



## CONTENTS

1	Introduction	2
2	Increasing Risk in a changing world	3
2.1	Exposure: Increase in coastal infrastructure	3
2.2	Hazard: Climate change and extreme weather events	4
2.3	Vulnerability: Demographic changes	
2.3.1.	Increasing population density in disaster prone areas	5
2.3.2.	Australia's increased aged population	6
2.3.3.	Increasing number of lone older person households	6
3	Cyclone Larry Johnstone Shire Post Disaster Residents Survey	
3.1	Severe Tropical Cyclone Larry	7
3.2	Background to <i>Johnstone Shire Post Disaster Residents Survey</i>	8
3.3	Methodology for data selection from survey for this report	8
4	Results	
4.1	Background: age of house/damage to house/insurance	9
4.2	Time became concerned/expectation of storm surge	10
4.3	Preparation: pre-cyclone and due to warning	11
4.4	Support: Contact with friends or family/special needs /emotions and reactions	12
5	Conclusions	14
6	References	16

**Appendices (from ~~10 0 10.62.2p0.01678267m 10.62.2ps910.0 0 10.09.473.781 Tm0300nces~~)**



## 2. Increasing risk in a changing world

“‘Risk’ is the probability of a loss, and this depends on three elements, hazard, vulnerability and exposure. If any of these three elements in risk increases or decreases, then risk increases or decreases respectively” (Crichton 1999:102). This paper puts forward the proposition that, in Queensland in relation to cyclone-based disasters, all three elements of risk are increasing and are projected to increase further in the future. The following diagram (Figure 1.) adapted from

Alt  
vulnerability based



## 2.3 Vulnerability: demographic changes

### 2.3.1 Increasing population density in disaster prone areas

“A large population in a hazardous location alone defines maximum vulnerability”(King 2001:155). “Between 2001 and 2026 Queensland is projected to experience the fastest household growth in Australia...(ABS 2004a:3)”. This increase in population is of concern as the most disaster-related damage since 1967 “...occurred in the eastern seaboard States, particularly in New South Wales and Queensland, which accounted for 66 per cent of Australia’s total cost and 53 per cent of the total number of disasters”(Bureau of Transport Economics 2001:55). In Queensland

**Figure 3. Queensland: Costs by type of disaster 1967–1999**

87% of the population lives within 30km of the coast (King and Gurtner 2005:4), putting the majority of the population at risk of cyclonic effects. “In Northern Australia an increasing population is also steadily increasing in vulnerability as people move into flood and cyclone prone areas”(King 2001:155).

(Bureau of Transport Economics 2001:33)

As can be seen be Figure 3, cyclones, floods and severe storms are the major types of disaster in Queensland. “The reality...is that as long as people continue to build and develop along the coastline they remain vulnerable to sea related hazards”(King & Gurtner

2005:9). “A recent study by CSIRO on the combined effect of demographic changes and climate change shows that a warmer climate may result in an increased risk of coastal inundation in populated areas”(COAG 2004:9).

The cost of these disasters to the Queensland community is already considerable (Table 1.), and rising sea levels, combined with increased storm intensities and storm surge heights, along with increases in the value of buildings in the vulnerable regions, will likely increase these losses (CSIRO 2002). This is not only due to an increased population in these areas, but also because even a small increase in such environmental factors as flood level or peak wind speed (Figure 2) can have a major impact on infrastructure.

**Table 1. Queensland: Cost of Disasters 1967-2006**

	Homes Damaged	Homes Destroyed	People Affected	Cost A\$ million
Cyclones	12,960	267	337,700	908.7
Severe storms	28,418	136	2,143,820	819
Floods	11,980	56	226,650	666.8
Flash floods	6,240	14	63,700	94
Bushfires	3	18	30,570	3
<b>TOTAL</b>	<b>59,601</b>	<b>491</b>	<b>2,802,440</b>	<b>2,491.5</b>
Accessed from EMA Disasters Database <www.ema.gov.au/>				

### **2.3.2 Australia's increasing aged population**

million people is projected to increase to between 24.9 and 33.4 million in 2051, and to between 22.4 and 43.5 million in 2101”

population ageing”(ABS 2006b). In 2004 the proportion of  
1 en 26%

### **2.3.3 Increasing number of lone older person hous**

“Between 2001 and 2026 [I]one person households are proje  
Queensland, growing by between 87% and 153%...(ABS 20  
65 and over lived alone (ABS 2006), and the number of old  
to increase. “By 2026 the number of older Australians ag  
projected to increase to between 844,000 and 962,000, accounting for between 34% and 39% of  
older Australians...”(ABS 2004a:2).

