SPACE, PLACE, POPULATION AND CENSUS ANALYSIS IN AUSTRALIA

by
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Outline of Paper

• Introduction
• Defining Appropriate Spatial Units for Analysis
• Australian Census Geography
• Settlement Type
• Identifying Different Population Geographies
• Conclusion
Where people live and work can be a relevant factor in understanding their behaviour.
In both academic and policy related research it is important to use appropriate spatial units which are meaningful in terms of the issue under investigation.
Social Catchments
An example of a relevant region

“The territory, occupied by a group of households and individuals who are in some form of regular social interaction and which inhabitants identify as ‘their’ community or region.”
Characteristics of Social Catchments

- Centred on a town or other urban place which is the focus of much of the interaction and is the location of many of the facilities people living in the area need and use.
- Most (but not all) people living within it feel a sense of belonging to the area and the social group living within it.
- While they can be delineated by sharp lines in fact their boundaries often are somewhat diffuse.
- The people living in the area share a sense of common interest and purpose.
- They can occur at several geographical scales.
Why Are Social Catchments Important in Planning?

• Localism and feelings of community and regional identity are a potent force in people’s consciousness in non-metropolitan areas.

• They represent areas of ‘communities of interest’ which opens the potential for mobilising group action and group involvement in activities.

• There are efficiencies to be gained locating goods and services in the central places of social catchments because people within social areas travel to these centres on a regular basis.

• They are often a more meaningful unit for social and economic planning than administrative divisions.
“Definitions of community should be meaningful in relation to prevailing social structures, levels of community organisation and interdependence and not to be defined purely on the basis of convenient administrative boundaries or data availability”
(Fenton 2000, p. 6)
The Australian Standard Geographical Classification (ASGC)

Source: ABS 2005

(a) Incorporated areas only.
(b) Areas covered by S Dist only.
(c) Areas covered by UC/L only.
Level 2 Social Areas: South Australia
Source: Smailes 1999
Level 3 Social Areas: South Australia

Source: Smailes 1999
The Generalised Urban Field Boundaries of South Australian Country Towns

Source: Smailes 1969
South Australia: Approximate Service Areas of Non-metropolitan Newspapers July 1971

Source: Hugo 1971, p. 58
US Commuting Zones, 1990
Source: Edmondson 1995
South Australia – Statistical Local Areas Outside Adelaide, 2001
Population per GP for SLAs

- GP locations
- Population per GP:
  - 0 - 1500
  - 1500 - 2000
  - 2000 - 2500
  - 2500 - 4000
  - 4000 - 180000
  - no doctors in SLA
GIS Approach to Determining GIS Catchments

- Assign each of 11,338 localities in Australia to its closest GP by road
- Assumes people will travel to their nearest service
- Derive natural catchments
- Can be applied to any service or any size or type of centre
Population per GP in WA

GP locations

Population per GP
- 0 - 1500
- 1500 - 2000
- 2000 - 2500
- 2500 - 4000
- 4000 - 18000
- no doctors in SLA

Kalgoorlie (29000, 28)
Coolgardie (6000, 2)
Natural Catchment Boundaries and SLA Boundaries
Overview of Possible Conceptual Framework for a Revised ASGC

Source: ABS 1997

Lowest level geographic units

<table>
<thead>
<tr>
<th>Input/Output units</th>
<th>Input units only</th>
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<tbody>
<tr>
<td>CD</td>
<td>Geocode?</td>
</tr>
<tr>
<td>Hundred/Parish</td>
<td>Block Face?</td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
</tbody>
</table>

Stable Unifying Level of ASGC = “Statistical Locality”
- suburb or similar in urban areas
- small homogenous unit outside urban areas

Classificatory Descriptors:
- urbanness/ruralness
- “remoteness”
- land use
- topography
- climate?
- soil type?
- drainage basin

Standard Regional Hierarchy of adjacent localities
- Urban Centres
- Urban Centres and their regions
- States and Territories
- A number of hierarchical levels

CONCORDANCE LINK
- Other boundaries especially Postcode
- LGA
- User Regions
Meshblocks

