Community Vulnerability to Tropical Cyclones and Associated Storm Surges

Cairns Caravan Parks Study

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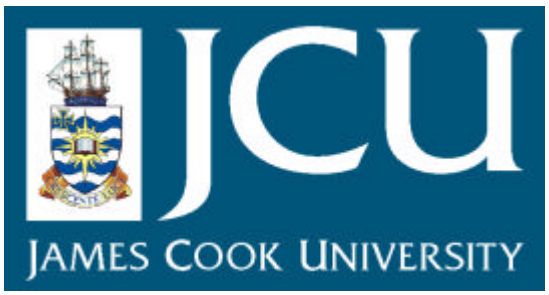
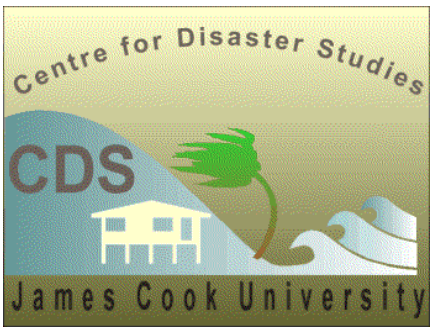
1999

Tropical Cyclone Coastal Impacts Program (TCCIP)





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1. Executive Summary

This study was commissioned by the Centre for Disaster Studies at James Cook University as part of the Tropical Cyclone Coastal Impacts Program. The study focuses on the particular vulnerabilities of caravan park occupants to tropical cyclones and tidal storm surge in the Cairns area. Fieldwork was conducted during the 1998-1999 cyclone season and involved inspecting caravan park grounds, interviews with park managers and a surveying a sample of 98 occupants in 11 parks. Following is a summary of conclusions and recommendations of the study:

?? The study concluded that all cyclone occupants are relatively vulnerable to cyclones, but two principal groups are specially vulnerable. The first of these is long term residents (over 2 years) with particular demographic profiles, including low skilled occupations and low levels of education. The other group of vulnerable occupants is international tourists, about half of whom don' t speak English as a first language.

?? Many participants believed that caravan parks foster increased interaction amongst their occupants than other urban communities. If this is the case, then it would assist in the management of the higher risks which caravan parks incur.

?? The fieldwork confirmed the relevance and timeliness of this study: for many caravan park occupants, this was the first contact they had with anyone to do with cyclones – many parks had little contact with the Cairns City Council or State and Federal emergency authorities in regard to cyclones.

?? Park managers are very nervous about losing business due to cyclone phobia. As a result no caravan park surveyed would supply information about cyclones to visitors. Despite this, caravan park managers were found to be a fundamental information link to reach caravan park occupants. Therefore, management programs for disaster risk reduction for caravan parks could benefit from the support from caravan park managers in order to successfully reach the target audience. Trying to bypass park managers will prove difficult in the management of disaster impacts.

?? It is highly recommended that the City Council considers the implications of the number of people who intend to relocated to the Atherton Tablelands in the event of cyclone.

?? It is also highly recommended that the Council and Emergency Managers consider that there are large numbers of permanent occupants concentrated at Coles Caravan Park, Cool Waters Caravan Park and City Caravan Park, and that these require special attention.

?? It is recommended that a copy of this report be sent to Coles Caravan Park (their request).

?? Finally it is recommended that the Council and Emergency Mangers consider how to make warnings known to short term international visitors in a way that retains the support (or at least acceptance) of caravan park managers. The experience of this study

is that park managers will prevent information being made available to visitors if they think it will impact upon their occupancy rates. In the case of international visitors, they may be achieved by dealing directly with the guide books that travellers use.

2. Acknowldgements

The author would like to thank the staff the Centre for Disaster Studies, James Cook University for their assistance with this project. David King contributed to the survey design and provided background material to the study. Linda Berry assisted by providing recommendations for the sampling scheme and office space during the sampling component. The author would also like to thank the Cairns City Council. In particular, Debbie Wellington provided assistance with mapping of caravan parks. The author would also like to thank all caravan parks who were involved in the study.

3. Introduction

In the event of a cyclone, the population living in caravan parks is particularly vulnerable. The dwellings found in caravan parks -demountables, caravans, wooden cabins- have been noted as being highly susceptible to wind damage (Toovey in King, 1996). Caravan parks are commonly situated in highly vulnerable locations: close to beaches, creeks and main roads. As such, they are vulnerable to destruction as well as flooding. This study was commissioned as a follow up to some pilot studies of caravan parks conducted by the Centre for Disaster Studies in 1997. These studies suggested that there are distinctive groups of residents in these places. Tourists from overseas may be divided into two groups - those for whom their native language is English and those who do not speak English as a first language. The pilot studies noted a general tendency that amongst park dwellers, overseas tourists were generally not elderly. Amongst visitors from other parts of Australia, there appeared to be a far greater number of mature to elderly people. In addition to differences in age, the pilot studies detected differences between visitors renting cabins and vans, and those who were travelling with their own camping equipment. A final group of park dwellers identified were long term residents. These people tended to be elderly and/or economically disadvantaged. In summary, the pilot studies indicated vulnerability in terms of population characteristics in addition to the vulnerability associated with the construction of the dwellings.

4. Aims

The aims of this research project were to

?? identify all of the caravan and camping grounds and parks in the Cairns area,

?? estimate the seasonal populations of these places,

?? describe the characteristics of the residents of these places,

?? assess and analyse awareness and preparedness in relation to cyclone and storm surge threats.

?? Record the cyclone plans and evacuation plans of caravan park managers in the study area.

5. Methods

The methods involved surveying a stratified sample of caravan park occupants and interviews with caravan park managers. Interviews were held with disaster management staff at the Cairns City Council for providing background to guide the study.

5.1 Interviews with park managers

Interviews were conducted with park managers of all parks surveyed. These interviews were used to describe the parks' individual characteristics discussed in section 6.1. Management staff were asked questions about capacity and occupancy rates. Many parks declined to be involved in the study on the grounds that anything to do with cyclones will scare away tourists. One park which was extremely reluctant to begin with was, in the end, very pleased to have its voice heard and requested a copy of the final report. Updating accurate books appeared a challenging task in the larger parks, and few parks could tell me how many sites were filled on any day in the previous week. Some did have precise information for the previous month. Only one of the parks was able to say exactly how many people were staying in the park at one time. This was because occupants were charged per dwelling, not per person, and the number of people on a site or in a cabin can vary. Although exact numbers were difficult to obtain, all park managers were prepared to estimate a round figure for their occupancy in cyclone season, and describe the types of people who came at different times of year.

Park managers were interviewed about their experience with cyclones, the sorts of questions tourists ask about cyclones and the sorts of information that they supply to tourists. Interviews also included questions on the physical characteristics and context of the parks, where managers gained their information from about cyclones and any plans they had made in the event of a cyclone.

5.2 Questionaire survey of park residents

Sampling regime

The aim of the sampling regime was to survey a representative sample of approximately half of the 21 caravan parks in and around Cairns. The large sample was selected so the different types of parks could be included: beach side parks, creek side parks, inner-city campsite style parks, holiday villas and parks which attract permanent occupants. The number of participants surveyed within each park was affected by the number of people staying in the park at the time of the study, and their willingness to take part in the study. It was also affected by their likelihood to be around at the time of survey. For example, it was noted that permanent occupants tended to spend more time in the parks than short term holiday visitors, thus causing potential for over-representation of permanent occupants. This effect was minimised by returning to parks at different stages of the day, and by asking the management staff to leave questionnaires with occupants who were absent from the park at the time of the survey. The 10 parks surveyed are listed in Table 1.

Park Name	Number of participants
Yorkeys Knob	13
Coles	16
Cool Waters	8
Wintersun	4
Palm Cove	5
Paradise	6
Woree	10
Ellis Beach	4
Sunland	7
Lake Placid	14
City Van Park	11

Table 1. Number of surveys per caravan park

Survey Design

The survey design for this project was adapted from Linda Berry's (1996) study on community vulnerability to tropical cyclones in Cairns. It focussed on addressing:

?? demographic data relevant to vulnerability

?? details of occupants trips to Cairns

?? country of origin

?? awareness of cyclones and storm surge

?? intended actions in event of cyclone or storm surge

?? state of preparation at time of survey

?? prior experience of cyclones

?? medical conditions affecting vulnerability

A condition of the survey design was to restrict the questionnaire to a single A4 sheet printed both sides, because it was determined that occupants on holiday were less likely to participate in the study if the questionnaire would take too long. This required excluding many of the questions which were asked in the Berry (1996) survey of community vulnerability in the broader Cairns community. The first draft of the survey design included a question on income brackets. This question was removed from the survey at the request of the director of the Centre for Disaster Studies. The questionnaire is reproduced as Appendix 1.

Data Analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS). Trends in the data were detected through the use of cross-tabulations and frequency tables. The data was represented using bar graphs and tables generated in SPSS and Mircosoft Excel. The use of more powerful statistical tests such as regression and correlation was rejected because the sample didn' t meet all the assumptions for these tests.

6. Results

6.1 Summary Caravan Park Characteristics

Lake Placid

Lake Placid is situated approximately 10 km inland. It is adjacent to the Barron Gorge making it vulnerable to land based flooding. The park has a capacity of 87 powered sites and a further 40 cabins and vans to rent. The highest number of occupants recorded by the management staff was about 400. In January 1999 there are approximately 20 people living permanently at the park. During cyclone season, occupancy varies from about 50 to 100 people, consisting of campervans, tents and short term stays in cabins. The current managers were familiar with the effects of cyclones Justin and Joy on the park. The managers stated that they follow cyclones closely and would pass on recommended advice to occupants as soon as it came to hand. They claimed to have lost income due to last minute cancellations on behalf of southern Australian residents who were ill informed and over cautious. When tourist occupants became aware of cyclones through the media they made inquiries to the park managers as a first point of contact, and asked whether they had to leave the park. The response the managers give to this question is that the tourists should monitor the cyclone and if there is a chance of it coming, then park managers supply a list of recommended precautions. The managers had no specific cyclone plan, but said they keep the grounds tidy as a matter of general policy, and would secure outdoor furniture and other potential missiles in advance. Overall, the managers seemed experienced, well informed, responsible and willing to co-operate with emergency authorities and the Cairns City Council.

Ellis Beach

Ellis Beach Caravan Park is 30km north of Cairns on the beachfront. It is highly vulnerable to storm surge and it is known to be isolated due to the road flooding in the event of a cyclone. The management staff experienced cyclone Justin, which stripped most trees of branches in the park. The park has 61 sites, 13 cabins and 3 solid units. It' s maximum capacity is about 250 people. In November and December the park management staff said they have about 100 people at a time, and from January to March they have approximately 50 guests at the park. The management staff cater for the expensive end of the caravan park industry, mostly attracting southern Australians for short stays in beachfront bungalows/cabins and European tourists travelling up the coast in campervans. The management pointed out that all buildings have a high cyclone rating. The park has a policy of having no permanent occupants, but at the time of interview 3 occupants were long term. Most park occupants have access to a motor vehicle which is relevant in the case of an early evacuation. Management staff expressed their dislike of ' media beat up' campaigns about the likelihood and severity of tropical cyclones and responded to tourist concerns by rejecting the claims. The management were open about their opposition to the idea of making cyclone brochures available to tourists, except in the case of an imminent event.

