CHAPTER 3: THE ELEMENTS AT RISK AND THEIR VULNERABILITY

In the first chapter we introduced the 'five esses' (shelter, sustenance, security, society and setting) into which we have organised our consideration of the elements at risk in the community and their vulnerability. The broader 'setting' elements were outlined in the previous chapter. In this chapter we describe the key aspects of the remaining four groups.

Shelter

Buildings: The buildings that provide shelter to the community at home, at work and at play vary considerably in their vulnerability to different hazards, and hence the degree of protection they provide the community. A database containing details of the use and structural characteristics of around 35 000 individual buildings in Cairns has been developed. For convenience, this mass of detail has been summarised down to the suburb level in the **Table C1** and **Table C2**, contained in **Appendix C**, whilst the content and structure of the building database are described in **Appendix D**.

Table C1 provides the suburb-by-suburb tally of the uses to which buildings are put. It should be noted that the numbers relate to individual buildings. This differs from most published statistics: with census data, for example, the number of 'flats' relates to number of individual dwelling units (i.e. individual flats) rather than buildings; in industry statistics, figures typically relate to the complete enterprise or facility.

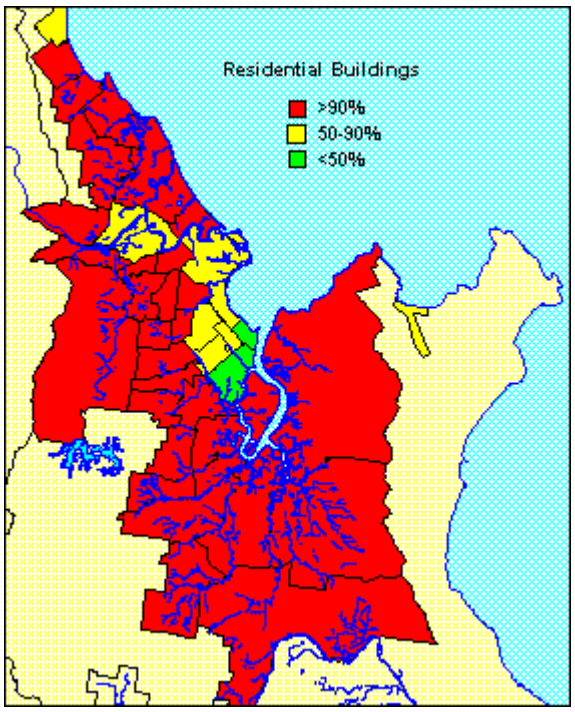

Figure 3.1: Proportion of residential buildings by suburb

Overall, around 91% of all buildings are residential (houses, flats and commercial accommodation) though the distribution is uneven across all suburbs, as shown in **Figure 3.1**. In City and Portsmith less than 50% of buildings are residential, whilst Aeroglen, Cairns North, Manunda, Parramatta Park,

Westcourt and Yarrabah have between 50 and 90% residential. All other suburbs are more than 90% residential.

Table C2 provides tallies of the three key structural characteristics of houses in each suburb, namely floor height, wall materials and roof materials.

Floor height is seen as a strong indicator of building vulnerability, not only for inundation hazards, but also for earthquakes. The detailed data show that some 77.5% of all houses are built on a slab (notionally 0.3 m above ground level); 8.8% have suspended floors of less than 1.0 m above the ground; and 13.7% have suspended floors that are 1.0 m or more above ground level. The high-set 'Queenslander'-type houses are typically found in the older suburbs such as City and Parramatta Park, and the hill-slope suburbs such as Edge Hill. In the older suburbs, many original high-set homes have had what was originally the under-floor area, developed for additional living space and are now regarded as being multi-story on a slab. Overall, the proportions of wall material are given in **Table 3.1**.

Table 3.1: Wall materials of houses and flats in Cairns

MATERIAL	HOUSES	FLATS
Brick	12.3%	16.0%
Concrete block	62.6%	78.6%
Timber	14.9%	3.0%
Fibro	7.8%	1.9%
Metal	2.3%[3]	0.4%

Roof material for both houses and flats is overwhelmingly metal (typically the classic corrugated iron) at 96.4%, with tile (3.3%) and fibro (0.3%) making up the remainder.

The period of development of each suburb is strongly reflected by the general style of housing they contain. In the older suburbs (City, Cairns North and Parramatta Park) the most common houses are elevated on stumps and have timber or fibro-clad walls. They also (typically) have high pitched hip ended roof shapes and small windows. In these older suburbs, however, there has been significant re-development with many of the original houses giving way to blocks of flats and other higher density developments.

This is in strong contrast to houses in the more recent suburbs (e.g. Bentley Park, Brinsmead and Mount Sheridan) in which houses are almost universally on a slab, have walls of concrete block and large areas of glass. Roof forms are fairly evenly split between hip and gable ended, but typically have a much lower pitch than those in the older suburbs.

Brick walls are most common in suburbs that developed in the 1960's and 1970's such as Earlville, Edge Hill, Mooroobool, Westcourt and Whitfield. Given their general vintage, the majority are likely to be of brick veneer construction, rather than 'solid' or cavity construction, given that brick veneer became an accepted construction method in Queensland in the late 1950s and has been the predominant brick form since then.

[3] The metal clad walls are mostly those which were formerly fibro clad and have been upgraded with aluminium or vinyl-coated cladding, though a few old houses have corrugated iron walls.

The pattern of urban growth in Cairns over the past 60 years can be seen in **Figure 3.2**, **Figure 3.3**, **Figure 3.4**, **Figure 3.5**, **Figure 3.6** and **Figure 3.7**. These maps have been compiled from a range of sources including historic aerial photography and field observation.

Engineered buildings constructed since 1975 have been subject to the Wind Loading provisions of the Australian Building Code whilst domestic buildings have been covered since 1983; Earthquake Loading provisions were introduced in 1979 and upgraded (and extended to domestic construction) in 1993. The approximate proportions of houses included in the Cairns *BUILDING* database, by decade of construction, are as follows:

Pre 1945	3.4%	1945-1954	5.3%
1955-1964	6.8%	1965-1974	11.4%
1975-1984	14.6%	1985-1994	54.3%
1995-(1997?)	4.1%		

Current residential growth in Cairns is predominantly to the south along the Bruce Highway towards Gordonvale and beyond, whilst some growth continues in the north to the west of the Captain Cook Highway. A somewhat controversial proposal has been presented to Cairns City Council to develop the Trinity East area, on the low-lying delta country opposite the CBD, as a satellite town to house approximately 20 000 people.

Mobility: The ability of people to get to and from shelter is almost as significant as the shelter itself. Cairns has a well developed urban road network. This network is mostly bitumen sealed and apart from potential flooding of low culverts, it is an all-weather network. In the study area there are 65.8 km of highway (Bruce Highway and Captain Cook Highway); 23.7 km of urban main roads; 101.2 km of suburban access roads and 898.4 km of suburban roads.

Passenger transport in Cairns is based largely on the family car as shown in **Table 3.2**. Mobility is, consequentially, very heavily dependant on household access to private cars, of which there are an estimated 53 200. **Figure 3.8** shows the distribution of households with no access to a vehicle and **Table C3** provides the detailed proportions by suburb. Both of these are based on data from the 1996 census.

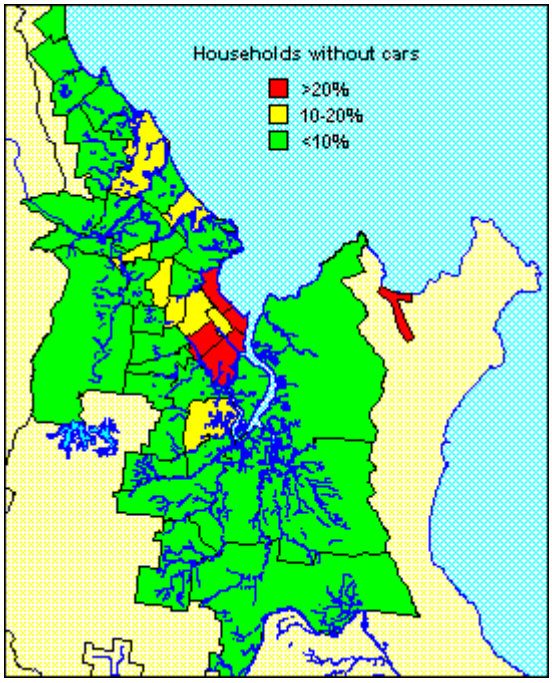

Figure 3.8: Proportion of households with no car (Source: ABS, 1998a)

Table 3.2 shows the proportions of travel mode used to get to work in Cairns on the day of the 1996 census. It clearly shows the dominance of the car, especially the use of the car by a single occupant.

Table 3.2: Mode of travel to work in Cairns (Source: ABS, 1998a)

MODE	NUMBER	PERCENT
Bus	952	1.7
Taxi	436	0.8
Car driver	31,556	57.3
Car passenger	4,914	8.9
Motor bike	808	1.5
Bicycle	1,829	3.3
Walk	2,228	4.0
Worked at home	2,219	4.0
Did not go to work	7,422	13.5
Other modes (eg boat)	1,610	2.9
Not stated	1,047	1.9

Because of the very large tourist industry in Cairns, there are large numbers of coaches, taxis, hire cars and other passenger vehicles available. A scheduled bus service provides coverage of most suburbs.

Sustenance

The Cairns community is sustained by a well developed infrastructure of utility lifelines (power, water, sewerage, telecommunications, etc) and logistic resources for the supply and distribution of food, clothing, fuel and other personal requisites. Each of these is important in their own right. There is, however, a very significant degree of interdependency as illustrated in **Figure 3.9**. In this figure the loss of the lifeline in the left-hand column will have an impact on the lifelines across the row to a significant (**S**) or moderate (**M**) degree.

	POWER	WATER	SEWER	COMMS	ROAD	RAIL	BRIDGE	AFLD	PORT
POWER		S	S	S	M	S		S	S
WATER	M		S					M	M
SEWER		S						M	M
COMMS	S	S	S		M	S		S	S
ROAD	M	M	M	M		M	M	M	M
RAIL					M		M		M
BRIDGE	S	S	S	S	S	S			
AFLD									
PORT									

(developed from Granger, 1997, Table 2)

Figure 3.9: Interdependency of lifeline assets

It is clear from this analysis that power supply and telecommunications ('comms') are overwhelmingly the most important of all lifeline assets in terms of what is dependant on them, followed closely by bridges, roads and water supply. Their significance to community sustainability, however, may be somewhat different - e.g. people can not survive for long without a safe water supply, but they can survive (albeit with some inconvenience) without the telephone, light and even power for some time.

Power supply: As described in Chapter 2, the main source of the Cairns power supply lies some 1 000 km to the south from the power stations near Rockhampton and at Gladstone. Transmission lines operated by Powerlink bring that supply to the Kamerunga Bulk Supply Substation at Caravonica (on low ground less than 800 m from the Barron River). There are two transmission lines. Each enters Cairns via the escarpment rather than the coastal lowland.

Reticulation within the Cairns urban area is managed by FNQEB. Full details of the reticulation system are not available to us, however, within the most densely settled area (from the Barron River south to Woree) there are 210 km of high voltage and 368 km of low voltage service strung on about 9 000 poles. This above-ground service is susceptible to disruption during periods of high wind, mostly as a result of debris or tree branches bringing down the lines. Since the experience of Cyclone *Justin*, which left the city without power for at least 36 hours, FNQEB has paid particular attention to reducing the risk posed by tree hazards.

