

# Boating incidents in NSW

Statistical Report for the 10-year  
period ended 30 June 2021

Centre for Maritime Safety



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# 1 Executive summary

The NSW Government has committed to a range of measures to improve boating safety outcomes in the *Maritime Safety Plan 2017–2021*. This plan highlights a number of priority safety areas for focussed attention and sets targets for the reduction of boating fatalities and boating serious injuries<sup>1</sup>. This report outlines the latest statistics in relation to each of these priority safety areas and provides an update on how the state is tracking against the plan's fatality and serious injury targets.

## Incidence of fatalities, serious injuries and boating related incidents

There were 17 boating fatalities and 52 serious injuries reported to Transport for NSW<sup>2</sup> in the 12-month period to 30 June 2021. These arose from a total of 436 boating related incidents – which represents an overall increase in boating incidents of more than 50 per cent on the previous year.

- **Total boating fatalities in 2020–21** (17) finished above the Maritime Safety Plan 2017–21 final target of 11.8, (set as a 30 per cent reduction from the base value of 16.9 established in 2014–15.) The number of reported fatalities was 16 per cent above the long-term (10 year) annual average.
- **Total serious injuries**<sup>3</sup> (52) finished slightly above the Maritime Safety Plan 2017–21 final target of 47.5 (set as a 30 per cent reduction from the base value of 67.9 established in 2014–15). The number of reported serious injuries was nearly 20 per cent below the long-term average.

While fatality numbers fluctuate widely year on year, factors that may have contributed to the increase observed in 2020–2021 include:

- An increase in **boating activity** on the state's waterways during the latter part of 2019–20, beginning from March 2020. This may relate to COVID-19, with indications that a surge in boating activities during this time may have been driven by restrictions around alternative pursuits and perceptions of boating as a 'COVID-safe outdoor activity'.
- Improved **reporting** and/or data capture in relation to commercial vessel incidents, which made up a large portion of overall boating incidents in 2020–21.

1 MSP targets for fatalities and serious injuries are based on a 30% reduction in numbers by the end of 2020–21, compared with the 10-year annual average up to and including 2014–15. The serious injury target is based on serious injuries reported to Transport for NSW, and does not include the considerable number of serious injuries that are believed to go unreported each year.

2 Incidents are reported to Transport for NSW through a number of channels, including through Boating Safety Officers or Police, or via self-reporting. The large 'self-reporting' component means that non-fatal incidents, including those causing serious injury, are prone to significant under-reporting.

3 Unless specified otherwise, the serious injuries referred to in this report do not include boating serious injuries treated in NSW hospitals but not reported to Transport for NSW. Examination of recent NSW Health records suggests that a large number of such 'unreported' serious injuries occur each year. However, the characteristics of the serious injuries reported to RMS do broadly match those only captured in the Health records, meaning the former are still a useful indicator of overall serious injury trends related to boating.

## Characteristics of fatal incidents

The mix of causes and other characteristics associated with the fatal incidents in 2020–21 was similar to that observed across the 10–year period to 30 June 2021<sup>4</sup>. For instance:

- Most fatal incidents in 2020–21 occurred on or in association with **smaller vessels** (those < 6 metres in length; 73%). The key contributory causes associated with these incidents were also typical and included **lifejacket not worn/ not functional**, **hazardous waters** and **lack of judgement** (each 53%).
- The main incident types associated with fatal incidents in 2020–21 were **capsizing** (33%) and **falling overboard** (20%).
- Only 12 per cent of the fatalities in 2020–21 were known to have been wearing a functional lifejacket, and preventable drownings (cases where a person was presumed to have drowned and was not known to have been wearing a lifejacket) accounted for 59 per cent of the fatalities. This reinforces the significance of **lifejacket wear** as the most important factor in preventing a fatality when someone is forced into the water.
- More than three–quarters (76.5%) of the fatalities in 2020–21 were **male**, a proportion that was similar to that recorded over the 10 years to 30 June 2021.

## Priority safety areas

2020–2021 saw mixed results across the 11 priority safety areas examined. Key findings for each are outlined below:

- **Lifejacket wear:** The overall number of preventable drownings associated with recreational incidents in 2020–21 (10) was statistically similar to the long–term annual average of 8.3. Nonetheless, the drowning fatality rate for recreational boating incidents has fallen by just over 55 per cent since 1992–93, without any significant change in the corresponding non–drowning fatality rate.

Up to 83 lives could have been saved over the last 10 years had all persons presumed drowned in recreational boating incidents been wearing a lifejacket. This represents 60.1 per cent of all recreational fatalities over the period.

- **Judgement:** Incidents attributed to a lack of judgement increased sharply in 2020–21, up by 178 per cent compared to 2019–20. The overall number of incidents related to lack of judgement in 2020–21 (175) was significantly greater than the long–term average of 69.0 incidents.
- **Boater age:** Boaters aged 70 and above accounted for a significantly higher share of recreational boating fatalities (20.3%) than their share of boat licences (8.6%). However, the number of recreational fatalities aged 70 or greater in 2020–21 (2) was statistically similar to the long–term annual average of 2.8.

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<sup>4</sup> Note that results should be interpreted with caution given small sample sizes.

Boaters aged under 30 were heavily over-represented in serious injuries – even taking into account that people under 12 are not eligible for a boat licence. This group accounted for 31.0 per cent of these injuries but only 14.0 per cent of boat licences.

- **Cold water:** Cold water incidents have followed a similar trend to that for boating incidents generally. The overall number of incidents related to cold water in 2020–21 (18) was statistically similar to the long-term annual average of 15.0 incidents.
- **Weather conditions:** Incidents attributed to weather conditions fell by 42 per cent in 2020–21 compared with the previous year despite overall boating incidents increasing by more than 50 per cent in the same period. The overall number of incidents related to weather conditions in 2020–21 (29) was statistically similar to the long-term average of 35.9 incidents.
- **PWC (Personal Watercraft):** The 22 incidents involving a PWC in 2020–21 represents a considerably higher number than in 2019–20 (6), reversing the declining trend observed in the previous few years. However, there has been no clear long-term trend in PWC incident numbers, and the total for 2020–21 (22) was statistically similar to the long-term average (18.6).

The overall rate of recreational incidents involving a PWC (per 100,000 registrations) has trended downwards over the last 10 years. However, the rate of these incidents in 2020–21 (120.6 per 100,000 registrations) was statistically similar to the long-term average of 155.0.

The rate of recreational PWC incidents causing serious injury has also fallen significantly over the 10-year period. In addition, the rate of these incidents in 2020–21 (27.4 per 100,000 registrations) was significantly below the long-term average of 60.8.

However, when the 10-year period to 30 June 2021 is considered as a whole, PWC remain heavily over-represented in overall recreational boating incidents and especially in recreational boating serious injury incidents. PWC were involved in 17.5 per cent of recreational serious injury incidents reported to Transport for NSW and 9.9 per cent of recreational incidents overall – but made up only about 5.5 per cent of registered recreational vessels. Lack of judgement and not keeping a proper lookout were a particular concern with PWC incidents, and together accounted for more than half (51.3%) of associated incident cause records.

- **Towing:** The overall number of incidents related to towing in 2020–21 (13) was statistically similar to the long-term average of 14.9 incidents. In addition, the relative number of towing incidents has not displayed any significant long-term trend.
- **Alcohol:** The number of boating incidents related to excess alcohol has fluctuated within a relatively narrow range in recent years, but broadly in line with overall boating incidents. The overall number of incidents related to excess alcohol in 2020–21 (7) was significantly above the long-term average of 5.3 incidents, albeit by a very small margin.
- **Paddle craft:** The number of paddle craft incidents has shown signs of an increasing trend in recent years. In addition, the overall number of incidents related to paddle craft in 2020–21 (11) was significantly greater than the long-term average of 5.9 incidents.

- **Excessive speed:** Incidents attributed to excessive speed have not shown any clear long-term trend. However, the number of such incidents in 2020–21 was down by 50 per cent on the 2019–20 total, despite an overall increase in boating incidents generally. In addition, the overall number of incidents associated with excessive speed in 2020–21 (6) was significantly below the long-term average of 10.2 incidents.
- **No proper lookout:** Incidents related to the lack of a proper lookout had been trending downwards until a reversal in 2019–20, which has continued in 2020–21 – although in relative terms the recent increase has been similar to that for boating incidents generally. The overall number of incidents associated with the lack of a proper lookout in 2020–21 (60) was significantly greater than the long-term annual average of 42.4 incidents.

The mixed boating safety results in 2020–21 demonstrate the continuing challenges in reducing boating incidents and trauma. Factors such as increased boating activity (in part driven by peoples’ responses to COVID-19) and an aging population are likely to place further pressure on boating safety going forward.

The factors that cause boating incidents are often complex and interrelated. However, for recreational boating fatalities the importance of lifejacket wear is pivotal – and a significant improvement in lifejacket wear rates amongst people involved in boating incidents would very likely feed through to lower fatality numbers.



## 2 Glossary

Various technical terms or phrases are used in this report. These are defined as listed below:

**Aquatic Management Area** – a local area of the state’s navigable waterways defined for administrative purposes – e.g. the management of moorings, the staging of licenced events and the reporting of boating incidents. There are 862 Aquatic Management Areas in NSW that together cover the state’s navigable waters.

**Boating incident** – an adverse event causing or involving any of the following in connection with the operation of a vessel: death or injury to a person; the loss of a person; the abandonment or presumed loss of a vessel; a collision, the grounding, sinking, flooding or capsizing of a vessel; a fire or explosion; or the loss of stability or structural failure of a vessel.

**Commercial boating** – boating related to financial or other valuable consideration. Includes passenger and charter services, boating for work purposes and hire and drive boating.

**Commercial incident** – a boating incident involving only commercial vessel(s).

**Commercial/ Recreational incident** – a boating incident involving both a recreational vessel and a commercial vessel (e.g. a collision).

**Fatality** – where a person is killed as a result of boating incident, dies within 30 days as a result of the incident, or is considered missing at sea.

**Incident cause** – a factor that is partly or wholly responsible for a boating incident or its outcome. There are three levels of incident cause referred to in this report: (1) major cause – the primary cause of an incident, as identified in Transport operational incident data; (2) secondary cause – any additional cause(s) identified for an incident in Transport operational incident data; and (3) likely contributory cause – any additional cause(s) identified for an incident in Transport fatality records.

**Lifejacket not functional** – lifejacket is materially damaged, comes loose during an incident because it isn’t secured properly, or – if an inflatable model – it doesn’t inflate (e.g. because of missing or empty CO<sub>2</sub> cylinder).

**Long-term** – refers to the 10-year period up to and including 30 June 2021 unless specified otherwise. Relates to long-term averages and long-term trends referred to in this report.

**Major waterway** – large well-known geographically discrete waterway used for boating – typically a large estuary, river system or lake. Each major waterway may include one or more Aquatic Management Areas, depending on geographic extent and local levels of boating usage.

**PWC** – Personal Watercraft, also known as a ‘jetski’. A small powered vessel that has a fully enclosed hull, does not retain water if capsized and is designed to be operated by a person lying, standing, sitting astride or kneeling on the vessel (but not seated within the vessel). Typically propelled and manoeuvred by water jet nozzles.

**Preventable drowning** – where a person is presumed to have drowned and was not known to have been wearing a lifejacket.

**Recreational boating** – ordinary boating for pleasure, not involving any financial gain (i.e. not ‘commercial’).

**Recreational incident** – a boating incident involving only recreational vessel(s).

**Reported incident** – an incident that has been reported to Transport for NSW, typically through the agency’s Boating Safety Officers or via self-reporting by boat operators. Unless explicitly stated otherwise, these incidents don’t include incidents that have been recorded by NSW Health via hospital records but not reported to Transport for NSW.

**Serious injury** – where a person suffers an injury requiring admission to hospital because of a boating incident.

**Statistically significant** – refers to an observed change, difference or trend that is unlikely to have occurred by chance alone. This is determined by an appropriate ‘statistical test’ designed to test the assumption that an observed change, difference or trend is due to chance alone. By scientific convention, if the probability of the result being just due to chance is less than 5%, it is deemed statistically significant in so far as the result is at least 95% likely to be due to some real effect, not just chance.

**Wearing a lifejacket** – where a person was believed to have been wearing a functional lifejacket (see also “lifejacket not functional”).



# 3 Introduction

This report examines boating incident<sup>5</sup> patterns and trends based on Transport operational incident data, for the 10-year period 2011–12 to 2020–21<sup>6</sup>. The report covers both commercially related and recreationally related boating incidents, with a focus on recreational boating incidents where appropriate.

While NSW continues to experience a significant long-term decline in the rates of fatal recreational boating incidents<sup>7</sup>, due to the number of fatalities in 2020–21, the state has not achieved the target of a 30 per cent reduction in total boating fatalities by 2020–21, as set under the Maritime Safety Plan 2017–21<sup>8</sup>. In addition, the state narrowly exceeded the corresponding target for total boating serious injuries.<sup>9</sup>

This is against a background of increasing numbers of people boating. General vessel registration and driver licence numbers grew slowly over the 10-year period to 30 June 2021 - by approximately 2.0 per cent and 3.3 per cent respectively. Personal Watercraft (PWC) registrations and licences grew much more steeply – by approximately 100.1 and 80.9 per cent respectively over the same period<sup>10</sup>. There are also indications of rapid growth in the unregistered and unlicensed activities such as paddle craft use. At the time of writing, there are indications that COVID-19 has led to a surge in boating activity, which is likely to be borne out in registration and licence numbers in the years ahead. This apparent increase in boating activity began as early as March 2020 and may have contributed to overall incident numbers increasing in both 2019–20 and 2020–21.

There are now nearly 550,000 people who hold a licence to drive a powered vessel, and nearly 250,000 registered vessels in the state. Almost 1 in 5 NSW households own a boat or watercraft<sup>11</sup> and it is estimated 2 million people go boating each year on the state’s waterways<sup>12</sup>.

