

NASBLA Engineering, Reporting & Analysis Committee (ERAC) – August 2017 Charge S&R-2017-1 Preliminary Analysis for Discussion¹

Exploring a possible recalculation of the numerator used in boating fatality rates: *A look at the gap between the victim's state of origin and accident location*

The Assigned Charge. In the 2017 committee cycle, as follow-up to earlier explorations of what might happen if the basis for the **denominator** used in recreational boating casualty or fatality rate calculations were to shift [from numbers of registered boats to estimates of exposure hours generated by the National Recreational Boating Survey](#),² ERAC turned attention to the feasibility and possible effects of recalculating the rate's **numerator**—the number of boating fatalities or injuries.³ The charge was to consider the implications for states' rates, particular the fatality rates, if the number were to be based on the accident victim's state of origin rather than the current calculation based on where the accident occurred.

Why Consider Modifying the Numerator? Isn't it Enough to Improve the Basis for the Denominator? While exposure hour-based statistics as the denominator in fatality or injury rates may be an improvement conceptually for assessing the risks associated with recreational boating, that change alone would not result in flawless measures, for example, of the effectiveness of a state's safe boating initiatives. As described in a July 2015 ERAC [research brief](#), the rate only accounts for where the fatality or injury occurred, not where the boat was registered or the victim resided. That is a potential issue for states with boating opportunities that attract a lot of boaters from other places; those out-of-state boaters may lack the local knowledge and will be at least partially products of their home states' boating safety cultures.⁴

What are the Challenges Associated with Considering a Change to the Numerator and Assessing the Impact on Fatality Rates? The primary challenges are the availability of relevant and valid data for a more comprehensive analysis. Currently, only one year's worth of state-level exposure data has been generated via the 2012 [National Recreational Boating Survey](#) (NRBS); that data not only serves as a potential basis for recalculating the denominator, but also for assessing the magnitude of exposure hours associated with "out-of-state" boaters versus their involvement in accidents as described in [preliminary Coast Guard work on recreational boating across state lines](#). Plotting the results from that February 2015 Fact Sheet on the NRBS, the July 2015 ERAC [brief](#)

¹ This discussion paper was prepared by Dr. Deborah Gona, ERAC staff, for charge team consideration. Many thanks to Ms. Susan Weber, USCG Representative to ERAC, for providing the database used in this initial analysis, and to Ms. Tammy Terry, Associate Member and former Chair of ERAC, for reviewing and preparing the database for creation of initial pivot tables and additional tabulations presented in the supporting materials.

² For more background, see [Breaking Down the Numbers: A Closer Look at Exposure Hours from the 2012 National Recreational Boating Survey, Small Craft Advisory, July-August 2014](#).

³ For years, recreational boating casualty and fatality rates have been one set of markers used to evaluate boating safety. The rates have been figured by taking the numbers of boating injuries or fatalities (numerator) and dividing them by the reported number of state-registered boats (denominator); to allow comparisons of the rates across time and jurisdictions, the results typically have been multiplied by a factor of 100K to standardize them.

⁴ It is important to note that state boating fatality rates—and comparisons of them—also are likely to be affected by factors other than the efficacy of state boating education and other safety programs. The composition of vessels or the types of waters involved may vary from state to state.

lends at least some credence to the suggestion that out-of-state boaters may be more likely to be involved in accidents;⁵ at minimum, the findings offer incentive to conduct more research as additional years of exposure hours are collected through future boating surveys.

However, apart from the challenges associated with exposure data is the challenge associated with the data on the accident victim's state of origin (known place of residence or vessel registration). Some of those challenges were identified in the [2015 Coast Guard work](#); others are described below and in the supporting materials.

“Recalculating” the Committee’s Assigned Charge. Given that the current set of exposure hours data is now five years old, and that the next batch is not scheduled for collection until 2018, the ERAC charge team had to consider the feasibility of proceeding with the charge as originally assigned. During the ERAC’s March 2017 in-person meeting, the team decided that it might be most appropriate to alter the scope of work as a first step toward possible future work in this area. The revised charge would focus on determining the magnitude of the issue—just how much of a gap is there is between the victim’s state of residence and the state where the accident occurred (which forms the current basis for the numerator)?

