

Recreational Boating-Related Fatalities in Canada, 2008–2017

Prepared for The Boating Safety Contribution Program, Transport Canada
by the Drowning Prevention Research Centre Canada

Drowning Prevention
Research Centre 



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The Drowning Prevention Research Centre Canada is the lead agency for drowning and water-incident research in Canada. The Centre conducts research into fatal and non-fatal drowning, significant aquatic injury and rescue interventions. Contact Barbara Byers, Research Director, experts@drowningresearch.ca, 416-490-8844.

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EXECUTIVE SUMMARY

Recreational boating-related injuries are a preventable cause of morbidity and mortality from outdoor aquatic recreation. This report describes the epidemiology of fatal recreational boating-related incidents in Canada during 2008–2017, drawn from the Drowning Prevention Research Centre (DPRC) database. Data were analysed to describe characteristics of the incidents based on demographics of the person who died, incident location, date and time, causes of the boating incident, and other environmental and personal factors that may have contributed.

During the 10-year period, there were 956 recreational boating-related fatalities in Canada – an average of almost 100 deaths per year.

Key findings include:

- Recreational boating-related death rates decreased from 2008 to 2017; however, they continue to account for a substantial proportion (21%) of all water-related deaths in Canada.
- Deaths primarily occurred among adults. Nine out of ten recreational boating-related fatalities occurred among males.
- Lakes were the most frequent type of body of water where deaths occurred.
- Death rates differed by province and territory with the highest rates found in the Yukon, Northwest Territories, and Newfoundland and Labrador.
- Recreational boating-related fatalities most frequently occurred in the warmer months (May through August) and on weekends; the most common month for fatalities was July and the most frequent day was Saturday.
- Most recreational boating-related deaths occurred during powerboat use. Canoes were the next most common type of watercraft used prior to a fatality.
- Poor weather conditions including rough water and high winds were frequent causes contributing to recreational boating-related deaths.
- Over one-third of individuals who were fatally injured in a recreational boating-related incident had consumed alcohol.
- The majority of individuals who died as the result of a recreational boating-related incident were not wearing a personal flotation device (PFD) at the time of the incident.

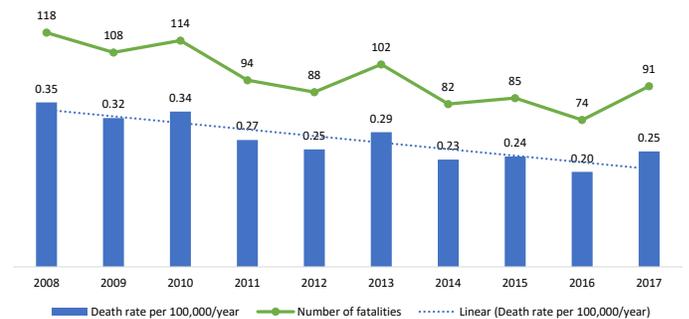
Recreational boating-related deaths are preventable. The information presented in this report serves to inform policy- and decision-makers, boating safety organizations and messaging.

INTRODUCTION

Drowning and water-related injuries are a significant cause of mortality in Canada with almost 500 unintentional water-related deaths occurring each year. Approximately one-quarter of these deaths are boating-related. During the most recent years for which complete data are available (2008–2017), there were 4,584 unintentional water-related fatalities in Canada. Of these, 956 (21%) were recreational boating-related fatalities. This is an average of 96 recreational boating-related deaths per year, contributing to a crude death rate of 0.27 per 100,000 population per year.

Figure 1 shows the number of recreational boating-related fatalities that occurred each year in Canada during 2008–2017 and the corresponding death rate. Recreational boating-related fatality rates decreased by 29% during the ten-year period from 0.35 per 100,000 in 2008 to 0.25 per 100,000 in 2017.

Figure 1: Number and rate of recreational boating-related fatalities by year, Canada, 2008–2017



This report describes the characteristics of recreational boating-related deaths by summarizing data on the demographics of the person who died, the incident location, date and time, boating activity, environmental factors, and personal factors.



METHODS

Data source

Data on all fatal recreational boating-related injuries in Canada were sourced from the Drowning Prevention Research Centre (DPRC) database, which contains detailed data on all unintentional water-related deaths that occur in Canada. As part of an ongoing surveillance project, trained local data collectors enter each of the provincial and territorial coroner’s and medical examiner’s offices annually to conduct structured reviews of the coroner’s files for all water-related deaths. These files typically include a combination of the following data sources: coroner’s investigation statement, police report, post mortem examination report, hospital records, witness statements, toxicology report, and death certificate. A structured questionnaire is used to obtain data on demographic characteristics; cause of death; location of incident; activity type and purpose of activity; and personal, equipment, and environmental factors. The face validity of the questionnaire has been assessed several times since it was created in 1991 and questions have been altered, added, or removed to ensure the most reliable and comprehensive data on water-related fatalities is collected.

For this report, data were extracted from the DPRC database for all recreational boating fatalities that occurred in Canada during the 10-year period, January 1, 2008 to December 31, 2017. Cases were identified as a recreational boating-related fatality and included for analysis if the purpose of activity was recreational (the deceased was on the water for the purpose of leisure or recreation) and the type of watercraft was a human-powered craft, powerboat, or other small pleasure craft (e.g., powerboat, personal watercraft, canoe, kayak, rowboat, non-powered inflatable craft, sailboat, sailboard/windsurfer/kite surfer). Excluded were deaths that were categorized as an occupational injury, defined as paid or self-employment (the deceased was on the water for purposes of their employment, such as commercial fishing/trapping and professional rescue missions).

Analysis

Descriptive statistics were reported to summarize the characteristics of fatal recreational boating in Canada for each of the variables listed in **Table 1**. Variable categories and definitions are included in Appendix A. Characteristics of recreational boating-related deaths were summarized in five-year periods. The most current five-year period was compared to the previous five-year period.

Crude fatal drowning rates per 100,000 population by age group and sex were calculated by dividing the total number of cases by the total population in each year of the ten-year period. Age-specific rates were calculated by dividing the number of cases in each age-group by the population of that age-group in Canada. Population estimates were obtained from Statistics Canada Table 17-10-0005-01, Population estimates on July 1st, by age and sex, for Canada and provinces and territories, annual.

Linear temporal trends were calculated in Excel. Where rates could be calculated (i.e., for age group and sex where population data for the denominator is available), temporal trends were calculated using the difference between the first and last year of the study as a percentage. Because of high interannual variability in recreational boating-related death rates in less populated provinces and territories, five-year moving averages were calculated to visualize temporal trends in provincial and territorial death rates.

Data limitations

Using fatalities data sourced from coroner and medical examiner offices has inherent limitations. Deaths are rarely witnessed by the people who report on them. Relying on witness statements can therefore introduce information bias (witnesses may incorrectly remember or estimate details like causes of the boating incident, distance from safety). Coroner’s and medical examiner’s investigations can take a long time to complete; some cases might still have been open at the time of this study, and therefore not included. Not all cases were available from the British Columbia Coroner’s office at the time of data collection for 2016 and 2017, therefore some recreational boating-related fatalities in British Columbia may not be included in these years.

Table 1: Variables used to describe recreational boating-related deaths in Canada

Demographics	Location	Date and time	Boating incident details	Environmental factors	Personal factors
Age Sex Ethnicity	Body of water Province/ territory Region Urban vs rural Other location details	Year Month Day of week Time of day	Type of watercraft Type of activity Type of incident Causes of incident Single or multi-person incident	Wave conditions Water current/flow Water depth Water temperature Wind speed Precipitation Distance from safety	Cause of death PFD use and availability Alcohol use Drugs (legal/illegal) Accompaniment

RESULTS

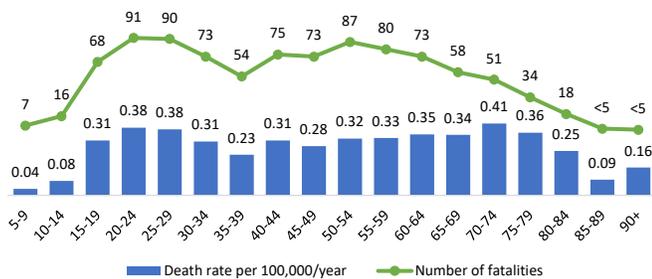
Demographics

Age

Recreational boating-related deaths occurred primarily among adults. The average age of individuals who suffered a recreational boating-related fatality during the study period was 45 years.

