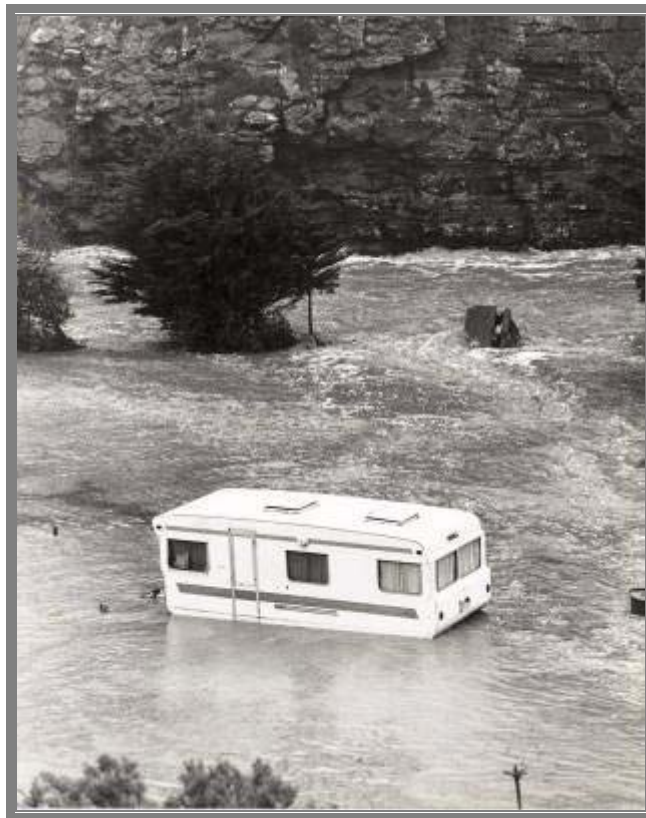




Australian Government  
Department of Transport and  
Regional Services



# VICTORIA CARAVAN PARKS FLOOD RISK SURVEY



*Cumberland River, March 1983*

**Final Report – Draft**

**June 2006**



Bewsher Consulting Pty Ltd

**THE STEERING COMMITTEE**

**VICTORIA CARAVAN PARKS  
FLOOD RISK SURVEY**

**FINAL REPORT – DRAFT**

**June 2006**

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## FOREWORD

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The study was overseen by a Steering Committee with representatives from:

- ▶ Floodplain Management Unit, DSE;
- ▶ North East Catchment Management Authority (NECMA);
- ▶ Goulburn Broken Catchment Management Authority (GBCMA);
- ▶ Melbourne Water (MW);
- ▶ Built Environment, DSE;
- ▶ Crown Land Management, DSE;
- ▶ Office of the Emergency Services Commissioner (OESC);
- ▶ Victoria State Emergency Services (VICSES);
- ▶ City of Greater Shepparton; and
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Bewsher Consulting Pty Ltd

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## EXECUTIVE SUMMARY

### Introduction (Section 1)

- ▶ The aim of this study is to provide an overall assessment of flood risks at caravan parks in Victoria, and to recommend best policy and practice for the management of flood risks at existing parks, extensions to parks and new parks.

### Background to Caravan Parks (Section 2)

- ▶ About 619 caravan parks are located in Victoria, which are distributed relatively widely across the State.
- ▶ Nearly 10,000 people live in caravan parks in Victoria, with a high proportion of elderly, unemployed and low income earners.
- ▶ The number of cabins in Victorian caravan parks has increased substantially over recent years, representing an increase in property exposure.

### Existing Regulations (Section 3)

- ▶ Building permits are *not* required for the installation of “movable dwellings” within caravan parks, which are defined as dwellings capable of being removed within 24 hours.
- ▶ Each caravan park owner must: (1) prepare an emergency management plan to the satisfaction of council; (2) display the evacuation procedures and give a copy of the evacuation procedures to patrons on arrival; and (3) inform prospective owners and residents of cabins (or caravans attached to rigid annexes) if the land is flood-liable.

### Flood Risk Mapping (Section 4)

- ▶ An analysis based on almost half of Victoria’s caravan parks indicates that 38% are subject to at least partial flooding in the 100 year event, and 22% are at least partly located within designated floodways. These results are regarded as underestimates. It is estimated that about half of Victoria’s caravan parks are at least partially flood-prone.

### Flood Risk Questionnaire (Section 5)

- ▶ A detailed assessment of flood risk was undertaken for 40 caravan parks in Victoria. The key results are summarised here.

#### *Flood hazard*

- ▶ 98% of the parks have at least a few sites located within the 100 year flood extent, and 58% have all sites subject to flooding.

#### *Elements at risk*

- ▶ 100% of the parks offer powered and/or unpowered sites; 90% have tourist cabins; 75% cater for “permanents”; 60% cater for “annuals”; and 50% have on-site vans.

#### *Flood response capacity*

- ▶ 35% of the park locations are not part of the Bureau of Meteorology’s quantitative flood warning network, and 33% have warning times of six hours or less.
- ▶ 18% of the parks occupy “shrinking island” locations.
- ▶ In at least 13% of the parks, insufficient time would be available to evacuate people, and in at least 23% of the parks, insufficient time would be available to evacuate property.
- ▶ The average (median) time a person occupies the position of park manager is four years; 80% of managers have not experienced a significant flood while manager.

#### *Existing management measures*

- ▶ 28% of the parks are afforded some protection by artificial levees, though often the level of protection is not known.
- ▶ 78% of the parks have evidence of some form of site planning as a floodplain management measure.
- ▶ 64% of the parks contain at least some dwellings with raised floors as a floodplain management measure, often tourist cabins.
- ▶ 50% of the parks contain at least some movable vans and/or cabins, often on-site vans, rarely “annuals” or tourist cabins.
- ▶ 38% of park owners do not possess an Emergency Management Plan, and 84% of the plans reviewed do not adequately address flood risk.
- ▶ 48% of park owners do not display evacuation procedures in public areas, and 60% do not issue evacuation procedures to patrons on arrival.
- ▶ 72% of applicable park owners do not provide written notice of flood-liability to prospective owners of cabins (or vans attached to rigid annexes) located in flood-liable areas, and 69% of applicable park owners do not provide written notice to prospective residents of these fixed structures.
- ▶ 18% of the parks have a clearly displayed flood marker or gauge board.
- ▶ Some park owners have insured their tourist cabins and/or vans against flood.

#### *Flood risk assessment*

- ▶ 23% of the parks have a high flood-readiness; 40% have a low flood-readiness.
- ▶ 20% of the parks are deemed to have an acceptable flood risk, 8% occupy locations that are deemed to be dangerous, and 73% have an intermediate flood risk, requiring the application of appropriate planning controls.



## Flood Risk Treatment (Section 6)

- ▶ Figure 6.1 presents a matrix of typical planning considerations for new caravan parks and park extensions, which are considered appropriate for the management of flood risks. It identifies the types of controls that should be implemented within various flood risk areas, and for various land uses within the parks. According to this matrix, areas of extreme flood risk – defined as areas with a high hydraulic hazard in the 100 year flood and an inadequate effective warning time – should not be developed for use as caravan parks. Areas of high flood risk – defined as areas with a high hydraulic hazard but with an adequate effective warning time – would allow only tourist cabins, on-site vans and powered and unpowered sites for tourists, subject to various planning controls. Areas of low-medium flood risk – defined as areas with a low hydraulic hazard – would permit all land uses typically found in caravan parks, including permanent residential dwellings, subject to various planning controls.
- ▶ Options to manage flood risk at existing caravan parks are limited. The most likely means of reducing risk is by improving emergency response. Flash flood warning systems need to be developed for caravan parks located in flash flood areas. Improving park access would allow greater time and safety for evacuation. Emergency Management Plans (EMPs) would be improved by a number of amendments to the relevant Regulation (to explicitly mention “flood”, to require to council to consult with the relevant floodplain management authority, and to require the park owner to submit an updated EMP every year with the application for renewal of registration) and by preparing a template and guidelines to assist owners in preparing a plan and to assist councils in assessing plans. Flood awareness would be improved by constructing more flood markers and by increasing compliance with the Regulation, possibly by making display of the approved evacuation plan a condition for registration.

## Future Directions and Recommendations (Section 7)

The following recommendations are made:

1. The Steering Committee continue to meet as the need arises to oversee progress and to discuss any issues formally raised by the caravan park industry. Such issues may include:
  - a) Opportunities to achieve better management of flood risk where caravan parks are located on Crown Land;
  - b) Registration fees and cost recovery processes;
  - c) Monitoring performance against requirements established through the planning process or relevant regulations; and

- d) Developing an accreditation system that benefits caravan park managers that act responsibly in terms of managing the flood risk.
2. CMAs and Councils work proactively with the caravan park industry to:
  - a) Improve knowledge of the flood risk faced by caravan parks by identifying land affected by flooding, the number and location of caravan parks affected and the flood risk;
  - b) Keep an inventory of caravan parks and issues;
  - c) Assist with the development of EMPs; and
  - d) If appropriate, incorporate EMPs into Municipal Emergency Management Plans and Flood Emergency Plans.
3. DSE and CMAs continue to develop best practice principles and guidelines for caravan park owners and managers. Opportunities include:
  - a) Modifying the two VPP Practice Notes to include some discussion of how to manage the flood risk at caravan parks;
  - b) Incorporating guidelines for managing the flood risk at caravan parks into *Principles and Practices for Floodplain Management in Victoria* (under preparation);
  - c) Developing a template and guidelines to assist caravan park owners and managers manage their flood risk, to include a flood response plan, tools to raise local flood awareness, and in the case where the State-wide flood warning system cannot provide sufficient notice of pending floods, a site specific flood warning system;
  - d) Developing tools for raising flood awareness (such as incorporating education messages into industry newsletters); and
  - e) Requiring briefs for future flood studies and floodplain management plans include a requirement to look at risk and risk reduction measures applicable to any caravan parks within the study area.
4. DSE and CMAs sponsor a legal review and/or seek advice from the Department of Justice to clarify how best to utilise existing mechanisms for minimising the flood risk at caravan parks and whether these should be strengthened.
5. DSE and municipal Councils ensure that flood mapping is updated as the need arises and that the relevant information is incorporated into planning schemes.
6. Caravan park owners work proactively with CMAs and Councils to reduce risks to occupants. Considerations may include:
  - a) Strategies for ensuring movable dwellings remain movable and can be moved within a realistic time frame;
  - b) Raising access roads (provided flood impacts are not made worse); and
  - c) Installing flood markers.

# 1. INTRODUCTION

## 1.1 Flood Risk at Caravan Parks

A recent study of caravan parks in NSW indicated that many parks were flood prone, some occupying highly hazardous sites, and that residential parks in particular, contained vulnerable people living in structures highly susceptible to flood damage. Levels of preparedness were found to be generally low. A number of recommendations, particularly pertaining to planning controls, were proposed to manage the risk (Yeo, 2001, 2003; Yeo & Grech, 2005).

Anecdotal evidence suggests that caravan parks in Victoria are also at serious risk from flooding, particularly as many parks occupy riverside locations. **Figure 1.1** shows a selection of photographs of flooded caravan parks. Flooding in April 1990 severely affected caravan parks at Sale, Stratford, Lindenow and Bairnsdale (BOM, 1992). Flooding in October 1993 caused damages of at least \$0.7 million to two caravan parks near the Ovens River (DCNR, 1993). Interviews have revealed that the October 1993 flood damaged many cabins and vans, including floor coverings and electrical appliances. Outdoors barbeques were lost, roads were scoured and bridges damaged. In June 1998, flooding of the Mitchell River and Gippsland Lakes damaged cabins and vans, and led to a significant short-term downturn in tourist trade. In September 1998, flooding of rivers in the North-East again affected park accommodation and infrastructure, and posed a health risk as septic systems were overloaded. Bank erosion and the deposition of flood debris are problematic after most floods. No evidence has been uncovered of flood fatalities or injuries in Victorian caravan parks (unlike NSW). Nevertheless, the use of often highly flood-prone caravan parks as permanent places of residence is inherently risky. The thousands of visitors to caravan parks during peak periods add another dimension to the problem.

## 1.2 Value of Caravan Parks

Caravan parks have traditionally provided low-cost, short-term venues for holidaying in Australia. Tourists are attracted to the aesthetic qualities and recreational opportunities afforded by caravan parks located near beaches, rivers and lakes. Caravan parks also provide accommodation to some permanent residents who cannot afford other forms of housing or who favour the lifestyle offered by such parks. It is understood that caravan parks have sometimes been used by the Government as a form of temporary crisis accommodation or transitional housing for the homeless. Data from the Australian Bureau of Statistics (ABS) indicate that caravan parks provide direct employment for more than 2,000 people in Victoria.<sup>1</sup> Further, caravan parks often make a significant contribution to local economies, especially during peak season.

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<sup>1</sup> For the December quarter 2003, 1,986 persons were employed in 432 caravan parks with 40 or more powered sites and cabins in Victoria (ABS Tourist Accommodation Australia, Expanded Scope Collection, 8635.0.55.001, Year Ended 31 December 2003, p.34). The total number employed will be higher, since the ABS data do not account for the estimated 187 parks with less than 40 powered sites and cabins (see **Section 2**).



**FIGURE 1.1 – Flooded caravan parks**

### 1.3 Acceptable Risk?

Although caravan parks offer the community many benefits they can also represent a serious flood risk to their occupants. The Australian Standard defines risk as “the chance of something happening that will have an impact on objectives” (ARMCANZ, 2000, p.100). Risk is measured in terms of likelihood and consequences. What constitutes an *acceptable* level of risk is a vexed question. Answers will vary in line with varying objectives and perspectives, including whether an individual is risk-averse or risk-tolerant.

Flood risk management involves balancing the relative benefits and costs of using the floodplain. It involves tradeoffs between economic, social and environmental objectives (DOJ & NRE, 1998, p.3). Nowhere is the difficult nature of this balancing act more apparent than for caravan parks. Various stakeholders have an interest in caravan parks in Victoria, with different ideas about what constitutes an acceptable level of flood risk, and the degree of rigour required to address that risk. On the one hand, flood risk managers such as the Catchment Management Authorities (CMAs) and the State Emergency Service (VICSES) emphasise the need to eliminate or reduce flood risk at caravan parks. On the other hand, caravan park owners, employees and users, and industry representatives such as the Victorian Caravan Parks Association (Vic CPA), emphasise the value of caravan parks. One role of local councils is to consider the risk due to flooding when assessing the merits of a proposed development, but another role is to promote development in the best interests of

the community (DOJ & NRE, 1998, pp.35-37). Whilst this double role could potentially lead to conflicts of interest, balancing this tension, and achieving an acceptable level of risk, is at the heart of risk management. Two case studies demonstrate the sometimes contentious nature of the balancing act.

### 1.3.1 *Chinaman's Bridge Caravan Park, Nagambie*

Chinaman's Bridge Caravan Park at Nagambie has been used for camping since the 1950s and as a formal caravan park since the late 1970s. Most of the park is located on land owned by Goulburn-Murray Water and (until 2001) leased by Strathbogie Shire Council. In 1999 there were about 508 sites, mostly occupied by "annuals",<sup>2</sup> with 28 permanent residents. The number of people on site varied from 30-40 off-peak to 2,000-3,000 in the Christmas holidays (SKM, 1999).

In 1999, the Goulburn Broken CMA commissioned Sinclair Knight Merz (SKM) to undertake a flood risk assessment for the caravan park (SKM, 1999). Located on a low-lying peninsula between the Goulburn River and Lake Nagambie, the park is subject to a very high flood hazard. At the moderate flood level (3 year ARI),<sup>3</sup> 50% of the park would be inundated, including some caravans and annexes. For a major flood (12 year ARI), 90% of the park would be flooded, and the access road would be flooded to a depth of 0.4m. In the 1% flood, the entire park would be inundated, 70% to depths in excess of 2.0m, 25% to depths of 1.0-2.0m, and 5% to depths of 0.75-1.0m. The access road would be flooded to depths exceeding 1.7m. Coupled with a deficient flood warning system and a low level of awareness, the overall flood risk is significant.

In June 2001, the Board of Goulburn-Murray Water resolved to close Chinaman's Bridge Caravan Park, citing environmental, public health and flooding reasons, as well as failing infrastructure and legal liability. One concern was the potential effect of caravan park debris on Goulburn Weir during flood events ([www.g-mwater.com.au](http://www.g-mwater.com.au)).

The announcement that the park would close was met with strong community opposition, and a "Save the Park" group was formed (see **Figure 1.2a**). The Plumbing Union defended the caravan park as a "Working Man's Paradise", providing a unique opportunity for many working class families to enjoy an affordable form of vacation ([www.plumbers.cepu.asn.au/](http://www.plumbers.cepu.asn.au/)).

Apparently in response to this community pressure, the State Government committed to review Goulburn-Murray Water's decision to close the park. Erwin Weinmann of Monash University was commissioned to conduct an independent review of the SKM flood study. His review supported the findings of the original study ([www.g-mwater.com.au](http://www.g-mwater.com.au)).

Probably also in response to petitions from its constituents, Strathbogie Shire commissioned a report, which concluded that a large tourist park on the site would be financially feasible. Shortly afterwards, the Shire invited expressions of interest for the redevelopment of the caravan park site. One of the requirements for the new tourist park was the establishment of "a stand-alone flood warning system" or connection to an existing flood warning system (Shire of Strathbogie and MacroPlan Australia, 2004).

Despite prospects for redevelopment, Chinaman's Bridge Caravan Park formally closed on 30 June 2004. Some 220 van sites had been vacated by that time. However, the remaining "annuals" siteholders were given a four month reprieve to remove their vans from the park, while Council were exploring ways to develop a new tourist park that would retain the

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<sup>2</sup> An "annual" site, or long-term holiday site, is a site that is continuously occupied by a movable dwelling such as a caravan but is used only occasionally for holiday purposes.

<sup>3</sup> ARI = Average Recurrence Interval, e.g. 100 year ARI is a flood that occurs or is exceeded on average once every 100 years. It has a 1% chance of occurring (or being exceeded), every year.

siteholders ([www.g-mwater.com.au](http://www.g-mwater.com.au)). In May 2005, a visit to the park gave the impression that a few people continued to live on the site, and that many vans remained there, most being difficult to relocate because they were raised well above the ground or were attached to rigid annexes (**Figure 1.2b**).

This case study highlights the fervent community resistance to closing a valued holiday location, despite the strong arguments mounted by the landowner, particularly the significant flood risk.



**FIGURE 1.2 – Chinaman’s Bridge Caravan Park**

### 1.3.2 Alpine Shire Planning Scheme amendments

In August 2004, proposed amendments to the Alpine Shire Planning Scheme were placed on exhibition. The amendments involved introducing the Floodway Overlay (FO) and Land Subject to Inundation Overlay (LSIO),<sup>4</sup> as well as associated schedules. The proposed schedule to the FO aims to *discourage* movable dwellings (excluding caravans and tents), dependent persons units, prefabricated holiday units and rigid annexes on land included in the FO. The proposed schedule to the LSIO aims to *encourage* these dwellings on land *outside* the LSIO. Both schedules specify that if these dwellings are permitted on flood-prone land, they should be maintained in a mobile condition (with drawbar, axle and wheels attached), should be capable of being removed with the minimum extent of flood warning, and should be owned by the owner/manager of the park. It is understood that a number of caravan park owners made submissions objecting to the proposed amendments, on the grounds that the amendments were inconsistent with growing the tourist industry, would reduce the value of caravan parks, and would cause a loss of business opportunity by reason of the difficulties of complying with the amendment.

This case study shows the strong opposition to flood risk reduction measures that are perceived as limiting development potential. In this case, the resistance was led by local caravan parks. The local council proposed the policy changes after its experience of severe floods in 1993 and 1998. In addition, local landholders at Myrtleford regard it as inequitable that the adjacent caravan park can construct cabins while they are refused permission to construct sheds on land within the same floodway (Roel Von't Steen, NECMA, *pers. comm.*, Nov 2005).

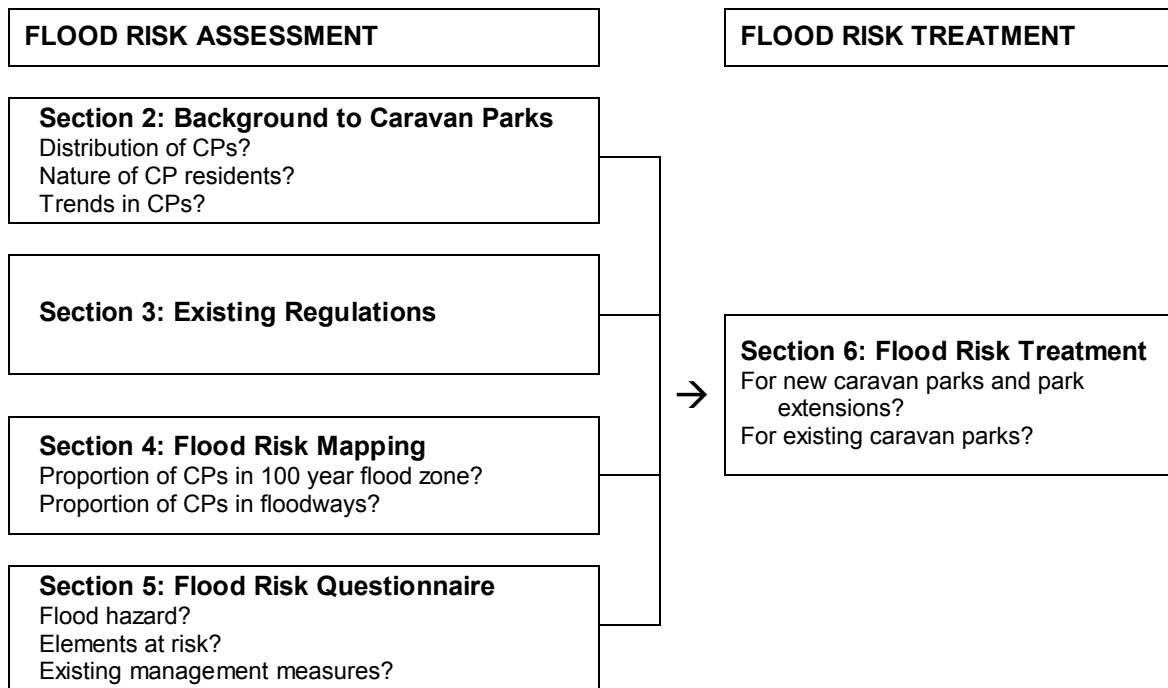
<sup>4</sup> FO and LSIO refer to mapping carried out under the Victorian Planning Provisions (VPP). Floodways are defined as waterways, major floodpaths, drainage depressions and high hazard areas which have the greatest risk and frequency of being affected by flooding (VPP Clause 44.03). Land Subject to Inundation is defined as land in a flood storage or flood fringe area affected by the 1 in 100 year flood (VPP Clause 44.04).

## 1.4 Aim

A prerequisite for setting an appropriate balance is a sound understanding of the flood risks. The aim of this study is to provide an overall assessment of flood risks at caravan parks in Victoria, and to recommend best policy and practice for the management of flood risks at existing parks, extensions to parks and new parks.