Methodology

A data request was made to the Coast Guard to pull specific fields from the Boating Accident Report Database (BARD) for the 10-year period 2006-2015:

- BARD case number
- State of residence associated with injured victims
- State of residence associated with fatal victims
- State of residence associated with operators
- Registration number
- HIN number of vessel
- Whether the vessel was rented
- Body of water of accident

For this project, in order to assemble the data for the team, the Coast Guard had to seek permissions for the release of these data fields and resulting records from jurisdictions with privacy restrictions. Before delivery, the data pull was further modified to narrow the years for analysis to the five-year period 2011-2015 because the offline Access files used to produce the annual national recreational boating statistics only have victim address data from 2011 on. While the prior address data is available online via BARD-Web, additional effort would have been needed to match it to the dataset used to produce the statistics, resulting in further delay of this initial analysis.

Additional explanatory notes about the BARD data, particular fields, records, and any restrictions on their use and disposition following completion of this project are included in a tab of the original Excel workbook provided by the Coast Guard. An explanation of the

⁵ The [research brief](#) plots the fraction of out-of-state exposure hours versus the fraction of accidents accounted for by those same boaters in 2012. If accidents matched relative exposure exactly, the points on the plot would appear as a straight line (parity line). The 2012 data indicates that 68 percent of the states lie above the parity line (see pp. 11-13).

methodology used by a charge team member in the review, clean-up (as needed), and general preparation of the data to facilitate the creation of pivot tables and additional tabulations also is included in tabs contained in two Excel workbooks—one for fatalities, the other, injuries. All of the files are available for review and additional manipulation by the charge team and are contained in a zip folder that has been uploaded to the [charge/project area of NASBLA's Basecamp](#).

Initial Analysis of the Gap between Victim's Residence and Accident Location. The tables included on pages 4 and 5 of this paper—the first presenting tabulations for fatalities, and the second, for injuries—were extracted from the last tab in each of the Excel workbooks created by the team member who manipulated the original database. Listed by the state of the fatality or injury accident (i.e., the state claiming the accident), the tables present the grand totals for the 2011-2015 period under consideration, and the following percentages:

% of fatalities / injuries that were residents of state where fatality occurred

% of fatalities / injuries that did not have valid residency information available

% of fatalities / injuries that were out of state residents

This initial pull and set of tabulations offer some interesting results for team consideration:

- In the case of fatalities, based on the available data for 2011-2015 and employing an admittedly arbitrary measuring stick, there are 11 jurisdictions for which at least 30 percent of their fatalities involved persons from out of state. There are at least three others for which the results are uncertain because of the large percentage of fatalities that did not have valid residency information.
- In the case of injuries, based on the available data for 2011-2015 and employing the same measuring stick, there are 13 jurisdictions for which at least 30 percent of their injuries involved persons from out of state. There are at least five others for which the results are uncertain because of the percentage of injuries that did not have valid residency information.
- For the period 2011-2015, a minimum of eight jurisdictions crossed that 30 percent mark for non-residents in both their fatality and injury accidents.
- Apart from the numerator issue, this preliminary run of data offers some basic, but potentially useful information to states that might not have had an opportunity to take a broader look at the origins of the persons involved in the fatality and injury accidents occurring in their jurisdictions. While some states are extremely aware of the composition of persons involved in accidents that have occurred in their states, others might not have assessed their accidents in this way. The results of this exercise suggest that it might be useful to proceed with the extra effort to compile the 10-years' worth of fatality and injury data, with an evaluation using the same or, if warranted, an improved methodology.