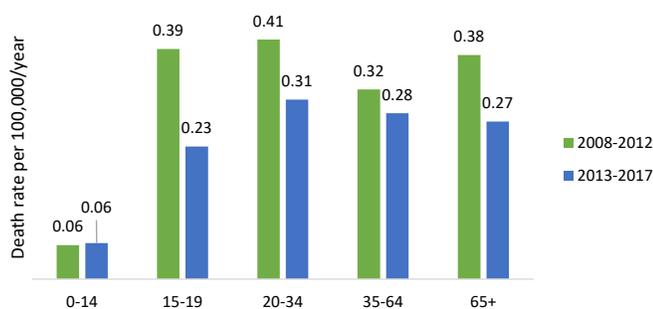
Figure 2 shows the number of recreational boating-related deaths per year and death rates per 100,000 population, by five-year age group. Death rates were lowest among children under the age of 15. The highest fatality rates were found among older adults 70–74 years of age (0.41 per 100,000) and young adults 20–24 and 25–29 years of age (0.38 per 100,000).

Figure 2: Number and rate of recreational boating-related fatalities by age group, Canada, 2008–2017



Consistent with the overall decrease in recreational boating-related fatalities during the study period, death rates decreased in most age groups in 2013–2017 when compared to 2008–2012 (Figure 3). The largest decreases in death rates occurred in the 15–19-year age group (-42% from 0.39 per 100,000 to 0.23) and among the older adult (65+ years) age group (-30% from 0.38 per 100,000 to 0.27). This differs from trends observed in all water-related fatalities where death rates in older adults have increased in recent years.

Figure 3: Recreational boating-related death rates by age group, Canada, 2008–2017



Sex

Males accounted for 91% of all recreational boating-related deaths (n=874) (Figure 4), an average of 87 deaths per year. This corresponds to a male fatality rate ten times higher than that of females (0.61 per 100,000 for males compared to 0.06 per 100,000 for females). The proportion of male fatalities from recreational boating is higher than that seen for all water-related deaths in Canada. Typically, an average of eight out of ten water-related fatalities occur among males.

Figure 4: Proportion of recreational boating-related fatalities, males vs. females, Canada, 2008–2017



Recreational boating-related fatality rates were higher for males than females across all age groups. Males account for the majority of recreational boating-related fatalities in all provinces, and in Atlantic Canada (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador), almost all recreational boating-related deaths (97%, n=111) occurred among males.

Ethnicity

Indigenous persons: To date, data on water-related fatalities among Indigenous persons has been collected and analyzed by non-Indigenous persons. The Drowning Prevention Research Centre is learning how information about Indigenous persons should be collected and shared to ensure no harm is done to the Indigenous community and/or individuals. We respectfully share the following high-level summary, based on coroner and medical examiner reports, understanding that knowledge about water-related fatalities among Indigenous peoples is limited and that future research should be driven by Indigenous researchers. In accordance with First Nation’s OCAP principles, the Drowning Prevention Research Centre welcomes opportunities to partner with First Nations, as well as Inuit and Metis peoples, in research and water-related fatalities prevention.

During 2008–2017, 80 persons who died as a result of recreational boating were identified by the coroner or medical examiner as Indigenous. This is 8% of all recreational boating-related deaths. By comparison, approximately 5% of the Canadian population identifies as Indigenous.

New Canadians: In 2010, the Drowning Prevention Research Centre began collecting data on the country of birth of persons who died of a water-related injury and the length of time they had been living in Canada.

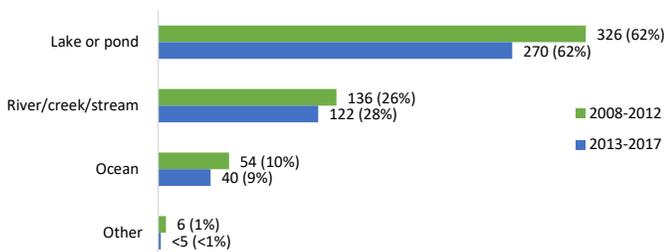
Unfortunately, country of birth could not be determined in 64% of recreational boating-related cases, and information on the number of years lived in Canada was even more difficult to obtain. From cases where the information was available, 51 recreational boating-related fatalities (since 2010) occurred among persons who were reported to have been born outside of Canada. Forty-three percent of these persons were born in the United States (n=22), 29% in European countries (n=15), and 14% in Asian countries (n=7).

Location

Body of water

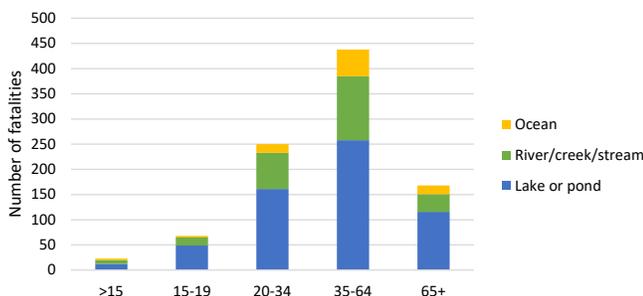
The most frequent type of body of water where recreational boating-related deaths occurred was a lake; almost two-thirds (62%) of the fatalities occurred in this setting (n=596). The next most common location was flowing water such as rivers, creeks, streams and waterfalls (27%, n=258), followed by the ocean (10%, n=94). Few recreational boating-related fatalities occurred in other bodies of water (1%, n=8) including canals, dams and dugout/retention ponds. When compared to the previous five-year period, recreational boating-related deaths decreased across all water bodies in 2013–2017, but the proportion of deaths by type of water body remained consistent (Figure 5).

Figure 5: Number and percent of recreational boating-related fatalities by body of water, Canada, 2008–2017



The type of body of water where recreational boating-related fatalities occurred did not differ substantially by age group (Figure 6). Fatalities most frequently occurred in a lake for all age groups, with lakes accounting for 52–69% of fatalities in each age group. Older adults had the highest proportion (69%) of recreational boating-related deaths in a lake or pond of all age groups; children less than 15 years of age had the lowest proportion of fatalities in a lake or pond (52%) and the highest proportion of fatalities in a river, creek or stream (35%) and the ocean (13%).

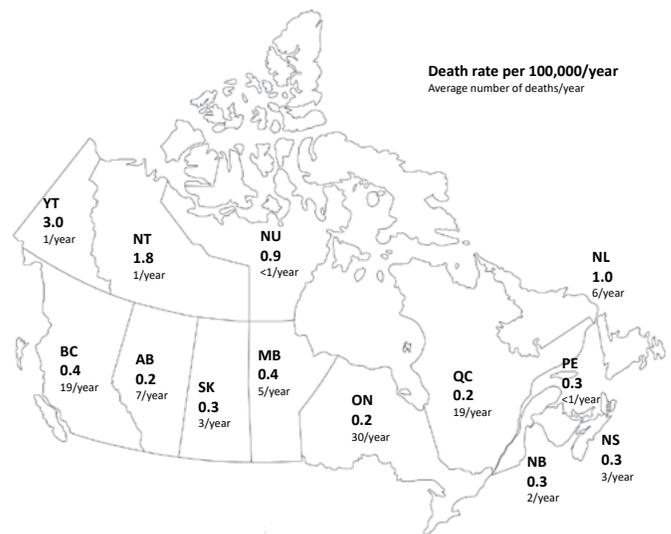
Figure 6: Recreational boating-related fatalities by body of water and age group, Canada, 2008–2017



Provinces and territories

Recreational boating-related fatalities occur in all regions of Canada (Figure 7). The highest number of fatalities occur in the most populous provinces: Ontario (30 deaths/year), Quebec (19 deaths/year), and British Columbia (19 deaths/year). When taking population into account, recreational boating-related death rates differ dramatically between provinces and territories. During 2008–2017, average annual recreational boating-related fatality rates were highest in the Yukon (3.0 per 100,000), the Northwest Territories (1.8 per 100,000), and Newfoundland and Labrador (1.0 per 100,000).