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5 Boating incidents are defined as per national guidelines, and include all accidents related to the operation of a vessel, but exclude situations such as unrelated medical episodes, deliberate intent or unrelated activities such as SCUBA diving.

6 Transport for NSW Eagle database records, based on fatality, serious injury and total incident counts and associated records as at 6 September 2021 unless otherwise stated. Incident numbers may be subject to subsequent change as the result of coronial findings or other investigations.

7 A significant long-term decline remains evident in the rate of recreational fatal boating incidents per 100,000 recreationally-registered vessels.

8 As measured against the long-term (10-year) average up to and including 2014–15, the plan’s base year.

9 Based on serious injuries reported to Transport for NSW. Serious injuries reported to NSW Health have followed a broadly similar trend.

10 Based on analysis of Transport for NSW boating licence and registration data.

11 *Recreational Boating Behaviour*. Report prepared for Transport for NSW by IPSOS. October 2019

12 NSW Boating Industry Association

While there is evidence of progress on certain fronts, such as with drowning fatalities, preventable fatalities and serious injuries continue to occur. Transport for NSW is striving Towards Zero, in support of community expectations of reduced trauma across the state's transport network. To continue the effort to eliminate fatalities and serious injuries, the agency has adopted the holistic Safe Systems approach to maritime safety<sup>13</sup>. This approach has four elements:

### **Safer People**

(the people in the system, including their choices and behaviours)

### **Safer Vessels**

(vessel design and safety equipment can reduce the risk and consequences of serious incidents)

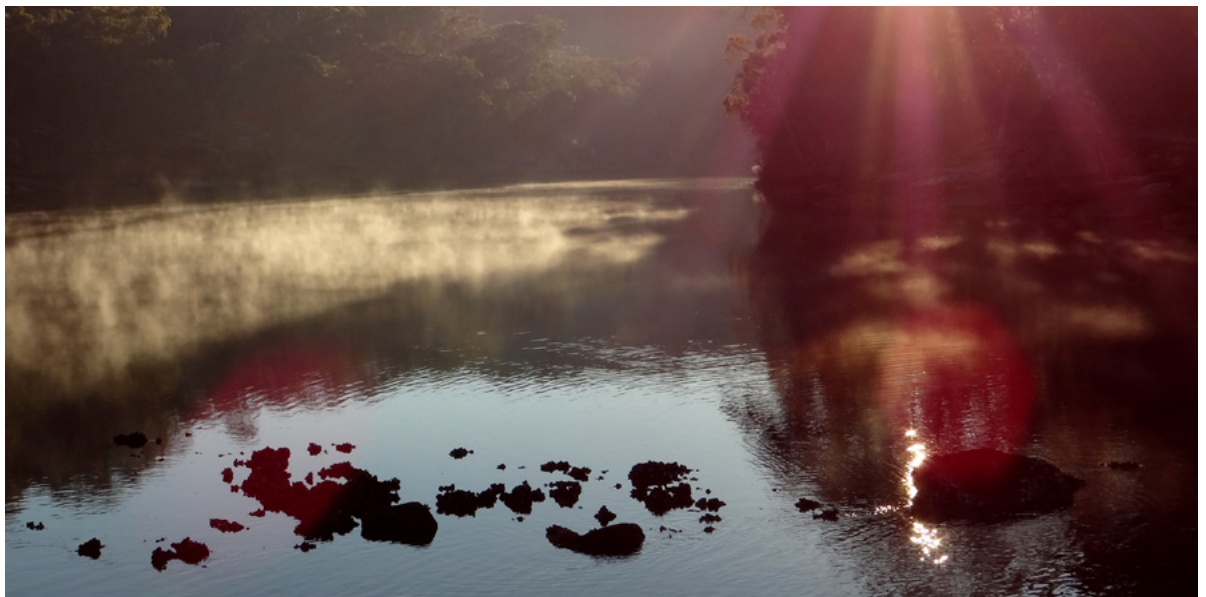
### **Safe Waterways**

(the physical environment and infrastructure in terms of safe navigation, access and storage)

### **Safe System**

(all the supporting elements behind maritime safety, including data, research, education and partnerships).

The Maritime Safety Plan 2017–21<sup>14</sup> identified 10 priority safety issues related to boating safety. These represent the main safety concerns identified through analysis of long-term incident data. An additional priority safety area, boaters aged 65-plus, has subsequently been identified. This report focusses on these 11 priority safety areas and provides an indication of how each is tracking in terms of boating incident numbers and severity, both for 2020–21 and in terms of long-term trends.



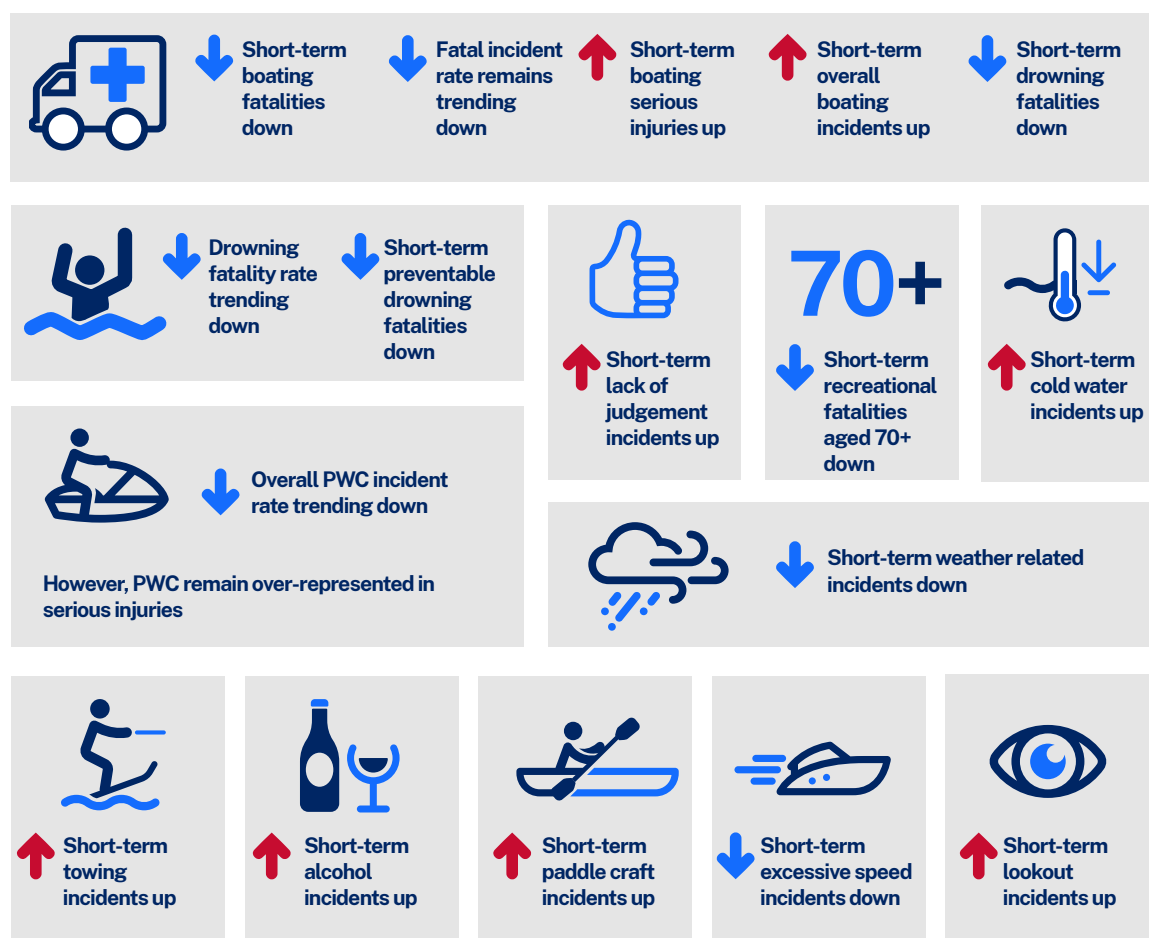
<sup>13</sup> Transport for NSW, Maritime Safety Plan 2017–21.

<sup>14</sup> The successor plan to MSP 2017–21 is currently being finalised and will seek to further address the safety issues identified in this report.

# 4 Snapshot of safety performance trends and comparisons for 2020–21

Boating incident data is inherently volatile. This section examines results for 2020–21 in the context of prior years and the fluctuations that have occurred year-to-year. Where the available data shows a significant long-term trend, or a significantly high or low value for 2020–21, this is highlighted in the following infographics. Further information in relation to these infographics is provided in Section 7 of this report.

Boating safety related results in 2020–21 were mixed, reflecting a 52.4 per cent increase in overall boating incidents since 2019–20. While fatalities finished above the final Maritime Safety Plan target, the recreational boating fatal incident rate has maintained a long-term downward trend.



There were 17 boating fatalities, 52 serious injuries and 436 boating related incidents recorded in the 12-month period to 30 June 2021 (Table 1).

- The number of fatalities was eight (32%) less than in 2019–20 (25) but was more than 16 per cent above the long-term annual average of 14.6.
- However, the recreational vessel fatality rate (per 100,000 vessel registrations) continues a long-term decline and, in trend terms, has fallen by approximately 49 per cent since 1992–93.
- The number of reported serious injuries in 2020–21 was 14 (36.8%) more than in 2019–20 (38) but was nearly 20 per cent below the long-term average of 64.6.
- The total number of incidents in 2020–21 was 150 (52.4%) more than in 2019–20 (286) and nearly 45 per cent above the long-term average of 300.9.

**Table 1:** Fatalities, serious injuries and related incident numbers for the 2020–21 financial year based on incidents reported to Transport for NSW<sup>15</sup>.

Vessel category	Incident category				Total incidents
	Fatalities	Fatal incidents	Serious injuries	Serious injury incidents	
Recreational	16	14	40	29	203
Commercial	1	1	9	9	175
Commercial/recreational	0	0	3	2	58
<b>TOTAL</b>	<b>17</b>	<b>15</b>	<b>52</b>	<b>40</b>	<b>436</b>
Change on 10 yr. av.	+16.4%	+17.2%	19.5%	22.5%	+44.9%
Average last 10 years*	14.6	12.8	64.6	51.6	300.9

\* 10-year average includes 2020–21. Serious injury numbers are likely to have been significantly affected by under-reporting, and based on NSW Health hospital records, the true number of boating-related serious injuries is considerably greater.

<sup>15</sup> Commercial vessel safety is managed by the Australian Maritime Safety Authority.

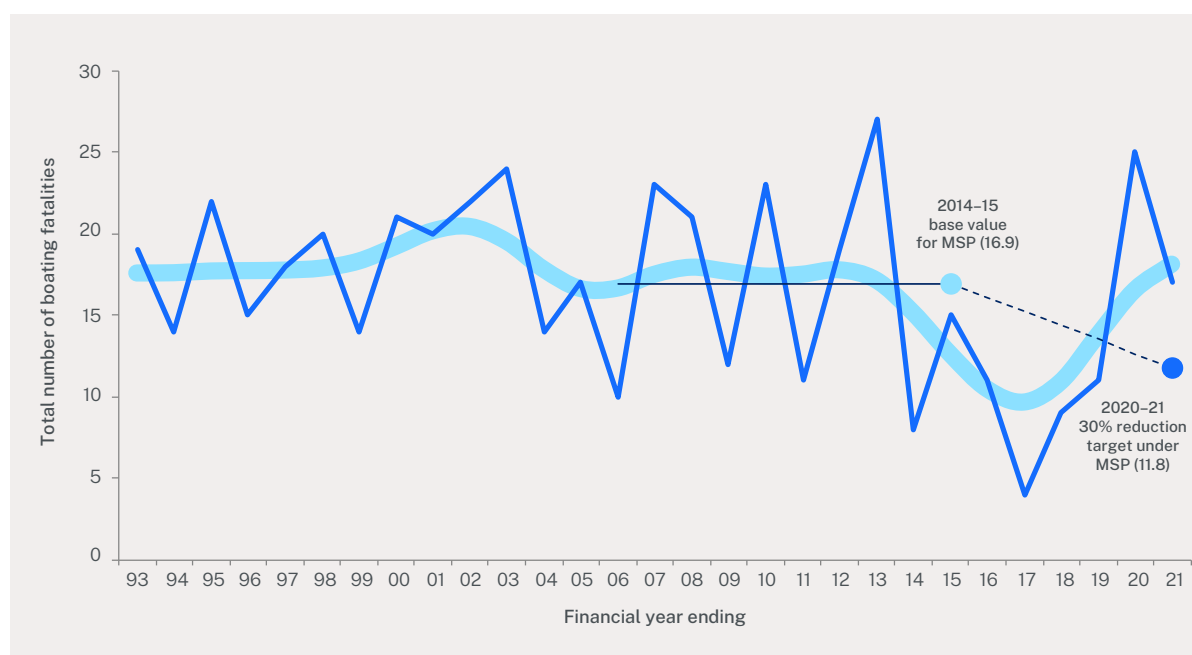
# 5 Fatality and serious injury outcomes against Maritime Safety Plan targets

This section provides incidence figures for fatalities and serious injuries over 2020–2021 and compares these against Maritime Safety Plan 2017–2021 targets. Findings indicate that both fatalities and serious injuries did not meet final targets, though the number of serious injuries in 2020–2021 was significantly below the long-term average.

## 5.1 Fatalities

There were 17 fatalities in 2020–21 arising from 15 incidents. This means fatalities finished above the Maritime Safety Plan 2017–2021 final target of 11.8, which was a 30 per cent reduction from the base value of 16.9 established in 2014–15 (Figure 1). The number of fatalities in 2020–21 was statistically similar to the long-term (2011–12 to 2020–21) average of 14.6.