The staff indicated that they did not receive information from the Council during previous cyclones and relied only on television broadcasts and weatherfax for updates. Ellis Beach has poor radio reception due to the surrounding mountains. In the likely event of a cyclone the park management encouraged early evacuation to the Atherton Tablelands. The management staff have familiarised themselves with the mountains behind the park and located places to take refuge after guests have been evacuated.

Plate 1. Ellis Beach front cabins occupied by a short term interstate visitor.

City Caravan Park

The City Caravan Park is located in the city centre less than 1km from the Esplanade. It is vulnerable to storm surge. The park is owned by the Cairns City Council and has 120 sites. The maximum recorded number is about 240 people. During the cyclone season the occupation ranges from 35 to 100 people, 35 of whom are permanent. As such, the park had the highest ratio of permanents to short term visitors, and represented a concentration of people at higher risk to natural disaster. For example, it has higher numbers of people who were unemployed, on disability pensions and in unskilled jobs (see table 6). Compared to other caravan parks, it doesn' t attract many tourists. The manager at the park has spent all of his life in cyclone prone areas and 18 years as City Caravan Park manager. He is more willing to provide information about cyclones to occupants than most park managers. He had some ideas about the how the grounds may provide some assistance in the event of a cyclone, principally that an adjacent sports oval would assist drainage of the park and that some of the trees offered protection during strong winds. The park manager is in frequent communication with the occupants and provided a useful way of making information available. He is also in close contact with the Council which would be important for co-ordinating evacuation procedures. Overall the City Caravan Park is relatively vulnerable in

the event of a cyclone, but the experience of the manager and his contact with both occupants and the Council would be important factors in mitigating against a disaster.

Woree

Woree Caravan Park is approximately 3 kilometres from Trinity Inlet and 1 kilometre from Smith's Creek. Gordon Creek is adjacent to the park, making the park vulnerable to land based flooding, and tidal surge. The park has 90 caravan sites, 21 cabins and 12 solid units. For most of the cyclone season the park operates at 50 percent capacity except over Christmas when it increases to 75 percent capacity. Twenty percent of it's occupants are permanent occupants. Like Lake Placid, Wintersun, and Ellis Beach, the park attracts a significant number of international tourists who frequently have a poor understanding of cyclones. The staff were confident that these tourists listened carefully to what management said, and that language was rarely a problem. The current management staff had lived for 10 years in cyclone affected areas and had been working at the park for 12 months in January 1999. They did not have information about cyclones available to occupants, but said they would be prepared to make it available prior to a cyclone. They had thought about cyclones and taken some measures to make sure accommodation was tied securely within the park. They were also aware that the creek at the back of the park increased the likelihood of flooding and were concerned about the danger from old trees falling.

Paradise Gardens Caravan Park

Paradise Caravan Park is situated at Clifton Beach approximately 500 metres inland. It is highly vulnerable to storm surge. The Park's 85 sites accommodate a maximum of approximately 160 occupants. Throughout the cyclone season 28 sites are usually occupied by about 35 people, 10 of whom are interstate tourists and 25 permanents. When tourists enquire about cyclones they ask where the cyclones hit and "how bad" they can be. They also ask if they need to secure their caravans with ropes. In response to these questions, the park managers are cautious not 'to scare them off' and prefer not to make published information available, but they do say that 'some [cyclones] can be bad'. The managers base their responses on 12 years personal experience living in cyclone affected areas, and have lived through cyclones Justin and Joy. Their experience at the park was 9 months. The managers themselves have had access to published material on cyclones and pay attention to television and radio warnings. They are careful to remove coconuts from trees in the park because they can fall during high winds. When asked about the vulnerability of the park to cyclones, they said they were only concerned with wind damage. They had not made any plans in terms of evacuation, but they said they would try to contact the council if necessary. They didn't think that language would be a problem if there were international tourists in the park.

Palm Cove

Palm Cove Caravan Park is on the beach front at Palm Cove, making it highly vulnerable to storm surge. The maximum capacity of the park is about 200 people (74 sites) in high season. In November and December capacity is estimated to be 40-50 people on 20 sites and in January, February and March, fewer than 10 visitors are expected at any one time.

There are no permanent occupants besides the park employees who total 5. The park has a policy of having a maximum stay of 12 weeks, with an equivalent minimum period between stays. The park does not advertise widely, and only attracts a small number of repeat visitors. Most visitors have experience in cyclone affected areas, and they do not approach the staff with questions about cyclones. The park had the most direct approach when it came to disseminating information about cyclones. When a cyclone watch has been broadcast the staff make sure that all guests are aware of it and are sufficiently prepared to leave within an hour' s notice. The experience of the staff during cyclone Justin was relevant to this study. They remained in contact with State Emergency Services following the warnings three days prior to the eventual crossing of the cyclone. Most vans were evacuated and sent to the Atherton Tablelands, but three couldn' t go for logistic reasons and the occupants of these vans took shelter provided by the SES. Three staff remained at the park when the cyclone crossed the land and cleaned up subsequent to the event. All visitors were evacuated early and no damage or injuries occurred.

Wintersun

Wintersun Caravan Park is situated in the suburb of Trinity Beach, approximately one kilometre from the ocean. The highest recorded number of occupants in peak season is about 1000. However, in the cyclone season occupancy was up to about 20 people, 15 of whom are permanent residents and the remainder are international tourists. The park had 48 powered sites and attracted a relatively high number of campers and motorhomes, many of whom did not speak English as a first language. When the park was surveyed, half of the international tourists declined to be interviewed, and those who accepted required quite a lengthy interview process. They had a poor understanding of what a cyclone was and overall they underestimated the potential damage cyclones are capable of imposing. When asked what they would do in the event of a cyclone, they said they would close all the windows and sleep. Tourists tend not to ask many questions about cyclones, but when they do they want to know what a cyclone is, and where they need to go to take shelter. The management said they had some brochures on cyclones, but didn' t know where they had put them. Like many of the park managers interviewed, the staff at Wintersun were concerned about the portrayal of cyclones in media, and how this affects their vacancy rate. Unlike most managers, but, the staff blamed the problem on ' southern media' coverage in particular, and didn' t complain about local coverage of cyclones. The staff had clearly thought about the possible impacts of cyclones on the park. They were confident that storm surge was not an issue, because they said they were 33 feet above sea level. They thought that wind damage was more of an issue, and said that in the build up to a cyclone event, they would be careful to dismount annexes from caravans which are known to blow away. This threat also contributed to their general measure of park maintenance in the form of trimming trees of palm fronds and coconuts on a regular basis. The management staff had lived in cyclone prone areas for 8 years, and had seen the impact of cyclone Joy on the park – which had little impact. The management have thought about where they would go in the case of a very serious cyclone, and had friends with an underground purpose built cyclone bunker. Overall, the staff seemed knowledgeable about cyclones, and were in contact with the council and police in previous cyclone seasons. They thought that cyclone Justin was a good ' practice run' in 1997. They thought that local media were ' terrific' in their

responsible treatment of cyclones, but national and interstate media were problematic and misleading.

Coles

Coles Caravan Park was a large park with 228 facilities including 79 caravan sites and approximately 60 cabins/villas and similar structures. The park is located on the border of the suburbs of Manunda and Manoora, approximately 3 km inland from Trinity Bay. The park managers were initially highly reluctant to be involved in the study, but after an informal interview they agreed and in the end expressed the most interest in the study of all the parks approached. They are the only park who requested a copy of the published report resulting from this investigation. The park managers were also the only staff who could produce a document which clearly and accurately demonstrated occupancy for that day. The park had an average of approximately 150 people per night during the cyclone season. It had the highest number of permanent occupants of all parks surveyed (75). The maximum capacity of the park was unknown. Tourists rarely enquired about cyclones, and when they did the staff told them there was nothing to worry about. The staff deliberately do not distribute published information on cyclones because it is thought to create panic. Management usually track the movement of cyclones using the Bureau of Meteorology' s fax service. The staff were not in contact with the Council or anyone else in relation to cyclones, but were concerned about the potential for storm surge to impact upon their park. Interestingly, the management were concerned that the Council was failing to perform its obligation to maintain drainage around the perimeter of the park. It is recommended that this is investigated by the Council. Staff informed me that the park was badly flooded in 1977, but they were not managing the park at the time. Overall, the park is considerably vulnerable to cyclones and associated impacts. It is highly recommended that disaster management authorities increase their interaction with this park to best manage the high number of permanent occupants.

Cool Waters

On the basis of an inspection of the grounds and an interview with the park manager, Cool Waters Caravan Park had the highest level of risk to natural disaster of all the the parks investigated for this study. The park is situated on the border of the suburbs of Brinsmead and Redlynch adjacent to the Brinsmead-Kamerunga Road. In terms of physical aspects contributing to vulnerability, Freshwater Creek flows through the middle of the park, and has been known to flood much of it (plate 2).

Plate 2. Freshwater creek runs through the middle of Cool Waters Caravan Park. The structure on the far bank (left hand side) is a caravan partially obscured amongst the trees.

The longest term resident interviewed for this study was found at Cool Waters, and had seen the creek cover much of the park with water over the 28 years that he has lived there. The park is one of the largest parks analysed for this project with 160 powered sites and 48 cabins. The park has a maximum capacity similar to other large parks – about 1000 people, although throughout the cyclone season the difference is much more significant. The park has a population of 300-400 people from November to March with a peak of about 600 at Christmas time. This provides a concentration of both permanent occupants and short term visitors throughout the cyclone season. An inspection of the park revealed that there were many more permanent residents than most caravan parks (estimate of 40 by management) and an analysis of interviews revealed that there was a higher degree of aged people in the park than most (6/8 were aged over 60, although the sample was too small to draw any statistically based conclusions). The park is made further vulnerable by the attitude of the manager who believed that a big cyclone will never hit Cairns, and that money spent on public awareness campaigns is a waste of tax payers money, in addition to being a threat to his business. The manger attributed 16 of his recent cancellations to inaccurate fears of cyclones. The manager was confident that storm surge was not an issue in the Cairns region. He worked extensively as a surveyor for electricity companies in the past and said that he had several years experience monitoring storm surges in Queensland. Based on this experience he said "huge cyclone surges just don' t happen, not here anyway". This attitude is a significant barrier to a cautious approach to disaster management.