Reticulation within the CBD area (generally south of Minnie Street and east of McLeod Street) is underground. Underground mains also service critical facilities, such as the Cairns and Calvary Hospitals. The Cairns City Substation (32-38 Hartley Street), which controls distribution to this key area, is a two-story structure with the sensitive facilities said to be located on the upper level.

Water supply: The bulk of the Cairns water supply is drawn from Lake Morris, formed by the Copperlode Falls Dam on Freshwater Creek. Lake Morris has a capacity of 45 000 megalitres and has a secure rainforest catchment. Water is released from the dam into Freshwater Creek and is picked up at the intake structure just upstream of Crystal Cascades. From there it is piped to the Freshwater Creek Water Treatment Plant.

Distribution to consumers is by gravity feed from at least 16 reservoirs and water towers throughout the study area. Reticulation involves some 1 720 km of water main of various sizes, materials and age. Almost half of the water reticulation network is constructed of brittle material (asbestos-cement or cast iron). This is particularly prevalent in the older areas of the city and in the larger trunk mains. The more modern segments of the network overwhelmingly employ ductile PVC pipe.

The water supply to the Yarrabah Community feeds from a large reservoir on a ridge to the west of the settlement and is piped to a small chlorine treatment plant just to the south of the Yarrabah Police Station. Water is reticulated throughout the settlement. Details of the network are not available.

Sewer: Most of the Cairns urban area is connected to the reticulated sewerage network. Sewerage treatment plants are located close to the mouth of the Barron River in Aeroglen; in Woree, at the head of Trinity Inlet (the Southern Pollution Control Plant); in Brinsmead; and in Smithfield. There are at least ten sewerage pumping stations throughout the city, most being in the low-lying inner area.

Disruption of power supply as a result of the impact of Cyclone *Justin* in 1997 caused raw sewage to escape the system because of the shut down of the pumping stations.

Telecommunications: Much of the telecommunications network infrastructure operated by Telstra in the Cairns urban area (both copper wire and optical fibre) is underground. Links to suburbs along the northern beaches are backed up by microwave links. Details of the infrastructure operated by Optus are not available, however their Cairns hub is located in Portsmith, close to the main Telstra depot.

The landfall station for the Cairns to Port Moresby (PNG) submarine cable is located in North Cairns.

The key to telecommunications - regardless of whether it is by conventional telephone, mobile phone, fax or Internet, and regardless of the service provider - is the network of telephone exchanges. Telstra exchanges are located in City (the main regional exchange), Clifton Beach, Earlville, Edge Hill, Edmonton, Gordonvale, Holloways Beach, Stratford, White Rock and Yarrabah. Most of these suburban exchanges are housed in re-locatable metal cabins.

Broadcast radio and TV services covering the region are provided from studios in City (ABC, 4CA, HOT FM, 4KZ & Radioactive 558), Earlville (Channel Ten TV), Manunda (WIN TV, 4CCR FM) and Parramatta Park (Sunshine television), however, transmitters are located on Mount Bellenden Ker (all TV and most FM radio), near Gordonvale (ABC Radio) and Trinity East (4CA).

Dedicated telecommunications networks are also operated by Australian Defence Force units (Far North Queensland Regiment at Westcourt and HMAS *Cairns* in Portsmith), the Civil Aviation Agency (mostly at the airport in Aeroglen) and numerous private sector organisations such as fishing and mining companies, many of them located in Portsmith. Many of the private VHF and UHF networks, such as those used by taxis, police, emergency services and so on, operate from base stations on Bellenden Ker and/or on prominent features on the coastal escarpment.

The key lifeline facilities throughout Cairns are located on **Figure 3.10**.

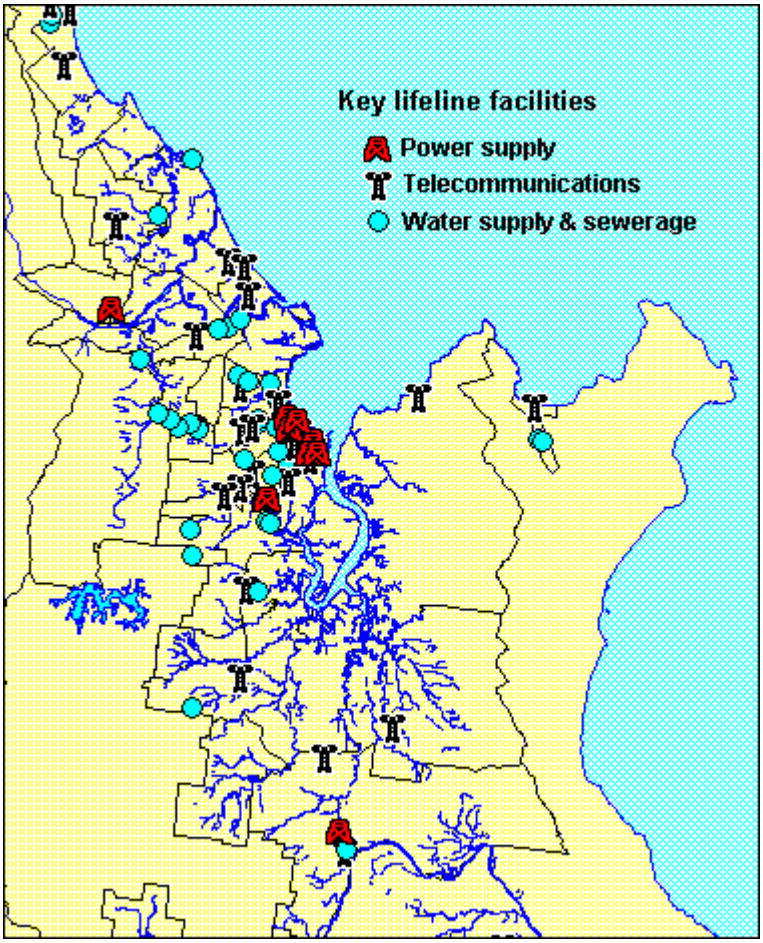

Figure 3.10: Key lifeline facilities

Logistic support: The supply and distribution of essential goods such as food, fuel and clothing are essential to the sustenance of the community. Of particular significance are those facilities that provide bulk or large scale storage and distribution services.

Food supply and distribution are obviously of great significance. Apart from small quantities of fruit and vegetables, meat and seafood, very little of the food consumed in Cairns is grown or processed locally. There is, consequently, a significant reliance on imported foodstuffs or raw materials such as flour. The bulk food storage, such as cold stores and grocery warehousing, and food processing facilities are concentrated in the Portsmith area. One of the few exceptions is the Country Bake bakery, commissioned in 1997, which is located in Bentley Park. Regional retailing facilities are located in City (Cairns Central), Earlville (Stockland Plaza), Manunda (Festival Faire), Smithfield (Smithfield Plaza) and Westcourt (Westcourt Plaza). Suburban shopping centres and 'corner stores' with smaller supermarkets or convenience stores, as well as smaller bakeries, butchers, green grocers, and so on, service most suburbs. The levels of stock held for basic foodstuffs are not known.

Bulk fuel and gas storage facilities are also concentrated in Portsmith, with secondary (especially operational) storage of specialist products at facilities such as the airport (avgas and jet fuel), HMAS *Cairns* (bunker and diesel fuel) and some of the larger industrial and transport facilities (mostly diesel). Retail distribution of motor fuel is effected through more than 35 service stations, mostly located along the main access roads such as Mulgrave Road/Bruce Highway and Sheridan Street/Captain Cook Highway. There is no reticulation of gas in Cairns, so supply is provided in bottles or to bulk 'bullet'

tanks. Distribution is, consequently, largely by dedicated tanker trucks. Transfer of aviation fuels from the port to the Joint Underground Hydrant-refuelling Installation (JUHI) at the airport utilises a dedicated B-double tanker unit. The capacity of bulk storage for most products is believed to be sufficient for approximately three weeks of normal usage. Tankers typically provide resupply from Brisbane and/or Sydney.

Most other bulk storage and distribution centres for products as diverse as cement, agricultural chemicals, pharmaceuticals, raw sugar, molasses, timber and hardware, as well as transport and handling equipment (such as fork lifts and cranes), are also concentrated close to the port and rail head facilities of Portsmith. Significant amounts of freight, including foodstuffs and goods such as pharmaceuticals, are also handled through the Cairns International Airport located at the mouth of the Barron River.

Limitations: Due to the lack of adequately detailed data, it has not been possible to model lifeline vulnerability in this study. Further work is required to improve the detail on lifeline infrastructures and logistic resources to develop a better understanding of their vulnerability and their significance to the overall vulnerability of the community.

Security

In the context of our risk assessment methodology, 'security' relates to aspects of community health, wealth and the services and structures that providing for public safety. In addition to identifying the physical elements at risk that relate to these aspects, we have identified a range of factors that will provide relative measures of community vulnerability and their distribution across Cairns.

Health: The key health facilities in Cairns are the Cairns Hospital (Cairns North) and Calvary Hospital (City), together with the Gordonvale Memorial and Yarrabah Hospitals. The two larger facilities are located within two blocks of the waterfront, and each other, in downtown Cairns. The Cairns Hospital is currently undergoing major re-development on the site occupied by the region's main public hospital since 1884. Both major hospitals provide a comprehensive range of medical, emergency and surgical services, whilst the smaller centres are somewhat more basic.

There are six major nursing homes. Four are located adjacent to each other in Westcourt, close to the Westcourt Plaza shopping complex (Good Samaritan, Nazareth Village, Bethlehem and FARNOHA – Far Northern Home for the Aged); the W.B. Winfield Nursing Home is located in Whitfield; and the Pyramid Retirement Centre is located on the northern edge of Gordonvale.

A wide range of private specialist medical practices, including pathology, surgery, and medical imaging are located within a few blocks of the two main hospitals. Medical centres and individual general medical practices are spread throughout the city. Services such as physiotherapy, dental, podiatry, chiropractic, optometry and chemists are available throughout the city, with some degree of concentration in the downtown area. Community health services, such as Blue Nurses, are also available.

The age make-up of the population is a reasonable indicator of the health vulnerability of the community, with the very young (under 5 years) and elderly (over 65) considered to be the most vulnerable groups. The relative distribution of these age groups is shown in **Figure 3.11** and **Figure 3.12** respectively. These maps show the distribution at the suburb level.

The distribution of under 5-year olds is clearly dominant in the newer, so-called 'nappy valley', suburbs such as Bentley Park, Kamerunga, Mount Sheridan and White Rock. High proportions of under 5's are

also found in the cane growing areas of Gordonvale, Mount Peter and Trinity East. The highest concentration, however, is in Yarrabah, where a remarkable 16% of the population is under 5.

By contrast, the distribution of the elderly is concentrated more in the northern beach suburbs of Clifton Beach and Palm Cove, the older suburbs of the city (Aeroglen, Earlville, Edge Hill, Manunda Parramatta park, Portsmith, Westcourt, Whitfield and Woree) and the cane growing areas of Gordonvale and Trinity East. Both are sourced from ABS (1989a).

