

## ***Recreational Boater Safety Survey Results from the Port of Duluth-Superior Commercial Harbor***

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Produced for the United States Coast Guard (USCG) Marine Safety Unit (MSU) Duluth by University of Minnesota Sea Grant Resiliency Specialist Thomas Beery.

### **Background**

As the number of recreational boaters and other watersport enthusiasts using the commercial harbor in the Port of Duluth-Superior increases, the U.S. Coast Guard, the shipping industry, Minnesota Sea Grant, and recreational outfitters are all seeking ways to safely and economically co-exist. In 2017, MSU Duluth asked Minnesota Sea Grant for help assessing the perspectives of safety and risk by recreational boaters who use the Port of Duluth-Superior harbor.

This report details the outcomes of a survey conducted in the Duluth-Superior harbor during the summer of 2017. This report also includes a brief background on risk management, an overview of the survey methods used and the results, and possible next steps for future risk management planning and community outreach.

### **Risk Management**

The research and literature on outdoor safety management provides a firm foundation for thinking about risk and risk management in the Duluth-Superior harbor. Accident models are useful tools for assessing potential accidents and facilitating safety. If we start with a simplified Dynamics of Accidents Model (see Figure 1), accident potential is presented as the sum of environmental hazards such as weather or water and human factors such as experience or communication. Simple diagrams of this nature help organize risk management planning.



Figure 1. Dynamics of Accidents Model<sup>1</sup>

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<sup>1</sup> Curtis, R. (n.d.). Outdoor Action Guide to Outdoor Safety Management. Retrieved October 10, 2017 <https://www.princeton.edu/~oa/safety/safeman.shtml>

The Duluth-Superior harbor, however, is complicated. It supports recreational and commercial users and is connected both to a Great Lake and a major freshwater estuary. Given this complex setting, a revised version of the Dynamics of Accidents Model is presented in Figure 2. The revised model adds locally specific environmental and human hazards, and also recognizes that an additional category of hazards exists, the “Intertwined Environmental and Human Hazards” category. The model is not intended to provide a comprehensive list of hazards, but is intended to display a sense of the complexity of the setting.