Many of the caravan parks surveyed for this study were microcosms - small communities isolated from the broader world. This was more so the case at Cool Waters than any other park studied for this project. One of the main reasons behind this was the overall approach of the manager who was attempting to make services available for the large number of occupants without them having to leave the park. An example of this was the planned refurbishment of an amenities block to house a doctor' s surgery and a hairdresser within the grounds of the park (plate 3). Whilst this could provide better access to medical and other services for people who have difficulty accessing them elsewhere, it nonetheless increases their isolation and dependence on the caravan park infrastructure with the result of them being further withdrawn from society. These are issues that need to be carefully considered in the management of natural disasters. Another aspect of the park which may affect vulnerability and increased dependence on the park infrastructure is that the owner encourages occupants to build or purchase solid or semi solid housing within the park (plates 4 and 5). In addition to encouraging people to live in a flood affected area, this type of development encourages people to commit tens of thousands of dollars for a structure on land they can never own. The owner clearly believes there is a market for this type of development, but, it is likely to be the most vulnerable people of all who will end up financially tied to it.

Plate 3. The owner of Cool Waters Caravan Park proposes to introduce health and retail services within the park.

Plate 4. The photo demonstrates a scaffolding and besa-block house structure which was build up around a caravan on the banks of the creek. This structure is highly prone to flooding.

Plate 5. The photo demonstrates a house for sale within Cool Waters caravan park. The sign reads: ' quality two bedroom "home" for a very affordable $60,000' . The wording cautiously puts the word "home" in inverted commas, because only the structure is for sale – not the land but this is not explained in the sign.

Yorkeys Beach Front Caravan Park

This Caravan park is situated adjacent to Yorkeys Beach making it highly vulnerable to storm surge. It is a small park, with a maximum of about 80 people and a usual population of from 30-50 over the cyclone season. These estimates include 25 permanent occupants. Most tourists are from Southern Queensland, New South Wales and Victoria and rarely ask questions about cyclones. There are more questions during periods featuring media coverage of cyclones and the sorts of questions that people ask include: "when will we get the next one?" ,"what happens during a cyclone?" and "what is tidal surge?" The management are aware that the park is at risk to cyclones, but they do not make published information available to guests. The management receive information about cyclones through television and through cyclone information booklets distributed by Cairns City Council. They are concerned about falling coconuts and falling Melaleuca branches in the event of strong winds. The staff have some experience of cyclones. For cyclone Justin, the staff led occupants into the toilet block for shelter. They considered Cyclone Justin a good ' practice' cyclone event. The staff also experienced cyclone Winifred, but they were not managing the park at the time. They have considered what shelter the region offers, and they are convinced that the elevated position of the ' knob' would be safe. However. their preference would be to go to the Atherton Tablelands.

(note: the management of Sunland Caravan Park permitted the surveying of park occupants but declined to participate in an interview.)

6.2 Position

Section 5.1 demonstrates that all Caravan sites are physically vulnerable in one way or another. This is because the natural features which attract the positioning of caravan parks are inherently vulnerable to natural disaster in Cairns. Parks tended to fall into two categories: beach side caravan parks or river/creek side caravan parks. Examples of beach side caravan parks are situated at Ellis Beach, Yorkeys Beach and Palm Cove. Almost all of these are directly opposite the beach and thus highly vulnerable to storm surge. In the case of Yorkey' s Beach, the caravan park is situated between the ocean and a creek, thus increasing the potential for storm surge affecting the park. Beachfront caravan parks require an established dialogue between park managers, emergency services and the Cairns City Council to effect strategic early evacuation in the likely event of a storm surge. This has already happened at Ellis Beach, where evacuations have been performed successfully.

Creek side or river side parks included Cool Waters, Lake Placid and Woree. Other parks in this category in the Cairns area which were not surveyed for this project include Barron River Caravan Park, Freshwater Caravan Park, Bi Ways Caravan Park, Fishery Falls Caravan Park. All of these parks are relatively vulnerable to land based flooding. Some of them have a history of flooding within living memory (eg Cool Waters). Some of them have also had experience with early evacuations as a measure of precaution eg Lake Placid.

6.3 Type of dwelling

Most of the dwellings encountered in this project were made of materials which provide little protection from the effects of cyclones. The majority of respondents (52/98) were staying in caravans. Clearly caravans provide a low level of protection. Of the 32 respondents who owned their vans, some had the intention of chaining their van to star pickets inserted 6 feet into the ground. Even if this provided increased protection from blowing away, the vans are still vulnerable to branches and other missiles which are airborne during a high wind event. It is worth noting that many of these respondents attached annexes to their vans and webs of tarpaulins and other structures. These elaborate structures are highly vulnerable to cyclone damage and become detached and airborne in even a low category cyclone (plate 6).

Plate 6. Many permanent occupants had elaborate systems of tarpaulins and annexes. These are known to blow away in high winds.

The 21 people who were staying in ‘ cabins’ were almost entirely renting these structures from the park managers. These structures were mostly made of either wood or light metal. Some had a concrete slab foundation, others were on metal poles inserted into the ground. These structures would be likely to provide more protection than a caravan, but they are still vulnerable to cyclones. The difference in terms of the demographic characteristics is perhaps more important in terms of cyclone vulnerability. More cabin renters had skilled occupations and higher levels of education.

Six people were in similar buildings to cabins which they classified as transportable homes. These structures were mostly owned by long term retired occupants. The building foundations seemed to be less solid than those which were constructed and rented as ‘ cabins’ by park managers.

Six respondents were staying in tents which obviously provide no protection to cyclones. They can, nonetheless be demounted or abandoned quickly. The tent occupants were mostly international tourists discussed in section 7.4. Ten respondents were staying in campervans or motor-homes. Whilst these vehicles would not provide much protection from cyclones, they tend to be well equipped and can be relocated reasonably rapidly (provided they are in working condition). Most of the motorhomes were owned or rented by short term visitors touring the coast and their occupants could evacuate at very short notice. This was not the case of one ‘ motor-home’ in the form of an ageing decommissioned public passenger bus converted into living quarters.

Three respondents were living in brick houses within caravan parks. These buildings would provide a relatively high level of protection, not only for their occupants but also accommodate park occupants who have fled from more flimsy structures such as tents and caravans. Other brick constructions within the park are required by Council regulations. All toilet and laundry block facilities were of solid brick construction and many park occupants had taken refuge in these structures during past cyclones.

		rented	owned	Total
accommodation type	caravan	20	32	52
	cabin	20	1	21
	tent	1	5	6
	motorhome	4	6	10
	brick building	2	1	3
	transportable home	1	5	6
Total		48	50	98

Table 2: Cross-tabulation: accommodation type by ownership

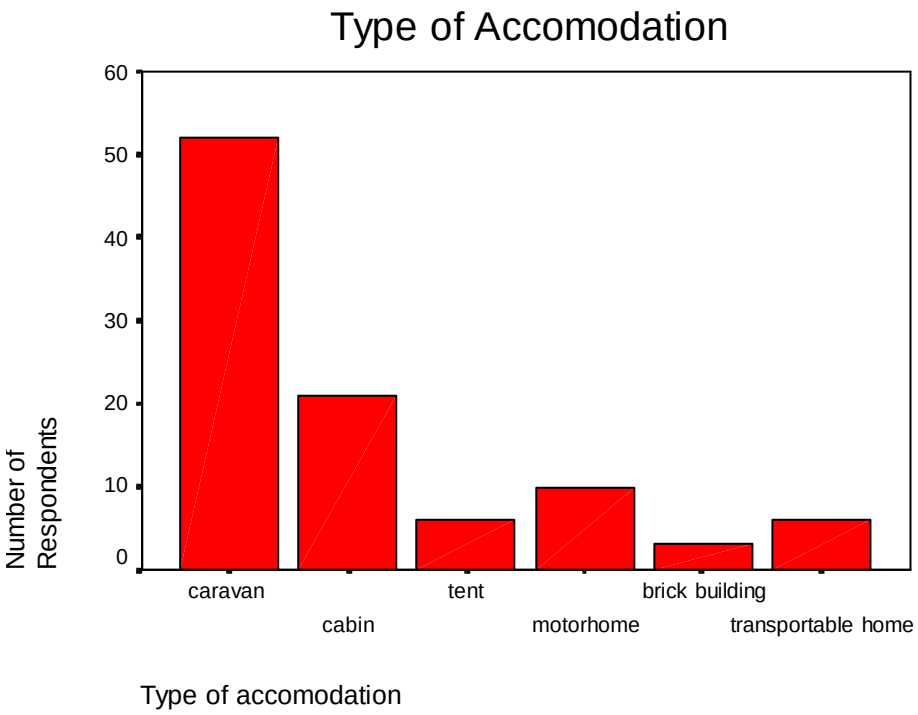

Figure 1. Types of accomodation.

6.4 Seasonality

Most caravan park managers estimate that they operate at between 30 and 50 percent occupancy during the cyclone season but it can be as low as 2%. Many have increased occupancy (up to 75 percent in one case) around Christmas. It is worth noting that most parks surveyed had difficulty providing accurate figures for occupancy. Only one park had

a computerised system which could tell the managers exactly how many people were registered on any given day. All figures below are managers estimates only.

Park	Maximum	Christmas	Percent	Nov-Mar	Percent
Yorkeys Knob	80	40	50%	30-40	40%-50%
Coles	450	Unknown	Unknown	200	45%
Cool Waters	1000	600	60%	300-400	30%-40%
Wintersun	1000	20	2%	20	2%
Palm Cove	200	50	25%	10	5%
Paradise	160	35	21%	35	21%
Woree	200	150	75%	100	50%
Ellis Beach	250	100	40%	50	20%
Lake Placid	400	50-100	12-25%	50-100	12-25%
City Van Park	240	50	20%	35-40	15%

Table 3: Park managers' estimates of occupancy

6.5 Length of Stay

There was great diversity in length of stay, but some themes were evident which suggest certain groups of habitants. The most common length of stay was very short (less than one week) and the next common was very long (greater than 5 years). A lower but significant number of people were also found to be staying for a number of months (3-12 months) Data are summarised in figure 2. Some of these may also be permanent dwellers, but were not classed as such for the purposes of analysis.