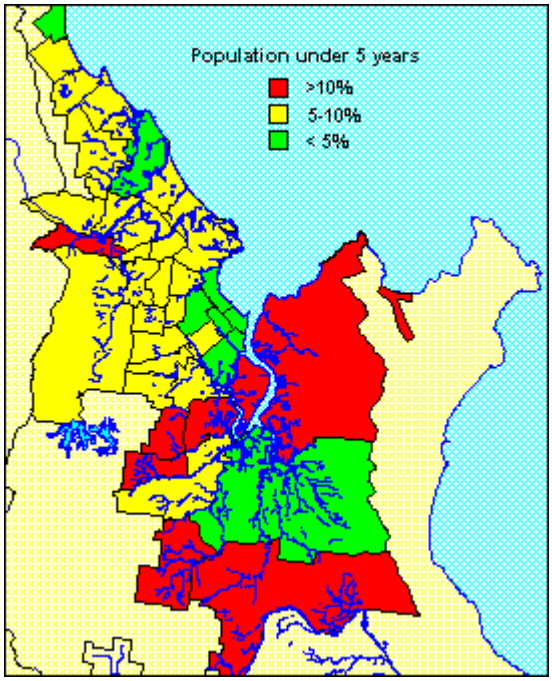

Figure 3.11: Cairns - population aged under 5

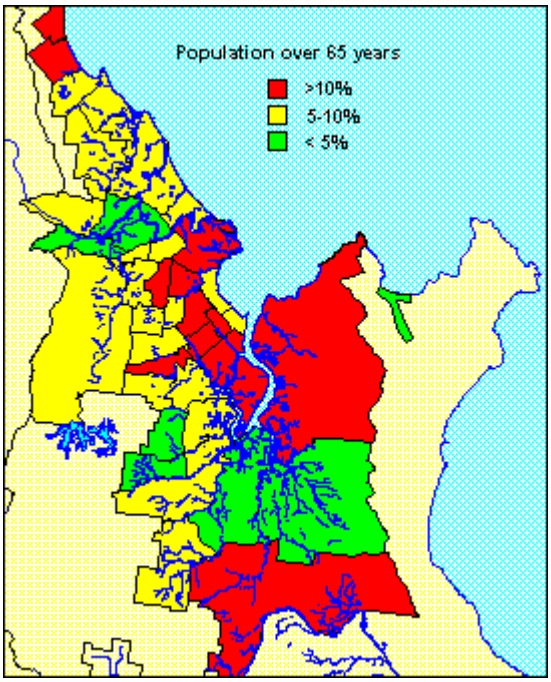

Figure 3.12: Cairns - population aged over 65

We have no specific information on the numbers or distribution of the particularly vulnerable population with specific physical or mental disabilities, or their carers.

Wealth: The economy of Cairns is undoubtedly dominated by tourism and sugar production, however, industries including fishing, building and construction, ship building and retailing also make a significant contribution. The following statistics provide some indication of the relative importance of these various sources of local wealth:

- retail expenditure in Cairns is currently estimated at $1.5 billion annually;
- the tourist industry brings approximately $1 billion into Cairns annually. Of that amount, takings from tourist accommodation in 1997 totaled $200.8 million ($162.8 million from hotels, motels and guest houses; $21.4 million from holiday flats and units; $7.5 million from caravan parks; and $9.2 million from hostels);
- the value of the Cairns/Far North Queensland region's agricultural production is around $800 million annually of which sugar makes up about 65%;
- the construction industry in Cairns is worth around $600 million annually;
- servicing the mining industry earns Cairns over $350 million per annum - the Freeport Indonesia mine in Irian Jaya accounts for at least $240 million of this figure. The value of the mining industry to Cairns will increase as more mines, such as the large kaolin mine north of Weipa on Cape York begin to use Cairns as their fly in/fly out base;
- a local shipbuilding firm is currently building two hydrographic research vessels for the RAN worth $200 million;

- the fishing industry of the region (including the Gulf), which is largely serviced from Cairns, is worth around $140 million per annum.

These economic indicators have been taken largely from material produced by Cairns-based W.S. Cummings Economic Research Services for a local real estate development business and published on the Web at *www.patonpartners.com.au.* Another indicator of the make-up of the Cairns economy is the number of people employed in each major industry sector. This is shown in **Table 3.3**.

Table 3.3: Cairns employment by industry (Source: ABS, 1998a)

INDUSTRY GROUP	PERSONS EMPLOYED	INDUSTRY PERCENT
Agriculture, forestry and fishing	1645	3.0
Mining	383	0.7
Manufacturing	3971	7.0
Electricity, gas and water supply	275	0.5
Construction	4632	8.2
Wholesale trade	2779	4.9
Retail trade	8769	15.4
Accommodation, cafes and restaurants	5796	10.2
Transport and storage	4674	8.2
Communication services	752	1.3
Finance and insurance	1427	2.5
Property and business services	4932	8.7
Government administration and defence	3173	5.6
Education	3151	5.5
Health and community services	4560	8.0
Cultural and recreational services	1764	3.1
Personal and other services	2195	3.9
Non-classifiable economic units	807	1.4
Not stated	1109	2.0
Total persons employed	56794	

The spatial distribution of 'wealth' within the city can be gauged from indicators such as unemployment, individual income and rental accommodation. Such indicators are relevant to risk calculations because the less wealthy will have greater difficulty recovering from a disaster impact and are more likely to have no, or inadequate, insurance protection.

Unemployment rates recorded at the 1996 census of over 10% are concentrated close to the 'downtown' area of Cairns in suburbs including Cairns North, Holloways Beach, Machans Beach, Manoora, Manunda, Parramatta Park, Portsmith and Westcourt. Portsmith, with 21.3% unemployment is the highest. The lowest rate of 3.07% was recorded in the rural suburb of Barron. These are shown in **Figure 3.13**.

A similar spatial pattern is evident in the proportion of dwellings that are being rented (**Figure 3.14**). The suburbs with the highest proportion of rental accommodation are Yarrabah (49%), the older and more central city suburbs (Cairns North, City, Manoora, Parramatta Park, Portsmith, Manunda, Westcourt and Woree) and areas along the northern beaches (Holloways Beach, Palm Cove and Yorkeys Knob). By contrast, the highest areas of home ownership (ie less than 20% rental) are in the

newer suburbs such as Brinsmead and Redlynch. Again both figures have been derived from data in ABS (1989a).

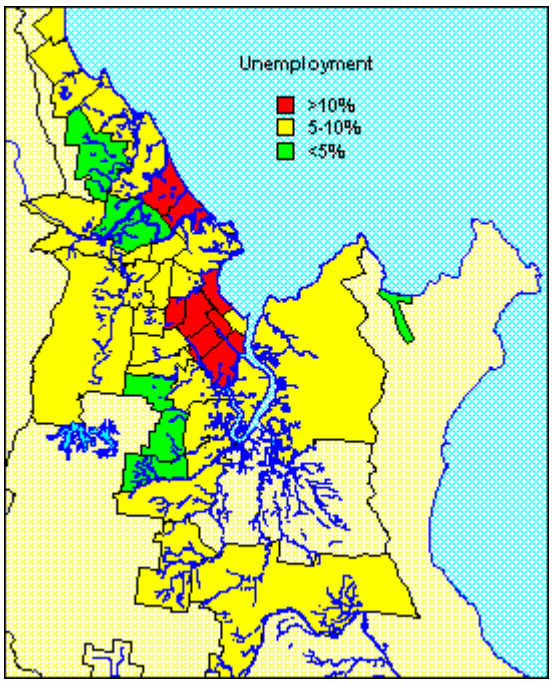

Figure 3.13: Cairns - unemployment rate

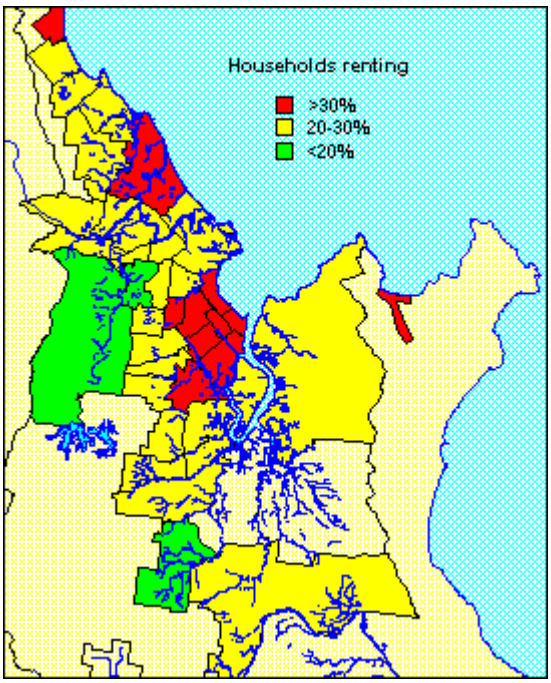

Figure 3.14: Cairns - percent of rental dwellings

An *Index of Socio-Economic Disadvantage* has been compiled by the ABS by undertaking a principal components analysis on 20 weighted variables from the 1996 census. The attributes, such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations, were selected to highlight disadvantage (see **Table C4** for a list of variable used). The resulting index has been standardised to have a mean of 1 000 and a standard deviation of 100 across all census collectors districts (CCD) in Australia (ABS, 1998b). For Cairns, the mean suburb average index value is 1 015.28, values ranging from a high (advantaged) value of 1 093.0 in Barron to a low (disadvantaged) value of 684.96 in Yarrabah and 842.33 in Portsmith as shown in **Figure 3.15**.

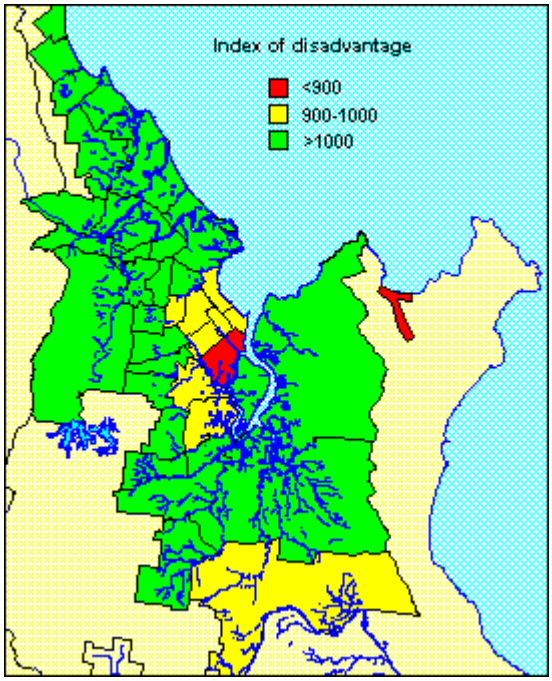

Figure 3.15: Cairns - areas of relative socio-economic disadvantage

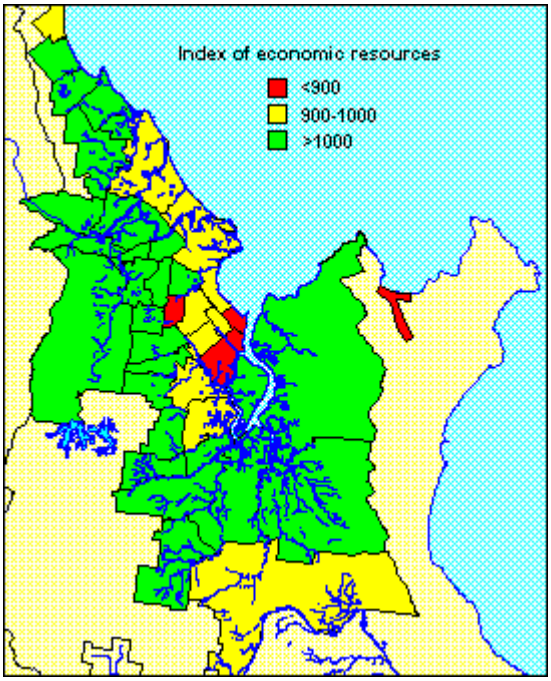

Figure 3.16: Cairns - areas of relative abundance of economic resources

A similar *Index of Economic Resources* is also available. This index is based on a profile of the economic resources of families. It is compiled from 22 weighted variables that reflect the income and expenditure of families, including measures of income, rent and home ownership (see **Table C5** for a list of variables used). This index is also standardised with a national mean of 1 000 and a standard deviation of 100. The Cairns mean index value is 999.01. At the disadvantaged end of the spectrum the four lowest suburbs are Yarrabah (747.48), Portsmith (839.66), Manoora (881.63) and City (889.17). At the high end, the top four are Bayview Heights (1 117.03), Brinsmead (1 101.57), Redlynch (1 096.76) and Barron (1 089.42). The spatial distribution is shown in **Figure 3.16**. Both figures are based on data contained in ABS (1998b).

