

Transport for NSW

# Boating incidents in NSW

Statistical Report for the 10-year  
period ended 30 June 2020



# Contents

1	Executive summary	3
2	Glossary	6
3	Introduction	8
4	Safety performance trends and comparisons for 2019–20	10
4.1	Incident numbers in 2019–20	11
5	Fatalities in 2019–20	12
6	Latest trends with respect to Maritime Safety Plan targets	14
6.1	Fatalities	14
6.2	Serious injuries	15
7	Trends in Maritime Safety Plan priority safety areas	16
7.1	Lifejacket wear	17
7.2	Lack of judgement	19
7.3	Boater age (65-plus)	21
7.4	Cold water	23
7.5	Weather conditions	26
7.6	Personal watercraft	28
7.7	Towing activities	30
7.8	Excess alcohol	32
7.9	Paddle craft	34
7.10	Excessive speed	36
7.11	No proper lookout	38
	Acknowledgments	40

# 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.

There were 25 boating fatalities, 39 serious injuries and 284 boating related incidents reported to Transport for NSW<sup>2</sup> in the 12-month period to 30 June 2020. While the number of reported fatalities was nearly 80 per cent above the long-term annual average, this should be considered in light of the fact that fatality numbers fluctuate widely year on year. The number of reported serious injuries was nearly 40 per cent below the long-term average.

As at the end of 2019-20, total boating fatalities were not on track<sup>3</sup> to meet the target of a 30 per cent reduction under the Maritime Safety Plan 2017-21.

Total serious injuries<sup>4</sup> were on track to meet the target of a 30 per cent reduction by 2020-21.

There has been increased boating activity on the states waterways during the latter part of 2019-20, beginning from March 2020. This may relate to COVID-19 and may have contributed to the higher number of boating incidents recorded in 2019-20.

The mix of causes and other characteristics associated with the fatal incidents in 2019-20 was similar to that applicable across the whole 10 year period to 30 June 2020. The only feature that stood out as being somewhat unusual was the fact that 55% of the incidents occurred on open (ocean) waters, as opposed to the less than one-third prevalence associated with the long-term data.

As has been typical of past years, most fatal incidents in 2019-20 occurred on smaller vessels (those < 6 metres in length; 55%). The key contributory causes associated with these incidents were also typical – with lifejacket not worn/ functional (60%), hazardous waters (50%) and lack of judgement (50%) being the most prevalent. The main incident types associated with fatal incidents in 2019-20 were fall overboard (35%), capsizing (30%) and bar crossing incident (10%).

As has also been typical of past years, only 24% of the fatalities in 2019-20 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 more than two-thirds (68%) of the fatalities. 92% of the fatalities in 2019-20 were

---

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 At the time of writing, preliminary data from 2020-21 (12 fatalities as at 1 March 2021) indicates that total fatalities will exceed – at least slightly – the MSP target for 30 June 2021 (<12 fatalities).

4 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. At the time of writing, preliminary data from 2020-21 (34 serious injuries as at 1 March 2021) indicates that total serious injuries remain on track to meet the MSP target for 30 June 2021 (<48 serious injuries). 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.



male, a proportion that was similar to that recorded over the 10 years to 30 June 2020. This reinforces the significance of lifejacket wear as the most important piece of safety equipment in preventing a fatality when you are forced into the water.

2019–20 saw an overall increase in boating incidents of nearly 30 per cent on the previous year and there were mixed results across the 11 priority safety areas examined. The main findings with respect to the priority safety areas were:

## **Lifejacket wear**

The drowning fatality rate for recreational boating incidents has fallen by almost 60 per cent since 1992–93, without any significant change in the corresponding non-drowning fatality rate.

There has been a recent (short-term) increase in recreational drowning fatalities and recreational preventable drownings have increased more sharply than recreational boating incidents generally in the last few years. The overall number of preventable drownings associated with recreational incidents in 2019–20 (17) was significantly greater than the long-term annual average of 7.9.

## **Judgement**

Incidents attributed to lack of judgement have trended up in the last few years and increased by 14.8% between 2018–19 and 2019–20. However, the relative increase was statistically similar to that for boating incidents generally (29.1%). The overall number of incidents related to lack of judgement in 2019–20 (62) was statistically similar to the long-term average of 58.2 incidents.

## **Boater age**

Boaters aged 70 and above accounted for a significantly higher share of recreational boating fatalities (21.4%) than their share of boat licences (8.2%). In addition, the number of recreational fatalities aged 70 or greater in 2019–20 (6) was significantly greater than the long-term annual average of 2.8.

## **Cold water**

The recent trend for incidents related to cold water is similar to that for boating incidents generally. The overall number of incidents related to cold water in 2019–20 (15) was statistically similar to the long-term (10 year) annual average of 15.9 incidents.

## **Weather conditions**

The relative increase in incidents attributed to weather conditions between 2018–19 and 2019–20 (108.3%) was significantly more pronounced than for boating incidents generally (29.1%). In addition, the overall number of incidents related to weather conditions in 2019–20 (50) was significantly greater than the long-term average of 37.9 incidents.

## PWC

When the 10 year period to 30 June 2020 is considered as a whole, Personal Watercraft (PWC) remain heavily over-represented in overall boating incidents and especially in recreational boating serious injury incidents. PWC were involved in 16.8% of recreational serious injury incidents reported to Transport for NSW and 9.3% of recreational incidents overall – but made up only about 5% of registered recreational vessels. Lack of judgement and not keeping a proper lookout were a particular concern with PWC incidents, and together accounted for nearly half (49.6%) of associated incident cause records.

However, there has been a steep decline in the overall number of PWC incidents over the last few years, at a time when overall reported recreational boating incident numbers have risen. In addition, 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 fallen significantly over the last eight years. In 2019–20, both these rates were significantly below their respective long-term averages – for overall recreational PWC incidents 38.2 per 100,000 registrations versus 155.7; for corresponding serious injury incidents 6.4 per 100,000 registrations versus 59.2.

## Towing

The overall number of incidents recorded as towing incidents (incident type = “injury – towing incident”) in 2019–20 (4) was significantly less than the long-term average of 6.7 incidents. However, 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. The overall number of incidents related to excess alcohol in 2019–20 (4) was similar to the long-term average of 5.0 incidents.

## Paddle craft

The number of paddle craft incidents has fluctuated without any overall trend in recent years. The overall number of incidents related to paddle craft in 2019–20 (5) was approximately equal to the long-term average of 5.2 incidents.

## Excessive speed

Incident attributed to excessive speed have not shown any clear long-term trend. The overall number of incidents associated with excessive speed in 2019–20 (12) was statistically similar to the long-term average of 11.3 incidents.

## No proper lookout

Incidents attributed to not keeping a proper lookout increased by 59.3% between 2018–19 and 2019–20. However, the relative increase was not statistically greater than that for boating incidents generally (29.1%).

The mixed boating safety results in 2019–20 demonstrate the continuing challenges in reducing boating incidents and trauma. Factors such as increased boating activity and an aging population are likely to place further pressure on boating safety going forward.

## 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 CO2 cylinder).
- **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 as a result 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 2010–11 to 2019–20<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, due to the number of fatalities in 2019–20, the state is not on track to achieve 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>7</sup>. The state does however remain on track to meet the corresponding target for total boating serious injuries<sup>8</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 2020 by approximately 3.4 per cent and 2.0 per cent respectively. PWC registrations and licences growing much more steeply – by approximately 84.0 and 60.9 per cent respectively over the same period<sup>9</sup>. There is 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 2019–20 compared with the previous year.

There are now more than 500,000 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>10</sup> and it is estimated 2 million people go boating each year on the state's waterways<sup>11</sup>.



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 24 September 2020 unless otherwise stated. Incident numbers may be subject to subsequent change as the result of coronial findings or other investigations.

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

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

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

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

11 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 on the state's roads and waterways. To continue the effort to eliminate fatalities and serious injuries, the agency has adopted the holistic Safe Systems approach to maritime safety<sup>12</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); and
- **Safe System** (all the supporting elements behind maritime safety, including data, research, education and partnerships).

The Maritime Safety Plan 2017–21<sup>13</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 2019–20 and in terms of long-term trends.



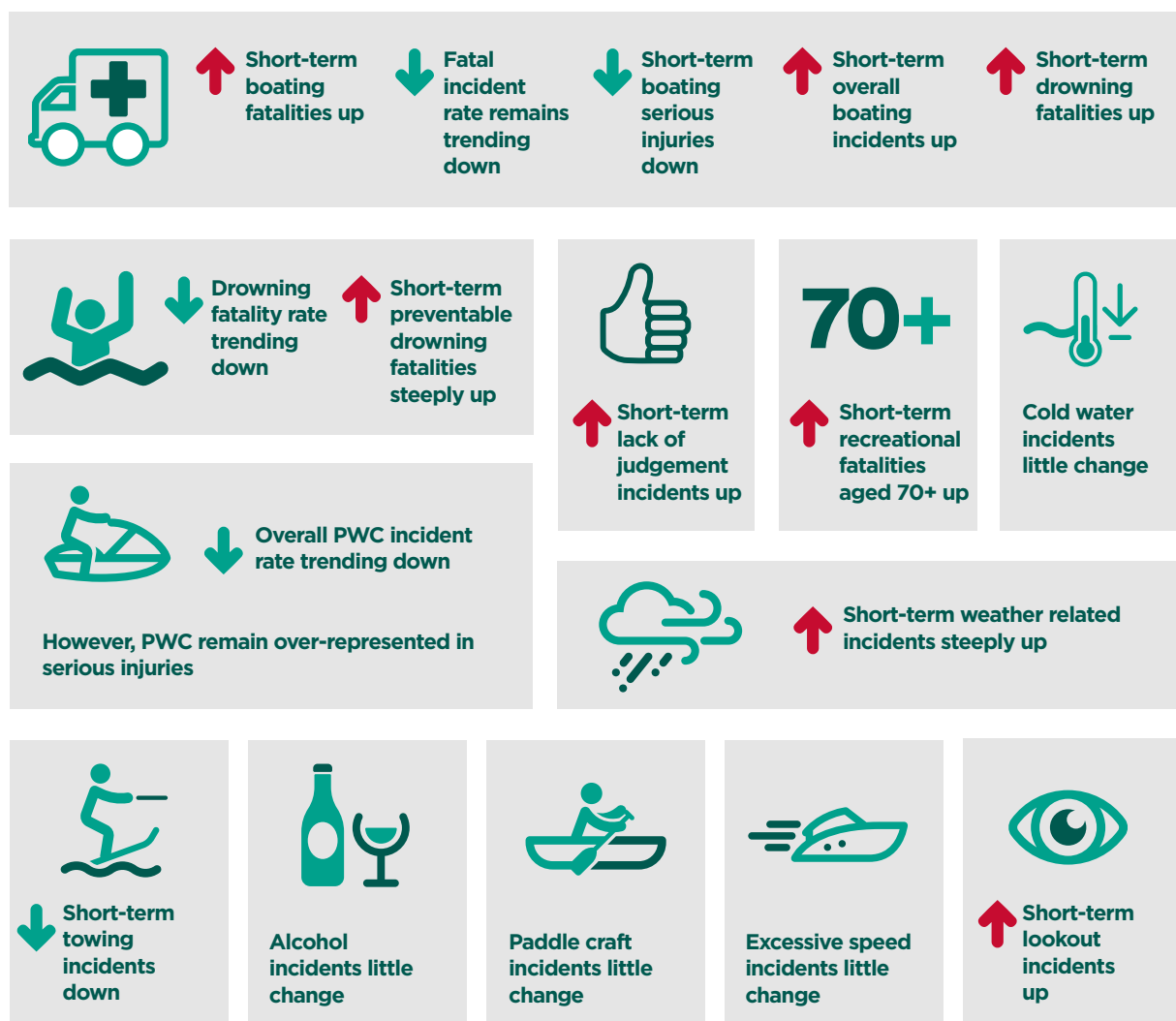
<sup>12</sup> Transport for NSW, Maritime Safety Plan 2017–21.