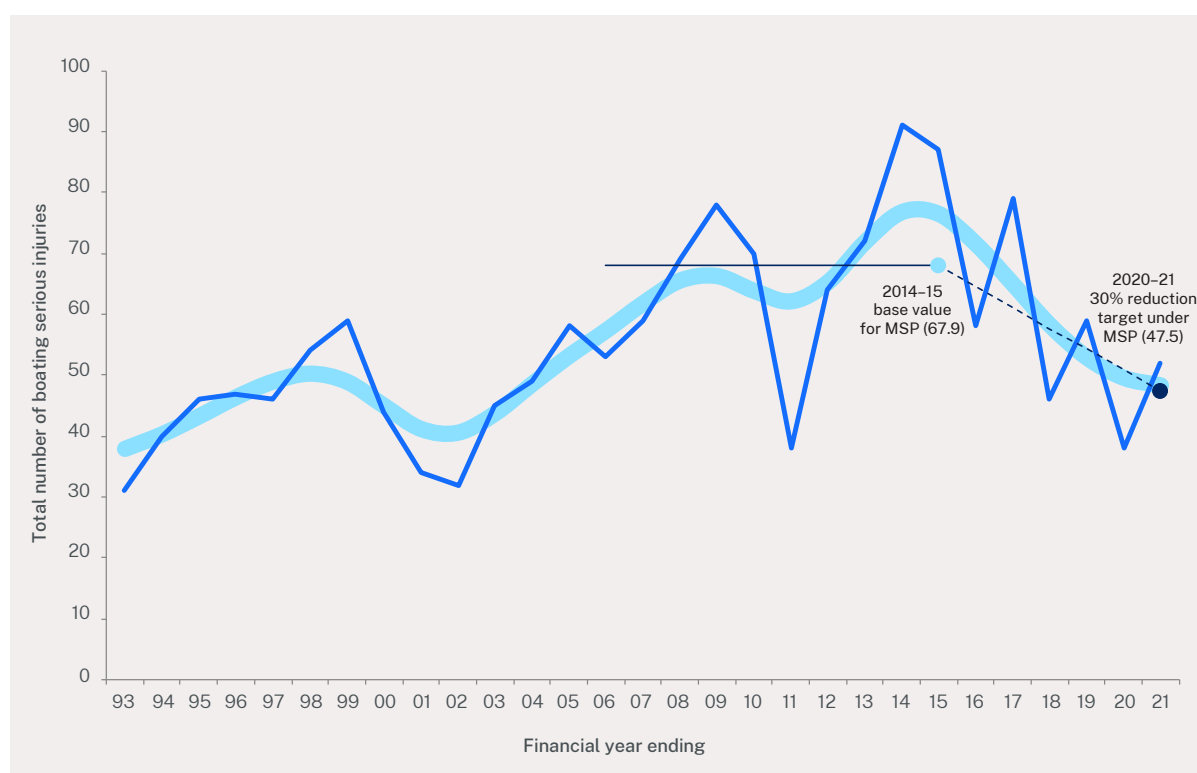
**Figure 1:** Tracking of total boating fatalities against MSP target of a 30% reduction by 2020–21. Base value equals the 10-year average up to and including 2014–15. Pale curve is indicative of medium-term trends and is based on application of weighted five-year moving averages.



## 5.2 Serious injuries

There were 52 serious injuries in 2020–21 that were reported to NSW Maritime. In recent years the overall number of boating serious injuries –based on Transport for NSW operational incident data –has been on a downward trend in line with intermediate targets under the Maritime Safety Plan 2017–2021. However, the 2020–21 total finished just above the final 30 per cent reduction target for that Plan (47.5 –Figure 2). The number of serious injuries in 2020–21 was significantly below the long–term (2011–12 to 2020–21) average of 64.6.

**Figure 2:** Tracking of total boating serious injuries against MSP target of a 30% reduction by 2020–21\*. Base value equals the 10–year average up to and including 2014–15. Pale curve is indicative of medium–term trends and is based on application of weighted five–year moving averages.



\* Serious injury numbers are based only on Transport incident reporting and are significantly lower than actual boating serious injuries based on recent data from NSW Health. Serious injury numbers may have also been affected by changes in reporting protocols and/or data capture over time.

According to incident data recorded by Transport for NSW, there were 52 boating serious injuries in NSW during 2020–21. However, based on long–term hospital records held by NSW Health<sup>16</sup>, the actual number of boating serious injuries occurring in NSW over the last 10 years has been more than five times what is currently reported to Transport for NSW. On this basis, the true number of serious injuries has averaged nearly 340 per year over the 10 years as opposed to the less than 65 per year reported to Transport for NSW. However, the Transport data appears to capture a good sample of the true total<sup>17</sup>, and is therefore useful for tracking of overall trends in boating serious injuries.

<sup>16</sup> Based on NSW Health hospital records for the 10–year period 2011–12 to 2020–21.

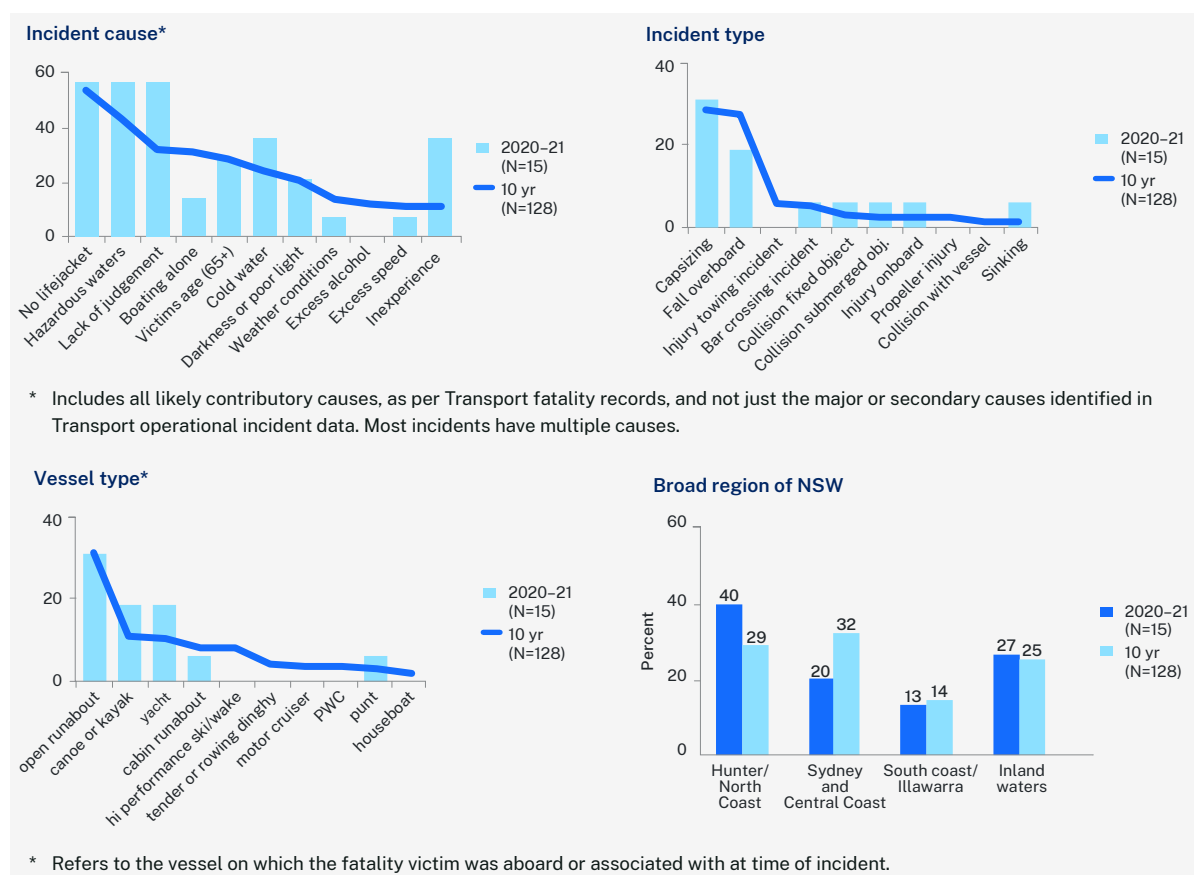
<sup>17</sup> There is a statistically significant correlation between the two sets of annual totals (Transport for NSW and NSW Health;  $r^2 = 0.55$ ;  $p < 0.01$ ; 14 d.f.). This means that changes in the overall total (NSW Health) are reflected in changes in the portion reported to Transport for NSW.

# 6 Causes and characteristics of fatalities in 2020–21 against the longer term (10–year) context

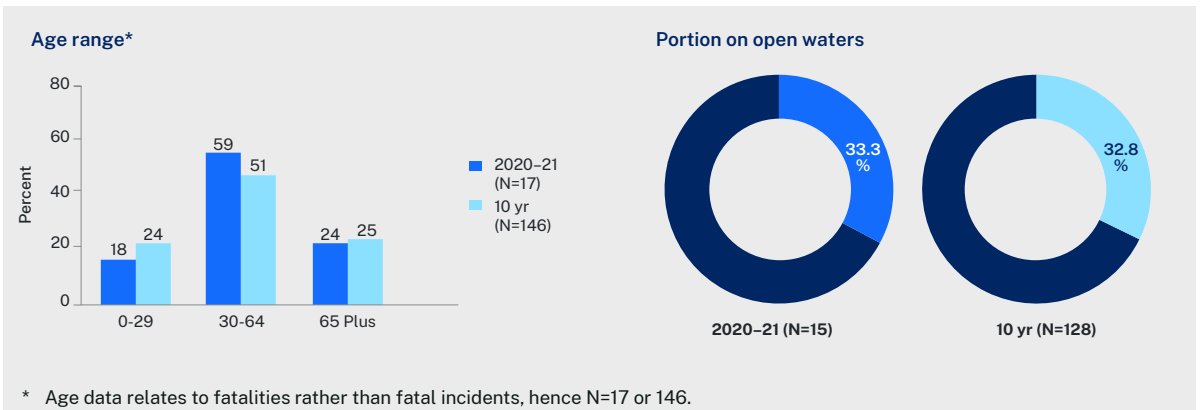
This section describes the causes and characteristics of boating fatalities in 2020–21 and compares these to long-term (10-year) averages. Overall, findings suggest that the range of causes and characteristics in 2020–21 is broadly consistent with the long-term picture. Any differences were generally well within what one might expect from random variation when comparing one year’s incidents to those of a 10-year period.

Figure 3 provides key breakdowns in relation to the characteristics of fatal incidents recorded in 2020–21 and compares these with the corresponding breakdowns for the 10-year period to 30 June 2021<sup>18</sup>.

**Figure 3:** Characteristics of fatal incidents and fatalities in 2020–21 and for the 10-year period to 30 June 2021. All data is based on percentages. 10-year data is shown in paler shading.



18 Given the small sample size (N=15), results in 2020–21 – particularly comparisons with the 10-year picture – should be interpreted with caution.



### Key statistics – fatal incidents and fatalities in 2020-21

- Key contributory factors to fatal incidents were lifejacket not worn/ functional, hazardous waters and lack of judgement (each 8 fatal incidents, 53%).
- The mix of causes and other characteristics of the fatal incidents was similar to that applicable over the last 10 years.
- The broad age distribution of fatalities in 2020-21 was very similar to that of the last 10 years. More than three-quarters (76.5%) of the victims were male.

The main incident types associated with the fatal incidents in 2020–21 were capsizing (33%) and falls overboard (20%). In 33 per cent of the fatal incidents in 2020–21, the victim(s) were on or associated with an open runabout. The next most prevalent vessel types – both 20 per cent of incidents – were yachts and canoes/ kayaks. Most of the fatal incidents occurred on or in association with smaller vessels, those less than six metres in length (73.3%).

In addition to the key breakdowns that are highlighted in Figure 3, the following key points also apply to the 15 fatal incidents in 2020–21 and the 128 such incidents over the 10–year period to 30 June 2021<sup>19</sup>:

- Just two out of the 17 fatalities recorded in 2020–21 (i.e. 12%) were known to have been wearing a functional lifejacket at the time of the incident. The corresponding figure for the 10 years is 33 fatalities (22.6%).
- ‘Preventable drownings’ (cases where a person was presumed to have drowned and was not known to have been wearing a lifejacket) accounted for 10 (59%) of the fatalities in 2020–21. Over the 10 years, the corresponding figure was 85 fatalities (58.2%).
- Seven (41%) of the fatalities in 2020–21 occurred in circumstances where lifejacket wear was required under current rules. The corresponding 10–year figure is 73 (50%).
- One (7%) of the fatal incidents in 2020–21 occurred at night, compared with 18 (14.1%) for the 10 years.
- Six (35%) of the fatalities in 2020–21 were not skipping the associated vessel at the time of the incident. Skippers were known to have accounted for eight fatalities (47%). The respective split for the 10–year period was 41.8% (61 fatalities) versus 45.2% (66 fatalities) – with the skipping status not specified for a further 19 fatalities (13%).
- 13 (87%) of the fatal incidents in 2020–21 involved people being forced into the water as a result of the incident. The corresponding figure over the 10 years was 105 (82%)

<sup>19</sup> Given the small sample size (N=15), results in 2020–21 – particularly comparisons with the 10–year picture – should be interpreted with caution.



# 7 Trends in Maritime Safety

## Plan priority safety areas

This section examines the available evidence in relation to each of the 10 priority safety areas identified in the Maritime Safety Plan 2017–21, plus an 11th priority safety area subsequently added as a result of mounting evidence (Section 6.11). This section provides a summary of how safety performance has been tracking against each of the priority safety areas over the 10-year period to 30 June 2021 – with an emphasis on fatality and serious injury incidents.

For most of the priority safety areas, both recreational and commercial vessel related incidents are included in the analysis, with overall boating incidents providing context. However, for four areas – lifejacket wear, towing activities, Personal Watercraft (PWC) and boater age – the analyses are based on recreational boating incidents only, as there is little or no crossover to commercial operations in relation to these safety areas.

