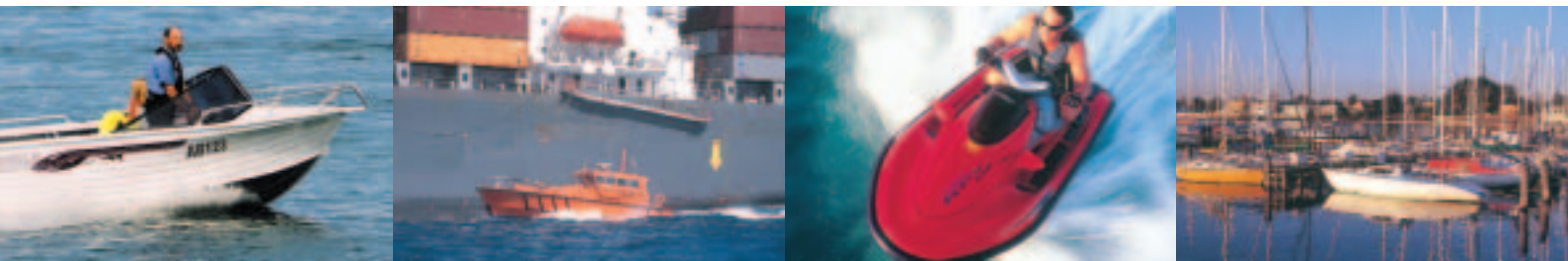


# Marine Safety in Victoria





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Prepared for Marine Safety Victoria  
by Monash University Accident Research Centre

October 2002



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## Minister's Message

The Bracks Government is serious about improving marine safety. It has introduced a program of safety initiatives aimed at reducing the potential for injuries and fatalities related to the operation of commercial vessels and recreational boats.

Increased funding has been made available to substantially improve commercial vessel survey services to help owners and operators go about their business as safely as possible. This has ensured that all commercial vessels are now surveyed annually, providing increased levels of public safety and workplace safety.

In conjunction with the introduction of recreational boat operator licensing, the Bracks Government has also significantly boosted funding to improve boating safety. A total of \$15.9 million is being reinvested into the recreational boating community through Boating Safety Funding Program over a period of five years. These funds target improved search and rescue capabilities across the State, education and training programs for all vessel operators and safety promotion through media and on-water programs throughout the boating season.

Other initiatives include the Victorian Recreational Boating Handbook, a vital safety reference for all recreational boaters, which is now also available in nine languages and accessible on the Marine Safety Victoria website [www.marinesafety.vic.gov.au](http://www.marinesafety.vic.gov.au) or on CD. The website also includes a 'Where to go Boating' site which also provides easily accessible links to tide and weather information for all parts of our coastline.

To build on these safety initiatives, we need a better understanding of why and how accidents and incidents occur on our waterways. Increased knowledge of their causes will lead to improved preventative measures.

This publication adds to the list of safety initiatives undertaken by the Bracks Government. It is the first comprehensive set of statistics of accidents and incidents for small commercial and recreational vessels to be published in Victoria. The Monash University Accident Research Centre has worked with Marine Safety Victoria to produce the statistics in a readable and useable format.

I expect that the research findings will become key inputs in the design of our safety programs to ensure our waterways are safe to enjoy and easily accessible for all Victorians.

**The Hon Candy Broad MLC**  
**Minister for Ports**



## Directors Message

It is pleasing to be able to publish a comprehensive set of statistics on accidents and incidents that have occurred on Victorian waterways. While this may seem a grim statement focussing on the past, these statistics already have given us the key indicators on where we should be concentrating our future safety promotion programs.

While the number of fatalities through boating accidents may seem relatively small, the compilation of these data sets revealed to us the significant numbers of people who are injured in boating and related activities. Many of these are not reported through our normal channels, and it was only through the work of the Monash University Accident Research Centre (MUARC) on hospital admission data that we were really able to fully appreciate the extent of injuries.



This publication may seem complete and exact to some readers, and we hope it will inform and provide a useful research tool. However, we at Marine Safety Victoria are the first to acknowledge that the quality, depth and robustness of some of the data is less than ideal. It was important though, to produce this first data set, and then with expert advice proceed to improve recording and collection of the information required in the future.

But the aim was not just to produce this document. We already are beginning to use the information that can be ascertained by analysing the data. This year will see a major campaign focussing on wearing lifejackets at appropriate times, and staying with your boat if it overturns or swamps until help arrives. These two themes arose from a study of the fatalities on our waterways over the last three years. By using similar key indicators in the future we hope to be able to reduce the number of fatalities and injuries.

Our waterways are there for all Victorians to enjoy. With some basic knowledge and a healthy respect for the dangers in the activity undertaken, we hope people will be able to enjoy boating along our coastline and on our lakes and rivers.

It is our intention to produce this document annually. With expert advice the quality of the information contained will improve and thus give all users of this document a good basis to address safe boating across the State.

A handwritten signature in blue ink that reads "John Lord". The signature is fluid and cursive, with a horizontal line under the name.

**John Lord AM**  
**Director**  
**Marine Safety Victoria**



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# 1. Introduction

## 1.1 Background

Marine Safety Victoria (MSV) is the State's marine safety agency and is responsible for the administration of the Marine Act 1988. Its objectives are to:

- facilitate efficient and safe operation of vessels
- facilitate navigation safety
- improve community awareness of boating safety
- improve and simplify vessel registration and operating requirements
- ensure an effective response to oil pollution incidents.

MSV is responsible for:

- Setting standards for the design, construction and equipment of commercial vessels to maintain structural integrity and seaworthiness.
- Setting standards related to recreational vessels and for operating and zoning rules.
- Licensing of pilots and harbour masters and determining standards for the training of pilots, pilot exempt masters and harbour masters.
- Determining standards and procedures for navigation and maritime safety on State waters.
- Developing appropriate standards for the provision and maintenance of navigational aids for State waters.
- Developing appropriate standards for dredging and maintenance of channels.
- Enforcing and monitoring compliance with prescribed standards.
- Developing, reviewing, coordinating and managing the Victorian Marine Pollution Contingency Plan.
- Providing authoritative advice, commissioning research and promoting education and training in Marine Safety matters.

In order to monitor its progress in marine safety and plan its future directions MSV has collected data on recreational, hire/drive and commercial marine incidents that have occurred in Victorian waters, and which fall within the MSV's jurisdiction. This data is analysed within this report.

## 1.2 Marine Incident Database (MID)

Incident reports are made in accordance with Section 65 (cc) of the Marine Act 1988. This report provides an overview of all marine incidents that have been reported in Victoria from July 1999 to June 2001. The data is based on financial years to ensure each summer boating season appears in a single reporting year.

The data recorded on the MID conforms with the nationally agreed data set established by the National Marine Safety Committee in 1998. A marine incident, is defined by the *National Marine Safety Data Collection Reference Manual 1998*, as an event causing or involving any of the following:

- The death of, or serious injury to, any person on board a vessel, or caused by a vessel
- The loss of a person from a vessel
- The abandonment, loss or presumed loss of a vessel
- The collision of a vessel with another vessel or an object
- The grounding, sinking, flooding or capsizing of a vessel
- A fire or explosion on board a vessel
- Structural failure of a vessel.

It is important to note that incident reports are generated only when an incident is notified to the Water Police or to another designated emergency response organisation. If 'outside' assistance is not required then there is no legal requirement for the incident to be reported. Thus many marine incidents are unlikely to be reported, and cannot appear on the MID, for example:

- Registered yacht club event incidents where rescues are performed by the yacht club itself
- Incidents where a passing (usually recreational) vessel has provided assistance
- Some categories of recreational incidents (eg. waterskiing incidents) where the vessel occupants provide the assistance directly.

Some reported incidents which occur in a marine setting are 'out of scope', and are therefore excluded from the MID system; those involving:

- Swimmers in distress (except 'swim to shores' that have left a marine vessel)
- Suicides
- Surf board and surf ski riders.

Finally, some reported incidents which require official response are included in the MID although they are not directly covered in the definitions of the national dataset; disablements being the most common such incident.

As the MID is limited to incidents requiring emergency response, other sources of data that may throw light on the extent of injury in marine settings were also investigated. Examination of hospital data sources indicate that there are of the order of 10 times more injuries occurring in marine incidents than are reported on the MID. As currently structured the MID is insufficient for planning marine injury prevention programs.

The collection of marine safety data continues to develop. Improvements in coverage and detail will rapidly occur as systematic analysis points the way.