Figure 7: Recreational boating-related fatality rates and average number of deaths per year by province and territory, Canada, 2008–2017

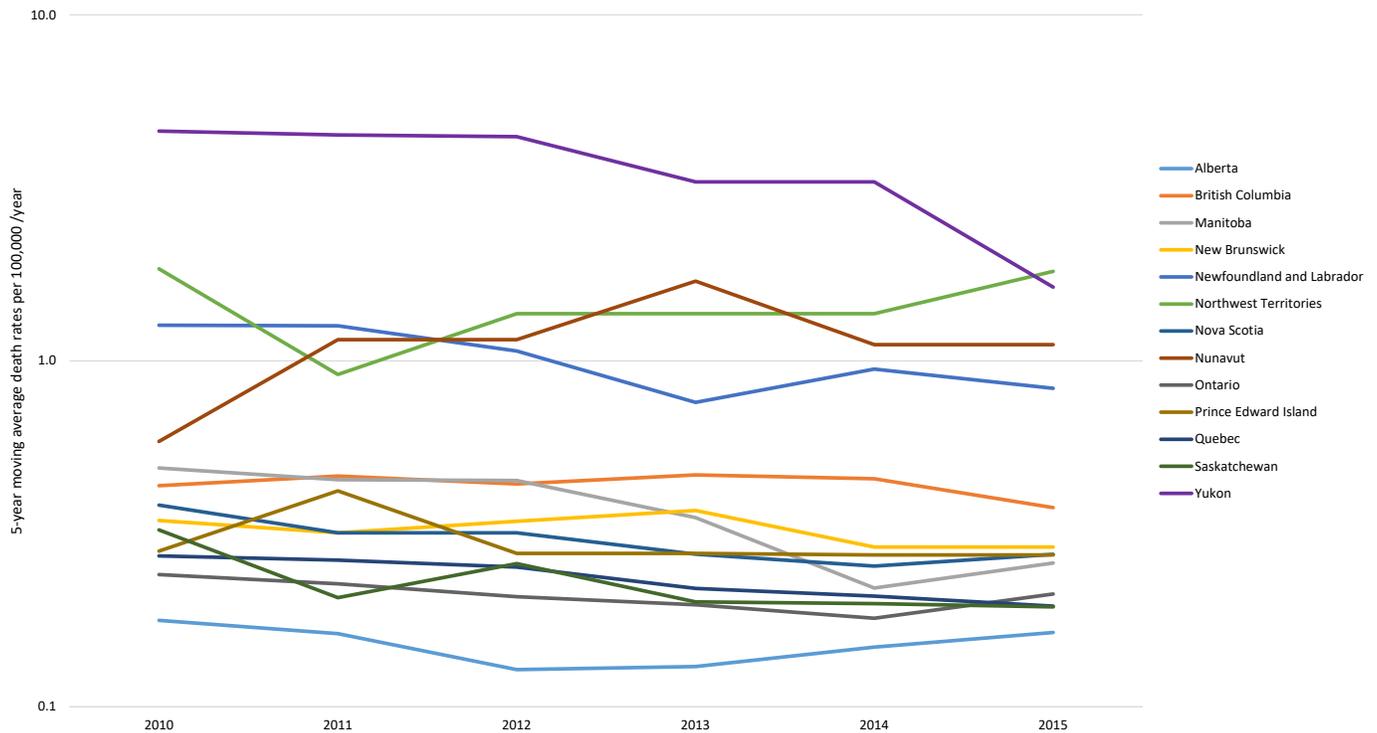


Consistent with the overall decrease in the recreational boating-related fatality rate in Canada during 2008–2017, death rates decreased in 12 of the 13 provinces and territories in 2013–2017, when compared to 2008–2012. The largest decreases occurred in the Yukon (-66%, 4.62 to 1.58), Manitoba (-47%, 0.49 to 0.26), Saskatchewan (-40%, 0.32 to 0.20), Newfoundland and Labrador (-34%, 1.27 to 0.83), Nova Scotia (-28%, 0.38 to 0.28), and Quebec (-28%, 0.27 to 0.20). Moderate decreases were also found in New Brunswick (-16%, 0.35 to 0.29), British Columbia (-14%, 0.44 to 0.37), Ontario (-12%, 0.27 to 0.20), Alberta (-7%, 0.18 to 0.16), Prince Edward Island (-3%, 0.28 to 0.27), and the Northwest Territories (-2%, 1.84 to 1.81).

The only region where there was an increase in the rate of recreational boating-related fatalities in 2013–2017 over the previous five-year period was Nunavut. The death rate increased from 0.6 per 100,000 per year during 2008–2012 to 1.0 per 100,000 per year during 2013–2017, however, there was still an average of less than one recreational boating-related death each year in Nunavut in the most current five-year period.

Figure 8 shows the change in recreational boating-related fatality rates in each province and territory over time.

Figure 8: Change in five-year moving average* recreational boating-related death rates by province and territory, Canada, 2008–2017



*Because of high interannual variability in recreational boating-related fatality rates, 5-year moving averages in rates were calculated to visualize temporal trends. For the study period (2008–2017), the first year for which a 5-year average can be calculated is 2010, and the last year for which a 5-year average can be calculated is 2015.

Urban versus rural location

A disproportionately high number of recreational boating-related fatalities occur in rural areas. Over half (55%) of recreational boating-related deaths occurred in rural settings, while approximately 20% of the population of Canada live in a rural setting. This is also higher than the proportion of all water-related deaths that occur in rural areas. Approximately two-thirds of the water-related deaths that occur in Canada occur in an urban area. The provinces and territories with the highest proportion of rural recreational boating-related deaths were Nunavut (100%), Manitoba (96%), and Saskatchewan (93%). In Prince Edward Island, New Brunswick, and Quebec, more recreational boating-related deaths occurred in urban environments than rural. The proportion of recreational boating-related deaths that occurred in rural areas decreased by 10% in recent years (58% rural deaths in 2008–2012 vs. 52% rural deaths in 2013–2017).

Other location details

Table 2 shows the number of recreational boating-related fatalities that occurred at specified locations such as at cottages or in parks. Such location details were relevant in 227 cases (24%). All other incidents did not occur in one of the locations listed in **Table 2** (e.g., occurred in open water outside of park boundaries).

During 2008–2017 recreational boating-related fatalities frequently occurred in provincial parks (n=66, 7%), at cottages/cabins (n=53, 6%), and in marinas (n=27, 3%).