For each priority safety area, a series of graphs is presented. For graphs illustrating seasonal patterns, differences across age groups or longer term changes through time, a trend curve or trend line (either dashed or solid) is generally fitted where such a curve or line provides a statistically significant fit to the data (i.e. provides a useful model of the underlying data). If no curve or line is fitted, it means either the graph's data does not follow a statistically significant trend or that the underlying trend is already evident from the graphical presentation used (e.g. licence numbers by age, Section 7.3)

### 7.1 Lifejacket wear

Lifejacket wear<sup>20</sup> is a key factor in the survival of boating incidents where persons are forced into the water<sup>21,22</sup>.

#### **Incidence**

Over the last 10 years, there were 103 recreational boating fatalities presumed due to drowning (Table 2).

- Of these, only 20 were known to have been wearing a lifejacket (Table 2), meaning up to 83 lives could potentially have been saved over this period had all persons being wearing a lifejacket. This represents 60.1 per cent of all recreational boating fatalities over the period.

20 Analysis of lifejacket related data, including drowning and non-drowning fatalities, is based on Transport boating fatality records (details in Figure 4).

21 O'Connor, P. (2008) National Assessment of Boating Fatalities in Australia 1999–2004. Report prepared for the National Marine Safety Committee.

22 Viaurox, C. and Gungor, A (2015) An Empirical Analysis of Life Jacket Effectiveness in Recreational Boating. Paper published in journal Risk Analysis.

- Of the 83 persons that might have been saved, the vast majority (75) are known to have not been wearing a lifejacket, while for eight victims, it is unclear whether or not they were wearing a lifejacket at the time.

**Table 2:** Summary of recreational drowning and lifejacket wear statistics for 2020–21, with long-term statistics provided for comparison.

Period	Total recreational boating fatalities	Fatalities presumed due to drowning		Drowning victims who were wearing a lifejacket		Drowning victims who were not wearing a lifejacket		Drowning victims for whom lifejacket wear status was unclear	
		Number	%	Number	%	Number	%	Number	%
2020–21	16	12	75.0	2	16.7	10	83.3	0	0.0
Last 10 years (2011–12 to 2020–21)	138	103	74.6	20	19.4	75	72.8	8	7.8

### Long-term trend

There has been a long-term decline in the rate of recreational drowning fatalities per 100,000 vessels (Figure 4). Despite the large year-to-year fluctuations in the rate, this decline is statistically significant. In trend terms, the drowning fatality rate has declined from 7.6 per 100,000 vessels in 1992–93 to 3.4 per 100,000 vessels in 2020–21 – a reduction of just over 55 per cent. By contrast, there has been no such decline in the non-drowning fatality rate (Figure 4). Indeed, the non-drowning rate has remained steady, aside from year-to-year fluctuations, averaging 1.7 per 100,000 vessels.

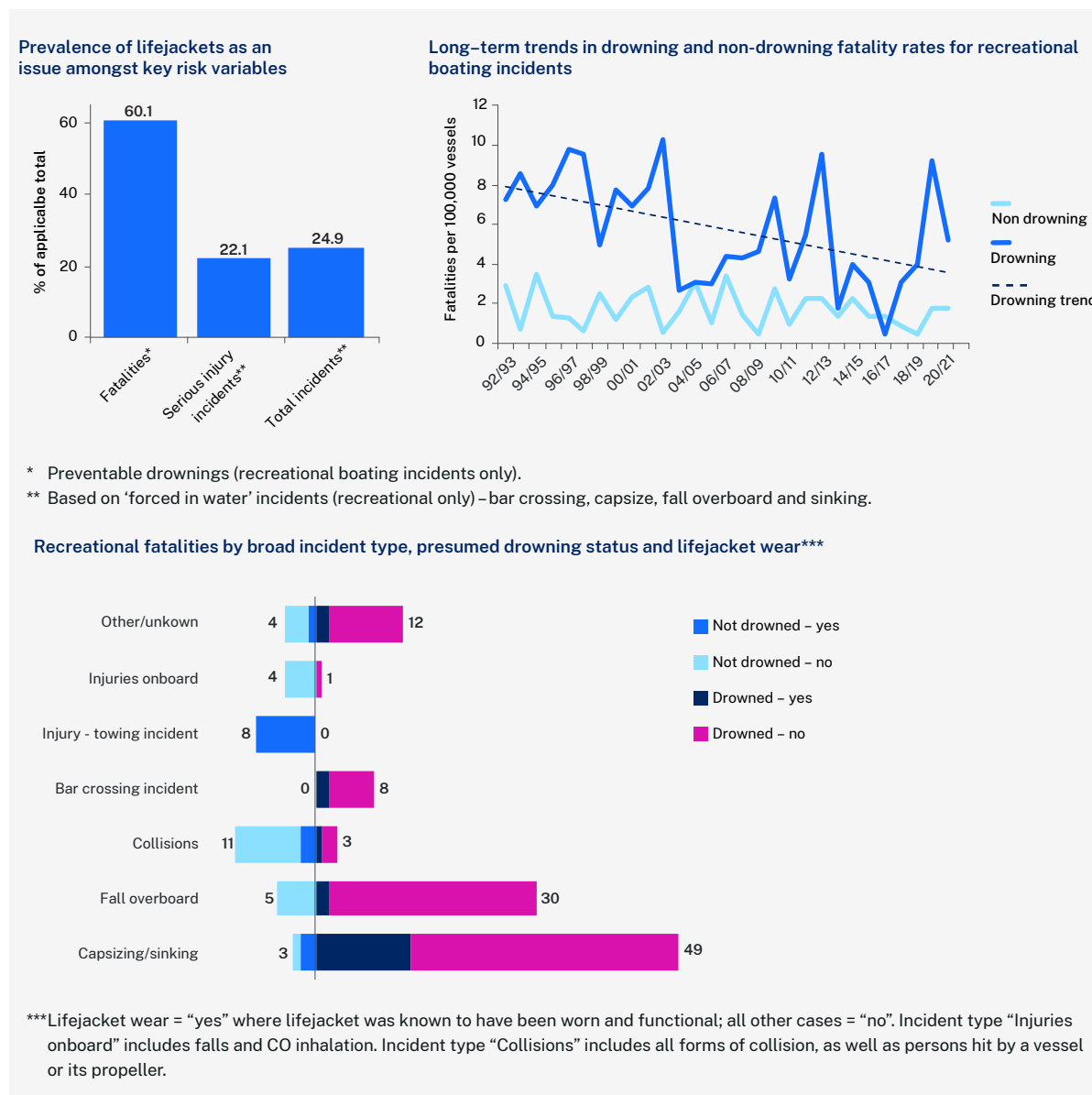
Nevertheless, the number of preventable recreational boating drownings in recent years has varied greatly, with 17 recorded in 2019–20 and zero in 2016–17. The overall number of preventable drownings associated with recreational incidents in 2020–21 (10) was statistically similar to the long-term (10-year) annual average of 8.3 drownings.

### Characteristics and influencing factors

Figure 4 also shows a clear distinction between the incident types related to drowning and non-drowning fatalities.

- The most prevalent incident types among recreational boating fatalities where the person is presumed to have drowned (N=103) were capsizing/ sinking (49), falling overboard (30) and bar crossing incidents (8) – with associated lifejacket wear rates of 26.5, 6.7 and 25.0 per cent respectively.
- Among non-drowning fatalities (N=35), the most prevalent incident types were collisions of various types (11), towing related injuries (8) and falling overboard (5) – with associated lifejacket wear rates of 18.2, 100 and 0 per cent respectively.

**Figure 4: Priority safety area – lifejackets – at a glance**



### Key statistics – lifejackets

- More than 60% of all recreational boating fatalities over the last 10 years (83 lives) could potentially have been saved if all presumed drowning victims had been wearing a lifejacket.
- More than 7 out of 10 people presumed drowned in recreational boating incidents over the last 10 years (i.e. 72.8%) were not wearing a lifejacket.
- Since the early 1990s the recreational vessel drowning fatality rate has declined by more than 55%, without any significant change in the corresponding non-drowning fatality rate.
- Just 6.7% of the people presumed drowned as a result of falling overboard over the last 10 years were known to have been wearing a functional lifejacket. For all persons who fell overboard over this period, the wear rate was only 5.7%.

## 7.2 Lack of judgement

### Incidence

Lack of judgement<sup>23</sup> was reported as a major or secondary incident cause in association with 15 (11.7%) of the 128 recreational and commercial fatal boating incidents recorded in the 10 years to 30 June 2021.

- Based on the incident reports, lack of judgement was also a likely contributory incident cause in association with a further 23 fatal boating incidents over this period (18.0%) – meaning lack of judgement was a likely factor in 38 (29.7%) of fatal boating incidents overall.
- Lack of judgement was also reported as a major or secondary incident cause in association with 103 (20.0%) of the 516 serious injury incidents recorded over the 10 years, and 690 (22.9%) of the 3009 boating incidents overall.

In 2020–21, there were eight fatal incidents for which lack of judgement was recorded as an incident cause. In five of these cases, lack of judgement was reported as a major or secondary cause.

### Long term trend

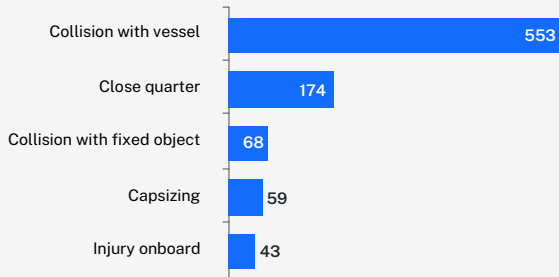
Incidents related to lack of judgement increased sharply in 2020–21 (up by 177.8% compared to 2019–20), and this increase was proportionately larger than the increase recorded for overall boating incidents (Figure 5). However, there is no clear long-term trend in incidents related to lack of judgement. The overall number of such incidents in 2020–21 (175) was significantly greater than the long-term (10-year) annual average of 69.0 incidents.



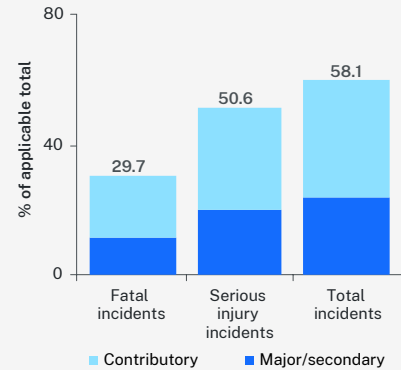
<sup>23</sup> Analysis of lack of judgement based on both Transport fatality records and Transport operational incident data.

**Figure 5: Priority safety area – lack of judgement – at a glance**

**Judgement – incident type records for incidents 2011–12 to 2020–21 (total = 1119)**

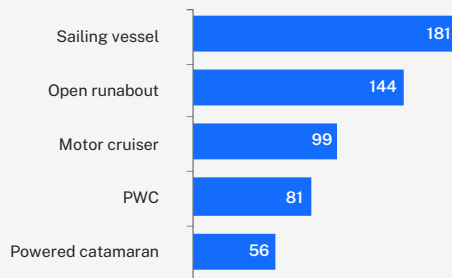


**Prevalence of judgement as an issue amongst key risk variables\***

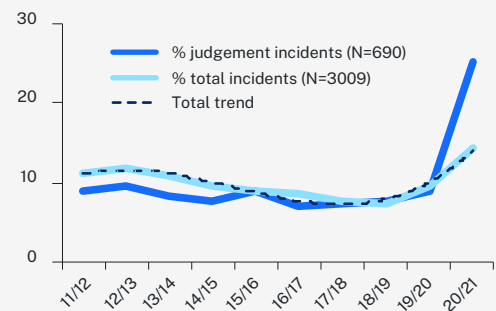


\* Contributory cause percentages for serious injury and total incidents are estimates based on the applicable proportion for fatal incidents.

**Vessels involved in 'lack of judgement' incidents 2011–12 to 2020–21 (total = 1079)**



**Judgement related trend against general incident trend**



### Key statistics – lack of judgement

- Lack of judgement was a likely factor in nearly 3 out of 10 fatal boating incidents (29.7%).
- More than half (53.3%) of the fatal incidents in 2020-21 involved lack of judgement as a likely factor.
- Nearly half (49.4%) of the incident –vessel records over the last 10 years related to lack of judgement involved a collision with another vessel.
- More than 1 in 6 (16.8%) of the vessels involved in incidents related to lack of judgement were sailing vessels. Nearly 1 in 7 (13.3%) were open runabouts.
- Incidents linked to a lack of judgement are highly seasonal, closely mirroring boating incidents generally. Just over 30 per cent (30.1%) occurred in December and January.
- Lack of judgement incidents are common on Sydney Harbour. The area around Sydney Cove and east of the Harbour Bridge recorded 30 such incidents over the last 10 years, this was followed by Darling Harbour/ Rozelle Bay (27) and the Farm Cove/ Garden Island area (25).

## 7.3 Boater age (65-plus)

Determining age-related differences in boating safety risk is complicated by the fact that boating activity is likely to vary considerably with age. In the absence of age-based exposure or usage data, licence numbers (Figure 6) provide the best available proxy for likely vessel usage – notwithstanding the fact not everyone aboard a vessel needs to be licenced, and that in some circumstances a vessel operator does not need a boat licence.

### Incidence

Recreational boating fatalities affect all age groups (Figure 6). The largest number of fatalities over the 10-year period to 30 June 2021 involved people in the 40–49 year age class (18.1%) and the 50–59 year age class (15.2%). However, these two age classes also accounted for the largest numbers of boat licence holders (Figure 6) – and therefore the relatively large numbers of fatalities in this ‘middle age’ range are to be expected.

However, when fatalities and licence numbers are compared across all age classes, evidence of over-representation in boating fatalities is evident amongst those aged 70 and over, and those aged up to 19 years of age (although the latter is affected by the fact that the minimum age for a licence in NSW is 12 years). The over-representation of boaters aged 70 and above is notable: they accounted for 20.3 per cent of all recreational boating fatalities, which was significantly greater than their 8.6 per cent share of boat licences.

