THE AUSTRALIAN NATURAL DISASTER RESILIENCE INDEX

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Australian Government
Department of Industry, Innovation and Science

Business
Cooperative Research Centres Programme
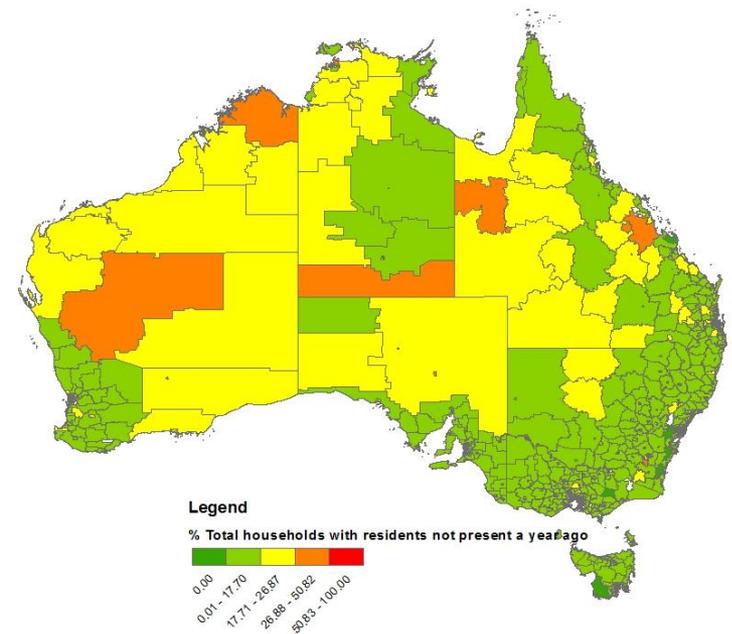
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Project aim:

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

Major output:

State of Disaster Resilience report

Legend
% Total households with residents not present a year ago

0.00 | 0.01 - 17.70 | 17.71 - 26.87 | 26.88 - 50.82 | 50.83 - 100.00

COPING CAPACITY

ADAPTIVE CAPACITY

Social character

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

Emergency services

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

Governance, policy and leadership

Organizational enablers of learning, adaptation and transformation

Economic capital

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

Community capital

The cohesion and connectedness of the community

Community and social engagement

Social enablers of learning, adaptation and transformation

Infrastructure and planning

Preparation for natural hazard events using strategies of mitigation or planning

Information and engagement

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

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DATA COLLECTION

Social character

Economic capital

Infrastructure and planning

Emergency services

Health workforce, Emergency service workforce, Volunteers

Community capital

Length of residence, Crime, Access to services

Information and engagement

Governance, policy and leadership

Community and social engagement

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DATA COLLECTION

- Social character
- Economic capital
- Infrastructure and planning
- Emergency services
- Community capital
- Information and engagement
- Governance, policy and leadership
- Community and social engagement

Indicators of land use planning for hazards
Indicators of emergency planning

Indicators of community engagement

Assess the broad content and scope of plans and policies to derive a score that can be used in the index as an indicator

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LAND USE PLANNING

LAND USE PLANNING AND ANDRI

The Australian Natural Disaster Resilience Index (ANDRI):

- A focus on *Capacity* (Coping and Adaptive)

- Local scale indicators

The question for Land Use Planning was:

- How might we comparatively measure *local planning <u>capacity</u>* Australia wide?

Capacity pointed to two areas: *policy* and *governance* in land use planning.

Why?

This is a current planning policy from a small Australian council.

It has its shortcomings:

- Acknowledges a risk, but defers responsibility.

- Shows inadequate knowledge of the risk

- *Very* dated

- Refers to an immanent study, which still hasn't been done

Is this a signal of capacity problems?

Policy Number 3 -   FLOODING WEST STRAHAN

Purpose:

Adopted: 19 November 2002

Minutes Reference: 92/02(b)

Authorised by: Mayor

Updated: 16th May 2006

Review Date:

POLICY

Objective:

Scope:

Policy:

Eastern extremity – Flooding, West Strahan

The eastern extremity of the area of West Strahan subject to flooding is generally Bay Street, Jones Street, Jack Street.

Applicants lodging planning and building applications in the above areas be advised that the area is prone to flooding and that Council will not be responsible for the greenhouse effect.

Once the flooding study in conducted this is to be incorporated into this policy.

Surveying Planning Capacity

When considered in terms of capacity, that example reveals two areas of focus:

1. How do planning frameworks provide capacity for planners to address hazards in their day to day work?

2. How do governance structures provide capacity for the continuous improvement of those policy frameworks?

These are the questions that guide the data collection and analysis of the land use governance indictors. The outputs have 2 forms:

• Numbers that serve as indictors for the Resilience Index

• A systematic comparison of Australian land use planning systems

1. Planning Governance Capacity

One indicator for planning capacity is the the size of a local Council, and the resourcing this provides to proactively respond to hazard risks in the built environment.