## 1.5 Outline

A range of methods have been used to achieve this aim. **Section 2** presents some background information for caravan parks in Victoria, including the distribution of caravan parks and industry trends. A brief summary of legislation pertaining to flood-prone caravan parks is provided in **Section 3**. **Section 4** presents the results of State-wide mapping used to estimate the number of caravan parks exposed to flooding and the severity of the flood hazard. **Section 5** details the results of a questionnaire, which was used to obtain a close up view of flood risks and flood risk management at 40 caravan parks. **Section 6** explores ways of treating the flood risk. **Figure 1.3** summarises the adopted approach.



**FIGURE 1.3 – Outline of report**

## 2. BACKGROUND TO CARAVAN PARKS

### 2.1 Caravan Park Distribution

A list of 619 caravan parks in Victoria was provided by the Victorian Caravan Parks Association (Vic CPA). While this list was slightly outdated, it was considered the best available record of caravan parks in Victoria.<sup>5</sup> Addresses in this list were used to match caravan parks to Local Government Areas (LGAs). Where only postal addresses were provided, street addresses were sourced from the Internet. **Figure 2.1** plots the distribution of caravan parks in Victoria. Seven LGAs have more than 20 caravan parks. In some cases this reflects the sheer size of the council area (e.g., East Gippsland), but in all cases it reflects people's preferred holiday locations, especially in coastal regions east and south of Melbourne, and along the Murray River near Echuca (Moir Shire) and Mildura. Only a few caravan parks are located in the Melbourne urban area. In general, caravan parks in Victoria are more widely dispersed than in NSW, where there is a strong bias towards coastal locations (Yeo, 2001, p.6). This probably reflects the diverse, non-coastal tourist locations in relatively close proximity to Melbourne, including the alpine areas near Bright, the Grampians and the Murray River.

### 2.2 Caravan Park Residents

At the 1996 Census, 9,362 people were recorded as living in caravan parks in Victoria, of whom 3,745 rented the caravan (Wensing et al., 2003, p.82).

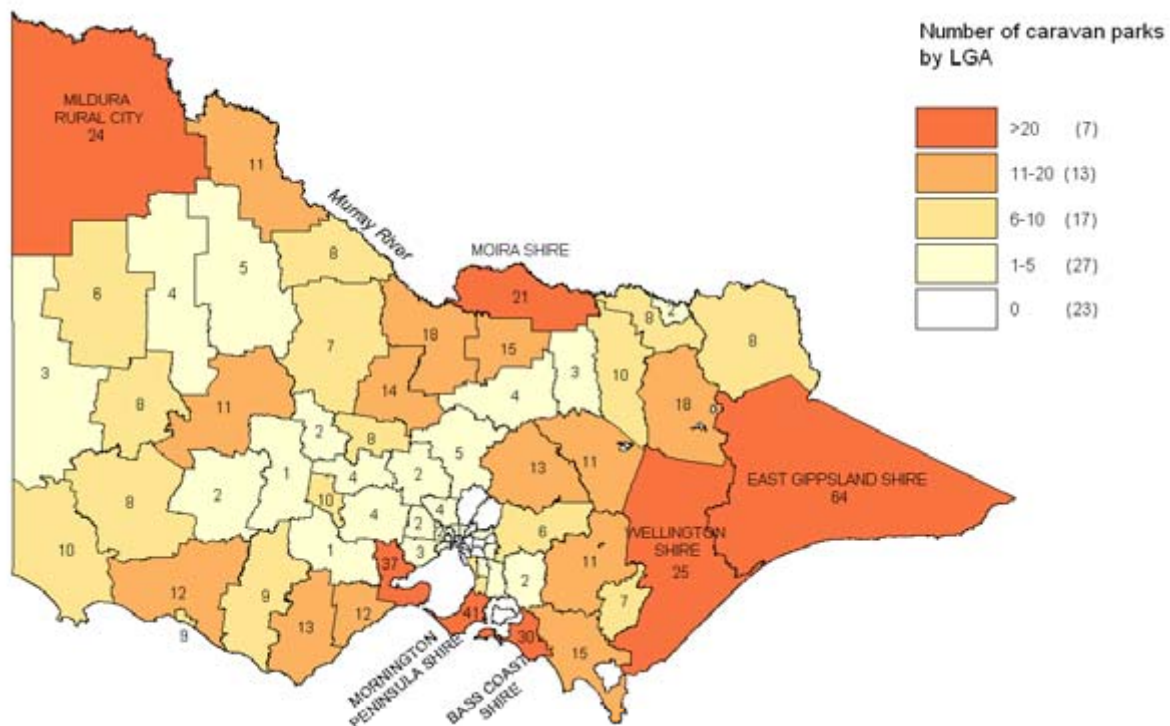
Australia-wide Census data indicate that long-term residents of caravan parks tend to possess a high level of vulnerability. **Table 2.1** shows that an anomalously high proportion of older people live in caravan parks. A large proportion of persons in caravan parks are single, and few children live in caravan parks. While a high proportion of residents are not in the labour force (many are retired), the unemployment level is more than double that for Australia as a whole. Those who are employed tend to be in low-paying jobs. These characteristics point to the likelihood of difficult emergency evacuation (high level of aged) and reduced capacities to recover after floods by repairing or relocating (low savings and income levels).

**TABLE 2.1 – Socio-economic data for residents of caravan parks in Australia, 2001 Census**

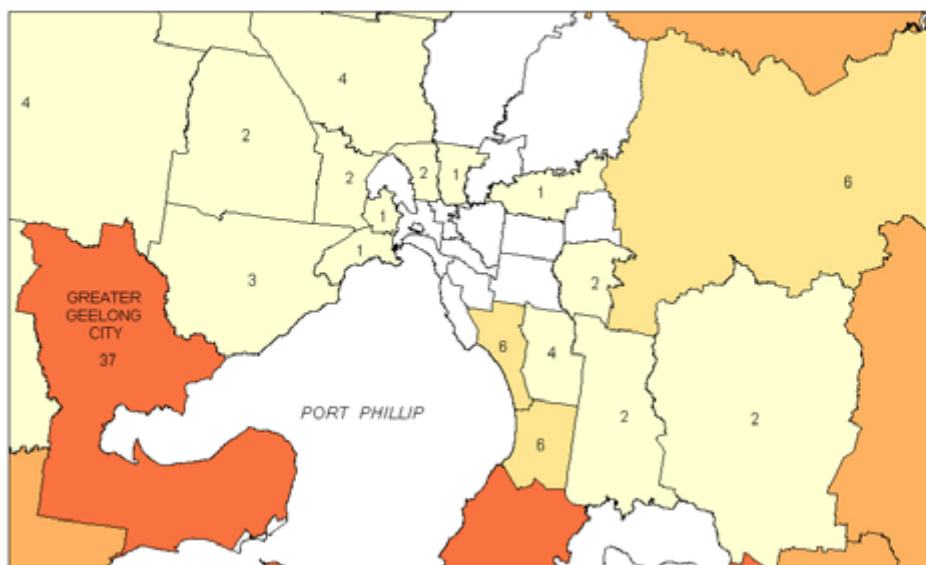
Source: Wensing et al., 2003, pp.20-22 and Appendix 2

	Caravan park residents	Australia
Age: 65 and over	23%	13%
Age: 55-64	19%	9%
Household type: lone person household	60%	24%
Household type: couple without children	25%	11%
Labour force status: not in labour force	51%	35%
Labour force status: unemployed	9.9%	4.4%
Occupation: labourers and related workers	25%	9%
Household income: less than \$500/week	62%	25%
Post-school qualifications: university degree	2%	13%
At same address in 1996	38%	52%

<sup>5</sup> As of May 2005, the Vic CPA's list contained 619 caravan parks, including members (numbering about 350) and non-members. Incidental reference to the list as part of this investigation has revealed a number of omissions: Ace CP, Seymour; Aspen Lodge CP, Mooropna; Gordon Park CP, Charlton; and Timeout Holiday Resort, Cobram. It is likely that a close examination would indicate a need for significant revision.



INSET FOR THE GREATER MELBOURNE AREA



**FIGURE 2.1 – Distribution of caravan parks in Victoria by Local Government Area**



## 2.3 Caravan Park Trends

Data from the Australian Bureau of Statistics' (ABS) triennial surveys of caravan parks in Australia (under the Tourist Accommodation series) have been used to construct **Figure 2.2**. It is important to recognise that these data are based only on caravan park establishments with 40 or more powered sites and cabins, etc. Another series shows that in September 2001, there were a total of 593 caravan park establishments in Victoria, of which 426 (72%) had 40 or more powered sites, and 167 (28%) had less than 40 powered sites (Wensing et al., 2003, p.19).<sup>6</sup> Thus, a sizeable proportion of Victoria's caravan parks are not captured in **Figure 2.2**. Nevertheless, this series is useful for assessing trends in the industry.

First, **Figure 2.2** shows that the number of caravan park establishments in Victoria (with 40 or more powered sites) fell by 8% from 1997 to 2003. The ABS differentiates "long-term" and "short-term" parks according to whether the majority of paying guests occupy sites for more than two months ("long-term") or less than two months ("short-term"). Interestingly, the number of "short-term" caravan parks increased by 5%, while the number of "long-term" caravan parks virtually halved over the period. That is, against a background of a decreasing number of establishments, there was also a shift towards short-term tourist accommodation.<sup>7</sup> This change is consistent with recent trends in NSW and Queensland.

Consistent with the change in the number of establishments is the change in total capacity of caravan parks. The total number of sites in caravan parks in Victoria fell by 9% from 1997 to 2003. Again, most of this reduction was accommodated in "long-term" caravan parks. **Figure 2.3** shows that the reduction in capacity was replicated in most other states and territories of Australia. Interestingly, accommodation takings increased substantially despite the decrease in capacity.

The decline in capacity of Victorian caravan parks was accommodated particularly in the "other powered sites" sector (a loss of over 3,900 sites, or 9%, from 1997 to 2003) and the "unpowered sites" sector (a loss of over 3,500 sites, or 29%, from 1997 to 2003). This decline contrasted with a 54% increase in the number of sites occupied by "cabins, flats, etc" (**Figure 2.2**). From March 1997 to March 2003, the number of cabins increased on average by 330 per annum (and another 360 cabins were added in the 6 months from June to December 2003). The contribution of cabins to total capacity increased from 6% to 10% over the six year period. A growth of cabins is consistent with trends across the country (**Figure 2.4**). The importance of this change is the replacement of powered and unpowered sites, which are occupied by dwellings that can be evacuated from a floodplain, to housing that is generally much more permanent. In essence, the amount and capital value of property exposed to flood risks in Victorian caravan parks is increasing.

**Figure 2.2** also shows a 31% increase in the number of sites occupied by long-term guests from 2000 to 2003, which increased the proportion of total sites occupied by long-term guests from 10% to 14%. This is surprising in view of the transition from "long-term" to "short-term" parks.<sup>8</sup> If this increase is real, it means that many more vulnerable people are residing in often flood-prone caravan parks. Long-term residency also tends to generate greater capitalisation, resulting in greater property exposure (Lambley & Cordery, 1992).

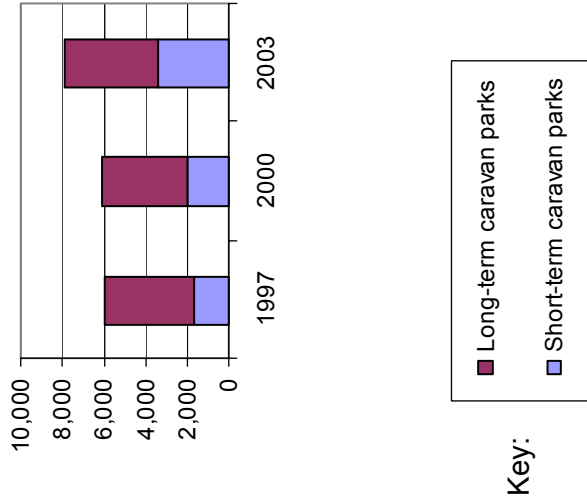
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<sup>6</sup> The ABS added 21 caravan parks in Victoria (with 40 or more powered sites and cabins, etc) to their database after the March 2003 survey, which would bring the total to 614 caravan parks in Victoria. This fits well with the Vic CPA's database, which listed 619 caravan parks in Victoria in May 2005.

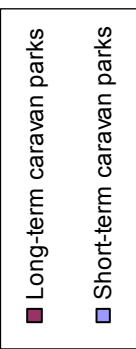
<sup>7</sup> Lynn Oaten, Vic CPA, suggests that this statistic could reflect a decline in holiday van parks, as people respond to increased site fees and as preferences change.

<sup>8</sup> The figure reported for the March quarter 2003, which the ABS revised, does appear to be anomalously high. This trend needs to be tested by a longer time series.

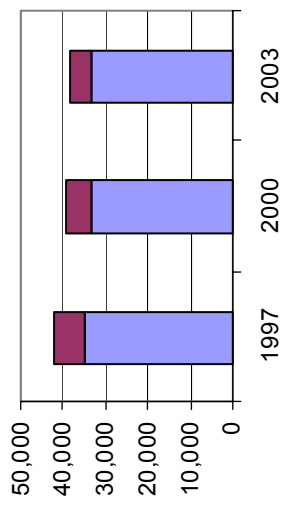
**Sites occupied by long-term guests<sup>d</sup>**



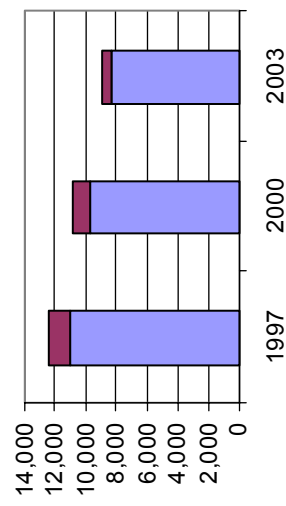
Key:



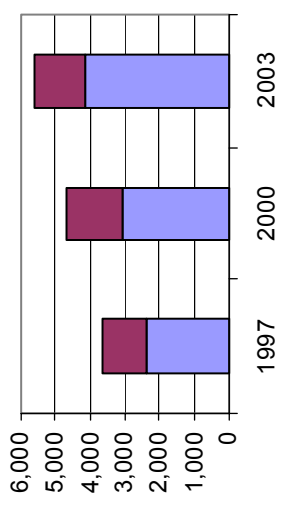
**Other powered sites**



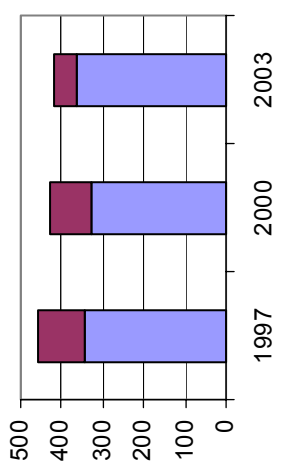
**Unpowered sites**



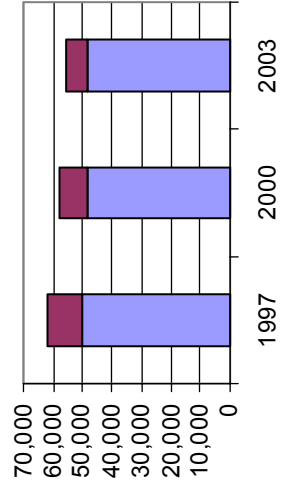
**Cabins, flats etc**



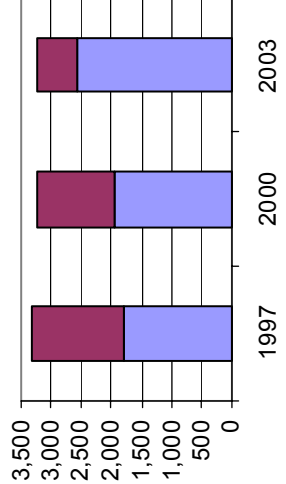
**Number of establishments**



**Total capacity**



**On-site vans**



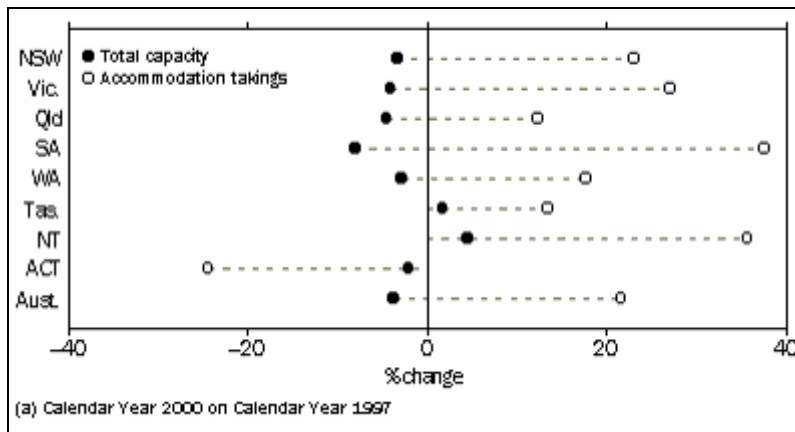
**FIGURE 2.2 – Caravan parks in Victoria: 1997-2000-2003**

**Notes**

- a) All data is taken from the March quarter in each year. This was chosen to avoid a break in time series between the March and June quarters of 2003, when 21 caravan parks in Victoria were added to the series.
- b) Data is only for establishments with 40 or more powered sites and cabins, flats, units and villas.
- c) A long-term caravan park is defined as one where the majority of paying guests occupy sites for periods of more than two months. A short-term caravan park is one where the majority of paying guests occupy sites for periods of less than two months.
- d) A long-term guest is defined as one who occupies the site for more than two months.

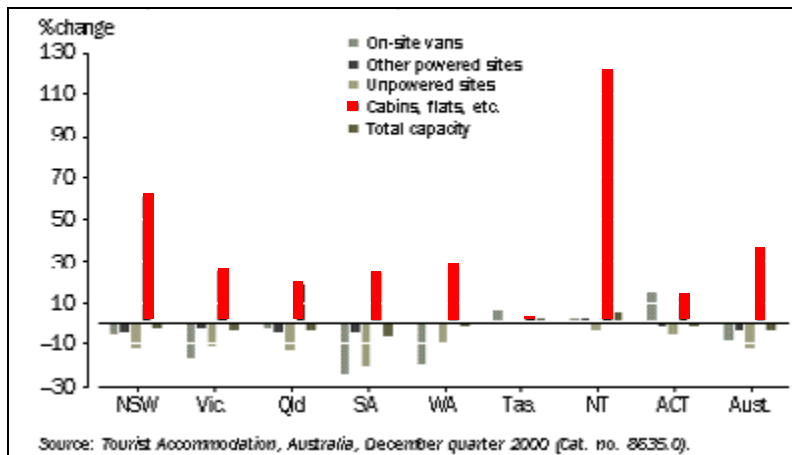
**Sources**

ABS Tourist Accommodation Australia, 8635.0, March Quarter 2000, pp.41-43; ABS Tourist Accommodation Australia, Expanded Scope Collection, 8635.0.55.001, Year Ended 31 December 2003, pp.25-34.



**FIGURE 2.3 – Capacity and accommodation takings in caravan parks: change from 1997 to 2000**

Note: Data is only for establishments with 40 or more powered sites and cabins etc.  
 Source: ABS Tourism Indicators Australia, 8634.0, December 2000, Graph F1.5.



**FIGURE 2.4 – Growth in caravan site capacity by type of site and State/Territory: change from 1997 to 2000**

Note: Data is only for establishments with 40 or more powered sites and cabins etc.  
 Source: ABS Tourism Indicators Australia, 8634.0, December 2001, Graph F2.3.

### 3. EXISTING REGULATIONS

A brief review of legislation was undertaken to better understand how the State has sought to use regulations to manage flood risk at caravan parks in Victoria. **Table 3.1** summarises the key results. Excerpts of the legislation considered to be of relevance are attached at **Appendix A**.

**TABLE 3.1 – Summary of State regulations pertaining to flood risk management**

Requirement	Source
Existing use rights apply to most caravan parks, unless the use has stopped for a continuous period of 2 years.	<i>Victorian Planning Provisions (VPPs) – Clause 63</i>
A “movable dwelling” is defined as one capable of being removed within 24 hours. The installation of a “movable dwelling” on flood-prone land in a caravan park does not require a building permit.	<i>Residential Tenancies Act 1997: s.3, s.517. Building (Interim) Regulations 2005, r.802 (authorised under Building Act 1993).</i>
The right of permanent residents to remain in a caravan park cannot be overturned by a planning scheme.	<i>Residential Tenancies Act 1997: s.518.</i>
A caravan park must be registered with the council on an annual basis. The application must specify the number of long term, short term and camp sites.	<i>Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999: r.7, r.9, schedule 2 (form 1).</i>
A caravan park owner must prepare an emergency management plan for evacuation procedures in the event of a fire or other emergency.	<i>Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999: r.36(1).</i>
A caravan park owner must notify patrons of the evacuation procedures in the emergency management plan, by giving them a copy and by displaying a copy.	<i>Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999: r.36(3).</i>
A caravan park owner must provide written notice of flood-liability to prospective owners or residents of UMDs, or RMDs with attached rigid annexes, situated on flood-labile land. <sup>9</sup>	<i>Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999: r.37.</i>
An annexe, including a rigid annexe, must be capable of being removed within 24 hours.	<i>Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999: r.4, schedule 3 (part 2, 7(1)).</i>
An UMD must have its own chassis, including attached running gear, but the wheels and axles of an UMD may be removed with council approval.	<i>Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999: schedule 3 (part 1, 1(3) and 5(1)).</i>

#### 3.1 Development of Caravan Parks

In relation to proposed caravan parks, the Victorian Planning Provisions (VPPs) specify what land uses are permitted in various zones. **Table 3.2** specifies which zones allow a caravan park without a permit (but with conditions), which zones allow a caravan park with a permit, and which zones prohibit a caravan park.

<sup>9</sup> UMD = “unregistrable movable dwelling”, which means a movable dwelling constructed on a chassis but does not include a registrable movable dwelling or a camper trailer.  
RMD = “registrable movable dwelling”, which means a movable dwelling that is, or has been, registered or is eligible for registration under the *Road Safety Act 1986*.

Existing caravan parks have existing use rights under planning schemes and are generally not able to be controlled under schemes. However, exceptions occur when a use is not continuous (ceases after two years) or when a use and/or development does not meet the condition of a planning permit (Grant Scale, *pers. comm.*, Nov 2005).

**TABLE 3.2 – Permissibility of caravan parks within VPP zones**

No permit required (Section 1 use)	Permit required (Section 2 use)	Prohibited (Section 3 use)
Public Park and Recreation Zone (PPRZ) (conditions apply) Public Conservation and Resource Zone (PCRZ) (conditions apply)	Residential 1 Zone (R1Z) Residential 2 Zone (R2Z) Low Density Residential Zone (LDRZ) Mixed Use Zone (MUZ) Township Zone (TZ) Residential 3 Zone (R3Z) Business 1 Zone (B1Z) Business 2 Zone (B2Z) Business 5 Zone (B5Z) Rural Zone (RUZ) Environmental Rural Zone (ERZ) Rural Living Zone (RLZ) Rural Activity Zone (RAZ) Green Wedge Zone (GWZ) Green Wedge A Zone (GWAZ)	Industrial 1 Zone (IN1Z) Industrial 2 Zone (IN2Z) Industrial 3 Zone (IN3Z) Business 3 Zone (B3Z) Business 4 Zone (B4Z) Rural Conservation Zone (RCZ) Farming Zone (FZ) Urban Floodway Zone (UFZ)

### 3.2 Building within Caravan Parks

Caravan park owners appear to have a great deal of latitude in relation to installing cabins in caravan parks, even in highly flood-prone caravan parks. While building permits are required for the installation of buildings (e.g., amenities blocks), they are not required for the installation of “movable dwellings”, which are defined as dwellings capable of being removed within 24 hours.