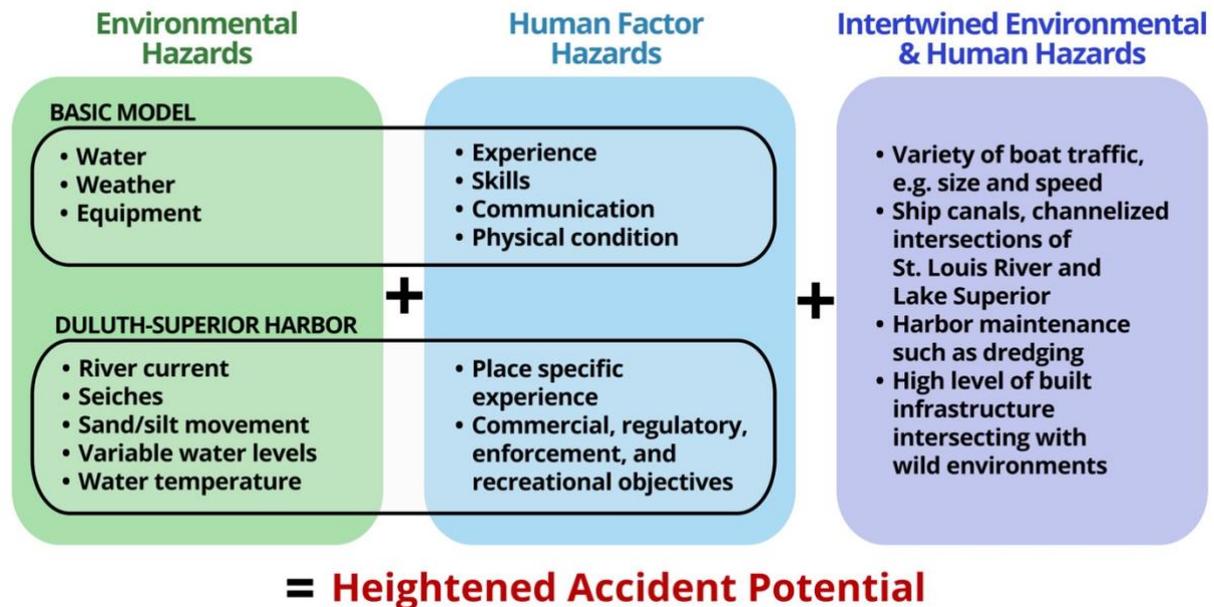


Figure 2. Dynamics of Accidents Model: Duluth-Superior harbor

## Methods

An in-person recreational boater safety survey was developed and field tested at boat landings in the Duluth-Superior harbor in July 2017. Using the results from the field testing, an online survey was developed, reviewed by the University of Minnesota Institutional Review Board, and distributed. Survey participation was voluntary and individual participants are not identifiable. While the majority of outreach to encourage participation in the survey was electronic, (i.e., appeals to boater groups and commercial recreational boating interests with email lists), approximately 20% percent of the outreach was in person at local boat landings. The survey was active from July through September 2017.

## Results

A total of 215 individuals responded to the survey. Two thirds of all of participants identified themselves as male and one third as female. The distribution of participant ages was broad (from 18 to 78) and relatively evenly distributed with a peak in the 48-57 age range. The distribution of types of boaters was 41% sail boaters, 33% paddle-sport boaters, and 26% motorized boaters (see Figure 3).

## Duluth-Superior Harbor Recreational Boating

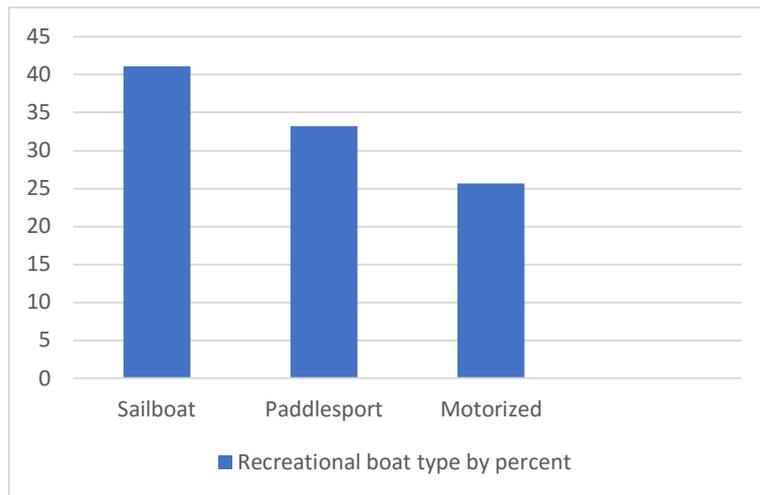


Figure 3. Responses to the survey question, “What kind of boat are you most likely to use when you recreate in the Duluth-Superior harbor?”

Survey participants were overwhelmingly from the Duluth area as indicated by the zip code they provided when asked for residency. Eighty percent of the reported zip codes from participants (n= 170) were from South St. Louis, North Carlton, and Northwest Douglas counties. Forty-five percent of participants reported that they engage in recreational boating in the Duluth-Superior harbor more than 16 times per year (see Figure 4).