<sup>13</sup> The successor plan to MSP 2017–21 is currently under development and will seek to further address the safety issues identified in this report.

## 4 Safety performance trends and comparisons for 2019–20

Boating incident data is inherently volatile. This section examines results for 2019–20 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 2019–20, this is highlighted in the following infographics. Further information in relation to these infographics is provided in Sections 6 and 7 of this report.

Boating safety related results in 2019–20 were mixed, reflecting a 29.1 per cent increase in overall boating incidents since 2018–19. While fatalities were significantly higher than normal, the recreational boating fatal incident rate has maintained a long-term downward trend.



## 4.1 Incident numbers in 2019–20

There were 25 boating fatalities, 39 serious injuries and 284 boating related incidents recorded in the 12-month period to 30 June 2020 (Table 1). The number of fatalities was 14 (127.3%) more than in 2018–19 (11) and was nearly 80 per cent above the long-term annual average of 14.0 (Table 1). 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 2019–20 was 20 (33.9%) less than in 2018–19 (59) and was nearly 40% below the long-term average of 63.3 (Table 1). The total number of incidents in 2019–20 was 64 (29.1%) more than in 2018–19 (220) but very close to the long-term average of 287.8 (Table 1).

The decline in serious injuries reported to Transport for NSW between 2018–19 and 2019–20 (33.9%) closely aligns with the 31.9% decline in boating serious injuries recorded by NSW Health over this period (345 in 2018–19, down to 235 in 2019–20).

**Table 1: Fatalities, serious injuries and related incident numbers for the 2019–20 financial year based on incidents reported to Transport for NSW<sup>14</sup>.**

Vessel category	Incident category				Total incidents
	Fatalities	Fatal incidents	Serious injuries	Serious injury incidents	
Recreational	25	20	29	21	177
Commercial	0	0	9	9	81
Commercial/recreational	0	0	1	1	26
<b>TOTAL</b>	25	20	39	31	284
<b>Change on 10 yr. av.</b>	+78.6%	+62.6%	-38.4%	-38.7%	+1.3%
<b>Average last 10 years*</b>	14.0	12.3	63.3	50.6	287.8

\* 10 year average includes 2019–20. 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

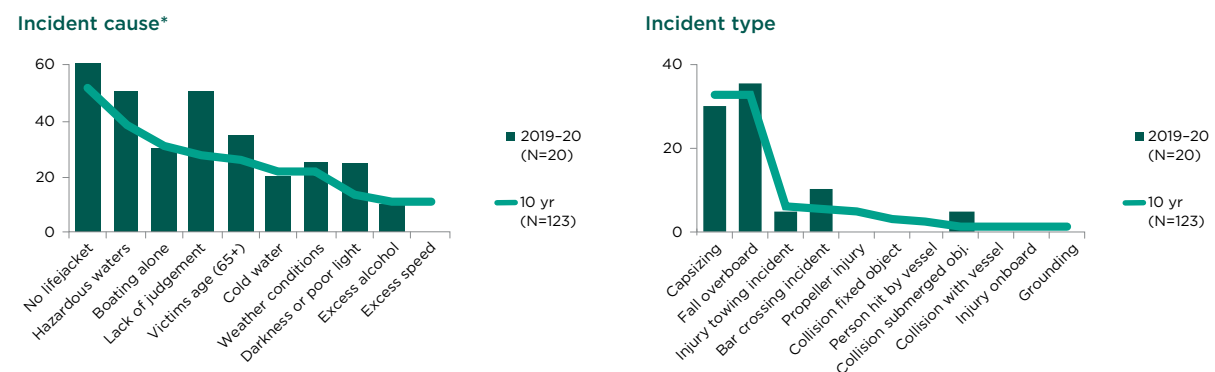


<sup>14</sup> Commercial vessel safety is managed by the Australian Maritime Safety Authority.

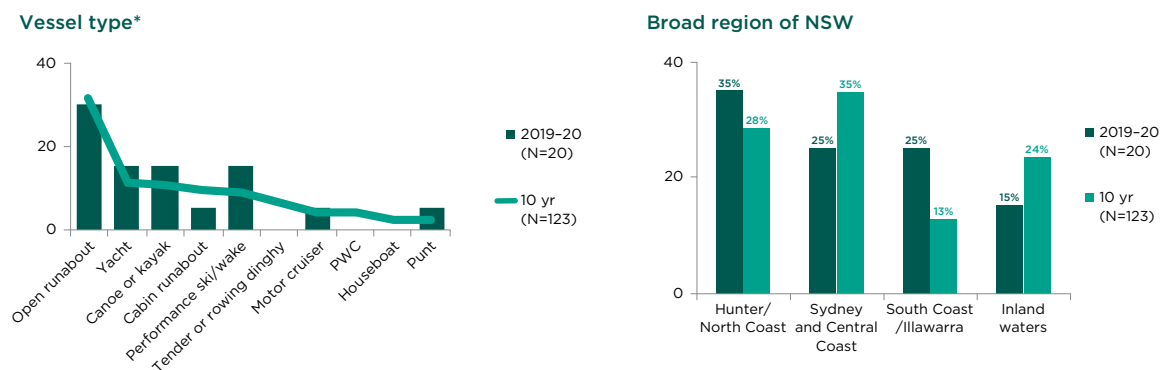
## 5 Fatalities in 2019–20

There were 25 boating fatalities in 2019–20 arising from 20 incidents<sup>15</sup>. The number of fatalities was significantly above the long-term (10 year) average of 14. Figure 1 provides key breakdowns in relation to the fatal incidents recorded in 2019–20 and compares these with the corresponding breakdowns for the 10 year period to 30 June 2020.

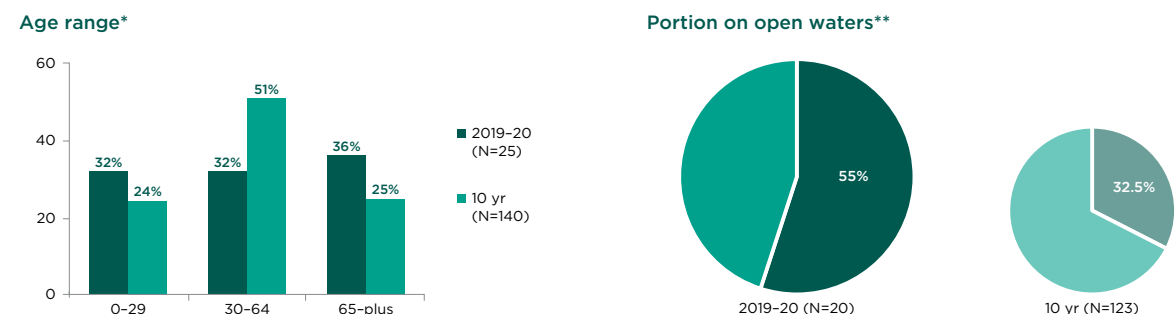
**Figure 1: Characteristics of fatal incidents and fatalities in 2019–20 and for the 10 year period to 30 June 2020. All data is based on percentages. 10 year data is shown in paler shading.**



\*Includes all likely contributory causes, as per Transport fatality records, and not just the major or secondary causes identified in Transport operational incident data. Most incidents have multiple causes.



\*Refers to the vessel on which the fatality victim was aboard or associated with at time of incident.



\*Age data relates to fatalities rather than fatal incidents, hence N=25 or 140. \*\*There is some indication that the proportion in 2019–20 is higher than that applicable over the whole 10 years<sup>16</sup>.

<sup>15</sup> Of the 20 fatal incidents in 2019–20, there were four that resulted in two or more fatalities (nine fatalities from the four incidents)

<sup>16</sup> Difference is statistically different at the P<0.1 level, but not at the P<0.05 level (Z-test of two proportions, P=0.099).



### Key statistics – fatal incidents and fatalities in 2019–20

- Key contributory factors to fatal incidents were lifejacket not worn/ functional (60%), hazardous waters (50%) and lack of judgement (50%).
- The mix of causes and other characteristics of the fatal incidents was similar to that applicable over the last 10 years, with any differences generally well within what one might expect from random variation when comparing one year's incidents to those of a 10 year period.
- However, there were signs of a higher than normal proportion of fatal incidents occurring on open (ocean) waters – 55% in 2019–20 versus 32.5% over 10 years.

The main incident types associated with these incidents were fall overboard (35%), capsizing (30%) and bar crossing incident (10%). In 30% of the fatal incidents in 2019–20, the victim(s) were on or associated with an open runabout. The next most prevalent vessel types – each 15% of incidents – were yachts, canoes and kayaks and high performance ski/ wake vessels.

In addition to the key breakdowns that are highlighted in Figure 1, the following key points also apply to the 20 fatal incidents in 2019–20 and the 123 such incidents over the 10 year period to 30 June 2020:

- Just six out of the 25 fatalities recorded in 2019–20 (i.e. 24%) 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 (23.6%).
- 'Preventable drownings' (cases where a person was presumed to have drowned and was not known to have been wearing a lifejacket) accounted for 17 (68%) of the fatalities in 2019–20. Over the 10 years, the corresponding figure was 84 fatalities (60%).
- 14 (56%) of the fatalities in 2019–20 occurred in circumstances where lifejacket wear was required under current rules. The corresponding 10 year figure is 68 (48.6%).
- Four (20%) of the fatal incidents in 2019–20 occurred at night, compared with 18 (14.6%) for the 10 years.
- 14 (56%) of the fatalities in 2019–20 were not skippering the associated vessel at the time of the incident. Skippers were known to have accounted for 10 fatalities (40%). The respective split for the 10 year period was 41.4% (58 fatalities) versus 47.1% (66 fatalities).
- 16 (80%) of the fatal incidents in 2019–20 involved people being forced into the water as a result of the incident. The corresponding figure over the 10 years was 102 (82.9%)