It is difficult to assess the overall importance of boater age in comparison to other priority safety areas as age-related data is not readily available for non-injury incidents. However, based on the available fatality data as well as serious injury data from NSW Health (Figure 6)<sup>24</sup> Boater age – particularly in terms of boaters aged 70 or older – is clearly an important issue.

The picture with serious injuries, based on NSW Health hospital data, is rather different to that for fatalities, although there is still evidence of over-representation amongst older boaters, particularly those aged 80-plus (4.5% of serious injuries versus 1.3% of licences). When all boaters aged 70 and above are considered, the over-representation is still statistically significant (12.2% versus 8.6%), though not for the age group 70–79 when considered alone (7.7% versus 7.3%).

Over the 10-year period to 30 June 2021, younger people (those under 30) were heavily over-represented in serious injuries, accounting for 31.0 per cent of these injuries but only 14.0 per cent of boat licences. While this difference is partly explained by people under 12 not being eligible to hold a licence, it is noteworthy that people aged 20–29 accounted for 16.6 per cent of serious injuries, a much higher proportion than the corresponding percentage of licences held (10.3).

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<sup>24</sup> NSW Health hospital records for the period 2011–12 to 2020–21 (March 31), including both recreational and commercial boating serious injuries.

## Long-term trend

The long-term trend in the number of recreational boating fatalities aged 70 or greater shows considerable fluctuation but with relatively high numbers in recent years following the generally lower numbers of several year ago. This is consistent with what has happened with overall recreational fatalities over the 10-year period. The number of recreational fatalities aged 70 or greater in 2020–21 (2) was statistically similar to the long-term (10-year) annual average of 2.8 such fatalities.

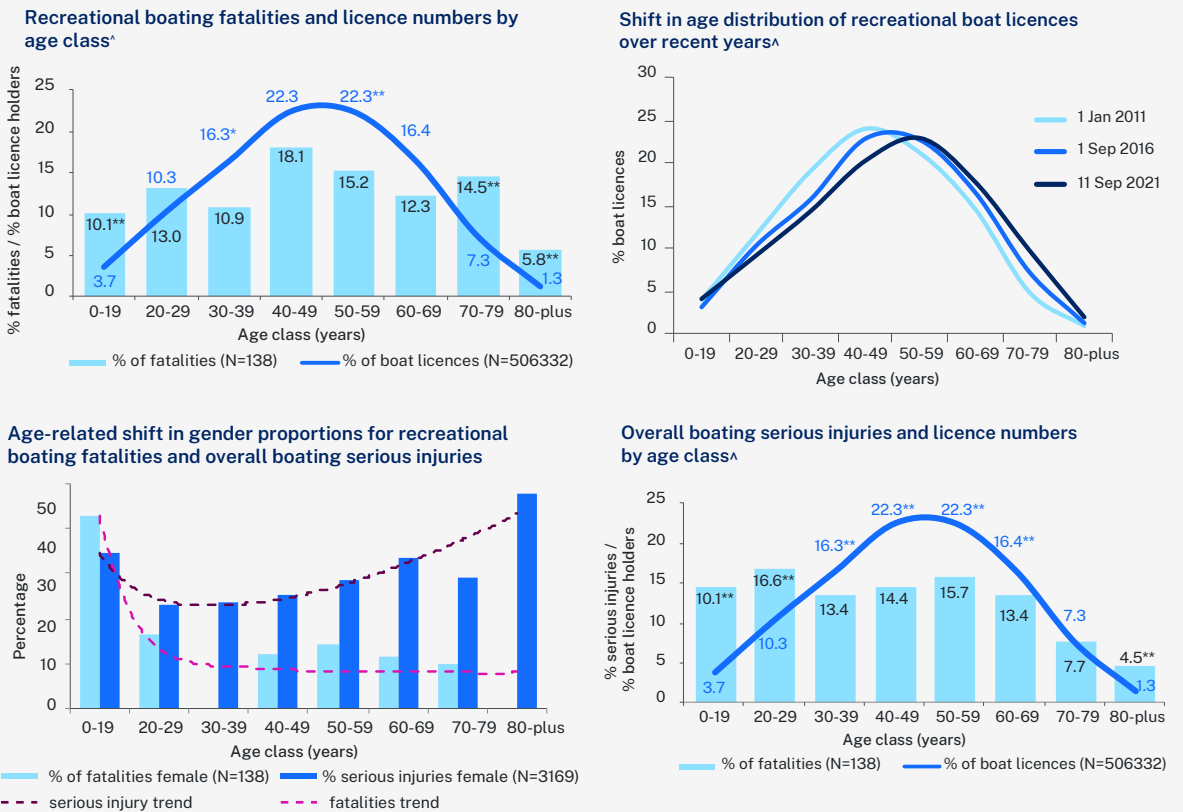
As more ‘baby boomers’ reach retirement and potentially participate in boating, there is the risk that fatalities may increase unless the right safety programs can reach this segment of the boating public. Licencing data suggests that this increased participation is already occurring, with a distinct shift in the age distribution to the right since 2011 (Figure 6). In the period from 1 January 2011 to 11 September 2021, the number of boat licences held by people aged 70 and above has increased by 137.6 per cent, while the numbers held by younger boaters have remained relatively steady (up by just 9.0% for people aged 30–69 and down by 3.0% for people aged under 30).

## Characteristics and influencing factors

Most recreational boating fatalities are male (86.2%, or nearly 7 out of 8). Males were also heavily over-represented in boating serious injuries according to NSW Health hospital data (71.1% versus 28.9%). However, the gender split does vary appreciably with age for both fatalities and serious injuries (Figure 6). The proportion of females among recreational boating fatalities was highest in the 0–19 age group (42.9%). The proportion of females among boating serious injuries was also relatively high in the 0–19 age group (34.7%) but even higher in the 80-plus age group (47.9%).



**Figure 6: Priority safety area – Boater age – at a glance**



\*\* Difference in proportions statistically significant<sup>25</sup>; \*difference just outside statistical significance<sup>26</sup>. <sup>▲</sup>Licence numbers based on average of representative dates across the 10-year period – 1 Jan 2011, 1 Sep 2016 and 11 Sep 2021. Serious injury data (NSW Health) covers from 1 July 2011 to 31 March 2021.

**Key statistics – boater age**

- Boaters aged 70 and above accounted for just over 1 in 5 (20.3%) of recreational boating fatalities but only about 1 in 12 (8.6%) of boat licences.
- Boaters aged 70 and above are also over-represented in terms of serious injuries, accounting for nearly 1 in 8 (12.2%) of serious injuries according to NSW Health hospital data.
- Younger boaters, those aged under 30, accounted for nearly 1 in 3 (31.0%) of serious injuries according to NSW Health hospital data. Those aged 20-29 accounted for approximately 1 in 6 (16.6%) of serious injuries but just over 1 in 10 (10.3%) of boat licences.
- The age of boating participants appears to be increasing; in a period of just over 10 years, the modal age of boat licence holders has increased by approximately seven years.

25 P<0.05, Z test of two proportions.  
26 0.05<P<0.1, Z test of two proportions.



## 7.4 Cold water

‘Cold water’<sup>27</sup> refers to water cold enough to be dangerous to a person who is forced into the water without protective garments (such as wetsuit). The effects of ‘cold water’ depend on the individual and the circumstances: most people begin to feel mild effects of ‘cold shock’ when they suddenly enter water as warm as 22–25 degrees C. However, the most serious effects of cold shock (rapid uncontrolled breathing, loss of airway control, panic etc.) generally prevail in water temperatures below about 16 degrees<sup>28</sup>. At such temperatures, a person without a lifejacket or other form of support is at a very high risk of drowning (see also Section 7.1).

NSW straddles a range of climate zones, and therefore has a wide range in prevailing water temperatures: the alpine waterways can have dangerously cold water (<16 degrees) at any time of year, while some northern areas may almost never experience such conditions. Most areas of the state are likely to experience dangerously cold waters for at least part of the year.

Key considerations with cold water are so-called ‘alpine waters’, as defined in the *Marine Safety Regulation 2016*, and incidents where a person is likely to have been suddenly forced into the water at a time or place where the water is likely to have been cold – e.g. a vessel capsizes in winter or spring. Data related to these two considerations is included in Figure 7.

The definition of ‘cold water’ incidents in relation to Figure 7 is based on three variables: incident type (those incidents in which a person was likely suddenly forced into the water), time of year (month) and incident location (geographic regions). The associated filters applied to Transport operational data are set out in Table 3 below.

**Table 3:** incident types, months and geographic regions used to define what is deemed a ‘cold water’ incident\*

Incident types			
Bar crossing incident   Capsizing   Fall overboard   Sinking			
Months/regions			
July and August	June and September	May, October and November	All remaining months (December – April)
<ul style="list-style-type: none"> <li>Hawkesbury/ Broken Bay</li> <li>Hunter/Inland</li> <li>Mid North Coast</li> <li>Monaro</li> <li>Murray Inland</li> <li>North Coast</li> <li>South Coast</li> <li>Sydney</li> <li>Sydney (Botany Bay/ Port Hacking)</li> </ul>	<ul style="list-style-type: none"> <li>Hawkesbury/ Broken Bay</li> <li>Hunter/Inland</li> <li>Monaro</li> <li>Murray Inland</li> <li>South Coast</li> <li>Sydney</li> <li>Sydney (Botany Bay/ Port Hacking)</li> </ul>	<ul style="list-style-type: none"> <li>Monaro</li> <li>Murray Inland</li> <li>South Coast</li> </ul>	Alpine waters only: <ul style="list-style-type: none"> <li>Blowering Reservoir</li> <li>Burrinjuck Reservoir</li> <li>Khancoban Pondage</li> <li>Lake Eucumbene</li> <li>Lake Jindabyne</li> <li>Pajar Dam</li> </ul>

\* Incident types based on situations where person likely to be forced into water; months and regions based on likely occurrence of cold water within NSW. “Alpine waters” are those defined under the *Marine Safety Regulation 2016* and which have had at least one boating incident in the 10 years to 30 June 2021.

27 Analysis of cold water incidents based on both Transport fatality records and Transport operational incident data.

28 <http://www.coldwatersafety.org/WhatIsCold.html>

## Incidence

Cold waters (as defined above in Table 3) were associated with 21 (16.4%) of the 128 recreational and commercial fatal boating incidents recorded over the 10 years to 30 June 2021. They were associated with much lower proportions of serious injury and total incidents (4.7% and 5.0% respectively).

Alpine waters accounted for three fatal incidents and four serious injury incidents over the 10 years to 30 June 2021 – which together accounted for 63.6 per cent of all alpine waters incidents, a significantly higher proportion than the corresponding figure for non alpine waters (21.2%). Alpine waters have some of the coldest waters in the state. These waters cool well below 10 degrees each winter and may be ‘dangerously cold’ (<16 degrees) much of the year.

## Long-term trend

Cold water incidents have increased slightly in recent years, reversing a previous downward trend. However, the recent trend for cold water incidents is similar to that for boating incidents generally. The overall number of incidents apparently related to cold water in 2020–21 (18) was statistically similar to the long-term (10-year) annual average of 15.0 incidents.

## Characteristics and influencing factors

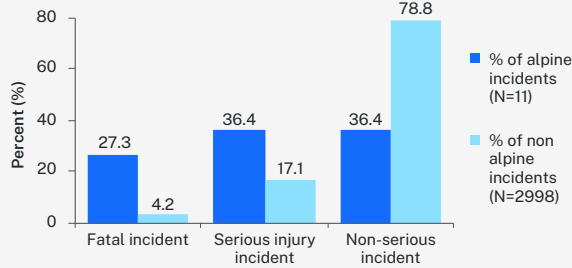
While Figure 7 shows that most ‘cold water’ incidents occurred in the winter months (June–August; 67.3%), a considerable proportion occurred in spring (September – November; 28.0%).

‘Cold water’ incidents have occurred across the state – while the South Coast region had the highest number (39 incidents), it was closely followed by the Hunter Inland (30 incidents). Even the comparatively warm North Coast had 17 incidents.

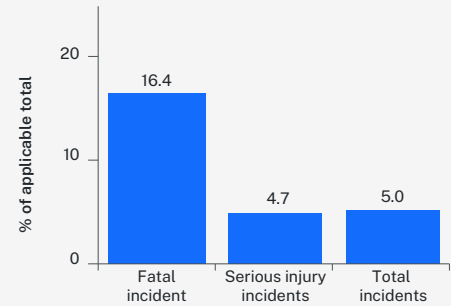


**Figure 7: Priority safety area – cold water – at a glance**

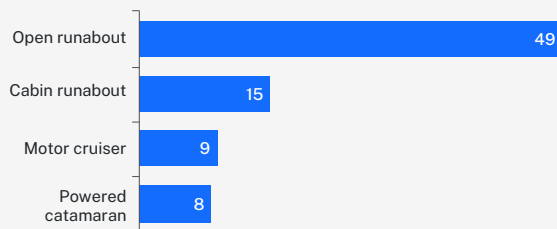
**Prevalence of fatal, serious injury and non-serious incidents for alpine and non alpine waters\***



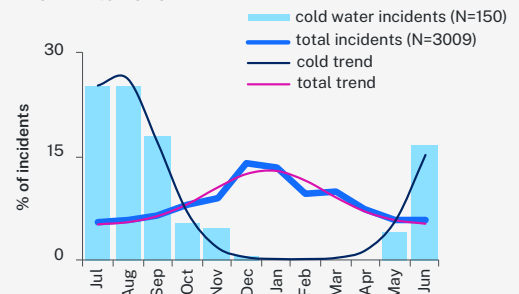
**Prevalence of cold water as an issue amongst key risk variables**



**Vessels involved in cold water incidents 2011-12 to 2020-21 (total = 155)**



**Seasonal patterns in 'cold water' incidents 2011-12 to 2020-21**



**Key statistics – cold water**

- Cold waters were associated with nearly 1 in 6 (16.4%) of fatal boating incidents.
- However, cold waters were associated with only about 1 in 21 serious injury incidents and 1 in 20 overall boating incidents.
- Alpine waters are particularly cold. Vessel capsizes and people falling overboard accounted for nearly half (45.5%) of the associated incident records on alpine waters.
- Open runabouts and paddle craft accounted for nearly two-thirds (63.6%) of the vessels involved in alpine waters incidents.
- Cold water incidents can occur almost anywhere in the state and, over the last 10 years, more than 1 in 4 (28.0%) occurred in spring.