Location	Number	Percent
Provincial park	66	7%
Cottage/cabin	53	6%
Marina	27	3%
Conservation authority	21	2%
Municipal park	18	2%
Private campground	18	2%
National park	11	1%
Private permanent residence	11	1%
Daycamp/resident camp	<5	<1%
Total	227	24%

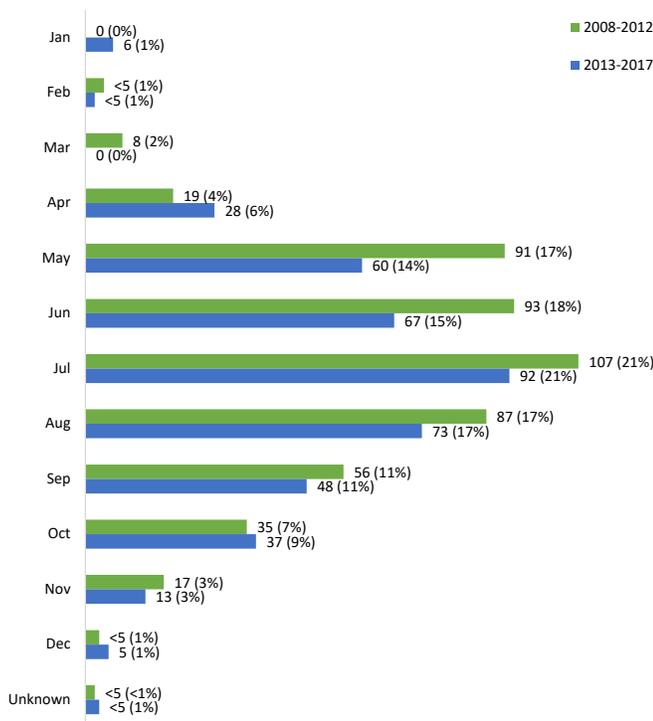
Date and time

Time of year

Figure 9 shows the distribution of recreational boating-related deaths during 2008–2017 across the months of the year. Boating fatalities occurred year-round in Canada, but the majority of the deaths occurred during the warmest months, May through September; (81%) of recreational boating-related fatalities occurred during one of these five months (n=774), with the greatest number occurring in July (n=199, 21%). An average of about one recreational boating-related fatality per year occurred during each of the coldest months: January, February, March, and December, compared to an average of about 20 deaths per year during the peak month, July. This distribution differs somewhat from all recreational water-related fatalities, where approximately one-third of deaths occur in cooler months and approximately two-thirds occur in May through September.

When comparing the most recent five years (2013–2017) to the previous five years (2008–2012) patterns in recreational boating-related fatalities by time of year were consistent overall. A slightly lower proportion of drownings occurred in May and June during 2013–2017 than in the previous years, with a slightly higher proportion occurring earlier in the season (in March and April).

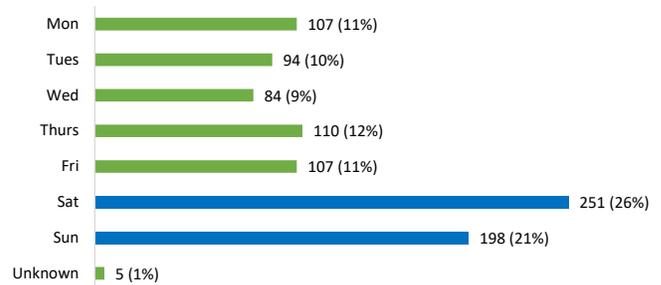
Figure 9: Number and percent of recreational boating-related fatalities by month, Canada, 2008–2017



Day of week

Fatal recreational boating incidents occurred every day of the week; almost half (47%) occurred on a weekend day (Saturday or Sunday) (n=449) (**Figure 10**). The highest frequency of fatalities occurred on Saturday (n=251, 26%); an average of 25 recreational boating-related fatalities occurred on a Saturday each year. Tuesdays (n=94) and Wednesdays (n=84) were the days with the fewest fatalities.

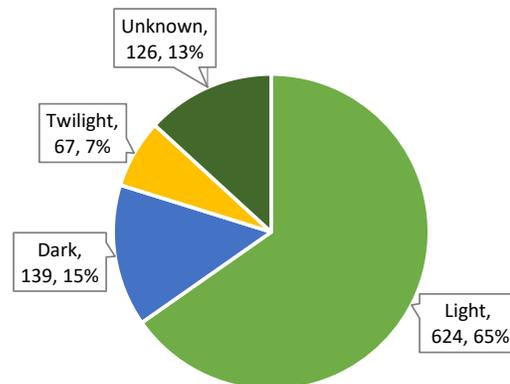
Figure 10: Number and percent of recreational boating-related fatalities by day of week, Canada, 2008–2017



Time of day

The majority (65%) of fatalities occurred during daylight hours (n=624) (**Figure 11**). Evening and nighttime recreational boating-related fatalities were less common, but some boating incidents did occur during twilight (7%, n=67) and after dark (15%, n=139). In 13% of cases (n=126) the time of day could not be determined.

Figure 11: Number and percent of recreational boating-related fatalities by time of day, Canada, 2008–2017



Boating incident details

Type of watercraft

The most frequent type of watercraft involved in recreational boating-related fatalities was a powerboat (n=488, 51%). In 368 cases, the size of boat was identified. The majority (68%, n=252) of these involved a small powerboat (less than 5.5 metres in length), and 23% (n=86) involved a large powerboat (greater than 5.5 metres in length). Eight percent of powerboat-related deaths where the size of boat was known involved a personal watercraft (n=30). After powerboats, the next most common type of watercraft in recreational boating-related fatalities was a canoe (n=222, 23%), followed by a kayak (n=70, 7%). The most frequent type of watercraft involved in recreational boating-related fatalities was consistent when comparing 2013–2017 to 2008–2012 (Figure 12). The proportion of personal watercraft-related deaths doubled in 2013–2017 (from 2% to 4%, with 18 deaths occurring in the most current 5-year period).

Figure 12: Number and percent of recreational boating-related fatalities by type of watercraft, Canada, 2008–2017

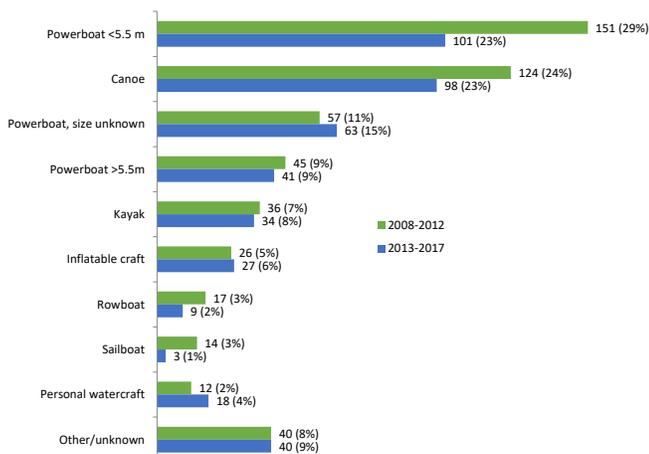
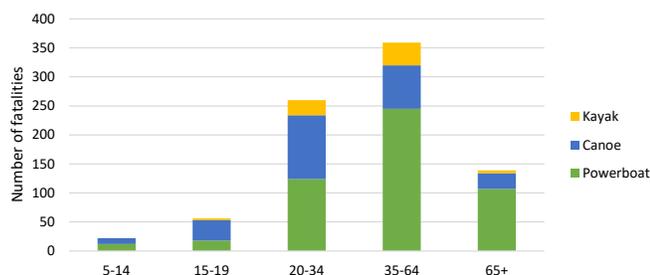


Figure 13 shows the number of recreational boating-related fatalities by age group for the most common watercrafts. Powerboat-related incidents were frequent among all adult age groups. The highest frequency of powerboat deaths occurred among 35–64-year-olds (n=245, 55% of recreational boating-related deaths in this age group). Recreational boating-related deaths among teenagers (15–19 years of age) were more likely to involve a canoe (n=35, 51% of deaths in this age group) than a powerboat (n=18, 26%).

Figure 13: Recreational boating-related fatalities by age group and most common type of watercraft, Canada, 2008–2017



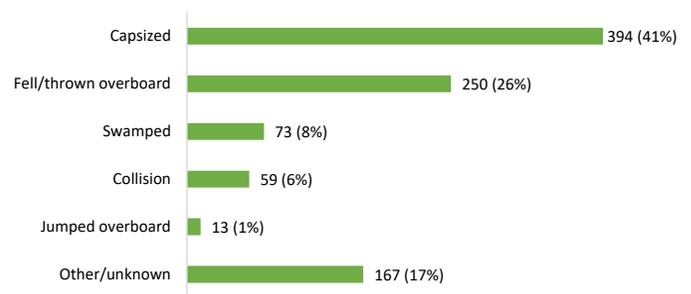
Additional activity while boating

In 34% of recreational boating-related fatalities, the deceased was fishing from the boat prior to the incident (n=324). The most frequent watercraft involved in recreational fishing incidents was a small powerboat (n=141, 44%), followed by a canoe (n=68, 21%).