Protection: The full range of public safety services is provided in Cairns.

The city is the headquarters for both the Far North Region, and the Cairns District, of the Queensland Police Service (QPS). QPS establishments are located at:

Far North Region HQ	14 McLeod Street, City
Cairns District HQ	5 Sheridan Street, City
City Police Station & watchhouse	5 Sheridan Street, City
Cairns Police Beat	Esplanade, City
Edmonton Police Station	103 Bruce Highway, Edmonton
Gordonvale Police Station	13 Cannon Street, Gordonvale
Smithfield Police Station	Captain Cook Highway, Smithfield
Yarrabah Police Station	7 Range Road, Yarrabah

The Cairns District Disaster Coordination Centre, when activated, is located in the QPS District HQ building in Sheridan Street. If that location were not viable, the centre would be relocated to the Royal Flying Doctor Service office in Junction Street, Edge Hill. District-level disaster control is vested in the District Police Superintendent in his (non-police) role as District Disaster Coordinator (DDC). The DDC is responsible for maintaining the district disaster plan.

The Queensland Department of Emergency Services (DES) Far North District is also headquartered in Cairns (in the State Government Building, 36 Shield Street). This department is the administrative head for the Queensland Ambulance Service, the Queensland Fire and Rescue Authority and the Emergency Services Division, the latter incorporating the Aviation Service, the Chemical Hazards and Emergency Management (CHEM) Unit and the Disaster Management Service.

Ambulance Stations are located at:

Cairns City	40 Anderson Street, Manunda
Edmonton	32 Hartill Street, Edmonton
Gordonvale	1 Cannon Street, Gordonvale
Smithfield	1-3 Stanton Road, Smithfield
Yarrabah	12 Stanley Road, Yarrabah

The Royal Flying Doctor Service (RFDS) provides the major air ambulance service throughout the north of the state. It operates from its hangar in the general aviation area of the airport (Royal Flying Doctor Street, Aeroglen) and headquarters at 5 Junction Street, Edge Hill. The St Johns Ambulance Society also provides volunteer ambulance services from its headquarters at 44 MacNamarra Street, Manunda.

Fire Stations are located at:

Cairns City	Gatton Street, Westcourt
Edmonton	103 Bruce Highway, Edmonton
Gordonvale	105 Norman Street
Smithfield	12 Lesley Street, Smithfield

The specialised Airport Rescue and Fire Service protects the airport. It is located on the airfield in Sir Sydney Williams Street, Aeroglen.

The DES Aviation Service operates a rescue helicopter from its base in Bush Pilots Avenue in the general aviation section of the airport.

Training and administration of State Emergency Service (SES) units in the Far North District is coordinated by the Disaster Management Service office in Cairns. Local SES units are the responsibility of Cairns City Council as is the coordination of the Local Disaster Committee (LDC). The LDC, chaired by the Deputy Mayor and supported by a full time executive officer, is responsible for the local disaster plan.

Cairns City SES units have ‘sheds’ at:

Gordonvale	Simmons Street, Gordonvale
Manunda	46 MacNamara Street, Manunda
Marlin Coast	Captain Cook Highway, Palm Cove
Trinity	Pecten Close, Trinity Beach

DES also provides support to the volunteer marine rescue service provided by the Australian Volunteer Coast Guard, which is based in Marlin Parade, City. It operates a number of small craft for mainly inshore search and rescue. It is supported to some degree by the Cairns Marine Radio Club, which is based at 52 MacNamara Street, Manunda.

There are two Australian Defence Force establishments in Cairns; the HMAS *Cairns* naval base, and the headquarters for the 51st Battalion of the Far North Queensland Regiment (FNQR). The primary role of HMAS *Cairns* is to support patrol boat operations, especially for fishery patrols, in the Coral Sea, Torres Strait and Gulf. Its key facilities, including stores, fuel and repair facilities, are located within the port area, whilst junior sailor accommodation is in Sheridan Street, Cairns North. The FNQR is a Defence Force Reserve army unit with a key role in reconnaissance and surveillance operations in the Cape York and Gulf areas. Most of its part-time troops live in the small and isolated settlements of the Cape and Gulf region. Its base is in Coxall Street, Westcourt.

The locations of the major public safety service facilities are shown on **Figure 3.17**.

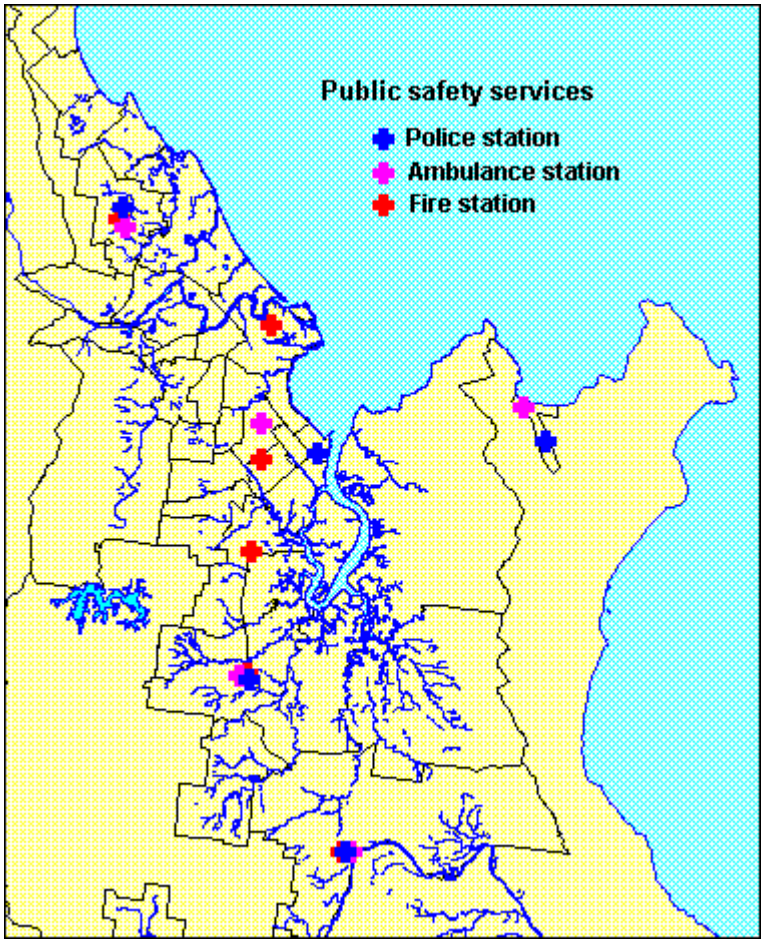

Figure 3.17: Cairns public safety services

The Australian Federal Police, the Australian Maritime Safety Authority and the National Safety Council also represent the Commonwealth Government's public safety role in Cairns. None of these agencies has a significant role in land-based disaster management in the Cairns region.

Apart from a system of levees protecting the airport and some bank protection works in the lower Barron River, there are no significant engineered mitigation structures such as levees or sea walls. Cairns City Council has, however, imposed development constraints for both flood and storm tide inundation below the 100 year average return interval (ARI) level since the mid-1990s. It was, in fact, the first local authority in Queensland to impose such development constraints for storm tide. The Australian Building Code, with its guidance for both earthquake and wind loads, is also enforced.

The protective services available in Cairns are more comprehensive than those found in most other regional Queensland centres. This is partly explained by the fact that Cairns is the headquarters for regional and district-level services, by its strategic location in Australia's north, by its history of disaster impacts and by its relative isolation.

Society

The capacity of individuals, families, households and neighbourhoods to withstand the impact of disaster has much to do with the cohesiveness and resilience of those communities. Social cohesion is a very complex thing and difficult to measure, especially in a population as large and as transient as that found in Cairns. The research that has been done by the Centre for Disaster Studies at James Cook University, however, suggests that it varies considerably across the city. The Machans Beach community, for example, is considered to have a particularly high degree of cohesion and community spirit, whilst areas in the Bungalow area of Parramatta Park have particularly poor levels of community identity. The development of indices of social vulnerability has still a long way to go, however, the measures discussed below appear to be amongst the most relevant.

Language and ethnicity: One of the strongest social links in a community is derived from language and ethnicity. For the resident population, English is clearly the most common language spoken, with 86.2% of the resident population over age 5 speaking it at home. The next largest groups are 'other' (with 3 226 or 3.0%) and Italian (1 290 or 1.2%). The 'other' group appears to include mainly Japanese and possibly Korean speakers. The published census results do not include data on these Asian languages spoken at home. These Asian languages are found most commonly in the suburbs of Cairns North, Mooroobool, Parramatta Park and Westcourt. The Italian speaking population is concentrated mainly in the sugar cane growing areas to the south of the city. The most common of the minor languages are German (942), various Aboriginal languages (655), Chinese (563), Tagalog (Filipino - 472), Dutch (384), French (362) and Greek (272).

Japan is clearly the largest source of tourists, though their dominance has been declining gradually in both absolute and proportional terms over the past five years. Their numbers also fluctuate seasonally, with January, February, August and December being the peak months.

Table 3.4 shows the average monthly numbers of foreign tourist arrivals in Cairns over the four years from 1993 to 1997. Assuming that all arrivals from Canada, New Zealand, PNG, Singapore, the United Kingdom and the United States, plus half of those from Hong Kong, speak English, and that none of the other visitors do, on average, more than 70% of all foreign visitors do not speak English. Of the non-English speaking visitors, close to 80% speak Japanese.

The only enclave in which a particular ethnic group dominates in the Cairns study area is the Aboriginal community of Yarrabah where 95% of the population are of Aboriginal and/or Torres Strait Islander descent. A few neighbourhoods in Manoora, Mooroobool and Westcourt also have significant (around 25%) proportions of indigenous people.

Religion: One of the more significant linkages that tend to span social cleavages such as ethnicity, is religion. In Cairns, the overwhelming majority (76%) of people who provided answers to the questions on religion in the 1996 census was Christian. Of the remainder, 3% was divided between Buddhism, Islam, Hindu and Judaism (in that order), whilst 21% said they had no religion. Of the Christian faiths, Catholic (38.8%), Anglican (32.8%), Uniting (9.5%) and Presbyterian (7.6%) have the largest congregations. Distribution across the city is quite even, though localised concentrations are obviously found where there are institutions such as convents, boarding schools and nursing homes, or, in the case of Yarrabah, because of its foundation as an Anglican mission.