### 1.3 Absence of exposure data

In studying risk it is critical to know the level of relevant activity (or exposure to risk). For example, two deaths for every 1,000 recreational boating 'events' reflects a better safety system than two deaths for every 500 'events'. Unfortunately, there is almost no 'event' information available on which to base estimates of the relative risk of different types of marine activities – personal watercraft use versus waterskiing for example.

Some jurisdictions report incidents per registered vessel as a substitute for usage data, following the precedent set in the road safety field. However, especially for recreational vessels, usage is related only indirectly to ownership. An apparent decline in the rate of injury (per vessels on the register) may simply reflect a 'bad' summer where far less usage has occurred.

Some jurisdictions report incidents/injuries per head of population. While this is preferable to a per vessel rate – and enables governments to judge relative risk across a wide range of activities – the limited coverage of the MID (to events requiring emergency response) limits the value of such rates for monitoring or planning purposes. In this report, no rate data is presented.

In the absence of exposure data it is very difficult to draw conclusions on which to base injury prevention planning. While frequency alone is a useful indication it is sub-optimal for planning. Consideration should be given to periodic usage surveys, which might be cost-effectively collected at the time of vessel registration or operator license renewal.



## 2. Structure of the Report

### 2.1 Marine Incident Database

For the purposes of this report, data from the MID is grouped into three broad categories: commercial vessel incidents; hire drive vessel incidents; and recreational vessel incidents. Each category has been analysed separately. Incidents fall into only one of these three categories – where a choice existed (eg. a commercial vessel colliding with a recreational vessel) the incident was classified according to the ‘highest’ category of vessel involved, namely from commercial to recreational.

#### 2.1.1 Commercial vessel

A commercial vessel is any vessel, other than one under the control of the Department of Defence, that is operated in connection with a commercial transaction of any kind including operation as a business, as a service, for profit, or for research.

It is important to note that jurisdiction for large commercial vessels (and vessel safety) rests primarily with the Commonwealth. The jurisdiction of MSV for commercial vessel safety matters is confined to Victorian registered vessels such as commercial fishing vessels, small ferries, fee for service passenger vessels, and the like.

#### 2.1.2 Hire Drive vessel

A hire drive vessel is any boat or vessel which is let for hire or reward or for any other consideration including vessels provided in conjunction with holiday establishments or hotels for the use of guests or tenants, and which the hirer uses solely for pleasure.

#### 2.1.3 Recreational vessel

Recreational vessels are those used solely for the purpose of recreational or sporting activities and not used for hire or reward.

### 3. Commercial Incidents

There were 80 marine incidents involving 'Victorian' commercial vessels recorded on the MID for the 3-year period July 1999 to June 2002. Due to a police dispute in the final year, 2001/2002, there is no data for the 2-months September and October 2001.

Table 1 indicates that disablement of vessels accounts for 41% and groundings a further 16% of incidents. While these types of incident are common they rarely result in injury (Table 2).

Table 1: Commercial marine incidents by type of incident and financial year: Marine Incident Database, 1999/2000 to 2001/2002

	1999/2000	2000/2001	2001/2002 (10 months)	3-year total	% of 3-year total
Disablement of Vessel	11	11	11	33	41
Grounding	–	8	5	13	16
Onboard Incident	2	2	3	7	9
Person Overboard	3	2	–	5	6
Overdue Vessel	1	4	–	5	6
Collision	–	3	2	5	6
Capsizing	–	2	2	4	5
Other Personal Injury	2	–	1	3	4
Flooding	2	–	–	2	3
Loss or Presumed loss of Vessel	–	1	–	1	1
Fire	–	1	–	1	1
Diver	–	–	1	1	1
<b>TOTAL</b>	<b>21</b>	<b>34</b>	<b>25</b>	<b>80</b>	<b>99</b>





Table 2: Commercial marine incidents by type of incident and severity: Marine Incident Database, 1999/2000 to 2001/2002\*

	Fatality	Injury	Non-injury	Total
Disablement of Vessel	–	–	33	33
Grounding	–	2	11	13
Onboard Incident	1	5	1	7
Person Overboard	3	–	2	5
Overdue Vessel	1	1	3	5
Collision	–	–	5	5
Capsizing	1	–	3	4
Other Personal Injury	–	3	–	3
Flooding	–	1	1	2
Loss or Presumed loss of Vessel	–	1	–	1
Fire	–	1	–	1
Diver	–	1	–	1
<b>TOTAL</b>	<b>6</b>	<b>15</b>	<b>59</b>	<b>80</b>

\* only 10 months of data is available for 2001/2002

Fishing vessels were, by far, the most commonly involved of commercial vessels under Victorian jurisdiction (Table 3).

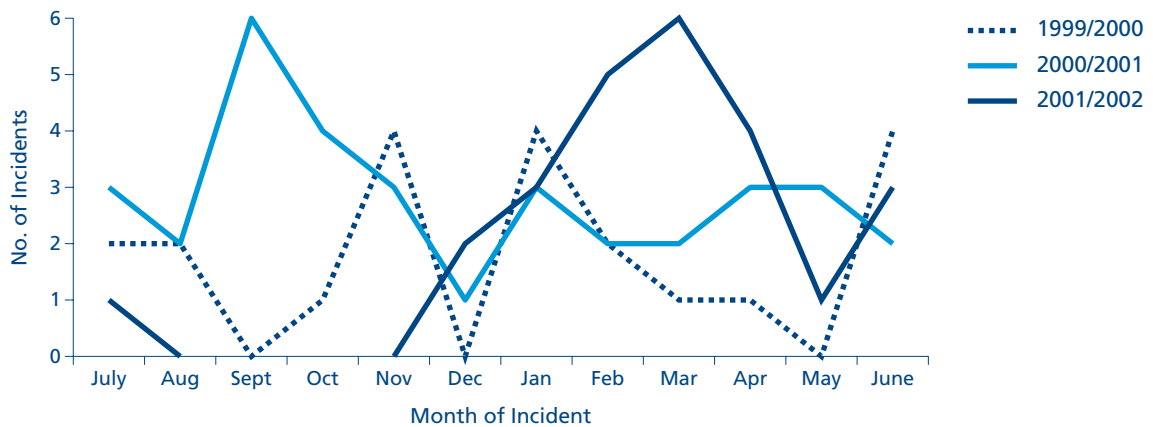
Table 3: Commercial marine incidents by type of vessel by severity: Marine Incident Database, 1999/2000 to 2001/2002\*

	Fatality	Injury	Non-injury	Total
Fishing vessel	5	6	20	31
Charter	–	1	8	9
Passenger Vessel	–	1	5	6
Motorboat	–	–	1	1
Non passenger vessel	–	–	1	1
Other	–	2	12	14
Missing	1	5	12	18
<b>TOTAL</b>	<b>6</b>	<b>15</b>	<b>59</b>	<b>80</b>

\* only 10 months of data is available for 2001/2002

Figure 1 shows the seasonal distribution of commercial marine incidents. There is widespread variation and the small numbers of incidents per month make interpretation difficult. Nevertheless, there is no obvious seasonal pattern.

Figure 1: Commercial marine incidents by month of incident and financial year: Marine Incident Database, 1999/2000 to 2001/2002\*



\* only 10 months of data is available for 2001/2002

The 80 commercial incidents were analysed by severity. Three severity categories were considered: fatal incidents; incidents leading to injury; and non-injury incidents.

### 3.1 Fatal incidents

There were 6 fatalities reported on the MID in the 3-years 1999/2000 to 2001/2002. Half were the result of persons overboard. All were single vessel incidents involving commercial fishing vessels. The following describes the six fatal incidents noted in the tables above:

- On a rainy day with poor visibility, very rough waters and storm conditions in inshore waters at Mallacoota, a diesel-fueled fishing vessel (under NSW survey), capsized. The body of one crew member, a 29-year-old male, was washed up on the beach, the second was missing, and the vessel sank.
- On a clear day with fair visibility, in Corner Inlet near Port Franklin with calm waters and a light NW wind a 53 year old male fisherman, who was the person at helm, was found floating in the water, drowned, after going overboard.
- On a cloudy day near Port Franklin, Apollo Bay, with fair visibility, rough waters and a strong SW wind a 53-year-old male crewmember went overboard off a fishing vessel.
- On a clear day in the offshore waters between Warrnambool and Peterborough, with good visibility, calm waters and a light NE wind a fishing vessel was reported as overdue. One deceased male crewmember was later recovered.
- On a clear day in offshore waters in the vicinity of Lakes Entrance, with good visibility, calm waters and a light S wind a 10-year old passenger on a fishing vessel was involved in an onboard incident with fishing gear and was fatally injured.
- In offshore waters near Gippsland, a fisherman was washed off a vessel, the body was not located.