What do YOU see in the data?

| | | | | Count of BARDID 2011-2015 |
|-----------------------|--|--|---|--|
| Grand Total 2011-2015 | % of Fatalities that were residents of state where fatality occurred* | % of Fatalities that did not have valid residency information available* | % of Fatalities that were out of state residents* | STATE OF FATALITY ACCIDENT (STATE CLAIMING ACCIDENT) |
| 65 | 73.85% | 7.69% | 18.46% | AK |
| 80 | 77.50% | 15.00% | 7.50% | AL |
| 55 | 80.00% | 0.00% | 20.00% | AR |
| 37 | 35.14% | 8.11% | 56.76% | AZ |
| 225 | 80.89% | 15.11% | 4.00% | CA |
| 41 | 75.61% | 7.32% | 17.07% | CO |
| 27 | 77.78% | 11.11% | 11.11% | CT |
| 1 | 0.00% | 0.00% | 100.00% | DC |
| 6 | 66.67% | 0.00% | 33.33% | DE |
| 291 | 84.54% | 4.81% | 10.65% | FL |
| 78 | 74.36% | 5.13% | 20.51% | GA |
| 6 | 83.33% | 16.67% | 0.00% | GU |
| 23 | 56.52% | 30.43% | 13.04% | HI |
| 28 | 85.71% | 3.57% | 10.71% | IA |
| 51 | 56.86% | 5.88% | 37.25% | ID |
| 82 | 90.24% | 0.00% | 9.76% | IL |
| 31 | 54.84% | 3.23% | 41.94% | IN |
| 22 | 90.91% | 0.00% | 9.09% | KS |
| 52 | 78.85% | 1.92% | 19.23% | KY |
| 116 | 88.79% | 4.31% | 6.90% | LA |
| 49 | 89.80% | 2.04% | 8.16% | MA |
| 79 | 68.35% | 10.13% | 21.52% | MD |
| 35 | 62.86% | 2.86% | 34.29% | ME |
| 106 | 85.85% | 8.49% | 5.66% | MI |
| 75 | 84.00% | 1.33% | 14.67% | MN |
| 79 | 83.54% | 2.53% | 13.92% | MO |
| 49 | 79.59% | 12.24% | 8.16% | MS |
| 35 | 65.71% | 2.86% | 31.43% | MT |
| 113 | 78.76% | 5.31% | 15.93% | NC |
| 15 | 80.00% | 0.00% | 20.00% | ND |
| 18 | 72.22% | 0.00% | 27.78% | NE |
| 12 | 66.67% | 0.00% | 33.33% | NH |
| 34 | 76.47% | 2.94% | 20.59% | NJ |
| 5 | 100.00% | 0.00% | 0.00% | NM |
| 32 | 50.00% | 15.63% | 34.38% | NV |
| 115 | 88.70% | 5.22% | 6.09% | NY |
| 74 | 90.54% | 1.35% | 8.11% | OH |
| 54 | 81.48% | 0.00% | 18.52% | OK |
| 63 | 79.37% | 1.59% | 19.05% | OR |
| 75 | 84.00% | 5.33% | 10.67% | PA |
| 12 | 16.67% | 83.33% | 0.00% | PR |
| 10 | 50.00% | 0.00% | 50.00% | RI |
| 91 | 91.21% | 1.10% | 7.69% | SC |
| 12 | 75.00% | 8.33% | 16.67% | SD |
| 90 | 75.56% | 4.44% | 20.00% | TN |
| 183 | 76.50% | 21.31% | 2.19% | TX |
| 38 | 65.79% | 0.00% | 34.21% | UT |
| 71 | 81.69% | 5.63% | 12.68% | VA |
| 3 | 0.00% | 100.00% | 0.00% | VI |
| 5 | 80.00% | 20.00% | 0.00% | VT |
| 113 | 83.19% | 7.08% | 9.73% | WA |
| 86 | 73.26% | 0.00% | 26.74% | WI |
| 20 | 75.00% | 5.00% | 20.00% | WV |
| 11 | 72.73% | 0.00% | 27.27% | WY |
| 26 | NA | NA | NA | OFFSHORE (CG) |
| 3205 | | | | Grand Total |
| | *See Methodology notes in Excel file 2011-2015Data_Fatalities review_Not for Distn_ERAC use only | | | |