### 3.3 Permanent Residents within Caravan Parks

Caravan park owners also have a good deal of latitude in relation to site usage, whether for long-term (residential) sites, short-term sites or camping sites. Permanent residents cannot have their duration of tenancy limited by a planning scheme. However, park owners may without a specified reason give residents 120 days’ notice to vacate a site, subject to certain conditions (*Residential Tenancies Act 1997*, s.314-315).

### 3.4 Other Regulations

Caravan parks must be registered annually. Each caravan park owner must prepare an emergency management plan, to the satisfaction of council, but there is no explicit provision detailing how frequently these plans should be revised. Caravan park owners must also display the evacuation procedures, give a copy of the evacuation procedures to patrons on arrival, and inform prospective owners and residents of cabins (or caravans attached to rigid annexes) if the land is flood-labile.

## 4. FLOOD RISK MAPPING

### 4.1 Aim

An important question for the investigation is the extent of the flood problem at caravan parks in Victoria. Is flooding as widespread a threat as the anecdotal evidence suggests? How many caravan parks are affected? To what magnitude of flooding are they exposed? After consultations with DSE, it was decided that the most comprehensive and efficient means of answering these questions probably could be achieved by mapping caravan parks and flood characteristics using a Geographic Information System (GIS).

### 4.2 Method

DSE provided GIS layers for designated floodways and the 1% flood extent. Melbourne Water provided layers of the 1% flood extent for drains and waterways within its area of jurisdiction. It is important to note the limitations of these data files. First, the GIS layers do not provide complete coverage of Victoria's floodplains. It is estimated that about 30% of floodways and 80% of 100 year floodplains have been mapped (CMA Floodplain Managers, *pers. comm.*, Dec 2005). During the course of this investigation, a number of caravan parks with a history of flooding were identified which were not located within flood risk zones, presumably because mapping had not been completed. Second, the available floodplain mapping may not be very accurate. Metadata for both the floodways (FLOODW25) and 1% flood extent (FLXTSTAT) record a positional accuracy of 10–100m. Although floodways are thought to be defined fairly precisely, the vast majority (93%) of polygons contained in the 1% flood extent layer are described as being of "low reliability".

In order to use GIS to assess the flood hazard experienced by caravan parks in Victoria, it was necessary first to construct a MapInfo file showing caravan park boundaries. The Valuer General's (VG) Office of DSE was engaged to this end. Data for caravan parks, tourist accommodation/holiday flats and tourist resort complexes were extracted from the 2004 revaluation data of commercial property (conducted by the Rating Authority Valuation sector of the VG's Office). This data was then matched to a State-wide property/parcel data layer. A large number of caravan parks were found to consist of multiple valuation assessments, producing inconsistencies which were partly resolved by removing duplicates. A process of cross-referencing with hardcopy maps and title searching was conducted to improve the match rate by manually assigning caravan park information to map polygons. A total of 1,529 potentially relevant parcels were generated by this method, consisting of 421 parcels coded as caravan parks and 1,108 parcels coded for other tourist uses.

Addresses from the Vic CPA list of caravan parks (**Section 2.1**) were used to match parcels derived from the revaluation data. Unfortunately, only 264 caravan parks (43% of the 619 total) could be matched, though subsequently this was raised to 302 (49%) by investigating selected caravan park locations on a case-by-case basis. A number of reasons account for the poor match rate. First, some caravan parks may be located on non-rateable land and so were not included in the 2004 revaluation survey. According to the *Local Government Act 1989*, non-rateable land includes land which "is vested in or owned by the Crown, a Minister, a Council, a public statutory body or trustees appointed under the act to hold that land in trust for public or municipal purposes". This is relevant because a number of caravan parks are located on Crown Land and managed by Committees of Management, so may qualify as "non-rateable". Second, often the address details from the Vic CPA list lacked the precision (e.g. street number) to enable a match (especially for parks on Crown Land).

Nevertheless, a 49% sample of Victoria's caravan parks offered a reasonable basis for a global assessment of flood hazard. The number of these caravan parks located within floodways and within the 100 year flood extent was calculated. The extent to which a caravan park is subject to flooding was assessed by three measures – whether a park is *partly* affected, whether the *centre-point* (centroid) of a park is affected, and whether a park is *entirely* affected. The park shown in **Figure 4.1** is counted as flood-prone because it is *partly* located within the 100 year flood extent. Its centroid is located just outside the flood extent and it is obviously not contained entirely within the flood layer.



**FIGURE 4.1 – Example of influence of park dimensions on flood analysis**

In addition to an analysis of the list of 302 recognised caravan parks, the number of flood-prone caravan park “parcels” was also assessed from a list of 457 parcels. This list of parcels was made up by adding three components: (a) 421 parcels coded as caravan parks; (b) 29 parcels coded as tourist accommodation/holiday flats and tourist resort complexes which were matched to caravan parks on the Vic CPA list; and (c) 7 parcels not included in the above which were known to be used as caravan parks. It was decided not to include all 1,529 parcels because most of these parcels were used for tourist uses other than caravan parks (e.g., bed and breakfast).

### 4.3 Results

The number and proportion of caravan parks and caravan park “parcels” *partly* contained, “contained” (as defined by the *centroid* of the polygon) and *entirely* contained within the two flood layers are listed in **Table 4.1**, **Table 4.2** and **Table 4.3**, respectively. The salient findings of the analysis are reported below:

- ▶ 38% of the 302 recognised caravan parks are at least *partly* inundated in the 100 year flood;
- ▶ 24% of the recognised parks are inundated in the 100 year flood at the *centroid* of the polygon;
- ▶ 13% of the recognised parks are *entirely* inundated in the 100 year flood;
- ▶ 22% of the recognised parks are at least *partly* located within designated floodways;
- ▶ 12% of the recognised parks are located within designated floodways at the *centroid* of the polygon;
- ▶ 5% of the recognised parks are *entirely* located within designated floodways;
- ▶ The proportion of caravan park *parcels* located within the 100 year flood extent and within floodways is little different to the results for the recognised caravan parks.

**TABLE 4.1 – Number of caravan parks and caravan park “parcels” contained *partly* within flood layers**

	Caravan parks		Caravan park “parcels”	
	Number	% of total (302)	Number	% of total (457)
100 year extent	116	38%	156	34%
Floodway	67	22%	91	20%

**TABLE 4.2 – Number of caravan parks and caravan park “parcels” with *centroid* contained within flood layers**

	Caravan parks		Caravan park “parcels”	
	Number	% of total (302)	Number	% of total (457)
100 year extent	72	24%	93	20%
Floodway	37	12%	47	10%

**TABLE 4.3 – Number of caravan parks and caravan park “parcels” contained *entirely* within flood layers**

	Caravan parks		Caravan park “parcels”	
	Number	% of total (302)	Number	% of total (457)
100 year extent	38	13%	48	11%
Floodway	15	5%	21	5%



#### 4.4 Interpretation

Based on an analysis of about half of Victoria's caravan parks, the above analysis suggests that 38% of caravan parks are subject to at least partial flooding in the 100 year event. Extrapolating this figure for the entire sector would suggest that in the order of 240 caravan parks in Victoria are exposed to inundation in the 100 year event. Similarly, since 22% of the sampled caravan parks are at least partly located within designated floodways, we may conclude that in the order of 140 caravan parks in Victoria are at least partially subject to severe flood risks. There are good reasons for regarding these statistics as underestimates of the real flood risk:

- ▶ As described above, only about 30% of floodways and 80% of 100 year flood extents in Victoria have been mapped, and the reliability of the 100 year flood mapping in some areas (including the upper reaches of catchments and the western part of the State) is low;
- ▶ No account has been made of floods rarer than the 100 year event, overland flow, or risks from coastal flooding;
- ▶ A caravan park does not have to be directly inundated by floodwaters in order to be adversely affected by flooding – isolation can be a serious problem;
- ▶ It seems likely that a significant proportion of the caravan parks that were not identified via the revaluation may have been regarded as “non-rateable” assessments because they occupied public reserves on Crown Land. Such Crown Land reserves are often located proximate to beaches and rivers.

For these reasons, in our view the actual proportion of Victoria's caravan parks subject to flooding will likely be higher than 38%. This could be investigated using alternative methods. All councils could be asked to submit a list of licensed caravan parks, with an indication of what flood overlays, if any, intersect with each park. This information was provided for the City of Greater Shepparton's 17 caravan parks, which indicated that 11 parks (65%) are at least partially located within the 100 year flood extent and 5 parks (29%) are at least partially intersected by floodways. In broad terms, it seems fair to conclude that about half (and possibly more) of Victoria's caravan parks are at least partially flood-prone.

In any case, the mapping adequately demonstrates that a large number of caravan parks in Victoria are subject to flooding. The number of caravan parks located in floodways is alarming. Caravan parks *entirely* located within floodways are a cause for particular concern.

## 5. FLOOD RISK QUESTIONNAIRE

### 5.1 Aim

A key outcome of the investigation is an assessment of the overall flood risk at caravan parks in Victoria. Flood frequencies and severities at caravan parks in Victoria were assessed at a broad scale in **Section 4**. This section describes the results of a detailed questionnaire/survey that was used to investigate the nature of the flood hazard and especially the vulnerability to flooding for a sample of caravan parks. What is the composition of caravan parks, both in terms of people and property? How well prepared are managers for flooding? To what extent do caravan parks comply with existing regulations about emergency management?

### 5.2 Method

An initial questionnaire was prepared and vetted by the Steering Committee, who made a number of suggestions for additions and improvements. The questionnaire was revised and used in a pilot study of five caravan parks in May 2005. Following the pilot study, the questionnaire was revised further, and an accompanying sheet of guidelines was prepared. The final questionnaire and guidelines are attached at **Appendix B**. DSE conducted a training session for the CMA floodplain managers, who were to conduct the survey.<sup>10</sup> Each CMA was encouraged to select a diversity of caravan parks to survey. Caravan park managers/owners were invited to participate in the study, and in most cases were quite willing to be involved. Some questions were directed to the park manager/owner whereas other questions were completed by the floodplain manager's own observations.

Between May and September 2005, 40 caravan parks were surveyed (including the pilot survey), which fell short of the target of 50 parks, but provides a basis from which sound conclusions may be reached. These 40 caravan parks are listed in **Appendix C**.<sup>11</sup> Surveys were taken in nine of the ten CMAs (**Table 5.1, Figure 5.1**). This geographic spread of surveys is pleasing, though it is noted that no caravan parks were captured from certain regions of the State – notably the area administered by Melbourne Water and the area east of Lakes Entrance that is known to have a number of highly flood-prone parks (Paul Flint, DSE, *pers. comm.*, Nov 2005).

The quality of the surveys was variable. Some were very comprehensive, while others had gaps that were remedied by follow-up phone calls to the floodplain managers or park managers. In a few instances the floodplain manager had given the questionnaire to the park manager to complete, which could taint the investigation, given that the park manager may have an interest in understating flood risk and overstating readiness for flooding. For these parks, the floodplain manager was contacted to vet the responses.

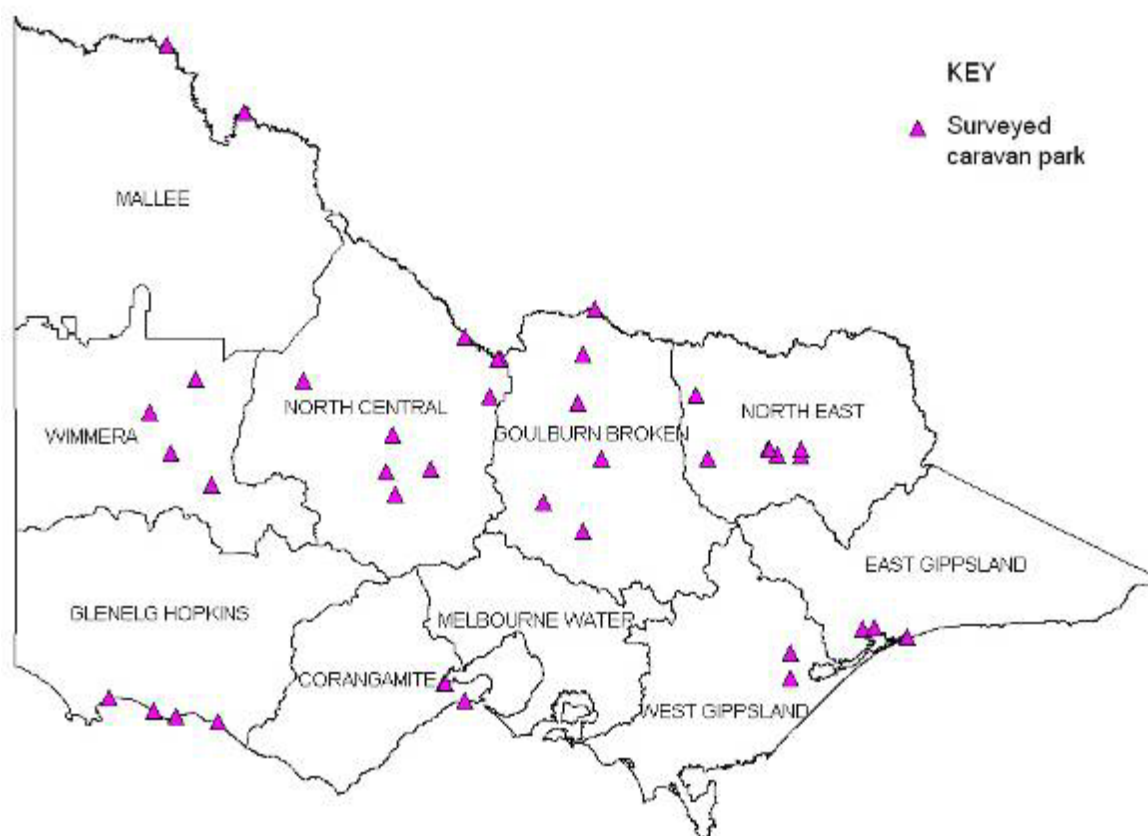
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<sup>10</sup> Goulburn Broken CMA and North East CMA engaged Earth Tech Engineering to conduct the surveys in their areas.

<sup>11</sup> Corangamite CMA undertook an additional survey, of Cumberland River Holiday Park, 2680 Great Ocean Road, Lorne (Surf Coast Shire), in November 2005. The findings for this park have not been included in the aggregate results, but have informed the discussion.

**TABLE 5.1 – Distribution of caravan park surveys by CMA**

CMA	Number of CP surveys
Corangamite	3
East Gippsland	3
Glenelg Hopkins	4
Goulburn Broken	7
Mallee	2
Melbourne Water	0
North Central	8
North East	7
West Gippsland	2
Wimmera	4
<b>TOTAL</b>	<b>40</b>



**FIGURE 5.1 – Distribution of caravan park surveys by CMA**

## 5.3 Results

### 5.3.1 Composition of caravan parks

Caravan parks in Victoria provide three kinds of accommodation:

- ▶ residential sites (“permanents”);
- ▶ long-term holiday sites (“annuals”), where a caravan or cabin is permanently situated in a caravan park but used only occasionally for holiday purposes; and
- ▶ tourist sites, which include cabins and on-site vans owned by the park, as well as powered and unpowered sites for tourists who bring their own means of accommodation (campervans, caravans or tents).

**Figure 5.2** shows the number of the 40 surveyed caravan parks offering each accommodation type. **Figure 5.3** shows the median number of sites for each accommodation type (counting only parks that provide that accommodation type).

Most of the caravan parks (75%) cater for “permanents”, though only ten of these 30 parks contain more than ten permanent sites.<sup>12</sup> The maximum number of permanent sites in a park is 90 and the median number is eight sites. In response to a question about the types of residents living in caravan parks, 20 out of the 30 parks catering for “permanents” indicated that they have “elderly” residents, seven parks have “disabled” residents and 15 parks have unemployed residents. (One caravan park reported that the Department of Human Services had used the park as a “dumping ground” for dislocated people). Census data confirm that a disproportionate number of vulnerable people—physically or financially—live in caravan parks in Australia (**Section 2.2**). However, several park managers pointed out that their elderly residents are fully mobile.

About 60% of the caravan parks cater for “annuals”, spread throughout Victoria. The maximum number of annual sites in a park is 370 and the median number is 40 sites. **Figure 5.3** shows that about one-third of the total number of sites in the surveyed caravan parks is comprised of “annuals”.

Nearly all the caravan parks (90%) contain tourist sites occupied by cabins owned by the park. The maximum number of tourist cabin sites in a park is 35 and the median number is 12 sites. Given industry trends, this accommodation type is expected to grow in importance (**Section 2.3**).

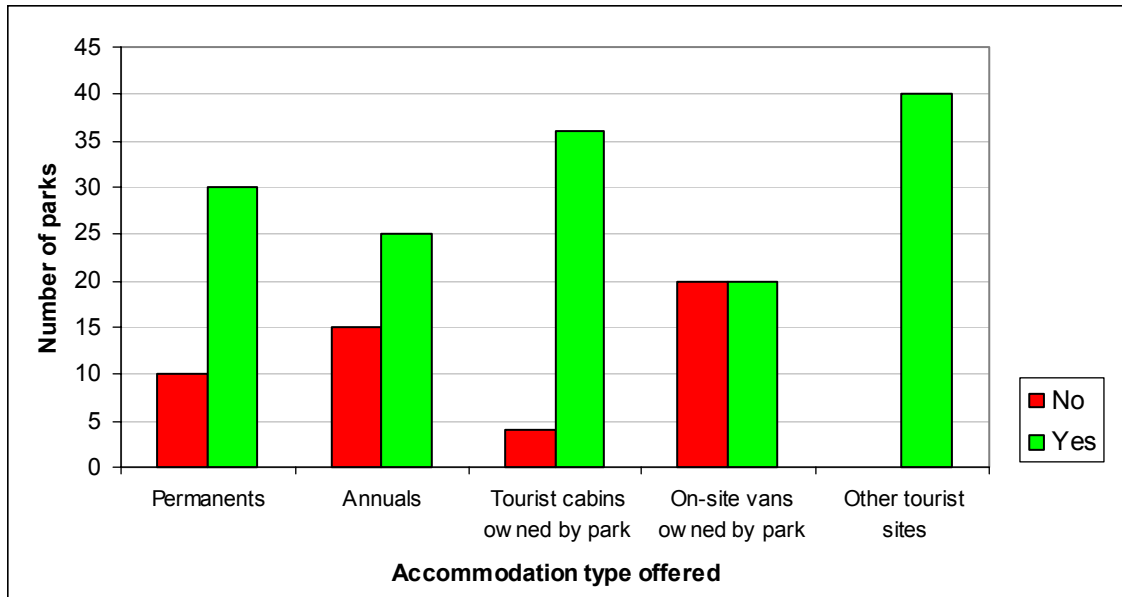
Half of the caravan parks contain tourist sites occupied by on-site vans owned by the park. The maximum number of on-site vans in a park is 35 and the median number is five.

Powered and/or unpowered sites for use by visitors are provided by every caravan park in the sample. The maximum number of these tourist sites in a park is 280 and the median number is 60 sites. **Figure 5.3** shows that about half of the total number of sites in the surveyed caravan parks is dedicated to these “other tourist” sites.

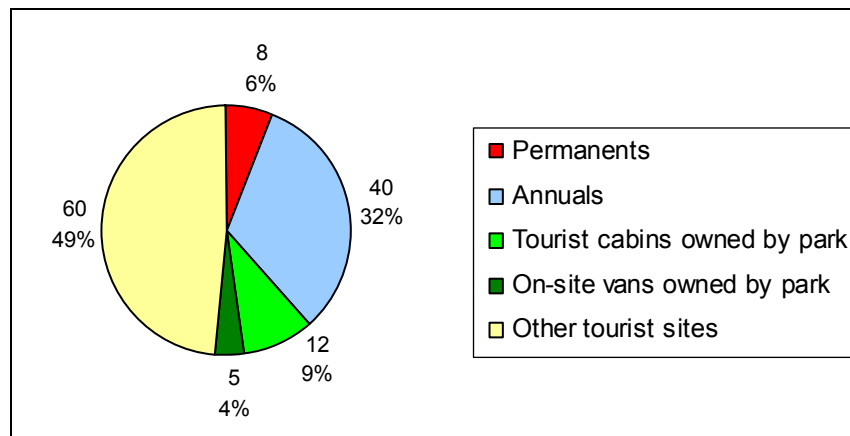
Overall, the total capacity ranges from a minimum of 25 sites to a maximum of 505 sites. The median total number of sites per park is 120.

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<sup>12</sup> A State register indicates that 71% of caravan parks in NSW provide long-term (permanent) sites (Yeo & Grech, 2005).



**FIGURE 5.2 – Number of caravan parks offering each accommodation type (N = 40)**



**FIGURE 5.3 – Median number of sites for each accommodation type (N = 40)**

Note: This calculation only includes parks with given accommodation type

### 5.3.2 Seasonal occupancy pattern

Most caravan parks record their highest occupancy in the Christmas holidays, the Easter long weekend, other school holidays, and during local festivals (e.g., Wangaratta jazz festival). Several parks in the irrigation districts cater for seasonal workers. Consequently, the number of people staying at caravan parks varies significantly throughout the year. The manager of a caravan park with 400 sites indicated that 2,000 people stay there in peak season. Few of these visitors are expected to be attuned to the threat of flooding. Should a flood occur during peak season, the task of evacuating these people, their pets and property could be very significant. For this reason, the number of people staying in caravan parks, and the variable nature of this exposure, needs to be accounted for in emergency management planning.

### 5.3.3 Physical flood threat

The flood hazard of the surveyed caravan parks was assessed initially by looking up the floodway and 100 year flood extent layers in the GIS. The results are presented in **Table 5.2**. Out of the 40 caravan parks, 39 are at least partly located within the designated 100 year flood extent – one park is situated just beyond the 100 year flood extent but is still subject to isolation. The majority of these 39 caravan parks (34) have more than half of their total areas located within the 100 year flood extent, and 21 parks are located entirely within the 100 year flood extent. Furthermore, 28 caravan parks are at least partly located within designated floodways. The majority of these (24) have more than half of their total areas located within floodways, and 11 parks are located entirely within floodways.

The extent of the 100 year flood was also assessed in the questionnaire (Q15A). The results closely correspond those reported above, with 39 parks reporting at least a few sites subject to flooding, and 23 parks reporting all sites subject to flooding in the 100 year event (**Table 5.2**).