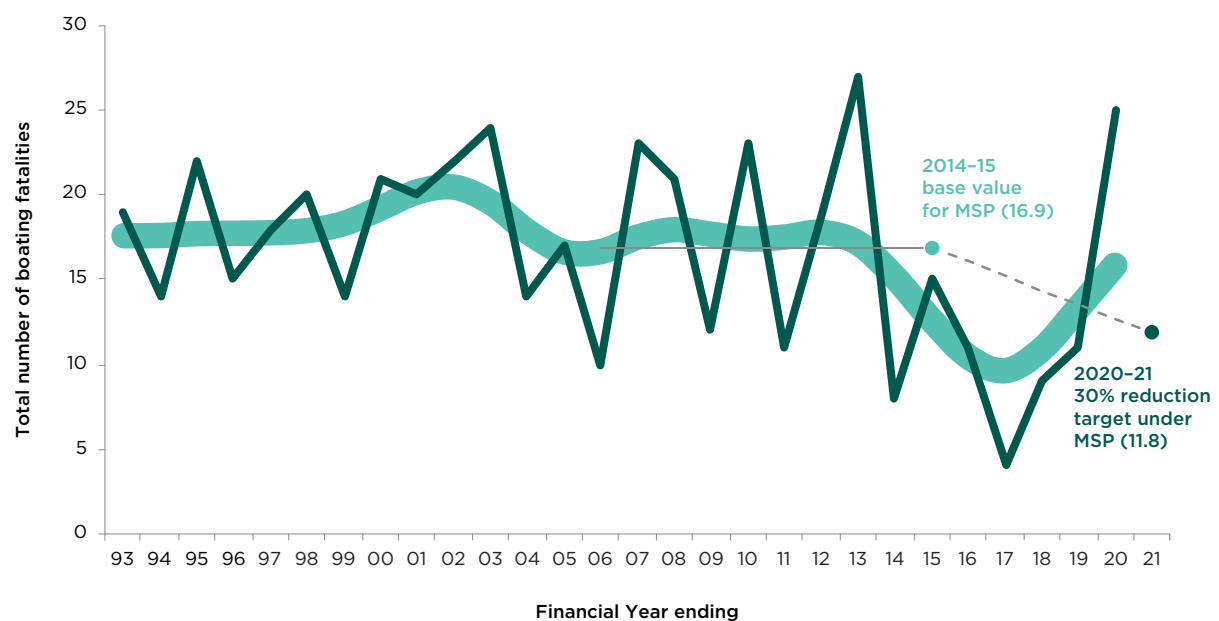


## 6 Latest trends with respect to Maritime Safety Plan targets

### 6.1 Fatalities

The number of fatalities in 2019–20 (25) was the highest total since 2012–13, and has reversed the recent downward trend that had been apparent over several years. The 25 fatalities arose from 20 separate incidents – one of which led to three fatalities and three of which led to two fatalities each. Based on data up to and including 2019–20, the number of fatalities is not on track to meet the Maritime Safety Plan 2017–2021 target of a 30 per cent reduction from the base value established in 2014–15 (11.8 – Figure 2). Fatalities in 2019–20 were well above the corresponding intermediate target of 12.7.

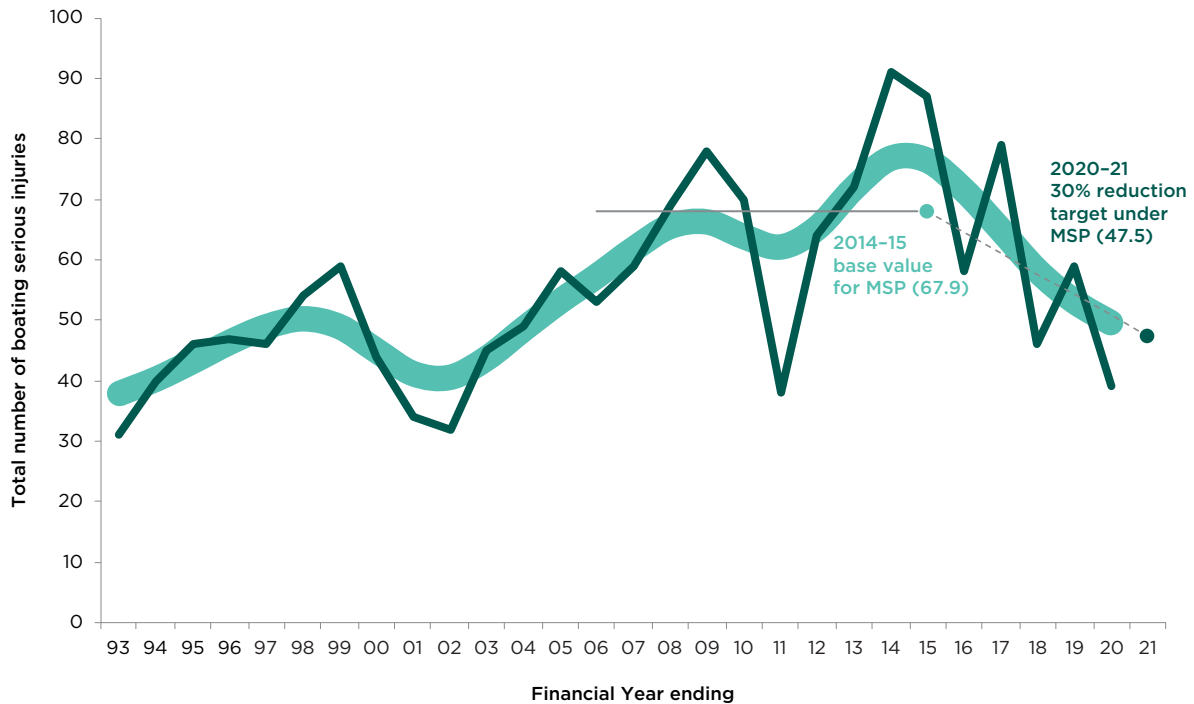
**Figure 2: Tracking of total boating fatalities against MSP target of a 30% reduction by 2020–21. Base value equals the 10 year average up to and including 2014–15. Pale curve is indicative of medium-term trends and is based on application of weighted five-year moving averages.**



## 6.2 Serious injuries

In recent years the overall number of boating serious injuries – based on Transport for NSW operational incident data – has been on a downward trend, and is now on track to meet the Maritime Safety Plan 2020–21 30 per cent reduction target (47.5 – Figure 3). The 39 serious injuries in 2019–20 was well below the corresponding intermediate target of 50.9.

**Figure 3: 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 39 boating serious injuries in NSW during 2019–20. However, based on long-term hospital records held by NSW Health<sup>17</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>18</sup>, and is therefore useful for tracking of overall trends in boating serious injuries.

<sup>17</sup> NSW Health hospital records for the 10 year period 2010–11 to 2019–20.

<sup>18</sup> There is a statistically significant correlation between the two sets of annual totals (Transport for NSW and NSW Health;  $r^2 = 0.57$ ;  $p < 0.01$ ; 13 d.f.). This means that changes in the overall total (NSW Health) are reflected in changes in the portion reported to Transport for NSW.

## 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 7.3). 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 2020 – 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 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>19</sup> is a key factor in the survival of boating incidents where persons are forced into the water<sup>20, 21</sup>.

Of these 79 lives that could potentially have been saved over the last 10 years (Figure 4), the vast majority (71) 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).

**Table 2: Summary of recreational drowning and lifejacket wear statistics for 2019–20, 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 who lifejacket wear status was unclear	
		Number	%	Number	%	Number	%	Number	%
2019–20	25	21	84.0	4	19.0	13	61.9	4	19.0
Last 10 years (2010–11 to 2019–20)	131	98	74.8	19	19.4	71	72.4	8	8.2

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 7.8 per 100,000 vessels in 1992–93 to 3.3 per 100,000 vessels in 2019–20 – a reduction of almost 60 per cent. However, 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, there has been a large increase in preventable recreational boating drownings in recent years and this increase has been more pronounced in relative terms than the increase in recreational boating incidents generally (Figure 4). The overall number of preventable drownings associated with recreational incidents in 2019–20 (17) was significantly greater than the long-term (10 year) annual average of 7.9 drownings.

Figure 4 also shows a clear distinction between the incident types related to drowning and non-drowning fatalities. The most prevalent incident types among fatalities where the person is presumed to have drowned (N=98) were capsizing/ sinking (43), falling overboard (32) and bar crossing incidents (8) – with associated lifejacket wear rates of 25.6, 6.3 and 37.5 per cent respectively. Among non-drowning fatalities (N=33), the most prevalent incident types were collisions of various types (10), towing related injuries (8) and falling overboard (5) – with associated lifejacket wear rates of 20.0, 100 and 0 per cent respectively.

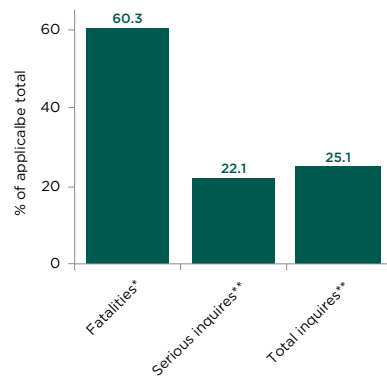
<sup>19</sup> Analysis of lifejacket related data, including drowning and non-drowning fatality, is based on Transport boating fatality records and on a lifejacket wear observational study (details in Figure 4).

<sup>20</sup> O'Connor, P. (2008) National Assessment of Boating Fatalities in Australia 1999 – 2004. Report prepared for the National Marine Safety Committee.

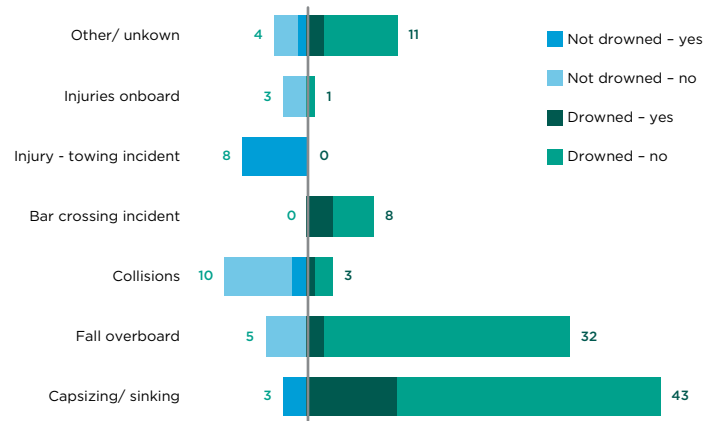
<sup>21</sup> Viauoux, C. and Gungor, A (2015) An Empirical Analysis of Life Jacket Effectiveness in Recreational Boating. Paper published in journal Risk Analysis.

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

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

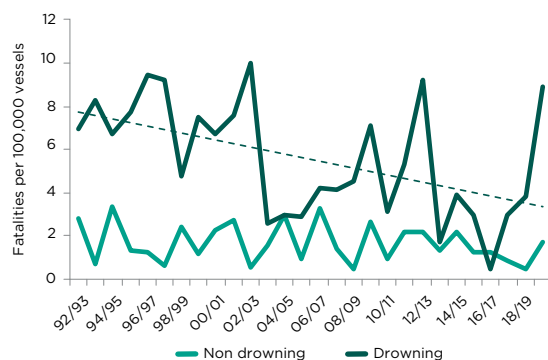


**Recreational fatalities by broad incident type, presumed drowning status and lifejacket wear\*\*\***

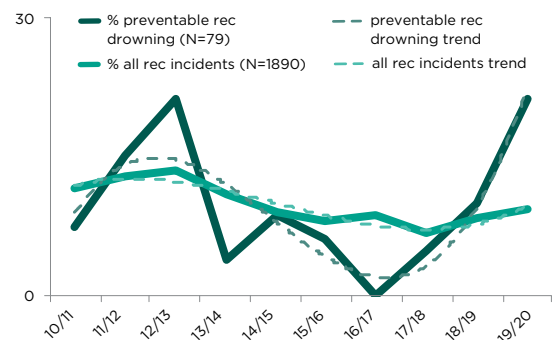


\*Preventable drownings (recreational boating incidents only). \*\* Based on 'forced in water' incidents (recreational only) – bar crossing, capsize, fall overboard and sinking. \*\*\* Lifejacket wear = "yes" where lifejacket was known to have been worn and functional; all other cases = "no". Incident type "Injuries onboard" includes falls and CO inhalation. Incident type "Collisions" includes all forms of collision, as well as persons hit by a vessel or its propeller.