Data Collection

We gathered a variety of data from various sources, including:

- Council Revenue and expenditure
- Council staff size
- Number of local land use planners
- Number of planning applications
- LGA population and land area
- Building activity

It was complex, and inconsistent, but we could arrive a good stable set of inputs

New South Wales																
Albury (C)	456	51722	113.43	305.9	0.7	565.1	1.2	21518	115	358	440	548	1,461	22,979	50.39	6.79
Armidale (A)	231	25318	109.60	4230.8	18.3	1064.9	4.6	10168	17	78	52	105	252	10,420	45.11	2.48
Ashfield (A)	178	44540	250.22	8.3	0.0	97.6	0.5	17222	5	72	428	130	635	17,857	100.32	3.69
Auburn (C)	279	88059	315.62	32.5	0.1	225.0	0.8	24636	972	1,035	2,424	1,880	6,311	30,947	110.92	25.62
Ballina (A)	274	41828	152.66	484.7	1.8	656.7	2.4	18025	62	268	305	367	1,002	19,027	69.44	5.56
Balranald (A)	63	2422	38.44	21693.1	344.3	1586.6	25.2	1081	4	3	0	5	12	1,093	17.35	1.11
Bankstown (C)	721	203202	281.83	76.8	0.1	596.9	0.8	62681	426	1,525	1,885	2,182	6,018	68,699	95.28	9.60

LGA Scale Data

We settled on:

Council Resources	LGA Scale		LGA Growth
Council Staff (FTE)	LGA Area		Dwelling Approvals (per annum & per week)
	LGA Population		
	LGA Dwelling Nos.		
	Road length		

New South Wales

	FTE Staff 14-15	FTE/Pop	FTE/Area	FTE/Roads	Total dwellings (2011 & 2012-16)	Total Dwellings/FTE	New dwellings (2012-16) as prop.of 2011 dwellings (%)	New dwellings per week in 2016
Albury (C)	456	113.43	0.7	1.2	22,979	50.39	6.79	10.54
Armidale Dumaresq (A)	231	109.60	18.3	4.6	10,420	45.11	2.48	2.02
Ashfield (A)	178	250.22	0.0	0.5	17,857	100.32	3.69	2.50
Auburn (C)	279	315.62	0.1	0.8	30,947	110.92	25.62	36.15
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Balranald (A)	63	38.44	344.3	25.2	1,093	17.35	1.11	0.10
Bankstown (C)	721	281.83	0.1	0.8	68,699	95.28	9.60	41.96
Bathurst Regional (A)	381	110.84	10.0	3.5	17,066	44.79	7.77	7.88
Bega Valley (A)	360	92.99	17.4	4.0	17,398	48.33	3.88	4.10
Bellingen (A)	135	96.37	11.9	4.2	6,016	44.56	1.47	0.50
Berrigan (A)	84	100.19	24.6	16.4	4,175	49.70	3.60	1.00
Blacktown (C)	1,427	237.79	0.2	0.9	112,598	78.91	11.72	82.15

Resilience Index Inputs

From this, inputs into the resilience index are as follows:

- FTE Council staff numbers
- Staff as a ratio of population, land area, roads and dwellings
- Growth, as indicated by new dwelling approvals 2012 – 16 as a ratio of 2011 numbers

New South Wales						
	FTE Staff 14-15	FTE/Pop	FTE/Area	FTE/Roads	Total Dwellings/FTE	New dwellings (2012-16) as prop.of 2011 dwellings (%)
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Data Analysis

The data exposes different challenges for different council typologies

NSW LGA	DECILE RANKINGS							Housing Growth	
	Council Staffing	LGA Scale						Housing Growth	
	(High decile = high resourcing)	(High decile = high impact on resources)*						(High decile = high impact on resources)*	
	FTE Council Staff	Pop/FTE	Area/FTE	Dwellings/FTE	Road Km/FTE	Scale Subtotal		Dwelling Growth 2011-2016 (Decile)	Dwellings p/week 2016 (Real)
Albury (C)	9	6	3	6	3	18		8	10.54
Armidale Dumaresq (A)	6	5	6	5	6	22		4	2.02
Ashfield (A)	5	9	1	10	1	21		6	2.5
Auburn (C)	6	10	1	10	2	23		10	36.15
Ballina (A)	6	7	4	7	4	22		8	7.06
Balranald (A)	1	1	10	1	10	22		2	0.1
Bankstown (C)	10	10	1	10	2	23		9	41.96
Bathurst Regional (A)	8	6	5	5	5	21		9	7.88
Bega Valley (A)	7	5	6	5	5	21		6	4.1
Bellingen (A)	4	5	5	5	5	20		2	0.5
Berrigan (A)	2	5	6	6	9	26		6	1
Blacktown (C)	10	9	2	8	2	21		10	82.15
Bland (A)	4	2	9	2	10	23		2	0.08
Blayney (A)	2	5	6	5	7	23		2	0.23
Blue Mountains (C)	9	7	4	7	4	22		4	5.37
Bogan (A)	2	1	10	1	10	22		1	0.06
Bombala (A)	1	2	9	3	9	23		1	0.06
Boorowa (A)	1	2	8	2	8	20		4	0.25
Botany Bay (C)	7	7	1	7	1	16		10	21.75
Bourke (A)	2	1	10	1	10	22		2	0.06
Brewarrina (A)	1	1	10	1	10	22		4	0.13
Broken Hill (C)	5	6	4	7	4	21		1	0.12