Length of residence: Awareness of the local hazard history, environment and how to cope with disaster, as well as the level of integration into the local community, can be measured by the length of time people have lived in the area. The population of Cairns is clearly an extremely mobile one, with growth being overwhelmingly based on in-migration. **Figure 3.18**, shows the proportion of the total population that was living at a different address at the 1991 census (i.e. five years previously).

Table 3.4: Cairns average monthly foreign tourist arrivals 1993-97 (Source: ABS Overseas Arrivals bulletins)

COUNTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Canada	334	334	381	268	186	229	381	311	283	638	411	300	4056
China	92	54	21	51	33	43	78	51	45	98	126	118	810
Germany	413	443	528	623	429	438	649	594	770	944	700	587	7118
Hong Kong	1302	3282	1865	1263	771	1471	1950	1455	988	1598	1883	2543	20371
Indonesia	235	240	334	209	216	233	262	200	213	133	166	303	2744
Italy	59	63	35	46	74	95	237	227	118	99	106	163	1322
Japan	16102	14810	15516	11971	12123	12220	14410	17928	12910	13172	12684	17282	171138
Korea	590	226	213	382	389	486	516	378	284	446	318	524	4752
Netherlands	66	97	89	81	67	115	213	117	185	259	241	194	1724
New Zealand	383	203	317	633	641	1318	1675	1798	1797	1016	506	447	10734
PNG	1678	1141	1031	1304	1221	1690	1779	1210	1569	1328	1644	2305	17900
Singapore	310	701	353	492	568	712	371	421	434	466	922	1929	7679
Sweden	149	130	92	60	30	169	134	60	138	242	170	320	1694
Switzerland	138	108	128	137	92	97	231	139	269	299	322	293	2253
United Kingdom	1277	1695	1659	1407	1241	1194	1564	1682	1541	2164	2241	1962	19627
United States	1176	1408	1861	1407	1181	1764	1834	1591	1577	1998	1734	1010	18541
Rest of the World	1493	1641	1066	1121	999	1120	1430	1360	1102	1415	1510	1740	15997
All Countries	25797	26576	25489	21455	20261	23394	27714	29522	24223	26315	25684	32020	308450

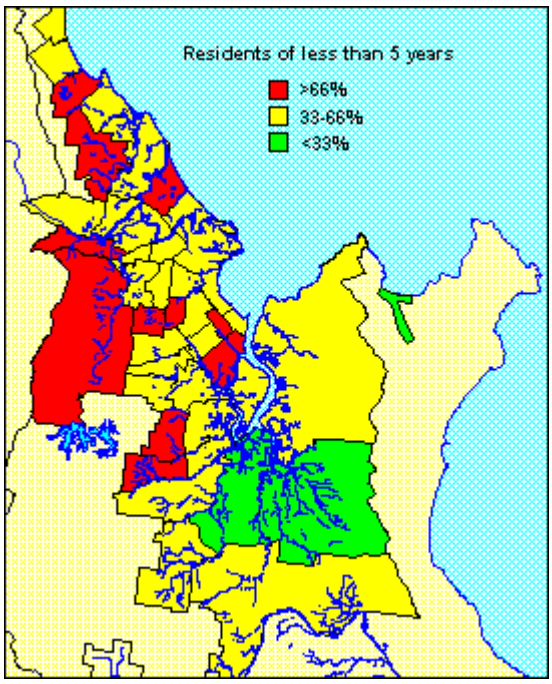

Figure 3.18: Proportion of population at census address for less than 5 years (Source: ABS, 1998a)

It is noteworthy that the more stable populations coincide largely with the cane growing areas, rather than the urban areas. The suburbs in which the greatest mobility is experienced include the growth centres of Caravonica, Holloways Beach, Kanimbla, Kewarra Beach, Manoora, Mount Sheridan,

Redlynch and Smithfield. There is also significant mobility in the inner suburb areas of Parramatta Park and Portsmith, which are undergoing residential redevelopment.

From figures published from the 1991 census, 41.8% of people were recorded at the same address that they were at for the previous census, 13.7 % had been living elsewhere in Cairns, 25.2% were living elsewhere in Queensland, 6.7% were living overseas, 5.1% were in NSW and 3.3% were in Victoria. The other states and territories together contributed the remaining 4.2%. It might be assumed from these figures that some 80% of the population (those who have lived in Queensland for five years or more) could be expected to have at least some awareness of the local hazard environment and emergency arrangements, though the research of Berry (undated) in the northern beach suburbs strongly suggests otherwise

Education: The disaster management literature suggests that the capacity of the community to understand and respond to information on risk or hazard potential is, to some degree, dependant on education and literacy. Much of the research reported in this literature, however, relates to developing countries where levels of literacy and access to information are typically poor. In a developed country such as Australia, basic levels of education and literacy are comparatively high across the community. In Cairns, for example, some 45% of people over 15 have gained some form of post-secondary qualification. In this community, therefore, education levels are unlikely to make a particularly significant contribution to community vulnerability.

Educational facilities are typically identified in disaster plans as shelters or evacuation centres following disaster because they have ample space and facilities such as toilets and canteens. **Table C6** lists the locations of the 42 primary and secondary schools in Cairns. Schools are also centres in which there are concentrations of more vulnerable people for significant parts of the day. The table also included statistics for the numbers of enrolments and teaching staff at government schools.

James Cook University (McGregor Street, Smithfield) and the Far North Queensland Institute of TAFE (14-42 Eureka Street, Manunda) provide tertiary-level education and training.

Other post-secondary training institutions include:

English language training centres -
Cairns Language Centre (91 Mulgrave Road, Parramatta Park),
International House Queensland (130 McLeod Street, City),
Holmes Colleges (18 Lake Street, City) and
Windmill College (Poolwood Road, Kewarra Beach);

and vocational training centres -
Cairns Hospitality Centre (383 Draper Street, Parramatta Park),
Cominos House Arts and Environment Centre (27 Greenslopes Street, Manunda),
Employment Training Centre (207 Bunda Street, Parramatta Park),
Endeavour Training Support Centre (37 Hoare Street, Manunda),
Retail Skills Centre (383 Draper Street, Parramatta Park) and
Skill Share (11 Federation Street, Westcourt).

At the other end of the educational process are the more than 40 child care centres and kindergartens that serve areas of employment (e.g. City, Manunda, Parramatta Park and Westcourt) and the 'nappy valley' suburbs (e.g. Bentley Park, Edmonton, Mooroobool, Mount Sheridan, White Rock and Woree). These centres are listed in **Table C7**. Given the very young age and vulnerability of children at these centres, they deserve particular attention.

The location of educational facilities across Cairns is shown in **Figure 3.19**.

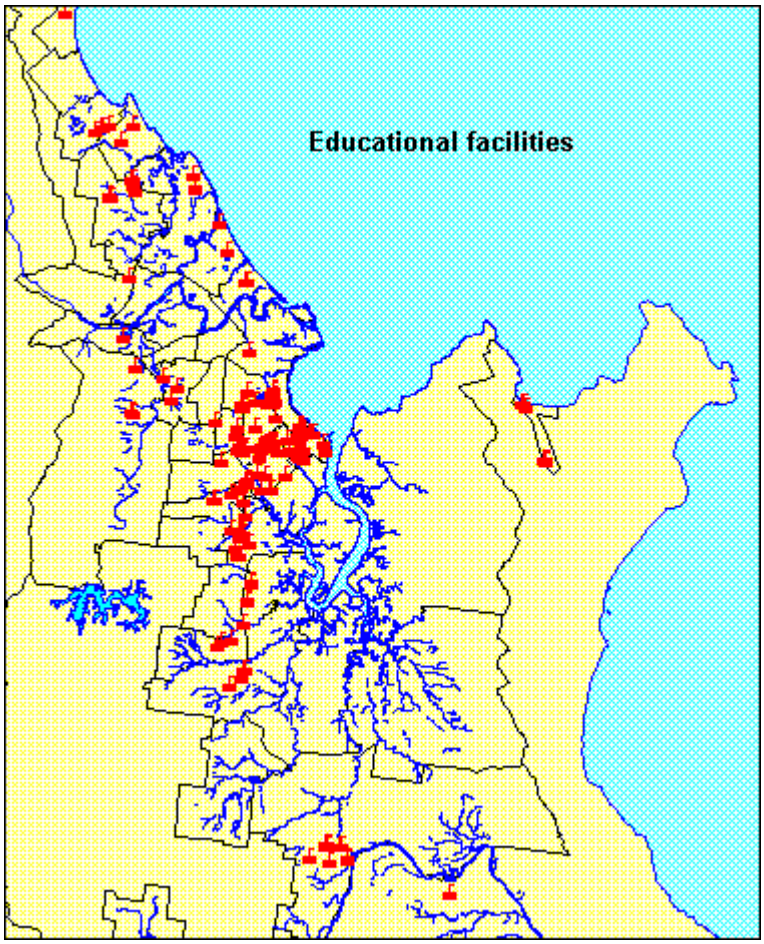

Figure 3.19: Cairns educational facilities.

The SEIFA *Index of Education and Occupation* also provides an overview of the distribution of population with an educational 'advantage'. As with the two SEIFA indexes already discussed, this index is also standardised with a national mean of 1 000 and a standard deviation of 100. The Cairns mean value is 1 001.25 and range from a high (high educational levels and high occupation status) of 1 085.05 in Palm Cove to a low (low education levels and job status) of 807.59 in Yarrabah. **Table C8** lists the variables used to build this index.

Community services: Community based groups provide a significant level of social resilience and effective networks for the dissemination of information. Cairns is extremely well served by these groups, which include those based on schools (e.g. Parents and Citizens Associations), churches (e.g. youth groups, fellowships, etc), sporting activities and community service clubs. It is likely that there is a significant degree of cross membership between these various groups, a situation that has been observed in other communities, to greatly enhance community resilience and cohesion.

A detailed community service guide for Cairns has not been available to this study, however, the list provided in **Table C9**, compiled from the Yellow Pages Directory, provides an (incomplete) impression of the broad extent of interests covered.

Critical, High Risk and Hazardous Facilities

The distribution of facilities that are critical to the safety and sustenance of the community provides a strong indicator of community vulnerability, particularly in the aftermath of a disaster impact. A total of 59 such facilities have been selected as representing the most critical to the overall vulnerability of the Cairns community. These are listed in **Table C10**.

Some of these facilities could, under certain circumstances, exacerbate the impact of a hazard event by adding to the danger. The loss of containment of hazardous materials such as chemicals or flammable substances as the result of a hazard impact, for example, would magnify the danger because of toxic contamination, fire or explosion. The facilities that are considered to contain secondary hazards are annotated in **Table C10**. The hazards contained at some of these facilities are not always obvious. For example, large commercial cold storage facilities would not usually be considered to be dangerous, however, they typically use large quantities of ammonia as their refrigerant (as much as three tonnes in some facilities). Apart from its noxious properties, as a gas, ammonia is highly flammable.

A wide range of essentially incompatible chemicals may be stored on the same premises. Supermarkets, garden supply nurseries, pool supply shops, hardware stores, school chemistry laboratories, pharmacies and so on, store a wide range of chemicals (generally in small quantities) that can become very dangerous if not properly contained and stored. Some chemicals, such as the various forms of cyanide, can be extremely dangerous, even in very small quantities. Some of these are used in a wide range of processes and can be found in the most obscure businesses such as fibreglass manufacture, electro-plating, jewellery manufacture and the manufacture of dental prostheses. Most facilities that store quantities of hazardous substances over certain thresholds, however, must display safety placards that identify the chemicals and the nature of the hazard they represent.