- 30 dwellings, 60 people
- Align to locality boundaries
- Not influenced by changeable boundaries
- Constructed along road centres, rivers, etc.
- New flexibility in geography
- Resulted in data available for individual units
- issues
The ASGC 2011
Source: Blanchfield 2004

Local Government Area
- Australia Part (a)
- States/Territories (a)
- Local Government Areas
- Statistical District
  - Australia Part (b)
  - Statistical Districts
  - Local Government Areas
- Statistical Subdivisions
- Statistical Local Areas
- Neighbourhood
  - Mesh Block

Main
- Australia
- States/Territories
- Statistical Divisions
- Major Statistical Regions
- Sections of State
- Statistical Region
- Sections of State
- Statistical Region Sectors
- Statistical Local Areas
- Neighbourhood
  - Mesh Block

Section of State
- Urban Centre/Locality
  - Australia Part (c)
  - Urban Centres/Locality
  - States/Territories
  - Remoteness

Remoteness
Urban: Rural Classification

- IUSSP Scientific Committee on Urbanisation and Population Distribution
  Prof Sidney Goldstein Chair 1971
- United Nations 1967
- Linge 1966
Criteria for Defining Urban Areas

- a population size threshold,
- population density,
- contiguity of built-up areas,
- political status,
- proportion of the population in non-agricultural occupations,
- presence of particular services or activities.
Australian Urban Definition

**Places with 20,000+**
- Population density criteria
- Collection District (c 200 households) building block
- Contiguity rules

**Places with 1,000-19,000**
- Defined subjectively
Some Widely Accepted Traditional Stereotypical Differences Drawn Between Urban and Rural Populations

Source: Hugo 1987

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Economy</td>
<td>Dominated by secondary and tertiary activities</td>
<td>Predominantly primary industry and activities supporting it</td>
</tr>
<tr>
<td>2. Occupational Structure</td>
<td>Manufacturing, construction, administration and service activities</td>
<td>Agriculture and other primary industry occupations</td>
</tr>
<tr>
<td>3. Education Levels and Provision</td>
<td>Higher than national averages</td>
<td>Lower than national averages</td>
</tr>
<tr>
<td>4. Accessibility to Services</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>5. Accessibility to Information</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>6. Demography</td>
<td>Low fertility and mortality</td>
<td>High fertility and mortality</td>
</tr>
<tr>
<td>7. Politics</td>
<td>Greater representation of liberal and radical elements</td>
<td>Conservative, resistance to change</td>
</tr>
<tr>
<td>8. Ethnicity</td>
<td>Varied</td>
<td>More homogeneous</td>
</tr>
<tr>
<td>9. Migration Levels</td>
<td>High and generally net in-migration</td>
<td>Low and generally net out-migration</td>
</tr>
</tbody>
</table>
Blurring of Urban:Rural Distinctions

• Long distance commuting
• Developments in transport and communication
• Mixing of populations
Can we Define Intermediate or Transition Areas Between Urban and Rural?

Ex-Urban Fringes, Peri-Urban, Peri-Metropolitan, Technoburbs, Exurban
Functional Metropolitan Regions

Limit of 25 percent of workers commuting to work in built-up urban area (Criteria suggested for US: US Federal Register 1999)
“The general concept underlying these definitions is that of a geographic area consisting of a large population nucleus together with adjacent communities having a high degree of economic and social integration with that nucleus. In effect, the definitions specify a boundary around each large city that includes most or all suburbs in addition to the city itself. Most definitions also include smaller satellite communities and some open country, since entire counties generally form the MSA building blocks. Some areas are defined around two, three or more central cities.”
## Counties by Urban Influence and Rural/Urban Continuum Codes, 1993

Source: Ghelfi and Parker 1995

### Urban Influence
- **Large, 1+ million pop. in total metro area**: 311
  - Central – 179
  - Fringe – 132
- **Small**: 525
  - Pop. 250,000 – 999,999 – 320
  - Pop. Less than 250,000 – 205