NSW LGA Types

Comparative Average of FTE Staff (by decile)
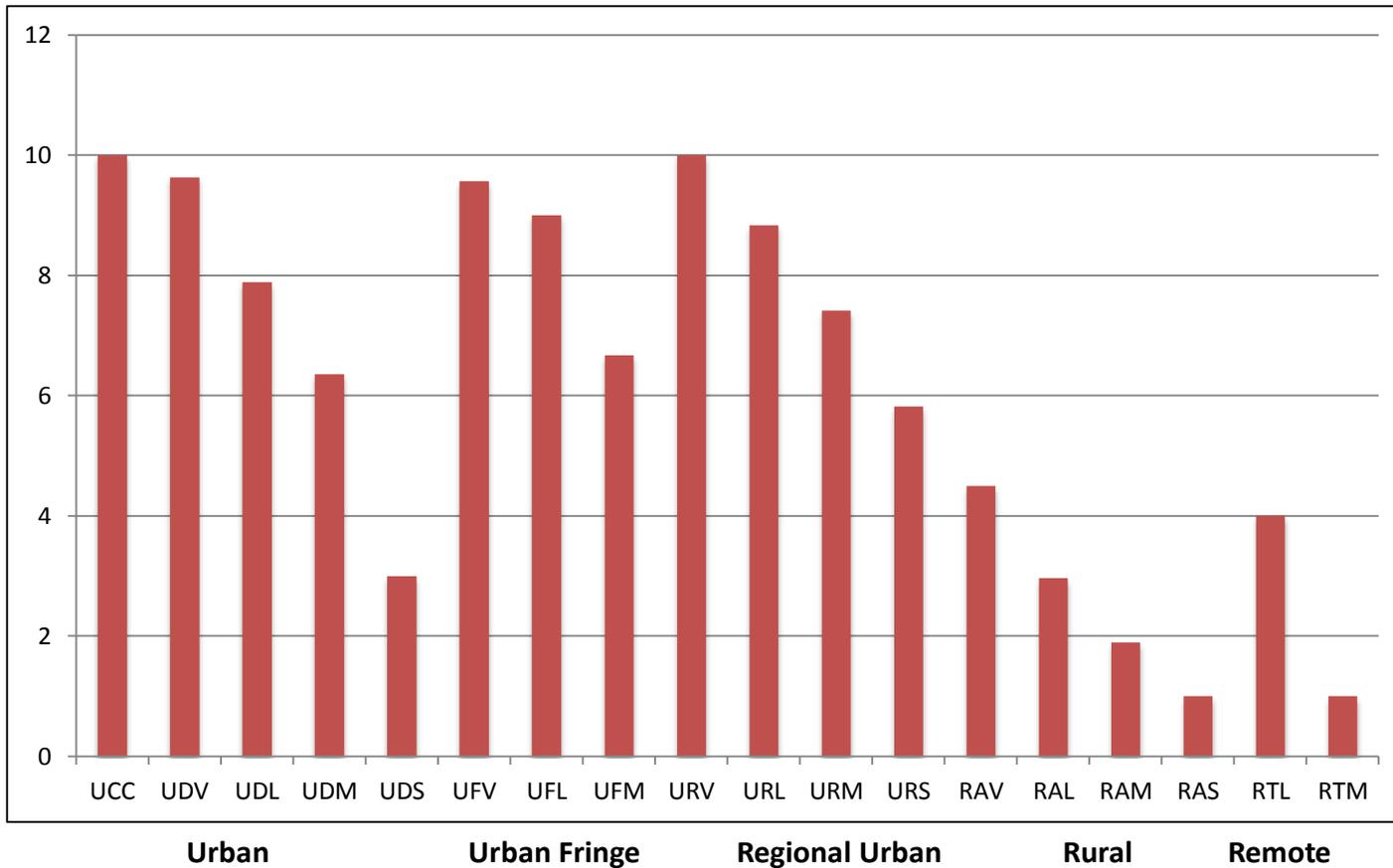