### 3.2 Injury incidents

There were 15 non-fatal injury incidents associated with commercial vessels reported to the MID in the 3-years 1999/00 to 2001/02.

Again, the majority (60%), where the type of vessel was known, occurred during commercial fishing.

Thirty-three percent of injuries were the result of onboard incidents (Table 2). More than half (53%) occurred on inshore waters, 33% in offshore waters and the remaining 13% in enclosed waters.

Six injury incidents involved fishing vessels (40% of commercial injury total), one each involved a charter and passenger vessel. Note, however, that data on vessel type was not available on almost half (47%) of reported incidents.

### 3.3 Non-injury incidents

There were 59 commercial marine incidents reported in the 3-years 1999/2000 to 2001/2002, which did not result in human injury. Most incidents (56%) were disablements, or groundings (19%). Of the non-disablements 69% were groundings and 19% collisions.

Table 4: Commercial marine non-injury incidents by type of incident and financial year: Marine Incident Database, 1999/2000 to 2001/2002

	Financial years			Total non-injury incident numbers	% of total non-injury incidents
	1999/2000	2000/2001	2001/2002 (10 months)		
Disablement of vessel	11	11	11	33	56
Grounding	–	7	4	11	19
Collision	–	3	2	5	8
Capsizing	–	2	1	3	5
Overdue vessel	–	3	–	3	5
Person overboard	2	–	–	2	3
Flooding	1	–	–	1	2
Onboard incident	1	–	–	1	2
<b>TOTAL</b>	<b>15</b>	<b>26</b>	<b>18</b>	<b>59</b>	<b>100</b>

Both disablements and non-disablement incidents were most common in inshore waters, while proportionally more non-disablements (15%) compared with disablements (3%) occurred in inland waters.

Table 5: Commercial marine non-injury incidents by location: Marine Incident Database, 1999/2000 to 2001/2002\*

	Non-disablements		Disablements		Total	
	N	%	N	%	N	%
Inshore waters	13	50	22	67	35	59
Enclosed waters	8	31	7	21	15	25
Inland waters	4	15	1	3	5	9
Offshore waters	1	4	3	9	4	7
<b>TOTAL</b>	<b>26</b>	<b>100</b>	<b>33</b>	<b>100</b>	<b>59</b>	<b>100</b>

\* only 10 months of data is available for 2001/2002

Almost all disablements occurred without vessel damage (94%) while 42% of non-disablements resulted in damage to the vessel, including two cases of major damage.

Twenty-seven percent of disabled vessels were fishing vessels. Sixty-seven percent of disablements and 58% of other non-injury incidents required towing.

Table 6: Commercial marine non-injury incidents by type of vessel: Marine Incident Database, 1999/2000 to 2001/2002\*

	Non-disablements		Disablements		Total	
	N	%	N	%	N	%
Fishing vessel	11	42	9	27	20	34
Charter	4	15	6	18	10	17
Passenger vessel	1	4	4	12	5	8
Motorboat	1	4	–	–	1	2
Non-passenger vessel	1	4	–	–	1	2
Other	4	15	7	21	11	19
Missing	4	15	7	21	11	19
<b>TOTAL</b>	<b>26</b>	<b>99</b>	<b>33</b>	<b>99</b>	<b>59</b>	<b>101</b>

\* only 10 months of data is available for 2001/2002



## 4. Hire/Drive Incidents

There were 24 marine incidents involving hire/drive vessels recorded on the MID for the 3-year period July 1999 to June 2002. Most of these incidents (n=14) occurred in the 1999/2000 financial year. With the data available, especially in the absence of exposure data, it is not clear whether the apparent major decline in hire/drive incidents from 1999/2000 to 2001/2002 is real, a function of changes in the hire/drive market or an artifact of some (unknown) flaw in the Database.

One third (n=8) of hire/drive incidents were disablements. Of the remaining incidents six were groundings and five were overdue vessels. This pattern of incident type is similar to that for commercial incidents.

Half of the reports were phoned in (n=12). Four of the twelve phone-ins were from the operators of overdue vessels. Four of the five overdue vessels returned on their own accord, the other one required towing.

Once incident resulted in a double fatality:

- On a day where conditions were cloudy, choppy with moderate (8>15K) south-easterly winds and visibility was good, three males endeavored to swim to shore. Only one was wearing a lifejacket. Two males drowned, the third made it back to the boat after some 4 hours in the water.



Table 7: Profile of hire/drive incidents: Marine Incident Database, 1999/2000 to 2001/2002

Frequency	1999/2000	2000/2001	2001/2002 (10 months)	3-year total
Incidents	14	8	2	24
– Collision	1	0	–	1
– Disablement	4	4	–	8
– Grounding	5	1	–	6
– Onboard incident	1	1	–	2
– Overdue vessel	2	2	1	5
– Person overboard	–	–	1	1
– Sinking	1	–	–	1
Fatalities	–	–	2*	2
Minor injuries	4**	–#	–	4
Severity rating				
– Property damage	–	1	–	1
– Fatal incident	–	–	1	1
– No damage	10	5	1	16
– Other vessel damage	2	–	–	2
– Serious injury	1**	1#	–	2
– Vessel lost	1	1	–	2
Location##				
– Enclosed waters	5	3	–	8
– Inland waters	4	2	–	6
– Inshore waters	5	3	2	10
– Method of report				
– Flare sighting	2	–	–	2
– Radio call	2	1	–	3
– Telephone	4	7	1	12
– Visual sighting	5	–	–	5
– Unspecified	1	–	1	2
Support				
– Tow required	4	3	–	7
– No tow required	10	5	2	17

\* 2 fatalities occurred during one incident

\*\* 4 minor injuries occurred during one incident

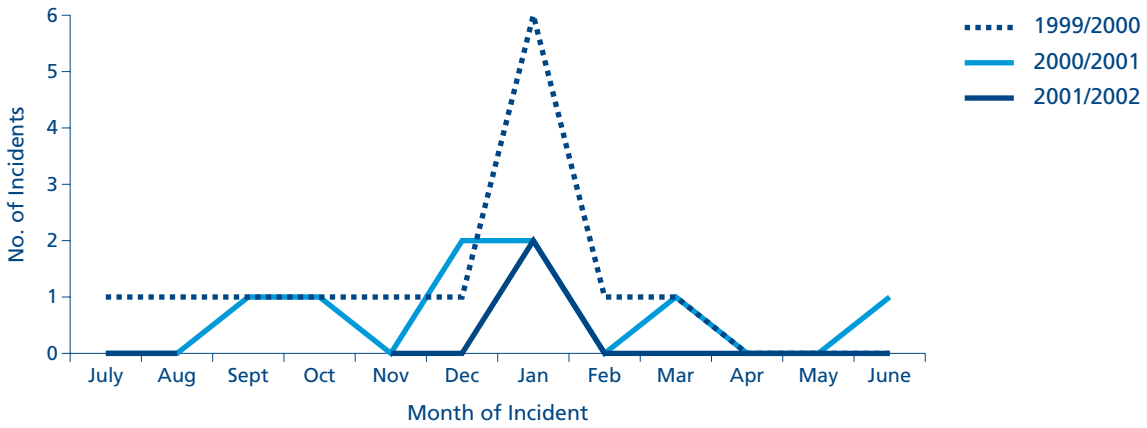
# severe sea-sickness, no other personal data reported, hence doesn't appear as a minor injury

## unfortunately, more precise location detail is not available



Most hire/drive incidents occurred in the summer boating season (Figure 2).

Figure 2: Hire/drive marine incidents by month of incident and financial year: Marine Incident Database, 1999/2000 to 2001/2002\*



\* only 10 months of data is available for 2001/2002

## 5. Recreational Incidents

There were 2,217 marine incidents involving recreational vessels recorded on the MID for the 3-year period July 1999 to June 2002, after excluding suicides and swimmers in trouble. Due to a police dispute the final year, 2001/2002, there is no data for the 2 months September and October 2001.

In addition, historical fatality data is presented.

