bushfire&natural HAZARDSCRC

THE AUSTRALIAN NATURAL DISASTER RESILIENCE INDEX

A system for assessing the resilience of Australian communities to natural hazards

An Australian Government Initiative

CRC AUSTRALIA

une University of New England

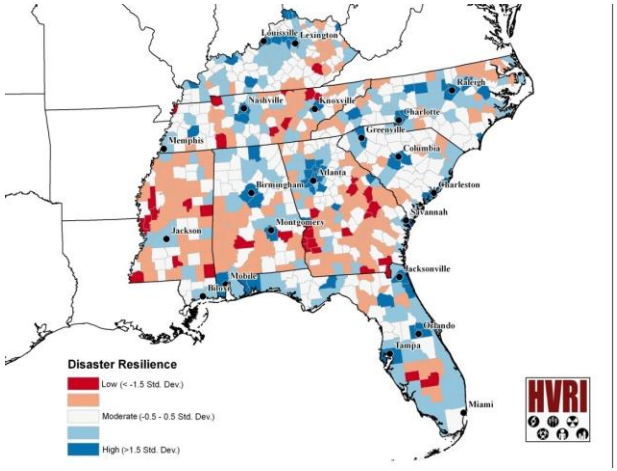
Project aim:

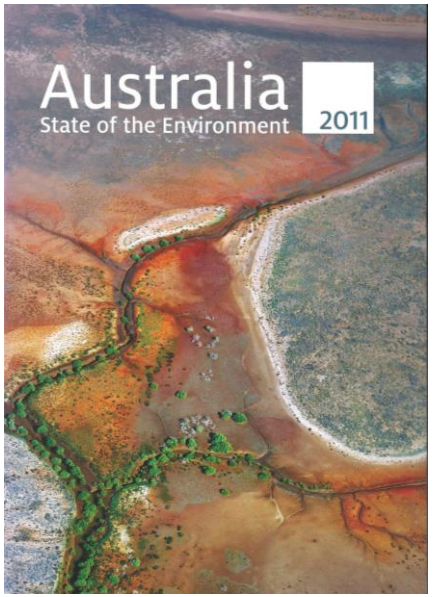
To develop an index that measures the current state of disaster resilience in Australian communities – the Australian Natural Disaster Resilience Index

Major output:

State of Disaster Resilience report

OECD Better Life Index



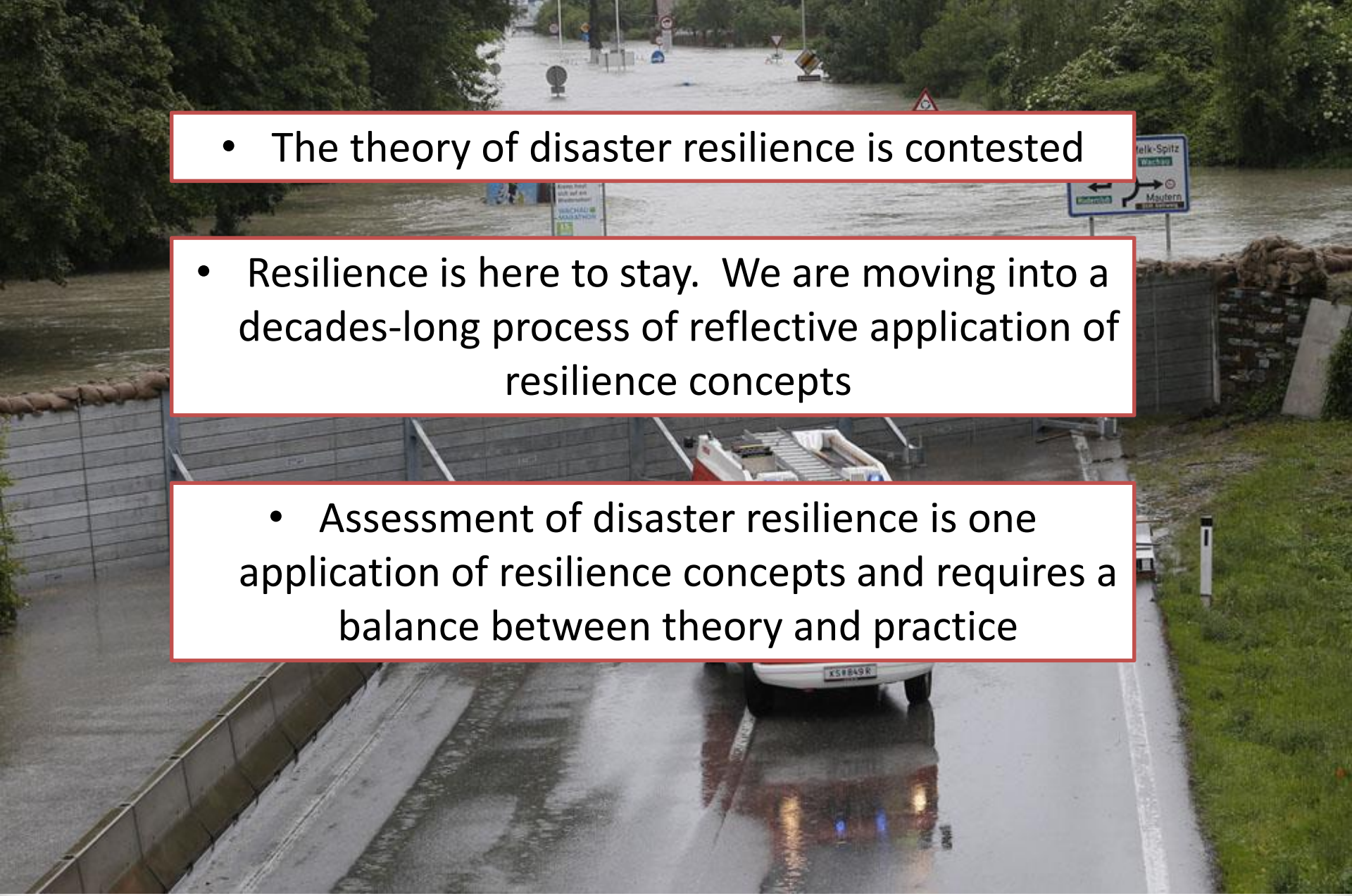


TODAY'S TALK

1) How we are approaching the assessment of disaster resilience in this project

2) Indicators of disaster resilience

3) First outputs – social character indicators



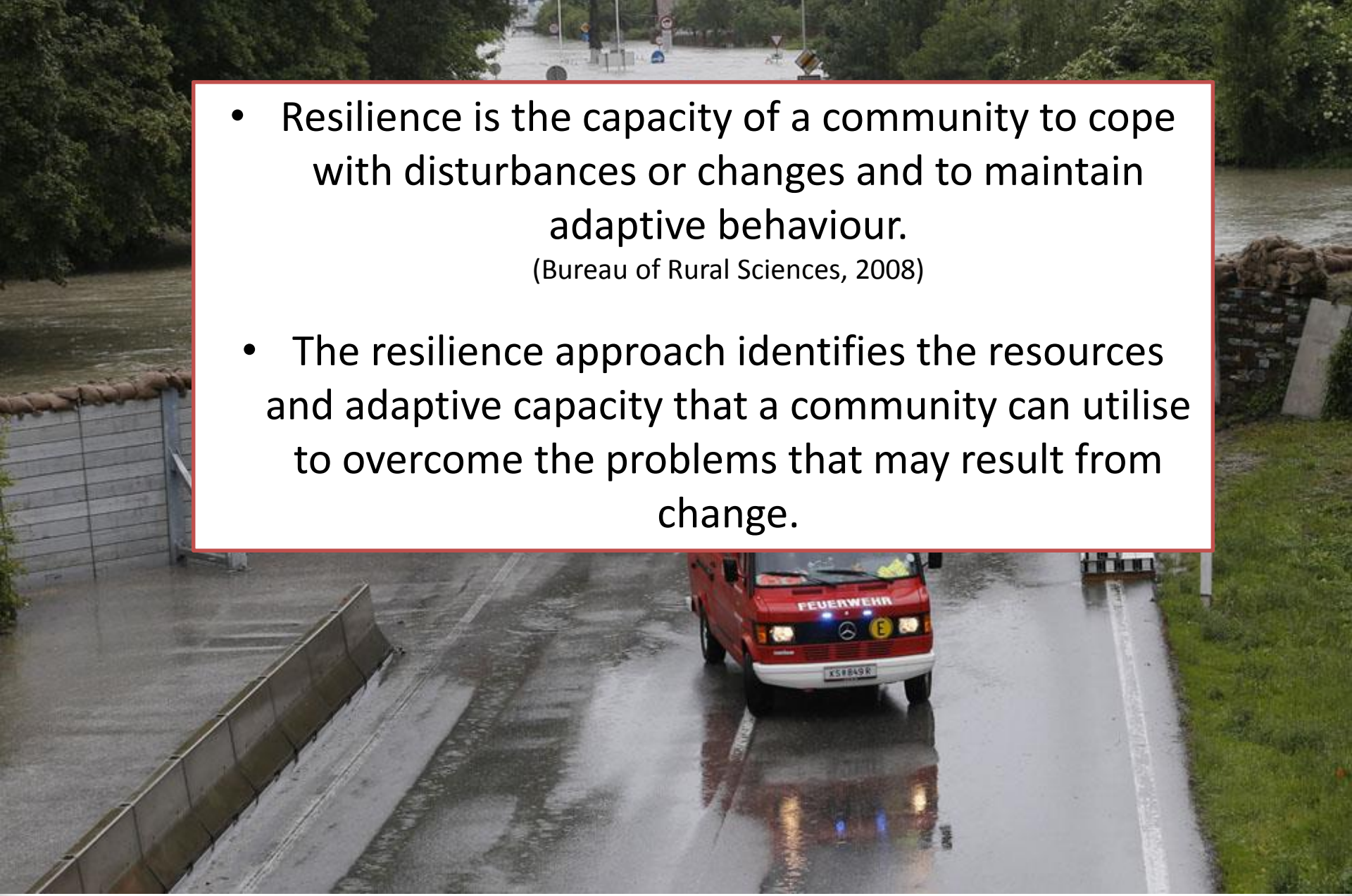
- The theory of disaster resilience is contested

- Resilience is here to stay. We are moving into a decades-long process of reflective application of resilience concepts

- Assessment of disaster resilience is one application of resilience concepts and requires a balance between theory and practice

Danube River flood barrier, 2013

Photo: Reuters, Leonhard Foeger



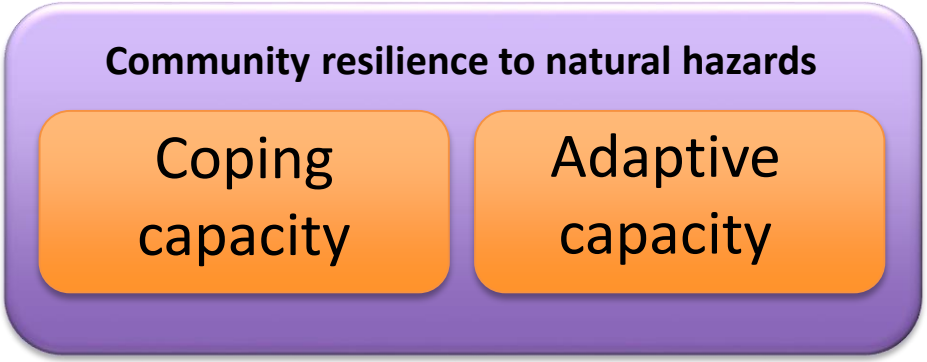
- Resilience is the capacity of a community to cope with disturbances or changes and to maintain adaptive behaviour.
  (Bureau of Rural Sciences, 2008)

- The resilience approach identifies the resources and adaptive capacity that a community can utilise to overcome the problems that may result from change.