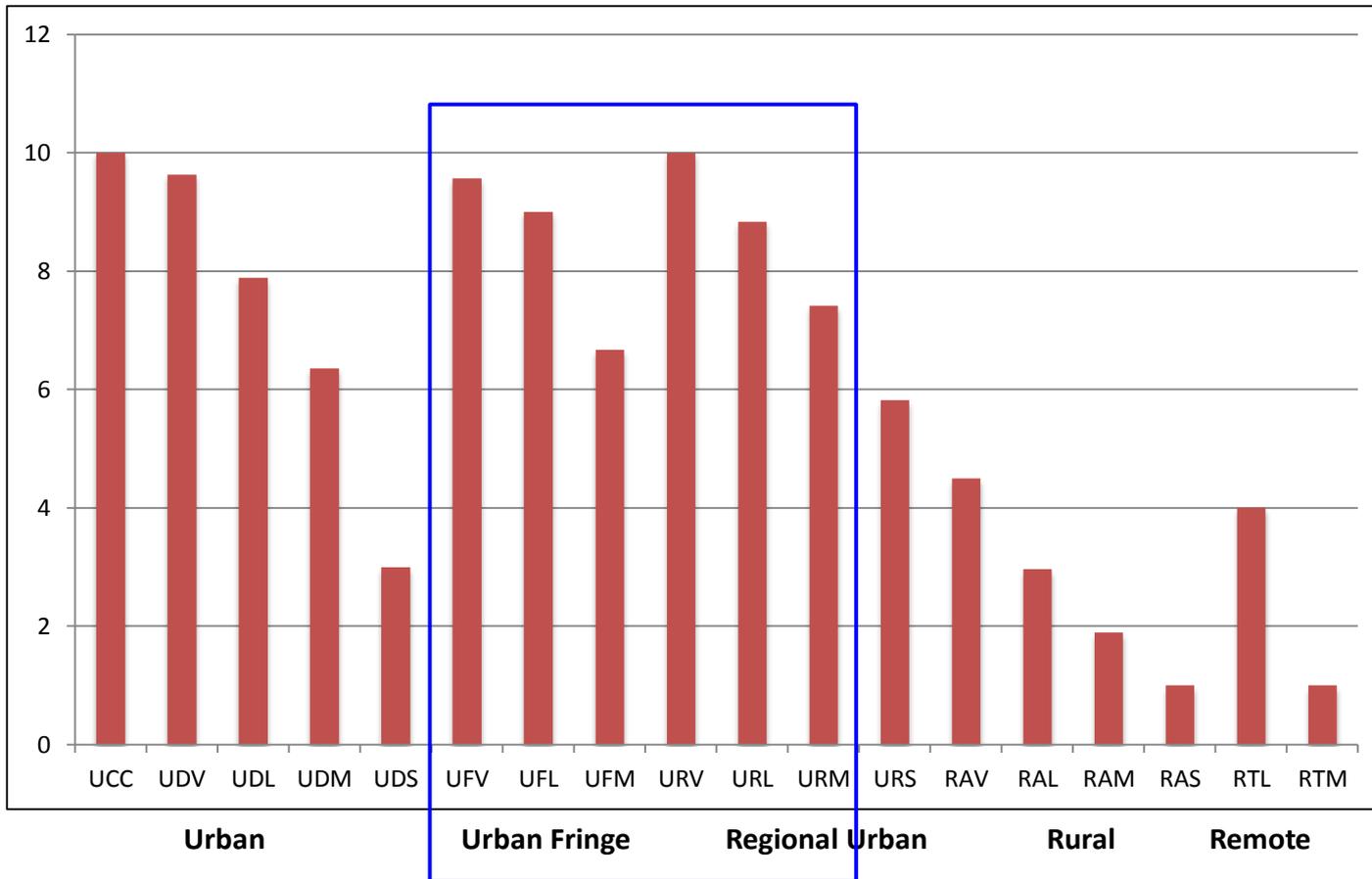LGA types are drawn from the Australian classification of local governments