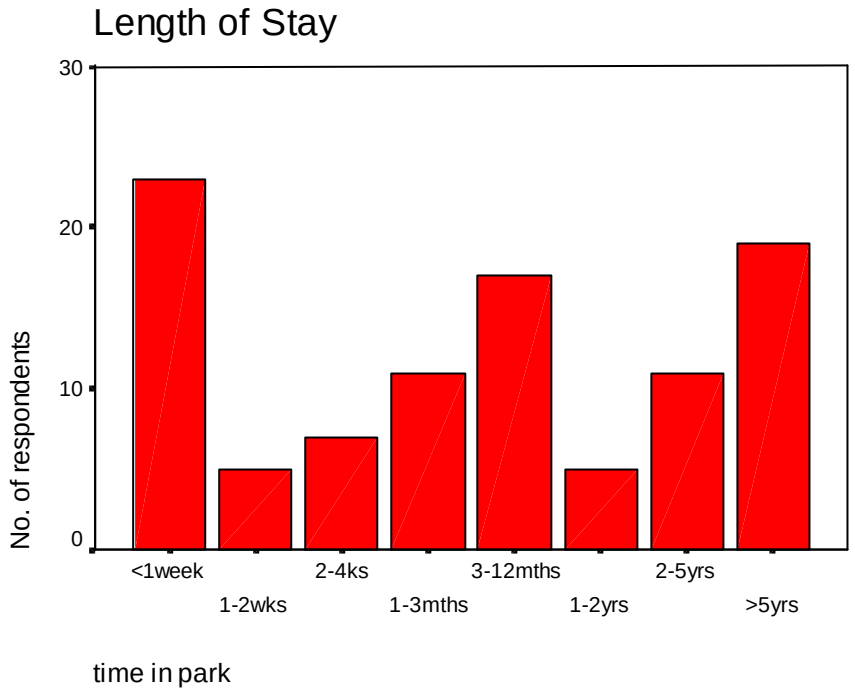

Figure 2. Length of Stay

A relationship was detected between length of stay and age of respondent, indicating that the short term visitors are overall much younger, and the long term visitors were much older (see Table 4). For example, of the seven respondents aged under 25, 4 had been staying in the same place for less than one week. By contrast, of the 22 respondents aged over 60, 12 of them had remained in the park for at greater than 5 years and a further 5 had been in the same park for over 2 years. There were also 6 people in the 40-60 bracket and 1 in the 25-40 range who had remained in the park greater than 5 years.

Duration by location

It is worth noting that length of stay was not uniform across caravan parks. For example, Ellis Beach Caravan Park had the highest rate of short term visitors, with 7 out of 8 respondents having stayed less than one week. No interviewees had stayed longer than 2 weeks at Ellis Beach. This sample reflects the policy of the management staff who indicated in interview that they only catered to a short term holiday market and discouraged occupants to stay longer than a few weeks. A similar policy applied at the Palm Cove Caravan Park where visitors are only admitted if they do not stay longer than 3 months. The only exception to this was a respondent who remained indefinitely at the park in exchange for part time grounds maintenance. By contrast, at Cool Waters Caravan Park, for example, 5 out of 8 respondents had been living at the park for at least 5 years, and the shortest stay was between 1-2 years. City Caravan Park and Coles Caravan parks also attracted long term visitors, but these parks also attracted short term visitors. These results are demonstrated in Table 5.

		Length of Stay							
		<1week	1-2wks	2-4ks	1-3mths	3-12mths	1-2yrs	2-5yrs	>5yrs
age range	10-14			1					
	15-25	4		1	2				
	25-40	10	2	2	3	7	2	2	1
	40-60	9	1	2	5	9	2	4	6
	>60		2	1	1		1	5	12
	no response					1			
Total		23	5	7	11	17	5	11	19

Table 4. Cross-tabulation: Length of stay by age

		Duration							
		<1week	1-2wks	2-4ks	1-3mths	3-12mths	1-2yrs	2-5yrs	>
location	Yorkeys	2		3	1	1	1		
	Woree	2	1	1	2	4			
	Sunland	2				3	2		
	Paradise		1			3		2	
	Ellis Beach	7	1						
	City Caravan Park			1	1	2		2	
	Wintersun	2				2			
	Lake Placid	5	2		2	2	1	2	
	Palm Cove			1	3				
	Coles	3		1	2			3	
	Cool Waters						1	2	
Total		23	5	7	11	17	5	11	

Table 5. Crosstabulation Location by Length of Stay

		type of employment							
		skilled	unskilled	unemp.	retired	dis. pens	student	b-packer	no r
duration	<1week	12	6	2				2	
	1-2wks		2		2	1			
	2-4ks	3	3	1					
	1-3mths	1	7	1	1	1			
	3-12mths	2	5	4	2	1	1		
	1-2yrs		2	1	2				
	2-5yrs	1	4	3	3				
	>5yrs	1	4		13	1			
Total		20	33	12	23	4	1	2	

unemp. = unemployed dis. pens = disability pension b-packer = backpacker

Table 6. Cross-tabulation of duration by occupation

		location										
		York	Woree	S-land	P-dise	E. B.	City	W-sun	L. P.	P.C.	Coles	C
age	10-14										1	
	15-25	2	1	2		1			1			
	25-40	2	5	2	4	4	1	1	5	1	3	
	40-60	4	3	4	1	2	5	2	6	4	6	
	>60		1		1	1	5		2		6	
	No response							1				
Total		8	10	8	6	8	11	4	14	5	16	

York = Yorkeys Caravan Park S-Land = Sunland Caravan Park P-dise = Paradise Caravan Park C.W. = Cool Wa Park

L.P = Lake Placid Caravan Park P.C. = Palm Cove Caravan Park E.B. = Ellis Beach Caravan Park W-sun = Winter Park

Table 7. Cross tabulation of age by location

6.6 Population Characteristics

Age

The age range was skewed towards an older population (figure 3). The few respondents in the age categories below 14 reflects the number of dependents graphed in Figure 6. Not all parks had a similar age distribution. Table 7 is a cross tabulation of age by location.

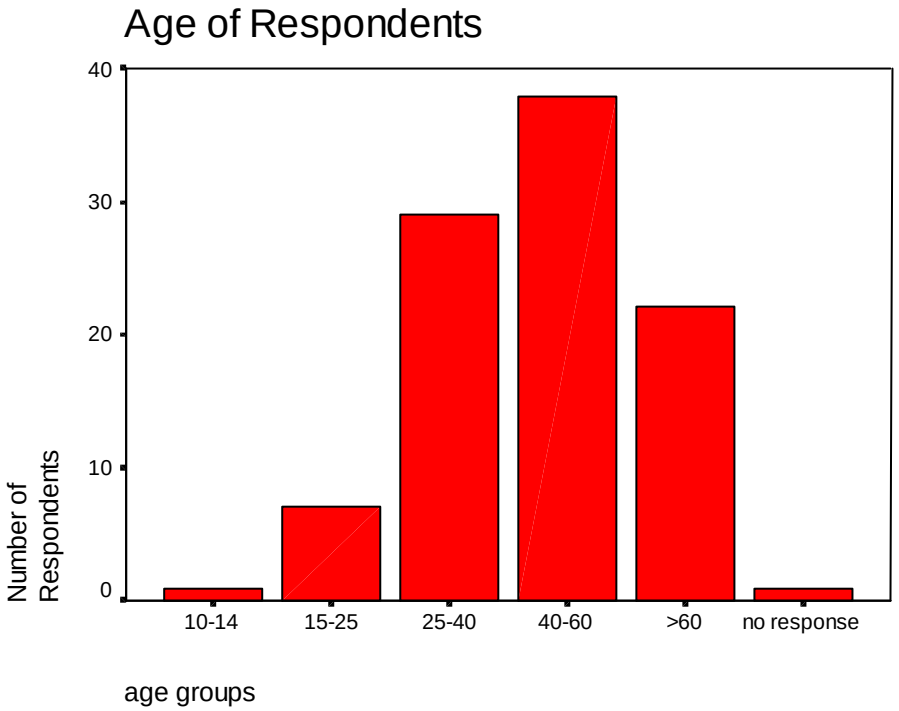

Figure 3. Age range of respondents

Employment

The most common job category was unskilled which applied to 33 respondents. Job types in this category included labourers, drivers, shop assistants, security guards, cleaners, gardeners and home duties. The next most common employment category was retired, with 23 and then skilled with 20. Skilled job types included tutors, chefs, executive assistants, financial managers, psychologists and nurses. Unemployed accounted for 12 respondents. Small numbers of people called themselves backpackers and students. It is worth noting that most people travelling as backpackers didn' t use the term backpacker for their occupation. Whilst figure 4 demonstrates that there was a fair proportion of respondents working in either skilled or unskilled positions, it also hides some of the stark realities of some of the caravan parks. Of the 11 respondents at City Caravan park, four were unemployed, 3 were retired and 2 were on disability pensions. In other words, 9 of the 11 respondents were low income earners largely dependent on government welfare. At Cool Waters Caravan Park, 7 of the 8 respondents were retired and 1 was unemployed. By contrast, at Yorkey' s Caravan park, 5 of the 8 respondents were working in skilled professions.

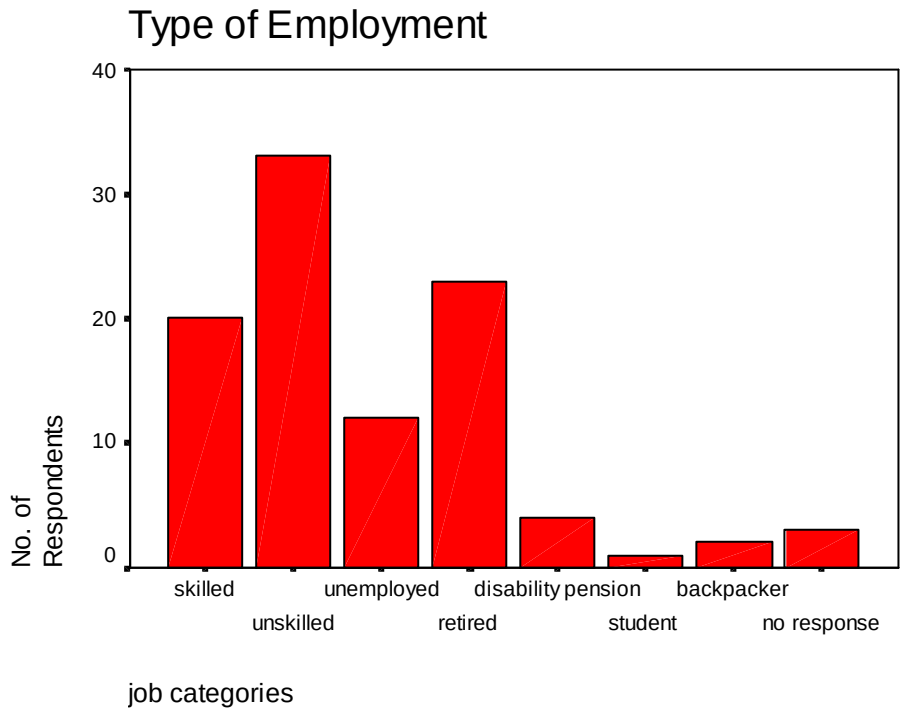

Figure 4. Type of employment

		Type of employment						
		skilled	unskilled	unemployed	retired	disability	student	ba
location	Yorkeys	5	1	1	1			
	Woree	2	3	1	2	1		
	Sunland	2	3	2			1	
	Paradise		2	2	1	1		
	Ellis Beach	4	1		1			
	City Caravan Park	1	1	4	3	2		
	Wintersun	1	2					
	Lake Placid	2	8	1	3			
	Palm Cove	1	4					
	Coles	2	8		5			
	Cool Waters			1	7			
Total		20	33	12	23	4	1	

Table 8. Cross-tabulation of employment by location

		Type of education					
		University	Technical	Secondary	Primary	no resp.	Total
duration	<1week	9	6	8			23
	1-2wks	2		3			5
	2-4ks	1	5	1			7
	1-3mths	3	2	6			11
	3-12mths	2	6	8		1	17
	1-2yrs			5			5
	2-5yrs	2	2	5	1	1	11
	>5yrs	2	4	9	3	1	19
Total		21	25	45	4	3	98

no resp. =no response

Table 9. Cross-tabulation: education by length of stay

Education

By far the most common level of education was secondary (45/98). Twenty five people claimed a technical or TAFE education and twenty one respondents had attended a tertiary institution. Four respondents had primary education and three chose not to respond.