Danube River flood barrier, 2013

Photo: Reuters, Leonhard Foeger

CONCEPTUAL MODEL FOR ASSESSING DISASTER RESILIENCE



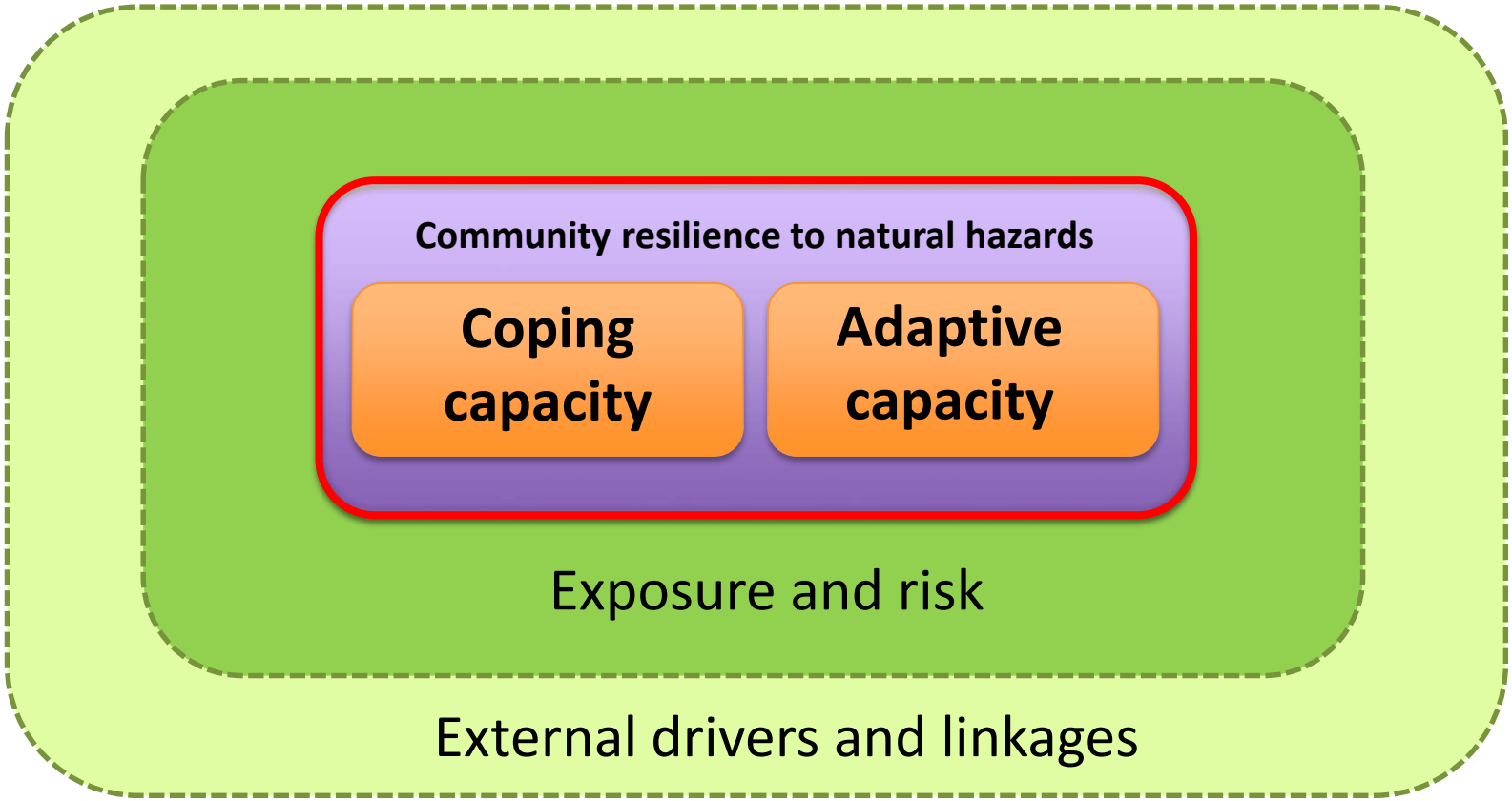
The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster (UNISDR 2004)

Factors influencing the ability to prepare for, absorb and recover from a natural hazard event

The process of adjustment to actual or expected [climate and its] effects in order to moderate harm or exploit beneficial opportunities (IPCC 2012)

Mechanisms that enable adjustment through learning, adaptation and transformation

CONCEPTUAL MODEL FOR ASSESSING DISASTER RESILIENCE

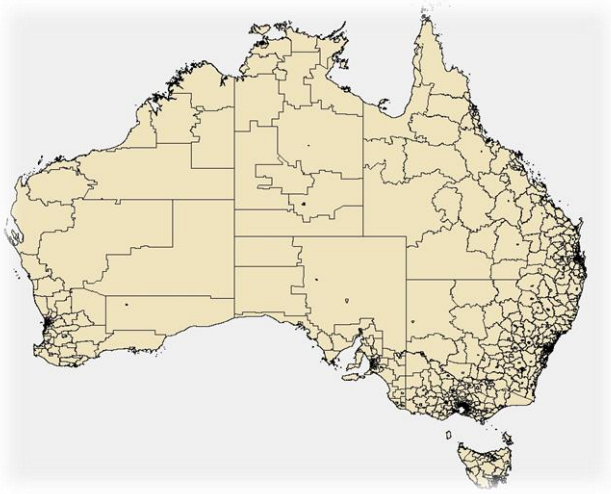


CONCEPTUAL MODEL FOR ASSESSING DISASTER RESILIENCE

Community resilience to natural hazards

Coping capacity

Adaptive capacity



We are assessing the potential for resilience

Assessing resilience at a national scale means we need the same variables across the whole of Australia

- Existing large scale data sets
- Proxies for many capacities

COPING CAPACITY

Social capital

Social and demographic factors that influence ability to prepare for and recover from natural hazard events

Education, Age, Employment, Gender, Household structure, Migration & mobility, English language proficiency

- Economic capital
- Infrastructure and planning
- Emergency services
- Community capital
- Information and engagement

COPING CAPACITY

Social capital

Economic capital

Economic factors that influence ability to prepare for and recover from natural hazard events

Income equity, Remoteness, Home ownership, Single sector employment dependence, Growth rate, Transport

Infrastructure and planning

Emergency services

Community capital

Information and engagement

COPING CAPACITY

- Social capital
- Economic capital
- Infrastructure and planning
  - Preparation for natural hazard events using strategies of mitigation or planning
- Emergency services
- Community capital
- Information and engagement

Dwelling type, Building codes, Municipal service levels, Land use planning policy

COPING CAPACITY

Social capital

Economic capital

Infrastructure and planning

Emergency services

The presence, capability and resourcing of emergency services, warning systems and disaster response plans

Access to health services, Emergency service size, structure and distribution, Emergency service volunteerism, Disaster response plans

Community capital

Information and engagement

COPING CAPACITY

- Social capital
- Economic capital
- Infrastructure and planning
- Emergency services
- **Community capital**
  The cohesion and connectedness of the community
- Information and engagement

Length of residence, Recreation and leisure opportunities, Crime, Access to social services, Sense of community, Volunteerism, Well-being

COPING CAPACITY

- Social capital
- Economic capital
- Infrastructure and planning
- Emergency services
- Community capital
- **Information and engagement**

  Availability of natural hazard information, community engagement and partnerships to encourage risk awareness

Risk awareness tools, Emergency service community engagement, Internet access

ADAPTIVE CAPACITY

Governance, policy and leadership

Organizational enablers of adaptation

Community and social capital

Organizational structure, Review and learning processes, Mission and culture, Partnerships, Research and development

ADAPTIVE CAPACITY

Governance, policy and leadership

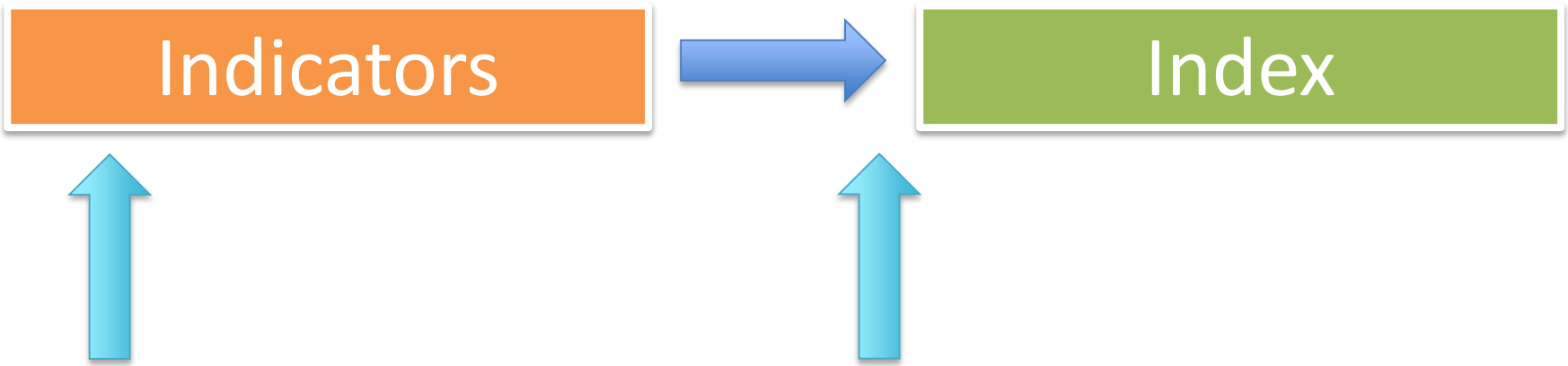
Community and social capital

Social enablers of adaptation

Opportunity for social learning, Civic engagement, Social groups, Social capital

- Mechanisms enabling organizational and social change
- Differs from coping capacity because the focus is on learning and transformation as the way that change happens

INDEX CALCULATION



Literature review

- Relationship between the indicator and disaster resilience – positive or negative
- Validation versus logic evidence

Statistical analysis

- Index calculation
- Indicator weighting
- Correlations among indicators
- Sensitivity analysis