Lack of social contact  
increases vulnerability, as  
there is less chance of

assistproeoplis n a disast Auj0.00031 Tc 0.10571 w 12 0 0 12 70.92 355.2006 T9m(s)Tj12 0 0 12 34.85591.65

**3. Cyclone Larry Johnstone Shire Post Disaster Residents Survey**

amage to local



**3.2 Background to *Johnstone Shire Post Disaster Residents Survey***

n

**4. Results**

**4.1 Background: House age/property insu**

**4.2 Time became concerned/ Expe**

### 4.3 Preparation: pre-cyclone and due to warning

This section looks at the preparations made by residents, both pre-cyclone season and during the cyclone warning period for Cyclone Larry. The most obvious pattern is the large number of 60+ lone households (31%) who made no preparations prior to the cyclone season at all (Table 8). The 60+ lone households were also less likely to prepare or purchase additional items due to hearing a cyclone warning (Table 9). This group were more than twice as likely to do nothing compared to others in their age group. This seems at odds with the perception

**Table 8. Preparation pre-cyclone**

	Household age			Total			
	60+ single	60+ sharing	<60				
Time of beg ref	56.0	9.29	74.8	mnning prepar ref	56.0	9.29	74.8

*Time of beg ref 56.0 9.29 74.8 mnning prepar ref 56.0 9.29 74.8*

60+

**4.4 Support: Contact with friends or family/special needs /emotions and reactions**

ceive    assistan    bo            l  
          an                    n  
red dur    e e        o    ga    s

Turning to the emotions experienced by people impacted by Cyclone Larry, King and Gurtner (2006:34) found “[w]hile the small number of single parents with young children were more strongly in the scared category, the elderly and special needs households are not significantly different from the rest of the population”. This picture changes, however, when one looks at 60+ lone households compared to the rest of the population. Upon hearing the cyclone warning, while only slightly more than the average percent in this group reported being worried (21%), a larger than average percent stated they felt both prepared and calm (Table 12). Unfortunately a larger than average percent also stated they did not take the situation seriously, and 43% took no action.

**Table 12. Emotions/reactions**

	Household age + single	Household age with others	<60	Total
--	------------------------------	---------------------------------	-----	-------

As to the personal effect, 29% of 60+ lone households stated they felt worried and 14% felt disorientated. However it should be noted that the responses to these survey questions “...is obviously a simplification”

44531 403.6799 T8092 371.5.67972 Tm(b)Tj 0 12 70.92 355.t

respondents

who stated they were stressed may have meant the same

study does not identify the needs to be considered in the impact of disasters on older lone households. Section 2.3.3 of this study, this group is more likely to be socially isolated and an emotional support system is necessary to help decrease the

## **5. Conclusions**

### **INCREASING HAZARD**

Due to climate change, scientific research shows that scale single events with more severe cycles.

Even a minor increase in intensity of a storm can result in damage costs that are increased disproportionately. A small increase in wind speed results in a much greater increase in wind speed, which leads to much greater areas being affected.

### **INCREASING EXPOSURE**

Between 2001 and 2026 Queensland's population is projected to increase by 3.0 million people. Between 2004 and 2051 Queensland's population is projected to increase by 3.0 million people.