One unusual facility included in **Table C10**, on the strength of its potential hazardousness, is the Cairns Crocodile Farm located at the head of Trinity Inlet. This facility contains some 9 000 salt water crocodiles ranging from a few tens of centimetres to more than five metres in length. Their escape as the result of a hazard impact, such as a storm tide or flood, would add a very interesting dimension to community risk.

Facilities in which people concentrate at various times can also be considered to be high risk facilities (in terms of people exposed), especially for hazards such as earthquakes which strike without warning at any time of day. Such facilities are too numerous to list individually but would include the following groups of facility:

- schools, preschools and other educational facilities;
- entertainment, recreational and sporting facilities;
- transport terminals;
- tourist accommodation such as hotels, resorts and hostels;
- shopping, commercial and professional centres; and,
- hospitals and nursing homes.

A Composite View of Community Vulnerability

In this chapter so far we have described a broad range of the elements at risk within the Cairns community and identified some of the key aspects that contribute to their vulnerability. These have been drawn from the large amount of high resolution data accumulated on the hazard phenomena, people, buildings and infrastructure of Cairns since 1995. Whilst these data provide a detailed quantitative description of specific aspects of the city's risk environment, they do not, of themselves, provide an adequate measure of overall community vulnerability. Nor do they individually reflect the relative levels of vulnerability across the city.

We consider that it is highly desirable, however, to be able to identify those parts of the city that would provide a potentially disproportionate contribution to community risk because of the number and nature of the elements at risk they contained. Given that most people tend to identify themselves with the suburb in which they live and/or work, we have aggregated these data to that level.

There is little in the risk or disaster management literature to provide a guide for this task so we have created our own methodology based on the 'five esses' described in this chapter and a composite, or combined community vulnerability assessment. **Appendix E** provides a detailed explanation of the methodology and the logic behind the selection of the variables included.

The following six figures illustrate the spatial distribution of the suburbs according to their contribution to community vulnerability from the setting (**Figure 3.20**), shelter (**Figure 3.21**), sustenance (**Figure 3.22**), safety (**Figure 3.23**) and society (**Figure 3.24**) groups plus a composite view (**Figure 3.25**). The accompanying tables (**Table 3.5**, **Table 3.6**, **Table 3.7**, **Table 3.8, Table 3.9**, **Table 3.10**) list the suburbs in rank order, grouped in the same manner as shown on the maps. A full listing of the rank for each suburb, for each group, is provided in **Table 3.11**, whilst **Table C8 Table C9**, **Table C10** list the variables used in the assessment of each of the SEIFA indexes used.

It is of interest to note that the settlements of Gordonvale and Yarrabah both rank highly on the five individual measures and the composite measure. Both have been, or continue to be, 'central places' that provide a range of services to their immediate hinterland. In the case of Gordonvale, its role as the centre of the sugar industry and its history as the centre of the former Mulgrave Shire is reflected in the range of services (such as hospital, nursing home, commercial activity and so on) provided. Yarrabah, by contrast, is a separate and self administering Aboriginal Community. Its isolation from Cairns and its separate administration has seen it become largely self sufficient in terms of health services, education facilities and other services.

The former rural village of Edmonton, which has now become absorbed into the Cairns suburban growth, also reflects a residual central place character. On the northern beaches, Smithfield is rapidly developing as the regional service centre and will probably emerge, over the next few years, as a key central place.

It is emphasised that values in **Table 3.10** and the 'Overall' column in **Table 3.11** do **not** equate to a risk rating. **They simply provide an indication of the relative contribution made to overall community risk by each suburb, assuming that an even and equal exposure to the impact of all hazards existed.** This is clearly not the case, as will be explored in the following chapters.

In the next chapters, we bring together an analysis of the earthquake (Chapter 4), landslide (Chapter 5), flood (Chapter 6) and cyclone (Chapter 7) hazards, and their threat to the Cairns community. In Chapter 8 we draw these together into an assessment of the total multi-hazard risk faced by the Cairns community and link that assessment to a consideration of some risk mitigation strategies.

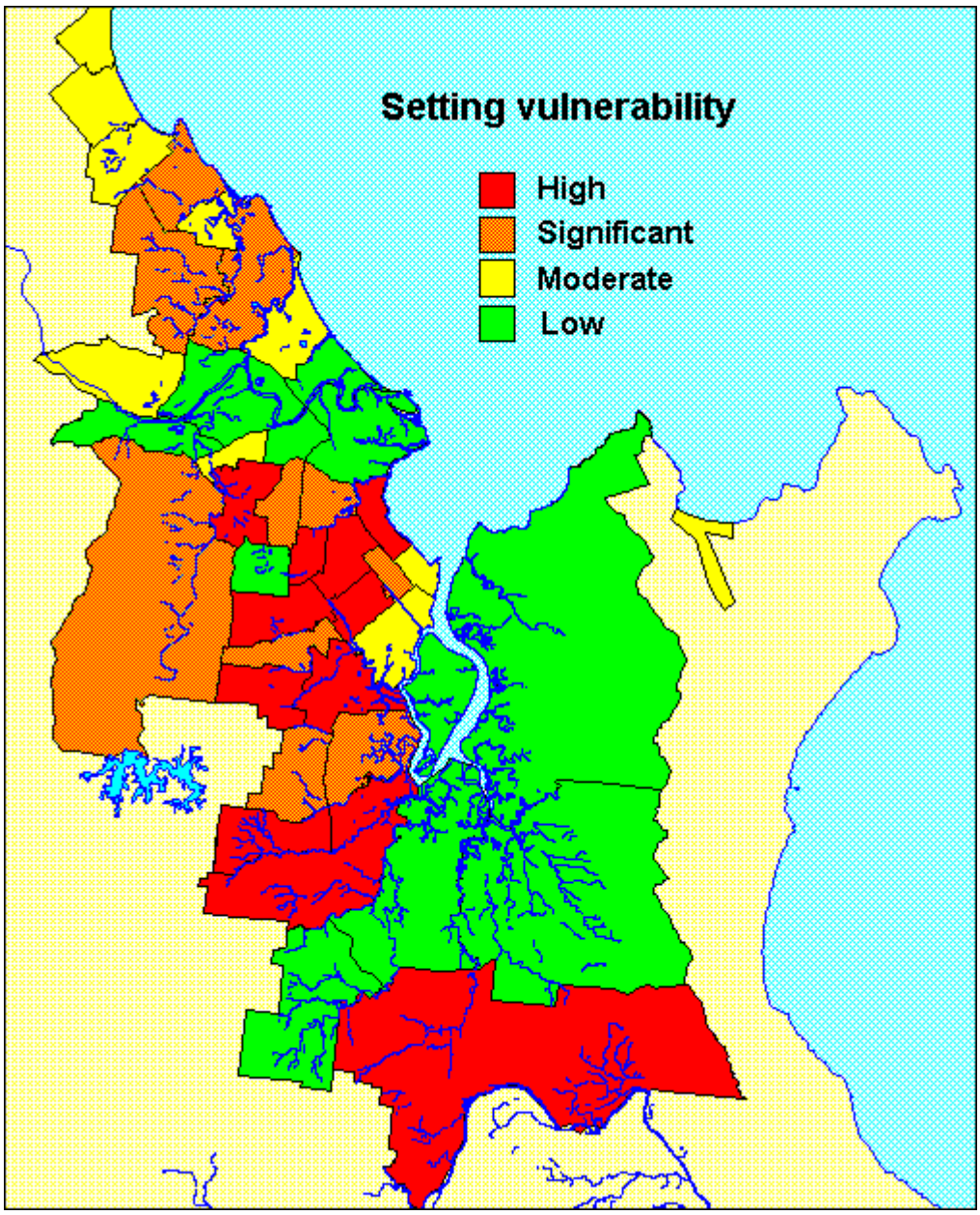

Figure 3.20: Relative suburb contribution to setting group vulnerability

Table 3.5: Relative suburb contribution to setting group vulnerability

RANK GROUP	SUBURBS (in rank order)
HIGH	Mooroobool, Manoora, Westcourt, Manunda, Edmonton, Cairns North, Woree, Gordonvale, Bentley Park, Brinsmead, Bayview Heights
SIGNIFICANT	White Rock, Edge Hill, Trinity Beach, Smithfield, Earlville, Whitfield, Redlynch, Parramatta Park, Yorkeys Knob, Mount Sheridan
MODERATE	Holloways Beach, Kewarra Beach, Freshwater, Yarrabah, City, Clifton Beach, Palm Cove, Caravonica, Trinity Park, Portsmith
LOW	Machans Beach, Kanimbla, Stratford, Kamerunga, Trinity East, Mount Peter, Aeroglen, Barron, Kamma, Wright's Creek