COPING CAPACITY

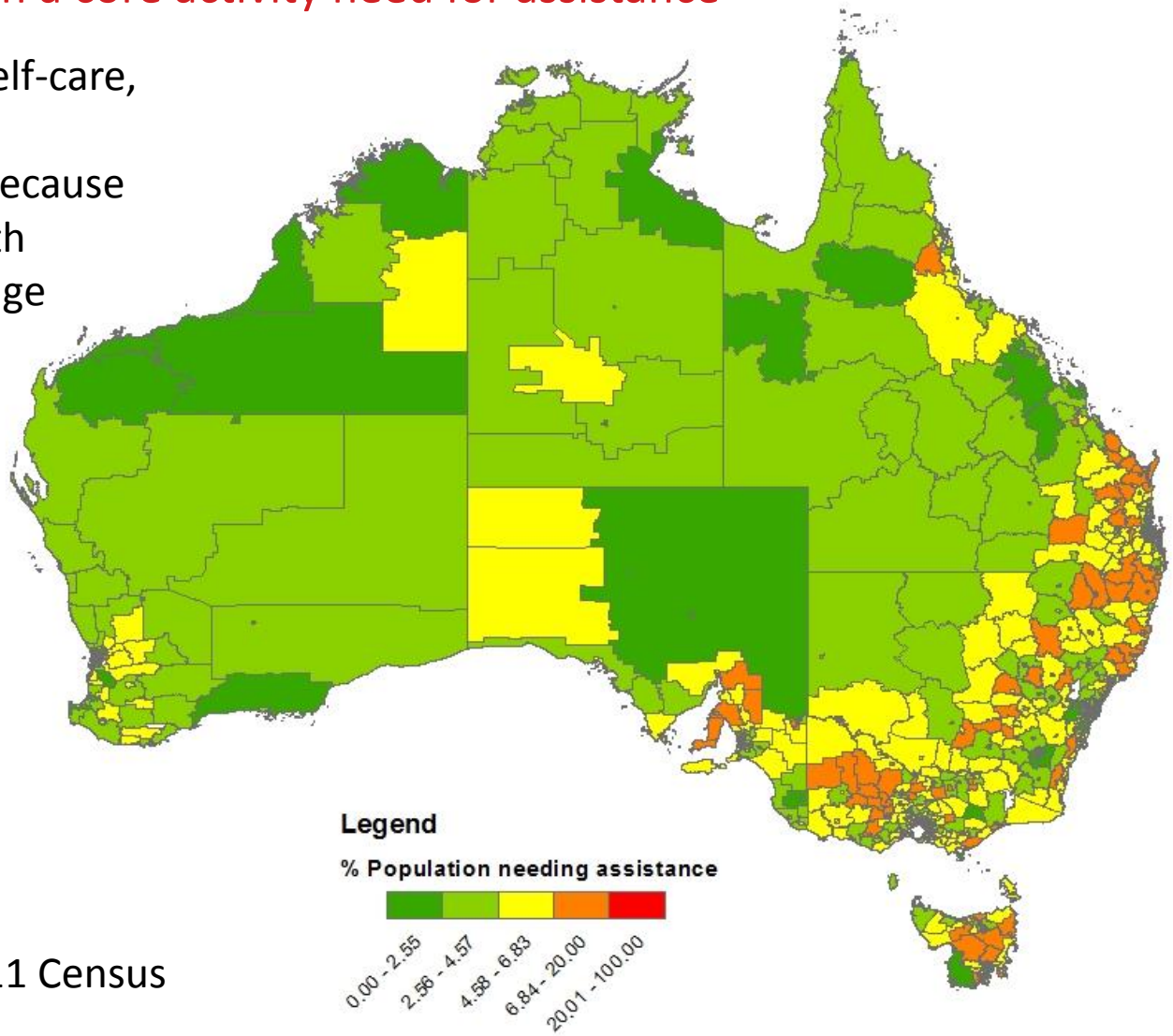
- **Social capital** — Education, Age, Income, Employment, Gender, Household structure, Migration, English language proficiency
- Economic capital
- Infrastructure and planning
- Emergency services
- Community capital
- Information and engagement

NEED FOR ASSISTANCE

% Population with a core activity need for assistance

Need help with self-care, mobility and communication because of disability, health condition or old age

Negative relationship to resilience – greater assistance = less coping capacity



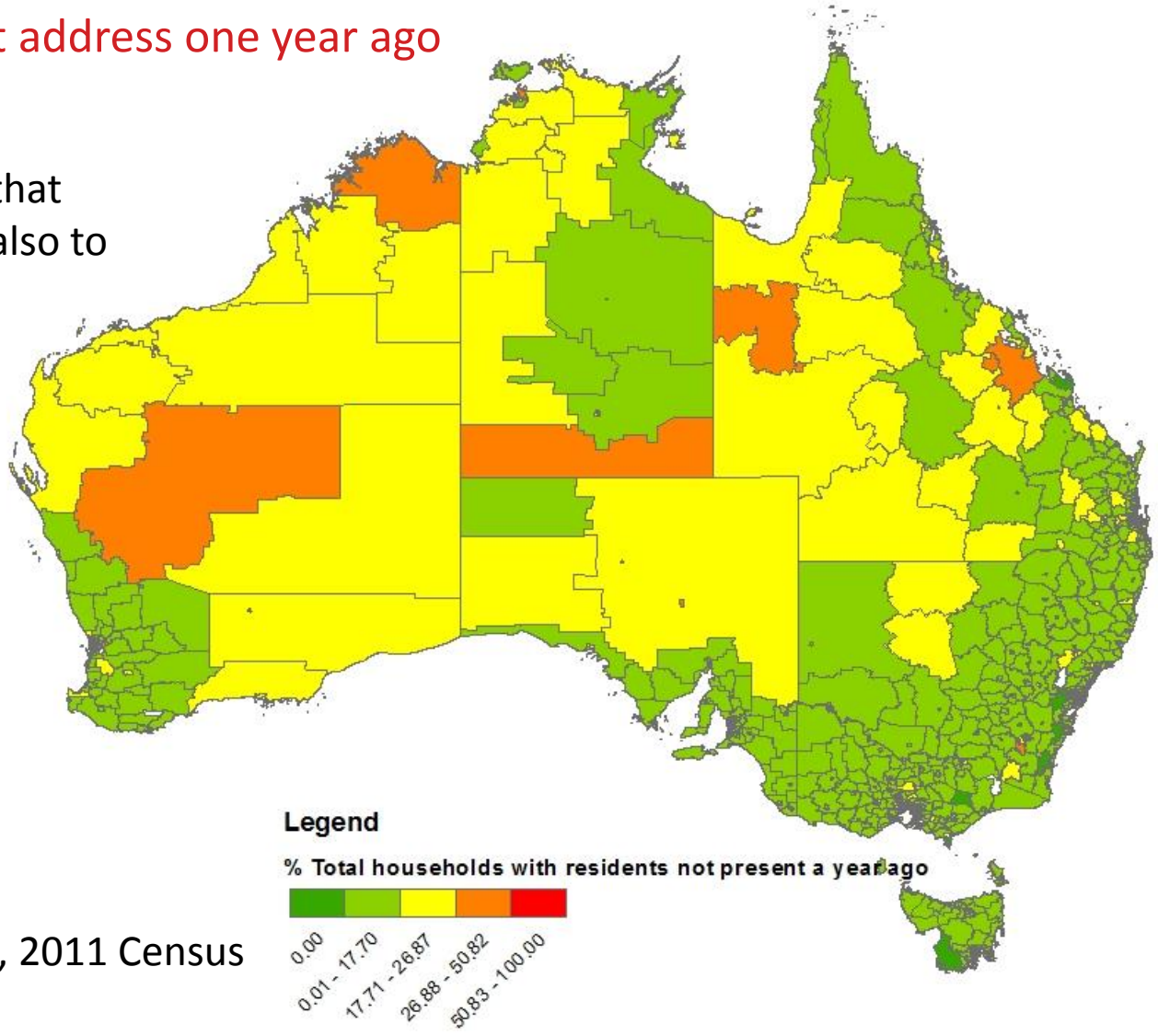
SA2 level data, 2011 Census ASSNP

MIGRATION

% Households with one or more residents having a different address one year ago

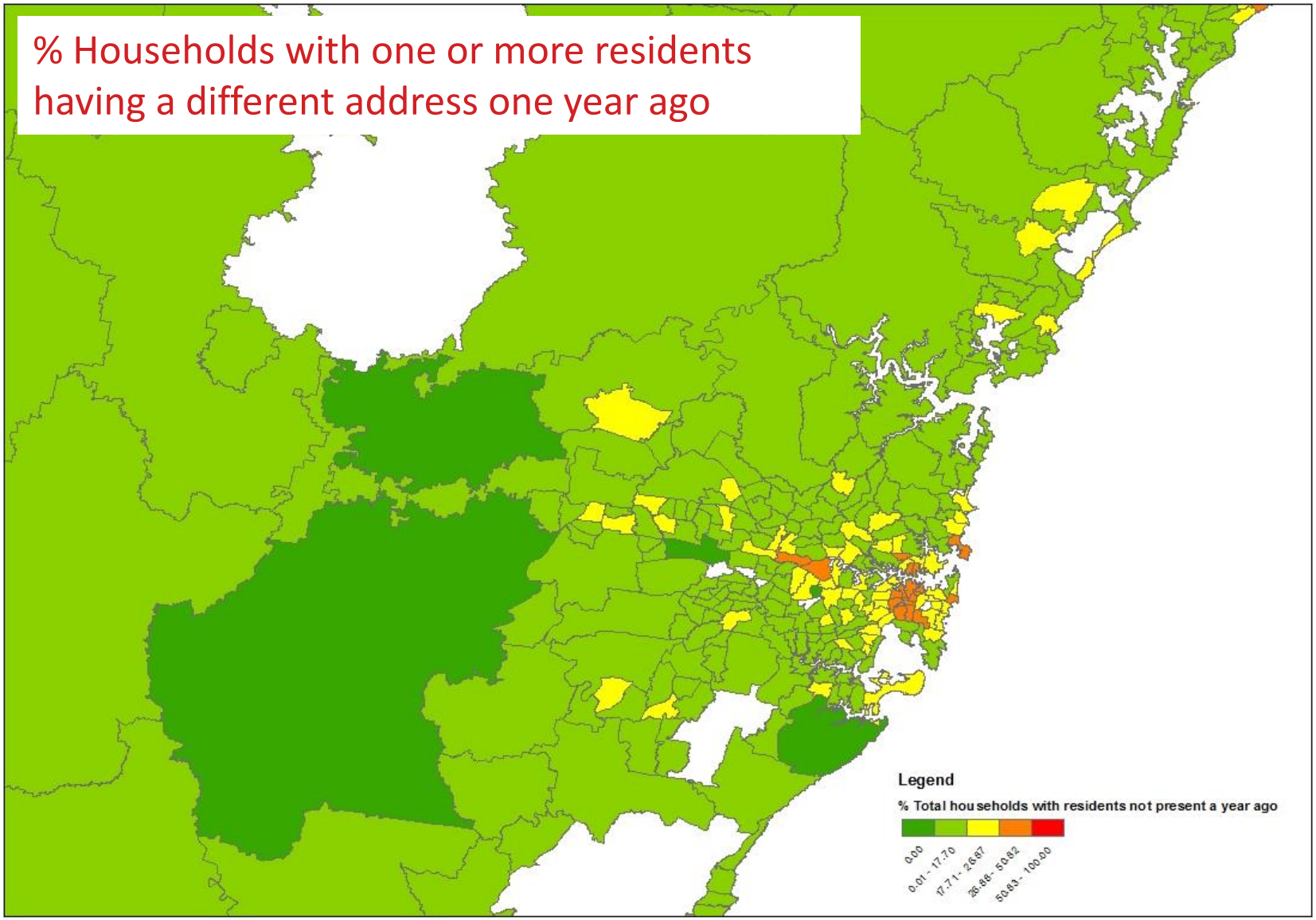
Internal mobility
Residents new to that address (possibly also to the area)

Negative relationship to resilience – less familiarity with an area = lower coping capacity