**TABLE 5.2 – Flood hazard at sampled caravan parks (N = 40)**

Q. No.		Number of CPs	% of sample
–	Caravan park partly within 100y flood extent	39	98%
	More than half park area within 100y flood extent	34	85%
	Caravan park entirely within 100y flood extent	21	53%
–	Caravan park partly within floodway	28	70%
	More than half park area within floodway	24	60%
	Caravan park entirely within floodway	11	28%
15A	At least a few sites within 100y flood extent	39	98%
	All sites within 100y flood extent	23	58%
10	Caravan park historically affected by floods	37	93%
11	Source of flood threat		
	Overtopping of creek/river banks	39	98%
	Overtopping of lake banks	1	3%
	Storm waves/tidal flooding	1	3%
	Urban stormwater	5	13%

Most of the surveyed caravan parks are known to have been affected by floods in the historical record (**Table 5.2**) (a number of floodplain managers ticked “yes” if the land was flooded, even though no caravan park was present at the time). The time elapsed since the largest flood, and most recent flood, differs markedly across the State (**Table 5.3**). East Gippsland and the North East experienced serious flooding in 1998. Flooding affected many river systems in the Goulburn Broken CMA and extended down the Murray River in Spring 1993. A notable flood year in West Gippsland is 1990. Serious flooding affected many river systems in central and western Victoria in Spring 1983. Impressions of flood incidence from this investigation match those reported in the *Victoria Flood Management Strategy*, which found a relatively high incidence of floods in north-central Victoria, north-east Victoria and west Gippsland (DOJ & NRE, 1998, p.12). In contrast, large areas of western Victoria have been experiencing prolonged drought, without a significant flood for over 20 years, and with the record flooding of 1909 or 1946 a fading memory. This varied flood incidence has implications for managerial flood experience and preparedness.

**TABLE 5.3 – Flood history at sampled caravan parks**

Sources: Interviews (Q10); *Victoria Flood Management Strategy*, Appendix B;  
Victorian Water Resources Data Warehouse

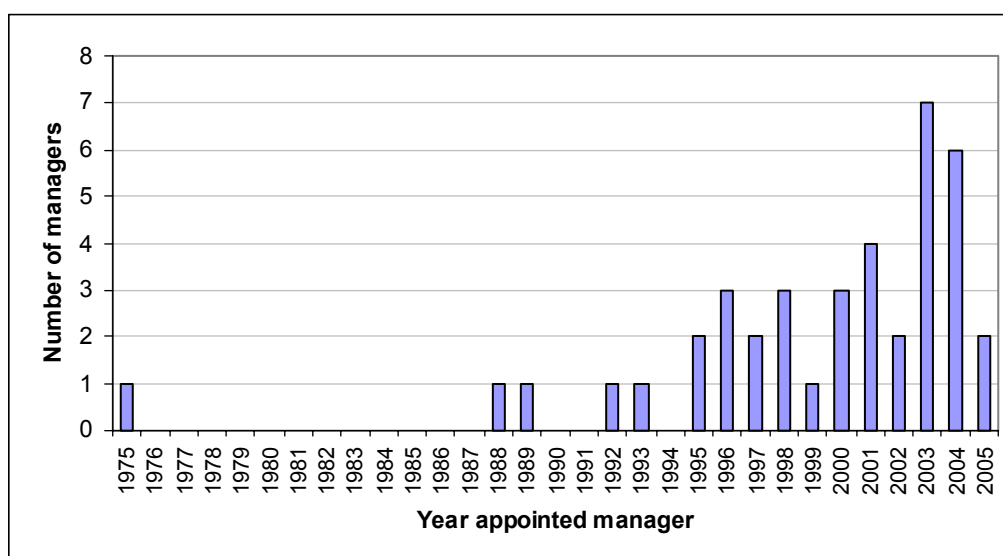
CMA	River	Largest flood	Most recent flood
Corangamite	Barwon River	1952 (90y ARI)	1995-Nov
East Gippsland	Mitchell River and lakes	1990-Apr(?) (30y ARI)	1998-Jun
Glenelg Hopkins	Eumerella River	1946	
Glenelg Hopkins	Hopkins River	1946	1983-Sep
Glenelg Hopkins	Moyne River	1946 (100y ARI)	1983-Sep
Glenelg Hopkins	Surry River	1976-Oct	
Goulburn Broken	Broken Creek	1956(?) 1974-May(?)	1993-Oct (100y ARI)
Goulburn Broken	Broken River	1993-Oct (100y ARI)	1993-Oct
Goulburn Broken	Goulburn River	1974-May (70y ARI)	1993-Oct
Goulburn Broken	Seven Creeks	1916 (100y ARI)	1993-Oct (35y ARI) 2003-Sep (minor)
Goulburn Broken	Yea River	1959 (100y ARI)	2005-Feb (minor)
Mallee	Murray River	1956 (100y ARI)	1993/1994 (30y ARI)
North Central	Avoca River	1909	1996-Oct (20y ARI)
North Central	Bendigo Creek	1949	
North Central	Campaspe River	1956 (100y ARI)	1983-Sep (30y ARI)
North Central	Loddon River	1909 (100y ARI)	1983-Sep (30y ARI)
North East	Kiewa River	1998-Sep (100y ARI)	2004-Sep (minor)
North East	Ovens River	1993-Oct (100y ARI)	1998-Sep (33y ARI)
West Gippsland	Avon River	1990-Apr (50y ARI)	
West Gippsland	Thomson River	1978-Jun (100y ARI)	1993-Sep (20y ARI)
Wimmera	Wimmera River	1909 (100y ARI)	1983-Oct (30y ARI)
Wimmera	Yarriambiack Creek	1909	1983-Oct

The stated mode of flooding at most of the surveyed caravan parks is normal overtopping of creek or riverbanks (**Table 5.2**). Urban stormwater was identified as a risk at five parks, including in Bendigo and Geelong. Few of the surveyed parks are located on the coastline or next to a lake, accounting for the low number of parks subject to the other modes of flooding. However, flood behaviour at several parks can be influenced by blocked estuaries (problematic for several rivers in Glenelg Hopkins CMA) and by high tides. A few parks in North East CMA are subject to annual spring flooding associated with snow-melt. Some parks are situated below reservoirs, with a (very small) risk of dam-break flooding.

### 5.3.4 Flood experience

**Figure 5.4** shows the year in which caravan park managers were appointed. It points to the relatively high turnover of park managers, and is consistent with findings for NSW. Over 50% of park managers have been so for less than five years, and over 80% of park managers have been so for less than ten years. The average (median) time a person occupies the position of park manager is four years. It is therefore no surprise that 60% of managers have no experience of flooding at the caravan park. While 40% of managers have had some experience, for half of these the flooding was inconsequential. Only 20% of managers have experienced a significant flood while manager.<sup>13</sup>

If this trend continues, more than half of the park managers interviewed in 2005 will have moved on by 2010. This will involve a loss of flood experience and flood response capacity, and points to the need for mechanisms to ensure incoming managers are made aware of flood risks and their responsibilities to maintain a “flood-ready” culture.<sup>14</sup>



**FIGURE 5.4 – Park managers’ year of appointment (N = 40)**

### 5.3.5 Flood warning

An important aspect of a caravan park’s flood risk profile is the provision of flood warnings and the time available to respond to flood warnings. The Bureau of Meteorology (BoM) indicated whether each caravan park location was part of its quantitative flood warning network.<sup>15</sup> For locations in the network, the BoM also estimated available warning times. It is acknowledged that these warning times often relate to prediction of the flood peak, whereas caravan parks may be affected well before the peak, especially in major floods. Also, warning times at a given site vary according to the particular pattern of rainfall in each flood event. For example, Chinaman’s Bridge Caravan Park at Nagambie would be provided with a longer warning time (eight hours) for a flood travelling down the Goulburn River through Seymour than for flooding generated by more local rainfall (SKM, 1999). Also,

<sup>13</sup> Some managers may have had experience of floods at other caravan parks or prior to being appointed manager.

<sup>14</sup> A number of people can play a role in sustaining flood readiness in caravan parks, including owners as well as managers. Park owners are expected to be less transient than managers, so educating owners could be more efficient. However, it is likely that some owners reside a distance from the park. Park managers are likely to bear the responsibility of managing the park’s response to flooding.

<sup>15</sup> Locations in Victoria for which the Bureau of Meteorology issues height-time flood predictions are listed at [www.bom.gov.au/hydro/flood/vic/](http://www.bom.gov.au/hydro/flood/vic/) (navigate to ‘Flood Class Levels’).



for sites along regulated rivers, warning times vary according to the available storage prior to the flood, as well as decisions made over storage releases. For example, in respect of Loddon House Caravan Park, in October 2000 a 100 year inflow was completely absorbed by Cairn Curran Reservoir on the Loddon River, which prior to the event was at 58% capacity. Had the reservoir been full, the outflow would have been substantial (Bill Viney, Goulburn-Murray Water, *pers. comm.*, Oct 2005). In this study, the shorter end of the range of available warning times was adopted. Warning times for caravan parks that are not part of the BoM's predictive network were derived from the questionnaire results (Q14A).

Of the 40 surveyed caravan parks, 24 locations are part of the BoM's quantitative flood warning network and 14 are not. Two parks at Lakes Entrance and Ocean Shores are considered marginal, because although the BoM does not issue specific predictions there due to the complicating effect of ocean tides and other variables, flood predictions for rivers upstream would provide some forewarning. A map showing the distribution of the surveyed caravan parks according to provision of quantitative flood warning services is included as **Figure 5.5**. Locations that are *not* part of the BoM's quantitative flood warning network include parks along the Kiewa River (upstream of the Mongans Bridge gauge) where warning times are short, remote parks along coastal rivers in southwest Victoria where warning times are often short, and several areas in Wimmera CMA.

Estimated available warning times are shown in **Figure 5.6**. These range from an hour's warning for some parks near mountain ranges, to several weeks' warning for parks along the lower Murray River. A significant number of parks (13) have flood warning times of six hours or less,<sup>16</sup> allowing only a short time for emergency measures to save life and property, especially if the flood rises undetected at night. Seven of these 13 parks do not receive official warnings. At the other end of the spectrum, nine parks have more than two days warning of floods, allowing substantial time for loss-reducing measures, including in some cases time to shift cabins to flood-free ground.

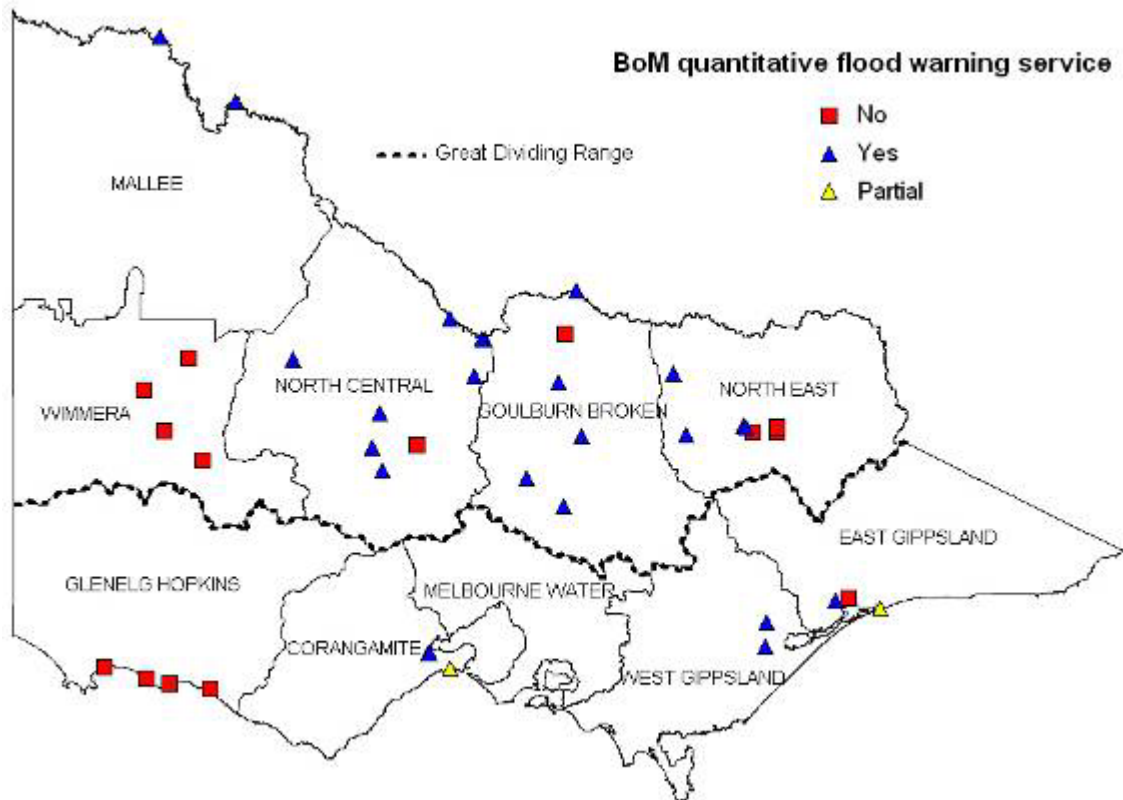
Parks that do not receive specific height-time flood predictions may still benefit from more general Bureau services, including general weather forecasts, Flood Watches and Severe Weather Warnings. The limitation with these is that the location, magnitude and timing of floods are usually uncertain, and park managers may hesitate to act without certainty.

A number of parks described semi-formal or informal means of anticipating floods. Although the BoM does not issue flood predictions for Horsham or Dimboola along the Wimmera River, predictions upstream at Glenorchy serve as an indicator of approaching floods. Goulburn-Murray Water and other water management authorities may issue flood "advices" for regulated rivers. The manager at Cairn Curran Reservoir ensures that the manager of Loddon House Caravan Park located a short distance downstream is notified about releases (Ivan Smith, Goulburn-Murray Water, *pers. comm.*, Oct 2005). Several park managers look up river levels on the BoM's web-site. Some receive faxes directly from the BoM. One manager contacts VICSES for telemetered water levels. Other parks describe their (vague?) intention to "keep a close watch on the river". A few parks described measures to notify residents about emergencies. One park has delegated two permanent residents as wardens to advise and evacuate other residents. Two parks use emergency sirens.

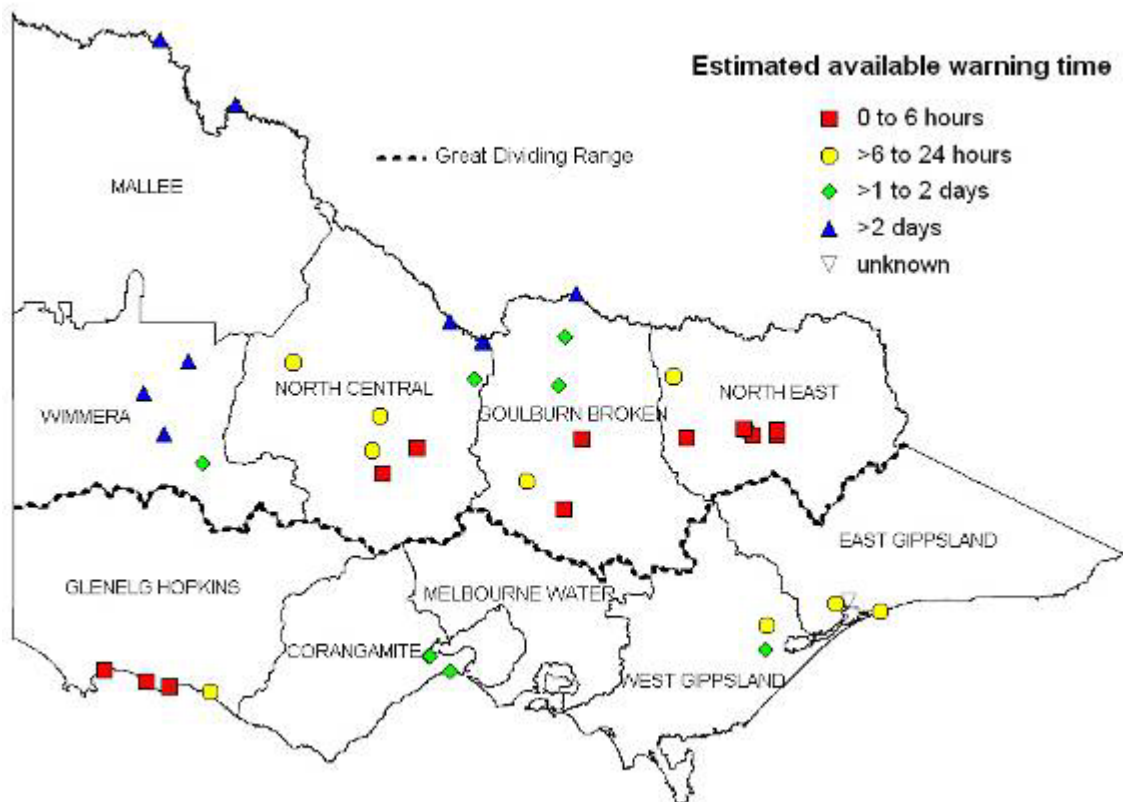
A number of recommendations pertaining to flood warning at caravan parks are outlined in **Section 6.3.6**.

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<sup>16</sup> Flooding occurring within about six hours of rain, usually the result of intense local rain and characterised by rapid rises in water levels, is defined by the Bureau of Meteorology as "flash flooding".



**FIGURE 5.5 – Provision of flood warning services**



**FIGURE 5.6 – Estimated available warning times**

### 5.3.6 Evacuation capacity

Flood warnings will only be of value if met by a population able and ready to respond. Question 12 of the survey asked floodplain managers to assess the physical constraints to evacuation at each caravan park. Most caravan parks (29 out of 40 in the sample) are believed to have ready egress to high ground, for both pedestrians and vehicles. Two caravan parks are believed to have ready egress to high ground for pedestrians only (i.e., roads would be cut). Nine parks are expected to be completely isolated by floodwater, and seven of these fall into the dangerous “shrinking island” category, where the park would first be isolated, then completely inundated by a rising flood. (One of the parks that would be completely surrounded by floodwater has its own airstrip, which could be used for medical emergencies).

Question 16 of the survey asked caravan park managers to list the resources they would rely upon for the evacuation of people and property. The most common answer (27 responses) was “park resources”, which includes four-wheel drives, tractors and boats. Many managers (25 responses) also indicated they would call on VICSES for assistance. Of the 30 parks with permanent residents, 17 expected that the “permanents” would look after themselves. Many parks (23 responses) also mentioned other sources of assistance, especially the Country Fire Authority (CFA), and also the Police, Shire staff, Lions, Rotary, local farmers or townspeople, and even a nearby RAAF base. Some managers expect that the owners of the “annual” vans will assume responsibility for their own property, while others have been given keys to the “annuals” to do what they can to remove valuables.

Mindful of the nature and number of caravan park occupants, the distance to safe ground, the moveability of property (see **Section 5.3.10**), and the anticipated resources available for the evacuation task, question 17 asked the floodplain managers to estimate the time required to evacuate people and property from the caravan park. This was a difficult question and even allowing for the real diversity of caravan parks, the range of answers was surprisingly high, from 15 minutes to 24 hours for people, and from 30 minutes to three days for property. The estimated median time required to evacuate people was only one hour, whereas the median time required to evacuate movable property was nine hours.

A comparison of available flood warning times (or better, the time available before evacuation routes are cut) with the times required to evacuate people and property is important. This comparison showed that the available time was less than or equal to the time required to evacuate people for five parks, and the available time was less than or equal to the time required to evacuate property for nine parks. Given people’s tendency to seek confirmation of flood threats, and sometimes their reluctance to evacuate (especially for “permanents”), these results are regarded as underestimates (an allowance of only 15 minutes to evacuate everyone from a 120-site caravan park during peak season is too low). This result highlights a real concern – a number of caravan parks will not have sufficient time to evacuate the park prior to being inundated, posing a genuine threat to life and property.

### 5.3.7 Levees

A major objective of the questionnaire was to assess what measures, if any, are used in caravan parks to manage the flood risk. The results of questions 18 and 19 are summarised in **Figure 5.7**. Photographs of selected features of the caravan parks are included at **Figure 5.8**.

**Figure 5.7** indicates that 11 of the 40 surveyed caravan parks claimed to be afforded some protection from flooding by artificial levees. **Figure 5.8a,b** shows two classical levees, the first a large levee that completely encircles a Murray River caravan park. The approximate level of protection was thought to be known for five of the 11 levees: ‘minor’; 2 year; 20 year;

30 year; and 100 year + 300mm. The level of protection was not known with any surety for the other six levees. An essential starting point for flood risk management is accurate knowledge of the flood risk – these caravan parks need to understand the real level of protection afforded by their levees.

One by-product of protection by levees that was detected at several caravan parks is the so-called “levee effect”. This refers to the increase in development subsequent to protection, and the decrease in preparedness. At one park, since the levee was built, a marked increase in the number of cabins and vans with rigid annexes amounts to a substantial increase in catastrophe potential, if and when the levee is overtopped. Managers at two other parks expressed confidence that the levee would “totally” protect their park, though neither knew the level of the levee. Another problem is that construction of a ring levee necessarily places a caravan park into the dangerous “shrinking island” category (see **Section 5.3.6**). These problems highlight a need for education of park managers, and for emergency plans that take account of the real risk (however small) of levee overtopping.

### 5.3.8 Site planning

A common means of reducing exposure to flooding is through the strategic placement of accommodation types – 31 parks exercised this measure in one form or another. **Figure 5.7** shows that 15 of the 30 caravan parks with permanent residents and 18 of the 37 caravan parks with tourist cabins or vans have placed (at least to some extent) less mobile structures on the highest ground within the park. In a similar vein, 21 of the 39 caravan parks with unpowered sites have set aside the lowest ground in the park for camping purposes (at least to some extent). This would seem to be a sensible use of low-lying land (see **Figure 5.8c,d**). However, flash floods can pose a significant risk to campers, particularly in mountainous areas. It is possible that some areas are too dangerous even for campers to occupy. Established procedures to educate, warn and evacuate campers are vital.

**Figure 5.9** plots the answers to a similar question (Q15A), showing the proportion of each accommodation type subject to flooding in the 100 year event. The differences between most accommodation types are not pronounced – whether for “permanents”, “annuals”, “tourist cabins” or “other tourist sites”, about 80% of caravan parks indicated that all or most sites would be flooded. Given that over half of the caravan parks place unpowered sites on the lowest land, this similarity is surprising. Perhaps it indicates that a flood as high as the 100 year flood would in many places overwhelm the site planning measures. On-site vans appear to be more exposed to the 100 year flood than other accommodation types, since 95% of caravan parks indicated that all or most sites would be flooded. This suggests that mobile on-site vans have often been sited on lower levels.

### 5.3.9 Floor raising

Another common means of reducing exposure to flooding is through floor-raising. The guidelines accompanying the questionnaire stipulated that for a dwelling to qualify as being raised *as a means of reducing flood risk*, it should be at least 60cm above the ground (**Appendix B**). **Figure 5.7** shows that 25 of the 39 caravan parks with dwelling structures (64%) have raised at least some dwellings. The level to which dwellings had been raised was known for eight caravan parks – mostly above the 1993 flood level (see **Figure 5.8e**). **Figure 5.10** plots the extent of floor-raising for different accommodation types (Q15B). It shows that tourist cabins owned by the park are the most likely accommodation type to be raised. **Figure 5.8e,f** shows examples of raised cabins, **Figure 5.8g** shows a rare instance of a raised “annual” van and **Figure 5.8h** shows one of several raised amenity blocks.