**Long-term trends in drowning and non-drowning fatality rates for recreational boating incidents**



**Lifejacket related trend (prev. drownings) against general incident trend**



**Key statistics – lifejackets**

- More than 60% of all recreational boating fatalities over the last 10 years (79 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. 72.4%) were not wearing a lifejacket.
- Since the early 1990s the recreational vessel drowning fatality rate has declined by nearly 60%, without any significant change in the corresponding non-drowning fatality rate.
- Just 6.3% 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 5.4%.

## 7.2 Lack of judgement

Lack of judgement<sup>22</sup> was reported as major or secondary incident cause in association with 12 (9.8 per cent) of the 123 recreational and commercial fatal boating incidents recorded in the 10 years to 30 June 2020. Based on the incident reports, lack of judgement was also a likely contributory incident cause in association with a further 22 fatal boating incidents over this period (17.9 per cent) – meaning lack of judgement was a likely factor in 34 (27.6 per cent) of fatal boating incidents.

Lack of judgement was also reported as a major or secondary incident cause in association with 91 (18.0 per cent) of the 506 serious injury incidents recorded over the 10 years, and 582 (20.2 per cent) of the 2878 boating incidents overall.

In 2019–20, there were 10 fatal incidents for which lack of judgement was recorded as an incident cause. In eight of these cases, lack of judgement was deemed to be a contributory cause rather than a major or secondary cause.

Incidents related to lack of judgement have increased slightly in recent years, reversing a previous downward trend (Figure 5). The overall trend for lack of judgement incidents is similar to that for boating incidents generally. The overall number of incidents related to lack of judgement in 2019–20 (62) was statistically similar to the long-term (10 year) annual average of 58.2 incidents.

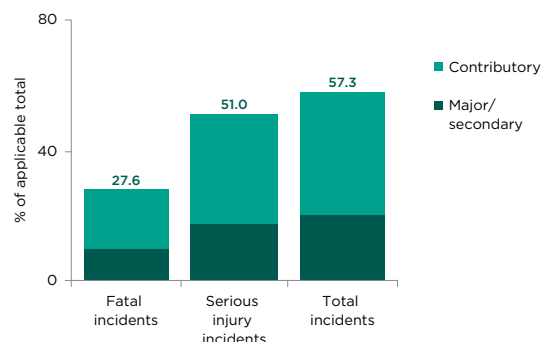
Incidents linked to a lack of judgement are highly seasonal, closely mirroring boating incidents generally (Figure 5). Nearly 30% (29.4%) occurred in December and January.



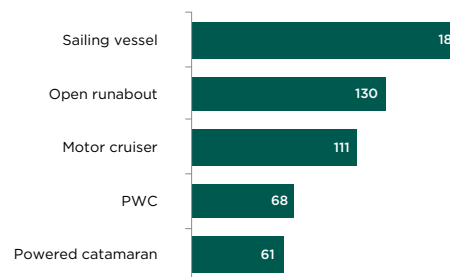
<sup>22</sup> Analysis of lack of judgement based on both Transport fatality records and Transport operational incident data.

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

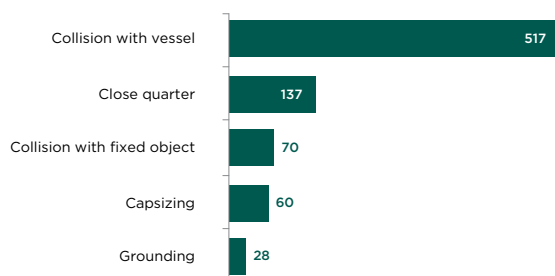
**Prevalence of judgement as an issue amongst key risk variables**



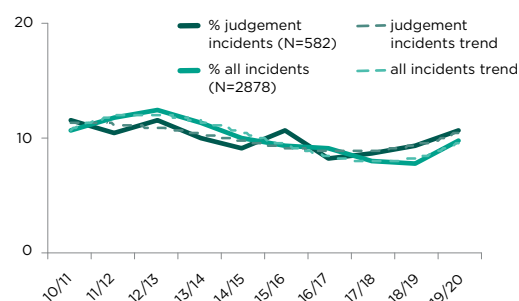
**Vessels involved in 'lack of judgement' incidents 2010-11 to 2019-20 (total = 927)**



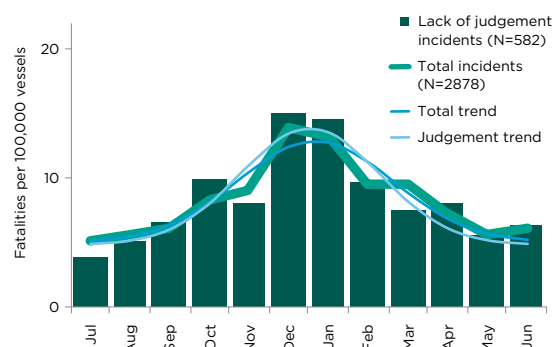
**Judgement – incident type records for incidents 2010-11 to 2019-20 (total = 983)**



**Judgement related trend against general incident trend**



**Seasonal patterns in judgement related incidents 2010-11 to 2019-20**



**Lack of judgement 'hot spots' over 10 years**

Location/ area	Incidents
Syd. Harb. — Sydney Cove/ east of Bridge	26
Syd. Harb. — Darling Harbour/ Rozelle Bay	22
Syd. Harb. — Farm Cove to Garden Island	19
Murray River — Moama to Torrumbury	16
Sydney Harbour — Heads	16
Average*	0.7

\*average of the 862 Aquatic Management Areas in NSW

### Key statistics – lack of judgement

- Lack of judgement was a likely factor in more than 1 in 4 (27.6%) of fatal boating incidents.
- Half (50%) of the fatal incidents in 2019-20 had lack of judgement as a likely factor.
- More than half (52.6%) of the incident – vessel records over the last 10 years related to lack of judgement involved a collision with another vessel.
- Almost 1 in 5 (19.5%) of the vessels involved in incidents related to lack of judgement were sailing vessels. Nearly 1 in 7 (14.0%) were open runabouts.



### 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.

Recreational boating fatalities affect all age groups (Figure 6). The largest number of fatalities over the 10 year period to 30 June 2020 involved people in the 40–49 year age class (16.8 per cent) and the 50–59 year age class (16.0 per cent). 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 is 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 21.4 per cent of all recreational boating fatalities, which was significantly greater than their 8.2 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>23</sup> Boater age – particularly in terms of boaters aged 70 or older – is clearly an important issue.

The long-term trend in the number of recreational boating fatalities aged 70 and above has closely followed that for all recreational boating fatalities, with a large increase in the last few years. The number of recreational fatalities aged 70 or greater in 2019–20 (6) was statistically greater than the long-term (10 year) annual average of 2.8 such fatalities.

Most recreational boating fatalities are male (87.8 per cent, or more than 7 out of 8). The proportion of females among recreational boating fatalities was highest in the 0–19 age group (38.5%). Males were also heavily over-represented in boating serious injuries according to NSW Health hospital data (70.6% versus 29.4%). The proportion of females among boating serious injuries was also relatively high in the 0–19 age group (37.2%) but even higher in the 80-plus age group (47.8%).

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).

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 (4.3 per cent of serious injuries versus 1.2 per cent of licences). When all boaters aged 70 and above are considered, the over-representation is still statistically significant (12.0 per cent versus 8.2 per cent), though not for the age group 70–79 when considered alone (7.7 per cent versus 7.0 per cent).

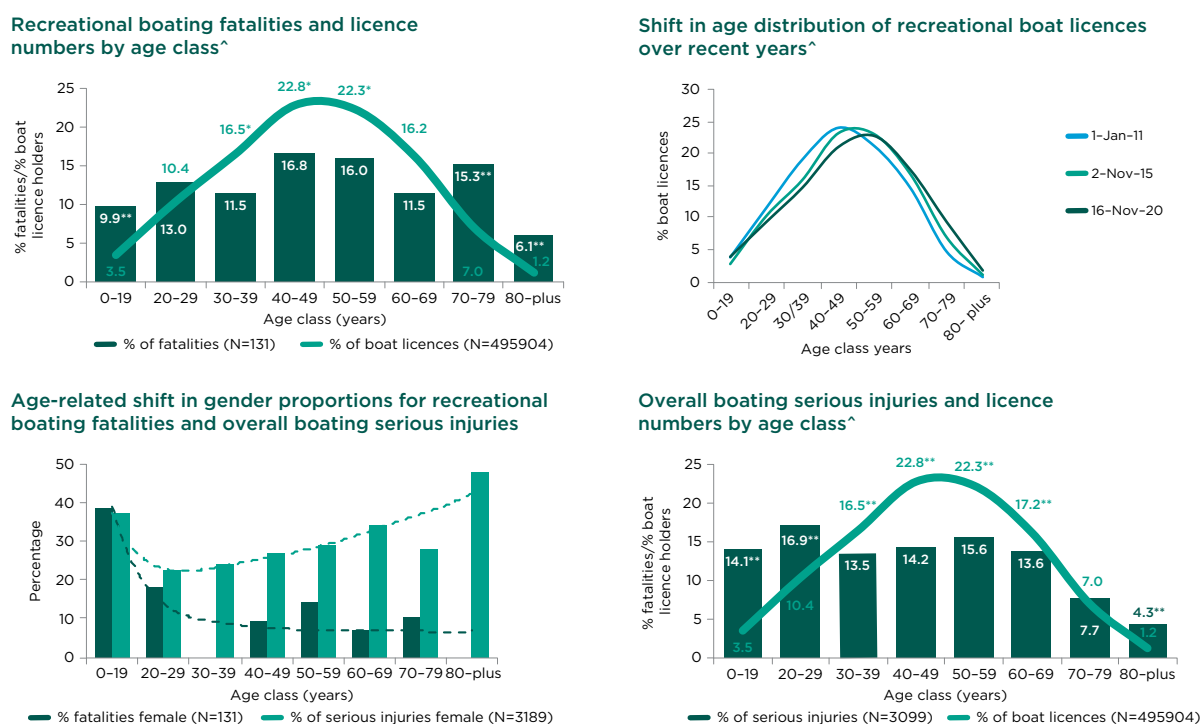
---

23 NSW Health hospital records for the period 2010–11 to 2019–20 (December 31), including both recreational and commercial boating serious injuries.

Over the 10 year period to 30 June 2020, younger people (those under 30) were heavily over-represented in serious injuries, accounting for 31.0 per cent of these injuries but only 13.9 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 16.9 per cent of serious injuries, a much higher proportion than the corresponding percentage of licences held (10.4).