SA2 level data, 2011 Census
MV1D

MIGRATION

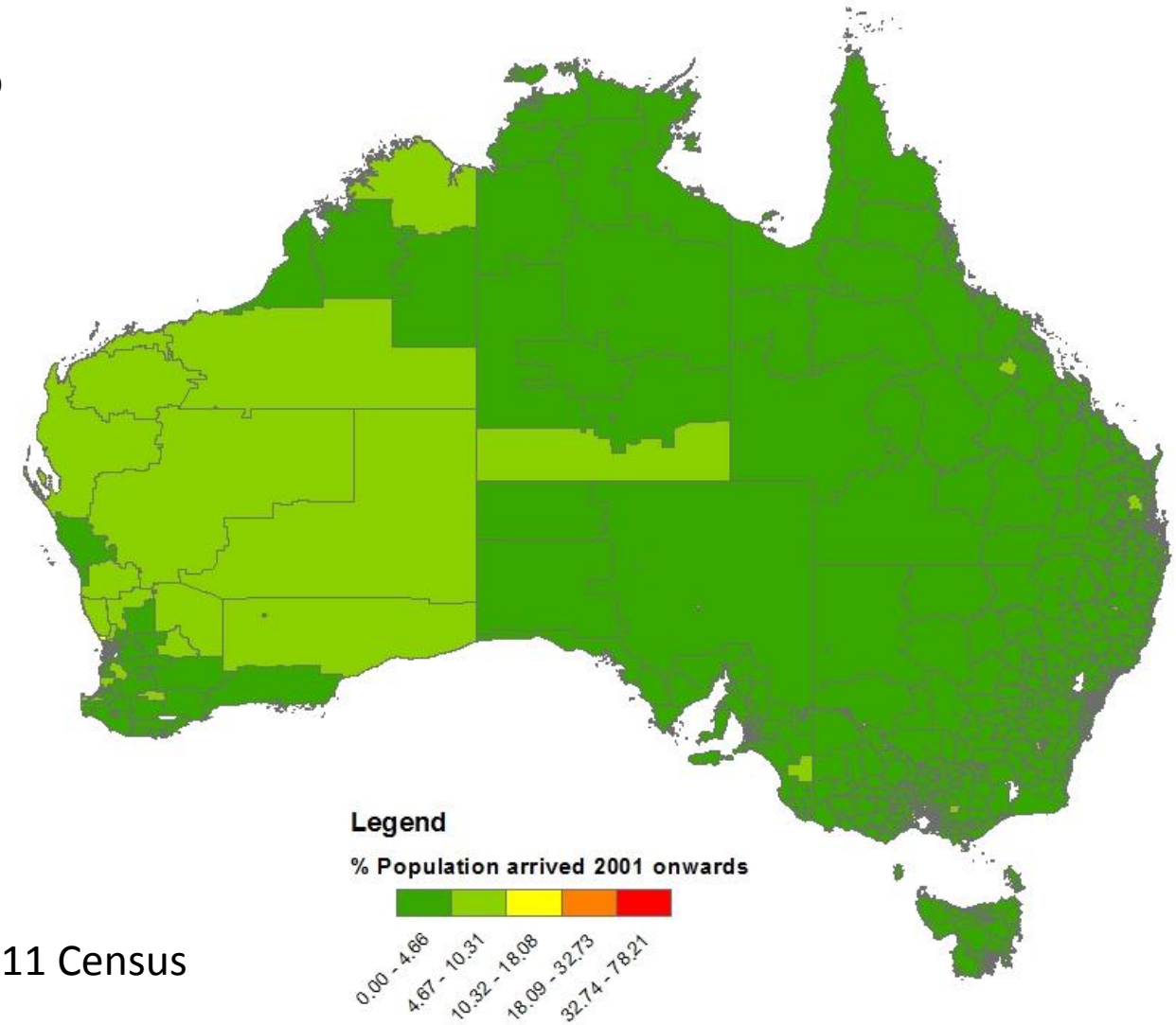

% Households with one or more residents having a different address one year ago
Legend
% Total households with residents not present a year ago
0.00
0.01 - 17.70
17.71 - 26.67
26.68 - 50.82
50.83 - 100.00

MIGRATION

% Population arrived in Australia after 2001

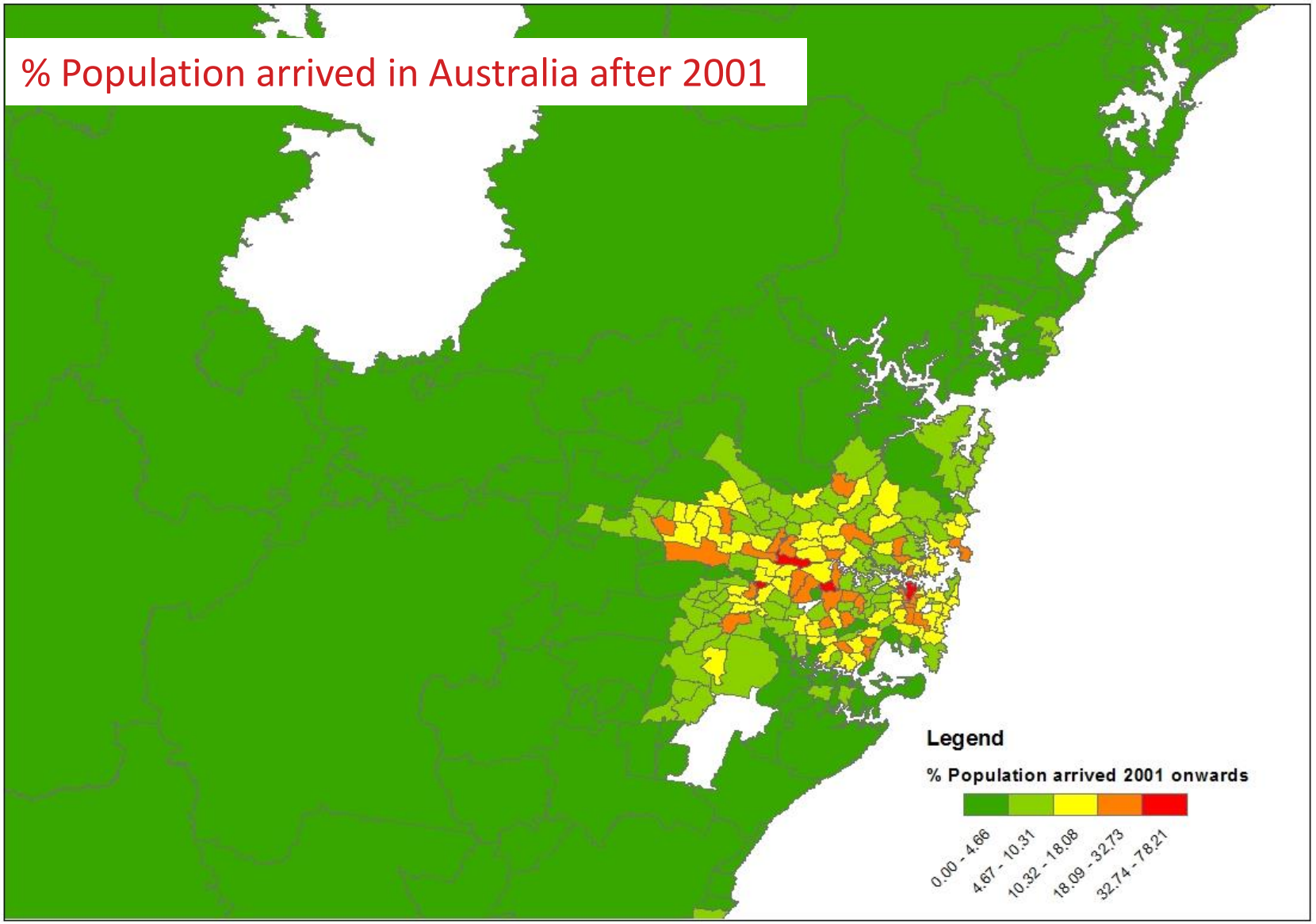
Residents new to Australia

Negative relationship to resilience – less familiarity with Australian hazards and systems = lower coping capacity



SA2 level data, 2011 Census
YARRP

MIGRATION

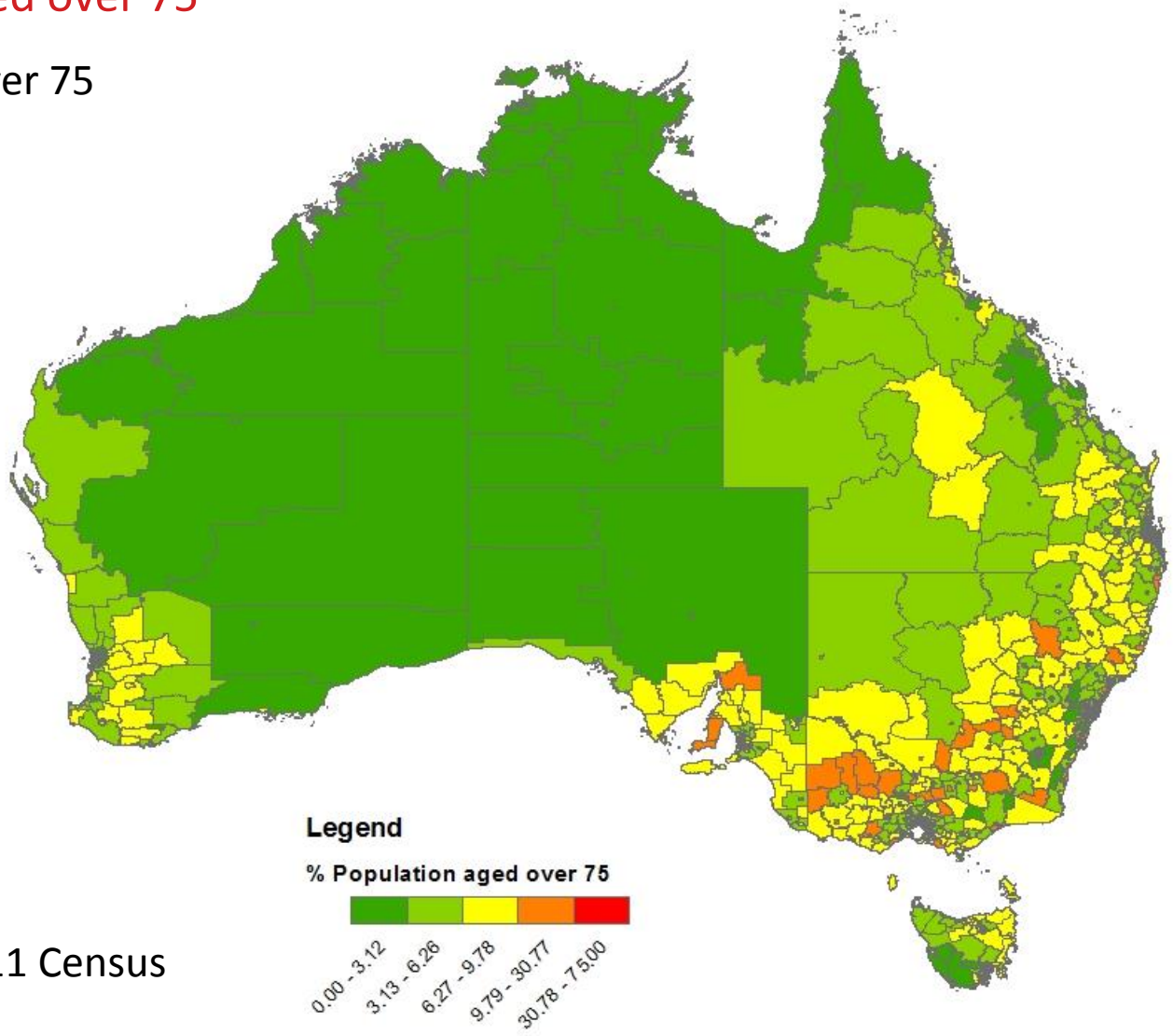

% Population arrived in Australia after 2001
Legend
% Population arrived 2001 onwards
0.00 - 4.66
4.67 - 10.31
10.32 - 18.08
18.09 - 32.73
32.74 - 78.21