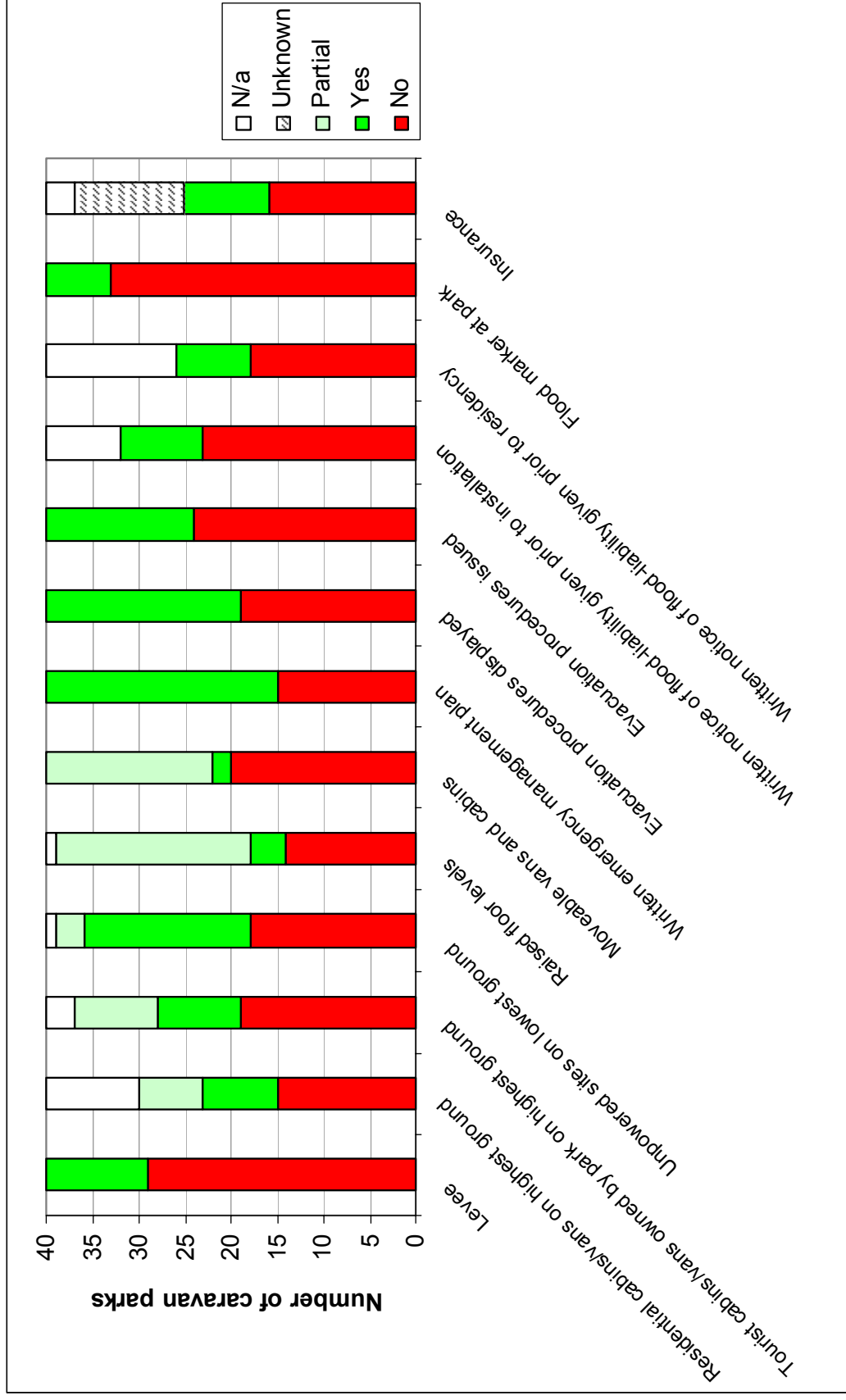


FIGURE 5.7 – Management measures at surveyed caravan parks (N = 40)

**FIGURE 5.8 – Features of surveyed caravan parks**



*a. Levee around caravan park (Goulburn Broken CMA)*



*b. Levee around caravan park (Corangamite CMA)*



*c. Unpowered sites on lowest ground (North East CMA)*



*d. Unpowered sites towards river on right (North Central CMA)*



*e. Raised cabins, to 1993 flood level (North East CMA)*



*f. Raised cabins (Goulburn Broken CMA)*

**FIGURE 5.8 – Features of surveyed caravan parks**



*g. Raised “annual” van (Goulburn Broken CMA)*



*h. Raised amenities block, above 1956 flood level (Mallee CMA)*



*i. Vans are routinely shifted from this low-lying area every spring (North East CMA)*



*j. Mobile on-site van; inset shows “stacker-jack” used to level the caravan (North East CMA)*



*k. Buses used for on-site accommodation can be quickly moved (Goulburn Broken CMA)*



*l. Movable cabin, wheels intact (Mallee CMA)*

**FIGURE 5.8 – Features of surveyed caravan parks**



*m. “Yurts” (small cabins) (North East CMA)*



*n. Resident’s accommodation (Goulburn Broken CMA)*



*o. Rigid annexe attached to “annual” van (North East CMA)*



*p. Mobile “annual” van, with readily dismantled annexe (Goulburn Broken CMA)*



*q. Flood mark (West Gippsland CMA)*

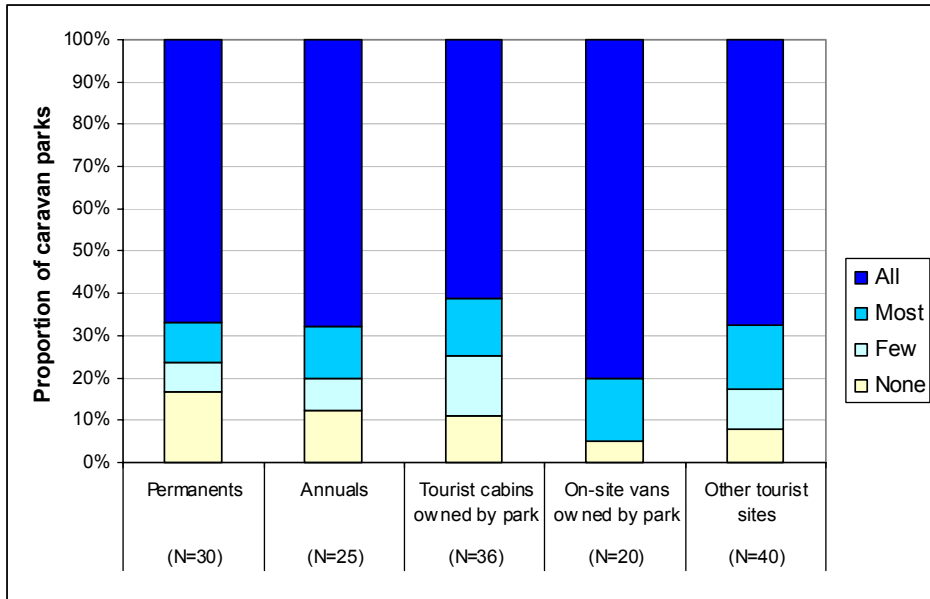


*r. Flood mark (Goulburn Broken CMA)*

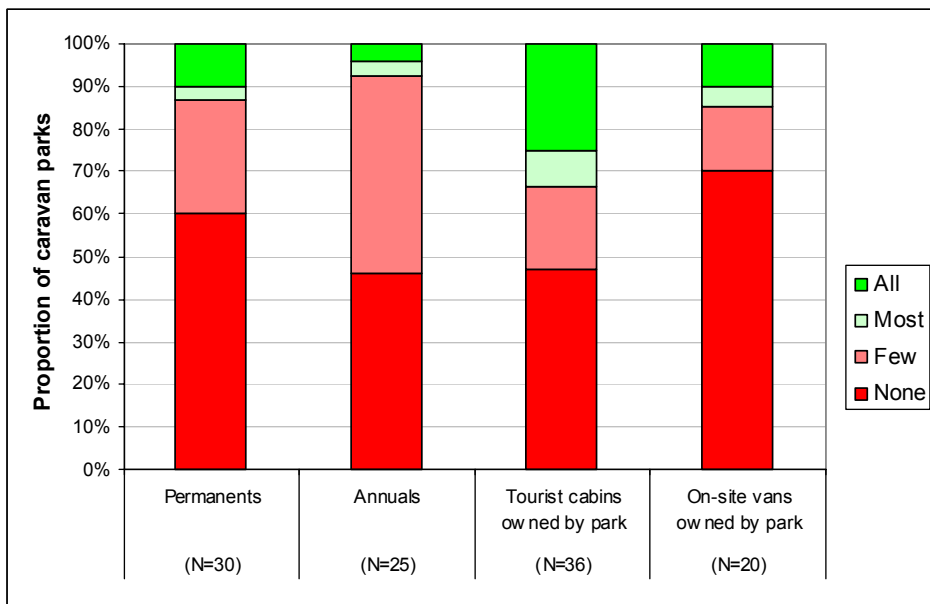


*s. Gauge board (North East CMA)*

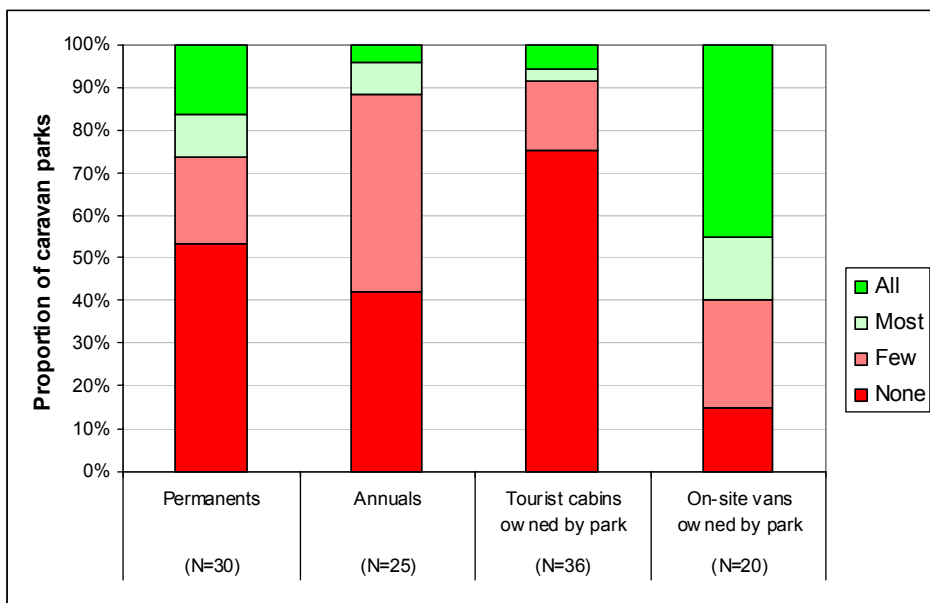




**FIGURE 5.9 – Proportion of caravan parks flooded in 100 year event by accommodation type**



**FIGURE 5.10 – Proportion of caravan parks with raised floor levels by accommodation type**



**FIGURE 5.11 – Proportion of caravan parks with mobile dwellings by accommodation type**

### 5.3.10 Movable property

Another common means of reducing flood damages is by the short-term relocation of property beyond the flood extent. Several issues relating to the capacity to carry out these emergency measures were outlined in **Section 5.3.6**. **Figure 5.7** shows that 50% of the surveyed caravan parks contain at least *some* movable vans and/or cabins (defined as those that are not attached to a rigid annexe, are readily disconnected from services, have a chassis or draw-bar attached and tyres pumped, with towing vehicles available). There are significant differences in movability between accommodation types (Q15C). **Figure 5.11** shows that 60% of the parks with on-site vans are able to shift all or most of their vans to flood-free ground in the time available before a flood. One park routinely shifts on-site vans to higher sites during spring (**Figure 5.8i**). Another innovative preparedness measure at this park is the decision to mount the on-site vans on “stacker jacks” as opposed to the usual winding legs, because the former can be moved quickly (**Figure 5.8j**). Canvas annexes are preferred to rigid annexes at another park. Buses are used there as a form of on-site accommodation, and are readily shifted in advance of a flood (**Figure 5.8k**).

In contrast to on-site vans, **Figure 5.11** shows that only 8% of the parks with tourist cabins would be able to shift all or most of their cabins to flood-free ground in the time available before a flood. In part, this reflects park owners’ preference for floor-raising for this form of accommodation. However, cabins are valuable assets and may not be insured, so some managers endeavour to shift their cabins from the flood zone. Long warning times along the lower Murray River (weeks) provide time to remove cabins, which remain on wheels (**Figure 5.8l**). Another manager has access to towing equipment to remove “yurts” from his park, though short warning times (two hours) could frustrate this strategy (**Figure 5.8m**).

**Figure 5.11** also suggests that 26% of caravan parks with permanent residents would be able to shift all or most of their residential dwellings to flood-free ground prior to a flood. This is a surprisingly high figure, since most of the residential dwellings observed during the study would be essentially immovable. **Figure 5.8n** shows a typical set up. Often these types of dwellings are affixed to secondary structures and connected to services such as water and sewerage.

Furthermore, **Figure 5.11** indicates that only 12% of caravan parks with “annuals” would be able to shift all or most of this accommodation type to flood-free ground prior to a flood. Often these dwellings take on the characteristics of those belonging to permanent residents. **Figure 5.8o** shows an annual van attached to a permanent annexe. However, **Figure 5.8p** shows an annual van with a canvas annexe to facilitate rapid removal. Given the few raised “annual” dwellings (**Figure 5.10**) and the few mobile “annual” dwellings, this accommodation seems especially susceptible to flooding. Perhaps this reflects the owners’ distance from the site and limited perception of the risk.

### 5.3.11 Emergency Management Plans

The process of preparing (and revising) an Emergency Management Plan (EMP) is a key instrument for promoting effective flood risk management in caravan parks. This is recognised by an explicit regulation requiring caravan park owners to prepare an approved EMP:

*A caravan park owner must, to the satisfaction of the council, prepare an emergency management plan providing for evacuation procedures to be followed by residents and occupiers in a fire or other emergency that may affect the caravan park; and*

*The council must consult with the relevant fire authority before determining any matter under this regulation.*

(Residential Tenancies [Caravan Parks and Movable Dwellings Registration and Standards] Regulations 1999 – Regulations 36[1] and 36[4])

For the 40 caravan parks in the sample, it was found that 15, or 38%, do not have an EMP (**Figure 5.7**). However, there are also serious concerns about the quality and utility of the EMPs that have been prepared. One issue is the *currency* of the plans. Over 70% of existing plans are believed to be more than two years old (Q15e). Given ongoing changes in the composition of caravan parks, some of these plans may not reflect current situations. New managers tend to inherit old plans and have little ownership of their contents.

A review of 19 of the 25 EMPs indicates that only three address flood risk in an adequate manner – 16 or 84% of the plans are inadequate. In some cases the plan consists only of emergency telephone numbers and a map showing assembly points in the caravan park. Many parks have adopted generic plans that emphasise bushfire risk, possibly reflecting the Regulation’s requirement that the fire authority be consulted – it is understood that the CFA has prepared a template used by many parks. Several of these generic plans contain no explicit mention of flood risk (perhaps floods are subsumed under “other emergencies”), and some have designated assembly points inappropriately located within floodways. About five parks have adopted the generic “Floods/Severe Storms” plan attached here as **Figure 5.12**. This template is weighted towards the severe storm threat (note the emphasis on windows), saying very little about how to respond to rising water. Only a handful of plans contain any sort of site-specific consideration of the flooding risk. Two of these also have shortcomings. The first plan consists entirely of a generic SES guide for the river valley as a whole, with no indication as to how the caravan park is related to the reference gauge. The second plan emphasises removal of vans from the park, but this survey has shown that few vans there are in a condition to be moved.

<p style="text-align: center;"><b>FLOODS/SEVERE STORMS</b></p> <p>In the event of a flood or severe storm Emergency Control Personnel should:</p> <ul style="list-style-type: none"><li>• Store or secure all loose items external to buildings</li><li>• Secure all windows (closing curtains/blinds) and external doors</li><li>• Tape windows and glass entrances and protect them with boards and sand bags (if necessary)</li><li>• Isolate/shut off electricity, water and gas services</li><li>• Protect valuables, disconnect electrical equipment, and cover and/or move it away from windows</li><li>• During a severe storm remain inside a building, keeping away from windows</li><li>• After the storm, evaluate the need to evacuate if uncontrolled fires, gas leaks or structural damage has occurred as a result of the storm</li><li>• Report to the chief warden regarding the status of occupants’ safety</li></ul>
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**FIGURE 5.12 – Generic Emergency Management Plan used in several caravan parks**

In contrast, the three EMPs deemed to be adequate contain a realistic, site-specific consideration of the flooding risk. More than anything, these plans demonstrate a degree of effort and ownership that is not evident in the many generic plans. Although they are not perfect, they are a good start. Features of an “ideal” EMP are listed in **Section 6.3.6**.

It is instructive to consider likely reasons for the generally dismal state of EMPs in the surveyed caravan parks. Some caravan park owners/managers may lack the resources to prepare meaningful plans. A manager of a high risk caravan park recognised both the need and obligation to prepare a plan, but with a very small staff, he complained of “drowning in paperwork”. This corresponds to research that shows that smaller firms find it “easy to ignore planning while devoting virtually all of their attention to dealing with day-to-day problems” (Burby & Wagner, 1996, p.55). Another reason for poor EMPs is a lack of awareness of the problem, including managers who had not considered the possibility that levees “protecting” their parks could be overtopped. The failure to prepare EMPs and the poor quality of EMPs suggests that many managers do not take flood risk management seriously. It also raises questions about whether caravan park owners’ compliance with the Regulation is monitored, and what standards, if any, councils require of EMPs in order to be “satisfied”. This reflects the significant variability across Victoria’s municipalities with respect to the way flood risk is addressed.

### 5.3.12 Public awareness measures

Efforts to evacuate patrons from caravan parks are expected to be more successful if the patrons already have some awareness of evacuation procedures. The *Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999* require park owners to convey these procedures in several ways:

*A caravan park owner must notify residents and occupiers of the evacuation procedures in the emergency management plan by—*

- (a) giving them a copy of the evacuation procedures before they take up residence or occupy a site at the caravan park; and*
- (b) displaying a copy of the evacuation procedures in a prominent position in—*
  - (i) the caravan park office; and*
  - (ii) every building in the caravan park that contains communal facilities.*

(Regulation 36(3))

**Figure 5.7** shows that 19 of the 40 surveyed parks, or 48%, do not display evacuation procedures in the office and communal buildings, and that 24 parks, or 60%, do not issue evacuation procedures to patrons on arrival. This suggests substantial non-compliance with the Regulation (though a few parks display evacuation procedures in every tourist cabin).

Another aspect of the Regulation seeks to ensure that owners and users of fixed structures are informed about the flood risk prior to installation/residency:

*If a caravan park is in an area which is liable to flooding within the meaning of the Building Regulations 1994, the caravan park owner must give written notice of that fact—*

- (a) to the owner of an unregistrable movable dwelling [UMD] or registrable movable dwelling [RMD] with attached rigid annexe before the dwelling or annexe is installed on a site in the caravan park; and*
- (b) to the resident of such a dwelling before the resident takes up residency of that dwelling on that site.*

(Regulation 37)

Of the 32 caravan parks with cabins (UMDs), or with vans (RMDs) attached to rigid annexes located in designated flood-liable areas, 23 managers (72%) indicated that they do not issue written notice of flood-liability to prospective owners of these fixed structures. Similarly, of the 26 caravan parks with permanent residents *and* with cabins, or vans with rigid annexes, located in designated flood-liable areas, 18 managers (69%) indicated that they do not issue written notice to prospective residents of these fixed structures (**Figure 5.7**). One park has set out to meet Regulation 37(a) by including the following notation on its Annual Licence Agreement:

*Flood prone land: Government regulation requires that an intending purchaser of an annual facility situated on a site that may be subject to flood must be advised of this. In this regard it is advised that the lower level of the park has been subject to flooding.*

Another means of raising flood awareness is via clearly displayed flood markers or gauge boards. **Figure 5.7** shows that seven parks (18% of the sample) have such markers. **Figure 5.8q** shows a flood mark for the April 1990 flood, **Figure 5.8r** for the October 1993 flood, and **Figure 5.8s** shows a typical gauge board. Following the park survey, which had the unintended consequence of raising some managers' awareness of the flood risk, one park proposes to set up a photographic display of historic floods in the kiosk.

### 5.3.13 Other risk-reducing measures

Discussions with park managers revealed a number of other management measures in addition to those described above. These include:

- ▶ Constructing a temporary levee using plyboard, tarpaulin and gravel;
- ▶ Storing sandbags on site to guard against flooding;
- ▶ Snap-fitting connections for sewers;
- ▶ Using fill to provide a van storage area above minor flood level;
- ▶ Phasing out "permanents" from the park, either as a deliberate measure to reduce flood exposure or to attract more tourists for financial reasons;
- ▶ Cessation of bookings if notified of a flood;
- ▶ Raising valuables in "annuals" prior to a flood, if the owners provide keys; and
- ▶ Prohibiting the removal of draw-bars and wheels from caravans, and checking tyre inflation pressures regularly.

### 5.3.14 Insurance

Most of the questions relating to management measures assess risk-reducing measures. Question 19 of the survey sought information about the extent of risk *transfer* through insurance. Nine out of the 37 caravan parks with park-owned cabins or vans have insured these assets against flood (**Figure 5.7**). This figure (24%) seems surprisingly high, given the stated difficulty of obtaining flood insurance in Australia. However, closer analysis indicates that three of these nine parks have located their cabins beyond the 100 year flood extent, and three others have raised most cabins. In relation to the remaining three caravan parks with flood insurance, perhaps insurance companies are less discerning in dealing with commercial enterprises than with residential properties. Park-owned cabins and vans were not insured in 16 parks (43%) and 12 respondents were unable to answer the question.

### 5.3.15 Regulations

Caravan park managers' knowledge of council policies and regulations relating to flood risk at the caravan park was assessed in question 20. Fourteen managers were unaware of any policies, nine referred to the need for Emergency Management Plans (three of these specified that they had to keep the EMP up-to-date), and eight referred to planning schemes that controlled development within flood-prone areas of caravan parks. One manager indicated that no planning permit was required for new sites.

### 5.3.16 Readiness

Floodplain managers were asked to provide a subjective assessment of the overall state of readiness for flooding at each caravan park (question 21). This took into account the effectiveness of the management measures, the attitude of the manager and the level of community awareness. Nine caravan parks are believed to have a high readiness for floods and 16 caravan parks have a low readiness (**Table 5.4**). The level of preparedness may reflect the prior flood experience of the manager. All but one of the managers from the "high readiness" parks had experienced floods. Conversely, in 13 out of the 16 caravan parks with a low state of flood readiness, the managers had not experienced floods.

**TABLE 5.4 – Overall flood readiness at sampled caravan parks (N = 40)**

	Readiness	
	Number	% <sup>a</sup>
Low	16	40%
Medium	15	38%
High	9	23%

Note a) Percentages do not add up to 100% due to rounding.

### 5.3.17 Acceptability of flood risk

Floodplain managers were also asked to provide a subjective assessment of the overall flood risk at each caravan park, viewing risk as a combination of probability and consequence (question 22). The following pointers were used:

- ▶ Acceptable location probably requiring minimal controls, little if any danger;
- ▶ Possibly acceptable location with appropriate controls in place;
- ▶ Possibly unsuitable location even with controls, a dangerous situation.

The highest risk rating was allocated to three parks (**Table 5.5**). It is instructive to consider why each of these parks was deemed to be dangerous.

**TABLE 5.5 – Acceptability of flood risk at sampled caravan parks (N = 40)**

	Risk	
	Number	% <sup>a</sup>
Acceptable location	8	20%
Possibly acceptable location	29	73%
Possibly unsuitable location	3	8%

Note a) Percentages do not add up to 100% due to rounding.