Type of boating incident

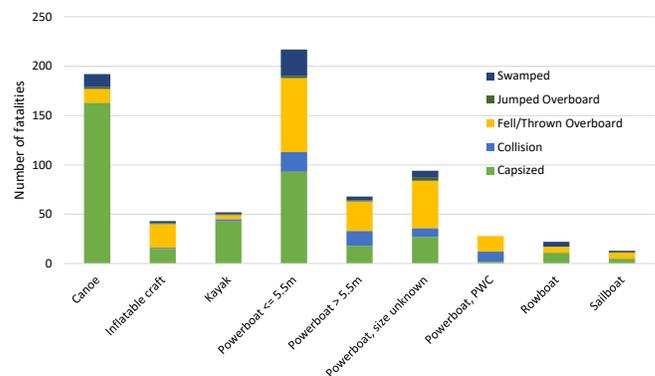
The highest frequency of recreational boating-related fatalities occurred when the person capsized (n=394, 41%) (Figure 14). Falling or being thrown overboard was also a common cause of recreational boating-related death (n=250, 26%). Fewer incidents involved the watercraft being swamped (n=73, 8%), a collision (n=59, 6%), or the person who died jumping overboard (n=13, 1%).

Figure 14: Number and percent of recreational boating-related fatalities by type of boating incident, Canada, 2008–2017



The most frequent type of boating incident differed by type of watercraft (Figure 15). Canoeing, kayaking, and small powerboat deaths most frequently occurred as a result of capsizing (73%, 61%, and 37% of deaths were due to capsizing, respectively) whereas personal watercraft and all other powerboat related deaths were most frequently associated with falling or being thrown overboard (53% and 38%, respectively). The highest proportions of collision-related recreational boating deaths were associated with personal watercraft (33%) and small powerboats (8%).

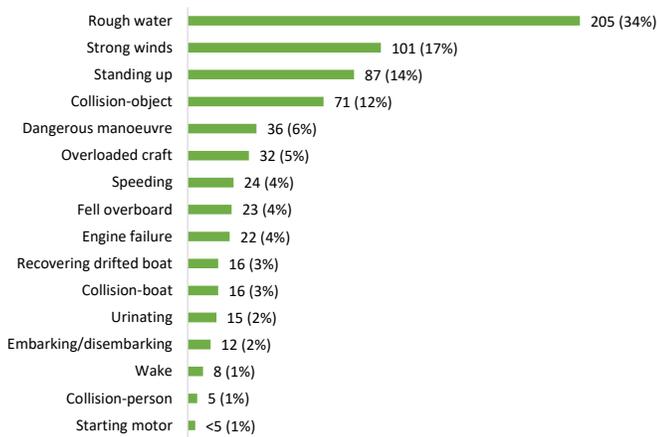
Figure 15: Recreational boating-related fatalities by type of watercraft and type of boating incident, Canada, 2008–2017



Causes of boating incident

Figure 16 shows the proportion of recreational boating-related fatalities for which at least one contributing cause was known to be involved (n=608). Poor weather conditions, including rough water (n=205, 34%) and strong winds (n=101, 17%), were the most commonly reported causal factors. In 15% of cases for which causes were known, a collision (with an object n=71, another boat n=16, or a person n=5) was identified as the cause of the recreational boating-related death. Standing up in the watercraft was also a frequently reported cause (n=87, 14%).

Figure 16: Number and percent of recreational boating-related fatalities by contributing cause*, Canada, 2008–2017



* More than one of these causes might have contributed to a single boating incident.

Single versus multiple-person incident

Over one-third (37%, n=351) of recreational boating-related deaths were multiple-person incidents where more than one person died as a result of a single incident. Deaths involving canoes had the highest proportion of multiple-person incidents, with 46% (n= 103) of all canoeing-related deaths involving more than one fatality. Small powerboats had the next highest proportion of multiple-person incidents (40%, n=102).

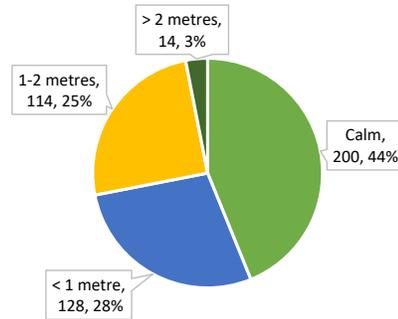


Environmental factors

Wave conditions

Wave conditions at the time of the boating incident were known in 48% of cases (n=456) (**Figure 17**). In cases where wave conditions were known, over half (56%, n=256) occurred while waves less than 1 metre (n=128, 28%), 1–2 metres (n=114, 25%), or over 2 metres high (n=14, 3%) were present.

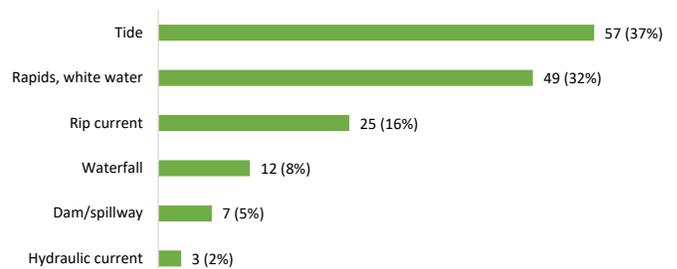
Figure 17: Number and percent of recreational boating-related fatalities by wave conditions, Canada, 2008–2017



Water current/flow

Figure 18 shows recreational boating-related fatalities by water current at the time of the incident. This information was known and relevant (i.e., the incident occurred in a body of water where water current/flow could reasonably be expected to be a factor) for 16% of cases (n=153). In cases where water current/flow was known and relevant, tides (n=57, 37%) and rapids/white water (n=49, 32%) were the most frequently identified conditions.

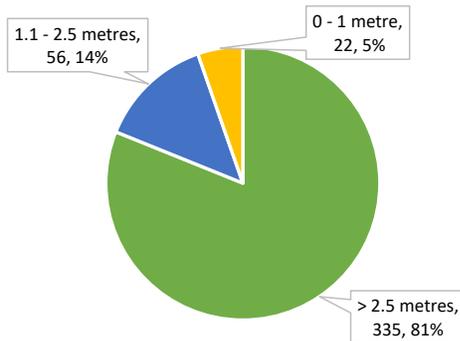
Figure 18: Number and percent of recreational boating-related fatalities by water current/flow, Canada, 2008–2017



Water depth

Water depth at the time of the boating incident was known in 43% of cases (n=413) (**Figure 19**). While the majority (81%, n=335) of recreational boating-related fatalities where water depth was known occurred in deep water (greater than 2.5 metres in depth), 22 deaths (5%) occurred in very shallow water (less than 1 metre deep).

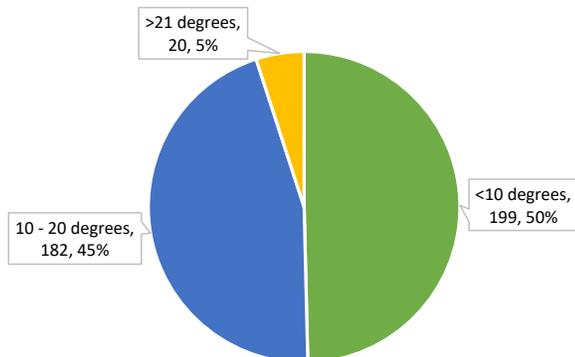
Figure 19: Number and percent of recreational boating-related fatalities by water depth, Canada, 2008–2017



Water temperature

Cold water is prevalent in Canada, and most recreational boating-related deaths for which water temperature was known occurred in cold or very cold water. Water temperature at the time of the boating incident was known in 42% of cases (n=401) (**Figure 20**). In these cases, half (50%, n=199) of the recreational boating-related deaths occurred in very cold water (less than 10 degrees Celsius), 45% in cold water (10–20 degrees Celsius), and 5% occurred in warm water over 21 degrees Celsius.