Table 8: Recreational marine incidents by type of incident and financial year: Marine Incident Database, 1999/2000 to 2001/2002

	1999/2000	2000/2001	2001/2002 (10 months)	3-year total	% of 3-year total
Disablement of Vessel	530	561	495	1586	72
Grounding	36	50	45	131	6
Capsizing	48	28	38	114	5
Overdue Vessel	34	20	21	75	3
Unspecified	34	13	8	55	3
Loss or Presumed loss of Vessel	9	23	19	51	2
Collision	19	13	10	42	2
Onboard Incident	16	10	10	36	2
Person Overboard	10	9	8	27	1
Fire	8	8	7	23	1
Sinking	8	7	5	20	1
Other Personal Injury	4	5	7	16	1
Flooding	2	6	4	12	1
Structural Failure	1	6	4	11	1
Swamping	4	1	4	9	0
Explosion	4	0	1	5	0
Loss of Stability	1	2	1	4	0
<b>TOTAL</b>	<b>768</b>	<b>762</b>	<b>687</b>	<b>2217</b>	<b>101</b>





Figure 3 shows a clear seasonal pattern associated with recreational marine incidents with a peak in January and lows in the winter months, corresponding with the recreational boating season.

Figure 3: Recreational marine incidents by month of incident and financial year: Marine Incident Database, 1999/2000 to 2001/2002\*



\* only 10 months of data is available for 2001/2002

### 5.1 Fatal Incidents

There were 21 fatal recreational marine incidents resulting in 27 fatalities over the 3-year period; six in 1999/2000, seven in 2000/2001; and eight in 2001/2002. Data for only six of the eight occurring in 2001/2002 is available due to police dispute action, hence much of the following data is based on 19 incidents reported to the MID, supplemented, where possible, with data from the two non-recorded incidents.

Fatal incidents most often occurred on inshore waters (n=9, 43%) or on inland waters (n=7, 33%).

All but one fatality involved a single vessel.

Table 9: Fatal recreational marine incidents by location and financial year: Marine Incident Database, 1999/2000 to 2001/2002

	Financial years			Total fatal incident numbers	% of total fatal incidents
	1999/2000	2000/2001	2001/2002 (10 months)		
Inshore Waters	3	4	2	9	43
Inland Waters	2	2	3	7	33
Enclosed Waters	1	1	1	3	14
Offshore Waters	–	–	2	2	10
<b>TOTAL</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>21</b>	<b>100</b>

Almost half the fatal incidents involved capsizings (n=10, 48%).

Table 10: Fatal recreational marine incidents by type of incident and financial year: Marine Incident Database, 1999/2000 to 2001/2002

	Financial years			Total fatal incident numbers	% of total fatal incidents
	1999/2000	2000/2001	2001/2002 (10 months)		
Capsizing	3	3	4	10	48
Person overboard	1	2	–	3	14
Collision	1	1	–	2	9
Swamping	–	–	2	2	9
Firearm incident	–	–	1	1	5
Overdue vessel	1	–	–	1	5
Swim to shore	–	–	1	1	5
Sinking	–	1	–	1	5
<b>TOTAL</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>21</b>	<b>100</b>

Weather conditions are available for 19 of the 21 fatal incidents. Most (67%) of fatal incidents occurred in clear conditions with good visibility, while almost equal numbers of fatal incidents occurred in calm, compared to rougher, water conditions.

Available vessel data indicates that almost half the fatal recreational incidents were associated with motor boats (Table 11).

Table 11: Fatal recreational marine incidents by type of incident and vessel type: Marine Incident Database, 1999/2000 to 2001/2002\*

	Vessel type						Total fatal incidents
	Motor boat	Other	Paddle/row boat	PWC (jetski)	Sailing boat	Missing	
Capsizing	5	1	1	–	2	1	10
Person overboard	1	–	–	–	1	1	3
Collision	–	–	–	1	1	–	2
Firearm incident	1	–	–	–	–	–	1
Overdue vessel	1	–	–	–	–	–	1
Swim to shore	1	–	–	–	–	–	1
Sinking	–	–	–	–	–	1	1
<b>TOTAL</b>	<b>9</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>19</b>

\* only 10 months of data is available for 2001/2002



### 5.1.1 Capsizings

Capsizings account for more than half of the recreational marine fatal incidents in the 3-year period for which detailed data is available (n=19). The following describes the 10 fatal capsizings noted in the above tables.

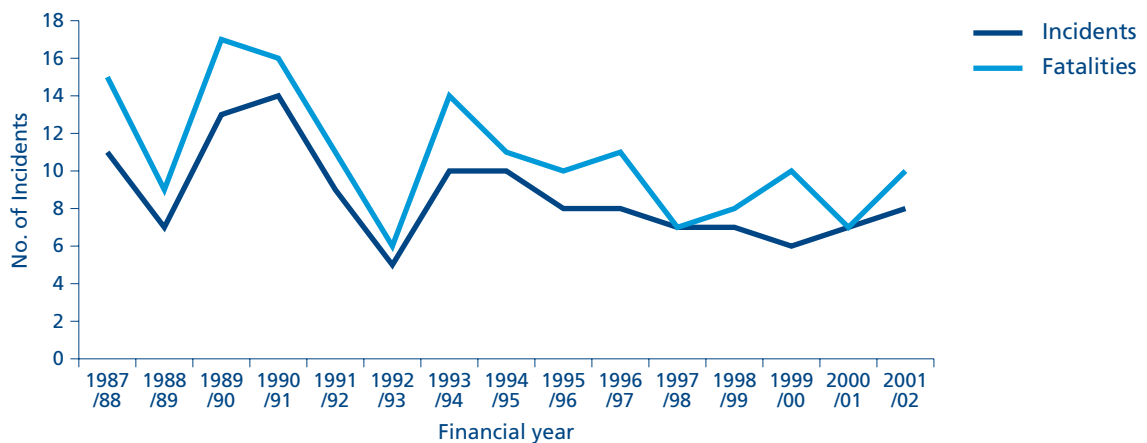
- On a clear day in Corio Bay with good visibility, calm waters and a moderate SW wind a kayak capsized with two males aboard. One made it to shore, the other was left clinging to the kayak and was reported missing, later confirmed as a fatality.
- On a cloudy day with good visibility, choppy waters and a NE moderate wind a 5.5m sailing boat overturned and sank quickly. Three persons on board did not put on lifejackets and attempted to swim 1 nautical mile to Faulkner Beacon, one person reached the Beacon and raised the alarm. A passing yacht attempted to assist one person in the water but the person failed to respond and disappeared. The vessel was lost.
- On a clear day on Lake Eildon at Bonnie Doon with good visibility, choppy waters and a light NW wind a 4.4m petrol driven skiboat overturned after being caught in the wash of a passing vessel. One of two persons drowned.
- On a clear day in offshore waters with good visibility, calm waters and a light SW wind, a petrol powered motorboat with an outboard motor capsized after a collision with a floating or submerged object. One male was missing and was later recovered deceased. The vessel sustained major damage.
- In offshore waters a 'tinny' was washed out the entrance to Tamboon Inlet, the vessel overturned 500m offshore. Of four vessel occupants one swam to shore and three drowned.
- On a clear day in the Barwon River with good visibility, choppy waters and a light E wind, a 4.9m half cab petrol powered (outboard) motorboat overturned while travelling seaward through the mouth of the Barwon River. One person swam to shore and was hospitalised suffering hypothermia, the other drowned. The body and vessel were recovered.
- On a clear day on Lake Mokoan with good visibility, choppy waters and a moderate NE wind a yacht capsized with two persons onboard. Unsuccessful attempts were made to right the vessel. A lifejacket was worn by the survivor, but not the deceased, although there was a second jacket on board. The deceased drowned.
- On a clear day at Mallacoota Inlet with good visibility, rough waters and a strong NE wind a paddle (row) boat capsized while attempting to paddle to Rabbit Island. The deceased's body was later recovered.

- On a clear day on Lake Cairn Curren with good visibility, choppy waters and a moderate SE wind a small powered 'tinny' containing three shooters overturned. Three persons were reported missing, no lifejackets were onboard. Two of the drowned persons were wearing waders.
- On a clear day in surf 4km east of Pt Ricardo in Bass Strait with good visibility, calm waters and a light wind, a petrol powered 4.5m motorboat with an outboard motor was overturned by a wave. The occupants swam to shore but one got into trouble and drowned in the attempt.

### 5.1.2 Historical fatality data

Recreational fatality data is available from 1987/88. The chart below shows the number of recreational fatal incidents and fatalities recorded each financial year from 1987/88 to 2001/2002.

Figure 4: Fatal recreational marine incidents over time, 1987/1988 to 2001/2002\*



\* only 10 months of data is available for 2001/2002

Since 1989/90, most recreational boating fatality incidents have been associated with 'tinnys' (n=39, 28% of total) and 'fishing boats' (n=35, 25%; Figure 5). There may well be considerable overlap between these two vessel categories. With respect to the type of incidents resulting in fatality, half (n=79; Figure 6) were the result of overturned vessels.