## 7.5 Weather conditions

### Incidence

Weather conditions<sup>29</sup> were reported as a major or secondary incident cause in association with 15 (11.7%) of the 128 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2021. Weather conditions were also a likely contributory incident cause in association with a further 14 fatal boating incidents over this period (10.9%) – meaning that weather conditions were a likely factor in 29 (22.7%) of fatal boating incidents.

When the cause “hazardous waters” – which usually relates to weather conditions at least indirectly – is added, the number of fatal incidents is even higher – 57 incidents (44.5% of the total). If other possibly related causes are also considered – such as bar conditions and cold water – it is likely that as many as 50 per cent of fatal boating incidents are directly or indirectly related to weather conditions.

Weather conditions were also reported as a major or secondary incident cause in association with 34 (6.6%) of the 516 serious injury incidents recorded over the 10 years, and 359 (11.9%) of the 3009 boating incidents overall. Based on the data available for fatal incidents, it is estimated that weather conditions were at least a contributory factor in 12.7 per cent of serious injury incidents and 23.1 per cent of total incidents over the 10-year period.

In 2019–20, weather conditions were directly associated with five out of the 15 fatal incidents (33.3%).

### Long-term trend

Weather related incidents fell sharply in 2020–21, almost completely reversing the large increase recorded in the previous year (Figure 8). While overall boating incidents increased by more than 50 per cent between 2019–20 and 2020–21 (52.4%), incidents attributed to weather conditions fell by 42 per cent. The overall number of incidents related to weather conditions in 2020–21 (29) was statistically similar to the long-term (10-year) annual average of 35.9 incidents.

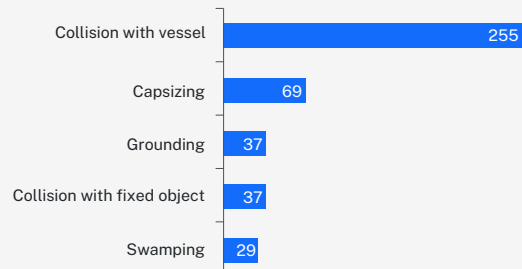
The sharp fall in weather related incidents in 2020–21 may relate to changes in boating behaviour as a result of Covid-19 and/or a change in the co-occurrence of ‘bad weather days’ and popular boating days across the state. Given that sailing vessels were the most numerous vessel type associated with weather related incidents over the last 10 years (Figure 8), it may be that mass-cancellation of sailing events over the 2020–21 racing season due to Covid-19 led to fewer incidents involving sailing vessels. Anecdotally, sailing races give rise to a relatively large number of minor incidents associated with wind gusts and/or sudden changes in wind direction.

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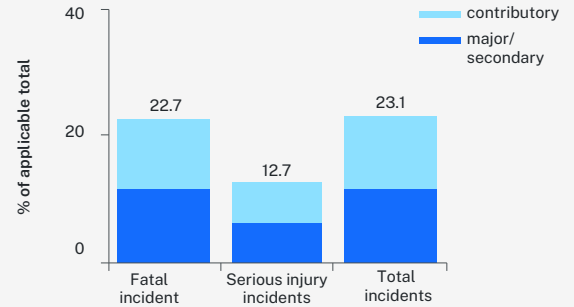
<sup>29</sup> Analysis of weather conditions based on both Transport fatality records and Transport operational incident data.

**Figure 8: Priority safety area – weather conditions – at a glance**

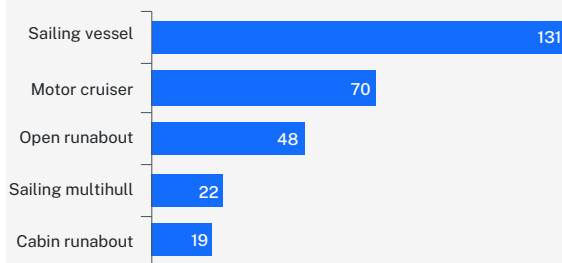
**Weather - incident type records for incidents 2011-12 to 2020-21 (total = 527)**



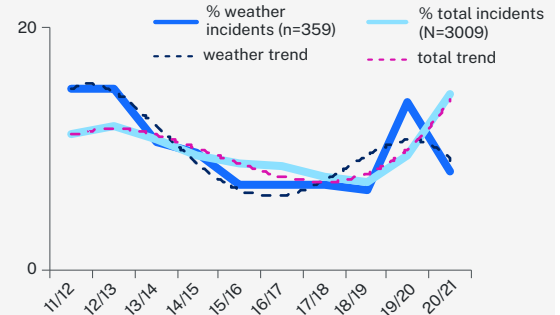
**Prevalence of weather as a cause amongst key risk variables\***



**Vessels involved in 'weather conditions' incidents 2011-12 to 2020-21 (total = 504)**



**Weather related trend against general incident trend**



\* Major/ secondary and contributory cause numbers for fatalities are based on Transport fatality records and may differ slightly from operational data due to reclassifications affecting related causes including weather conditions and hazardous waters. Contributory cause numbers for serious injury and total incidents are estimates based on the applicable proportion for fatal incidents.

**Key statistics – weather conditions**

- Weather conditions were a likely factor in nearly 1 in 4 (22.7%) of fatal boating incidents.
- When related incident causes are considered – such as hazardous waters, bar conditions and cold water – it is likely that as many as 1 in 2 (50%) of fatal boating incidents are directly or indirectly related to weather conditions.
- 26.0% (i.e. more than 1 in 4) of vessels involved in weather-related incidents were sailing vessels.
- Weather related incidents occur all year and are quite common outside of the October to April 'boating season'. This is most apparent in August and September (more than 16% occurred in these two months alone).
- Weather related incidents occur on a variety of sheltered and exposed waterways. Over the last 10 years most occurred in the Sydney region (149, 41.5%), Hunter Inland region (76, 21.2%) and the Hawkesbury River/ Broken Bay region (60, 16.7%).

## 7.6 Personal watercraft

### Incidence

PWC<sup>30</sup> are heavily over-represented in overall recreational boating incidents and especially in recreational boating serious injury incidents:

- PWC accounted for an average of only around 5.5% of registered recreational vessels over the 10-year period to 30 June 2021<sup>31</sup>.
- However, PWC were involved in 70 (17.5%) of the 399 recreational serious injury incidents recorded over the same period.
- PWC were also involved in 186 (9.9%) of the 1873 recreational boating incidents recorded overall.
- In addition, PWC feature in a high percentage of complaints<sup>32</sup>

PWC have not been over-represented in relation to fatalities. PWC were involved in five (4.2%) of the 120 recreational fatal boating incidents recorded in the 10 years to 30 June 2021.

### Long-term trend

There has been no significant long-term trend in the overall number of PWC incidents reported to Transport for NSW and numbers have fluctuated considerably. However, the rate of recreational incidents involving a PWC (per 100,000 registrations) has trended downwards over the last 10 years, and the rate of such incidents causing serious injury has also fallen significantly over this period.

In 2020–21, there were no fatality incidents involving a PWC, however, there were five recreational serious injury incidents.

A comparison of PWC incidents in 2020–2021 with long-term averages highlights the notable decline in the rate of both overall incidents and serious injury incidents:

- The overall rate of recreational boating incidents involving a PWC was 120.6 incidents per 100,000 registered PWC, which was statistically similar to the long-term (10-year) average of 155.0.
- The corresponding rate for serious injury incidents (27.4 incidents per 100,000 registered PWC) was significantly below the long-term average of 60.8.
- Similar results for 2020–21 were also achieved with actual PWC incident numbers – with total incidents involving a PWC (22) being statistically similar to the long-term average (18.6) and the reported number of serious injury incidents involving a PWC (5) being significantly below the long-term average of 7.0, albeit by a very small margin.

In making the above comparisons, it should be noted that all of the applicable 10-year averages reflect – to a greater or lesser extent – very high numbers or rates recorded in the early part of the 10-year period. This means that, although recreational PWC related incident numbers and rates were all considerably higher in 2020–21 than in 2019–20, they have remained either close to or below the applicable long-term averages.

<sup>30</sup> Analysis of PWC incidents based on both Transport fatality records and Transport operational incident data

<sup>31</sup> PWC accounted for 4.0% of registered recreational vessels at the end of 2011–12, increasing to 7.6% at the end of 2020–21.

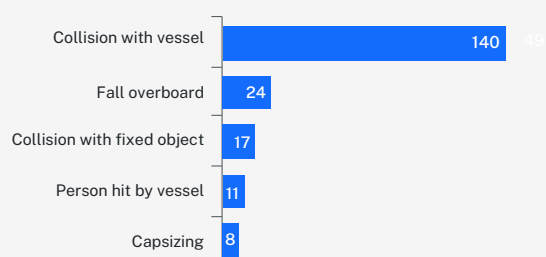
<sup>32</sup> Transport for NSW, Boating trauma and compliance in NSW – report for the 10-year period to 30 June 2019. PWC were featured in 28.3% of all boating-related complaints.

## Characteristics and influencing factors

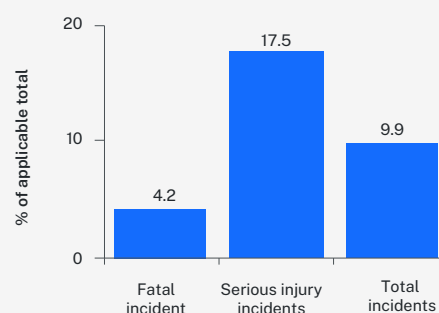
Recreational incidents involving a PWC are highly seasonal, with a pronounced summer maximum (Figure 9). December and January together accounted for 43.5 per cent of the incidents. There is some indication of secondary seasonal peaks corresponding to the October long weekend (October) and the Easter/ Anzac Day period (primarily April) – however these possible peaks are not incorporated into the seasonal model applied to the data.

**Figure 9: Priority safety area – Personal Watercraft – at a glance**

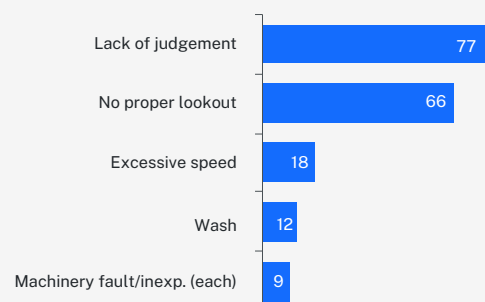
**PWC - incident type records for rec incidents 2011-12 to 2020-21 (total = 251)**



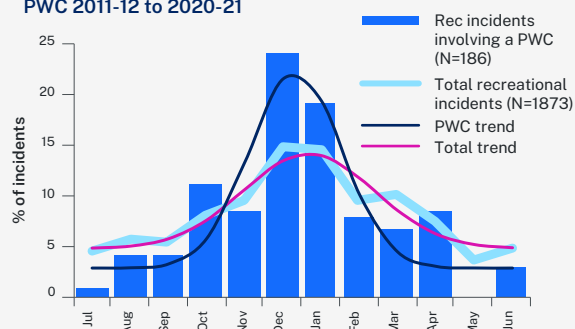
**Prevalence of PWC as an issue amongst key risk variables**



**PWC - incident cause records for rec. incidents 2011-12 to 2020-21 (total = 279)**



**Seasonal patterns in rec. incidents involving a PWC 2011-12 to 2020-21**



### Key statistics – Personal Watercraft (PWC)

- PWC were involved in just over 1 in 6 (17.5%) of recreational serious injury incidents. However, they accounted for only about 1 in 18 (5.5%) of recreational vessel registrations over the last 10 years.
- Despite this over-representation across the last 10 years, there have been significant declines in the rate (per 100,000 registrations) of both serious injury and overall incidents involving a recreational PWC.
- The main contributory causes associated with incidents involving a PWC was lack of judgement (27.6%) and no proper lookout (23.7%). Together these accounted for 51.3% of associated incident cause records.
- Collisions with another vessel was by far the most common incident type associated with PWC - accounting for more than half (55.8%) of related records.
- PWC related incidents are concentrated in the Botany Bay/ Port Hacking area (33.9% of state total), the Hawkesbury River/ Broken Bay area (18.8%) and Murray Inland region (17.7%).

## 7.7 Towing activities

Towing activities include water skiing, wakeboarding and aquaplaning<sup>33</sup>. Towing fatalities are normally of the ‘non-drowning’ type – related to trauma from a collision or propeller injury – rather than people being forced into the water by, for example, a vessel capsize or sinking.

### Incidence

Towing accounted for 15 (12.5%) of the 120 recreational fatal boating incidents recorded over the 10-year period to 30 June 2021<sup>34</sup>.

Incidents involving towing activities also accounted for 88 (22.1%) of the 399 recreational serious injury incidents and 149 (8.0%) of the 1873 recreational boating incidents overall recorded over the 10-year period.

In 2020–21, there were no fatal incidents involving towing activities. There were, however, five incidents leading to serious injury.

### Long-term trend

The overall number of incidents related to towing in 2020–21 (13) was statistically similar to the long-term (10-year) annual average of 14.9 incidents. In addition, there has been no significant trend in the number of towing incidents over the 10-year period.

### Characteristics and influencing factors

Incidents linked to towing were extremely seasonal, even more so than for recreational boating incidents generally (Figure 10). The six-month period November to April accounted for 88.6 per cent of such incidents (versus 66.8% for all recreational incidents). January alone accounted for 29.5 per cent (versus 14.7%).