#### PARK A

- ▶ Infrequent floods; 100% floodway > potential for deep, high-velocity flows
- ▶ Very short warning time (< 2 hours)
- ▶ “Shrinking island” location, i.e. limited egress
- ▶ Consists mostly of annuals with some permanents
- ▶ Mostly immovable cabins/vans
- ▶ No EMP, risk denial

#### PARK B

- ▶ Frequent floods; 100% floodway > potential for deep, high-velocity flows
- ▶ Very short warning time (2 hours)
- ▶ Possible “shrinking island” location, i.e. doubtful egress
- ▶ Mixed accommodation types, some permanents
- ▶ Mixed capacity to evacuate cabins/vans
- ▶ No EMP, though manager otherwise well prepared

#### PARK C

- ▶ 80% floodway > potential for deep, high-velocity flows; 100% within 100 year extent
- ▶ Short warning time (6 hours)
- ▶ “Shrinking island” location, i.e. egress available only over flood-prone bridge
- ▶ Consists mostly of annuals with some permanents
- ▶ Mostly immovable cabins/vans
- ▶ No EMP

The critical features contributing to the “dangerous” classification are high flood hazard (floodway), short warning times and a high likelihood that the park will be isolated then completely inundated (“shrinking island”). With a permanent population at each caravan park, and potentially hundreds of tourists in peak season, the “elements at risk” are substantial. None of these parks have EMPs, but even these might not be sufficient to compensate for the inherently dangerous locations.

Eight parks were deemed to be in acceptable locations requiring minimal controls. These all had significant proportions of their properties located beyond the 100 year flood extent.

Intermediate risk ratings were allocated to the sizeable balance of parks. Several parks that are located entirely in floodways would have been classified as dangerous but for mitigating features: either they had ready egress to high ground, even if warning times were short; or they had long warning times, even if egress would later be cut off.

It should be acknowledged that these risk assessments are preliminary, subjective and sometimes completed without all the facts (e.g., 100 year flood depths and velocities). Nevertheless, this exercise does provide a reliable “big picture” for flood-prone caravan parks in Victoria. A small but significant minority have a very severe flood risk, with real threats to life and property. The majority have a lesser though still significant flood risk, requiring appropriate planning and regulation.

## 5.4 Summary

A detailed assessment of flood risk was undertaken for 40 caravan parks in Victoria. Based on this sample, the key results are described below.

### Flood hazard

- ▶ 98% of the parks have at least a few sites located within the 100 year flood extent, and 58% have all sites subject to flooding.

### Elements at risk

- ▶ 100% of the parks offer powered and/or unpowered sites; 90% have tourist cabins; 75% cater for “permanents”; 60% cater for “annuals”; and 50% have on-site vans.
- ▶ The number of people staying in parks tends to increase dramatically during peak season.

### Flood response capacity

- ▶ 35% of the park locations are not part of the Bureau of Meteorology’s quantitative flood warning network, and 33% have warning times of six hours or less.
- ▶ 18% of the parks occupy locations that are expected to be first cut off then inundated during flooding.
- ▶ In at least 13% of the parks, insufficient time would be available to evacuate people, and in at least 23% of the parks, insufficient time would be available to evacuate property.
- ▶ The average (median) time a person occupies the position of park manager is four years; 80% of managers have not experienced a significant flood while manager.

### Existing management measures

- ▶ 28% of the parks are afforded some protection by artificial levees, though often the level of protection is not known.
- ▶ 78% of the parks have evidence of some form of site planning as a floodplain management measure, with least mobile structures on the highest ground, and/or unpowered sites on the lowest ground. Very few on-site vans are located beyond the 100 year flood extent.
- ▶ 64% of the parks contain at least some dwellings with raised floors as a floodplain management measure. Tourist cabins are the most likely dwelling type to be raised.
- ▶ 50% of the parks contain at least some movable vans and/or cabins, often on-site vans, rarely “annuals” or tourist cabins.
- ▶ 38% of park owners do not possess an Emergency Management Plan, and 84% of the plans reviewed do not adequately address flood risk.
- ▶ 48% of park owners do not display evacuation procedures in public areas, and 60% do not issue evacuation procedures to patrons on arrival.
- ▶ 72% of applicable park owners do not provide written notice of flood-liability to prospective owners of cabins (or vans attached to rigid annexes) located in flood-liable areas, and 69% of applicable park owners do not provide written notice to prospective residents of these fixed structures.
- ▶ 18% of the parks have a clearly displayed flood marker or gauge board.
- ▶ Some park owners have insured their tourist cabins and/or vans against flood.

### Flood risk assessment

- ▶ 23% of the parks have a high flood-readiness; 40% have a low flood-readiness.
- ▶ 20% of the parks are deemed to have an acceptable flood risk, 8% occupy locations that are deemed to be dangerous, and 73% have an intermediate flood risk, requiring the application of appropriate planning controls.



## 6. FLOOD RISK TREATMENT

### 6.1 Introduction

A key aim of the investigation is the recommendation of best policy and practice for the management of flood risk at caravan parks in Victoria. Should a proposed caravan park be permitted on flood-prone land? If yes, with what controls? What can be done to reduce the risk at existing parks? In what ways could Emergency Management Plans be improved? Is there a need to amend State regulations?

Any approach towards managing flood risk at caravan parks in Victoria must come to terms with the diversity of risk across the State. One aspect is the variability of flood behaviour. Floods seem to occur more frequently in the North East than in the South West. Warning times range from an hour at some sites in the upper reaches of rivers to days and even weeks along the Murray River. Designation of land as a floodway is an insufficient basis upon which to differentiate risk, because a floodway at Bright is very different to a floodway at Mildura, at least in terms of available warning times.

Another aspect is variability of the “elements at risk”. Caravan parks in Victoria cater for permanent residents and tourists, each of which are characterised by different vulnerability profiles – the former often needing assistance (and special encouragement!) in evacuation, the latter often with little appreciation of the latent risks of occupying a site. Caravan parks also contain a variety of dwelling structures, with variable degrees of mobility. Most cabins and caravans occupying residential sites and “annuals” sites could not be removed in the time available before a flood, whereas camping sites could be speedily vacated.

Each caravan park has its own, unique flood risk profile. This highlights the need for assessing flood risks at each caravan park, and also makes clear that guidelines prepared to manage flood risk must have sufficient flexibility to cater for the diversity across the State. The following sections describe flood risk management firstly for new caravan parks and park extensions, secondly for existing caravan parks.

### 6.2 Planning Considerations for New Caravan Parks and Park Extensions

#### 6.2.1 Flood risk classification

The planning process offers real potential for managing flood risks for proposed caravan parks and park extensions. When a planning application is lodged for a new development, the local council has a responsibility to apply planning controls to ensure that the resultant flood risks are managed appropriately. An essential first step is to assess flood risk at the site of the proposed development.<sup>17</sup> The proposed risk classification system is a function of two important considerations:

- ▶ *Hydraulic Hazard Class:* — The hydraulic hazard is dependent solely on the depth and velocity of waters during a 100 year flood. It provides a measure of the potential for loss of life and personal injury as well as damage to property. Areas with a high hydraulic hazard will be dangerous to people, evacuation by trucks would be difficult, able bodied adults would have difficulty in wading to safety, and there would exist the potential for significant structural damage to buildings.

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<sup>17</sup> If there is any doubt about the flood-liability of a proposed site for a caravan park, councils should seek the advice of the relevant floodplain management authority under section 52 of the *Planning and Environment Act*.

- ▶ *Effective Warning Time:* — This is the time available for the evacuation of people and their goods before the onset of flooding. It represents the time between the delivery of an official flood warning and the loss of evacuation routes due to flooding (ARMCANZ, 2000, p.97).

Using these considerations, a three-tiered flood risk classification system is proposed for caravan parks as follows:

- ▶ *Extreme Flood Risk:* — These are areas where hydraulic hazard is high and there is inadequate effective warning time. These are dangerous areas where the risks associated with any type of new caravan park development are likely to be unacceptable to the community.
- ▶ *High Flood Risk:* — In these areas, the hydraulic hazard remains high, however the effective warning time is adequate to allow safe evacuation of people and the relocation of movable structures. These are dangerous flood areas where only some types of land uses could be permitted within new caravan park developments, and then only with very strict controls.
- ▶ *Low-Medium Flood Risks:* — In these areas, the hydraulic hazard is low. That is, should it be necessary, trucks could evacuate people and possessions and able-bodied adults would have little difficulty in wading to safety. Provided appropriate controls are implemented, new caravan park developments could be allowed in these areas.

#### 6.2.2 Types of controls

The type of planning controls that could be applied to new caravan parks and park extensions comprise:

- ▶ site planning, including the location of the various types of cabins, caravans and tent accommodation;
- ▶ minimum floor levels of cabins and caravans or other flood-proofing measures such as the use of flood-compatible building materials;
- ▶ mobility, i.e. controls to ensure that dwelling structures can be easily moved and relocated *within the available flood warning time*;
- ▶ approved emergency management plan;
- ▶ the provision of a site-specific flood warning system; and
- ▶ public awareness initiatives to ensure a high level of awareness amongst owners, operators and residents.


**Figure 6.1** presents a matrix of typical planning considerations for new caravan parks and park extensions that are considered appropriate for the management of flood risks. It identifies the types of controls that should be implemented within various flood risk areas, and for various land uses within the parks.

Flood designation	None					Land subject to inundation					Floodway				
Hydraulic hazard class <sup>a</sup>	Low					High					High				
Effective warning time <sup>b</sup>	(See note c)					Adequate					Inadequate				
Flood risk level	LOW-MEDIUM RISK					HIGH RISK					EXTREME RISK				
Accommodation type	Permanents & Annuals	Tourist cabins	Movable on-site vans	Non-movable on-site vans	Powered/unpowered sites	Permanents & Annuals	Tourist cabins	Movable on-site vans	Non-movable on-site vans	Powered/unpowered sites	Permanents & Annuals	Tourist cabins	Movable on-site vans	Non-movable on-site vans	Powered/unpowered sites
Site planning controls	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗
Floor level controls and flood-proofing	✓	✓	X	✓	X	✗	✓	X	✓	X	✗	✗	✗	✗	✗
Mobility controls	X	X	✓	X	✓	✗	X	✓	X	✓	✗	✗	✗	✗	✗
Approved emergency management plan	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗
Site specific flood warning system <sup>d</sup>	X	X	X	X	X	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗
Public awareness measures	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗

LEGEND

✓ Required

X Not required

 Unsuitable land use

**Notes**

- a) Hydraulic hazard is based solely on the depths and velocities of floodwater in a 100 year flood. It indicates the level of danger to people and property. Note that in some low risk areas a low hazard classification could reflect areas not flooded in a 100 year event, but still inundated in rarer events.
- b) Effective warning time refers to the time available for the evacuation of people and their property before the onset of flooding. The effective warning time is equal to the time between the delivery of an official warning to prepare for imminent flooding and the loss of evacuation routes due to flooding (ARMCANZ, 2000, p.97).
- c) Both long and short effective warning times are possible in the low-medium flood risk area. The consequences of inundation, however, are significantly less than in the high and extreme flood risk areas.
- d) A site-specific flood warning system is only required in flash flood areas, where the available warning time is six hours or less. Nevertheless, in areas where a site-specific flood warning system is not required, a description of flood warning arrangements should be specified in Emergency Management Plans, including parks located in low-medium risk areas.

**FIGURE 6.1 – Planning considerations for new caravan parks and park extensions**

### 6.2.3 Extreme flood risk areas

An extreme flood risk denotes locations that pose a *danger* to human life. An extreme risk classification does not correspond precisely to designated floodways, because some parks located in floodways allow ample time for people to be evacuated, or have high-level access, and therefore pose less danger than parks where available warning times are short and only low-level access is available. The criteria used here to demarcate caravan parks with an extreme flood risk closely correspond to those contained in the VPP Practice Note, *Applying the Flood Provisions in Planning Schemes: A Guide for Councils* (DOI, 2000a, p.7), which lists the following situations as reasons to refuse a development (**Figure 6.2**):

- A development should be refused if it is likely to cause an unacceptable increase in flood risk in the following situations:*
- it is likely to result in danger to the life, health and safety of the occupants due to flooding of the site*
  - it relies on low-level access to and from the site*
  - it is likely to increase the burden on emergency services and the risk to emergency personnel*
  - it is likely to increase the amount of flood damage to public or private assets*
  - it is likely to raise flood levels or flow velocities to the detriment of other properties. Potentially adverse effects on upstream and downstream areas must be identified and addressed. Development should not transfer flooding problems from one location to another*
  - it is likely to obstruct flood flows or reduce natural flood storage. The capacity of land subject to inundation to convey and store floodwater must be maintained*
  - it is likely to be detrimental to natural habitats, waterway stability, water quality or sites of significance*
  - if any subdivision, development or redevelopment is likely to increase the number of buildings located in a floodway area.*

**FIGURE 6.2 – Extract from VPP Practice Note (DOI, 2000a, p.7)**

As indicated in the matrix in **Figure 6.1**, caravan parks are inappropriate land uses in extreme flood areas due to the risk of loss of life. These are areas potentially affected by deep and fast flows, where floods often rise in just a few hours, where egress from the park is rapidly lost, and where there is likely to be insufficient time for evacuation. Having permanent residents in such dangerous locations is clearly unsuitable. However, if warning times are very short, even camping cannot be regarded as a safe use. Having a caravan park in these areas could constitute a liability for council and would certainly increase the burden on the emergency services.

### 6.2.4 High flood risk areas

The matrix suggests that caravan parks could be permitted in areas of high flood risk, albeit with very strict controls. These areas still constitute significant flood risks, and may include some areas that are located entirely within designated floodways. However, they are not classified as extreme flood risks because of the existence of mitigating features, such as longer warning times, or a high-level access that would enable park patrons to evacuate even with short notice. Nevertheless, caravan parks located in these areas do need a range of controls to safeguard people and property.

As indicated in the matrix, in our view “permanents” should not be permitted in new caravan parks or park extensions in areas of high flood risk.<sup>18</sup> Allowing what can amount to a form of medium-density residential development on land that may be flooded regularly would be likely to increase flood losses, especially given the limited mobility of most of these dwelling structures (**Section 5.3.10**). It would also place additional burdens on the emergency services, especially when dealing with residents who may be reluctant or unable to evacuate without assistance.

In our view “annuals” should also not be permitted in high risk areas. Allowing them would lead to an increase in loss potential, given that most “annuals” soon lose their mobile status (**Section 5.3.10**). It is also unreasonable to burden the park manager or emergency services with the responsibility of relocating any “annuals” that remain mobile.

However, tourist cabins, on-site vans, and powered and unpowered sites would all be permitted in high flood risk areas subject to the controls indicated in the matrix. One control is site planning, so that tourist cabins are located on higher land in a park and unpowered sites are located on lower-lying land. Another control for tourist cabins and non-movable on-site vans in high risk areas is the application of minimum floor levels and other flood-proofing measures such as the use of flood-compatible building materials. For movable on-site vans, the matrix requires the owner/manager to have robust plans in place to shift them. All caravan parks would be required to have an approved Emergency Management Plan (see **Section 6.3.6**). Parks located in high risk areas where effective warning times are six hours or less would be required to have a site-specific flood warning system, possibly including the use of sirens to notify park occupants. All parks would be required to institute public awareness measures.

#### 6.2.5 *Low-Medium flood risk areas*

Caravan parks would be permitted in low flood risk areas, which are defined as areas where the hydraulic hazard in the 100 year flood is low, posing little threat to life. Permanent residency and other uses would be permitted, subject to the controls indicated in the matrix. However, given the lower risks in these areas, the implementation of the controls are likely to be less onerous to the park owners. For permanents and annuals, minimum floor levels are preferred to mobility regulations because experience says that few of these structures retain a capacity to be moved, and it is unreasonable to expect park managers or the emergency services to take responsibility for these. How high residents’ dwellings should be raised is a moot point – ideally they should meet normal residential standards (100 year plus freeboard) but this could prove to be unacceptable. A draft version of the matrix allowed tourist cabins *either* to be raised or to be maintained in a mobile condition. This recognised that in a very few cases, removing cabins before the onset of flooding was a realistic option (e.g., for the Murray River at Mildura, where flood warning times are substantial, **Section 5.3.10**). However, a meeting of the CMA floodplain managers decided that floor level controls, rather than mobility controls, were most appropriate for tourist cabins, which is reflected in the current matrix.

#### 6.2.6 *Implementation*

It is understood that the DSE Planning Reform Unit does not support the preparation of a specific VPP Practice Note dealing with flood risk management at caravan parks, suggesting instead that the two existing VPP Practice Notes related to flooding (DOI, 2000a,b) be revised to include some general discussion on the issue. The Planning Reform Unit sees the issue being best dealt with through internal CMA procedures. The information provided in **Figure 6.1** should be considered as the first step towards the preparation of “best

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<sup>18</sup> If it is decided that permanents should be prohibited from high flood risk areas, mechanisms would need to be identified that could confine the use of a caravan park to tourists only.

practice” guidelines for the CMAs. These will be used to standardise approaches towards assessing flooding referrals for proposals for new caravan parks and park extensions. One possible forum where these guidelines could be formalised is in the draft document *Principles and Practices for Floodplain Management in Victoria* (VCMAs, MW, DSE, 2005). More work needs to be undertaken to develop the controls identified in **Figure 6.1** and to ensure that they can be consistently applied across the State. One issue is to investigate potential mechanisms to restrict (high flood risk) caravan parks to tourists only. Another issue is to determine floor level height for various types of dwellings.

A planning application for a new caravan park would need to indicate how the proposed dwelling types comply with the required planning controls for the given flood risk classification. For example, if the current matrix is accepted, a proposed caravan park located in a “high” flood risk area would need to demonstrate evidence of site planning, raise its tourist cabins, maintain on-site vans in a mobile condition, prepare an Emergency Management Plan, establish a site-specific flood warning system and institute public awareness measures. An integrated approach like this is superior to an incremental approach with progressive development (Grant Scale, *pers. comm.*, Nov 2005).

Other planning aspects also need to be considered. These include the environmental importance of riverbank protection (Clause 15.01-2 of the VPPs). Minimum setbacks for new structures should be determined by council in consultation with the responsible floodplain management authority (Roel Von't Steen, NECMA, *pers. comm.*, Nov 2005).

As specified in **Section 3.1**, caravan parks are only permitted in certain zones. It is understood that one council recently brought forward a planned change in zone from Rural Zone (RUZ) to Farming Zone (FZ) in order to prevent an application for a new caravan park along the Murray River being approved (Paul Flint, DSE, *pers. comm.*, Nov 2005). If the controls in **Figure 6.1** were incorporated into standard planning procedures, this may provide a more appropriate method of managing flood risks than that used by the council referred to above.

It is recognised that the implementation of these controls will only influence the construction of new caravan parks or the extension and redevelopment of existing parks. The introduction of these controls will not immediately alter the flood risks at any of the 619 existing parks. Nevertheless as redevelopment gradually occurs in the future, more responsible management of the flood risk problems should be achieved.

## 6.3 Managing Flood Risks at Existing Caravan Parks

### 6.3.1 Identifying flood risks

Caravan parks often began as camping grounds.<sup>19</sup> Over time these evolved to provide more permanent forms of accommodation, and today provide the primary place of residence for nearly 10,000 Victorians (**Section 2.2**). Flood risk mapping has shown that many caravan parks in Victoria – perhaps half – occupy flood-prone locations (**Section 4.4**). However, with the exception of the 40 caravan parks surveyed in this study, the full dimensions of flood risk are not known. In view of their vulnerable nature, a process needs to be undertaken to identify every flood-prone caravan park in Victoria, recording the flood designation (floodway, land subject to inundation, etc), flood warning availability and time, access conditions, and the particular “elements at risk” (number of sites for each dwelling type). Local councils are best placed to take on this task, because they are already required to

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<sup>19</sup> For example, Cumberland River Holiday Park began as a camping area in the early 1930s ([www.cumberlandriver.com.au/history.html](http://www.cumberlandriver.com.au/history.html)).

identify risks (and treat risks) within their municipalities as part of the Community Emergency Risk Management (CERM) process.<sup>20</sup> As the responsible floodplain management authority, CMAs need to assist councils with the provision of flood information. Future flood studies and floodplain management studies should give explicit consideration to flood-prone caravan parks, in the same manner as the *Upper Ovens River Flood Study* (Earth Tech Engineering, 2003, pp.35-44).

### 6.3.2 Constraints to flood risk reduction

A number of constraints mean that reducing flood risk at caravan parks is no easy task. Indeed, *even preventing an increase in risk is difficult* because: (a) much of the exposure may pre-date regulatory controls; (b) existing use rights may enable the owner to bypass provisions of local planning schemes; and (c) the *Residential Tenancies Act 1997* enables owners to install “movable dwellings” on flood-liable land without a building permit, and protects permanent residents’ rights in relation to planning schemes (**Section 3**).

### 6.3.3 Park closures

Despite these constraints, there may be some opportunity to close down caravan parks located in areas of extreme flood risk, where there is real danger to occupants. Of the 40 caravan parks surveyed, 19 are located on Crown Land, 18 on Freehold, and 3 on council-owned land. Should the flood risk be deemed unacceptable, the land-owners presumably could decide to close a park down, perhaps upon the expiration of a lease. This was the decision Goulburn-Murray Water reached in relation to Chinaman’s Bridge Caravan Park, but as we have seen, strong community and political pressure has to date resulted in an incomplete closure (**Section 1.3.1**). However, landowners may not be aware of the flood risk, or may be more concerned about continuity of income from park operations. In these cases, the floodplain management authority may need to negotiate with the landowner.

### 6.3.4 Ensuring “movable dwellings” are movable

Beyond this, the *Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999* do provide some controls of benefit in maintaining flood readiness in caravan parks. The Regulation states that movable dwellings should be able to be moved within 24 hours, and that annexes should be able to be dismantled within 24 hours. Councils should hesitate to grant approval to remove the running gear from cabins located on flood-liable land (unless the cabins are raised), and should routinely check that cabins installed after the Regulation remain on their chassis with draw-bar, axle and wheels intact.

### 6.3.5 Introducing a cap on number of residential sites

Caravan park owners are required as part of the registration process to inform council about the number of long-term, short-term and camping sites provided. If an appropriate mechanism can be found and if the *Residential Tenancies Act* permits, the number of long-term sites for permanent residents could be capped at the present level, to prevent an increase in risk exposure in higher flood risk areas where flood conditions are dangerous. Possibly a condition to this effect could be included as part of the annual registration process.

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<sup>20</sup> The process of Community Emergency Risk Management is outlined at [www.ses.vic.gov.au](http://www.ses.vic.gov.au) (search for ‘Community Emergency Risk Management’).

### 6.3.6 Improving emergency response

Because of the constraints to reducing flood exposure, indeed, even to preventing an increase in this exposure, by default the key strategy for addressing flood risk at existing caravan parks has been through emergency response – flood warning and evacuation. But this study has revealed a number of concerns relating to parks' capacity to respond:

- ▶ Many park locations are not part of the BoM's quantitative flood warning network;
- ▶ Many parks have warning times of six hours or less;
- ▶ Some parks occupy locations where egress would be cut prior to inundation of the park;
- ▶ Some parks provide insufficient time to evacuate people and property;
- ▶ A high turnover of park managers means that most have no experience of flooding;
- ▶ Many parks do not have Emergency Management Plans (EMPs), and most plans do not address flood risk adequately;
- ▶ Many park owners do not display evacuation procedures in public areas, or issue evacuation procedures to patrons on arrival; and
- ▶ 40% of the surveyed caravan parks were found to be poorly prepared for floods.