NSW LGA Types

Urban Fringe & Regional Centres

Comparative Average of FTE Staff (by decile)

	UCC	UDV	UDL	UDM	UDS	UFV	UFL	UFM	URV	URL	URM	URS	RAV	RAL	RAM	RAS	RTL	RTM
	Urban					Urban Fringe			Regional Urban				Rural				Remote	
Number of LGAs in each category	1	8	8	12	2	7	1	4	3	6	17	11	21	24	19	4	1	1

Urban Fringe & Regional Centres

Population/EFT
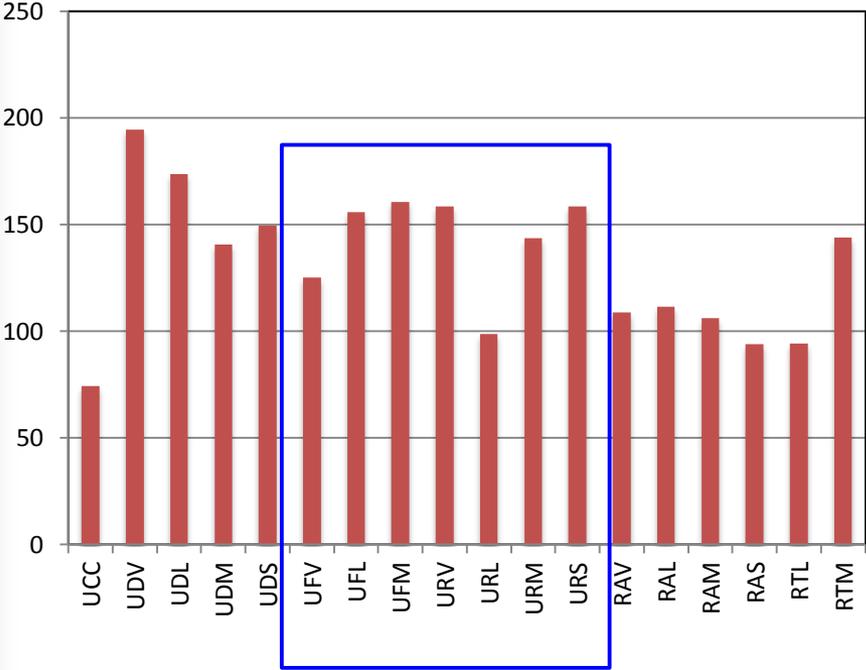
Higher compared to rural

Area/EFT
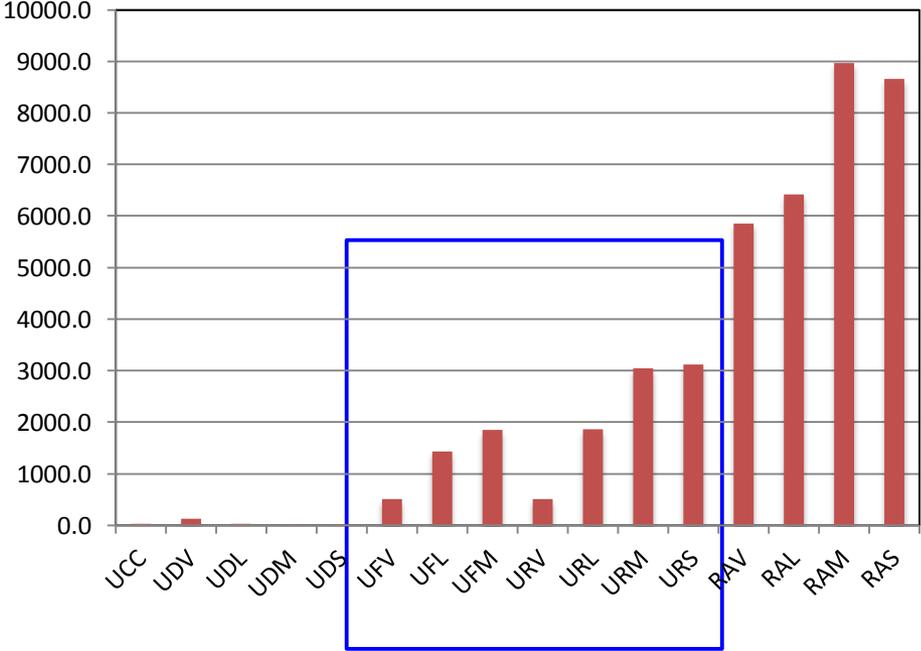
Higher compared to urban

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NSW LGA Types

Growth in dwellings 2012 – 16, % over 2011 figure

Urban Fringe & Regional Centres
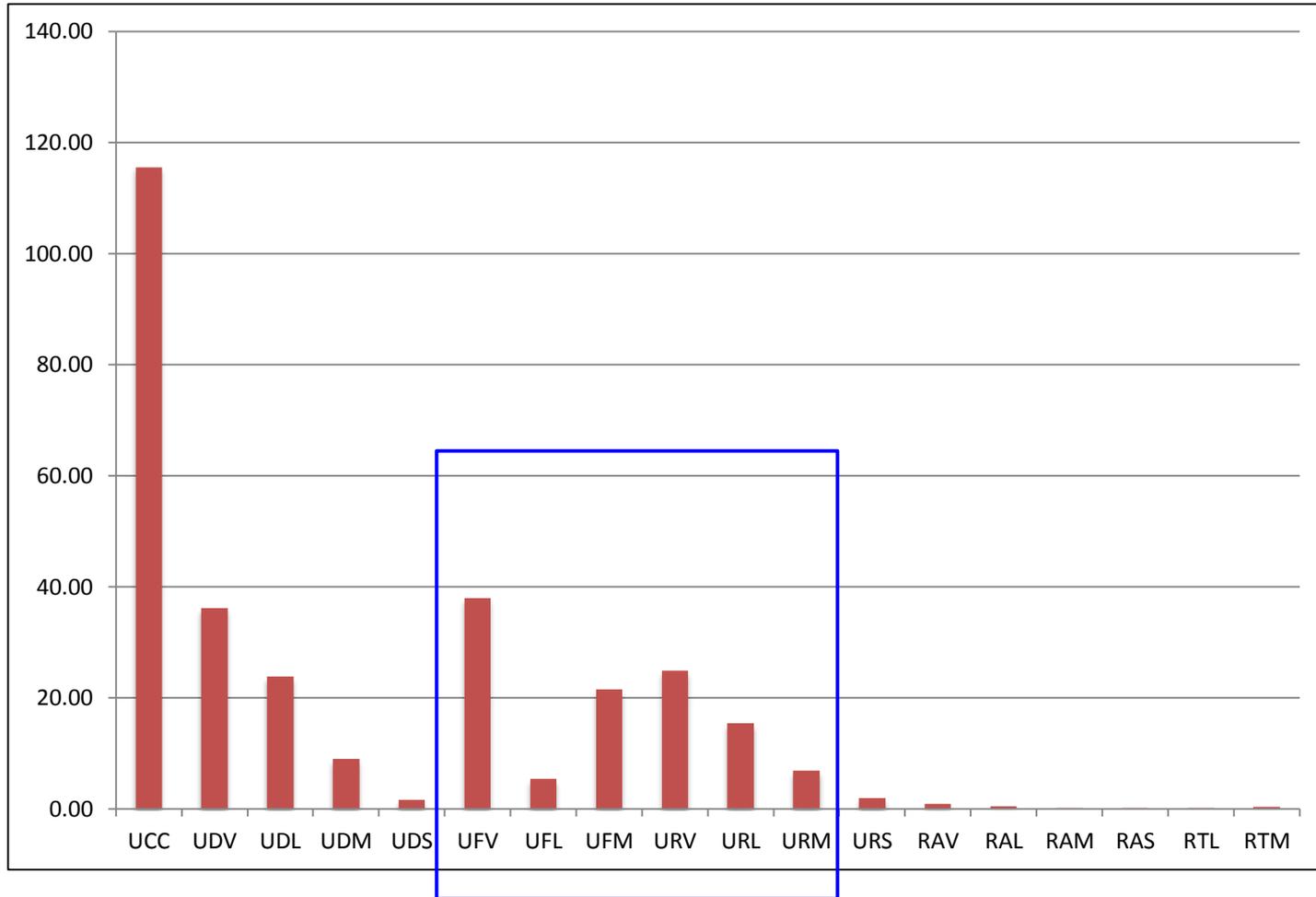

But experiences a high rate of growth …

Metro Fringe & Regional Centres