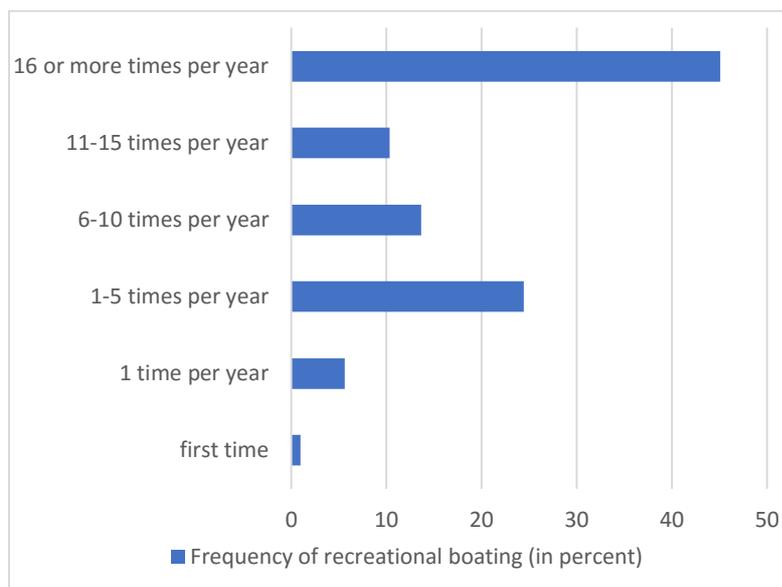


Figure 4. Responses to the survey question, “Please identify how often you boat in the Duluth-Superior harbor”

Recreational boat use by Duluth-Superior harbor zone was addressed in a number of survey questions. Although results show that all zones of the Duluth-Superior harbor are used by recreational boaters (see Figure 5 and Figure 6), zones 1 and 2 emerged as areas most likely to be used (see Figure 6).