AGE

% Population aged over 75

Residents aged over 75

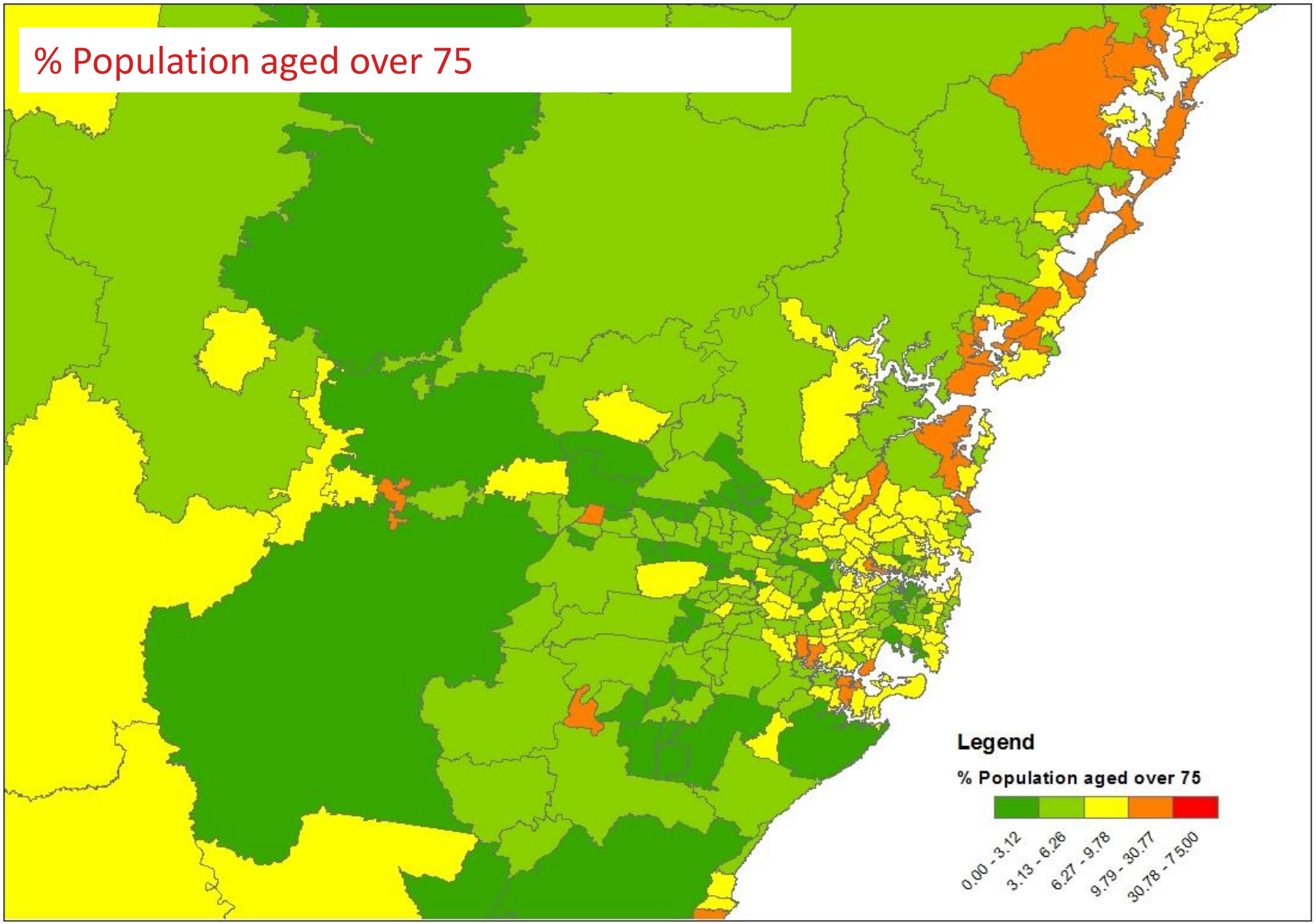
Negative relationship to resilience – being older = lower coping capacity



SA2 level data, 2011 Census

AGEP

AGE

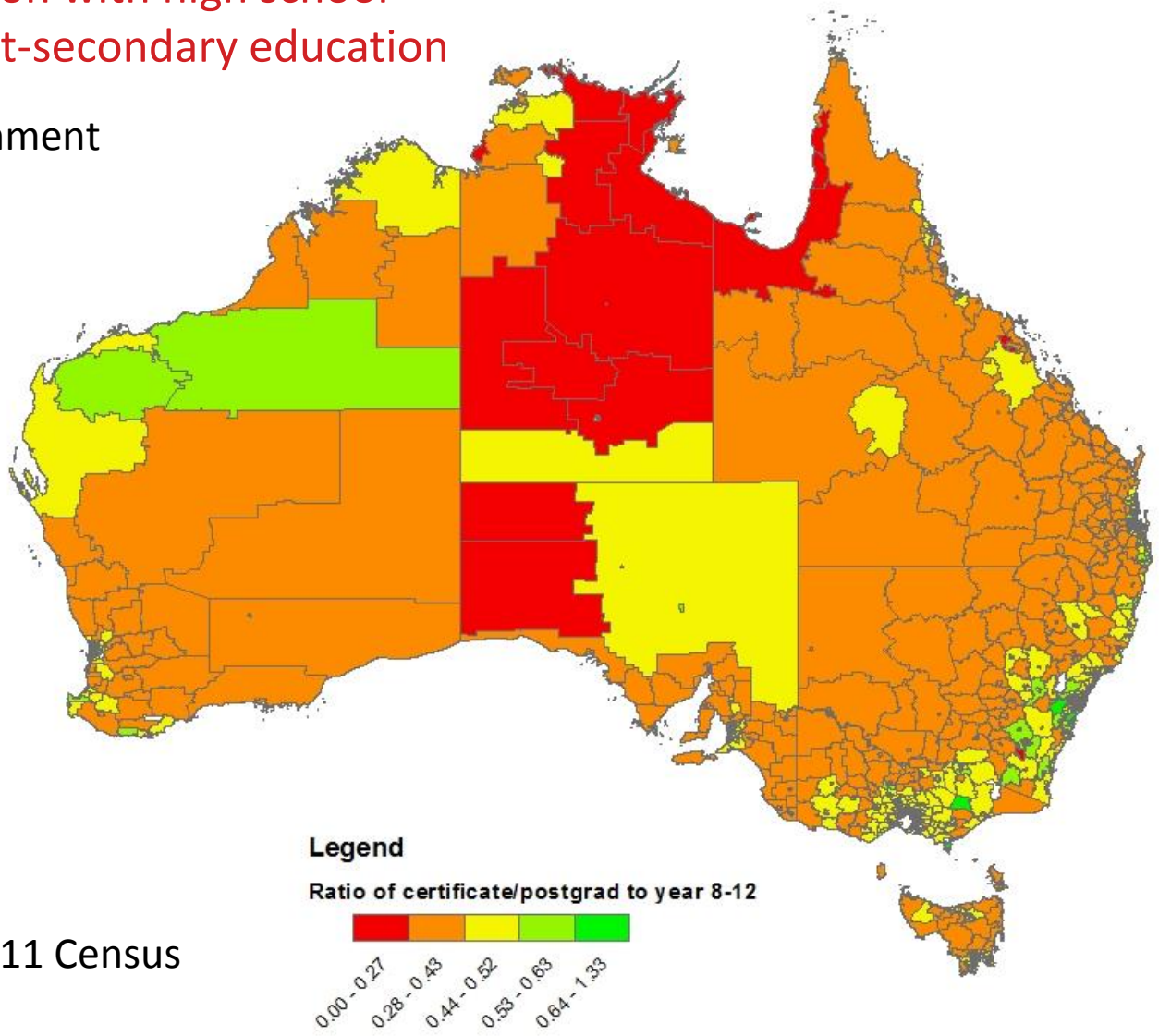

% Population aged over 75
Legend
% Population aged over 75
0.00 - 3.12
3.13 - 6.26
6.27 - 9.78
9.79 - 30.77
30.78 - 75.00

EDUCATION

Ratio of population with high school education to post-secondary education

Educational attainment

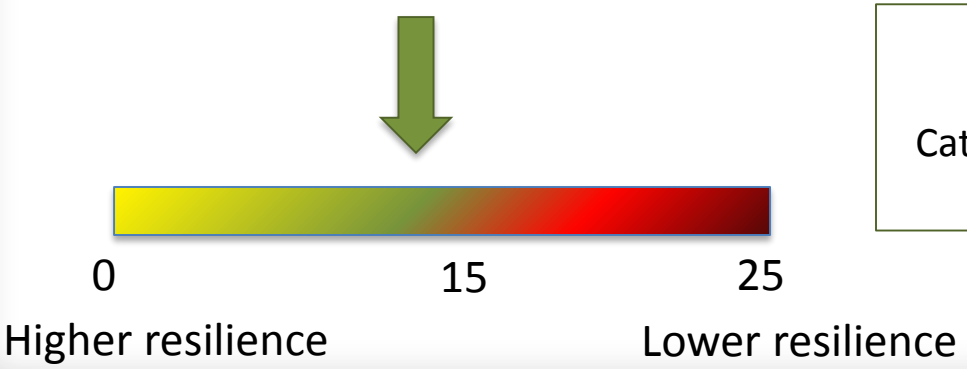
? Negative relationship to resilience – less education = lower coping capacity



SA2 level data, 2011 Census
HEAP

EXAMPLE INDEX OF SOCIAL CAPITAL

	Total score	% population with need for assistance	% households not resident 1 year ago	% migrants arriving since 2001	% Population aged >75	Educational attainment ratio
Surry Hills	15	2	5	5	2	1
Cabramatta/ Lansvale	19	4	2	5	3	5
Armidale	16	3	4	3	3	3
Ulladulla	15	3	2	1	5	4



Categories based on percentiles
(<25, 25-50, 50-75, 75-90, >90)
Categorized into a corresponding scale of 1 to 5, where 1= low and 5 = high

Disaster Resilience

COPING CAPACITY

- Social character
- Economic capital
- Infrastructure and planning
- Emergency services
- Community capital
- Information and engagement