1. In staffing terms, considered as a raw number, these council's are generally well resourced, sitting between the 6th and 10th deciles of LGA's;

2. But the impact of scale is significant: they tend to be relatively large geographically, and have large populations, both of which can impact on resources;

3. This is compounded by the high growth, as indicated by the high change in dwelling numbers in many of these locations, especially in larger format LGAs in these types.

4. Conclusion: while these LGAs show good staffing numbers, they experience challenges in terms of both scale, and the rate of change, which in combination can be dynamically challenging for staffing.
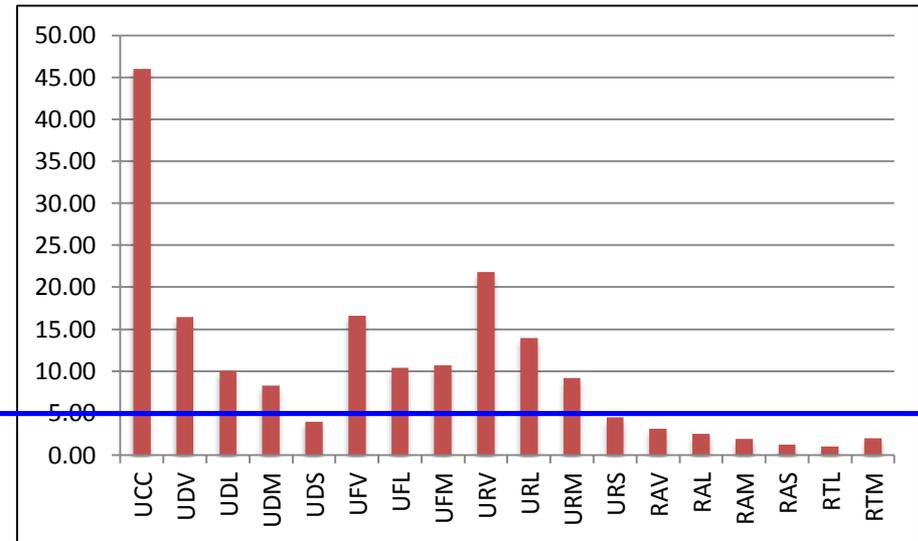
Council Staff & Planning Staff

No reliable data nation-wide about numbers of planners working in each council. But there is in NSW, and we can use this to draw some assumptions.