## Duluth-Superior Harbor Recreational Boating

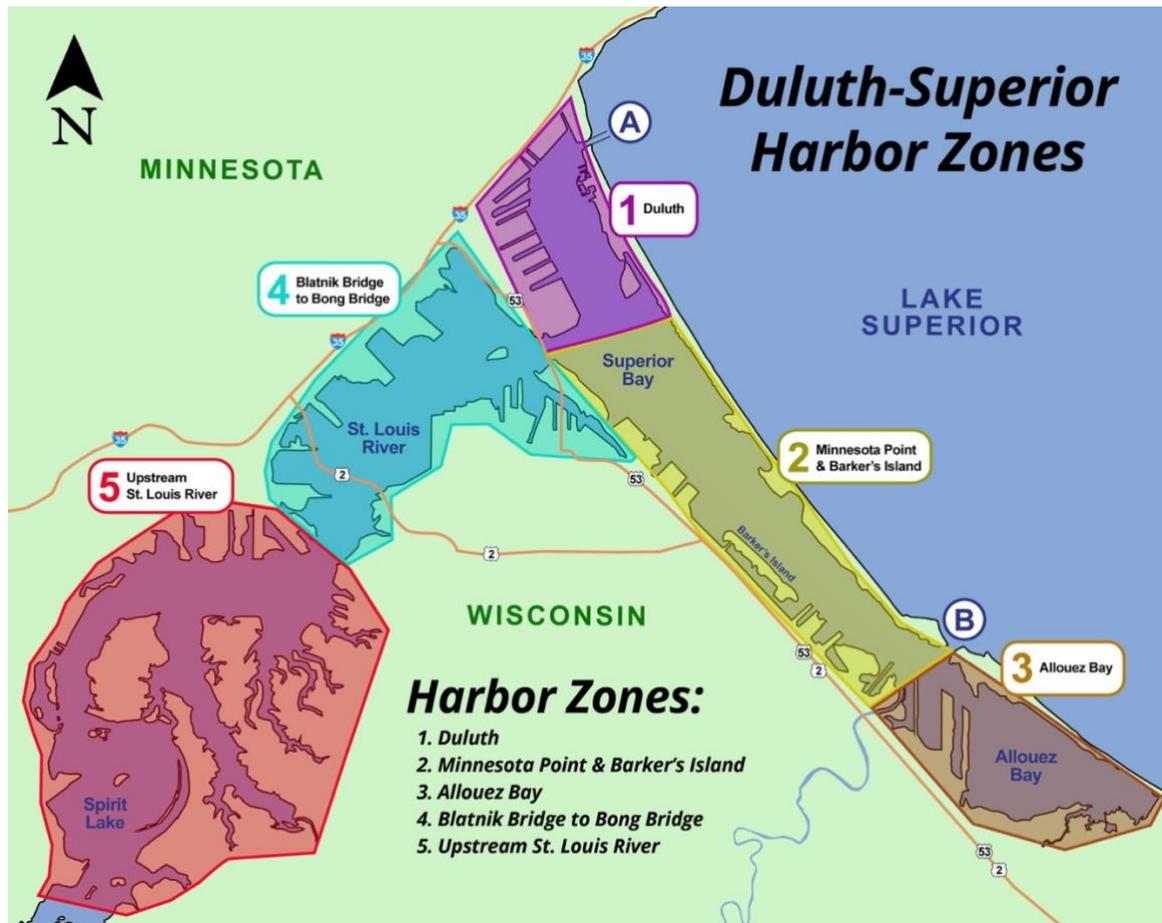


Figure 5. Duluth-Superior harbor zone map

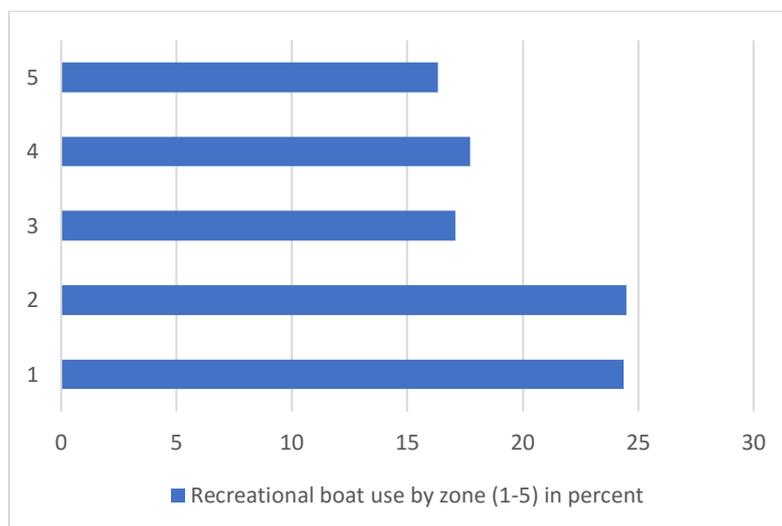


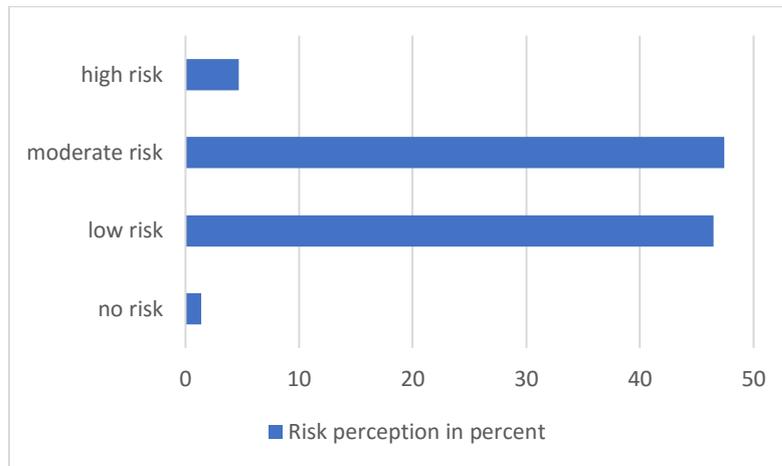
Figure 6. Percent time spent recreational boating by Duluth-Superior harbor zones

In addition to boater use in specific harbor zones, 88% of participants said they boated in or through the Duluth Ship Canal (Figure 5, point A) and 78% of participants said they boated in or through the Superior Ship Canal (Figure 5, point B).