## CONCLUSIONS FROM JOHNSTONE SHIRE POST DISASTER RESIDENTS SURVEY

households had no house or contents insurance, as compared to 4% of



## REFERENCES

ABS (1996) *4102.0 - Australian Social Trends, 1996*. Australian Bureau of Statistics, Commonwealth of Australia, Canberra. Accessed 15/09/2006 at [www.abs.gov.au/ausstats/abs@.nsf/2f762f95845417aeca25706c00834efa/90e51fb0bf87c261ca2570ec0073d3b3!OpenDocument](http://www.abs.gov.au/ausstats/abs@.nsf/2f762f95845417aeca25706c00834efa/90e51fb0bf87c261ca2570ec0073d3b3!OpenDocument)

ABS (2004a) *Household and Family Projections, Australia, 2001 to 2026*. Australian Bureau of Statistics, Commonwealth of Australia, Canberra. Accessed 15/09/2006 at [www.abs.gov.au/AUSSTATS](http://www.abs.gov.au/AUSSTATS)

Department of Natural Resources & Mines (2004) *Queensland Climate Change and Community Vulnerability to Tropical Cyclones, Synthesis Report August 2004*. Department of Natural Resources & Mines, Queensland State Government. Accessed 22/09/2006 from [www.longpaddock.qld.gov.au/ClimateChanges/pub/OceanHazardsMenu.html](http://www.longpaddock.qld.gov.au/ClimateChanges/pub/OceanHazardsMenu.html)

Dore, M. (2000) *The importance of measuring the costs of natural disasters at a time of climate change*. Australian Journal of Emergency Management, Spring 2000, pp. 46-51.

Emanuel, K. (2005) *Increasing destructiveness of tropical cyclones over the past 30 years*. Nature, Vol.436, 4 August 2005, Nature Publishing Group, pp.686-688.

Environmental Protection Agency (2002) *State Coastal Management Plan - Queensland's Coastal Policy*. Environmental Protection Agency, The State of Queensland. [www.epa.qld.gov.au/environmental\\_management/coast\\_and\\_oceans/coastal\\_management/state\\_coastal\\_management\\_plan/](http://www.epa.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/state_coastal_management_plan/)

EPA (2006) *Media - Wave and Tide graphs of Cyclone Larry*. Environmental Protection Agency, The State of Queensland. Accessed 26/10/2006 from [www.epa.qld.gov.au/about\\_the\\_epa/media\\_room/archived\\_issues/cyclone\\_larry/media\\_wave\\_and\\_tide\\_graphs\\_of\\_cyclone\\_larry/](http://www.epa.qld.gov.au/about_the_epa/media_room/archived_issues/cyclone_larry/media_wave_and_tide_graphs_of_cyclone_larry/)

Handmer, J. (2003) *We are all vulnerable*. The Australian Journal of Emergency Management, Vol. 18 No 3., August 2003, pp.55-60.

Handmer, J. (2006) *American exceptionalism or universal lesson? The implications of Hurricane Katrina for Australia*. The Australian Journal of Emergency Management, Vol. 21 No. 1, February 2006, pp. 29-42.

Hayne, M. and Schneider, J. (2002) *Minimising the Impacts of Natural Hazards on our Urban Coastal Communities*. Coast to Coast pp.153-156. [www.coastal.crc.org.au/coast2coast2002/proceedings/Theme3/Minimising-impacts-natural-hazards.pdf](http://www.coastal.crc.org.au/coast2coast2002/proceedings/Theme3/Minimising-impacts-natural-hazards.pdf)

*e Larry:*  
ering, James Cook

King, D and Goudie, D. (2006) *Cyclone Larry Post Disaster Residents Survey*. Centre for Disaster Studies, James Cook University & Australian Bureau of Meteorology.

McInnes, K. L., Walsh, K. J. E., Hubbert, G. D. and Beer, T. (2003) *Impact of Sea-level Rise and Storm Surges on a Coastal Community*. *Natural Hazards* 30: 187–207, 2003. Kluwer Academic Publishers. Printed in the Netherlands.

