centre. The ABS would value input from users on the number and size range of classes which they feel are useful in the Australian context. It should also be remembered that census data will be available for individual Urban Centres and Localities as well as aggregated to these classes.

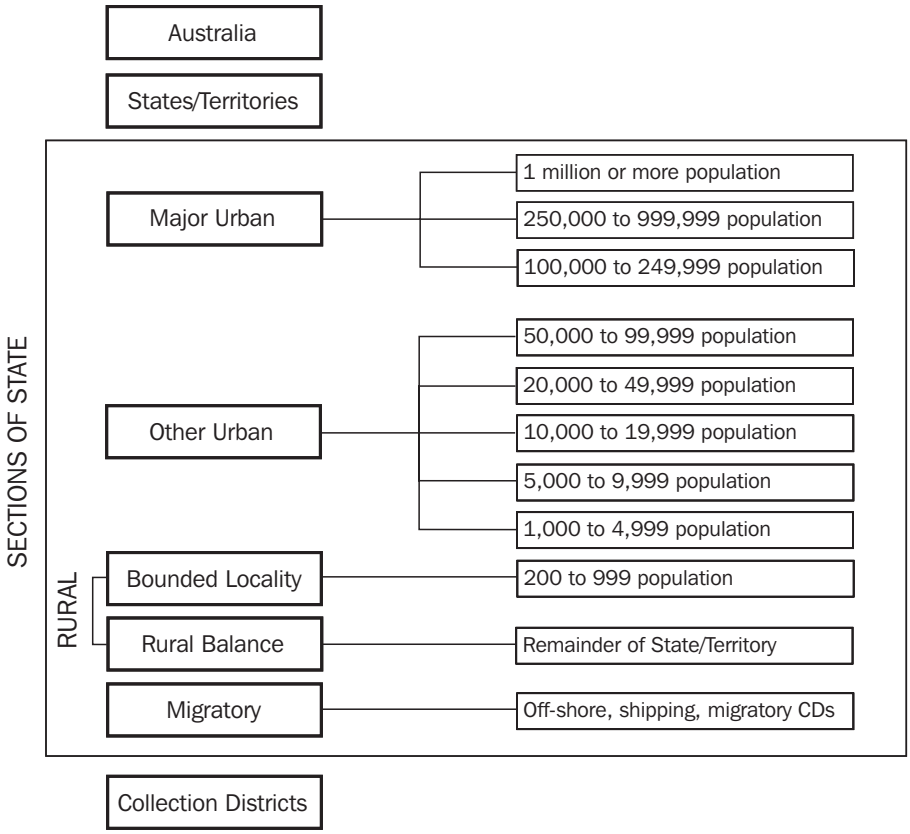
There is also at least some demand to split the current Locality (population concentrations of 200 to 999) class into two classes:

- Bounded Localities 500 to 999
  200 to 499

While the population of Bounded Localities in the 200 to 499 class is only 174,285 or less than 1% of the total population (1996 Census), the ABS will consider this additional change to the SOS Structure if there is sufficient demand from users.

Subject to the above, the Section of State Structure proposed for the 2001 edition of the ASGC will appear as follows:

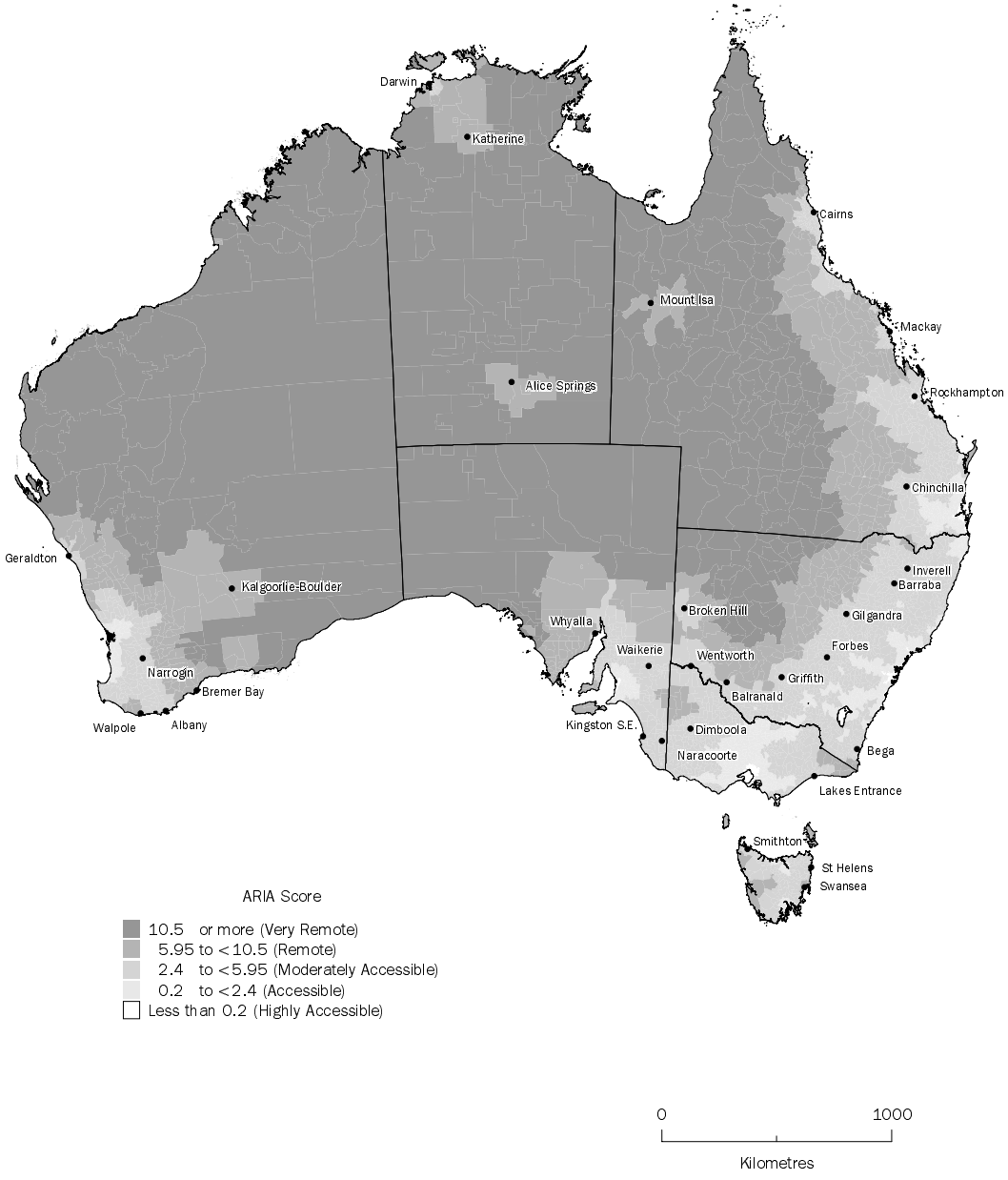
5 PROPOSED SOS STRUCTURE FOR ASGC (2001 EDITION)



APPENDIX A

Remote Australia

ARIA Score by 1996 Census Collection District



APPENDIX B SERVICE GROUPINGS USED IN THE ANALYSIS OF SERVICE AVAILABILITY

Education	Preschool
	Primary
	Secondary
	University
	TAFE
Health	Hospitals
	General Medical
	Nursing Homes
	Other Health Services
Other Services	Police
	Financial
	Postal
	Waste Disposal Services
	Government Services
	Retail
	Wholesale
	Manufacturing
	Accommodation
	Religious
	Entertainment and Recreation

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