The absence of exposure data for recreational marine activities means that no meaningful trend can be determined and the annual number of incidents and fatalities are small, hence variation would be expected from year to year.



Figure 5: Fatal recreational marine incidents over time by vessel type, 1987/1988 to 2001/2002

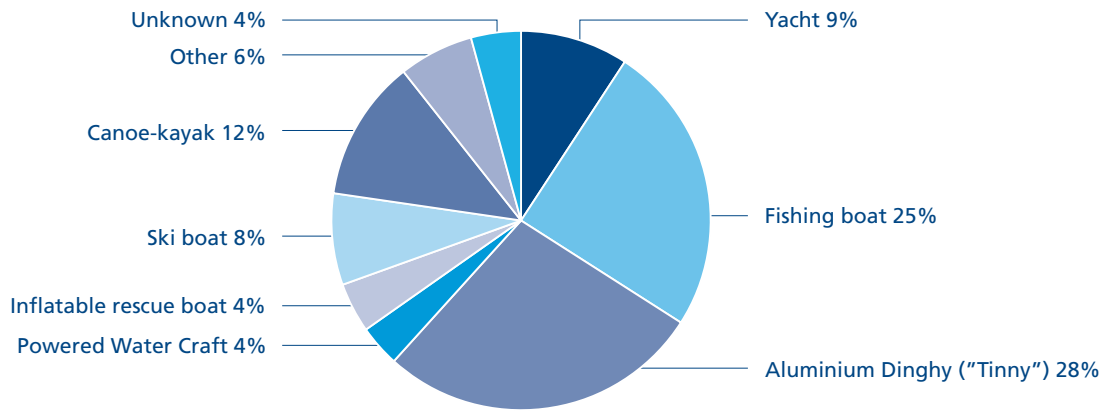


Figure 6: Fatal recreational marine incidents over time by incident type, 1987/1988 to 2001/2002

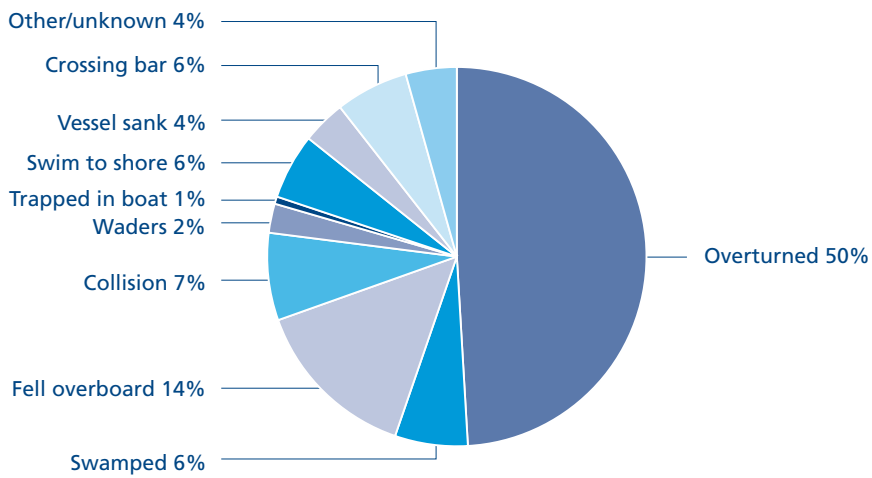
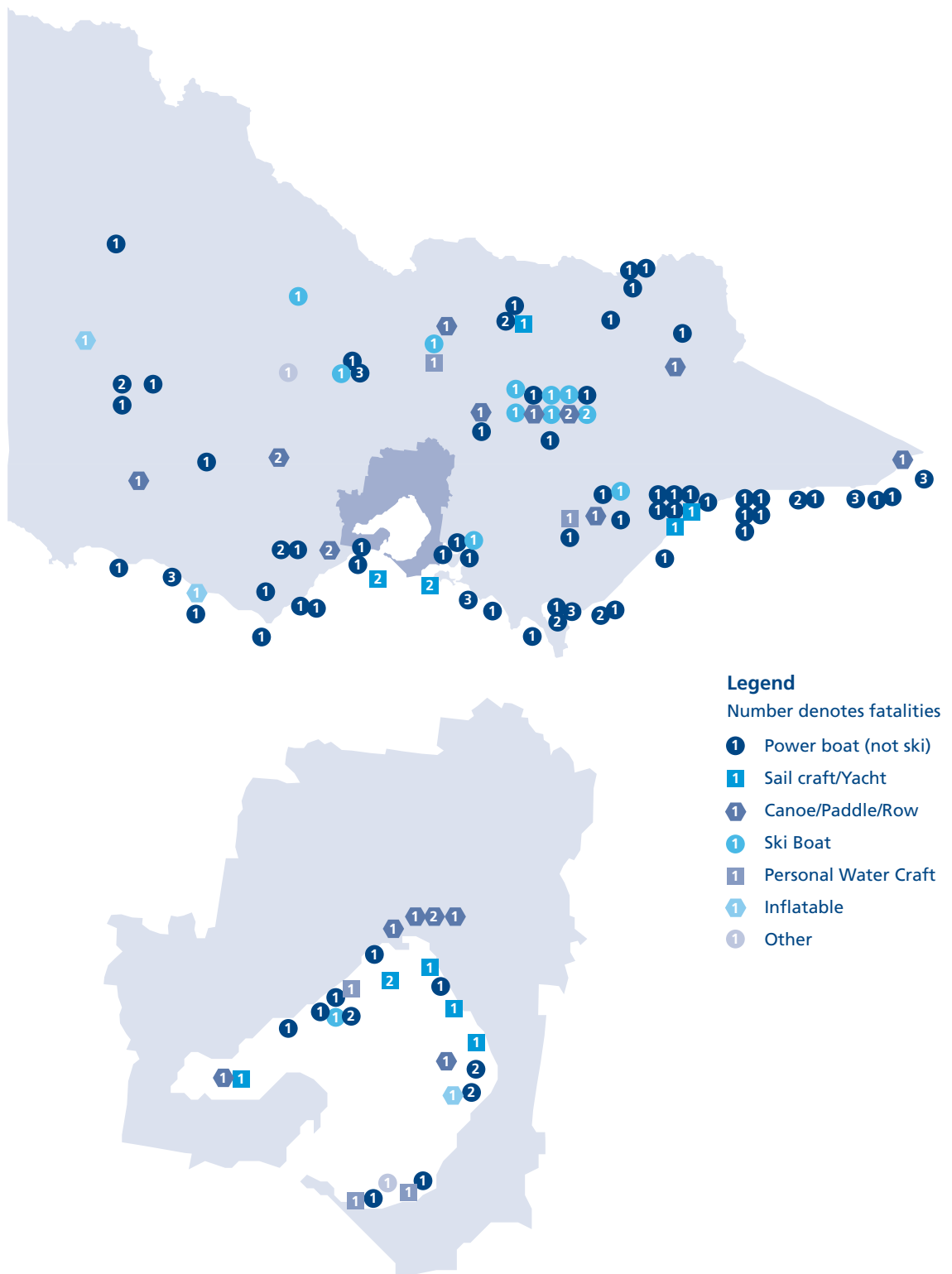


Figure 7: Fatal recreational marine incidents over time by location, 1987/1988 to 2001/2002





## 6. Victorian Injury Surveillance Data

### 6.1 Introduction

As the Marine Incident Database only represents incidents requiring Police or Search and Rescue organisation responses, a special analysis was made of alternative sources of data in an effort to better understand the larger marine safety picture. Data from injured persons treated at hospital emergency departments and injured persons admitted to hospital were examined. These data sets are not designed to provide detailed data on how injuries occurred however reasonable estimates can be made.

The Marine Incident Database records an annual average of 30 fatalities and injuries across the three categories of marine incident. The hospital data record an average of in excess of 250 injuries. Thus it appears that there are of the order of 10 times more injuries occurring per annum in marine incidents than are recorded on the Marine Incident Database.