| | | | | Count of BARDID 2011-2015 |
|-------------|---|--|---|--|
| Grand Total | % of Injuries that were residents of state where injury occurred* | % of Injuries that did not have valid residency information* | % of Injuries that were out of state residents* | STATE OF INJURY ACCIDENT (STATE CLAIMING ACCIDENT) |
| 38 | 86.84% | 7.89% | 5.26% | AK |
| 241 | 71.78% | 8.30% | 19.92% | AL |
| 166 | 72.29% | 0.00% | 27.71% | AR |
| 440 | 46.14% | 8.86% | 45.00% | AZ |
| 1331 | 77.46% | 17.36% | 5.18% | CA |
| 157 | 82.17% | 12.74% | 5.10% | CO |
| 145 | 75.17% | 12.41% | 12.41% | CT |
| 6 | 0.00% | 50.00% | 50.00% | DC |
| 28 | 50.00% | 3.57% | 46.43% | DE |
| 1943 | 72.72% | 9.78% | 17.50% | FL |
| 360 | 81.67% | 6.39% | 11.94% | GA |
| 8 | 75.00% | 25.00% | 0.00% | GU |
| 25 | 48.00% | 40.00% | 12.00% | HI |
| 106 | 74.53% | 5.66% | 19.81% | IA |
| 156 | 67.31% | 5.13% | 27.56% | ID |
| 291 | 84.88% | 3.44% | 11.68% | IL |
| 142 | 59.86% | 8.45% | 31.69% | IN |
| 79 | 89.87% | 1.27% | 8.86% | KS |
| 151 | 67.55% | 9.27% | 23.18% | KY |
| 453 | 86.09% | 3.75% | 10.15% | LA |
| 206 | 77.18% | 8.74% | 14.08% | MA |
| 586 | 52.39% | 13.31% | 34.30% | MD |
| 125 | 45.60% | 12.80% | 41.60% | ME |
| 317 | 73.50% | 9.15% | 17.35% | MI |
| 282 | 81.56% | 4.26% | 14.18% | MN |
| 438 | 58.90% | 1.83% | 39.27% | MO |
| 115 | 61.74% | 12.17% | 26.09% | MS |
| 53 | 77.36% | 9.43% | 13.21% | MT |
| 448 | 73.66% | 3.13% | 23.21% | NC |
| 20 | 80.00% | 0.00% | 20.00% | ND |
| 143 | 81.12% | 0.70% | 18.18% | NE |
| 113 | 45.13% | 7.96% | 46.90% | NH |
| 332 | 66.27% | 3.92% | 29.82% | NJ |
| 59 | 72.88% | 1.69% | 25.42% | NM |
| 173 | 39.88% | 9.25% | 50.87% | NV |
| 545 | 64.77% | 25.69% | 9.54% | NY |
| 320 | 89.69% | 2.19% | 8.13% | OH |
| 214 | 81.31% | 5.61% | 13.08% | OK |
| 175 | 77.71% | 14.29% | 8.00% | OR |
| 226 | 82.74% | 3.98% | 13.27% | PA |
| 8 | 0.00% | 100.00% | 0.00% | PR |
| 82 | 59.76% | 2.44% | 37.80% | RI |
| 384 | 68.49% | 4.43% | 27.08% | SC |
| 40 | 85.00% | 0.00% | 15.00% | SD |
| 368 | 76.36% | 2.45% | 21.20% | TN |
| 539 | 79.22% | 16.88% | 3.90% | TX |
| 292 | 70.21% | 8.56% | 21.23% | UT |
| 282 | 78.01% | 4.26% | 17.73% | VA |
| 7 | 0.00% | 100.00% | 0.00% | VI |
| 19 | 42.11% | 36.84% | 21.05% | VT |
| 293 | 84.30% | 6.14% | 9.56% | WA |
| 354 | 62.43% | 2.26% | 35.31% | WI |
| 67 | 55.22% | 0.00% | 44.78% | WV |
| 59 | 72.88% | 3.39% | 23.73% | WY |
| 38 | NA | NA | NA | OFFSHORE (CG) |
| 13988 | | | | Grand Total |

*See Methodology notes in Excel file 2011-2015Data_Injuries review_Not for Distn_ERAC use only