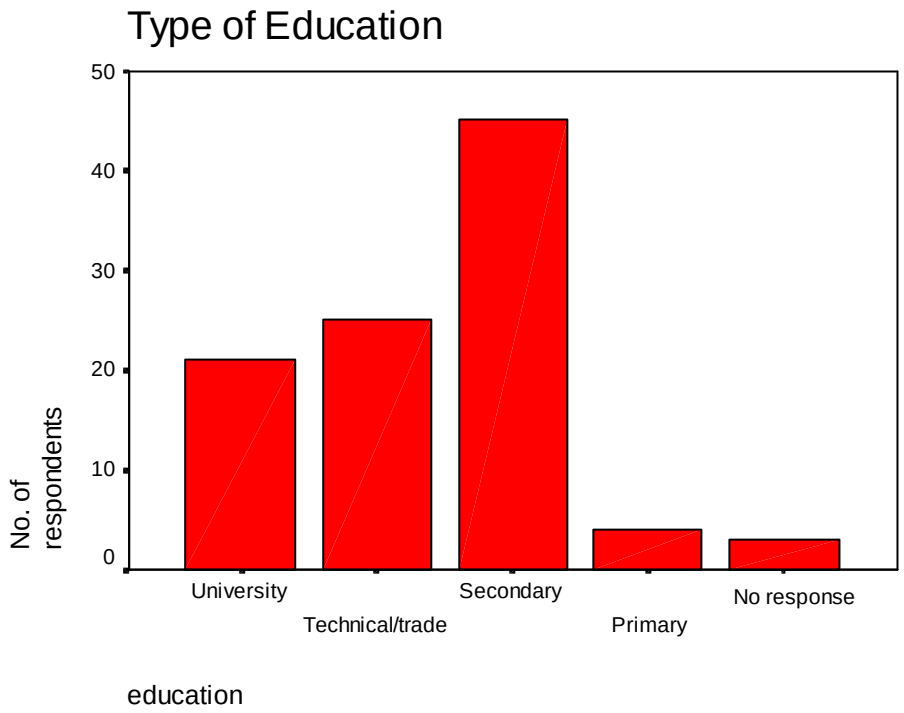

Figure 5. Level of Education

Dependents

The vast majority of people did not have dependents (78/98). Six respondents had 1 dependent, a further 6 had 2 dependents. Four respondents had 3 dependents, 2 respondents had 4 dependents and 1 respondent had 5 dependents.

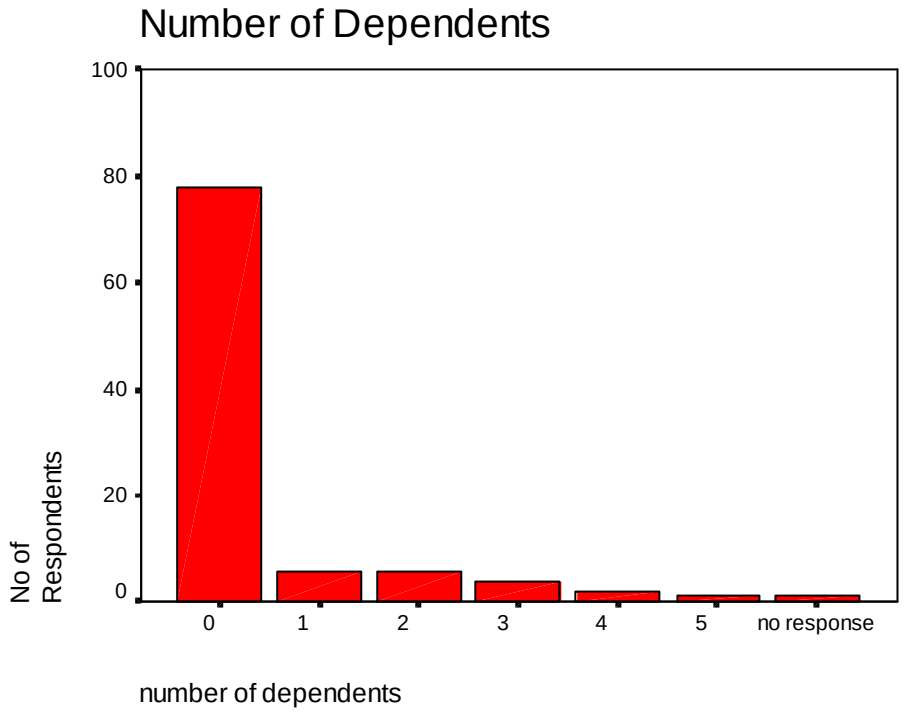

Figure 6. Number of dependents by respondent

Normal place of residence

Most respondents listed areas of North Queensland as their normal place of residents (63/98). As already noted, 30 respondents were ‘ permanent’ caravan park dwellers, and obviously called Cairns home. Other respondents who called North Queensland home included short term visitors from places such as Townsville, Atherton and Tully. Five respondents were from other parts of Queensland and 13 were from other parts of Australia. 10 respondents were from overseas, 5 from English speaking countries and 5 from non-English speaking countries.

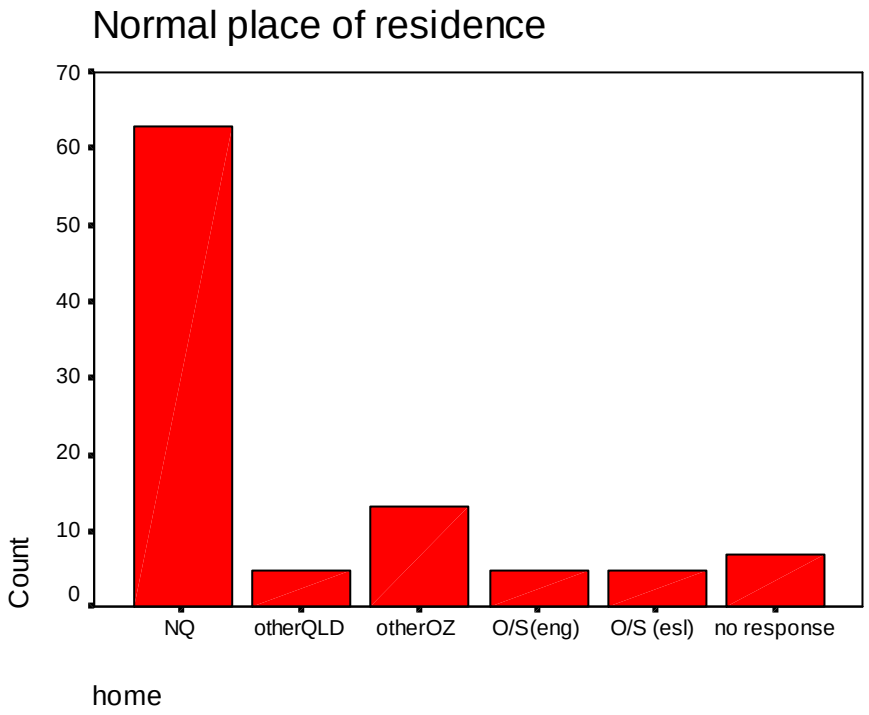

Figure 7. Normal Place of residence

Level of English

Most people interviewed spoke English as their first language (72/98). Of those who didn' t speak English as a first language, 14 had an excellent level of English and would not have difficulties understanding radio warnings or communicating with park managers and emergency services. Eight respondents replied that their English was good. Of these 8, 5 were residents of North Queensland and 2 were from non-English speaking countries. These respondents were reasonably confident that they would understand warning broadcasts and be able to communicate with management staff. Three people replied as having basic English, indicating that they would have significant difficulty understanding radio broadcasts and communicating with management staff. The three respondents who replied as having basic English were all groups of European travellors who had not been in Australia long and had a poor understanding of cyclones. It is also worth noting that some park occupants from non-English speaking countries declined to be interviewed for this study.

6.7 Preparedness

What would caravan park residents do in the event of a cyclone?

Respondents were asked what they think they would do in a cyclone. In reality, it is impossible to know exactly what respondents would do, but the question remains worthy of asking, partly because it provides an idea of how much respondents have considered the issue, and it gives at least a reasonable picture of their intentions, even if circumstance and behaviour dictate otherwise in a real life situation. Thirty seven respondents said they would

relocate, and the Atherton Tablelands was the most common destination. This reflects a significant issue for disaster managers. If the trend is confirmed in other aspects of the Cairns community, then attempts by a large number of people to go to the Atherton Tablelands will cause its own problems. Eighteen respondents indicated that they would follow course of action consistent with those recommended by Emergency Management Australia and the Bureau of Meteorology. These actions include securing potential debris, preparing supplies of freshwater and a ' cyclone kit' containing a battery powered radio and foodstuffs, listening to updates on the radio and preparing to evacuate if instructed by emergency services. Ten people said they had no idea what they would do in a cyclone. These people tended to be short term visitors with little experience in cyclone affected areas. Fourteen people had their own plans for what they would do in a cyclone. Many of these include intoxication with liquor or other substances. Twelve respondents replied that they would do nothing different, that they would ' just stay put' , ' sit it out' and so on. Five inexperienced respondents said they would follow whatever direction they received from management authorities, and 2 said they would independently make their way to known public cyclone shelters.

State of Preparation

When asked if they had already made any preparations for cyclones or storm surge, 31 indicated that they had prepared a ' cyclone kit' containing tinned food and other preparations consistent with those recommended by emergency management authorities. Thirteen respondents indicated that they had made preparations of a different kind- for example, securing their caravan with chains, packaging of valuables and documents for a hasty evacuation and dry packs for clothing. This means that 44 people had made some kind of preparations at the time of survey (January 1999). This was slightly less than the number of respondents who had made no preparations at the time of survey (46). Eight people chose not to reply.