Figure 6 provides a snapshot of key data and statistics related to boater age. In addition to the points discussed above, it shows that the age-distribution of licence holders has progressively shifted to the right in recent years. In the period from 1 January 2011 to 16 November 2020, the number of boat licences held by people aged 70 and above has increased by 120.9%, while the numbers held by younger boaters have remained relatively steady (up by just 7.4% for people aged 30–69 and down by 5.2% for people aged under 30).

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



\*\*Difference in proportions statistically significant<sup>24</sup>; \*difference just outside statistical significance<sup>25</sup>. <sup>^</sup>Licence numbers based on average of representative dates across the 10 year period – 1 Jan 2011, 2 Nov 2015 and 20 Dec 2019. Serious injury data (NSW Health) covers first half of 2019–20 and was extrapolated to whole Financial Year for better comparison with fatality data.

### Key statistics – boater age

- Boaters aged 70 and above accounted for more than 1 in 5 (21.4%) of recreational boating fatalities but accounted for only about 1 in 12 (8.2%) of boat licences.
- Boaters aged 70 and above are also over-represented in terms of serious injuries, accounting for nearly 1 in 8 (12.0%) 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 more than 1 in 6 (16.9%) of serious injuries but approximately 1 in 10 (10.4%) of boat licences.
- The age of boating participants appears to be increasing; in a period of just under 10 years, the modal age of boat licence holders has increased by approximately seven years.

24  $P < 0.05$ , Z test of two proportions.

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

## 7.4 Cold water

'Cold water'<sup>26</sup> means water cold enough to be dangerous to a person who is forced into the water without protective garments (such as wetsuit). Exactly what is 'cold' depends 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>27</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).

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 was 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			
<ul style="list-style-type: none"> <li>• Bar crossing incident</li> <li>• Capsizing</li> <li>• Fall overboard</li> <li>• Sinking</li> </ul>			
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 2020.

<sup>26</sup> Analysis of cold water incidents based on both Transport fatality records and Transport operational incident data.

<sup>27</sup> <http://www.coldwatersafety.org/WhatIsCold.html>

Cold waters (as defined above in Table 3) were associated with 28 (22.8 per cent) of the 123 recreational and commercial fatal boating incidents recorded over the 10 years to 30 June 2020. They were associated with much lower proportions of serious injury and total incidents (4.7 per cent and 5.5 per cent respectively).

Alpine waters accounted for three fatal incidents and four serious injury incidents over the 10 years to 30 June 2020 – 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 (21.7 per cent). 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.

Cold water incidents have increased slightly in recent years, reversing a previous downward trend (Figure 7). 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 2019–20 (15) was statistically similar to the long-term (10 year) annual average of 15.9 incidents.

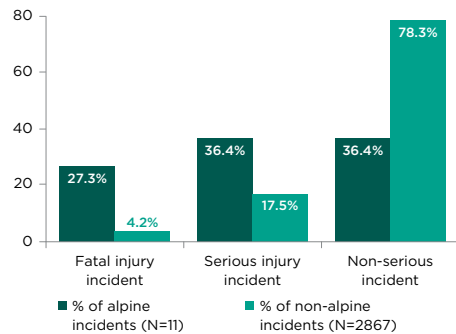
While Figure 7 shows that most ‘cold water’ incidents occurred in the winter months (June–August; 65.4%), a considerable proportion occurred in spring (September – November; 28.9%). Figure 7 also shows that ‘cold water’ incidents have occurred across a wide variety of coastal and inland waterways and not just in the State’s south – the waterway with the greatest number was Sydney Harbour (15 incidents).



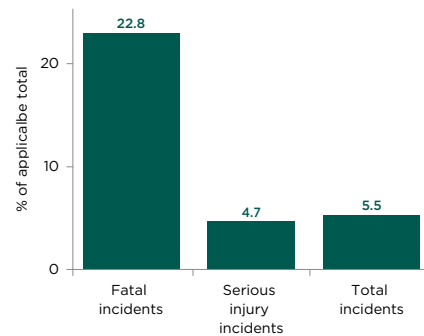


**Figure 7: Priority safety area – cold water – at a glance**

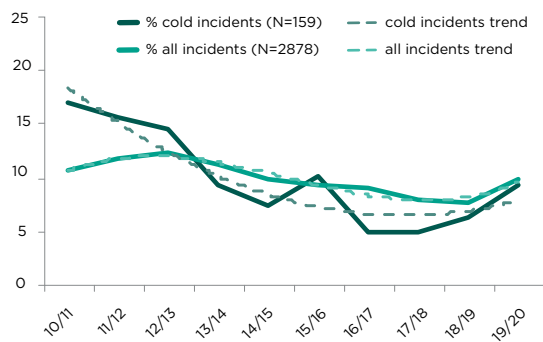
**Prevalence of fatal, serious injury and non-serious incidents for alpine and non alpine waters**



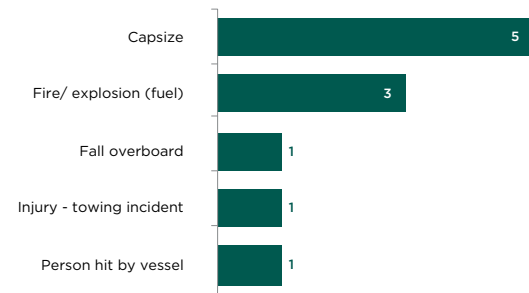
**Prevalence of cold water as an issue amongst key risk variables**



**Cold water incident trend against general incident trend**



**Vessel - incident type records – alpine waters incidents 2010-11 to 2019-20 (total = 11)**

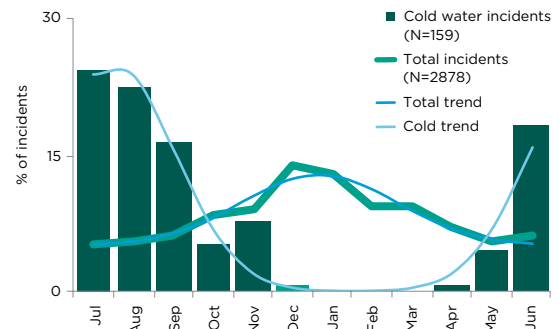


**Cold water incidents 'hot spots' over 10 years**

Waterway	Incidents
Sydney Harbour	15
Murray River	10
Batemans Bay	7
Brisbane Water	6
Lake Macquarie	6
Average*	1.6

\*indicative only, based on an estimated 100 major 'waterways' in NSW and number of cold water incidents

**Seasonal patterns in 'cold water' incidents 2010-11 to 2019-20**



### Key statistics – cold water

- Cold waters were associated with nearly 1 in 4 (22.8%) of fatal boating incidents.
- However, cold waters were associated with only about 1 in 21 serious injury incidents and 1 in 18 overall boating incidents.
- Alpine waters are particularly cold. Vessel capsizes and people falling overboard accounted for more than half (54.5%) of the associated incident records on alpine waters.
- Cold water incidents can occur almost anywhere in the state and, over the last 10 years, nearly 1 in 3 (28.9%) occurred in spring.

## 7.5 Weather conditions

Weather conditions<sup>28</sup> were reported as a major or secondary incident cause in association with 17 (13.8 per cent) of the 123 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2020. Weather conditions were also a likely contributory incident cause in association with a further 10 fatal boating incidents over this period (8.1 per cent) – meaning that weather conditions were a likely factor in 27 (22.0 per cent) 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 – 51 incidents (41.5 per cent 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% 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 32 (6.3 per cent) of the 506 serious injury incidents recorded over the 10 years, and 379 (13.2 per cent) of the 2878 boating incidents overall. Based on the data available for fatal incidents, it is estimated that weather conditions were at least a contributory factor in 10.9 per cent of serious injury incidents and 20.9 per cent of total incidents over the 10 year period.

In 2019–20, weather conditions were directly associated with five out of the 20 fatal incidents (25 per cent).

Weather related incidents had been trending downwards until a sharp reversal in 2019–20 (Figure 8). In relative terms, the increase in incidents attributed to weather conditions between 2018–19 and 2019–20 (108.3%) was significantly more pronounced than that for boating incidents generally (29.1%). The overall number of incidents related to weather conditions in 2019–20 (50) was significantly greater than the long-term (10 year) annual average of 37.9 incidents.

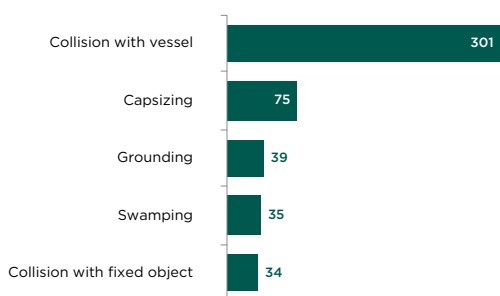
Weather related incidents occur on a variety of sheltered and exposed waterways (Figure 8).



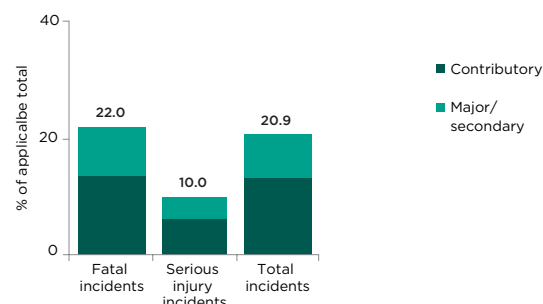
<sup>28</sup> Analysis of weather conditions based on both Transport fatality records and Transport operational incident data.

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

**Weather – incident type records for incidents 2010-11 to 2019-20 (total = 586)**

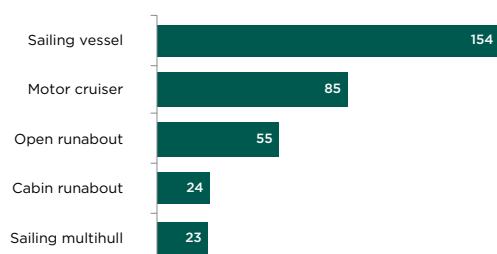


**Prevalence of weather as a cause amongst key risk variables\***

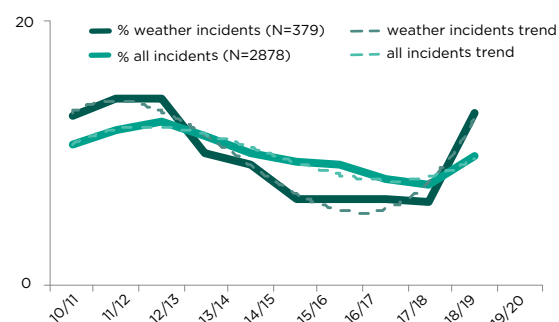


\*Major/ secondary and contributory cause numbers for fatalities are based on Transport fatality records and may differ slightly from operational data due to reclassifications affecting related causes including weather conditions and hazardous waters. Contributory cause numbers for serious injury and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

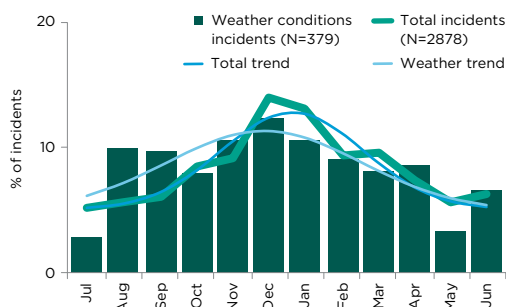
**Vessels involved in 'weather conditions' incidents 2010-11 to 2019-20 (total = 545)**



**Weather related trend against general incident trend**



**Seasonal patterns in weather related incidents 2010-11 to 2019-20**



**Weather incident 'hot spots' over 10 years**

Location/ area	Incidents
Syd. Harb. – Darling Harbour/ Rozelle Bay	11
Port Stephens – central	11
Mid east Lake Macquarie	9
Sydney Harbour – north of Point Piper	9
Port Stephens – east	9
Average*	0.4

\*average of the 862 Aquatic Management Areas in NSW

**Key statistics – weather conditions**

- Weather conditions were a likely factor in more than 1 in 5 (22%) 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.
- 32.5% (i.e. just under 1 in 3) of vessels involved in weather-related incidents were sailing vessels.
- Weather related incidents occur all year, but are relatively common in August and September (nearly 20% occurred in these two months alone).