Council Staff NSW
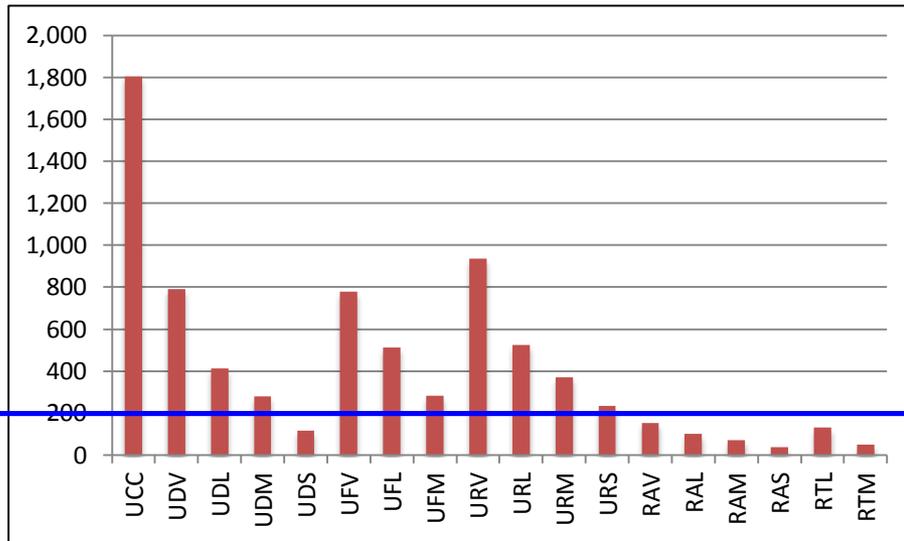
Planning Staff, NSW Councils

Councils with less than 200 staff will struggle to have 5 planners, which will affect the capacity for *strategic* planning in the small council.

2. Regulatory System Capacity

In looking at planning regulation, we were interested in how the planning system itself facilitated the capacity of the planner to give due consideration to hazards in their day-to-day work.

Survey of Planning Systems: Limitations and Possibilities

The Index provides a unique survey of all Australian local planning systems, with a hazard focus.

The scale of the task, and the variability it throws up, imposes some limits:

- Cannot viable survey all fine scaled local hazards to see if they are addressed;
- Cannot include fine scale plans for specific areas within an LGA
- Capacity to *qualitatively* assess plans is limited

But they survey enables some useful analyses:

- Comparison and contrast of how different state planning address hazards
- Consideration of where policy effort is concentrated on hazards within each system
- Identification of LGAs that lag on some areas of policy development relative to the state

Local Planning Functions

1. Land Use Strategy

2. Rezoning

3. Structure Planning & Subdivision

4. Development

Each are typical functions of land use planning, and each has the potential to impact upon the way hazards are situated in relation to the built environment.

1.

2.

3.

4.

Planning Policy Hierarchy

Planning activity is structured by a hierarchical system of policy, strategy and rules.

State

Legislation and Policy
- Statutory objectives, standards, and procedures for planning in the state.

Region

Metropolis- and Region-Scale Strategic Plans
- Broad land use priorities and strategic directions for regions

Local

Strategy and Policy
- Statements of broad future directions, and issues-based standards

Structure Planning
- Broad based plans for local areas

Maps and Codes
- Identifies local priorities and applies land-based rules for development of land.

Hazard Profiles

It was also important to consider hazard profiles. Each council will address different hazards, so cannot be expected that have the same policy mix.

But this can to some extent be addressed typologically. To recognise different hazard profiles, we have grouped LGAs as follows:

- Metro Inner
- Metro Coastal
- Metro Fringe
- Regional Coastal
- Regional Inland

Key Questions

How do planning systems across the state hierarchy include hazards within the frame of decision making at the local level?

Local Planning Function	Informing policy
Strategic Land Use Planning	State Policy and Regional Plan
Rezoning	Regional Plan and Local Strategy
Subdivision	Local Codes and State Guidelines
Development	Local Codes and State Guidelines

To consider how the system provides for hazards in local planning functions, we therefore need to read how hazards are pitched to those functions in the informing policy.