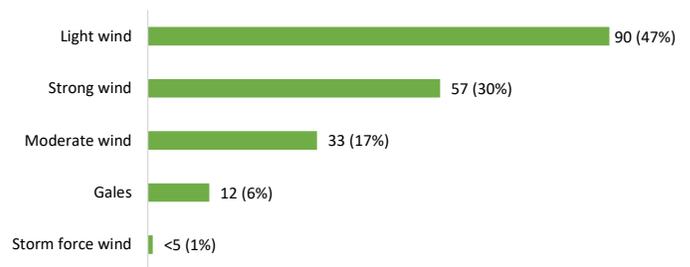
Figure 20: Number and percent of recreational boating-related fatalities by water temperature, Canada, 2008–2017



Wind speed

Information on wind conditions could be obtained for 20% of cases (n=193) (**Figure 21**). In cases where wind speed was known, 47% of recreational boating-related deaths occurred during light wind (n=90), 30% during strong winds (n=57), 17% during moderate wind (n=33). Fewer incidents occurred during gales (6%, n=12) and storm force winds (n=<5, 1%).

Figure 21: Number and percent of recreational boating-related fatalities by wind conditions, Canada, 2008–2017



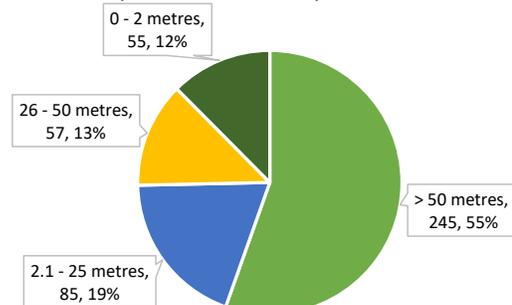
Precipitation

Information on precipitation such as rain or snow at the time of the incident was available in 34% of cases (n=322). In cases where precipitation was known, the majority (93%) of recreational boating-related fatalities occurred while there was no precipitation. Six percent of recreational boating-related deaths occurred while it was raining (n=19). Hail and snow were rarely present when fatalities occurred (less than 1% each).

Distance from safety

How far from safety the boating incident occurred was known for 46% of cases (n=442) (**Figure 22**). In cases where distance from safety was known, over half (55%, n=245) occurred at least 50 metres from the dock or shore, 19% (n=85) occurred between 2 and 25 metres away, 13% (n=57) occurred from 26 to 50 metres away, and 12% (n=55) occurred within 2 metres of safety.

Figure 22: Number and percent of recreational boating-related fatalities by distance from safety, Canada, 2008–2017

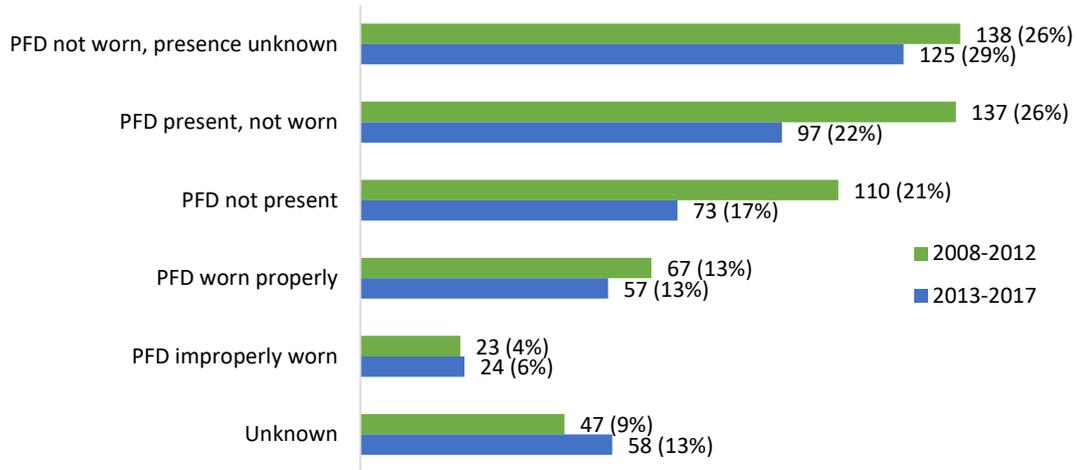


Personal factors

Cause of death

The majority of recreational boating-related fatalities were drownings (n=849, 89%). The next most frequent cause of death was trauma (n=54, 6%) followed by exposure-related causes such as hypothermia (n=27, 3%). Most trauma-related deaths were either blunt force trauma (n=27, 50%) or head trauma (n=24, 44%).

Figure 23: Number and percent of recreational boating-related fatalities by personal flotation device presence/use, Canada, 2008–2017



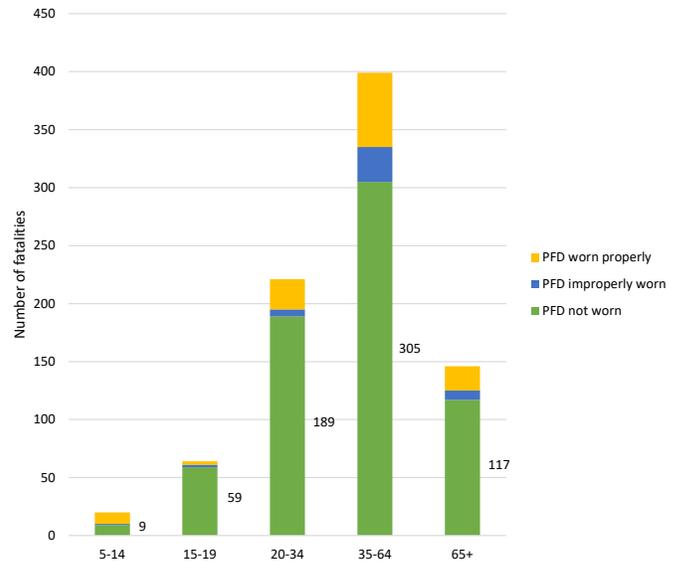
Personal flotation device use

In 80% of recreational boating-related fatalities for which personal flotation device (PFD) information was known, a PFD (such as a lifejacket) was not worn by the person who died at the time of the incident. A PFD was worn properly in only 13% of recreational boating-related deaths (n=124) (**Figure 23**). In 5% of incidents, a PFD was improperly worn (n=47). In all other cases for which information about PFD use was known (n=680, 71%), the individual was not wearing a PFD at the time of the recreational boating-related incident. In 34% of the cases where a PFD was not worn, one was present in the watercraft at the time of the incident (n=234). In 39% of cases where a PFD was not worn, it could not be determined whether a PFD was present or not (n=263), and in 27% of these cases there was no PFD present (n=183). PFD use did not change substantially when comparing 2013–2017 to 2008–2012 (**Figure 23**).

Figure 24 shows lifejacket use by age group, and the number of recreational boating-related deaths in each age group that occurred when the individual who died was not wearing a PFD. Among people who died from recreational boating-related injuries, PFD use was low across all age groups. Older children (10–14 years) had the highest proportion of PFDs worn properly (50%).

Low PFD use is a widely established risk factor for recreational boating-related fatalities, and the majority of recreational boating-related deaths in Canada continue to involve individuals who were not wearing a PFD.

Figure 24: Recreational boating-related fatalities by lifejacket use and age group, Canada, 2008–2017



Alcohol consumption

Alcohol consumption was detected in 36% (n=341) of the individuals who died from a recreational boating-related injury through post-mortem blood analysis. In an additional 5% (n=44) of individuals, alcohol consumption was suspected by investigators but a blood alcohol concentration (BAC) level could not be obtained. In the majority (74%, n=253) of the cases where BAC was available, the reported level was above the legal limit of 0.08 g/100mL.