Stern, N. (2006) *Stern Review on the Economics of Climate Change*. HM Treasury, British Government, London. Accessed 1/11/2006 from

[www.hm-treasury.gov.uk/Independent\\_Reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/Independent_Reviews/stern_review_economics_climate_change/sternreview_index.cfm)

\_0.98 297.76939 542.40bPa7 Tc 0.000d0 Tw 12 0 0 12 546.11842sK.0 P098 60415018  
Lyden, K. O. Page, G. and Whitton, P.

ric Research & Queensland Department of Natural Resources. Accessed 23/10/2006 from  
[www.longpaddock.qld.gov.au/ClimateChanges/pub/CSIRO2002.html#end](http://www.longpaddock.qld.gov.au/ClimateChanges/pub/CSIRO2002.html#end)

## Appendix I. Method

The following appendices are from the *Cyclone Larry Post Disaster Residents Survey*, adapted for this report. This section is verbatim from page 5 (King and Goudie 2006).

The survey was conducted by short answer questionnaire. One respondent from each household answered the questions that were put to them by the interviewer. The interview team worked closely t

## **Appendix II. Notes on questions, answers and coding of responses**

The numbers relate to the original 42 questions asked by the researchers (King and Goudie 2006:54-59). I have only included those 20 questions relevant to this report, but kept the original numbers for ease of cross-referencing. The section of the survey instrument used for this report is included as Appendix III.

### **3. What did you do to prepare for this cyclone season?**

Many people's little responses to questions two and three were no or didn't do anything etc. For single people and even couples this is a rational response, but many people indicated that they maintain a level of preparedness without necessarily having a formal plan or taking specific action.

### **4. At what time (and day) did you first become aware cyclone Larry was heading your way?**

While Sunday was the warning period the development of the low was watched much earlier in the week. There was plenty of time on Sunday from people to prepare for the cyclone and as it was a glorious sunny day many respondents indicated that they participated in other activities.

### **6. What further preparations did the warnings prompt you to carry out?**

This question sought information of the actual actions of people. Some gave a single action, when others indicated a number of activities. Coding has attempted to summarise knees into groups of separate actions.

### **7. Can you remember how you felt when you heard the cyclone advice messages for cyclone Larry?**

Frightened has been coded under scared. A few people said they prayed (these responses appeared genuine) and these have been coded along with feeling calm, although the intent may have been more oriented to action rather than to personal self-control.

### **8. Can you recall how you acted on this feeling?**

A dominant response was that people got on with preparations with a sense of increased urgency and importance. This question was looking for the type of response rather than the specific actions as these have already been recorded in question six.

### **9. Who was in your household on Sunday March 19th as Cyclone Larry approached the coast (ie were all the family at home? did others come to your household?) (List ages and gender)**

A number of data columns were generated from this question. The interviewers generally did not record whether others have come to the household but this information is implicit in various other answers. The total number of people and householders recorded, and a list of ages and genders. From this an approximate definition of the family type or group of people present in the house has been attempted and from this information the classification of vulnerability categories may be added. However we did not ask people their relationships to other members of the household, so that the family type variable is indicative only. An additional variable was generated from a combination of age, family type and the special needs question. Households were classified as elderly if the members, or the mean age of a couple, were over 65 years of age. Single parents with children under twelve were selected next, then additional households containing someone with special needs. Some of these had already been classified as elderly,

**13. Did members of your household talk to / visit / stay with, neighbours during the Cyclone Larry**

ber who

ad contact

**27. Is your property insured for cyclone damage? a) Yes, House only b) Yes, Contents only c) Yes, House and contents d) No**

There were some respondents who answered no, and made a comment that the dwelling was rented and that the landlord probably had insurance.

**37. What was the effect of Cyclone Larry on you personally?**

Responses to question 37 will not on a continuum scale but tended to be quite diverse, such that coding has attempted to reflect the diversity but with some compression of emotional responses.

**40. Is there anyone in this household who has special needs?**

If yes how were their needs met during the passage of the cyclone?

This question was a broad self definition. If somebody answered yes their responses have been coded. Thus some babies had special needs while others did not, and some eighty-year-olds had special needs while others did not.

**42. Visual observation of damage**

See question 25. Items from both of these questions have been recorded within a 50 character limit.