ADAPTIVE CAPACITY

- Governance, policy and leadership
- Community and social capital

PEOPLE

Phil Morley
Graham Marshall
Judith McNeill
Richard Stayner
Peter Hastings

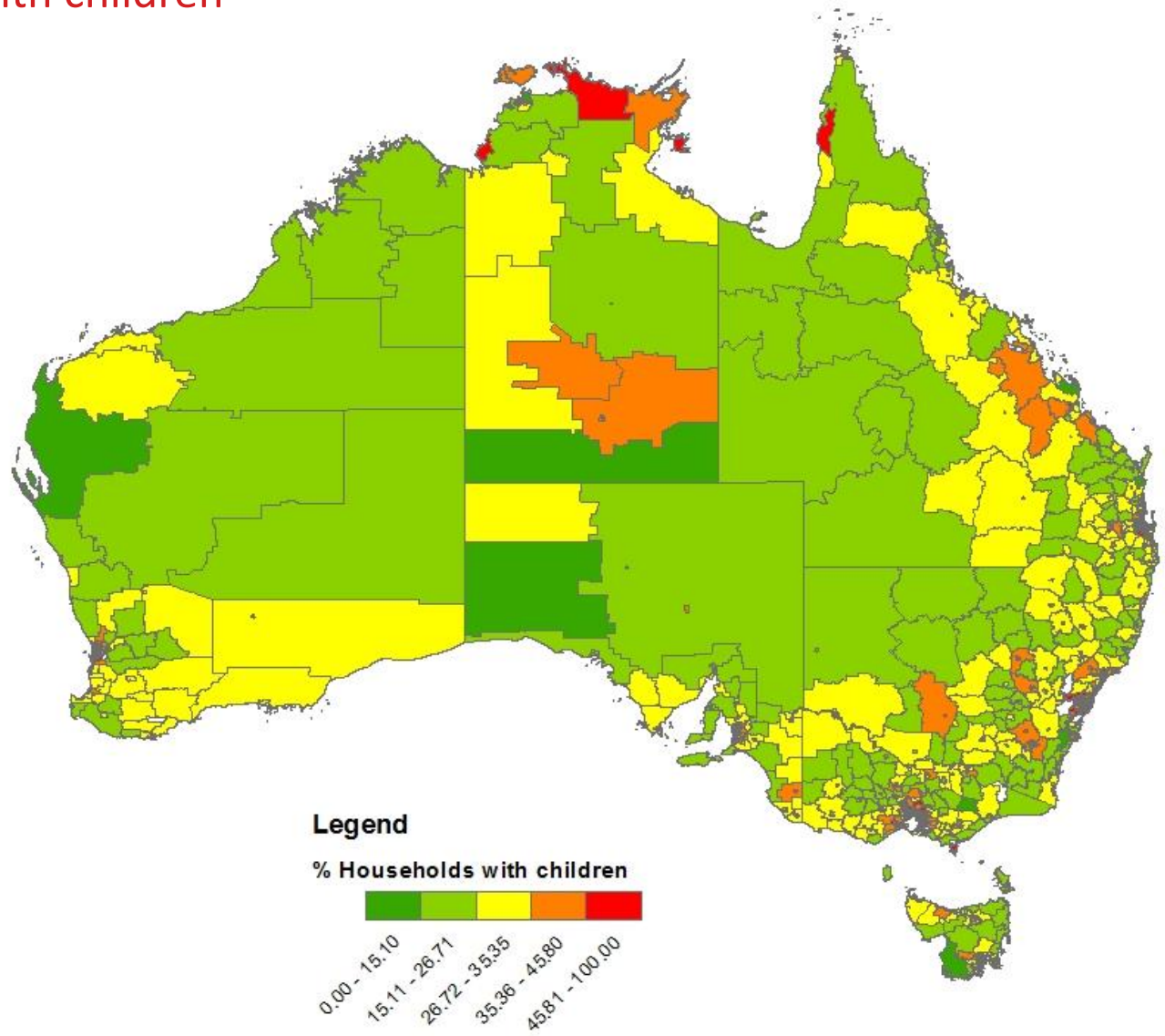
Melissa Parsons
James McGregor
Ian Reeve
Martin Thoms
Sonya Glavac

Gwynne Brennan, CFA Vic
Sandra Barber, Fire Tas
Trent Curtin, Vic MFESB
Paul Fletcher, SA MFB
Colleen Ridge, SES Tas
Holly Foster, EM Vic
Chris Lewis, NSW FB

Karen Enbom, CFA Vic
Andrew Richards, NSW SES
Sunara Fernando, NSW RFS
Suellen Flint, DFES WA
Raelene Thompson, AEMI
John Richardson, Red Cross
Tamara Beckett, DEPI Vic