## 7.6 Personal watercraft

PWC<sup>29</sup> were involved in five (4.3 per cent) of the 115 recreational fatal boating incidents recorded in the 10 years to 30 June 2020.

PWC were involved in 66 (16.8 per cent) of the 394 recreational serious injury incidents recorded over the same period. PWC were also involved in 175 (9.3 per cent) of the 1890 recreational boating incidents recorded overall.

Based on the proportion of registered recreational vessels that were PWC during this period (3.9 per cent at the end of 2010–11, increasing to 6.6 per cent at the end of 2019–20 and averaging around 5 per cent over the period), PWC are heavily over-represented in overall recreational boating incidents and especially in recreational boating serious injury incidents. In addition, PWC feature in a high percentage of complaints<sup>30</sup>.

In 2019–20, there were no fatality incidents involving a PWC, however, there was one recreational serious injury incident.

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 (Figure 9). However there has been a steep decline over the last few years, at a time when overall recreational boating incidents have risen. Also, 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 fallen significantly over the last eight years.

In 2019–20, the overall rate of recreational boating incidents involving a PWC was 38.2 incidents per 100,000 registered PWC, which was significantly below the long-term (10 year) average of 155.7. Similarly, the corresponding rate for serious injury incidents (6.4 incidents per 100,000 registered PWC) was significantly below the long-term average of 59.2. Similar results for 2019–20 were also achieved with actual PWC incident numbers – with total incidents involving a PWC (6) being significantly below the long-term average (17.5) and the reported number of serious injury incidents involving a PWC (1) being significantly below the long-term average of 6.6.

Recreational incidents involving a PWC are highly seasonal, with a pronounced summer maximum (Figure 9). December and January together accounted for 42.3% of the incidents.

Figure 9 also shows that PWC related incidents are concentrated in the Botany Bay/ Port Hacking area (33.7% of state total), the Hawkesbury River/ Broken Bay area (18.9%) and Murray Inland region (16.6%).



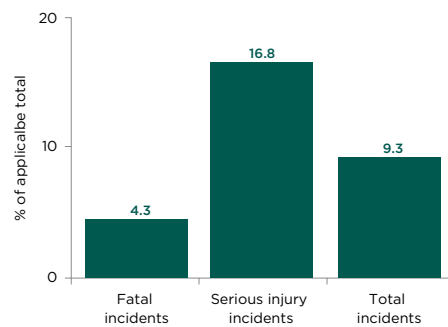
<sup>29</sup> Analysis of PWC incidents based on both Transport fatality records and Transport operational incident data.

<sup>30</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.

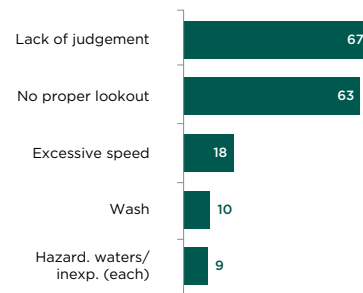


**Figure 9: Priority safety area – Personal Watercraft – at a glance**

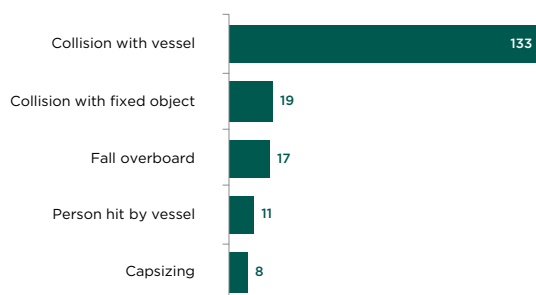
**Prevalence of PWC as an issue amongst key risk variables**



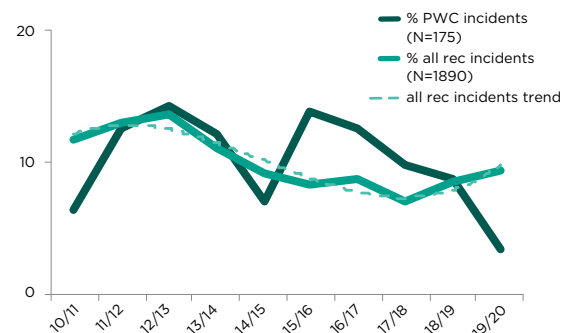
**PWC – incident cause records for rec. incidents 2010-11 to 2019-20 (total = 262)**



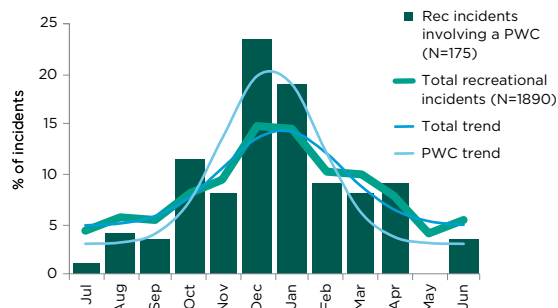
**PWC – incident type records for rec. incidents 2010-11 to 2019-20 (total = 235)**



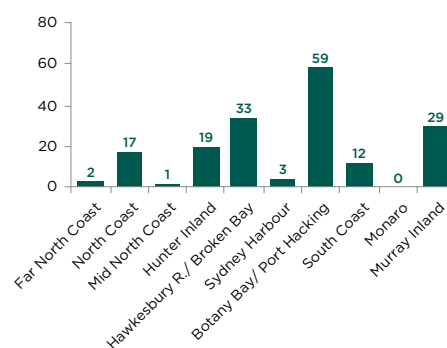
**PWC related trend against general incident trend**



**Seasonal patterns in rec. incidents involving a PWC 2010-11 to 2019-20**



**Number of PWC-related rec incidents by region 2010-11 to 2019-20**



### Key statistics – Personal Watercraft (PWC)

- PWC were involved in just over 1 in 6 (16.8%) of recreational serious injury incidents. However, they accounted for only about 1 in 20 (5%) of recreational vessel registrations over the last 10 years.
- Despite this over-representation across the last 10 years, the number of reported incidents and serious injuries related PWC in 2019-20 was relatively low.
- The main contributory causes associated with incidents involving a PWC was lack of judgement (25.6%) and no proper lookout (24.0%).
- Collisions with another vessel was by far the most common incident type associated with PWC – accounting for more than half (56.6%) of related records.

## 7.7 Towing activities

Incidents involving towing activities<sup>31</sup> are generally recorded in the Transport operational database as “injury – towing incident”. Towing activities include water skiing, wakeboarding and aquaplaning.

All of the towing incidents recorded over the 10 years to 30 June 2020 were recreational boating incidents. Towing accounted for 15 (13.0 per cent) of the 115 recreational fatal boating incidents recorded over this period<sup>32</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.

The incident type “injury – towing incident” also accounted for 53 (13.5 per cent) of the 394 recreational serious injury incidents and 67 (3.5 per cent) of the 1890 recreational boating incidents overall recorded over the 10 year period. The actual number of serious injury incidents and overall boating incidents related to towing is likely to have been considerably higher than the figures quoted here, due to the likelihood that some towing-related incidents were recorded under incident types such as “collision with vessel” or “propeller injury”.

In 2019–20, there were three fatal incidents involving towing activities. In addition, three serious injury incidents were recorded under incident type “injury – towing incident”.

The overall number of incidents recorded as towing incidents in 2019–20 (4) was significantly less than the long-term (10 year) annual average of 6.7 incidents. However, the relative number of towing incidents has not fallen significantly over the 10 year period (Figure 10).

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 89.6% of such incidents (versus 66.9% for all recreational incidents). January alone accounted for 35.8% (versus 14.6%).

Towing incidents overwhelmingly occurred on coastal rivers and on inland waterways (Figure 10). The Murray River accounted for 23 incidents (34.3% of total), while the Hawkesbury and Nepean Rivers accounted for 12 incidents (17.9%).

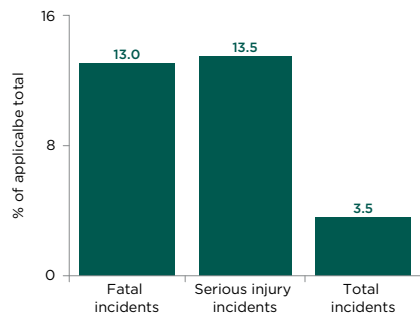


31 Analysis of towing incidents based on both Transport fatality records and Transport operational incident data.

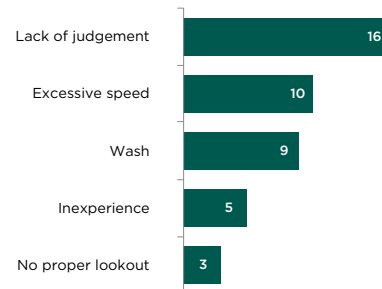
32 Total includes eight incidents that were recorded under incident type “injury – towing incident” in Transport operational incident data, as well as seven other incidents clearly related to towing activities based on Transport fatality records.

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

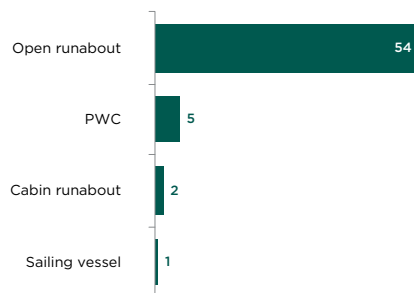
**Prevalence of towing incidents as an issue amongst key risk variables**



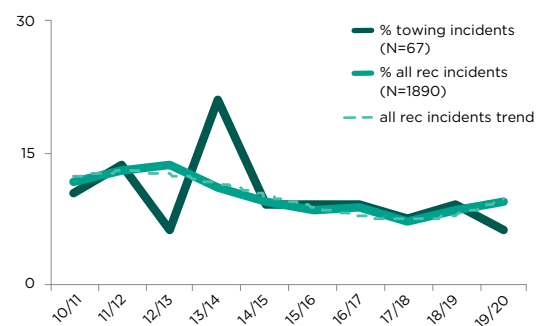
**Towing – incident cause records for incidents 2010-11 to 2019-20 (total = 79)**



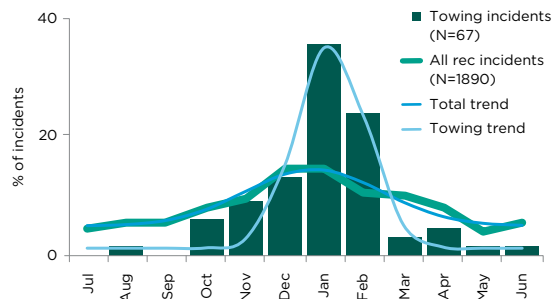
**Vessels involved re 'towing injury' incidents 2010-11 to 2019-20 (total = 72)**



**Towing related trend against general incident trend**



**Seasonal patterns in towing incidents versus all rec incidents 2010-11 to 2019-20**



**Towing incident areas over 10 years**

Waterway	Incidents
Murray River near Moama	13
Murray River (other)	10
Hawkesbury/ Nepean River	12
Wyangala Dam	4
Botany Bay/ Georges River	3
Average*	0.7

\*indicative only, based on an estimated 100 major 'waterways' in NSW

### Key statistics – towing

- Towing activities accounted for more than 1 in 8 (13.0%) of fatal recreational boating incidents.
- The main contributory cause linked to towing incident records were lack of judgement (20.0%), excessive speed (12.7%) and wash (11.4%).
- Three quarters (75.0%) of the vessels involved in towing incidents were open runabouts.
- Nearly 9 out of 10 (89.6%) of towing incidents occurred in the November to April period.