The shortcomings that this study has identified can be addressed by improving flood warning systems, improving park access and improving EMPs.

#### Improving flood warning

A key need is to ensure that caravan parks subject to flash flooding (warning times of less than six hours) have some sort of warning system in place. The primary responsibility for flash flood warning rests with Local Government, though the BoM can provide specialist advice in relation to the establishment of these systems (VFWCC, 2001). One option might be an emergency siren that is automatically triggered when the local watercourse reaches a pre-determined level (alternatively, a siren could be triggered by the manager).

Caravan parks located along the Wimmera River at Horsham and Dimboola would benefit from a more formal system linking local gauges to the Glenorchy gauge. Horsham City Council should liaise with the BoM, Wimmera CMA and Grampians Wimmera Mallee Water to establish this system.

Many different organisations are involved in the provision of flood warnings in Victoria. These include the BoM, VICSES, the CMAs, Melbourne Water, rural water authorities, local councils, Police and local communities (VFWCC, 2001). Clearly these agencies need to adopt an integrated approach towards the task of providing warnings, and a recent Memorandum of Understanding between the BoM and Goulburn-Murray Water is an example of this. Given their local networks and responsibilities under the Community Emergency Risk Management process, local councils should take the lead in liaising with other agencies to improve flood warning services for caravan parks within their municipalities.

#### Improving park access

A significant reduction in risk could be achieved at some caravan parks simply by improving access to the park. Raising the level of the access road would provide additional time and increased safety during evacuations. Councils and/or park owners may be able to fund road raising, depending whether public or private roads are involved. Raising access roads would be permitted only if the works did not create adverse flood/drainage effects on adjacent properties.



## Improving Emergency Management Plans (EMPs)

An important finding of this study has been the apparent failure of many park owners to prepare an EMP and the generally inadequate manner in which flood risk is addressed in EMPs. One way of improving the quality of emergency management planning would be through amendments to the *Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999*. In particular, Regulation 36 should give explicit mention to flood risks (as well as fire and other hazards), and for flood-prone parks should mandate the council to consult with the relevant floodplain management authority, or possibly VICSES, as well as the relevant fire authority, prior to approving the park's EMP.<sup>21</sup> The amended Regulation could look like this:

*A caravan park owner must, to the satisfaction of the council, prepare an emergency management plan providing for evacuation procedures to be followed by residents and occupiers in a fire, **flood** or other emergency that may affect the caravan park (Regulation 36(1)); and*

*The council must consult with the relevant fire authority before determining any matter under this regulation. **If a caravan park is in an area which is liable to flooding within the meaning of the Building (Interim) Regulations 2005,**<sup>22</sup> **the council must also consult with the relevant floodplain management authority before determining any matter under this regulation** (Regulation 36(4)).*

An amendment to Regulation 4 would also be necessary, to define the "relevant floodplain management authority" (being the regional CMA or Melbourne Water).

At present the Regulation contains no requirement for parks to maintain their plans as "living" documents. For this reason it is suggested that a new sub-regulation be added that requires park managers to submit updated EMPs to council on a *regular* basis (perhaps with the application for renewal of registration, every year). One way of ensuring that all caravan parks in Victoria prepare EMPs would be to make the submission of a plan, to council's satisfaction, a *requirement* for registration. This may also require a new sub-regulation to Regulation 7.

***A caravan park owner must submit a suitably updated emergency management plan to council, with an application for renewal of registration every year.*** (Regulation 36(5)).

*An application for renewal of registration of a caravan park must—*

- (a) be in the form of Form 1 of Schedule 2; and*
- (b) be lodged with the council on or before 15 November in each year; and*
- (c) be accompanied by the relevant prescribed fee; and*
- (d) be accompanied by the emergency management plan prepared under Regulation 36.*** (Regulation 7).

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<sup>21</sup> A member of the Steering Committee from the City of Shepparton noted that currently each referral to the Country Fire Authority costs Council \$110, which is often not recovered by the fee Council is permitted to charge the park under the *Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999*. Concern was expressed about the financial burden of requiring councils also to consult with the relevant floodplain management authority, and it was suggested that registration fees should not be tied to the Regulation. However, the member of the Steering Committee from the Victorian Caravan Parks Association noted that having the fees in the Regulation adds surety for the caravan park owners. In view of this quandary, it is recommended that alternative ways of setting registration fees be investigated.

<sup>22</sup> This definition of flood-prone land is taken from Regulation 37 of the *Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999*. The *Building (Interim) Regulations 2005* replaced the *Building Regulations 1994*. This definition may not capture caravan parks subject to flooding only during events rarer than the 100 year flood.

As well as amending the Regulations, tools such as a template and guidelines should be developed to help caravan park owners prepare the EMP, and to help councils assess the quality of the plan.<sup>23</sup> The CMAs need to assist park owners and councils by providing flood information. From a flood risk management point of view, an EMP should contain these features:

- ▶ A hazard assessment, including a description of historic floods and their local consequences, and a map showing the extent of historic floods, the 100 year flood, and any levees (potential sources of this information include the CMA, council, flood studies, long-term residents, and the Victorian Water Resources Data Warehouse);<sup>24</sup>
- ▶ A description of the “elements” at risk, including the number and type of sites at risk (on a map), and the numbers of people at risk in low season and peak season;
- ▶ A description of the means of receiving flood warnings and locally monitoring the risk;
- ▶ A description of the means of alerting park patrons to developing risks;
- ▶ A table comparing levels on the reference stream gauge to levels at the park (if applicable) (e.g., Table 11-2 of the *Yea Flood Study*, Water Technology, 2005);
- ▶ A description of key actions to be undertaken at various threat levels or “triggers”, as well as the time required and resources available for these tasks;
- ▶ A description of evacuation procedures, including a map of evacuation points and routes;
- ▶ A clear definition of organisational, park staff and park patrons’ responsibilities; and
- ▶ A list of emergency contacts (Police, VICSES, CFA, etc).

The Municipal Emergency Management Plan and Flood Management Plans should incorporate the EMPs prepared for each caravan park within the municipality.

### Improving flood awareness

Educating caravan park communities about flooding is important for the community's effective response to a flood warning. Many parks already have some sort of flood marker. In some states of the United States, the display of flood warning signs and flood heights at the entrance of camping grounds and mobile home parks is compulsory (Lambley & Cordery, 1992, p.48). The CMAs and VICSES, in association with local councils, could seek funds to install flood markers in caravan parks with extreme and high flood risk.

The *Residential Tenancies Regulations* already contain provisions for informing park patrons about the possibility of flooding and the necessary response. Unfortunately, this study found a significant level of non-compliance with Regulations 36(3) and 37. In this case, improving flood awareness is a matter of improving compliance. While it may be difficult to assess whether the manager issues evacuation information to people on arrival, it should be relatively easy to assess whether evacuation information is displayed in public areas. Again, a sure way of boosting compliance would be to require the display of the park’s evacuation plan, at least in the office and kiosk (if such exists), as a condition for park registration.

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<sup>23</sup> In this regard, the template contained in the “Business Floodsafe Toolkit” is worthy of review (see Gissing et al., 2005, and [www.ses.nsw.gov.au](http://www.ses.nsw.gov.au)).

<sup>24</sup> An example of the information publicly available at the Victorian Water Resources Data Warehouse ([www.vicwaterdata.net/](http://www.vicwaterdata.net/)) is included in **Appendix D**.

### 6.3.7 *Motivating councils*

A key player in managing flood risk at caravan parks is the local council. Whether in identifying flood risks, registering caravan parks, developing local flood warning systems, or ensuring caravan parks prepare satisfactory Emergency Management Plans, local councils have a central role. However, the significant level of non-compliance with the Residential Tenancies Regulations suggests that many municipal councils pay little attention to this role. Many park managers could not identify any council requirements (**Section 5.3.15**). Possible reasons for councils' seeming laissez-faire approach include a lack of capacity or a lack of willingness. Some councils may be disinclined to enforce the Regulations because they actually *own* the caravan park.

If flood risk at caravan parks is to be effectively managed, it is vital that councils take a genuine interest. One vehicle for overcoming councils' lack of commitment could be the Natural Disaster Risk Management Studies Programme, which makes Natural Disaster Relief payments conditional upon a set process of identifying, analysing and treating local risks (DOJ & NRE, 1998, p.37; [www.dotars.gov.au/localgovt/ndr/arrangements.aspx](http://www.dotars.gov.au/localgovt/ndr/arrangements.aspx)).

### 6.3.8 *Motivating park managers*

Many of the recommendations set forth so far relate to amending regulations and improving compliance with regulations. The problem with reliance upon the "stick" is that it can induce a minimalist approach:

*Mandates [for written evacuation plans] leave the public at risk when attitudes of threat denial and inaction prevail. While helpful, they are no substitute for the hard work of disaster awareness education and close coordination of the implementation of disaster response planning (Drabek, 1994, p.222)*

Caravan park owners and managers need to be convinced not only of their obligations in relation to emergency management planning, but also of the *value* to their own enterprises of such planning. Emergency management planning should be viewed as just one arm of total business planning. A small investment in flood-proofing or maintaining mobility can reduce the risk of damage to park assets, which often include tourist cabins, on-site vans and other infrastructure. Similarly, a small investment in planning and staff training can speed the process of cleaning up after a flood. A business recovery process would include means of advising clients (such as the owners of "annuals") that the park was open for business.

Local councils, VICSES, the CMAs and the Victorian Caravan Parks Association could all play a role in educating caravan park owners and managers about the value of adopting risk management principles and practices. Messages about the inevitability of flooding and value of risk management could be incorporated into the proposed guidelines to assist managers in preparing EMPs (**Section 6.3.6**), as well as in industry newsletters.

### 6.3.9 Implementation

A co-ordinated review of the flood risks at existing caravan parks together with a review of the risk treatment measures currently implemented at these parks is required. Such a review should be carried out by the relevant council and the CMA and should be targeted at those parks with the higher flood risks. Related to this is a need to extend the coverage and improve the quality of State-wide flood mapping (see **Section 4.2**).

A number of amendments to the *Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999* have been proposed. Because responsibility for these Regulations is shared between a number of Ministers, good coordination will be required for effective amendment.

Although primarily intended for new parks, the type of controls in **Figure 6.1** provide a benchmark against which the suitability of various measures within existing caravan parks could be assessed. Some measures such as Emergency Management Plans, flood warning and improved public awareness could be implemented at minimal cost.

Further work needs to be undertaken to review the present legislative authority of councils and CMAs to require implementation of new flood risk treatment measures as part of renewals of registrations at existing parks.

## 7. FUTURE DIRECTIONS AND RECOMMENDATIONS

As the investigation has unfolded, it has become clear that this study forms just the first stage of a process to better address flood risk at caravan parks in Victoria. The Steering Committee will need to meet to further consider the report's findings and to collaborate with relevant agencies to assist the development of an appropriate response strategy. The results of this research combined with Victoria's emergency management arrangements would encourage caravan park owners and managers to be more aware of and to manage flood risk.

Caravan park managers need to be able to manage the existing flood risk which could threaten the safety of people and property sited in the caravan park. The existing regulations require caravan park owners to prepare an Emergency Management Plan to the satisfaction of Council to address flooding and for prospective owners or residents of most types of movable dwellings to be notified in writing of flood liability (see **Table 3.1**).

Although it would appear that in many instances these requirements are not strictly enforced, it is in the interests of caravan park owners and managers to minimise their liability to claims for damage in the event of a flood. Ignorance or apathy is not excusable under law. All Councils have emergency response strategies as part of their emergency management planning processes and the inclusion of caravan park emergency response actions would strengthen the implementation of an emergency response and enable an efficient mobilisation of resources.

For proposed new caravan parks or new development within caravan parks in flood-affected areas, there is scope to manage the flood risk through the planning system. The flood overlays require a planning permit for "works", even though the underlying zone may allow a caravan park with appropriate conditions. Assessment in such cases would be by the CMA or Melbourne Water as the referral authority, and would require an assessment of the specific proposal in relation to the flood risk. **Figure 6.1** provides a starting point for formulating conditions of permit, indicating that as a matter of principle, sites in areas of extreme flood risk should be discouraged. A primary concern of planning needs to be the management of the threat to life and protection of property for caravan park occupants.

Caravan park owners and managers cannot be expected to work in isolation. In this regard:

- ▶ Councils have an obligation to ensure caravan parks in areas known to be flood-affected include flooding as one of the components to be included in emergency response plans. Councils can be supported by the Victoria State Emergency Service which has a statutory responsibility to assist local government with emergency management planning.
- ▶ CMAs are best placed to understand and communicate the flood risk to Councils and caravan park owners and managers. They have the data, the knowledge and the expertise.
- ▶ Both Councils and CMAs need to work together to ensure that appropriate flood information is incorporated into planning schemes and ordinances, so that the flood risk is transparent and referrals to CMAs can occur.

This report provides a solid foundation for further work. The Steering Committee will need to continue to meet to achieve implementation of the following recommendations:

1. The Steering Committee continue to meet as the need arises to oversee progress and to discuss any issues formally raised by the caravan park industry. Such issues may include:
  - a) Opportunities to achieve better management of flood risk where caravan parks are located on Crown land;
  - b) Registration fees and cost recovery processes;
  - c) Monitoring performance against requirements established through the planning process or relevant regulations; and
  - d) Developing an accreditation system that benefits caravan park managers that act responsibly in terms of managing the flood risk.
2. CMAs and Councils work proactively with the caravan park industry to:
  - a) Improve knowledge of the flood risk faced by caravan parks by identifying land affected by flooding, the number and location of caravan parks affected and the flood risk;
  - b) Keep an inventory of caravan parks and issues;
  - c) Assist with the development of Emergency Management Plans; and
  - d) If appropriate, incorporate Emergency Management Plans into Municipal Emergency Management Plans and Flood Emergency Plans.
3. DSE and CMAs continue to develop best practice principles and guidelines for caravan park owners and managers. Opportunities include:
  - a) Modifying the two VPP Practice Notes to include some discussion of how to manage the flood risk at caravan parks;
  - b) Incorporating guidelines for managing the flood risk at caravan parks into *Principles and Practices for Floodplain Management in Victoria* (under preparation);
  - c) Developing a template and guidelines to assist caravan park owners and managers manage their flood risk, to include a flood response plan, tools to raise local flood awareness, and in the case where the State-wide flood warning system cannot provide sufficient notice of pending floods, a site specific flood warning system;
  - d) Developing tools for raising flood awareness (such as incorporating education messages into industry newsletters); and
  - e) Requiring briefs for future flood studies and floodplain management plans include a requirement to look at risk and risk reduction measures applicable to any caravan parks within the study area.
4. DSE and CMAs sponsor a legal review and/or seek advice from the Department of Justice to clarify how best to utilise existing mechanisms for minimising the flood risk at caravan parks and whether these should be strengthened.
5. DSE and municipal Councils ensure that flood mapping is updated as the need arises and that the relevant information is incorporated into planning schemes.
6. Caravan park owners work proactively with CMAs and Councils to reduce risks to occupants. Considerations may include:
  - a) Strategies for ensuring movable dwellings remain movable and can be moved within a realistic time frame;
  - b) Raising access roads (provided flood impacts are not made worse); and
  - c) Installing flood markers.

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# **APPENDIX A**

## **EXCERPTS FROM LEGISLATION**

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Version No. 034

**Residential Tenancies Act 1997**

Act No. 109/1997

Version incorporating amendments as at 20 September 2005

**3. Definitions**

**"caravan"** means—

- (a) a movable dwelling; or
- (b) an immovable dwelling situated in a caravan park—  
but, except in Part 14, does not include such a dwelling occupied in pursuance of a contract of employment;

**"caravan park"** means an area of land on which movable dwellings are situated for occupation on payment of consideration, whether or not immovable dwellings are also situated there;

**"movable dwelling"** means a dwelling that is designed to be movable, but does not include a dwelling that cannot be situated at and removed from a place within 24 hours;

**"resident"** means—

- (b) in relation to a caravan park, a person who occupies a site in the caravan park as his or her only or main residence and—
  - (i) who has obtained the prior written agreement of the caravan park owner to do so (whether that agreement was given in respect of that site or another site in the caravan park); or
  - (ii) who has so occupied any site in the caravan park for at least 60 consecutive days;

**517. Building provisions**

The **Building Act 1993**, except Part 12A, does not apply to movable dwellings situated in a caravan park but does apply to buildings situated in a caravan park that are not movable dwellings.

**518. Planning provisions**

A planning scheme or permit under the **Planning and Environment Act 1987** whether made before or after the commencement of this section cannot limit the duration of residency in a caravan park.

Version No. 002

## **Residential Tenancies (Caravan Parks and Movable Dwellings Registration and Standards) Regulations 1999**

S.R. No. 88/1999

Version incorporating amendments as at 1 July 2004

### **4. Definitions**

In these Regulations—

**"annexe"** means an attachment to a movable dwelling used as an extension of the habitable area of that dwelling and capable of being erected or removed from the site within 24 hours;

**"camp site"** means a site in a caravan park that is not provided with individual electrical power or any other individual site services and that is used for the placement of a tent or motor vehicle and intended for use by an occupier other than a resident;

**"chassis"** means a composite platform on which an unregistrable movable dwelling is constructed and which is—

(a) an integral part of the unregistrable movable dwelling; and

(b) capable of fully supporting the unregistrable movable dwelling at all times;

**"flexible annexe"** means an annexe which, apart from any rigid support frame, has walls and a roof of canvas or other flexible material;

**"long term site"** means a site in a caravan park designed for a movable dwelling and intended for use by a resident;

**"prefabricated holiday unit"** means a dwelling other than a tent or annexe that is intended for use by an occupier other than a resident and is designed to be erected on site from pre-constructed components but does not include a dwelling that cannot be situated at and removed from a place within 24 hours;

**"registrable movable dwelling"** means a movable dwelling that is, or has been, registered or is eligible for registration under the **Road Safety Act 1986**;

**"rigid annexe"** means an annexe which has walls and a roof constructed of non-flexible materials;

**"running gear"** means the axles wheels and drawbar of a movable dwelling;

**"short term site"** means a site in a caravan park designed for a movable dwelling and intended for use by an occupier other than a resident but does not include a camp site;

**"tent"** means a movable dwelling which, apart from any rigid support frame, has walls and a roof of canvas or other flexible material;

**"tie down gear"** means a device that connects the anchor point to the means of restraint for an unregistrable movable dwelling or annexe;

**"unregistrable movable dwelling"** means a movable dwelling constructed on a chassis but does not include a registrable movable dwelling or a camper trailer.

### **6. Application for registration**

An application for registration must—

(a) be in the form of Form 1 of Schedule 2; and

(b) be lodged with the council; and

(c) include a plan of the caravan park clearly indicating the location and numbers of all buildings and facilities and all long term sites, short term sites and camp sites; and

### **7. Application for renewal of registration**

An application for renewal of registration of a caravan park must—

(a) be in the form of Form 1 of Schedule 2; and

(b) be lodged with the council on or before 15 November in each year; and

### **9. Period of registration**

(1) Subject to sub-regulation (2), the registration of a caravan park is annual registration from 1 January to 31 December.

### **13. Register of caravan parks**

A council must keep a register of the caravan parks in its municipal district containing the following information in respect of each caravan park— ...

### **36. Emergency management plans**

- (1) A caravan park owner must, to the satisfaction of the council, prepare an emergency management plan providing for evacuation procedures to be followed by residents and occupiers in a fire or other emergency that may affect the caravan park.
- (2) A caravan park owner must comply with sub-regulation (1)—
  - (a) if the caravan park is in operation before 1 July 1999, by 1 January 2000; or
  - (b) otherwise, before the caravan park commences operation.
- (3) A caravan park owner must notify residents and occupiers of the evacuation procedures in the emergency management plan by—
  - (a) giving them a copy of the evacuation procedures before they take up residence or occupy a site at the caravan park; and
  - (b) displaying a copy of the evacuation procedures in a prominent position in—
    - (i) the caravan park office; and
    - (ii) every building in the caravan park that contains communal facilities.
- (4) The council must consult with the relevant fire authority before determining any matter under this regulation.

### **37. Flood prone land**

If a caravan park is in an area which is liable to flooding within the meaning of the Building Regulations 1994, the caravan park owner must give written notice of that fact—

- (a) to the owner of an unregistrable movable dwelling or registrable movable dwelling with attached rigid annexe before the dwelling or annexe is installed on a site in the caravan park; and
- (b) to the resident of such a dwelling before the resident takes up residency of that dwelling on that site.

## **Schedule 2**

### **Form 1**

#### **Application for Registration/Renewal of Registration of a Caravan Park**

To (name of council):

I (applicant's name) of (applicant's address) being the owner of (name of caravan park) situated at (address of caravan park) apply for \*registration/renewal of registration of (caravan park name) for the period / / to 31/12/ .

Number of:      long term sites  
                     short term sites  
                     camp sites

\* Delete what is not applicable.

Signature:

Date:

## **Schedule 3**

### **Design, Construction, Installation and Maintenance of Movable Dwellings**

#### **Part 1—Unregistrable Movable Dwellings**

##### **1. Structure and design**

- (3) An unregistrable movable dwelling or major part of an unregistrable movable dwelling must have its own chassis capable of supporting the structure adequately at all times, including transportation on its attached running gear.

##### **5. Installation**

- (1) With the approval of the council, the wheels and axles of an unregistrable movable dwelling may be removed but only when the dwelling is placed on footings in accordance with the requirements of clause 1(2).

#### **Part 2—Annexes**

##### **7. Annexes—general**

- (1) Annexes must be portable and capable of being readily dismantled.

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Version No. 001

**Building (Interim) Regulations 2005**

S.R. No. 51/2005

Version as at 14 June 2005

**802. Flood areas**

- (1) This regulation does not apply to—
  - (a) a Class 10 building; or
  - (b) an unenclosed floor area of a building; or
  - (c) an alteration to an existing building if the area of the existing building is not increased by more than 20m<sup>2</sup>.
- (2) For the purposes of this regulation, land is in an area liable to flooding if—
  - (a) by or under the **Water Act 1989** it is determined as being liable to flooding (however expressed); or
  - (b) it is identified in a planning scheme under the **Planning and Environment Act 1987** as being in an area liable to flooding; or
  - (c) it is described on a sealed plan of subdivision or plan of strata subdivision or plan of cluster subdivision (as the case requires) as being liable to flooding (however expressed); or
  - (d) it is designated by the relevant council as likely to be flooded by waters from—
    - (i) a waterway, as defined in section 3 of the **Water Act 1989**; or
    - (ii) any land upon which water concentrates or upon or over which surface water usually or occasionally flows (whether in a defined channel or otherwise) including land affected by flow from a drainage system.
- (3) The report and consent of the relevant council must be obtained to an application for a building permit if the site is on an allotment that is in an area liable to flooding.
- (4) The report and consent of the relevant council under sub-regulation (3) need not be obtained to an application for a building permit if.
  - (a) a planning permit is required for the construction of the building; and
  - (b) the relevant planning scheme regulates the level of the lowest floor of the building in relation to any flood level declared under the **Water Act 1989** or otherwise determined by the floodplain management authority or the relevant council.
- (5) The relevant council must not give its consent under sub-regulation (3) if it is of the opinion that there is likely to be a danger to the life, health or safety of the occupants of the building due to flooding of the site.
- (6) In its report under sub-regulation (3) the relevant council may specify a level for the surface of the lowest floor of a building on the site.
- (7) Before specifying a floor level under subregulation (6) the relevant council must—
  - (a) consult with the floodplain management authority for that site; and
  - (b) specify a level at least 300mm above any flood levels declared under the **Water Act 1989** or otherwise determined by the floodplain management authority, unless the authority consents to a lower floor level.
- (8) The relevant council must without delay advise the floodplain management authority and the sewerage authority for that site of the floor level (if any) specified under sub-regulation (6).