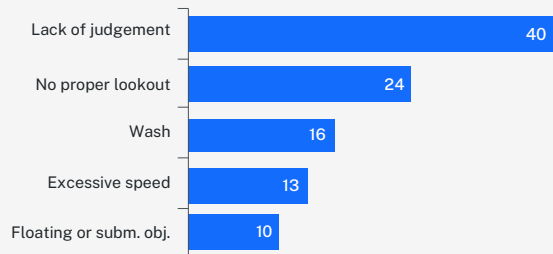
<sup>33</sup> Analysis of towing incidents based on both Transport fatality records and Transport operational incident data. Incidents involving towing activities are often recorded in the Transport operational database as “injury – towing incident”, although some are recorded under other incident types but with vessel activities that clearly point to towing. Both categories are included in the numbers provided in this report – which means more incidents are correctly captured than have been in previous reporting (which relied only on the “injury – towing incident” data for non-fatal incidents).

<sup>34</sup> Total includes eight incidents that were recorded under incident type “injury – towing incident” in Transport operational incident data, as well as seven other incidents clearly related to towing activities based on Transport fatality records.

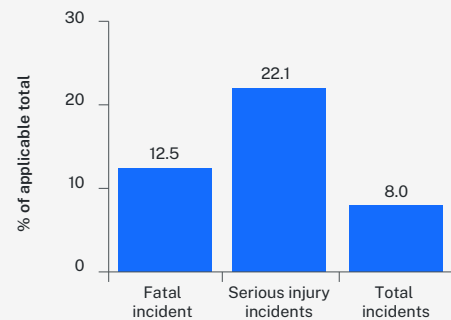


**Figure 10: Priority safety area – towing activities – at a glance**

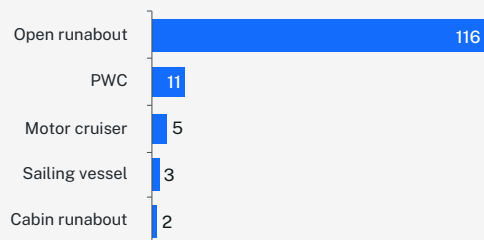
**Towing - incident cause records for incidents 2011-12 to 2020-21 (total = 188)**



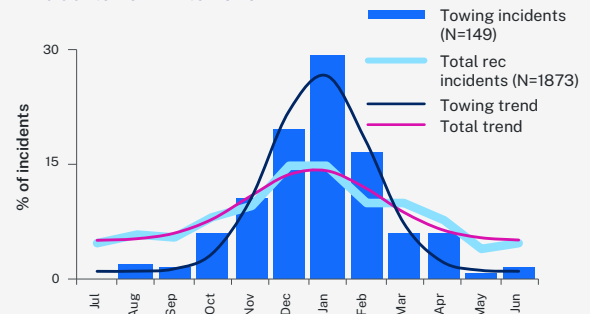
**Prevalence of towing incidents as an issue amongst key risk variables**



**Vessels involved re towing incidents 2011-12 to 2020-21 (total = 167)**



**Seasonal patterns in towing incidents versus all rec incidents 2011-12 to 2020-21**



**Key statistics – towing**

- Towing activities accounted for 1 in 8 (12.5%) of fatal recreational boating incidents and more than 1 in 5 (22.1%) of corresponding serious injury incidents.
- The main contributory cause linked to towing incident records were lack of judgement (21.3%), no proper lookout (12.8%) and vessel wash (8.5%).
- Nearly 70% of the vessels involved in towing incidents were open runabouts.
- Nearly 9 out of 10 (88.6%) of towing incidents occurred in the November to April period.
- Towing incidents mostly occurred on coastal rivers and on inland waterways. The Murray River accounted for 53 incidents (35.6% of total), while the Hawkesbury and Nepean Rivers accounted for 29 incidents (19.5%).

## 7.8 Excess alcohol

### Incidence

Excess alcohol<sup>35,36</sup> was reported as a major or secondary incident cause in association with 10 (7.8%) of the 128 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2021. Excess alcohol was also a likely contributory incident cause in association with a further four fatal boating incidents over this period (3.1%) – meaning that excess alcohol was a likely factor in 14 (10.9%) of fatal boating incidents.

Excess alcohol was also reported as a major or secondary incident cause in association with 19 (3.7%) of the 516 serious injury incidents recorded over the 10 years, and 53 (1.8%) of the 3009 boating incidents overall.

In 2020–21, there were no fatal incidents associated with excess alcohol.

### Long-term trend

The overall number of boating incidents related to excess alcohol has fluctuated within a relatively narrow range in recent years, but broadly in line with overall boating incidents. The overall number of incidents related to excess alcohol in 2020–21 (7) was significantly greater than the long-term (10-year) annual average of 5.3 incidents, albeit by a small margin.

### Characteristics and influencing factors

Incidents linked to excess alcohol were highly seasonal, with most in the spring/ summer period (Figure 11). The six-month period September to February accounted for 71.7 per cent of such incidents.

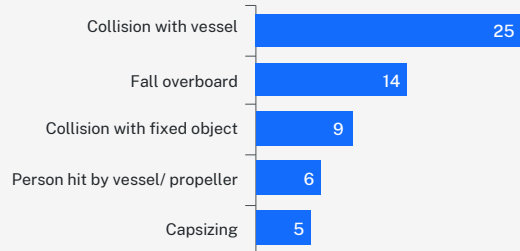


<sup>35</sup> Analysis of excess alcohol based on both Transport fatality records and Transport operational incident data.

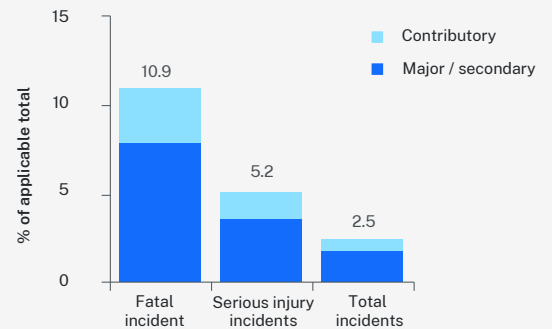
<sup>36</sup> An incident will normally have a cause of 'excess alcohol' recorded if a vessel operator involved is known or suspected of having a blood alcohol concentration above the legally prescribed limit (generally < 0.05 grams alcohol in 210 litres of breath or 100 millilitres of blood, but < 0.02 for commercial operators and zero for operators under 18 years of age).

**Figure 11: Priority safety area – excess alcohol – at a glance**

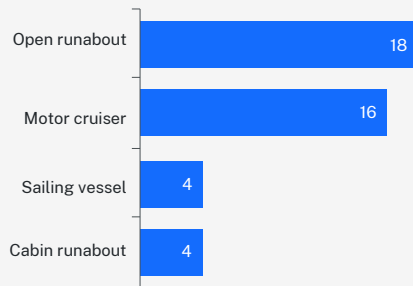
**Alcohol - incident type records for incidents 2011-12 to 2020-21 (total = 79)**



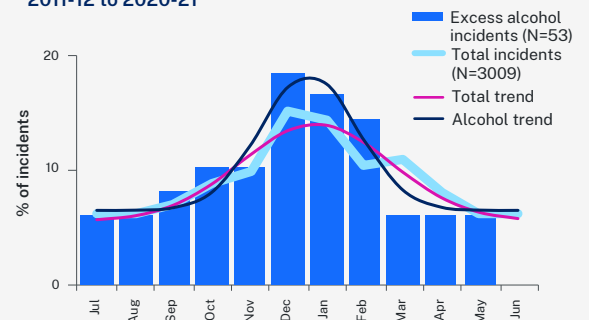
**Prevalence of alcohol as an issue amongst key risk variables**



**Vessels involved in 'excess alcohol' incidents 2011-12 to 2020-21 (total = 72)**



**Seasonal patterns in alcohol related incidents 2011-12 to 2020-21**



**Key statistics – excess alcohol**

- Excess alcohol was a likely factor in nearly 1 in 9 (10.9%) of fatal boating incidents.
- Nearly 1 in 3 (31.6%) of incident – vessel records associated with excess alcohol over the last 10 years involved a collision with another vessel.
- Nearly 1 in 5 (17.7%) of such records involved falls overboard and more than 1 in 9 (11.4%) involved a collision with a fixed object.
- 1 in 4 (25.0%) of the vessels involved in excess alcohol incidents were open runabouts. More than 1 in 5 (22.2%) were motor cruisers.
- Excess alcohol incidents were most common in the Hawkesbury River/ Broken Bay region (15 incidents, 28.3%) and in both Sydney Harbour and the Hunter Inland region (each 10 incidents, 18.9%). The greater Sydney area, including the Hawkesbury River and Broken Bay, accounted for 58.5% of the state total.

## 7.9 Paddle craft

Paddle craft<sup>37</sup> include canoes, kayaks and dragon boat type craft.

### Incidence

Paddle craft were involved in 16 (12.5%) of the 128 fatal boating incidents recorded in the 10 years to 30 June 2021. All of these fatal incidents were recreational boating incidents. These craft were involved in eight (1.6%) of the 516 serious injury incidents and 59 (2.0%) of the 3009 overall boating incidents recorded over the 10 years.

In 2020–21, there were three fatal incidents involving paddle craft.

### Long-term trend

There has been a recent increasing trend in the number of paddle craft involved in boating incidents, broadly in line with the increase in overall boating incidents. The number of paddle craft involved in incidents in 2020–21 (11) was significantly greater than the long-term (10-year) annual average of 5.9 incidents. It is likely that the absence of any improving long-term trend, would be at least partly due to the increased participation in paddle craft activities in recent years – which, anecdotally at least, has far exceeded the growth rate for boating generally. Improved data collection is required to support analysis of this user group, especially long-term data on vessel usage or at least vessel numbers.

### Characteristics and influencing factors

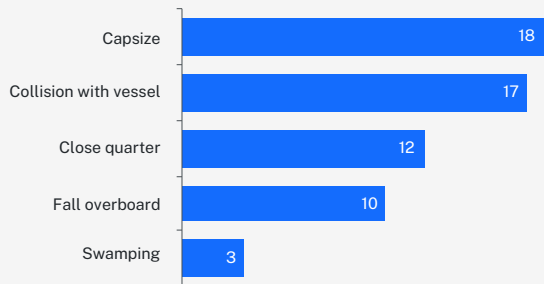
Incidents involving paddle craft tend to be seasonal, with most in the late spring to summer period (Figure 12). The four-month period October to January accounted for 59.3 per cent of such incidents.



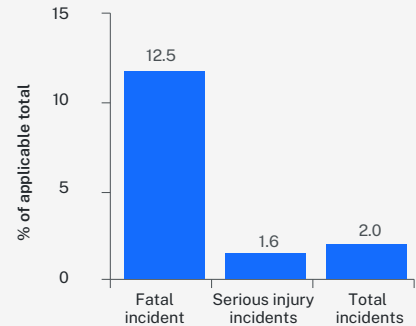
<sup>37</sup> Analysis of paddle craft incidents based on both Transport fatality records and Transport operational incident data.

**Figure 12: Priority safety area –paddle craft safety – at a glance**

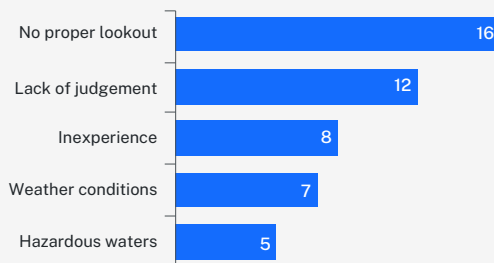
**Paddlecraft - incident type records for incidents 2011-12 to 2020-21 (total = 69)**



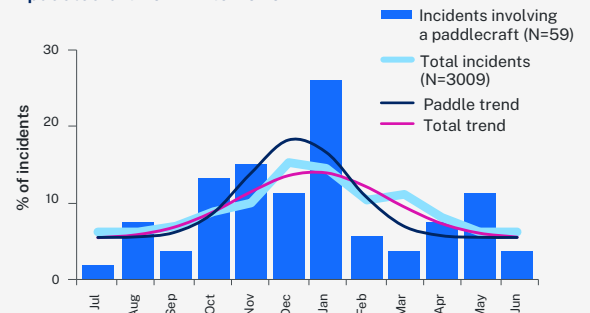
**Prevalence of paddle craft as an issue amongst key risk variables**



**Paddlecraft - incident cause records for incidents 2011-12 to 2020-21 (total = 70)**



**Seasonal patterns in incidents involving a paddlecraft 2011-12 to 2020-21**



**Key statistics – paddle craft**

- Paddle craft were involved in 1 in 8 (12.5%) of fatal boating incidents.
- No proper lookout was the most common cause associated with paddle craft incidents, accounting for 22.9% of related incident records. This was followed by lack of judgement (17.1%) and inexperience (11.4%).
- The most common incident types associated with paddle craft were vessel capsize (26.1% of records) and collisions with another vessel (24.6%). Together, these incident types accounted for more than half of all related records.
- Incidents involving paddle craft occurred on both coastal and inland waterways. The Hawkesbury River/ Broken Bay region accounted for 14 such incidents (23.7%), followed by both Sydney Harbour and the Murray Inland region (each 11 incidents, 18.6%),
- Anecdotal evidence points to a large increase in paddle craft numbers in recent years.

## 7.10 Excessive speed

### Incidence

Excessive speed<sup>38</sup> was reported as a major or secondary incident cause in association with eight (6.3%) of the 128 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2021. Excessive speed was also a likely contributory incident cause in association with a further five fatal boating incidents over this period (3.9%) – meaning that excessive speed was a likely factor in 13 (10.2%) of fatal boating incidents.

Excessive speed was also reported as a major or secondary incident cause in association with 41 (7.9%) of the 516 serious injury incidents recorded over the 10 years, and 102 (3.4%) of the 3009 boating incidents overall.

In 2020–21, there was one fatal incident associated with excessive speed.