### Rural/Urban Continuum

#### Metro counties
- **836**

#### Nonmetro counties
- **2,305**

#### Adjacent to large metro
- **With own city**: 63
  - Urbanised adjacent** - 33
    - Less urbanised adjacent *** - 29
      - Rural adjacent**** - 1
  - Without city: 123
    - Urbanised adjacent – 3
      - Less urbanised adjacent – 80
    - Rural adjacent – 40

#### Adjacent to small metro
- **With own city**: 185
  - Urbanised adjacent – 97
    - Less urbanised adjacent – 88
    - Rural adjacent – 0
  - Without city: 630
    - Urbanised adjacent – 5
      - Less urbanised adjacent – 418
    - Rural adjacent – 207

#### Not adjacent to a metro area
- **With own city**: 231
  - Urbanised nonadjacent – 109
    - Less urbanised nonadjacent – 119
    - Rural nonadjacent – 3
  - Without city: 1,073
    - Urbanised nonadjacent – 6
      - Less urbanised nonadjacent – 539
    - Rural nonadjacent – 529

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* Own city means the county contains all or part of a city containing at least 10,000 residents.

** Urbanised means the county contains at least 20,000 urban residents.

*** Less urbanised means the county contains 2,500-19,999 urban residents.

**** Rural means the county contains 0-2,499 urban residents.
County Identification Codes Created by the Economic Research Service, USDA

Source: Butler and Beale 1994

Rural/Urban Continuum Code

Metro counties:

0  Central counties of metro areas of 1 million+
1  Fringe counties of metro areas of 1 million+
2  Counties in metro areas of 250,000 - 1 million population
3  Counties in metro areas of fewer than 250,000 population

Non-metro counties:

4  Urban population of 20,000+, adjacent to metro area
5  Urban population of 20,000+, not adjacent to metro area
6  Urban population of 2,500 - 19,999, adjacent to metro area
7  Urban population of 2,500 - 19,999, not adjacent to metro area
8  Less than 2,500 urban population, adjacent to metro area
9  Less than 2,500 urban population, not adjacent to metro area
United States Rural/urban Settlement Continuum According to Cromartie and Swanson.
Source: Cromartie and Swanson 1996, 5-6

<table>
<thead>
<tr>
<th></th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Metro Core</td>
<td>Begins with an ‘urbanised area’ i.e. extent and distribution of the built-up area. If 50 percent of the spatial unit’s population is contained in the urbanised area it is indicated as part of the metro core.</td>
</tr>
<tr>
<td>2</td>
<td>Metro Outlying</td>
<td>Areas linked to core by commuting and exhibiting metropolitan character (as measured by population density, percent urban and recent population growth).</td>
</tr>
<tr>
<td>3</td>
<td>Non-Metro Adjacent</td>
<td>Physically adjacent to a metropolitan area with at least 2 percent of employed labour force commuting to urban core.</td>
</tr>
<tr>
<td>4</td>
<td>Non-Metro Non-Adjacent with City</td>
<td>Areas not adjacent to Metro Areas but contain all or part of a city of 10,000 or more residents.</td>
</tr>
<tr>
<td>5</td>
<td>Non-Metro Non-Adjacent without City</td>
<td>Access not adjacent to Metro Areas and without a city of 10,000 or more inhabitants.</td>
</tr>
</tbody>
</table>
Issues Regarding the Urban Rural Dimension

• Can we develop operational definitions of Functional Urban Regions which can be used in a wide range of nations?
• Can we develop operational definitions of Polynucleated Urban Regions for use in a wide range of nations?
• Can we develop operational definitions of ex-urban areas which are transitional between quintessentially urban and quintessentially rural areas?
• Should we develop standard settlement classifications which are more complex than urban and rural?
• Do we have to be confined to place of residence based settlement classifications assigned to people?
“In an increasingly complex pattern of settlement, linked with socio-economic polarisation, no single measure can represent all of the distinct aspects of settlement structure, which will be of interest to public policy.”
Dimensions of Modern Human Settlement
(Coombes and Raybould, 2001)