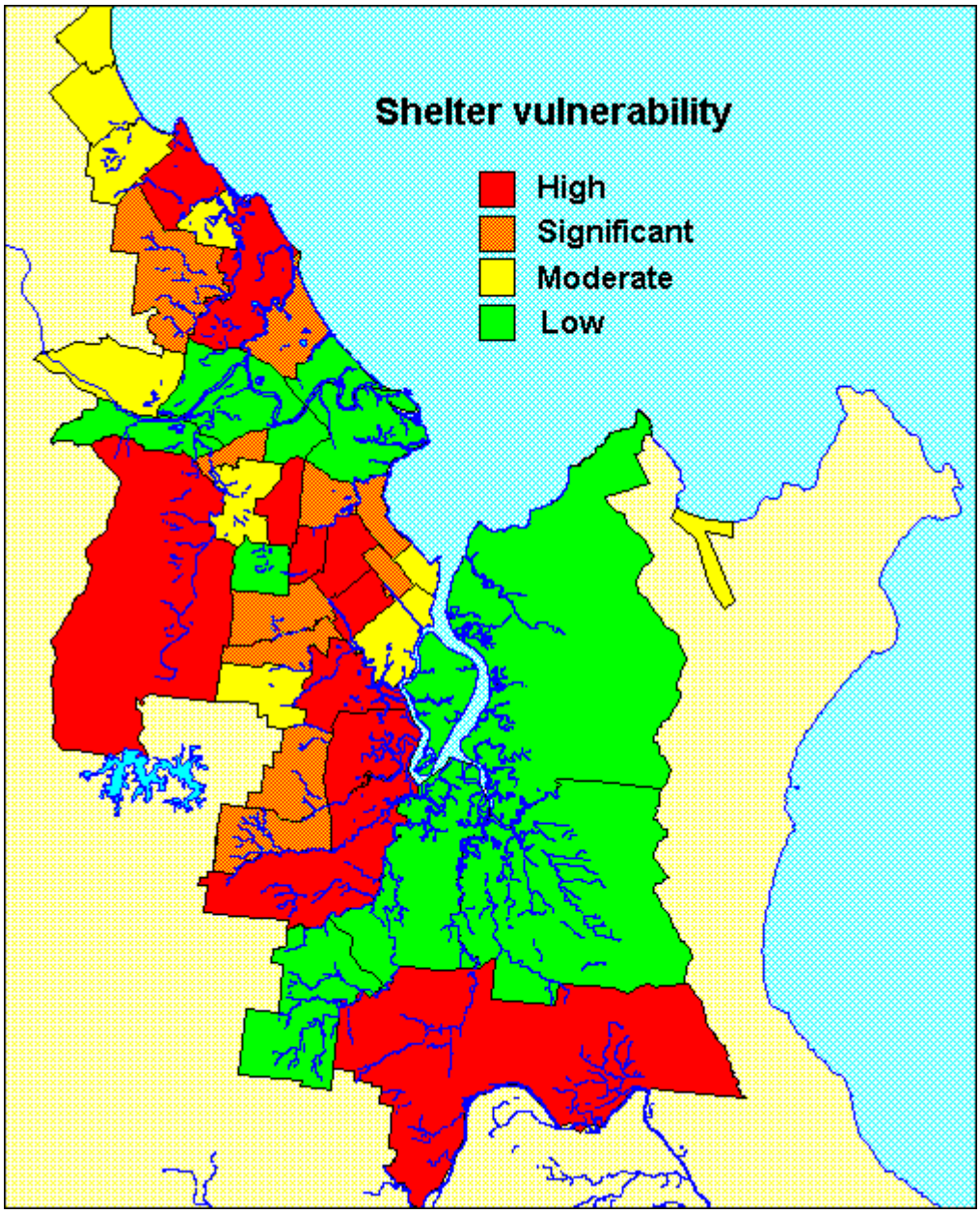

Figure 3.21: Relative suburb contribution to shelter group vulnerability

Table 3.6: Relative suburb contribution to shelter group vulnerability

RANK GROUP	SUBURBS (in rank order)
HIGH	Edmonton, Manunda, Woree, Westcourt, Whitfield, Manoora, Gordonvale, Trinity Beach, White Rock, Yorkeys Knob, Redlynch
SIGNIFICANT	Mooroobool, Holloways Beach, Edge Hill, Cairns North, Bentley Park, Freshwater, Earlville, Parramatta Park, Smithfield, Mount Sheridan
MODERATE	Kewarra Beach, Bayview Heights, Yarrabah, Palm Cove, Clifton Beach, Brinsmead, Portsmith, City, Caravonica, Trinity Park
LOW	Kamerunga, Machans Beach, Stratford, Trinity East, Kanimbla, Aeroglen, Mount Peter, Kamma, Barron, Wright's Creek

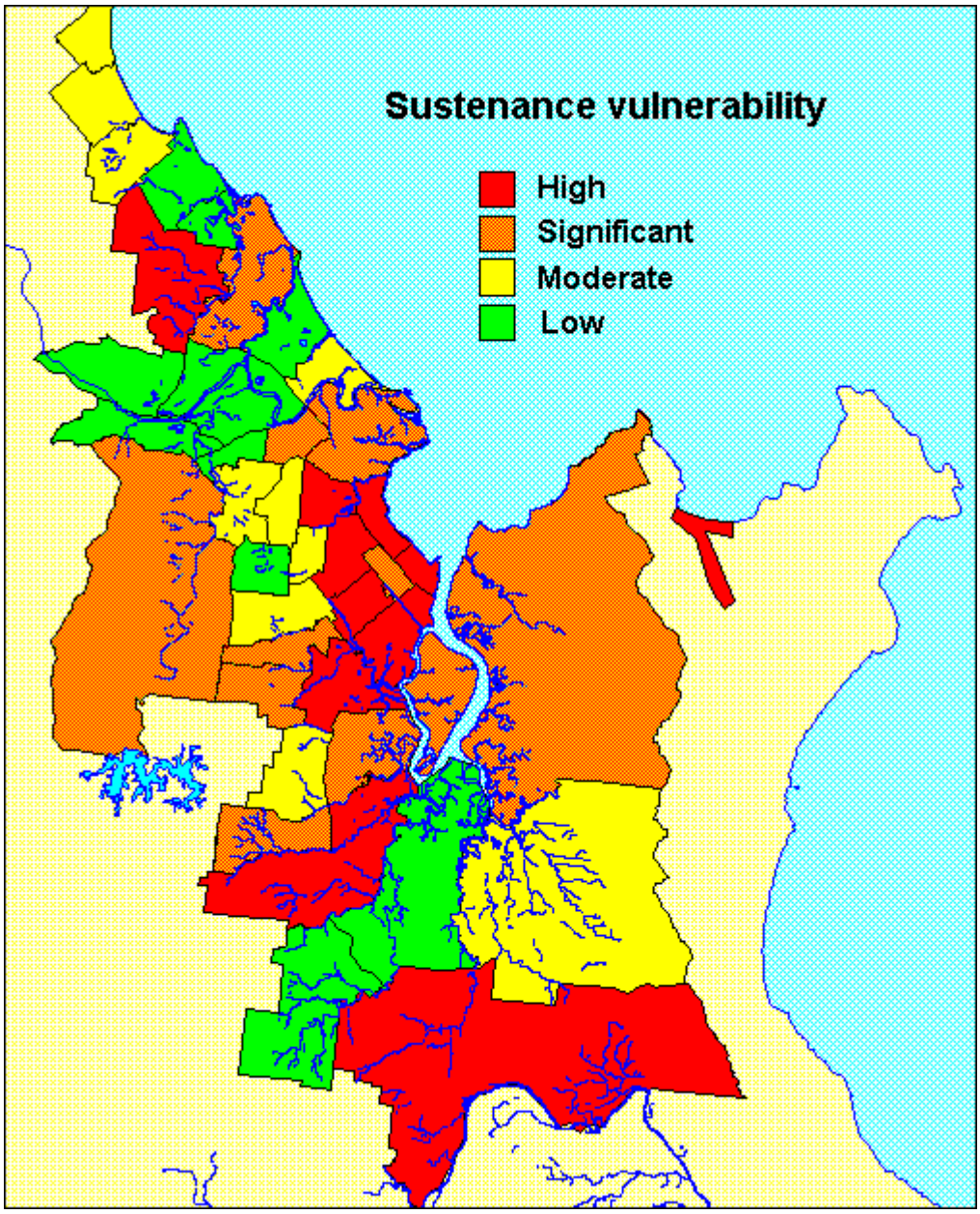

Figure 3.22: Relative suburb contribution to sustenance group vulnerability

Table 3.7: Relative suburb contribution to sustenance group vulnerability

RANK GROUP	SUBURBS (in rank order)
HIGH	Gordonvale, Portsmith, Manunda, Westcourt, Yarrabah, City, Cairns North, Smithfield, Woree, Edmonton, Edge Hill
SIGNIFICANT	Parramatta Park, Earlville, Redlynch, Bentley Park, Stratford, White Rock, Trinity East, Aeroglen, Yorkeys Knob, Bayview Heights
MODERATE	Palm Cove, Mooroobool, Clifton Beach, Kamma, Brinsmead, Whitfield, Mount Sheridan, Manoora, Kewarra Beach, Machans Beach
LOW	Wright's Creek, Trinity Beach, Holloways Beach, Kanimbla, Freshwater, Caravonica, Mount Peter, Kamerunga, Trinity Park, Barron

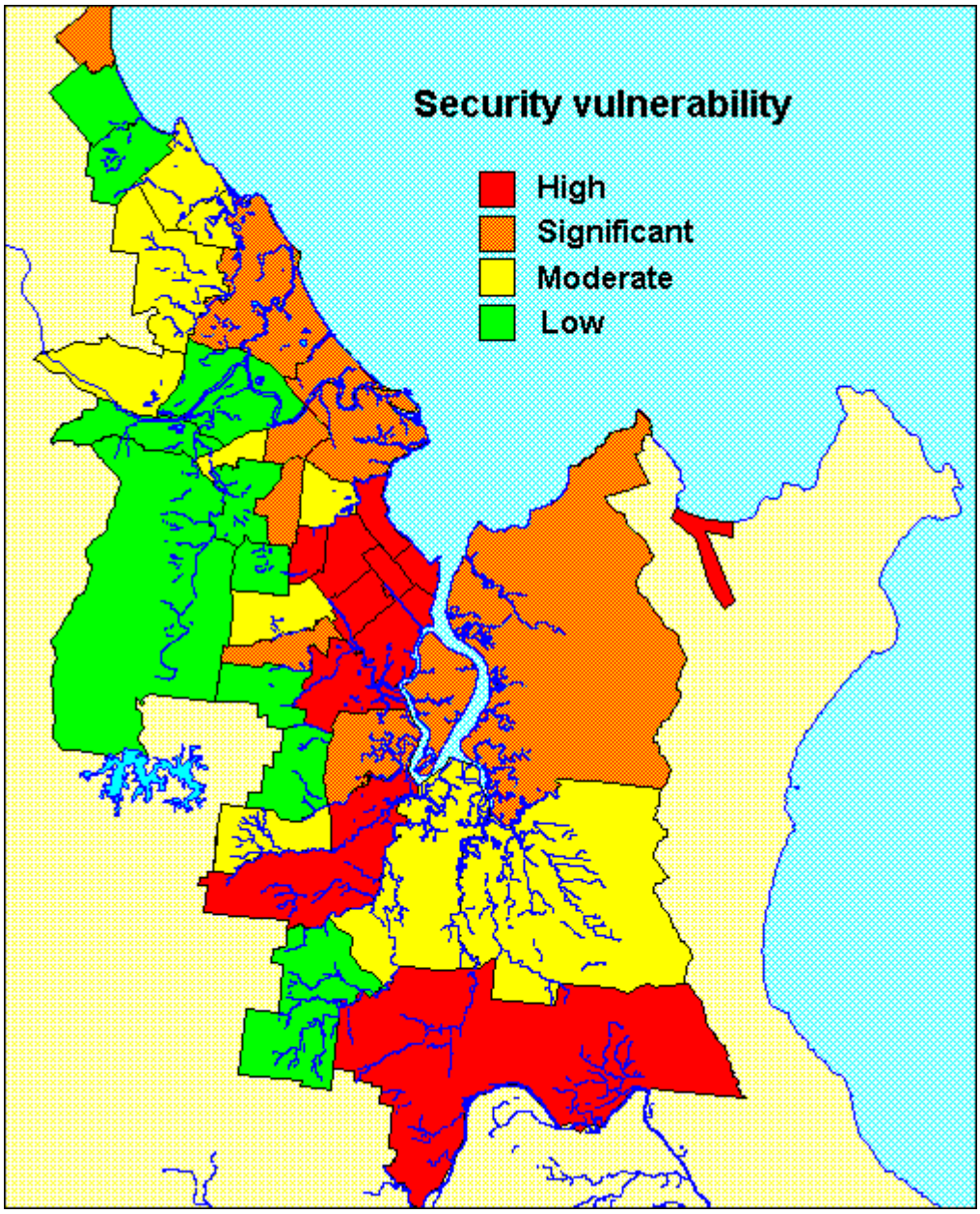

Figure 3.23: Relative suburb contribution to security group vulnerability

Table 3.8: Relative suburb contribution to security group vulnerability

RANK GROUP	SUBURBS (in rank order)
HIGH	Westcourt, Gordonvale, Yarrabah, Portsmith, Parramatta Park, Manunda, Cairns North, Woree, Manoora, City, Edmonton
SIGNIFICANT	Earlville, White Rock, Aeroglen, Trinity East, Whitfield, Yorkeys Knob, Palm Cove, Machans Beach, Holloways Beach, Stratford
MODERATE	Bentley Park, Edge Hill, Wright's Creek, Trinity Beach, Smithfield, Kamma, Mooroobool, Caravonica, Trinity Park, Freshwater
LOW	Clifton Beach, Kanimbla, Mount Sheridan, Mount Peter, Redlynch, Kewarra Beach, Barron, Kamerunga, Bayview Heights, Brinsmead