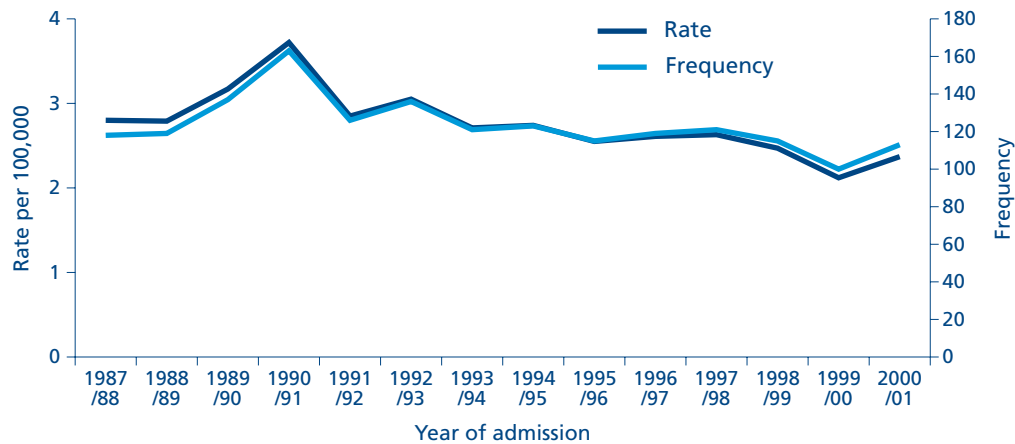
### 6.2 Hospital admissions – Victorian Admitted Episodes Dataset

The Victorian Admitted Episodes Dataset (VAED) is a collection of data on inpatient admissions to all Victorian hospitals and contains information from admission to discharge. Data is coded using the International Classification of Diseases (ICD) coding system.

Public hospital data is available for the 14-year period July 1987 to June 2001, private hospital data is available for the period July 1992 to June 2001. Readmissions within 30 days are excluded. Trend data over time is considered and a more detailed description of data for the 2-year period July 1999 to June 2001 is provided to coincide with the coverage of the Marine Incident Database data.

Over the 14-year period July 1987 to June 2001, 1,726 admissions to Victorian public hospitals are recorded on the VAED for water-transport related injury. Water transport injuries are defined as accidents involving watercraft, where watercraft are defined as devices used for transporting passengers or goods on the water, including a small boats (watercraft propelled by paddle, oars or small motor, with a passenger capacity of less than ten). This equates to an average of 123 admissions per year. Figure 8 shows the trend over time for the 14-year period in the state of Victoria. There appears to have been a slow, small decline in the risk of being seriously injured in a marine incident over the 14-year period (Figure 8).

Figure 8: Water transport hospital admissions rates and frequency over time, Victoria: Victorian Admitted Episodes Dataset, 1987/1988 to 2000/2001



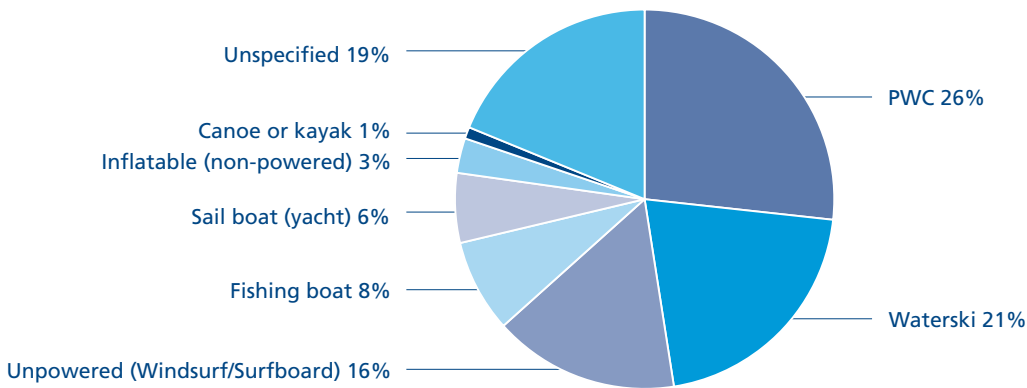
There were 220 hospitalised cases of injury (public and private hospitals) associated with water transport in the 2 years 1999/2000 and 2000/2001. The ICD system defines a watercraft as ‘any device for transporting passengers or goods on the water’. This system also distinguishes between different types of watercraft making it possible to separate ‘commercial’ and ‘recreational’ incidents. If the craft was a ‘merchant’ or a ‘passenger’ ship, the incident was considered commercial. Incidents involving fishing boats were examined to determine whether the injured person was working at the time of injury. No records matched this criteria so all other crafts were considered to be recreational. It would be quite possible for a different picture to emerge if Workers Compensation data was considered.

### 6.2.1 Recreational hospital admissions

There were 214 hospitalisations for recreational water transport incidents reported on the VAED for the period July 1999 to June 2001. This contrasts with the 44 injuries formally recorded in the Marine Incident Database. Almost a third of water transport hospitalisations involved jetskis/hovercrafts (27%), followed by waterskis (21%) and unpowered watercraft (windsurfers/surfboards 16%; Figure 9 and Table 12). In Victoria there are 68 registered hovercraft and 4,252 registered jetskis (PWC), hence the majority of this ICD category are likely to be PWC’s. Also, surfboards are ‘out of scope’ on the Marine Incident Database but are undistinguishable from windsurfers on the VAED so are included as marine incidents only for this section of the report.



Figure 9: Water transport hospital admissions by craft type, Victoria: Victorian Admitted Episodes Dataset, 1999/2000 to 2000/2001



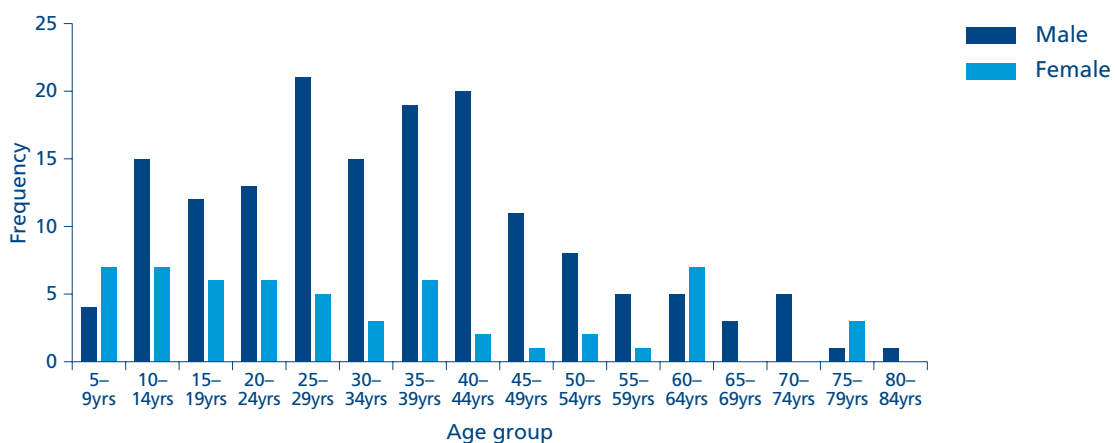
While definitional and scope issues preclude direct comparison there can be no doubt that hospitalisation data point to a massive underreporting of PWC and waterski incidents within the Marine Incident Database – presumably such events typically do not require external emergency response and so are not reported.

Table 12: Hospital admissions for water transport related injury incidents in Victoria, age and gender by activity type: Victorian Admitted Episodes Dataset, 1999/2000 to 2000/2001

	Other powered watercraft (hovercraft/jetskis)	Water-skis	Other unpowered watercraft (surfboard/windsurfer)	Fishing boat	Sailboat (yacht)	Inflatable craft (non-powered)	Canoe or kayak	Unspecified watercraft	Total
<b>Male</b>									
0–14	4	5	1	4	0	3	0	1	19
15–29	14	14	13	1	2	1	0	2	47
30–44	18	13	9	4	3	0	0	7	54
45–59	8	4	0	1	2	0	1	8	24
60–74	1	1	3	4	1	0	0	3	13
75+	0	0	0	1	0	0	0	1	1
<b>Subtotal</b>	<b>45</b>	<b>37</b>	<b>26</b>	<b>15</b>	<b>8</b>	<b>4</b>	<b>1</b>	<b>22</b>	<b>158</b>
<b>Female</b>									
0–14	5	2	2	0	1	1	0	3	14
15–29	3	2	4	2	0	1	0	5	17
30–44	3	4	1	0	0	1	0	2	11
45–59	0	0	1	0	1	0	0	2	4
60–74	1	0	0	0	2	0	0	4	7
75+	0	0	0	0	1	0	0	2	3
<b>Subtotal</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>2</b>	<b>5</b>	<b>3</b>	<b>0</b>	<b>18</b>	<b>56</b>
<b>TOTAL</b>	<b>57</b>	<b>45</b>	<b>34</b>	<b>17</b>	<b>13</b>	<b>7</b>	<b>1</b>	<b>40</b>	<b>214</b>
<b>%</b>	<b>27</b>	<b>21</b>	<b>16</b>	<b>8</b>	<b>6</b>	<b>3</b>	<b>1</b>	<b>19</b>	<b>101</b>

Hospital admissions peaked among persons aged 10–44 years of age, with the highest peaks at 25–29 years for males and 60–64 years for females (Figure 10). Males were over-represented accounting for 74% of ED presentations.