The general perception of risk associated with recreational boating in the Duluth-Superior harbor reported by survey participants was low to moderate. On a scale of 1 to 4 where low

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risk is 1 and high risk is 4, the average rating was 2.55 (Figure 7). Interestingly, few participants perceived recreational boating in the Duluth-Superior harbor as having either “no risk” or “high risk.”



*Figure 7.* General perception of the risks associated with recreational boating in the Duluth-Superior harbor.

The question of whether there was a relationship between risk perception and type of boating was investigated. In order to test this potential relationship, a statistical testing method called analysis of variance (ANOVA) was used. Participants who identified as sail boaters reported the lowest risk-perception rating (2.30) of any of the three user groups. This score showed a statistically significant difference when compared to the other two groups (paddle sports boaters reported 2.71 and motorized boaters reported 2.76). Simply stated, the sail boating participants, in general, perceive less risk in the harbor than other recreational boater groups.

The specific elements of risk perception are listed in Table 1. Weather events were the top risk category identified, followed by two aspects of harbor traffic; commercial vessels and other recreational boats. The risk category of “other” included 8 of 21 responses that described behavior from other boaters; these responses indicate additional weight to the “other recreational boats of all types” risk category.

Risk Category	%	Count
weather events (precipitation, wind, fog, etc.)	16.08%	200
commercial vessels (ships, barges, etc.)	14.15%	176
other recreational boats of all types	12.86%	160
visible physical hazards (logs floating, rocks, etc.)	11.98%	149
subsurface non-visible obstacles	10.05%	125
water temperatures	9.00%	112
water currents	8.92%	111
built harbor structures (in use or abandoned)	6.11%	76

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Risk Category continued	%	Count
sea planes	5.23%	65
living natural hazards (e.g., animals (birds), shoreline vegetation, etc.)	1.61%	20
fishing nets	1.21%	15
human onshore behavior, please describe briefly	1.13%	14
other, please list:	1.69%	21
Total	100%	1244

*Table 1.* Specific risks considered by recreational boaters in the Duluth-Superior harbor

Survey participants reported a wide variety of sources for accessing safety information (Table 2). The top two categories were online sources and government agencies. The specific agencies noted most frequently (cited in the open-ended follow-up question) were the National Oceanic and Atmospheric Administration (NOAA) and the United States Coast Guard (USCG), which were mentioned 40 and 39 times respectively. The number three source of safety information was the category of “friends and family.” Of interest was the result showing only 16 out of the 215 participants answered that they did not seek safety information.

Duluth-Superior harbor recreational boating safety information	%	Count
online sources (blogs, other websites)	21.71%	112
government agency	20.93%	108
friends/family	14.53%	75
electronic chart plotter (GPS, Hummingbird, Raytheon, etc.)	13.18%	68
other	8.72%	45
local radio/associated websites	6.20%	32
local newspaper/associated websites	5.04%	26
local TV/associated websites	3.68%	19
I do not seek safety information	3.10%	16
local business, please specify	2.91%	15
Total	100%	516

*Table 2.* Safety information sources sought by survey participants

## Discussion

The results in this report provide a snapshot of recreational boater perceptions and/or perspectives in the Duluth-Superior harbor based on 215 responses to our recreational

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boater survey. Each of the following themes of analysis address implications and/or actions for consideration in risk management and safety planning for the Duluth-Superior harbor.

### **Active Users, Dynamic Places**

It was reported that survey participants show a generally high level of Duluth-Superior harbor use (16 or more times per year). It has also been shown that recreational boaters use the entire Duluth-Superior harbor (Figure 5). Zones 1 and 2 are used most frequently. Zones 1 and 2 also represent the areas with the most diverse and concentrated harbor activity and are home to research boats (e.g. University of Minnesota's research vessel R/V Blue Heron), numerous commercial shipping sites (e.g. Calumet Duluth Marine Terminal's fueling facility), government agencies (e.g. U.S. Coast Guard station), and privately owned and residential zoned property. It was also noted that a majority of recreational boaters access Lake Superior via the Duluth Ship Canal in zone 1 and the Superior Ship Canal in zone 2.