## 7.8 Excess alcohol

Excess alcohol<sup>33 34</sup> was reported as a major or secondary incident cause in association with 10 (8.1 per cent) of the 123 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2020. Excess alcohol was also a likely contributory incident cause in association with a further 4 fatal boating incidents over this period (3.3 per cent) – meaning that excess alcohol was a likely factor in 14 (11.4 per cent) of fatal boating incidents.

Excess alcohol was also reported as a major or secondary incident cause in association with 18 (3.6 per cent) of the 506 serious injury incidents recorded over the 10 years, and 50 (1.7 per cent) of the 2878 boating incidents overall.

In 2019–20, there were two fatal incidents associated with excess alcohol.

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 (Figure 11). The overall number of incidents related to excess alcohol in 2019–20 (4) was similar to the long-term (10 year) annual average of 5.0 incidents.

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 nearly three quarters of such incidents (74.0%).



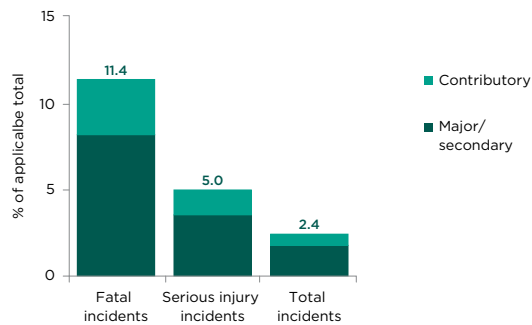
<sup>33</sup> Analysis of excess alcohol based on both Transport fatality records and Transport operational incident data.

<sup>34</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).

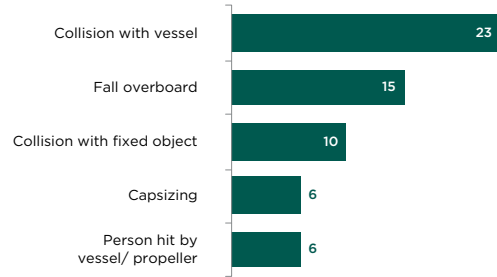


**Figure 11: Priority safety area – excess alcohol – at a glance**

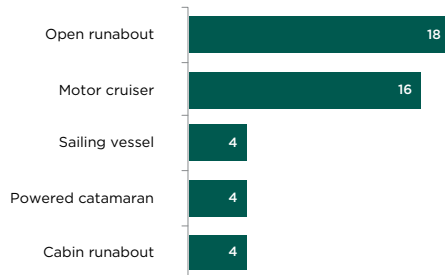
**Prevalence of alcohol as an issue amongst key risk variables**



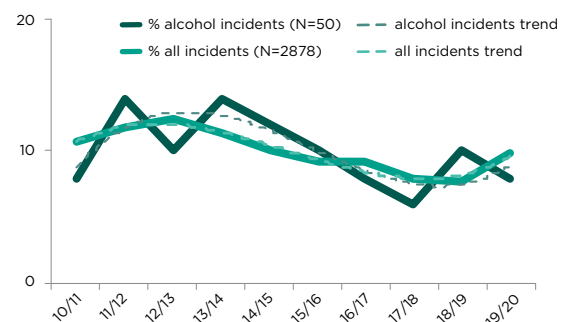
**Alcohol – incident type records for incidents 2010-11 to 2019-20 (total = 75)**



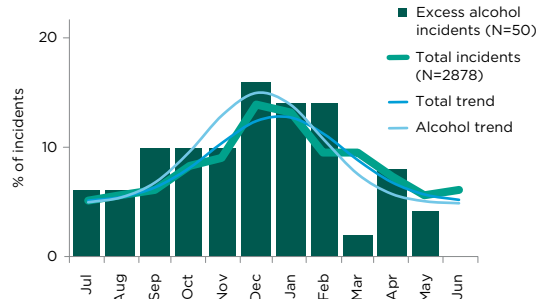
**Vessels involved in 'excess alcohol' incidents 2010-11 to 2019-20 (total = 67)**



**Alcohol – related trend against general incident trend**



**Seasonal patterns in alcohol related incidents 2010-11 to 2019-20**



**Alcohol incident areas over 10 years**

Waterway	Incidents
Sydney Harbour	10
Murray River	4
Hawkesbury/ Nepean River	3
Pittwater	3
Tuggerah Lakes/ Wyong River	3
Average*	0.5

\*indicative only, based on an estimated 100 major 'waterways' in NSW

### Key statistics – excess alcohol

- Excess alcohol was a likely factor in more than 1 in 9 (11.4%) of fatal boating incidents.
- Nearly 1 in 3 (30.7%) of incident – vessel records associated with excess alcohol over the last 10 years involved a collision with another vessel.
- 1 in 5 (20%) of such records involved falls overboard and more than 1 in 8 (13.3%) involved a collision with a fixed object.
- More than 1 in 4 (26.9%) of the vessels involved in excess alcohol incidents were open runabouts. Nearly 1 in 4 (23.9%) were motor cruisers.

## 7.9 Paddle craft

Paddle craft<sup>35</sup> include canoes, kayaks and dragon boat type craft. They were involved in 14 (11.4 per cent) of the 123 fatal boating incidents recorded in the 10 years to 30 June 2020. All of these fatal incidents were recreational boating incidents. Paddle craft were involved in 8 (1.6 per cent) of the 506 serious injury incidents and 52 (1.8 per cent) of the 2878 overall boating incidents recorded over the 10 years.

In 2019–20, there were three fatal incidents involving paddle craft.

There has been no significant trend in the number of paddle craft involved in boating incidents (Figure 12) and the number of paddle craft involved in incidents in 2019–20 (5) was approximately equal to the long-term (10 year) annual average of 5.2 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. In the absence of long-term data on usage or even vessel numbers, it is impossible to say whether paddle craft safety being maintained, getting worse or even improving.

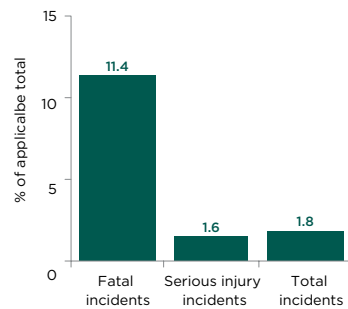
Incidents involving paddle craft tend to be seasonal, with most in the late spring to summer period (Figure 12). The four month period October to January accounted for 58.0% of such incidents. Figure 12 also shows that incidents involving paddle craft occurred on both coastal and inland waterways.



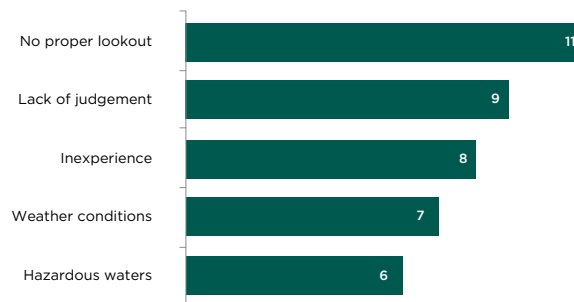
<sup>35</sup> Analysis of paddle craft incidents based on both Transport fatality records and Transport operational incident data.

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

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

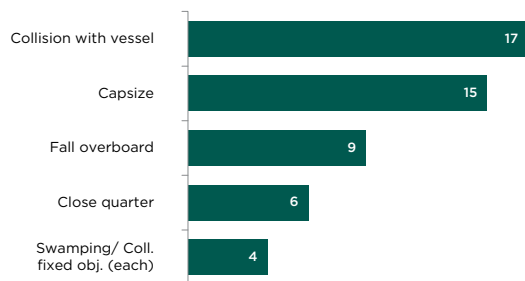


**Paddle craft – incident cause records for incidents 2010–11 to 2019–20 (total = 62)**

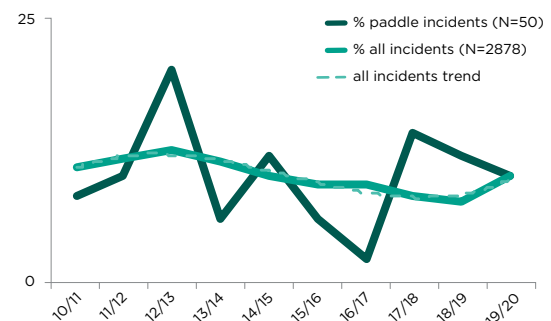


\*Based on a total of 52 incidents involving paddle craft, as graph includes data for 2 fatalities known to be related to paddle craft but not specified as such in the Tableau data used to construct the remaining graphs on this page.

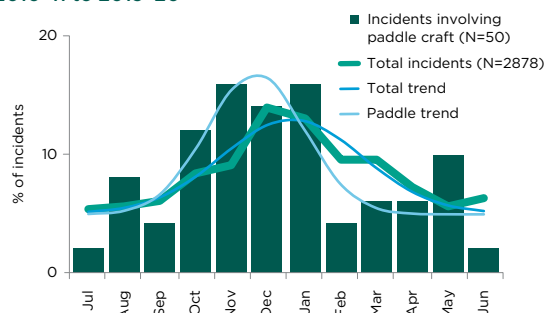
**Paddle craft - incident type records for incidents 2010–11 to 2019–20 (total = 60)**



**Paddle craft related trend against general incident trend**



**Seasonal patterns in incidents involving a Paddle craft 2010–11 to 2019–20**



**Paddle craft incident areas over 10 years**

Waterway	Incidents
Sydney Harbour	10
Murray River	7
Port Hacking	2
All other waterways (each)	0-1
Average*	0.5

\*indicative only, based on an estimated 100 major 'waterways' in NSW and number of paddle craft involved in incidents

**Key statistics – paddle craft**

- Paddle craft were involved in more than 1 in 9 (11.4%) of fatal boating incidents.
- No proper lookout was the most common cause associated with paddle craft incidents, accounting for 17.7% of related incident records. This was followed by lack of judgement (14.5%) and inexperience (12.9%).
- The most common incident types associated with paddle craft were collisions with another vessel (28.3% of records) and vessel capsizing (25.0%). Together, these incident types accounted for more than half of all related records.
- Anecdotal evidence points to a large increase in paddle craft numbers in recent years.