Figure 10: Hospital admissions for water transport related injury by age and gender, Victoria: Victorian Admitted Episodes Dataset, 1999/2000 to 2000/2001



#### 6.2.1.1 Jetskis/Hovercrafts (n=57)

While this category cannot distinguish between jetski’s (PWC) and hovercraft it is not anticipated that many of these incidents would be associated with the latter, thus the discussion assumes PWCs.

More than a third of injuries sustained while using PWC reported on the VAED were to persons aged 30–44 years (37%). Persons aged between 15 and 29 accounted for a further 30% of injuries with the younger age group, 0–14 years accounting for 16%. Seventy-nine percent of injuries were to males.

Common injuries sustained in these incidents were fractures of the lower extremity (19% of all jetski related injury), the upper extremity (9%) the vertebral column (5%) and the ribs (5%). Also intracranial injuries (9%), internal injuries of the chest (7%), open wounds of the lower extremity (7%) and burns of the lower extremity (5%).

Forty percent of these injuries were caused by an ‘accident to watercraft causing other injury’, this code includes falls due to collisions, burns while watercraft is on fire, struck by craft after falling or jumping from craft. Thirty-two percent were caused by ‘accident on board watercraft without accident to watercraft’, this code includes explosions, fires and falls when on board a watercraft. The cause of the remaining injuries (28%) was ‘other and unspecified water transport accidents’, including accidents to non-occupants being hit by the watercraft.

#### 6.2.1.2 Waterskis (n=45)

As with PWC incidents, more than a third of injuries while using waterskis were to persons aged 30–44 years (38%). Persons aged between 15 and 29 accounted for a further 36% of injuries with the younger age group, 0–14 years accounting for 16%. Eighty-two percent of injuries were to males.



#### 6.2.1.3 Unpowered watercrafts (windsurfers/surfboards) (n=34)

Persons aged between 15–29 were most likely to be hospitalised due to injuries occurring while using ‘unpowered watercrafts’ (50%). Persons aged between 30 and 44 accounted for a further 29% of injuries with the youngest age group, 0–14 years accounting for 9%. Seventy-seven percent of injuries were to males.

Common injuries sustained in these incidents were open wounds of the lower extremity (18%), fractures of the neck/spine/back (18%) and intracranial injuries (12%).

Forty-five percent of windsurfing/surfing injuries were caused by ‘other and unspecified water transport accidents’, including non-surfers/windsurfers being hit by a surfboard/windsurfer. A further 38% were caused by ‘accident on board watercraft without accident to watercraft’; this code would include falls from a surfboard or windsurfer. The cause of the remaining injuries (18%) was ‘accident to watercraft causing other injury’, this code includes falls due to collisions, or being struck by surfboard/windsurfer after falling or jumping from it.

#### 6.2.1.4 Fishing boats (n=17)

Persons aged 0–14 years, 30–44 years and 60–74 years each account for 24% of fishing boat related injury. A further 18% of injuries were to persons aged between 15 and 29 years. Eighty-eight percent of injuries were to males.

Common injuries sustained in these incidents were fractures of the lower extremity (12% of all fishing boat related injury), the upper extremity (12%) and the face (12%). In addition, burns of the lower extremity accounted for 12% of injuries.

Forty-seven percent of these injuries were caused by an ‘accident on board watercraft without accident to watercraft’; this code includes explosions, fires and falls when on board a watercraft. Thirty-five percent were caused by ‘accident to watercraft causing other injury’, this code includes falls due to collisions, burns while watercraft is on fire, and being struck by craft after falling or jumping from craft. The cause of the remaining injuries (18%) was ‘other and unspecified water transport accidents’, including accidents to non-occupants being hit by the watercraft.

#### 6.2.1.5 Sailboats (n=12)

Persons injured on sailboats tends to be older than those injured on the other watercrafts discussed, considering persons aged 30–44 years, 45–59 years and 60–74 years each account for 25% of sailboat related injury. Eighty-eight percent of injuries were to males.

Common injuries sustained in these incidents were fractures of the lower extremity (19% of all sailboat related injury), the upper extremity (9%) the vertebral column (5%) and the ribs (5.3%). Also intracranial injuries (9%), internal injuries of the chest (7%), open wounds of the lower extremity (7%) and burns of the lower extremity (5%).

Sixty-seven percent of injuries were caused by ‘accidents on board watercraft without accident to watercraft’; this code includes explosions, fires and falls when on board a watercraft. A further 17% were caused by an ‘accident to watercraft causing other injury’, this code includes falls due to collisions, burns while watercraft is on fire, struck by craft after falling or jumping from craft. The cause of the remaining injuries (17%) was ‘other and unspecified water transport accidents’, including accidents to non-occupants being hit by the watercraft.

### 6.3 Emergency Department Presentations – Victorian Emergency Minimum Dataset

The Victorian Emergency Minimum Dataset (VEMD) commenced in October 1995 and is an electronic hospital emergency department information management system. The VEMD records details of injuries treated at 28 participating Victorian public hospital emergency departments (ED), which account for approximately 80% of statewide ED presentations.

Marine injuries are not coded as part of the VEMD, however the VEMD contains a 'Description of Injury Event' text variable which can be utilised to search for terms associated with marine incidents. Terms such as 'boat', 'yacht', 'waterskiing' and so forth were used to identify cases. Some manual validation ensures that the text searches are accurately identifying appropriate cases. Injuries out of scope of the Marine Incident Database were excluded: suicides, swimmers in trouble, surfers and surf skiers.

Data was analysed for the period, July 1999 to December 2001 (inclusive). There were 676 ED presentations for marine related incidents reported to the VEMD during this 2-year period.

A category called 'boat' injury, where cases were identified by containing the text term 'boat' in the injury description, but without further details was the highest ranking category of marine incident on the VEMD accounting for 37% of all cases. More than a third of marine incident ED presentations were associated with waterskis (35%), followed by jetskis (7%) and wake boards (7%; Figure 11 and Table 13). This pattern of marine activity is similar to that for hospitalised cases and again highlights the shortfall of this type of incident reporting in the Marine Incident Database.

Figure 11: Water transport hospital admissions by craft type, Victoria: Victorian Emergency Minimum Dataset, July 1999 to December 2001

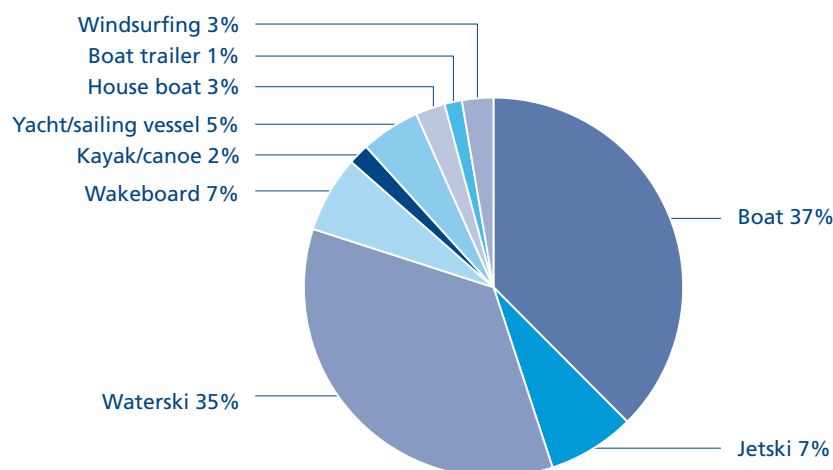




Table 13: Emergency department presentations for marine related injury incidents in Victoria, age and gender by activity type: Victorian Emergency Minimum Dataset, July 1999 to December 2001