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## **Victoria Planning Provisions**

Last updated to include: Amendment VC34, gazetted on the 22 September 2005.  
[www.dse.vic.gov.au/planningschemes/aavpp/63.pdf](http://www.dse.vic.gov.au/planningschemes/aavpp/63.pdf)

### **63 EXISTING USES**

#### **Clause 63.01 Extent of existing use rights**

An existing use right is established in relation to use of land under this scheme if any of the following apply:

- The use was lawfully carried out immediately before the approval date.
- A permit for the use had been granted immediately before the approval date and the use commences before the permit expires.
- A permit for the use has been granted under Clause 63.08 and the use commences before the permit expires.
- Proof of continuous use for 15 years is established under Clause 63.11.
- The use is a lawful continuation by a utility service provider or other private body of a use previously carried on by a Minister, government department or public authority, even where the continuation of the use is no longer for a public purpose.

#### **Clause 63.06 Expiration of existing use rights**

An existing use right expires if either:

- The use has stopped for a continuous period of 2 years, or has stopped for two or more periods which together total 2 years in any period of 3 years.
- In the case of a use which is seasonal in nature, the use does not take place for 2 years in succession.

#### **63.08 Alternative use**

If land is used for a use in Section 3 of a zone for which an existing use right is established, a permit may be granted to use the land for an alternative use which does not comply with this scheme. The responsible authority must be satisfied that the use of the land for the alternative use will be less detrimental to the amenity of the locality.

#### **63.11 Proof of continuous use**

If, in relation to an application or proceeding under the Act or this scheme, including an application for a certificate of compliance under Section 97N of the Act, the extent of any existing use right for a period in excess of 15 years is in question, it is sufficient proof of the establishment of the existing use right if the use has been carried out continuously for 15 years prior to the date of the application or proceeding. An existing use right may be established under this clause even if the use did not comply with the scheme immediately prior to or during the 15 year period, unless either:

- At any time before or after commencement of the 15 year period the use has been held to be unlawful by a decision of a court or tribunal.
- During the 15 year period, the responsible authority has clearly and unambiguously given a written direction for the use to cease by reason of its non-compliance with the scheme.

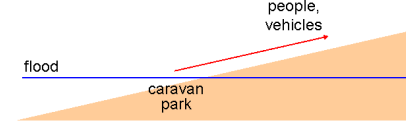
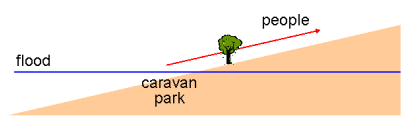
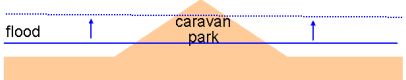
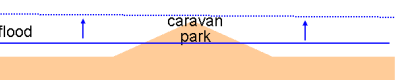
## **APPENDIX B**

# **QUESTIONNAIRE AND GUIDELINES**





12) Consider the ease of evacuation from the park in a 100 year event. Mark evacuation routes on the map provided. Which of these situations is most fitting? (Tick one box only)

<input type="checkbox"/> Ready egress to high ground for <i>pedestrians and vehicles</i> 	<input type="checkbox"/> Ready egress to high ground for <i>pedestrians only</i> (no vehicular access) 
<input type="checkbox"/> All egress cut, isolating park, but some flood-free ground within park 	<input type="checkbox"/> All egress cut, isolating park, no flood-free ground within park ('shrinking island') 

13) Is the creek/river incorporated into an official flood warning system? No  Yes  Unknown

14) A) Typically, how many hours' (or days') warning of a flood would be available for this caravan park?  
 \_\_\_\_\_ hours ( \_\_\_\_\_ days)

B) Typically, how many hours (or days) would elapse between a flood warning and the loss of egress from the park, when all evacuation routes are cut? (if applicable) \_\_\_\_\_ hours ( \_\_\_\_\_ days)

C) Typically, how many hours (or days) would it take after the flood peak for floodwaters to recede sufficiently to allow access to the park? (if applicable) \_\_\_\_\_ hours ( \_\_\_\_\_ days)

D) Typically, how many hours (or days) would it take after the flood peak for floodwaters to recede sufficiently to allow the park to reopen for business? \_\_\_\_\_ hours ( \_\_\_\_\_ days)

15) Complete this table about exposure and mobility of different accommodation types in the park.

Accommodation type	How many sites could be <b>flooded</b> in the 100 year event?	How many cabins/vans have <b>raised floor levels</b> as a means of reducing flood exposure?	How many cabins/vans could be <b>shifted</b> to flood-free ground in the time available before a flood?
<i>Residential</i> cabins and vans ('permanents')	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>
<i>Long-term holiday</i> cabins and vans ('annuals')	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>
<i>Tourist</i> cabins owned by park	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>
<i>Tourist</i> on-site vans owned by park	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>
<i>Other tourist</i> sites (powered and unpowered)	None <input type="checkbox"/> Few <input type="checkbox"/> Most <input type="checkbox"/> All <input type="checkbox"/> N/a <input type="checkbox"/>		

Ask park operator { 16) What resources (e.g., vehicles) does the manager rely on for the evacuation of people and property?  
 Park resources  (e.g., tractor) ..... Park residents' resources  .....  
 VICSES  ..... Other  .....

17) A) Mindful of the age and mobility of park residents (if any) (*question 9*), the total number of occupants (assume peak occupancy), the distance to safe ground, and the resources available, about how many hours would be needed for orderly evacuation of park residents and occupants? \_\_\_\_\_ hours

B) Mindful of the number of flood-prone, mobile dwelling structures (*question 15*), the distance to safe ground, and the resources available, about how many hours would be needed to evacuate *moveable* vans/cabins? \_\_\_\_\_ hours

**MANAGEMENT MEASURES**

18) What measures, if any, are in place to manage flood risk at this caravan park?  None

<i>Measures to reduce frequency of flooding</i>	
a. Levee If yes, is level of protection known? No <input type="checkbox"/> Yes <input type="checkbox"/> What is level of protection? (e.g., 10 year flood; 1993 flood) .....	No <input type="checkbox"/> Yes <input type="checkbox"/>
<i>Measures to reduce property exposure to flooding</i>	
b. Strategic placement of accommodation types Non-moveable <i>residential</i> cabins and vans on highest ground Non-moveable <i>tourist</i> cabins and vans owned by park on highest ground Unpowered sites on lowest ground	No <input type="checkbox"/> Yes <input type="checkbox"/> Partly <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Partly <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Partly <input type="checkbox"/>
c. Raised floor levels to minimise flood exposure (see question 15) If yes, is level of protection known? No <input type="checkbox"/> Yes <input type="checkbox"/> What is level of protection? (e.g., 10 year flood; 1993 flood) .....	No <input type="checkbox"/> Yes <input type="checkbox"/> Partly <input type="checkbox"/>
d. Moveable vans and cabins (i.e. not attached to rigid annexe, readily disconnected from services, chassis or draw-bar attached, tyres pumped, tractors available) (see question 15)	No <input type="checkbox"/> Yes <input type="checkbox"/> Partly <input type="checkbox"/>
<i>Measures to increase flood preparedness</i>	
e. <u>Written</u> emergency management plan <i>incorporating flood risk</i> If yes, approx. how old is the plan? 0-2 years <input type="checkbox"/> > 2 years <input type="checkbox"/> <b>Please attach a copy of the section of the plan addressing flood risk, if possible</b>	No <input type="checkbox"/> Yes, viewed <input type="checkbox"/> Yes, not viewed <input type="checkbox"/>
<i>Measures to raise awareness of flood risk</i>	
f. Evacuation procedures displayed in office and communal buildings	No <input type="checkbox"/> Yes <input type="checkbox"/>
g. Evacuation procedures always issued to residents and occupants upon arrival	No <input type="checkbox"/> Yes <input type="checkbox"/>
h. Written notice of flood-liability given to owners of cabins or vans with attached rigid annexe, prior to <i>installation</i>	No <input type="checkbox"/> Yes <input type="checkbox"/>
i. Written notice of flood-liability given to residents of cabins or vans with attached rigid annexe, prior to <i>residency</i>	No <input type="checkbox"/> Yes <input type="checkbox"/>
j. Flood marker at park (e.g., height of previous flood <i>clearly</i> marked on telegraph pole)	No <input type="checkbox"/> Yes <input type="checkbox"/>

Other .....

19) Are the cabins and vans owned by the park insured against flood? No  Yes  Unknown

20) What policies or regulations, if any, has the local council imposed in respect of flood risks at this caravan park?

.....  
 .....(attach as necessary)

21) Estimate the overall state of *readiness* for flooding at this caravan park.  
 Low (ineffective management measures, indifferent manager, low community awareness)  
 Medium  
 High (effective management measures, innovative manager, high community awareness)

22) Estimate the overall flood *risk* at this caravan park, mindful that risk is a combination of probability and consequence.  
 Low (acceptable location probably requiring minimal controls, little if any danger)  
 Medium (possibly acceptable location with appropriate controls in place)  
 High (possibly unsuitable location even with controls, a dangerous situation)

23) Please record any other comments about the risk of flooding and management of flooding at this caravan park.

.....  
 Please attach the **emergency management plan** and any further information that may be of value to our investigation, for example, **photographs** of the park and photocopies of relevant **council policies**.

Questions 18e to 20 – Ask park operator

## Victorian Caravan Park Flood Risk Survey and Policy Recommendations Questionnaire – Guidelines on Use

### **About the project**

Caravan parks often represent a special flood risk. Recognising this, funding has been secured to conduct a project aimed at better understanding and managing this risk in Victoria. The project is being facilitated by Bewsher Consulting Pty Ltd and overseen by a steering committee, with representatives from two Catchment Management Authorities, Melbourne Water, Vic SES, Victorian Caravan Parks Association, Rural City of Shepparton, Department of Sustainability and Environment (DSE) and the Office of the Emergency Services Commissioner.

A key tool for our investigation is the questionnaire, which is to be administered by floodplain managers from the Victorian Catchment Management Authorities and Melbourne Water. We ask you to acquaint yourself thoroughly with the contents of the questionnaire, and to read these guidelines prior to visiting the selected caravan parks.

### **What caravan parks will be surveyed?**

- We hope to survey about 50 parks from all different areas of Victoria using the attached questionnaire.
- The floodplain managers may select which parks to survey, in liaison with Neil Watson, DSE (ph: 03 9637 9014). However, we do want to survey a *diversity* of parks, to ensure that our study considers the full range of issues. With that in mind, as far as is practicable, floodplain managers should select a range of parks according to these criteria:
  - 1) Highly flood-prone parks (e.g., in a floodway), less severely flood-prone parks (e.g., towards the edge of the LSIO layer), parks subject to urban stormwater flooding, parks subject to coastal flooding;
  - 2) Parks without levees as well as parks with some protection from levees;
  - 3) Parks with short warning times (e.g., < 6 hours) and long warning times;
  - 4) Parks with a significant number of residential sites, parks that cater for tourists, and parks that cater for "annuals";
  - 5) Old parks and new parks;
  - 6) Parks from different LGAs.

Out of these criteria, the two main ones would be 1) and 4). We do wish to include a number of the most severely flood-prone caravan parks in our survey. Also, an early impression is that few parks have a sizeable number of permanent residents – so if there are any flood-prone parks of this type in your jurisdiction, please survey at least one.

### **What's the process to follow?**

- Neil Watson has prepared a letter to be posted to caravan parks to be surveyed. This will be mailed to the selected caravan parks, informing park operators about our study and requesting their assistance. It also flags that a floodplain manager may soon contact them. Perhaps a week before the intended visit, the floodplain manager should request an appointment with the caravan park operator (note that school holidays may not be the best time for this). Allow up to an hour at a park to complete the questionnaire. Please note that some questions (namely, 5 to 9, 16, 18e to 20) are to be directed to the park operator, while answers to other questions should be based upon the floodplain manager's own observations and research. Experience

suggests that some park operators may give unduly optimistic answers to questions about the mobility of vans and readiness of the park for flooding. That is why this sort of information is best based upon the floodplain manager's own sober assessment. Observation is just as important as interview for completing the questionnaire.

- In speaking to the park operators, the floodplain managers should try to allay any fears by telling operators that we are seeking information from 50 caravan parks, of which theirs is just one. Our purpose is to get a "big picture" across Victoria, not to make judgements about any particular park. Any public results from this study will not identify any individual caravan parks.

### **Notes on Interview Questions**

Q1-4 Background questions that can be done prior to the site visit.

Q5-9 Background questions that require the **input of the park manager/operator**.

Q6 Note the two sections: A) Land tenure, B) Who operates the park?

Q8 Caravan parks in Victoria generally cater for 3 kinds of users:

- 1) *Residents* (sometimes called '**permanents**')
- 2) People who rent a site upon which a cabin or van is permanently situated, but who use their cabin or van only occasionally for *holiday* purposes (called long-term holiday sites or '**annuals**')
- 3) *Tourists*, who may either rent park cabins or on-site vans, or stay in the van they towed in, or camp in their own tents.

This is an important question that helps us determine what type(s) of accommodation is provided by the park. Note the breakdown of the third category (tourist sites) into 3 sub-categories: a) cabins owned by park, b) on-site vans owned by park, c) powered and unpowered sites.

Don't neglect the total number of sites.

Q9 The elderly and disabled are often physically vulnerable to flooding (being less mobile), while the unemployed are often financially vulnerable to flooding (being less able to recover from losses).

Q10-15 To be assessed by the **floodplain manager**, mostly requiring visual inspection of the park.

Q10 The floodplain manager should be aware of significant flood events for particular creeks and rivers, however the park manager/operator will probably need to be consulted about the local flood experience.

Q11 Some parks can be flooded both from overtopping of creek banks and from urban stormwater (overland flow).

Q12 The pilot survey indicates that the two common situations are the one in which there is ready egress to high ground for pedestrians and vehicles, and the worrying 'shrinking island' scenario.

Q15 Please take care on this question. The same categories of accommodation that were introduced in question 8 are used. The first question relates to the proportion of sites that are at risk. Two common strategies for managing flood risk (usually one or the other) are to raise floor levels or to maintain a mobile status. The second and third questions seek information about the extent to which these strategies are used in a park. Obviously, this is not relevant to casual visitors to the park, hence the shaded area for which an answer is not required.

Note that our interest in the second question is in floor levels that have been raised *as a means of reducing flood exposure*. These floors should be at least 60 cm (2 feet) above the ground to qualify as "raised".

Note that for a caravan to qualify as able to be shifted in a hurry, it should *not* be attached to a rigid annexe, should be easily disconnected from any services, should have a draw-bar attached (sometimes these are removed), should have tyres pumped, and should have tractors or other suitable vehicles available.

Similarly, for a cabin to qualify as able to be shifted in a hurry, it should be easily disconnected from services, should be on a chassis capable of being towed (i.e., with wheels or possibly skids), and should have tractors available.



*A cabin that could be moved quickly*

Q16 Requires the input of the park **manager/operator**.

Q17 To be assessed by the **floodplain manager**.

Q17 Hopefully it is clear from the wording of the question that the evacuation of people and moveable property in the time before a flood is expected to be no easy task. The results of this question will make for an interesting comparison with Q14A and Q14B – evacuation will be unsuccessful if the time required to evacuate exceeds the available warning time, or more precisely, the time available before evacuation routes are cut.

Q18 Parts a.-d. should be assessed by the **floodplain manager**. Parts e.-j. will require the **input of the park manager/operator**.

Q18a This includes public (e.g., town) and private levees.

Q18e This is an important question. You should ask to view the emergency management plan, and if possible, **obtain and attach a copy of any sections of the plan dealing with flood risk**. Also, please make a judgment about the age of the plan. This will enable us to make some sort of comment on the typical currency and quality of these emergency management plans.

Q18f Have a quick look around the office wall to see if any plan is displayed.

Q18j A mark that is known only to the manager does *not* qualify as a marker intended to raise public awareness of the flood liability of the caravan park. The marker must be obvious.

Q18 Don't overlook the space for comments on "other" management measures. These may include filling of the park's ground level during construction, the use of flood-compatible material in cabins, a park-specific warning system, or the use of park newsletters to convey flood advice to park occupants.

Q19-20 Require the **input of the park manager/operator**.

Q20 Please **attach copies of any local council policies or regulations** relevant to each caravan park.

Q21-23 These questions should be completed by the **floodplain manager**.

Q21-22 Note that in Q21, “high” readiness is a *positive* result, whereas in Q22, “high” risk is a *negative* result. Please note the danger of unthinkingly ticking “high” for Q22, having been influenced by Q21.

Q21 This is a subjective question. Often a park that has had a recent experience of flooding will have a “high” state of readiness, while parks that have not experienced flooding for decades will have a “low” state of readiness. Much also depends on the attitude of the manager. This is certainly *not* a question to put to the manager. It simply captures *your impression* of readiness.

Q22 This is a subjective but telling question. Our purpose is to gain an overall impression of the flood risk at each caravan park – does the park occupy an inherently dangerous location, or is the location acceptable for the type of caravan park? Risk is taken as the combination of the *probability of flooding* (i.e. frequency) and the *consequences of flooding*.

Example 1

Example 2

Q23 Any additional **comments** would be valued and can be written at the end, in the margins or separately attached.

We would also appreciate **photographs** of salient features of the site, particularly any examples of *good* management of the flood risk.

Thank you very much for your support of this project.

## **APPENDIX C**

### **LIST OF 40 SURVEYED CARAVAN PARKS**

<b>CMA</b>	<b>LGA</b>	<b>Caravan park name</b>	<b>Street</b>	<b>Suburb</b>	<b>River posing threat</b>
Corangamite	Greater Geelong City	Barwon Caravan & Tourist Park	153 Barrabool Road	Belmont, Geelong	Barwon River
Corangamite	Greater Geelong City	Geelong Riverview Tourist Park	59 Barrabool Road	Belmont, Geelong	Barwon River
Corangamite	Greater Geelong City	River View Family CP	Sweetman Parade	Ocean Grove	Barwon River
East Gippsland	East Gippsland Shire	Mitchell Gardens CP	2 Main Street	Bairnsdale	Mitchell River
East Gippsland	East Gippsland Shire	Waters Edge CP	623 Esplanade	Lakes Entrance	Gippsland Lake/ Cunningham Arm
East Gippsland	East Gippsland Shire	Nicholson River CP	915 Princes Highway	Nicholson	Nicholson River
Glenelg Hopkins	Glenelg Shire	Narrawong Holiday Park	Off Princes Highway	Narrawong	Surry River
Glenelg Hopkins	Moyne Shire	Belfast Cove CP	139 Princes Highway	Port Fairy	Moyne River
Glenelg Hopkins	Moyne Shire	Yambuk CP	Carrols Lane	Yambuk	Eumeralla River
Glenelg Hopkins	Warrnambool City	Hopkins River CP	125 Jubilee Park Road	Warrnambool	Hopkins River
Goulburn Broken	Campaspe Shire	Yarraby Holiday & Tourist Park Resort	75 River Avenue	Echuca	Murray River
Goulburn Broken	Greater Shepparton City	Shepparton Riverview CP	8047 Melbourne Road (Goulburn Valley Hwy)	Shepparton	Broken River
Goulburn Broken	Mitchell Shire	Goulburn River CP	14-16 Progress Street	Seymour	Goulburn River
Goulburn Broken	Moira Shire	Timeout Holiday Resort	off Goulburn Valley Hwy, west of Tocumwal Bridge	Cobram	Murray River
Goulburn Broken	Moira Shire	Numurkah CP	158 Melville Street	Numurkah	Broken Creek
Goulburn Broken	Murrindindi Shire	Yea Family CP	1 Court Street	Yea	Yea River
Goulburn Broken	Strathbogie Shire	Euroa Caravan & Tourist Park	Kirkland Avenue	Euroa	Seven Creeks



<b>CMA</b>	<b>LGA</b>	<b>Caravan park name</b>	<b>Street</b>	<b>Suburb</b>	<b>River posing threat</b>
Mallee	Mildura Rural City	Apex River Beach Holiday Park	Apex Park, Cureton Avenue	Mildura	Murray River
Mallee	Mildura Rural City	Robinvale Riverside CP	Riverside Drive	Robinvale	Murray River
North Central	Buloke Shire	Gordon Park CP	Calder Highway	Charlton	Avoca River
North Central	Campaspe Shire	Rich River CP	Crescent Street	Echuca	Murray River
North Central	Campaspe Shire	Rochester Caravan and Camping Park	Church Street	Rochester	Campaspe R.
North Central	Campaspe Shire	All the Rivers Run CP	Headworks Road	Torrumbarry	Murray River
North Central	Greater Bendigo City	Central City CP	362 High Street	Golden Square, Bendigo	Bendigo Creek
North Central	Loddon Shire	Bridgewater on Loddon Tourist CP	9 Park Street	Bridgewater on Loddon	Loddon River
North Central	Loddon Shire	Laanecoorie Lakeside Resort Park	58 Brownhills Road	Laanecoorie	Loddon River
North Central	Mount Alexander Shire	Loddon House CP	Maryborough Road	Baringhup	Loddon River
North East	Alpine Shire	Bright CP	1 Cherry Lane	Bright	Morses Creek
North East	Alpine Shire	Porepunkah Bridge CP	36 Mt Buffalo Road	Porepunkah	Ovens River
North East	Alpine Shire	Riverview CP	Mt Buffalo Road	Porepunkah	Buckland River
North East	Alpine Shire	Tawonga CP	1 Mountain Creek Road	Tawonga	Kiewa River
North East	Alpine Shire	Mount Beauty Holiday Centre and CP	Kiewa Valley Highway	Tawonga South	Kiewa River
North East	Wangaratta Rural City	Painters Island CP	Pinkerton Crescent	Wangaratta	Ovens River
North East	Wangaratta Rural City	Gentle Annie Camping Reserve	Gentle Annie Lane	Whitfield	King River

<b>CMA</b>	<b>LGA</b>	<b>Caravan park name</b>	<b>Street</b>	<b>Suburb</b>	<b>River posing threat</b>
West Gippsland	Wellington Shire	Thomson River CP	South Gippsland Highway	Sale	Thomson River
West Gippsland	Wellington Shire	Stratford Top Tourist Park	McMillan Street	Stratford	Avon River
Wimmera	Hindmarsh Shire	Dimboola CP	2 Wimmera Street	Dimboola	Wimmera River
Wimmera	Horsham Rural City	Dadswells Bridge CP	Western Highway	Dadswells Bridge	Mount William Creek
Wimmera	Horsham Rural City	Horsham CP	190 Firebrace Street	Horsham	Wimmera River
Wimmera	Yarriambiack Shire	Warrack Motel and Tourist Park	2 Lyle Street	Warracknabeal	Yarriambiack Creek

## **APPENDIX D**

### **EXAMPLE OF FLOW DATA FROM VICTORIAN WATER RESOURCES DATA WAREHOUSE**

# Cumberland River @ Lorne

Source: Victorian Water Resources Data Warehouse (Site Code 235216)