### **Implications and actions for future recreational boater safety planning:**

- Prioritize efforts in zones 1 & 2. Focus extra attention on these areas in the crafting of safety outreach.

### **Risk Perception**

Survey participants reported that the top two risks, after weather, were the risks resulting from other boats in the Duluth-Superior harbor, specifically, commercial vessels such as ships, lakers, and barges and all types of other recreational boats. This result makes sense given recreational boater use of zones 1 and 2 where boaters would likely encounter commercial vessels

### **Implications and actions:**

- Seek out leaders in the paddle sport, sailboat, and motorized boating communities to help refine the safety messages in ways that are tailored to their specific user groups.
- The mix of boat traffic (i.e., commercial, educational, enforcement, and recreational) must be addressed as a risk of special attention within risk management planning.

### **Duluth-Superior Harbor Safety Information Access**

Of particular importance in the risk perception survey responses was the result that only a very few participants, 16 (7% of all participants) reported they did not seek safety information. The other 93% of participants reported that they use a variety of safety information sources. This finding is a reminder that recreational boating safety information is sought after and used. The overlap between the top two reported sources of safety information - government agencies and online sources - may offer a starting point for where to improve public access to quality safety information. A coordinated safety messaging effort by the top two government agencies - NOAA and the USCG - could significantly improve safety awareness by recreational boaters in the harbor. Results showed that local messaging is important, with 80% of survey participants residing locally. However, it must be noted that survey distribution likely favored a local sample. In acknowledgement of missing adequate input of the non-local user, a mechanism to identify and reach out to non-local recreational boaters is needed.

### Implications and actions:

- Create a Duluth-Superior harbor recreation safety web portal. Such a site could include prominent links to NOAA/USCG sites for recreational boating safety information; links to water quality and water safety information, including rip current (e.g. ParkPointBeach.org safety), and links to plant and wildlife conservation safety (i.e. areas with restrictions due to nesting birds), etc.
- Identify and survey recreational users from outside the local area in order to gain a better understanding of their perspectives and experiences and how recreational boater safety outreach can be best tailored to them.

### A Ripple Effect?

Friends and family was the third most important source of safety information reported by survey participants. If, for example, NOAA and USCG can improve online recreational boater safety information, and Minnesota Sea Grant and other organizations can direct more people to those quality sources, then the information passed along by friends and family would more likely be useful and accurate.

### Implications and actions:

- Capitalize on the friends-and-family pathway of information sharing. Develop and use a tell-a-friend approach in a campaign to share recreational boater safety information.

## Conclusion

The implications and actions noted above and abbreviated in the following list provide opportunity to include the recreational boater perspective in the Duluth-Superior harbor safety planning process:

- **Prioritize Duluth-Superior harbor zones 1 & 2 for safety messaging.**
- **Coordinate Duluth-Superior harbor and Lake Superior recreational boater safety messages.**
- **Seek out leaders in the paddle sport, sailboat, and motorized boating communities to help refine the safety messages in ways that are tailored to their specific user groups.**
- **Address commercial and recreational boat traffic within risk management planning.**
- **Create a Duluth-Superior harbor recreation safety web portal that features the most-used safety sources such as NOAA and the United States Coast Guard.**
- **Use a tell-a-friend approach in a campaign to share safety information.**
- **Identify the non-local user. Assess the number of this group and consider how messaging should be tailored to this group.**

All questions or comments should be directed to Thomas Beery at University of Minnesota Sea Grant, [tbeery@d.umn.edu](mailto:tbeery@d.umn.edu). Figures 1, 2 & 5 were designed by Thomas Beery and Chris Benson, University of Minnesota Sea Grant. Thanks to Dale Bergeron, Christyn Buchholz, Sharon Moen, and Marie Thomas, University of Minnesota Sea Grant.