## 7.10 Excessive speed

Excessive speed <sup>36</sup> was reported as a major or secondary incident cause in association with 9 (7.3 per cent) of the 123 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2020. Excessive speed was also a likely contributory incident cause in association with a further 5 fatal boating incidents over this period (4.1 per cent) – meaning that excessive speed was a likely factor in 14 (11.4 per cent) of fatal boating incidents.

Excessive speed was also reported as a major or secondary incident cause in association with 44 (8.7 per cent) of the 506 serious injury incidents recorded over the 10 years, and 113 (3.9 per cent) of the 2878 boating incidents overall.

In 2019–20, there were no fatal incidents associated with excessive speed.

Incidents related to excessive speed are not showing any clear long-term trend (Figure 13). In relative terms, the increase in incidents attributed to excessive speed between 2018–19 and 2019–20 was similar to that for incidents generally. The overall number of incidents associated with excessive speed in 2019–20 (12) was statistically similar to the long-term (10 year) annual average of 11.3 incidents.

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).

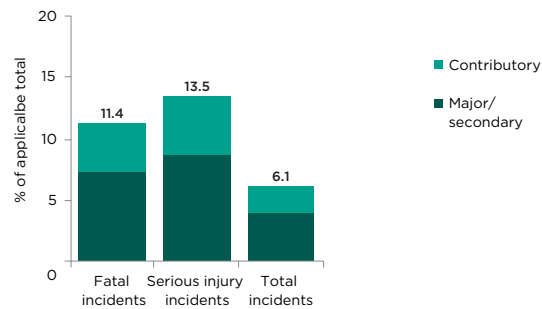


<sup>36</sup> Analysis of excessive speed based on both Transport fatality records and Transport operational incident data.

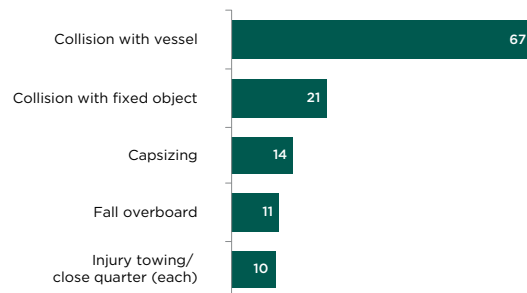


**Figure 13: Priority safety area – excessive speed – at a glance**

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

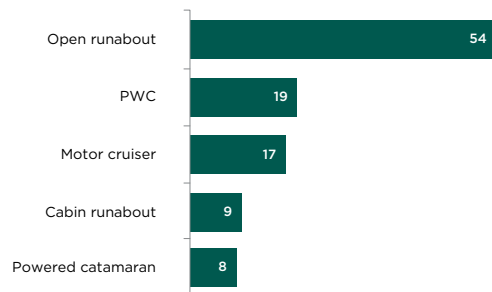


**Speed – incident type records for incidents 2010-11 to 2019-20 (total = 181)**

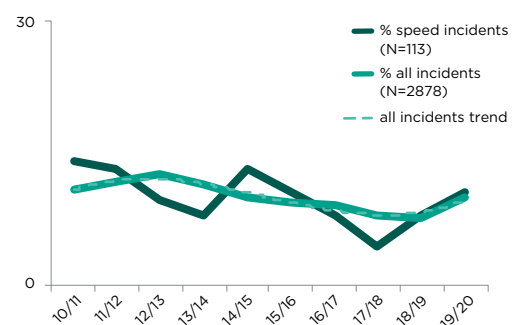


\*Contributory cause numbers for serious injury and total incidents are estimates based on proportion for fatal incidents.

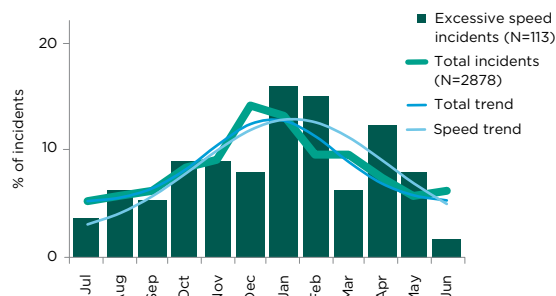
**Vessel involved in 'excessive speed' incidents 2010-11 to 2019-20 (total = 164)**



**Speed-related trend against general incident trend**



**Seasonal patterns in speed related incidents 2010-11 to 2019-20**



**Speed incident areas over 10 years**

Waterway	Incidents
Sydney Harbour	26
Hawkesbury/ Nepean River	11
Murray River	10
Georges River	8
Botany Bay	6
Average*	1.1

\*indicative only, based on an estimated 100 major 'waterways' in NSW

**Key statistics – excessive speed**

- Excessive speed was a likely factor in more than 1 in 9 (11.4%) of fatal boating incidents.
- Excessive speed is closely associated with the issue of “no proper lookout” (Section 7.11). Five of the 14 fatal boating incidents associated with excessive speed (35.7%) were also associated with not keeping a proper lookout.
- More than 1 in 3 (37.0%) of incident – vessel records associated with excessive speed over the last 10 years involved a collision with another vessel.
- Nearly 1 in 3 (32.9%) of the vessels involved in excessive speed incidents were open runabouts.

## 7.11 No proper lookout

No proper lookout<sup>37</sup> was reported as a major or secondary incident cause in association with 6 (4.9 per cent) of the 123 fatal recreational and commercial boating incidents recorded in the 10 years to 30 June 2020. No proper lookout was also a likely contributory incident cause in association with a further 2 fatal boating incidents over this period (1.6 per cent) – meaning that no proper lookout was a likely factor in 8 (6.5 per cent) of fatal boating incidents.

No proper lookout was also reported as a major or secondary incident cause in association with 65 (12.8 per cent) of the 506 serious injury incidents recorded over the 10 years, and 400 (13.9 per cent) of the 2878 boating incidents overall.

In 2019–20, there were no fatal incidents associated with the lack of a proper lookout.

Incidents related to the lack of a proper lookout had been trending downwards until a reversal in 2019–20 (Figure 14). In relative terms, the increase in incidents attributed to no proper lookout between 2018–19 and 2019–20 was not significantly greater than that for incidents generally. The overall number of incidents associated with the lack of a proper lookout in 2019–20 (43) was statistically similar to the long-term (10 year) annual average of 40.0 incidents.

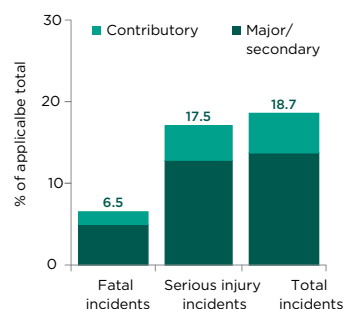
Many parts of Sydney Harbour recorded relatively high numbers of lookout incidents (Figure 14).



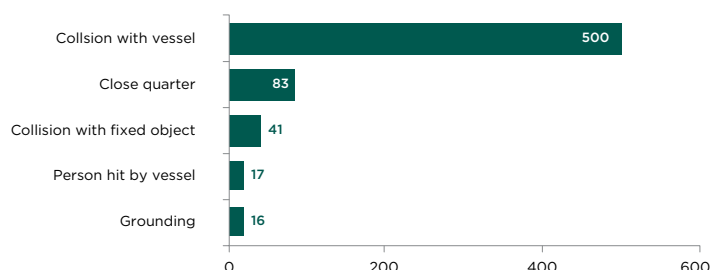
<sup>37</sup> Analysis of no proper lookout based on both Transport fatality records and Transport operational incident data.

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

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

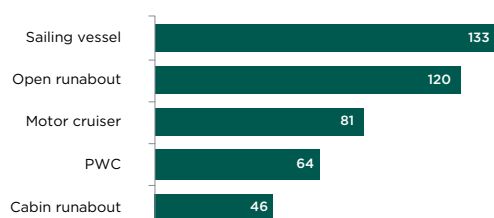


**Lookout – incident type records for incidents 2010-11 to 2019-20 (total = 729)**

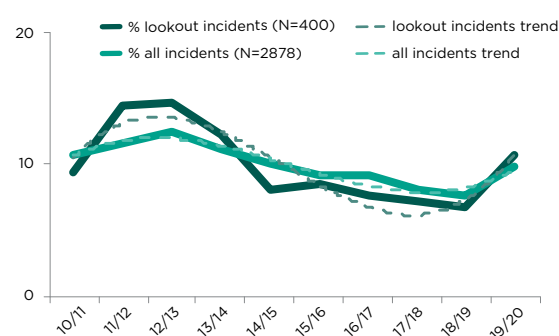


\*Contributory cause numbers for serious injury and total incidents are estimates based on proportion for fatal incidents.

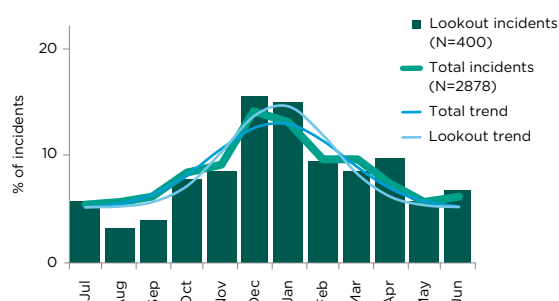
**Vessels involved in 'no proper lookout' incidents 2010-11 to 2019-20 (total = 704)**



**Lookout related trend against general incident trend**



**Seasonal patterns in lookout related incidents 2010-11 to 2019-20**



**Lookout incident 'hot spots' over 10 years**

Location/ area	Incidents
Syd. Harb. – Bradleys Head to Double Bay	14
Syd. Harb. – Sydney Cove/ east of Bridge	13
Syd. Harb. – Rushcutters Bay to Garden Is.	12
Syd. Harb. – North of Point Piper	11
Syd. Harb. – West of Bradleys Head	10
Average*	0.5

\*average of the 862 Aquatic Management Areas in NSW

**Key statistics – no proper lookout**

- No proper lookout was a likely factor in almost 1 in 15 (6.5%) of fatal boating incidents.
- 5 of the 8 fatal boating incidents associated with no proper lookout (62.5%) were also associated with excessive speed.
- More than two-thirds (68.6%) of incident – vessel records associated with no proper lookout involved a collision with another vessel.
- Nearly 1 in 5 (18.9%) of the vessels involved in incidents related to no proper lookout were sailing vessels, while more than 1 in 6 (17.0%) were open runabouts.

# 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.



**Centre for Maritime Safety**

PO Box K659 Haymarket NSW 1240

**P** 02 8265 7858

**E** [maritime@transport.nsw.gov.au](mailto:maritime@transport.nsw.gov.au)

**W** [maritimemanagement.transport.nsw.gov.au](http://maritimemanagement.transport.nsw.gov.au)

**Disclaimer**

While all care is taken in producing this work, no responsibility is taken or warranty made with respect to the accuracy of any information, data or representation. The authors (including copyright owners) expressly disclaim all liability in respect to anything done or omitted to be done and the consequences upon reliance of the contents of this information.

**© Transport for New South Wales**

Users are welcome to copy, reproduce and distribute the information contained in this report for non-commercial purposes only, provided acknowledgement is given to Transport for NSW as the source.

978-1-922549-49-5