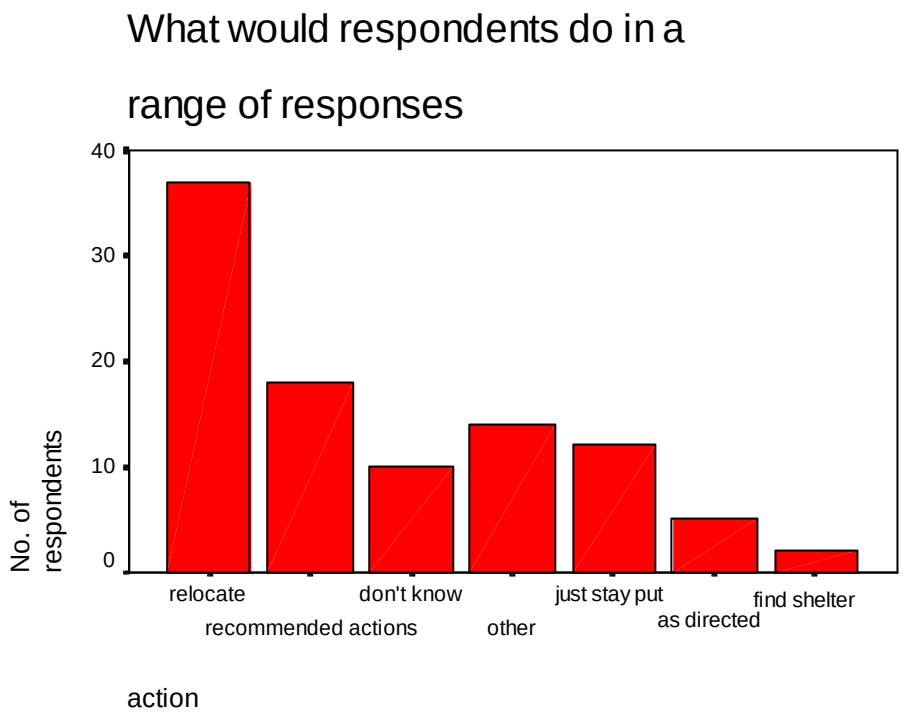

Figure 8. Anticipated actions in event of cyclone

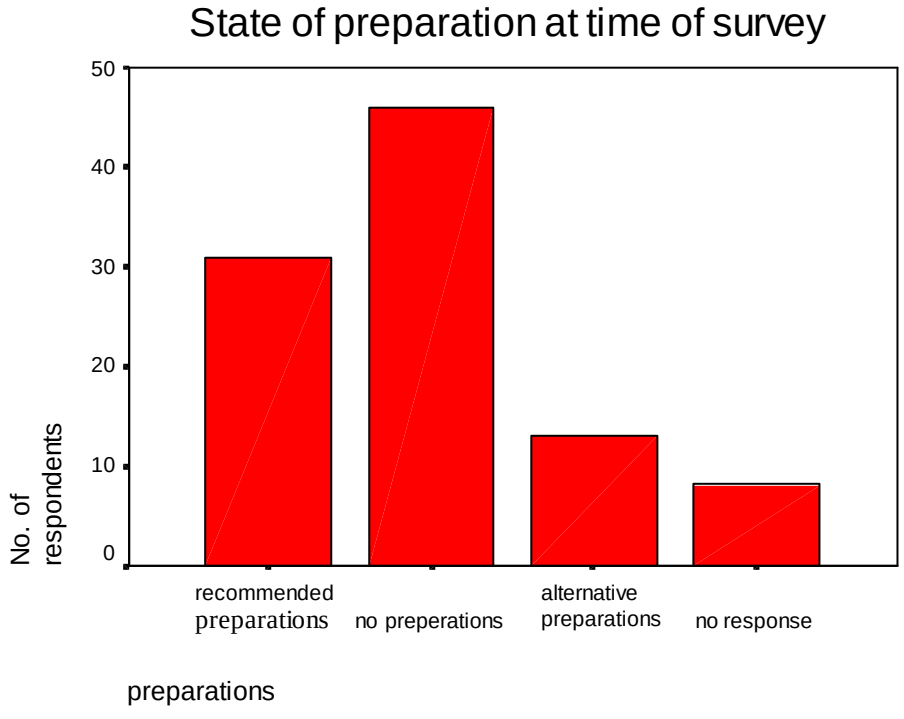

Figure 9. State of preparation at time of survey

Respondents were asked if they owned or had access to certain key items of relevance in the event of a natural disaster, and as a general indicator of their vulnerability. The

population had a high degree of mobility, given that 73/98 had access to a functioning motor vehicle. Eighty four of 98 had access to a torch or some other form of battery powered light. Sixty five had access to a battery powered radio and 77 had access to a television. Sixty eight respondents had a first aid kit. Seventy two had access to a telephone (see figure 10).

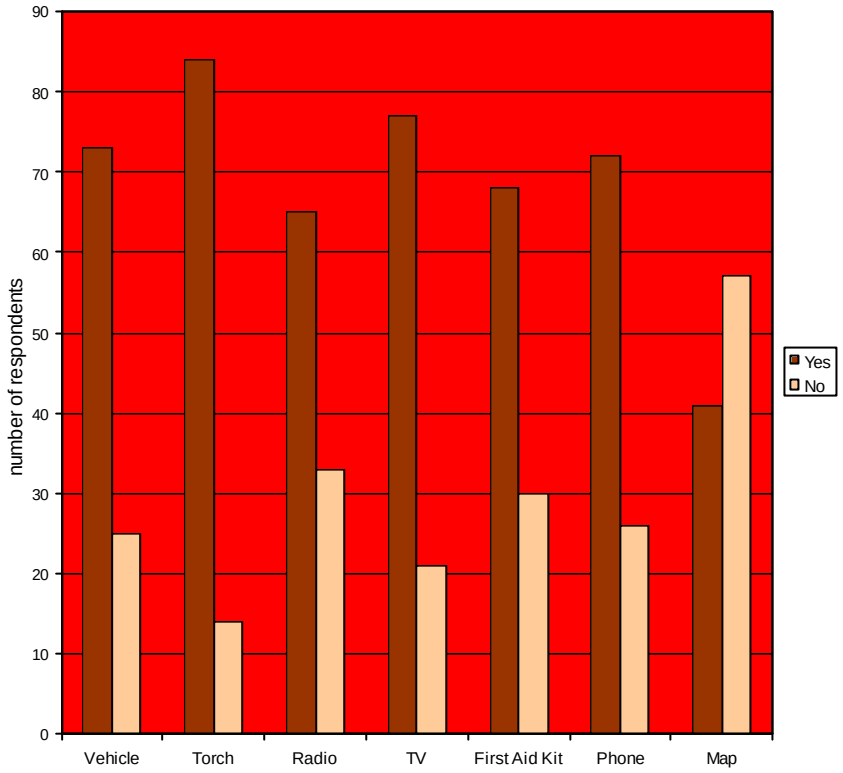

Figure 10. Key preparation items

		location Yorkeys	Woree	Sunland	Paradise	E.Beach	City	W-sun	L. Placid	P.Cove	
home	NQ	2	6	7	5	2	9	1	8	2	
	otherQLD	1	1						1		
	otherOZ	4				3	1		3	2	
	O/S(eng)	1		1		2					
	O/S (esl)		1			1		2	1		
	no response		2		1		1	1	1	1	
Total		8	10	8	6	8	11	4	14	5	

E.Beach = Ellis Beach Caravan Park City = City Caravan Park W-Sun = Wintersun Caravan Par

L. Placid = Lake Placid Caravan Park P. Cove = Palm Cove Caravan Park C.W. = Cool Waters Caravan Pa

Table 10. Cross tabulation of place of origin and location of caravan park

6.8 Knowledge of cyclones

Prior experience

Respondents had considerable past experience with cyclones. Sixty two out of 98 said they had experience at least one cyclone. Of these, 21 had experienced only one cyclone, 20 had experienced two cyclones, 9 had experienced 3 cyclones, 1 had experienced 4 cyclones, 2 had experienced 6 cyclones, 1 had experienced 8 cyclones and 2 had experienced 12 cyclones (see figure 11).

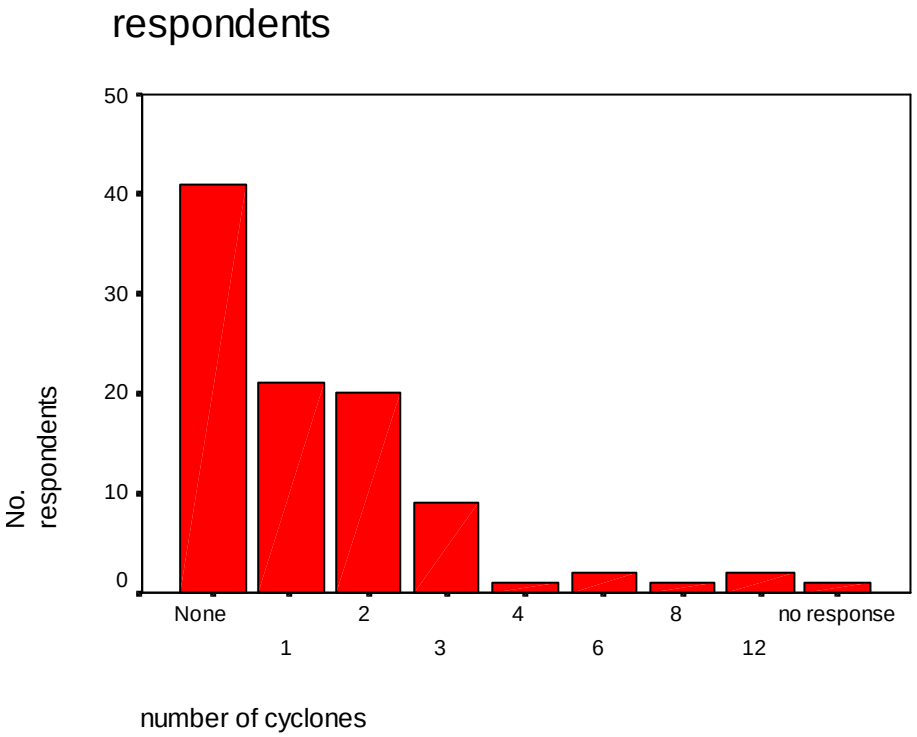

Figure 11. Experience of cyclones by respondent

The vast majority of respondents were aware of the possibility of a cyclone before they came to Cairns (86/98). Eight people were not aware of the possibility, and these were mostly from other countries.

Seasons and warnings

Respondents were asked if they knew when the cyclone season is in North Queensland. The vast majority of people were correct or mostly correct on the season, although some people classed as ‘ mostly correct’ were a little vague eg. (“ now” or “ summer”) Only 4 people didn’ t know when it was, and 5 people were incorrect (figure 12).