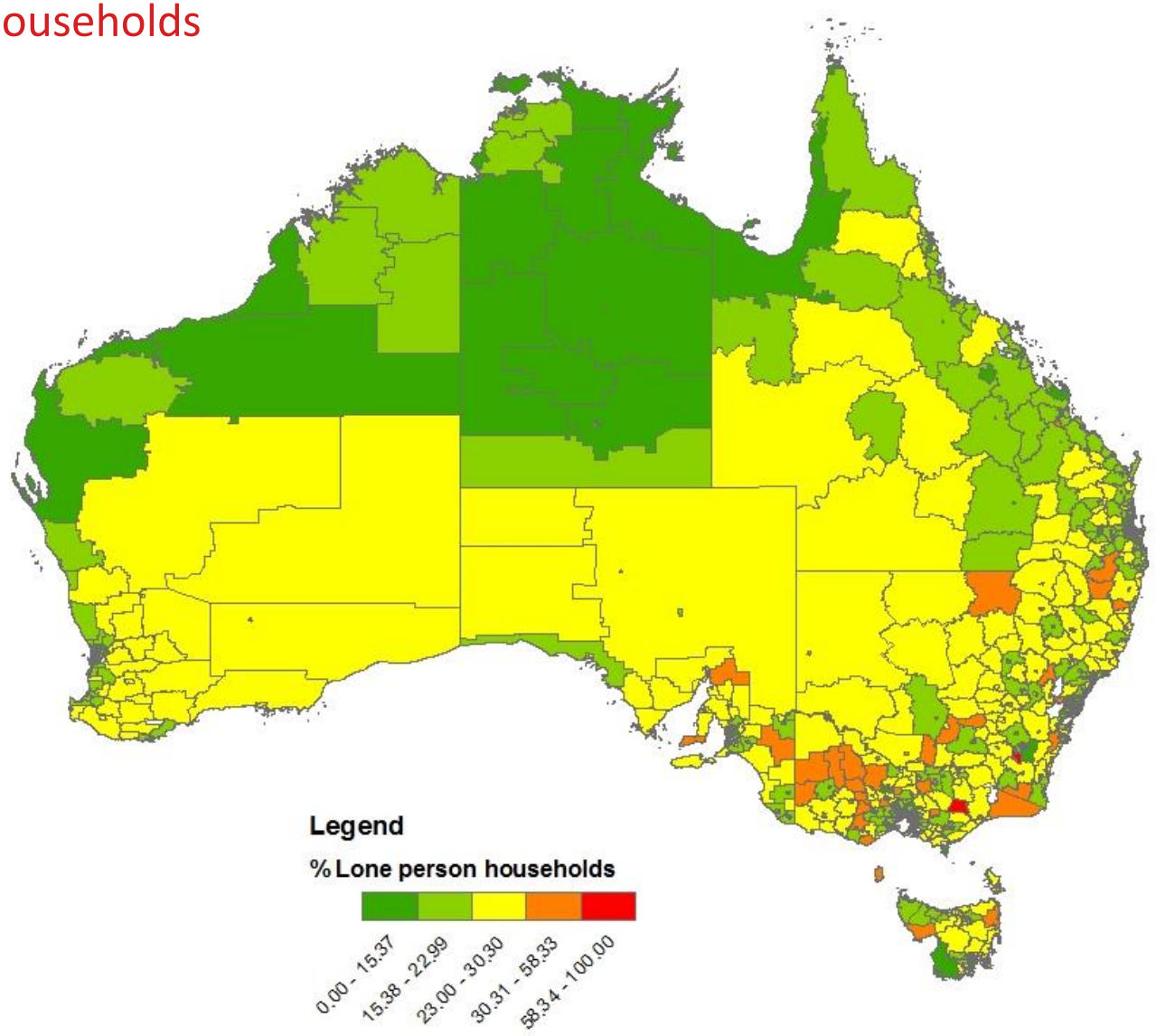
HOUSEHOLD STRUCTURE

% Households with children



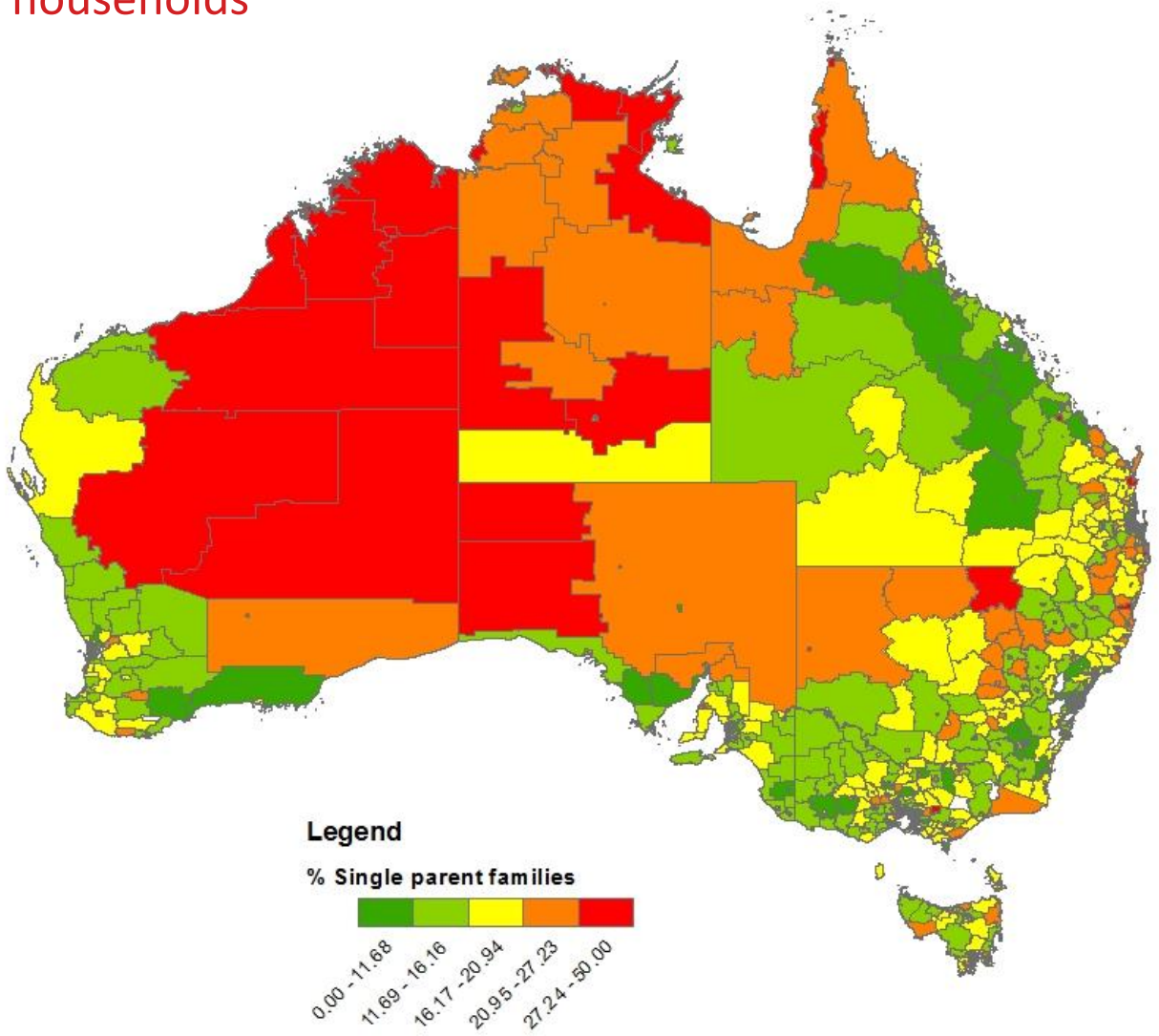
HOUSEHOLD STRUCTURE

% Lone person households



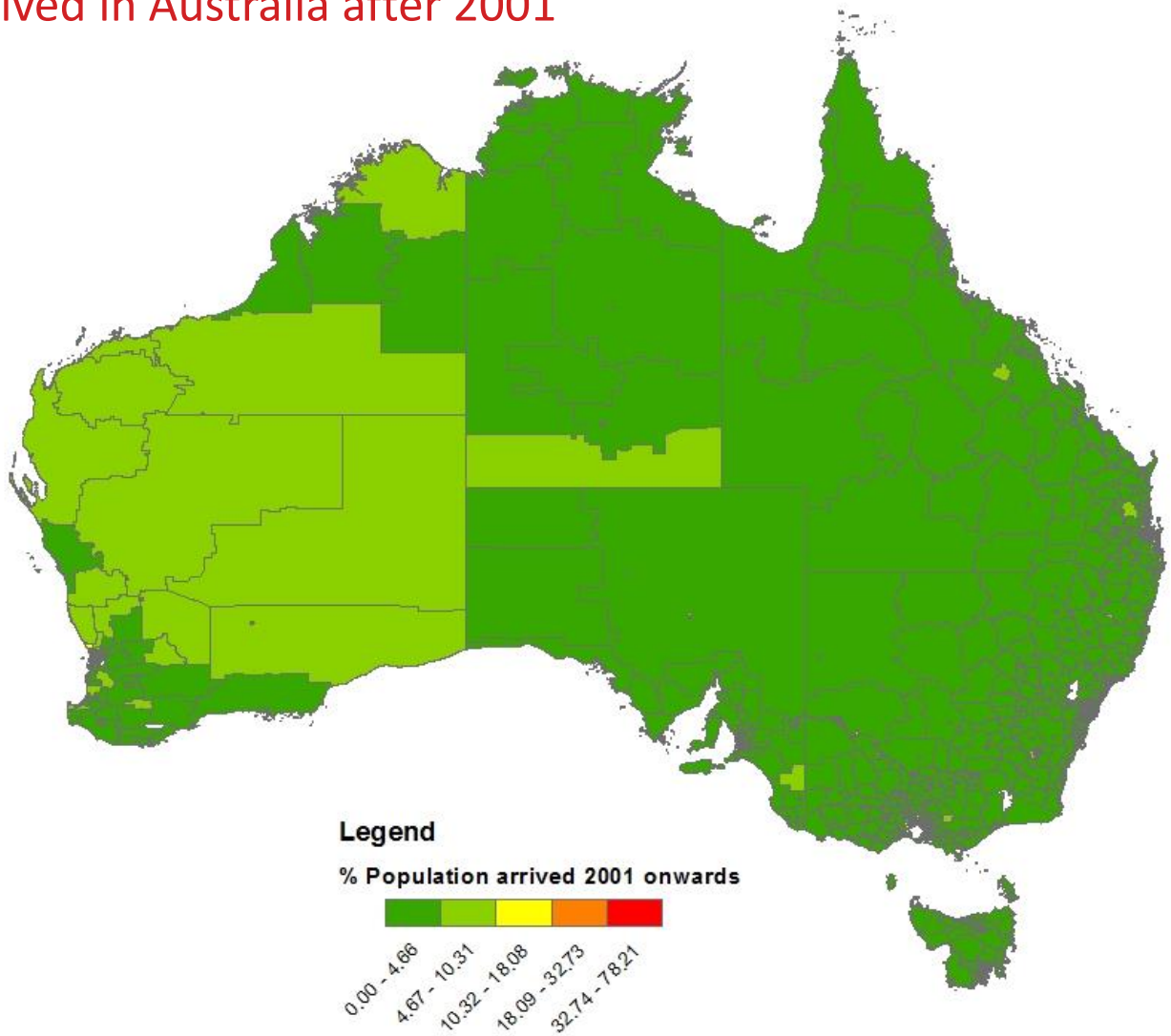
HOUSEHOLD STRUCTURE

% Single parent households



MIGRATION

% Population arrived in Australia after 2001



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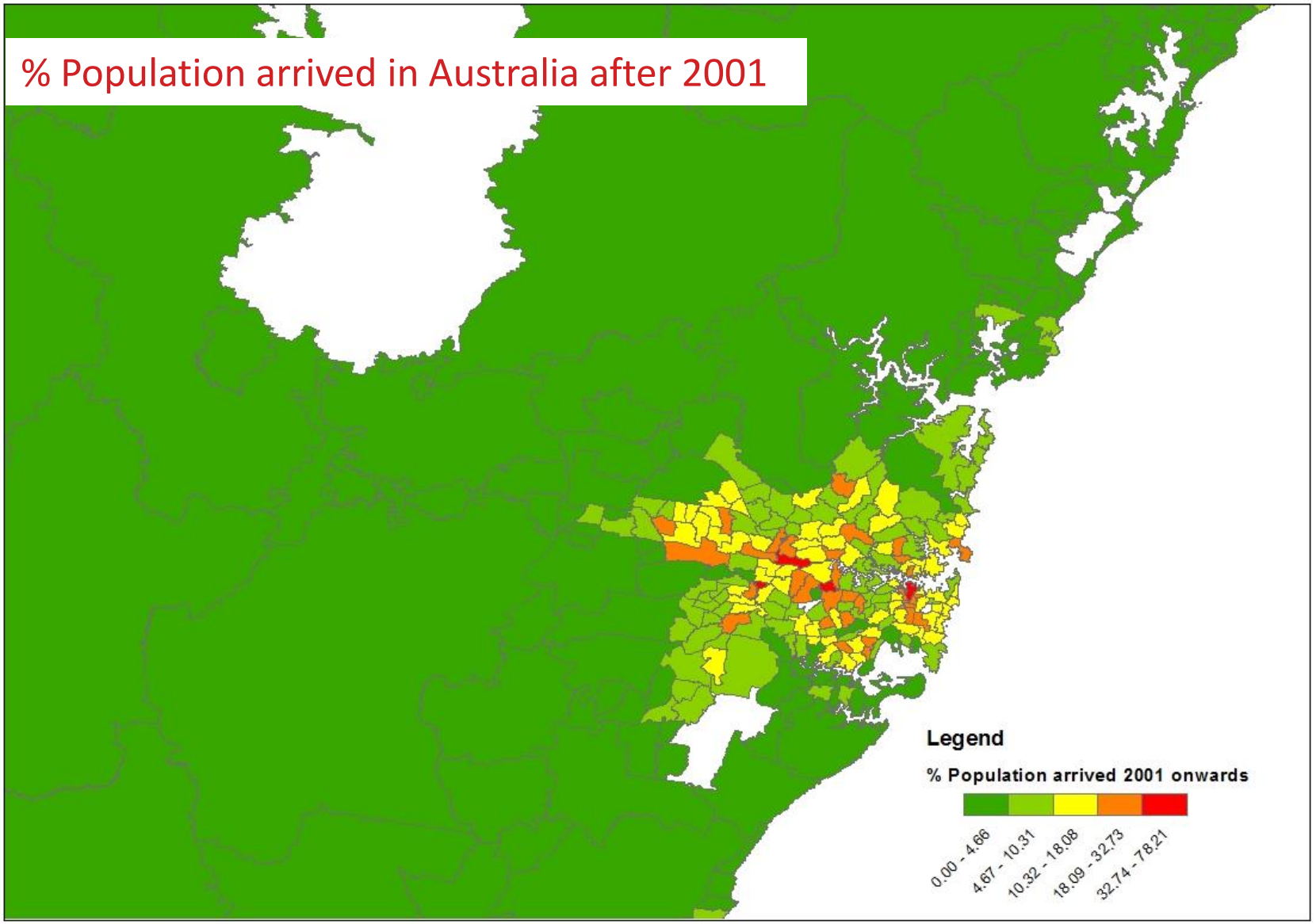
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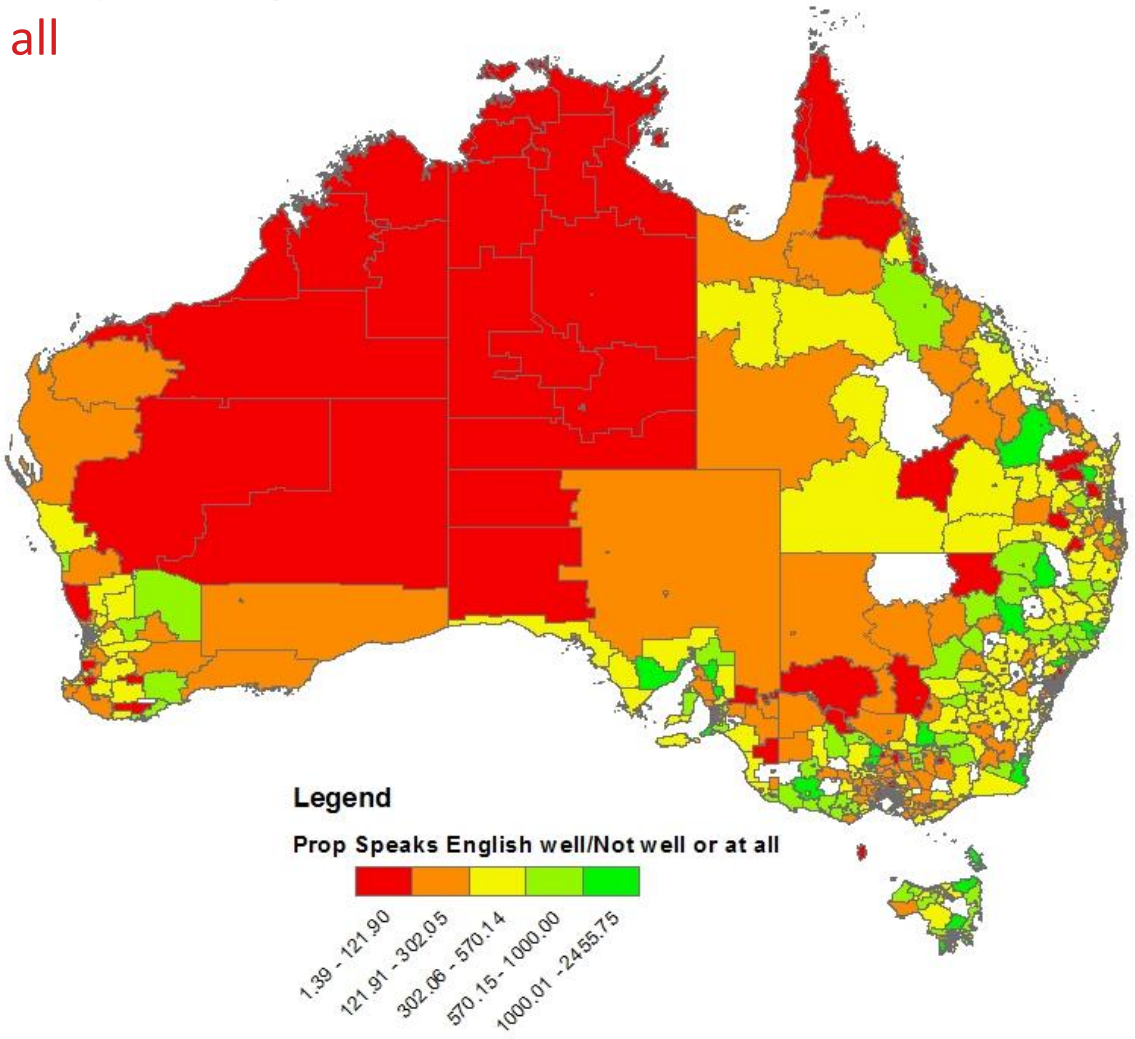
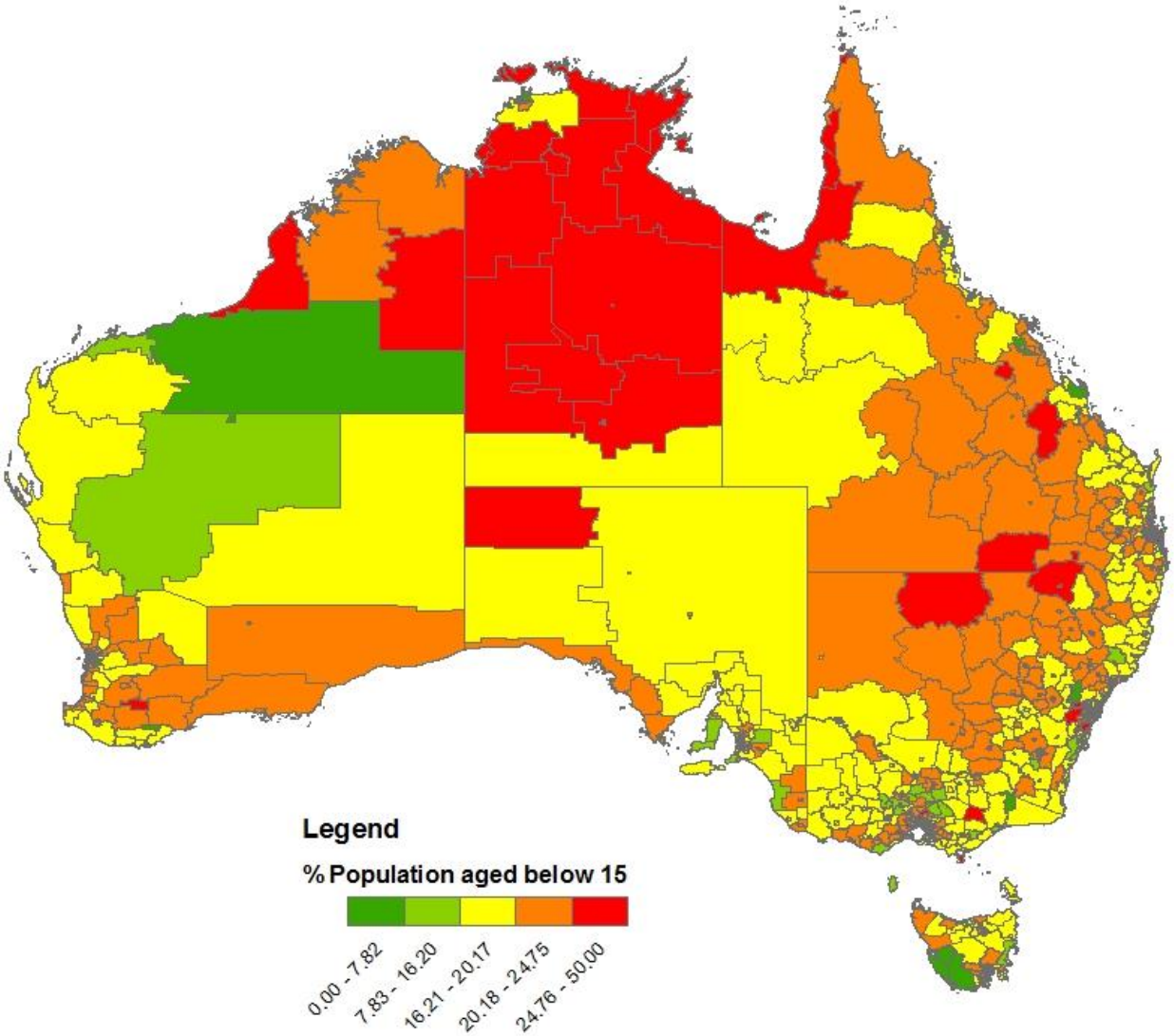
ENGLISH LANGUAGE PROFICIENCY