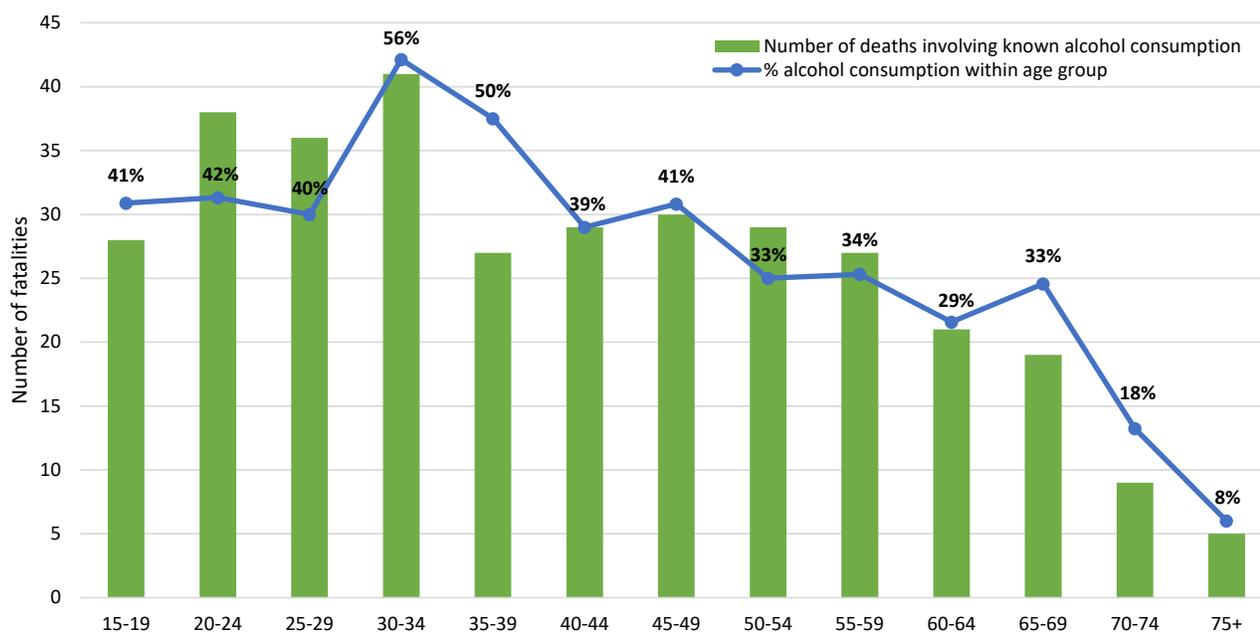
Alcohol consumption was most prevalent in young adults (Figure 25). In over half of the recreational boating-related fatalities among people in their 30s, elevated BAC levels were found. Teenagers and young adults (15–29 years) also had high proportions of alcohol consumption, ranging from 40–42%.

Drug consumption

In 20% (n=187) of recreational boating-related deaths, legal or illegal drugs were found in the bloodstream during post-mortem toxicological analysis. In two-thirds (65%) of these cases, evidence of illegal drug consumption was found in the person's blood (n=122, 13% of all recreational boating-related fatalities). The presence of legal drugs was identified in 62 cases, 6% of all recreational boating-related deaths.

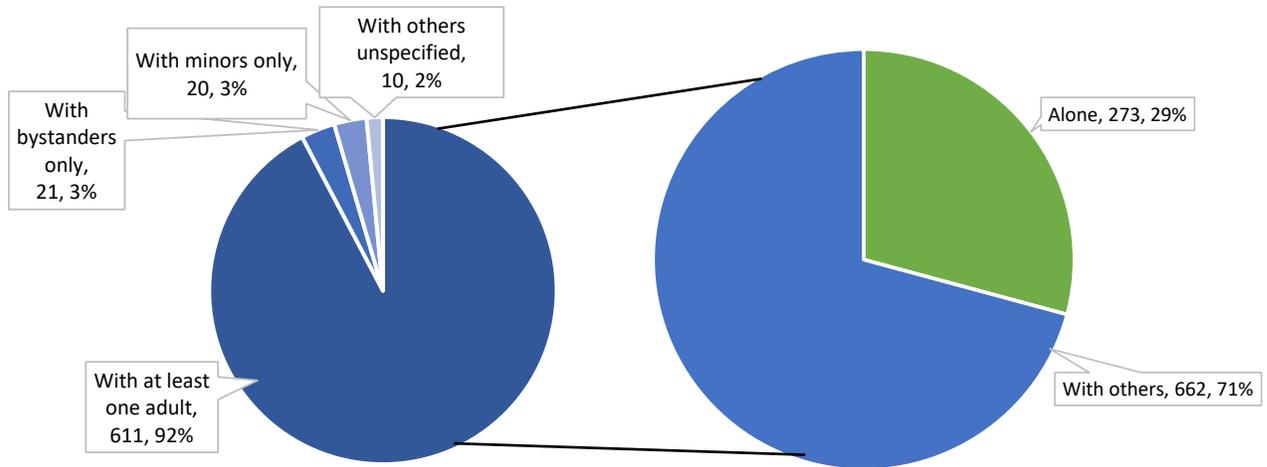
Marijuana was legalized in Canada in 2019. Because this report describes cases during 2008–2017, marijuana is included as an illegal drug.

Figure 25: Alcohol consumption* in recreational boating-related fatalities by age group, Canada, 2008–2017



*Includes cases where alcohol consumption was confirmed by post-mortem blood analysis only.

Figure 26: Number and percent of recreational boating-related fatalities by accompaniment at the time of the incident, Canada, 2008–2017



Boating alone or with others

Whether the person was alone or with others at the time of the recreational boating-related incident was known for almost all cases (n=935, 98%) (**Figure 26**). In 71% of those cases, the person who died was with others at the time of the incident (n=662). In the majority (92%) of cases where the person who died was accompanied, they were with at least one adult at the time of the death. In almost one-third (29%) of recreational boating-related deaths where accompaniment information was known, the person who died was alone at the time of the incident.

The proportion of deaths that occurred among people who were alone was higher in older age groups. The highest proportion of recreational boating-related deaths where the person who died was alone occurred among adults 55–59 years of age; in over half (51%, n=41) of all recreational boating-related deaths in that age group, the person was unaccompanied. Accompaniment at the time of the incident also differed by type of watercraft. In deaths involving sailboats and windsurfers, there were higher proportions of the person being alone at the time of the incident than with powerboats and canoes.



SUMMARY

- Recreational boating-related death rates decreased from 2008 to 2017; however, they continue to account for a substantial proportion (21%) of all water-related deaths in Canada.
- Deaths primarily occurred among adults. Nine out of ten recreational boating-related fatalities occurred among males.
- Lakes were the most frequent type of body of water where deaths occurred.
- Death rates differed by province and territory with the highest rates found in the Yukon, Northwest Territories, and Newfoundland and Labrador.
- Recreational boating-related fatalities most frequently occurred in the warmer months (May through August) and on weekends; the most common month for fatalities was July and the most frequent day was Saturday.
- Most recreational boating-related deaths occurred during powerboat use. Canoes were the next most common type of watercraft used prior to a fatality.
- Poor weather conditions including rough water and high winds were frequent causes contributing to recreational boating-related deaths.
- Over one-third of individuals who were fatally injured in a recreational boating-related incident had consumed alcohol.
- The majority of individuals who died as the result of a recreational boating-related incident were not wearing a PFD at the time of the incident.

Recreational boating-related incidents cause nearly 100 preventable deaths in Canada each year. Key risk factors include male sex, poor weather conditions, alcohol use, and not wearing a PFD.