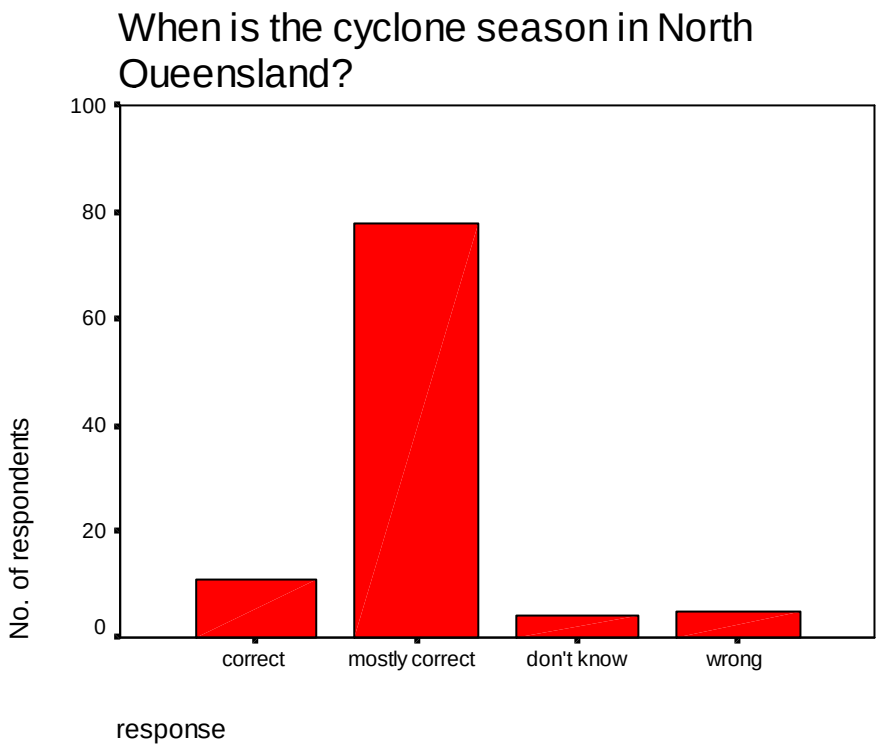

Figure 12. Respondents were asked when the cyclone season is in North Queensland

Respondents were also asked about the classification system for the intensity of cyclones. The questionnaire asked clients whether a category 1 or a category 5 was a more destructive cyclone. Eighty two respondents responded correctly, 7 didn' t know, and 9 were incorrect.

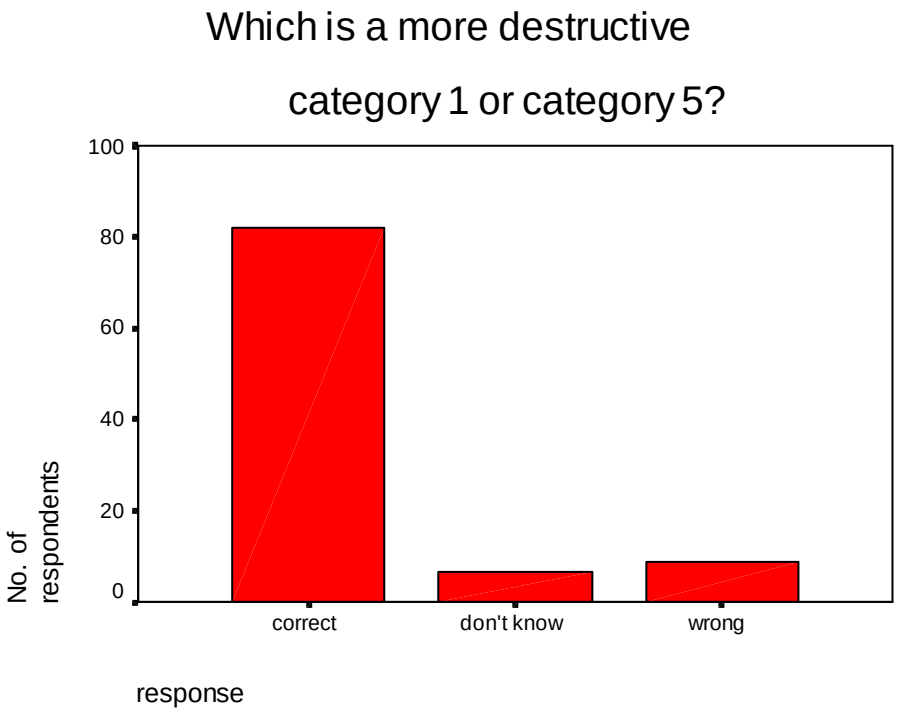

Figure 13. Respondents familiarity with cyclone categrories

6.9 Other Factors affecting vulnerability

Hospitals, doctors and medical conditions

Seventy eight people knew where to find a doctor as opposed to 20 who didn' t. Eighty four participants replied that they knew where to find a hospital. Of the 14 that didn' t know where the hospital was, 7 had been in Cairns for less than one week, but this represented a minority of recent arrivals. Table 11 demonstrates that 16 of 23 recent arrivals knew where to find the hospital.

		hospital		
		yes	no	Total
duration	<1week	16	7	23
	1-2wks	4	1	5
	2-4ks	7		7
	1-3mths	9	2	11
	3-12mths	16	1	17
	1-2yrs	4	1	5
	2-5yrs	11		11
	>5yrs	17	2	19
Total		84	14	98

Table 11. Cross-tabulation duration by knowledge of hospital location

Whilst the survey indicated that the majority of caravan park occupants knew where to seek medical attention, only a third knew where to locate a cyclone shelter. Many respondents expressed dissatisfaction with a perceived policy of the Cairns City Council that cyclone shelter locations were kept secret. Approximately one third of respondents indicated that they have special medical needs. require prescription medication. Two respondents indicated that they require mobility aids (wheelchairs, crutches).

Somewhere to go

Fifty seven participants indicated that they had friends or relatives in the Cairns area where they could go to take shelter in the case of a cyclone. Forty people said they didn' t, and one chose not to respond to the question (Table 12).

friends/relatives in Cairns area		Frequency
Valid	yes	57
	no	40
	no response	1
	Total	98

Table 12. Number of people with friends or relatives in the Cairns area

6.10 Warning systems

The study confirmed that most caravan park occupants expect to receive warnings about cyclones and storm surge via radio and television. Interestingly, only 4 participants replied that they expected to receive warnings by word of mouth (Table 13).

	Frequency
radio only	23
TV only	4
Radio and TV	58
word of mouth	4
own observation	4
don't know	2
newspapers	1
weather fax	1
no response	1
Total	98

Table13: Ways that caravan participants would expect to receive warnings

6.11 Trees and Park Protection

Part of the terms of reference for this project included a scope of the opinions amongst park operators and managers as to which types of trees provide protection from cyclones and which pose a threat. At Lake Placid – the managers had no opinion one way or another, other than the stated fact that trees and the shade they provide are part of what attracts people to their park. For this reason alone, large trees were likely to stay. Like most park managers, the staff stated that they trim dangerous branches from trees. At Ellis Beach the management staff saw their many trees as a problem. Their increased concern could be related to the fact that they cater more for immovable cabins rather than relocateable caravans and tents. At Palm Cove, an extensive interview was conducted with the park gardener, who had personally witnessed the affect of Cyclone Justin on the park. His overall comment was that large, native trees, particularly Melaleucas, drop small branches quickly, but retain large branches solidly. He said that coconut palms are very flexible, and can bend to being parallel with the earth then return upright after the gust. (However, he has also seen them fall.) This occurred during the Townsville 1998 floods, when the ground became waterlogged due to heavy rain and coconut palms toppled. Many park occupants interviewed for the project were fearful of branches falling on their caravans and recounted anecdotes of this occurring. (They nonetheless continued to remain beneath them for the purposes of shade).

7. Discussion

7.1 Park Managers and Cyclone information

No park encouraged occupants to become familiar with cyclone brochures. Their absence amongst the many brochures available in reception and cabins was noted, and when I inquired if they had copies available, all parks had mysteriously run out or never received them in the first place. When offered a supply of brochures, management staff usually rejected them, and explained that they had lost income due to cancellations and shortened stays due to exaggerated fears of cyclones. Some management staff said they would make published information available to guests prior to a cyclone, but this would rely on the staff having the information available. It would also assume that sufficient notice was available from the declaration of a cyclone warning. The question becomes complicated by the fact that any public awareness program aimed at caravan parks relies heavily on the cooperation of park managers, because it became repeatedly apparent that these are the first point of contact for many park occupants. Television and radio awareness programs have a high chance of reaching many park occupants. However, in the case of international tourists and bacpackers it can' t be assumed that radio and television media will reach them.

No park manager had a cyclone plan. Some had experience with evacuations, others had rounded up guests into the toilet block, but no one had a plan as such. The term ' cyclone plan' didn' t mean much to anyone. The closest thing to a cyclone plan encountered in the research was a general procedure at Palm Cove Caravan Park, which involved keeping a close eye on cyclone watches, making sure that all guests were aware of cyclones, and that if a watch was declared, that all guests were prepared enough to leave with one hour' s notice.

Experience with cyclones

The management staff at caravan parks play an instrumental role in communicating with park occupants, and this could be fundamental in the case of public awareness in general and evacuations in particular. For example, at Palm Cove during Cyclone Justin sea water came to within 5 metres of the park boundary, and toppled trees within the park (plate 7).

Plate 7. Management of Palm Cove Caravan Park experienced water coming across this road and up to a few meters of the park boundary during Cyclone Justin.

What was lacking was interaction between most parks and disaster management staff and researchers. The interviews for this project were the first contact that many managers have had with anyone about cyclone threats. This is a delicate subject with caravan park managers. Many are scared that any contact with disaster management and research staff will scare away tourists. It has already been noted that a number of parks declined to be part of this study, and many of those who accepted were very dubious about consenting to researchers interviewing park occupants. Throughout the study, park managers were surprised about how painless the study was, and how many guests were willing to be interviewed and remain in the park. But the fear remains with many park managers, and this is an area where further work is needed, to bridge gaps with park managers and tourist operators in general.

7.2 Preparedness

One factor reducing the vulnerability of caravan park occupants is that a large proportion of caravan park occupants are highly self sufficient. Many don' t rely on mains electricity supply for lighting, cooking and keeping of food. Many respondents indicated that they were able to store water, had substantial supplies of gas and battery powered lighting as well as supplies of food which didn' t require refrigeration such as cans and dried food. This was reflected in 44 respondents having specifically prepared cyclone kits and other preparations in the event of a cyclone. Whilst this proportion was high, and there were isolated cases where respondents were self sufficient to the point of having their own generators, a *larger* proportion of the sample had made no preparations at all (46/98). Nonetheless, the majority of the population surveyed owned or had access to certain key items in the event of

a cyclone such as, torches, first aid kits and battery powered radios. In addition, the majority of people surveyed had access to a vehicle (73/98). Whilst for these people early evacuation would be easier, it is probably the remaining 25 who provide a challenge for relocation. Nonetheless, overall these figures indicate that even caravan park residents with no specific cyclone preparations have a reasonable state of preparation.

It is of concern that of the 98 park occupants interviewed, only 18 indicated that in a cyclone they intended to follow the course of actions recommended through emergency management authorities. If we combine those who said they didn' t have any idea what to do (10) and those who specifically said that they would follow a course of actions likely to increase their vulnerability (14) then it is clear that the caravan park population is vulnerable through its intended actions.