- Settlement size – ranging from metropolitan to hamlet
- Concentration – ranging from dense to sparse
- Accessibility – ranging from central to remote
The Accessibility Dimension

• Physical accessibility (readily measurable using GIS)

• Mediated by socio-economic, cultural and other elements
ARIA (Accessibility/Remoteness Index of Australia)

- A generic index of accessibility/remoteness for all populated places in non-metropolitan Australia
- A model which allows accessibility to any type of service to be calculated from all populated places in Australia
a. **Highly Accessible** - Locations with relatively unrestricted accessibility to a wide range of goods and services and opportunities for social interaction.

b. **Accessible** - Locations with some restrictions to accessibility of some goods, services and opportunities for social interaction.

c. **Moderately Accessible** - Locations with significantly restricted accessibility of goods, services and opportunities for social interaction.

d. **Remote** - Locations with very restricted accessibility of goods, services and opportunities for social interaction.

e. **Very Remote** - Locationally disadvantaged - very little accessibility of goods, services and opportunities for social interaction.
Australia: Total Fertility Rate, Infant Mortality Rate and Standardised Mortality Rates for Males and Females Aged 15-64; 1992-95
Source: Glover, Harris and Tennant 1999, 135, 140, 144, 182

<table>
<thead>
<tr>
<th>Accessibility/Remoteness Index</th>
<th>TFR</th>
<th>IMR</th>
<th>SMR Males 15-64</th>
<th>SMR Females 15-64</th>
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</thead>
<tbody>
<tr>
<td>Very accessible</td>
<td>1.79</td>
<td>5.8</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>Accessible</td>
<td>2.15</td>
<td>7.1</td>
<td>118</td>
<td>102</td>
</tr>
<tr>
<td>Moderately accessible</td>
<td>2.30</td>
<td>6.3</td>
<td>116</td>
<td>106</td>
</tr>
<tr>
<td>Remote</td>
<td>2.43</td>
<td>8.0</td>
<td>128</td>
<td>126</td>
</tr>
<tr>
<td>Very remote</td>
<td>2.51</td>
<td>13.4</td>
<td>201</td>
<td>258</td>
</tr>
</tbody>
</table>
“Development of a Seamless ARIA”

• Index for every parcel of land in Australia (G-NAF)

• Separate individual indices for key services

• No interpolation – aggregation

• PSMA and GISCA
Different Population Geographies

Census relates people to a single location on the earth’s surface but the connection between people and place is not a fixed one.
Daytime Vs Nighttime Populations

Use of journey to work data

Seasonal Populations

Comparing place of usual residence and residence on night of the census
Diagrammatic Representation of Different National Populations

- Present in country
- Absent from country

- Citizens
- Others with resident status

Usual population included in National Censuses
# National Diasporas in Relation to Resident National Populations

Source: US Census Bureau, 2002a and b; Southern Cross, 2002; Bedford, 2001; Ministry of External Affairs, India, [http://indiandiaspora.nic.in](http://indiandiaspora.nic.in); Naseem, 1998; Sahoo, 2002; Iguchi, 2004; Gutiérrez, 1999; Dimzon, 2005; *Asian Migration News*, 15-31 January 2006; OECD database on immigrants and expatriates; Luconi 2006

<table>
<thead>
<tr>
<th>Country</th>
<th>Diaspora Population</th>
<th>Percentage of National Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>7 million</td>
<td>2.5%</td>
</tr>
<tr>
<td>Australia</td>
<td>900,000</td>
<td>4.3%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>850,000</td>
<td>21.9%</td>
</tr>
<tr>
<td>Philippines</td>
<td>7.5 million</td>
<td>9.0%</td>
</tr>
<tr>
<td>India</td>
<td>20 million</td>
<td>1.9%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>4 million</td>
<td>2.8%</td>
</tr>
<tr>
<td>China</td>
<td>30 to 40 million</td>
<td>2.9%</td>
</tr>
<tr>
<td>Japan</td>
<td>873,641</td>
<td>0.7%</td>
</tr>
<tr>
<td>Mexico</td>
<td>19 million*</td>
<td>19%</td>
</tr>
<tr>
<td>Singapore</td>
<td>100-150,000</td>
<td>3.5%</td>
</tr>
<tr>
<td>Niue</td>
<td>5,884</td>
<td>294.2%</td>
</tr>
<tr>
<td>Tokelau</td>
<td>2,019</td>
<td>138.5%</td>
</tr>
<tr>
<td>Samoa</td>
<td>78,253</td>
<td>44.5%</td>
</tr>
<tr>
<td>Fiji</td>
<td>128,284</td>
<td>15.8%</td>
</tr>
<tr>
<td>Italy</td>
<td>29 million</td>
<td>49.4%</td>
</tr>
</tbody>
</table>