### Long-term trend

Incidents related to excessive speed are not showing any clear long-term trend. However, the number of such incidents did decrease by 50 per cent from 2019–20 to 2020–21 (from 12 to 6) – despite an overall increase in boating incidents generally. The overall number of incidents associated with excessive speed in 2020–21 (6) was significantly less than the long-term (10-year) annual average of 10.2 incidents.

### Characteristics and influencing factors

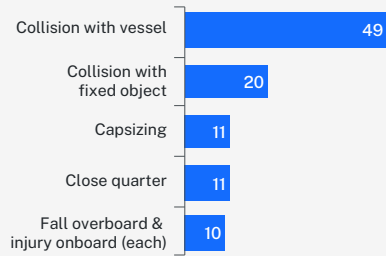
Incidents attributed to excessive speed tend to occur on busier waterways – particularly in the greater Sydney area, as well as on waterways in the Central Coast/ Hunter regions and on the Murray River (Figure 13). The Greater Sydney area accounted for 59 (57.8%) of such incidents and Sydney harbour alone accounted for 24 (23.5%).



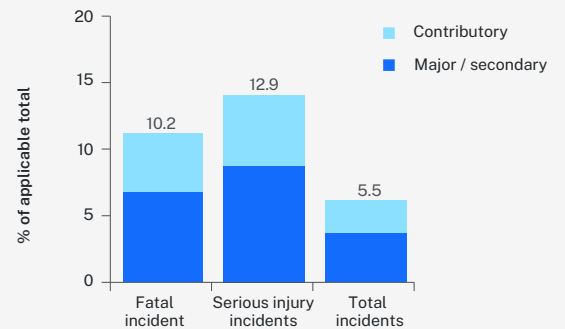
<sup>38</sup> Analysis of excessive speed based on both Transport fatality records and Transport operational incident data. Excessive speed is cited as an incident cause when evidence suggests the vessel(s) involved were being driven at an unsafe speed given the prevailing conditions, and where this speed likely contributed to the incident. Factors such as the existence of a posted speed limit, prevailing weather and sea conditions and the amount of boating traffic are considered in determining whether excessive speed is cited.

**Figure 13: Priority safety area –excessive speed – at a glance**

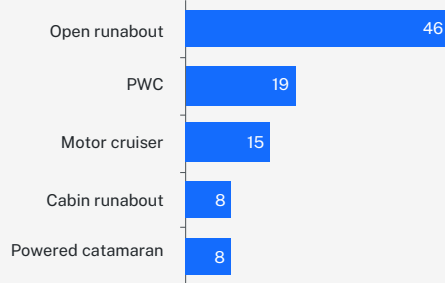
**Speed – incident type records for incidents 2011-12 to 2020-21 (total = 158)**



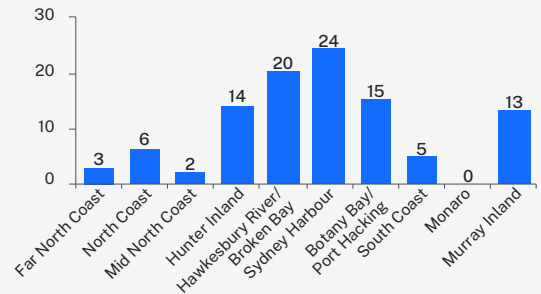
**Prevalence of speed as an issue amongst key risk variables**



**Vessels involved in 'excessive speed' incidents 2011-12 to 2020-21 (total = 144)**



**Number of speed-related incidents by subregion 2011-12 to 2020-21**



**Key statistics – excessive speed**

- Excessive speed was a likely factor in more than 1 in 10 (10.2%) of fatal boating incidents.
- Excessive speed is closely associated with the issue of “no proper lookout” (Section 6.4). Five of the 14 fatal boating incidents associated with excessive speed (35.7%) were also associated with not keeping a proper lookout.
- Nearly 1 in 3 (31.0%) of incident – vessel records associated with excessive speed over the last 10 years involved a collision with another vessel. Most of the records (60.1%) involved some sort of collision or close-quarters (threat of collision) situation.
- Nearly 1 in 3 (31.7%) of the vessels involved in excessive speed incidents were open runabouts.
- Incidents related to excessive speed show a similar seasonal pattern to that of boating incidents generally. 35.3% of such incidents occurred in January and February.

## 7.11 No proper lookout

### Incidence

No proper lookout<sup>39</sup> was reported as a major or secondary incident cause in association with six (4.7%) of the 128 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2021. No proper lookout was also a likely contributory incident cause in association with a further three fatal boating incidents over this period (2.3%) – meaning that no proper lookout was a likely factor in nine (7.0%) of fatal boating incidents.

No proper lookout was also reported as a major or secondary incident cause in association with 66 (12.8%) of the 516 serious injury incidents recorded over the 10 years, and 424 (14.1%) of the 3009 boating incidents overall.

In 2020–21, there were two fatal incidents associated with the lack of a proper lookout.

### Long-term trend

Incidents related to the lack of a proper lookout had been trending downwards until a reversal in 2019–20, which has continued in 2020–21. In relative terms, the increase in incidents attributed to no proper lookout between 2019–20 and 2020–21–20 was similar to that for boating incidents generally. The overall number of incidents associated with the lack of a proper lookout in 2020–21 (60) was significantly greater than the long-term (10-year) annual average of 42.4 incidents.

### Characteristics and influencing factors

Incidents related to not keeping a proper lookout have been heavily concentrated on Sydney Harbour, with many parts of the harbour recording relatively high numbers of such incidents. The Greater Sydney area accounted for 69.8% of these incidents, with Sydney Harbour alone accounting for 43.2%.

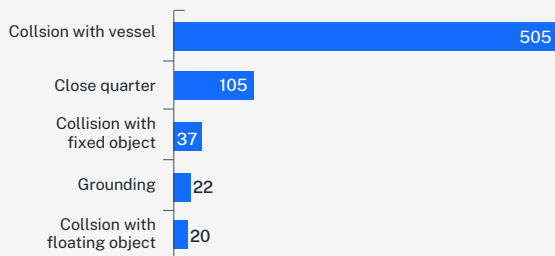


<sup>39</sup> Analysis of no proper lookout based on both Transport fatality records and Transport operational incident data. 'No proper lookout' relates to incidents where one or more persons were not keeping an effective lookout – one that would allow them to stop or alter course in time to avoid a collision – considering factors such as the speed they were travelling, the prevailing visibility and the amount of boating traffic in the area.

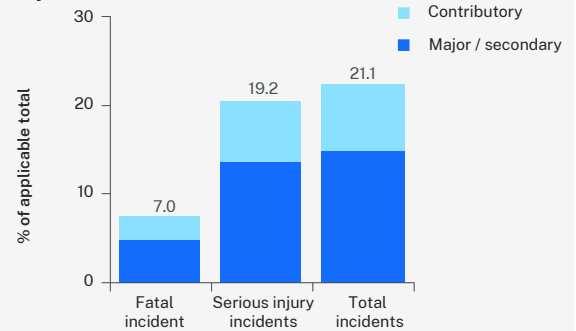


**Figure 14: Priority safety area – no proper lookout – at a glance**

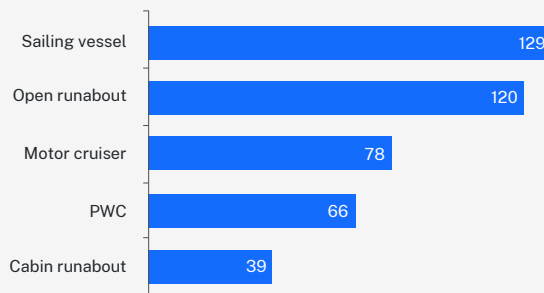
**Lookout – incident type records for incidents 2011-12 to 2020-21 (total = 761)**



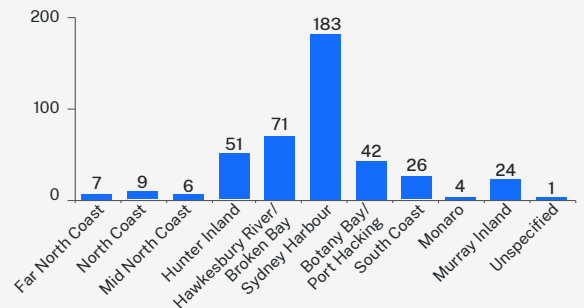
**Prevalence of poor lookout as an issue amongst key risk variables\***



**Vessels involved in 'no proper lookout' incidents 2011-12 to 2020-21 (total = 747)**



**Number of lookout-related incidents by subregion 2011-12 to 2020-21**



\*Contributory cause numbers for serious injury and total incidents are estimates based on proportion for fatal incidents.

### Key statistics – no proper lookout

- No proper lookout was a likely factor in almost 1 in 14 (7.0%) of fatal boating incidents.
- Five of the 9 fatal boating incidents associated with no proper lookout (55.6%) were also associated with excessive speed.
- Nearly two-thirds (66.4%) of incident – vessel records associated with no proper lookout involved a collision with another vessel.
- More than 1 in 6 (17.3%) of the vessels involved in incidents related to no proper lookout were sailing vessels, while a similar proportion (16.1%) were open runabouts.
- Incidents related to not keeping a proper lookout show a similar seasonal pattern to that of boating incidents generally. 30.7% of such incidents occurred in December and January.
- Nearly 7 out of 10 (69.8%) of lookout-related incidents occurred in the Greater Sydney area, which includes Sydney Harbour (43.2%), the Hawkesbury River/ Broken Bay region (16.7%) and southern Sydney (Botany Bay and Port Hacking – 9.9%).

# 8 Conclusions

This report shows there have been mixed results for boating safety in NSW. While there have been positive trends in relation to some issues, significant challenges remain.

Positive outcomes or trends are evident in relation to:

- a continuing decline in the rate of recreational vessel fatal incidents (per 100,000 registered recreational vessels)
- a large long-term decline in the drowning fatality rate for recreational boating incidents – down by just over 55% since 1992–93
- a large fall in the number of incidents attributed to weather conditions, despite the increase in boating incidents overall
- long-term declines in the rates of both serious injury incidents and overall incidents for PWC ('jetskis')
- a relative low number of incidents related to excessive speed in 2020–21

The data suggests challenges remain in relation to:

- **Lifejacket wear rates** – up to 60 per cent of recreational boating fatalities could have been prevented over the last 10 years had all persons presumed drowned in recreational boating incidents been wearing a lifejacket.
- **Judgement** – the number of incidents attributed to a lack of judgement increased sharply in 2020–21 and was well above the long-term average.
- **Boaters aged 70 and over** – this segment continue to be over-represented in boating fatalities, when considered in relation to the number of boat licences held.
- **Boaters aged under 30** – this segment is heavily over-represented in boating serious injuries, when considered in relation to the number of boat licences held and considering that people under 12 aren't eligible for a boat licence.
- **PWC ('jetskis')** – these vessels continue to be over-represented in recreational boating serious injury incidents, and to a lesser degree, in overall recreational boating incidents.
- **Overall boating fatalities and serious injuries** – both finished 2020–21 above their corresponding final target under the Maritime Safety Plan 2017–21

More work needs to be done to drive down boating fatalities and serious injuries. While boating incidents are caused by an array of interrelated factors, it is clear that not wearing a lifejacket is a big contributor – and that driving up overall lifejacket wear rates is fundamental to reducing boating fatalities.

While significant progress over the last few decades has been made in reducing the rate of recreational boating drowning fatalities, no such progress has been made with non-drowning fatalities – those typically associated with traumatic injuries arising from collisions and impacts, along with associated factors such as high speed, poor judgement and not keeping a proper lookout. Reducing these fatalities, along with serious injuries, will require attention across a range of vessel types and activities – particularly smaller high-speed vessels (such as open runabouts and PWC) and towing-related activities such as waterskiing and wakeboarding.

While incidents related to weather conditions fell in 2020–21, weather and related factors such as hazardous waters, bar conditions and cold water remain a major contributor to boating fatalities – second only to the non-wearing of lifejackets.

Changing demographics, in particular more ‘baby boomers’ reaching retirement and potentially participating in boating, pose challenges around the increasing numbers of older boaters. While the direct statistical evidence points to boaters aged 70-plus being over-represented in fatalities, the risk-factors that affect boaters in this age group are likely to be present at a considerably younger age – possibly masked to an extent by experience and safety-conscious attitudes. In the absence for definitive evidence as to when the various age-related risk factors first become a significant impediment to safe boating, it would seem reasonable to target education materials at boaters aged from about 65-plus.

The Covid-19 epidemic has resulted in wide-ranging changes to both work and leisure, and many of the changes may prove to be long-lasting. While recreational boating appears to have increased as part of an apparent shift towards leisure pursuits that are perceived as COVID-safe, the increased boating activity may make it more difficult to drive down incident rates – particularly if a significant proportion of the activity involves inexperienced boaters.

## 9 Acknowledgments

Transport for NSW wishes to thank the following –

- NSW Ministry of Health for providing access to information in the NSW Admitted Patient Data Collection, NSW Emergency Department Data Collection and the NSW Registry of Births, Deaths and Marriages – Death registrations.
- Centre for Health Record Linkage for conducting the record linkage.
- Aboriginal Health & Medical Research Council for supporting the ongoing data linkage project.
- Independent Hospital Pricing Authority for providing the International Classification of Diseases, 10th Revision, Australian Modification (ICD-10-AM) electronic code lists.
- The Cause of Death Unit Record File (COD URF) is provided by the Australian Coordinating Registry for the COD URF on behalf of the NSW Registry of Births, Deaths and Marriages, NSW Coroner and the National Coronial Information System. Source: Cause of Death Unit Record File held by the NSW Ministry of Health Secure Analytics for Population Health Research and Intelligence.

This serious injury research forms part of the routine monitoring activity undertaken by Transport for NSW to improve maritime safety for the community. It was approved by the following ethics committees –

- Approved by the NSW Population & Health Services Research Ethics Committee on 30th April 2018.
- Approved by the Aboriginal Health & Medical Research Council Ethics Committee on 14th May 2018.

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