7.3 Demographic factors

The questionnaire survey revealed that caravan park occupants are vulnerable due to a number of key demographic factors. Overall, it is quite an old population. With a modal class of 40 –60 and large number of people older than 60, age is likely to be a factor in dealing with the impacts of cyclones and floods on caravan park occupants. Employment is an important factor in determining a community's vulnerability to natural disaster, and the results of this study indicate that employment amongst caravan park occupants is low, and unskilled. The fact that such a large number of people were unemployed, retired or on disability pensions is a sign that caravan parks are used by people on low incomes as cheap a form of accomodation. There were some notable exceptions to this theme. For example, skilled professionals on holiday at Ellis Beach Caravan park, paid a premium price for well appointed beach front units on a short term stay. One of the characteristics which reduces dependency amongst caravan park occupants is that they have few dependants. Seventy-eight of the sample had none at all. This meant that the mean number ofchildren was approximately 0.4 per person. If we consider only the 20 participants who had dependants, their mean number of dependants was 2.15 – still less than the national average.

The level of education was quite low. Twenty one participants had a member of their party who had attended a tertiary institution. Taken with the 25 people who had a trade or technical education this added up to almost half who had some sort of post secondary training or education (46/98). The modal class was secondary education (45/95). Four people had a primary education and 3 didn' t respond. These results alone don' t reveal the entire story. For example, most of the people who had a tertiary education were short term visitors (11/2). One had remained in the caravan park for less thant 2 weeks). Conversely, all of those who had a primary education had remained in the park for at least 2 years. These trends confirmed that there are different groups of occupants which pose different types of vulnerability. These groups are further discussed in section 7.4.

7.4 Groups

The results demonstrated that there are two main groups of occupants who are particularly vulnerable to cyclone damage. It is clear from Figure 2 that there are two significant stand out classes for the duration of stay. One of these was very short term visitors: backpackers and overnighters. The other was very long term occupants, known as ' permanents' by the park managers. These two principal groups have important characteristics making them vulnerable to cyclones or storm surge. Tables 1 and 2 demonstrate that the groups have differences in their age structure, the types of parks they concentrate in location. These factors are the basis for further discussion below.

' Permanents'

Out of a sample of 98 respondents, 11 had remained in their caravan parks for 2-5 years and 19 had remained in their parks for over 5 years. Taken together, these constitute a large proportion of the sample (30/98). As discussed in section 5, there was some potential for over-representation of permanent occupants in the survey sample. Despite this, a number of points can be made. Long term residents, or ' permanents' as they are known to park managers, were not evenly distributed amongst the parks. Permanent occupants were concentrated at City Caravan Park, Coles Caravan Park and Cool Waters, where the longest length of stay recorded was 28 years. The highest number of permanent occupants was at Coles, where management staff indicated there were 75 permanent dwellers. Residents who had remained in the park longer than 5 years tended to be elderly with 12 out of 19 aged over 60, and 6 out of 19 aged from 40-60. By contrast, no-one interviewed under the age of 25 had remained in a caravan park for greater than 3 months. Respondents aged from 25 to 40 and 40 to 60 had the greatest diversity in their length of stay, and didn' t fall easily into any single group.

Almost all permanent occupants are low income earners. The majority of occupants who have remained in the park for over 5 years were retired (13 out of 19). Interestingly, not all retirees were permanent occupants. The diversity in retired respondents' length of stay suggests that many are quite mobile, often remaining in a given place for a few months and then moving on. Nonetheless, a significant proportion of long term residents are both elderly and retired. The other occupations for long term occupants (over 5years) were 4 unskilled workers, 1 skilled worker and one person on a disability pension. In the case of occupants from 2-5years (also considered permanent for the purposes of this discussion), 3 were retired, 3 were unemployed, four worked in unskilled jobs and 1 worked in a skilled job. As noted in section 7.3, permanent residents had a lower level of education than shorter term occupants. Overall in terms of demographic characteristics, permanent occupants are considerably vulnerable.

The structures that permanent occupants live in are also relatively vulnerable. There is a high tendency for permanents to become very attached to their homes, and build elaborate extensions in the form of tarpaulins, shade cloth structures, and make shift walls (plates 8,9). Permanents also tend to use plant pots for landscaping, and make extensive use of out door furniture. Because caravan park residents have a reduced capacity to stow and secure

these items the result is an increase in obstacles and possibility of missiles in the event of a cyclone.

Overseas travellers

Tourists from non-English speaking countries were located at Wintersun, Woree, Lake Placid and Ellis Beach. The management staff at Woree said that language isn' t a problem, and that tourists trust park managers' knowledge. From interviews with a sample of these occupants, I do not share the confidence of the management staff. Whilst I' m sure that these occupants could communicate sufficiently with management staff to book into a caravan park and pay their bill, the sample of tourists from non-English speaking countries approached interviewed for this project had great difficulty discussing cyclones.

Plate 8. This house structure was built around a caravan (left side of building)

Plate 9. Outdoor furniture, pot plants, and similar items are potential missiles in cyclones

The term cyclone didn' t mean much to these tourists. However, other terms such as 'hurricane' and 'typhoon' were more familiar. The number of people who fall into this category was low, but there were other international tourists who declined to be interviewed for this study because their level of English was low.

The sample of this study included 5 English speaking and 5 non-English speaking overseas tourists (or about 10 percent). These occupants tend to be young and mobile, carrying only a backpack or driving a campervan (plate 10).

Plate 10. Many tourists from non-English speaking countries drive campervans such as this one. When asked what they would do in a cyclone, these occupants said they would close the window and sleep through it.

All park managers interviewed for the project indicated that these tourists know very little about cyclones, which is reflected in the fact that each of the 5 non-English speaking tourists had never experienced a cyclone and were not aware of the possibility of cyclones before they arrived in Cairns. Despite this, in the short time since their arrival, they seemed to have gathered some knowledge of cyclones. Seven out of the 10 overseas tourists were mostly correct about the dates for the cyclone season, 1 didn' t know and 2 were wrong. However, none of them were familiar with the recommended precautions for minimising risk. In the event of cyclone, 3/10 said they would relocate, 3 had no idea what they would do, 2 said they would just sit it out, 2 said they would try to find official cyclone shelters and 1 said he would close the windows and sleep. These responses raise a degree of concern: overall they were not very sure what they would do. Some were complacent and wondered what all the fuss was about, others were genuinely concerned by the information they had gathered since they had arrived.

Overseas tourists will require particular attention in the management of cyclone risk. Disaster managers can not rely on mainstream television and radio awareness campaigns to reach this group. In addition to the language factor, a large proportion of them staying in tents and campervans and don' t even have access to radio or television. To reach them,

disaster managers may need to come up with innovative techniques, and possibly consider starting with the guide books –such as the Lonely Planet series- that these travellers use.

7.5 trees – protection or danger?

Most parks featured significant quantities of trees. As it was succinctly put by one park manager: ‘ people want shade in caravan parks’ . Whilst all park managers agreed on the need for trees in caravan parks, not all agreed on the value in a cyclone. At Woree managers were convinced that trees are dangerous, whereas at, Palm Cove staff believed that Palm trees are so flexible they aren’ t a danger and the melaleucas drop all their small leafy branches but retain all the strong branches, thus providing protection from other missiles and dampening the impact of wind. At most other caravan parks opinion was not strong either way.

Plate 11. Management staff who had more experience with cyclones thought that large melaleucas such as this one dropped their small branches early and retained their big branches, providing protection from other debris.

8. Conclusion and recommendations

The study confirmed that caravan park occupants are highly vulnerable to natural disaster for several key reasons. Most parks are located either near to beaches or near to creeks and rivers, the affect being that they are physically vulnerable to flooding. The study confirmed that most parks attract one or both of two types of people with increased vulnerability to cyclones. The first of these is permanent occupants who have a tendency to be withdrawn from society, elderly and low income earners. The other is international visitors who are vulnerable because they have little or no knowledge of what cyclones are, and some do not have sufficient English to understand and follow broadcasted warnings. Moreover, they are less likely to receive the warnings due to their preferred modes of travel.

However, many participants believed that caravan parks foster increased interaction amongst their occupants than other urban communities. If true, this in itself would assist in the management of the higher risks which caravan parks incur. Many participants described past cyclones where more able occupants provided assistance to those who were less able. Management staff serve as a first point of contact for park occupants, and this allows for rapid dissemination of communication.

The fieldwork confirmed the relevance and timeliness of this study: for many caravan park occupants, this was the first contact they had with anyone to do with cyclones – many parks had little contact with the Cairns City Council or State and Federal emergency authorities in regard to cyclones. There are but, three general recommendations to be made. It is highly recommended that the City Council considers the implications of the number of people who intend to relocated to the Atherton Tablelands in the event of cyclone. It is also highly recommended that the Council and Emergency Managers consider that there are large numbers of permanent occupants concentrated at Coles Caravan Park, Cool Waters Caravan Park and City Caravan Park, and that these require special attention. Finally it is recommended that the Council and Emergency Managers consider how to make warnings known to short term international visitors in a way that retains the support (or at least acceptance) of caravan park managers. The experience of this study is that park managers will prevent information being made available to visitors if they think it will impact upon their occupancy rates. In the case of international visitors, they may be achieved by dealing directly with the guide books that travellers use. Part of the solution could be to make provision of cyclone survival information in cabins and rental vans a legal requirement (as is the case for fire evacuation in hotels.

Caravan parks are unique communities. The interview process involved visiting 11 caravan parks and each one was different in its own way. There are two but, which stand out when it comes to making recommendations based on this study. It is recommended that the Cairns City Council considers the soundness of existing and proposed housing constructions within the Cool Waters Caravan Park. This is large park with a concentration of vulnerable people. That these people spend tens of thousands of dollars to purchase a structure in a flood affected area on land they can never fully own is worthy of further investigation. The manager of this park encouraged the withdrawal of park occupants from the rest of society and declared himself a quasi mayor in his own town. It is also recommended that the

Council investigates drainage issues at Coles Caravan Park, where complaints were made by park management staff who thought that the Council was not fulfilling it' s role of providing drainage around the perimeter of the park. Coles was the only park which requested a copy of the final report from this project. It is recommended that the Council forward a copy to their office.

9. References

Berry, Linda (1996) *Community Vulnerability to Tropical Coastal Cyclones and Associated Storm Surges: case study of the Cairns northern beaches townships. Preliminary Report to Queensland Emergency Services*. Centre for Disaster Studies, James Cook University, Cairns

King, David (1996) *Cairns Cyclone Storm Surge Impact: Summary of 1995/96 Research Projects*, Centre for Disaster Studies, James Cook University, Cairns

10. Appendix 1. Survey Questionnaire

11. Appendix 2 maps of caravan parks in Cairns area