* Mexican diaspora in the U.S.
For some purposes the traditional view of a national population comprising people living within national borders on the night of a census enumeration needs to be modified to incorporate those citizens and nationals elsewhere. The nation-state may not be the appropriate “envelope” within which some analyses of national populations are conducted.
Australia: Permanent Departures by Country of Intended Residence, 1993-94 to 2003-04
Source: DIMIA unpublished data
## Australia-born Population Living in Foreign Nations Around 2001 and Counted in Population Censuses

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Source</th>
<th>Number</th>
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<tbody>
<tr>
<td>New Zealand</td>
<td>2001</td>
<td>Statistics New Zealand, 2001 Census</td>
<td>56,259</td>
</tr>
<tr>
<td>Japan</td>
<td>2001</td>
<td>OECD 2003</td>
<td>9,200*</td>
</tr>
<tr>
<td>Germany</td>
<td>2001</td>
<td>Federal Statistics Office, Germany</td>
<td>8,322</td>
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<tr>
<td>Austria</td>
<td>2001</td>
<td>Statistics Austria</td>
<td>1,686</td>
</tr>
<tr>
<td>Finland</td>
<td>2002</td>
<td>Statistics Finland</td>
<td>673</td>
</tr>
<tr>
<td>Thailand</td>
<td>2000</td>
<td>National Statistical Office, Thailand</td>
<td>1,400*</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>2001</td>
<td>Commissioner for Census and Statistics, Hong Kong</td>
<td>6,251*</td>
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<tr>
<td>USA</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>75,314</td>
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<td>Belgium</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>1,136</td>
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<tr>
<td>Canada</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>20,155</td>
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<tr>
<td>Switzerland</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>3,420</td>
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<td>Czech Republic</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>230</td>
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<td>Denmark</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>1,663</td>
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<td>Spain</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>3,913</td>
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<tr>
<td>France</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>4,216</td>
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<tr>
<td>Great Britain</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>107,871</td>
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<td>Greece</td>
<td>2001</td>
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<td>20,449</td>
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<tr>
<td>Hungary</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>258</td>
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<tr>
<td>Ireland</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>6,107</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>96</td>
</tr>
<tr>
<td>Mexico</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>281</td>
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<td>Netherlands</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>9,529</td>
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<td>Norway</td>
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<td>Dumont and Lemaitre 2005, 33</td>
<td>1,101</td>
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<td>Poland</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>608</td>
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<td>Portugal</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>1,192</td>
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<td>Slovak Republic</td>
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<td>52</td>
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<td>Sweden</td>
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<td>2,525</td>
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<td>Turkey</td>
<td>2001</td>
<td>Dumont and Lemaitre 2005, 33</td>
<td>2,938</td>
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<tr>
<td>Indonesia</td>
<td>2002</td>
<td>Soeprobo 2004</td>
<td>2,279</td>
</tr>
<tr>
<td>Korea</td>
<td>2002</td>
<td>Park 2004</td>
<td>1,623</td>
</tr>
</tbody>
</table>

Total: 350,747

*Population with Australian nationality

b Australian citizens

c Population with Australian/New Zealander ethnicity born outside of Hong Kong
Conclusion

• Need in research to be aware of the significance of space and place.
• Need for being more flexible in the spatial units within which data are aggregated.
• Need to take advantage of modern developments in SIS, G-NAF, etc.