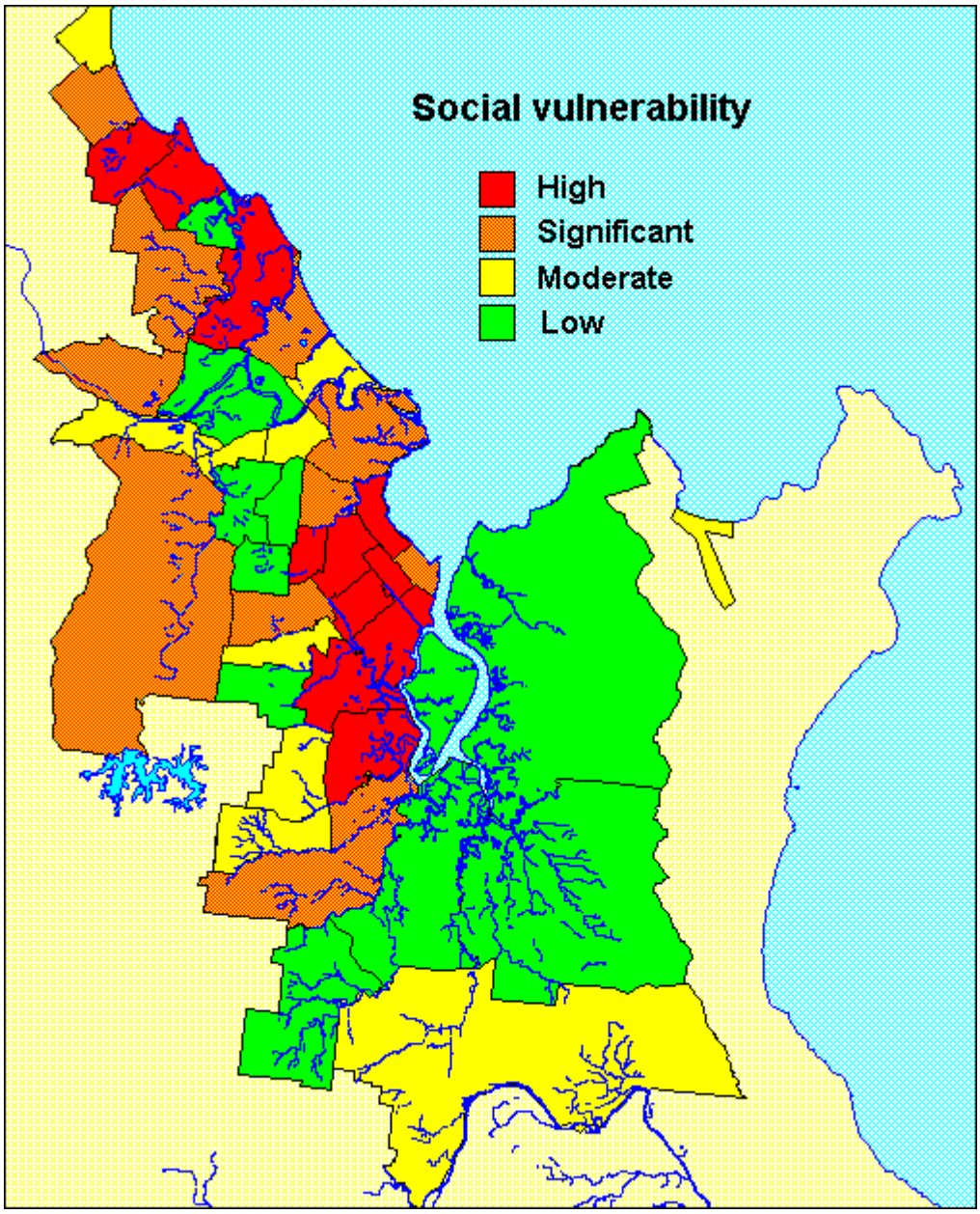

Figure 3.24: Relative suburb contribution to society group vulnerability

Table 3.9: Relative suburb contribution to society group vulnerability

RANK GROUP	SUBURBS (in rank order)
HIGH	Parramatta Park, Manoora, Portsmith, Yorkeys Knob, Cairns North, Westcourt, Manunda, Woree, White Rock, Kewarra Beach, Trinity Beach
SIGNIFICANT	Mooroobool, Redlynch, Smithfield, Holloways Beach, Edmonton, Edge Hill, Aeroglen, City, Caravonica, Clifton Beach
MODERATE	Gordonvale, Earlville, Bentley Park, Mount Sheridan, Palm Cove, Yarrabah, Kamerunga, Stratford, Freshwater, Machans Beach
LOW	Whitfield, Trinity Park, Brinsmead, Kanimbla, Trinity East, Mount Peter, Bayview Heights, Wright's Creek, Kamma, Barron

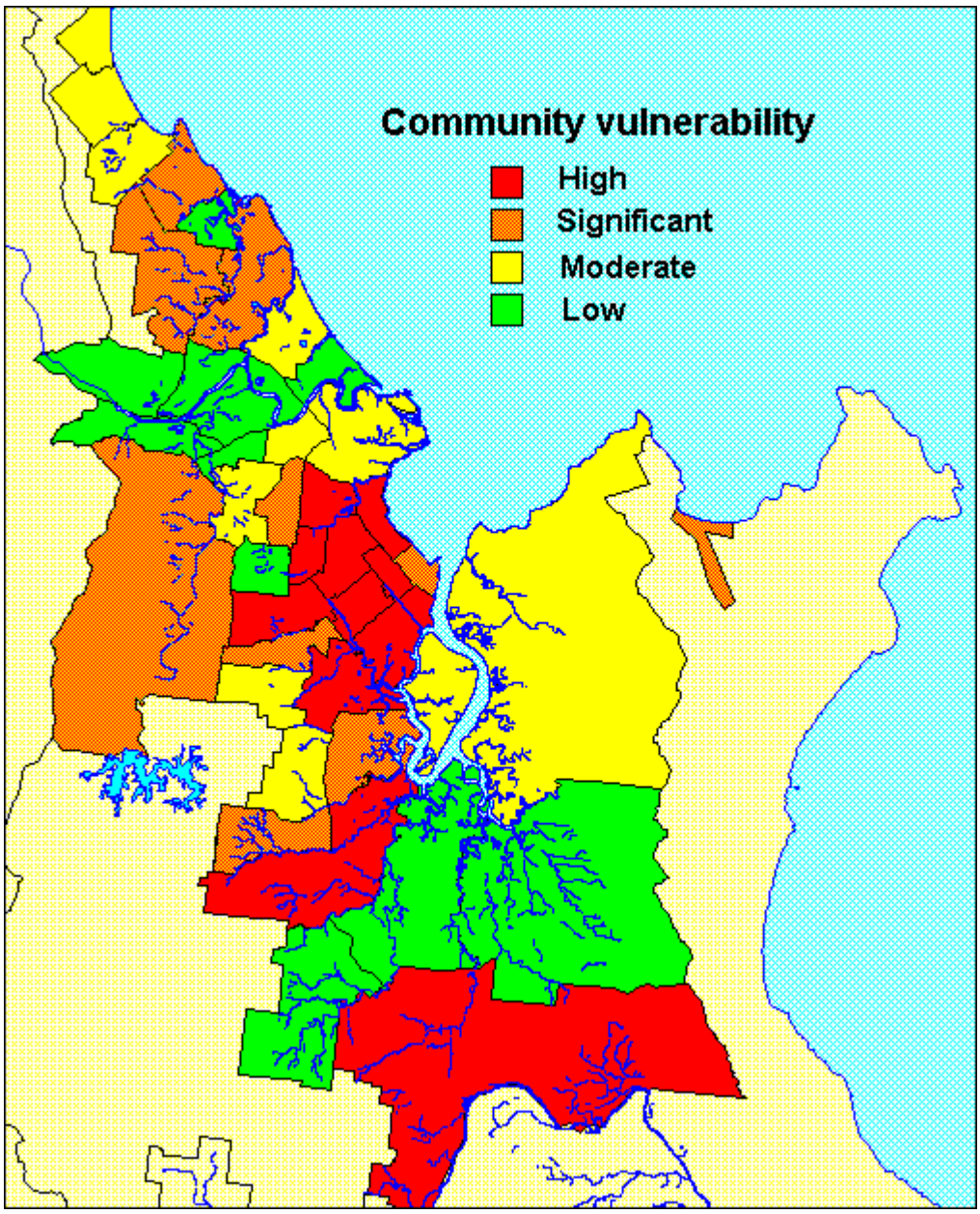

Figure 3.25: Relative suburb contribution to overall community vulnerability

Table 3.10: Relative suburb contribution to overall community vulnerability

RANK GROUP	SUBURBS (in rank order)
HIGH	Westcourt, Manunda, Gordonvale, Manoora, Edmonton, Woree, Portsmith, Parramatta Park, Cairns North, Mooroobool, White Rock
SIGNIFICANT	Yarrabah, Yorkeys Knob, Edge Hill, City, Smithfield, Trinity Beach, Earlville, Bentley Park, Whitfield, Redlynch
MODERATE	Holloways Beach, Kewarra Beach, Aeroglen, Palm Cove, Bayview Heights, Brinsmead, Mount Sheridan, Stratford, Clifton Beach, Trinity East
LOW	Freshwater, Caravonica, Machans Beach, Trinity Park, Kamma, Kamerunga, Kanimbla, Wright's Creek, Mount Peter, Barron

Table 3.11: Ranking of each suburb's contribution to overall community vulnerability

SUBURB	SETTING	SHELTER	SUSTAIN	SECURITY	SOCIETY	OVERALL
Aeroglen	38	37	19	14	18	24
Barron	39	40	41	38	41	41
Bayview Heights	11	23	21	40	38	26
Bentley Park	9	16	15	22	24	19
Brinsmead	10	27	26	41	34	27
Cairns North	6	15	7	7	5	10
Caravonica	29	30	37	29	20	33
City	26	29	6	10	19	15
Clifton Beach	27	26	24	32	21	30
Earlville	16	18	13	12	23	18
Edge Hill	13	2	3	6	7	2
Edmonton	5	1	10	11	16	6
Freshwater	24	17	36	31	30	32
Gordonvale	8	7	1	2	22	4
Holloways Beach	22	13	34	20	15	22
Kamerunga	35	32	39	39	28	37
Kamma	40	39	25	27	40	36
Kanimbla	33	36	35	33	35	38
Kewarra Beach	23	22	30	37	10	23
Machans Beach	32	33	31	19	31	34
Manoora	2	6	29	9	2	5
Manunda	4	2	3	6	7	2
Mooroobool	1	12	23	28	12	11
Mount Peter	37	38	38	35	37	40
Mount Sheridan	21	21	28	34	25	28
Palm Cove	28	25	22	18	26	25
Parramatta Park	19	19	12	5	1	9
Portsmith	31	28	2	4	3	8
Redlynch	18	11	14	36	13	21
Smithfield	15	20	8	26	14	16
Stratford	34	34	16	21	29	29
Trinity East	36	35	18	15	36	31
Trinity Beach	14	8	33	25	11	17
Trinity Park	30	31	40	30	33	35
Westcourt	3	4	4	1	6	1
White Rock	12	9	17	13	9	12
Whitfield	17	5	27	16	32	20
Woree	7	3	9	8	8	7
Wright's Creek	40	41	32	24	39	39
Yarrabah	25	24	5	3	27	13
Yorkeys Knob	20	10	20	17	4	14