Ratio of people who speak English well to not well or not at all



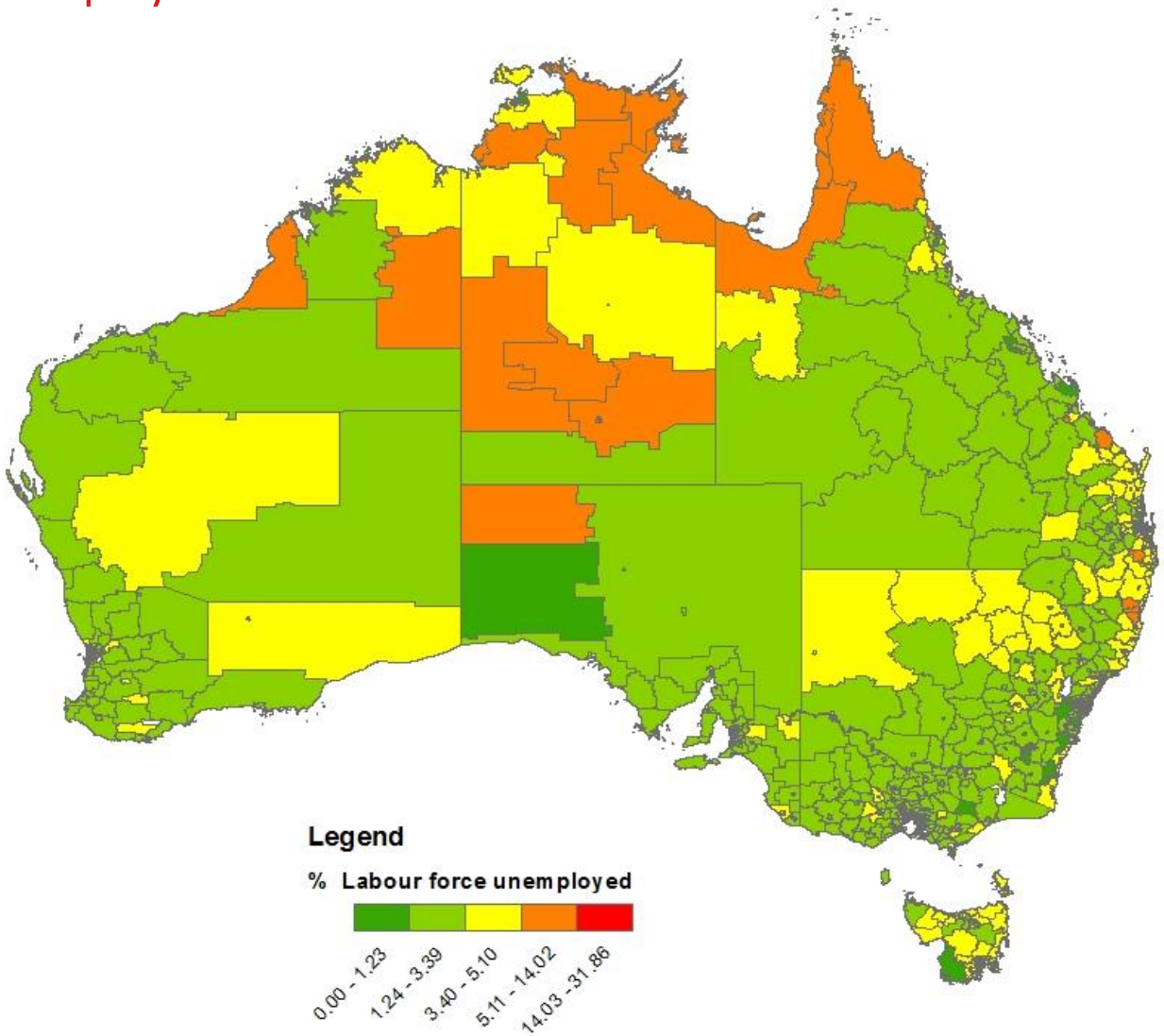
AGE

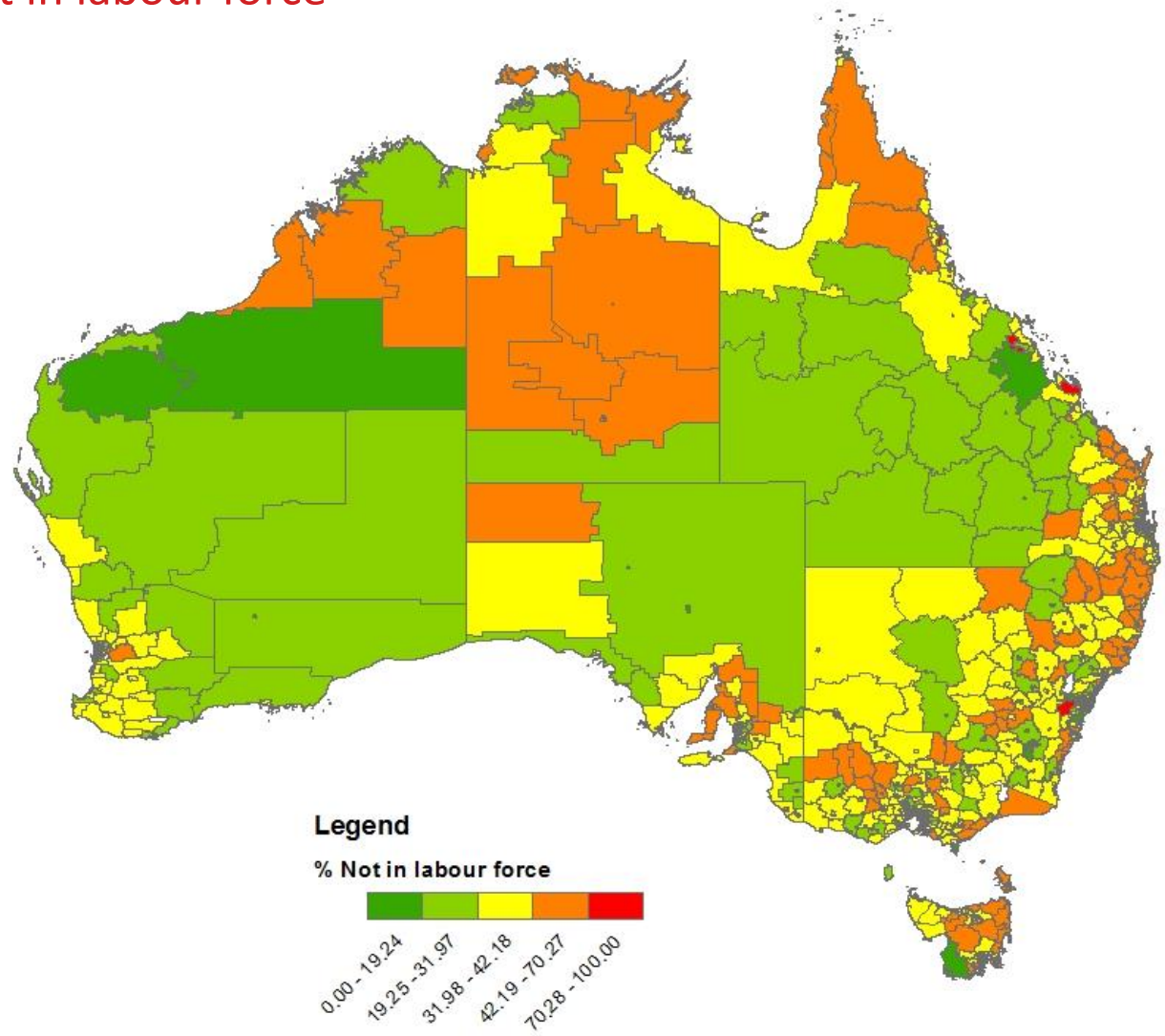
% Population aged below15



EMPLOYMENT

% Labour force unemployed



EMPLOYMENT

% Population not in labour force