	Marine item or activity based on text – number of ED presentations, VEMD July 1999 to December 2001												Total
	Boat NFS	Water- ski	Jet- ski	Wake board	Yacht/ Sailing	Wind surf	House boat	Boat trailer	Canoe	Kayak	Dinghy	Para- sailing	
<b>Male</b>													
0–14	21	9	–	3	–	–	4	1	1	1	–	–	8
15–29	51	108	26	21	6	4	–	3	3	1	–	1	33
30–44	69	55	18	6	8	8	3	1	2	1	–	–	132
45–59	41	11	–	–	8	3	2	4	–	–	–	–	232
60–74	8	2	–	–	1	–	1	–	–	–	–	–	103
75+	4	–	–	–	1	–	–	–	–	–	–	–	15
<b>Subtotal</b>	<b>194</b>	<b>185</b>	<b>44</b>	<b>30</b>	<b>24</b>	<b>15</b>	<b>10</b>	<b>9</b>	<b>6</b>	<b>3</b>	<b>–</b>	<b>1</b>	<b>523</b>
<b>Female</b>													
0–14	11	9	1	4	–	–	–	–	–	–	–	–	2
15–29	22	26	4	5	3	2	2	–	2	1	1	–	24
30–44	9	13	1	5	3	1	1	1	–	–	–	–	42
45–59	9	3	–	–	4	–	2	0	–	–	–	–	57
60–74	5	–	–	–	–	–	2	–	–	–	–	–	26
75+	3	–	–	–	–	–	–	–	–	–	–	–	6
<b>Subtotal</b>	<b>59</b>	<b>51</b>	<b>6</b>	<b>14</b>	<b>10</b>	<b>3</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>–</b>	<b>157</b>
<b>TOTAL</b>	<b>253</b>	<b>236</b>	<b>50</b>	<b>44</b>	<b>34</b>	<b>18</b>	<b>17</b>	<b>10</b>	<b>8</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>680</b>

Overall, the proportion of ED presentations for marine incidents requiring admission to hospital was low (4%), but higher rates of admission were seen for jetskiers (8% admitted; Table 14).

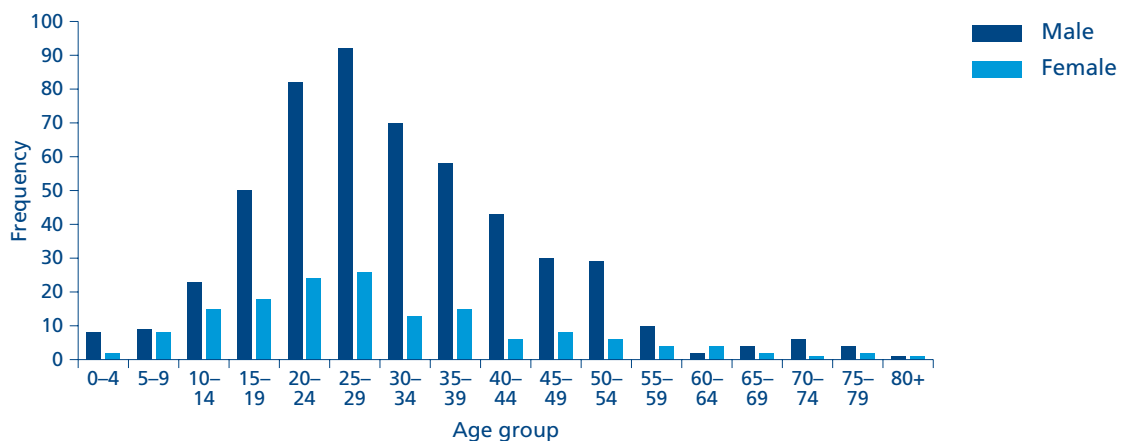
Table 14: Emergency department presentations for marine related injury incidents in Victoria by activity type: Victorian Emergency Minimum Dataset, July 1999 to December 2001

	Non-admission		Admissions		Total	
	N	%	N	%	N	%
'Boat'	189	75	64	25	253	100
Waterskiing	203	86	33	14	236	100
Jetskiing	41	82	9	18	50	100
Wakeboarding/tubing	37	84	7	16	44	100
Sailing/yachting	30	88	4	12	34	100
Windsurfing	14	78	4	22	18	100
Other	35	85	6	15	41	100
<b>TOTAL</b>	<b>549</b>	<b>81</b>	<b>127</b>	<b>18.8</b>	<b>676</b>	<b>100</b>

Presentations peaked among persons aged 15–39 years of age, with the highest peak at 25–29 years (Figure 12).

Males were over-represented accounting for 77% of ED presentations.

Figure 12: Emergency department presentations for marine related injury by age in Victoria: Victorian Emergency Minimum Dataset, July 1999 to December 2001



### 6.3.1 Boat – not further specified (n=253 injury cases)

Of the 253 persons injured by ‘boats’ (identified by text but no further detail) recorded on the VEMD:

- 7% were work related incidents
- One third of injured persons were aged 20–34 years
- 77% were male
- Injuries were most commonly the result of:
  - Slips, trips and falls on, around, and from the boat (32%)
  - Being caught in, between, or lacerated by a boat or boating related item (16%)
  - collisions (9%)
  - explosions/fires (7%)
  - boat maintenance/repair (7%)
  - propeller injuries (6%)
- 25% of injuries required hospital admission
- 47% occurred in the summer months
- Open wounds (26% of ‘boat’ total) and fractures (19%) were the most common types of injuries sustained
- The hands (13%) and feet (10%) were the most common body regions injured
- Open wounds to the hands were the single most common injury outcome (16 cases).



### 6.3.2 Waterskiing (n=236 injury cases)

Of the 236 injured waterskiers recorded on the VEMD:

- 45% were aged 20–29 years
- 78% were male
- Injuries were most commonly the result of:
  - falls (37%)
  - rope related incidents (12%)
  - collisions with objects (11%)
- 14% of injuries required hospital admission
- 70% occurred in the summer months
- Fractures and sprains/strains were equally common, each accounting for 22% of ED presentations. Another 15% of injuries were muscle and tendon injuries and 14% were open wounds
- The shoulder was the most common body region injured (10% of all injuries), followed by the knee, chest and face (each 9% of total)
- Knee strain/sprain was the single most common injury outcome (12 cases).

### 6.3.3 Jetski (n=50 injury cases)

Of the 50 injured jetskiers recorded on the VEMD:

- 68% were aged 20–34 years of age
- 88% were male
- Injuries were most commonly the result of:
  - falls from the jetski (41%)
  - being struck by a jetski (10%)
- 18% of injuries required hospital admission
- 64% occurred in the summer months
- Sprains/strains were the most common injury outcome (26% of jetski total), followed by fractures 24% and open wounds (12%).
- The chest was the most common body region injured (18% of jetski injuries), followed by the ankle (16%) and face (14%).
- Ankle strain/sprains and open wounds to the face were the most common injury outcomes (5 cases each).

### 6.3.4 Wakeboards, tubes and ski biscuits (n=44 injury cases)

Of the 44 injured persons in this group recorded on the VEMD:

- 41% were aged 20–29 years and 34% were aged 10–19 years
- 68% were male
- Injuries were most commonly the result of:
  - falls from the wake board/tube/ski biscuit (36%)
  - being struck by the wakeboard during the ride of after falling off (20%)
  - were being struck by a boat whilst on a ski biscuit (9%; all were admitted to hospital)
- 16% of injuries required hospital admission
- 70% occurred in the summer months
- Open wounds (34%), fractures (16%) and sprains/strains (11%) were the most common injury outcomes.
- Thirty-nine percent of injuries were to the head and face.

## 7. Glossary

### Commercial vessel

A commercial vessel is any vessel, other than one under the control of the Department of Defence, that is operated in connection with a commercial transaction of any kind including operation as a business, as a service, for profit, or for research.

### Hire Drive vessel

A hire drive vessel is any boat or vessel which is let for hire or reward or for any other consideration including vessels provided in conjunction with holiday establishments or hotels for the use of guests or tenants, and which the hirer uses solely for pleasure.

### Recreational vessel

Recreational vessels are those used solely for the purpose of recreational or sporting activities and not used for hire or reward.

### Inland Waters

Any navigable water that is not tidal. For example a river, dam, lake or creek. Where a river becomes tidal, only the non-tidal section will be classed as inland waters, while the tidal section of that river will be classed as enclosed waters.

### Enclosed Waters

Any navigable tidal water such as a harbour, coastal bay, estuary, tidal creek or tidal river, but does not include tidal waters identified as partially smooth.

### Inshore Waters

Any open stretch of water extending laterally along the coast up to and including three nautical miles (nm) offshore. It also includes bar entrances and tidal waters identified in each State as being partially smooth.

### Offshore Waters

All open water more than 3nm seaward from the coast.

### Water Transport Accident

An accident involving a watercraft, ie. a device for transporting passengers or goods on the water, including a small boat (defined as a watercraft propelled by paddle, oars or small motor, with a passenger capacity of less than ten).



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