APPENDIX A: DEFINITIONS

Body of water

Ocean: a body of salt water characterized by tides (includes harbour areas, open water, etc.).

Lake or pond: an open body of fresh water.

River/stream/creek/waterfall: fresh water with a definite current/flow.

Urban vs rural location

Urban (city or town with population of 1,000+): the incident was in an urban location, within the geographic boundaries of a city or town with a population over 1,000 people.

Rural (all non-urban locations): the incident was in a rural location, i.e., not within the geographic boundaries of a city or town with a population over 1,000 people.

Other location details

Provincial park: the incident took place in a rural area designated as a provincial park; includes water within park boundaries as well as shoreline and waterfront.

National park: the incident took place in a rural area designated by the federal government as a national park; includes water within park boundaries as well as shoreline and waterfront.

Municipal park or waterfront: the incident took place in an area designated by the municipal government as a park or public waterfront area; includes water within park boundaries as well as shoreline and waterfront.

Conservation area: the incident took place in an area designated as a conservation area; includes water within conservation area boundaries as well as shoreline and waterfront.

Cottage/cabin/camp: seasonal residence, private waterfront, etc.; the incident took place at the waterfront of a private cottage or cabin of a seasonal nature.

Private permanent residence (private waterfront): the incident took place at the waterfront of a private residence of a permanent nature.

Marina: incident took place in an area designated as a marina.

Private campground: incident took place in an area designated as a private campground; includes water within private campground boundaries as well as shoreline and waterfront.

Day camp/resident camp: incident took place in an area designated as a day camp or resident camp; includes water within campground boundaries as well as shoreline and waterfront.

All other locations: includes all other locations not covered above. For example, in open water not inside park boundaries, an institution, etc.

Unknown: the specific location of the incident was not noted in the file.

Type of watercraft

Large powerboat: over 5.5 m (18 feet) in length, powered by a motor.

Small powerboat: 5.5 m (18 feet) and under, open “fishing type” craft powered by a motor.

Powerboat, size unknown: the file indicated that the deceased was in a craft powered by a motor at the time of the incident, but the size of the boat was not noted.

Powerboat, personal watercraft: the incident took place while the deceased was riding a personal watercraft; a motorized (1–2-person) craft powered by jet propulsion; including Sea-Doo, Jet Ski, WaveRunner, etc.

Canoe: the incident took place while the deceased was in a canoe.

Kayak: the deceased was in a closed kayak at the time of the incident.

Rowboat: the deceased was in a craft that was propelled by dual oars at the time of the incident.

Non-powered inflatable craft: the deceased was in a craft that must be inflated to gain its shape and buoyancy (not an inflatable toy). The craft did not have a motor.

Sailboat: the deceased was using a wind powered sailboat when the incident occurred.

Sailboard/windsurfer/kite surfer: the deceased was using a sailboard, windsurfer or kite surfer when the incident occurred.

Other: the incident took place when the deceased was in a boat or watercraft which is not described in any of the above categories.

Unknown: the file indicated that the deceased was in a boat at the time of the incident, but information on the type of craft was not mentioned.

Type of boating incident

Fell/thrown overboard (but not because of capsizing, collision, or swamping): during the incident the deceased fell or was thrown overboard from a craft (which remained upright) but not because capsizing, collision, or swamping.

Capsized: the boat/craft overturned, putting the deceased into the water.

Collision: the boat/craft during operation or at rest collided or was hit by another object, e.g., another craft, a stump or log, a rock, a swimmer.

Swamped: the boat/craft took on water as a result of high waves (from another boat, a storm, etc.).

Jumped overboard: deceased intentionally jumped out of the boat to rescue a person/object.

Other: there were other contributing factors indicated in the file which led to the boating incident.

Causes contributing to boating incident

Standing up in craft (other than to urinate): the victim stood up in the craft which resulted in injury or contributed to the incident.

Urinating: the victim was standing and urinating when the incident occurred.

Overloaded craft: the craft had more than the recommended number of passengers while in operation.

Wake of powerboat: the craft was crossing the wake of other boats when the incident occurred.

Starting motor (e.g., loss of balance while pulling pull cord): the victim was starting the motor (manual pull cord), which resulted in the incident.

Strong winds: the craft was operating in strong wind conditions which contributed to the boating incident.

Rough water/large waves: the craft was being operated in rough water/large wave conditions which contributed to the boating incident.

Collision between two boats: the victim’s boat collided with another boat, which resulted in injury or contributed to the incident.

Collision with person (non-boater like a swimmer): the victim’s boat collided with a swimmer, water skier, etc., which resulted in injury or contributed to the incident.

Collision with fixed object (e.g., dock, shore, rock): the victim’s boat collided with a dock, shore, rock, buoy, etc., which resulted in injury or contributed to the incident.

Boarding or leaving a moored boat, on gangplank or boat: the victim fell or slipped which resulted in injury or contributed to the incident.

Fall from moving boat: the boat continued, leaving the victim in the water with no way to get back to shore.

Speeding: the operator was using excessive speed which resulted in or contributed to the incident.

Swimming to recover boat: the victim was in the water attempting to recover a drifting boat.

Abrupt turn or other dangerous manoeuvre: the operator of the boat made an abrupt turn or other dangerous manoeuvre which resulted in the incident.

Engine failure: the boat/craft engine/motor failed to operate properly.

Water current

Rip current (undertow): the file indicated that there was a strong channel of water flowing seaward from near the shore.

Rapids, white water: the file indicated that the incident occurred in water moving quickly through a channel resulting in rapids.

Waterfall: the file indicated the incident occurred where water was falling over a cliff.

Dam spillway: the file indicated the incident occurred in water moving over/through man-made barriers used to control the flow of water.

Fast/strong current: the file indicated that the current of the water was fast or strong; includes river currents, lake currents, ocean currents not covered on any of the other choices.

Hydraulic current: incident occurred at base of dam, after rocks in a river.

Tide: incident occurred where there was a tidal system.

Unknown: although it was a relevant situation, the movement of the water was not indicated in the file.

Wave conditions

Calm: the state of motion of the water surface was still (glassy).

Waves less than 1 metre: rippled to slight wave motion.

Waves 1-2 metres: moderate to choppy wave motion.

Waves greater than 2 metres: white caps – rough to very rough, small craft warning, or worse, storm conditions.

Unknown: the movement of the water was not indicated in the file.

Wind speed

Light wind (10 knots or less): calm, no movement to gentle breeze producing ripples to small wavelets.

Moderate wind (11–21 knots): moderate breeze producing small waves becoming larger.

Strong wind (20–33 knots): strong breeze producing moderate waves.

Gale (34–47 knots): gale winds producing moderately high waves of greater length.

Storm force wind (48–63 knots): storm winds producing very high waves.

Hurricane (64 knots or more): hurricane conditions producing huge waves; air is filled with foam and spray.

Unknown: relevant situation but the file did not indicate the wind speed at the time of the incident.

Precipitation

Rain: there was intermittent or consistent rain during the time of the incident.

Snowing: it was intermittently or consistently snowing at the time of the incident.

Hail: there was precipitation in the form of hail or ice pellets at the time of the incident.

No precipitation: the conditions were clear at the time of the incident.

Unknown: relevant situation but there was no information on weather conditions in the file.

PFD involvement

PFD worn properly: a lifejacket/PFD/flotation survival garment was worn properly by the deceased.

PFD improperly worn: the file indicated that the deceased was wearing a lifejacket/PFD/flotation survival garment but that it may have been the wrong size or the fastenings were not done up, etc.

PFD present but not worn: the file indicated that a lifejacket/PFD/flotation survival garment was present when the incident occurred, but it was not worn by the deceased.

PFD not present: a relevant situation where one would expect to find a lifejacket/PFD/flotation survival garment, but the file specifically noted that one was not present.

PFD not worn, uncertain if present: the file indicated that a lifejacket/PFD/flotation survival garment was not worn; while it may have been at the scene of the incident verification could not be made.