Data Collection – Local

| | CODE | | | | |
	General	Subdivision Fire	Flood	Other	Development Fire
N		N	Y	N	N
	2.8 temporary use of land		6.2 Flood Planning		
N		N	N	N	N
	2.8 temporary use of land				
N		N	Y	N	N
	2.8 temporary use of land		6.2 Flood Planning		
			6.4 Flood planning		
	Y		Y	Y	Y
	38 Development within Zone 1a (requires hazard assessments)		98 Flood Planning	5.5 development within the coastal zone 3(d) "coastal hazards"	38A developmen select zones mus first satisfy bushf management principles
	101 Development control plans urban release (3) (f) "amelioration of natural and environmental hazards ..."				
			Y	Y	N
	2.8 temporary use of land		6.3 Flood Planning	5.5 development within the coastal	

Data Collection – Regional

REGIONAL PLANS NEW SOUTH WALES		Does it actively describe hazards in the region?	Does it acknowledge planning's role in hazard mitigation?	Does spec haza
GREATER SYDNEY				
A Plan for Growing Sydney		YY	YY	Y
Towards Our Greater Sydney 2056		N	Y	N
Greater Sydney Sustainability Profile		Y	Y	N
		Provides good quality metro scale maps of flood hazard and bushfire prone land		
SYDNEY DISTRICT PLANS				
Central District Plan (draft)		YY	YY	YY
	Bayside, Burwood, Canada Bay, Inner West, Randwick, Strathfield, City of Sydney, Waverley, Woollahra	Especially relative to climate change, such as sea level rise, urban heat	suggests confronting climate change impacts through various measures	linked Susta Meas
North District Plan (draft)		YY	Y	Y
	Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Northern Beaches, Mosman, North Sydney, Ryde, Willoughby	flood and bushfire and coast	yes, largely by referring to existing measures in NSW	
West Central District Plan (draft)		YY	Y	Y
	Blacktown, Cumberland, Paramatta, The Hills	flood and bushfire	existing measures and ongiong improvement	Princ devel Hawk Floo
West District Plan (draft)		YY	Y	Y
	Blue Mountains, Penrith, Hawkesbury	flood and bushfire	existing measures and ongiong improvement	Princ devel Hawk Floo
South West District Plan (draft)		YY	Y	Y
	Camden	flood and bushfire	existing measures	Princ

Data Collection – State

STATE PROVINCES WESTERN AUSTRALIA	Does it explain planning's role in mitigating hazards in the state?	Does it include specific hazard risk principles for zoning, subdivision & development	Does it desirabl base fo hazard
OPERATIONAL & DEV CONTROL POLICIES			
Liveable Neighbourhoods (draft) (2015)		YY	
		requires hazards to be considered in site and context analysis in development applications	
4.2 Planning for Hazards and Safety	YY	N	N
	Mostly related to manmade hazards, but contains general advice to avoid areas of natural hazards		
PLANNING GUIDELINES			
Guidelines for Planning in Bushfire Prone Areas (2015)	YY	YY	YY
		Explains measures for all levels of planning: streatgy development, rezoning , subdivision and development	Maps, a assessm
Coastal Hazard Risk Management and Adaptation Planning Guidelines (2015)		YY	YY
		Provides a comprehensive risk assessment model for coastal hazards	
Sea Level Change in Western Australia – Application to Coastal Planning		Y	YY
		instructs planning to take into account a	provide discussi

Questions

State

- Hazards in the objectives of planning
- State planning policy for flood (coastal/riverine) and bushfire
- Requirements for local level mapping

Regional

- Inclusion of hazards in region/metro strategy
- Mapping of regional hazards
- Specification for further local action

Local

- Local policy acknowledgement of hazards
- Evidence of local assessment of hazards
- Planning maps of hazards
- Hazard-focussed code for subdivision and development

Scoring

Each Question is scored:

0: No provision
1: Soft Provision
2: Robust Provision

Scoring Matrix

(e.g. the first dozen Tasmanian LGAs)

Tasmanian Councils	1	2	3	4	5	6	7	8	9	10	11	12
State												
In state objectives	1	1	1	1	1	1	1	1	1	1	1	1
Planning policy for: Fire	2	2	2	2	2	2	2	2	2	2	2	2
Riverine Flood	0	0	0	0	0	0	0	0	0	0	0	0
Coastal Inundation	2	2	2	2	2	2	2	2	2	2	2	2
Requires local mapping	2	2	2	2	2	2	2	2	2	2	2	2
Regional												
Inclusion of hazards	1	2	2	2	2	2	2	2	2	1	1	1
Mapping of hazards	2	1	1	1	1	1	1	1	1	2	2	2
Requires further local action	1	1	2	2	1	2	1	1	2	1	1	1
Local												
Policy statements on hazards	0	2	2	2	2	2	2	2	2	2	2	2
Hazard assessments	0	0	2	2	0	0	0	2	0	2	0	0
Hazard maps for: Fire	2	2	2	2	2	2	2	2	2	2	2	2
Flood	2	2	2	2	2	2	2	2	2	2	0	2
Hazard based code	2	2	2	2	2	2	2	2	2	2	2	2
Total /28	**17**	**19**	**22**	**22**	**19**	**20**	**19**	**19**	**20**	**19**	**17**	**19**

Questions