



## 2002 National Recreational Boating Survey Report

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United States  
Coast Guard



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Office of  
Boating Safety

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## **Executive Summary**

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With more than 70 million Americans enjoying boating<sup>1</sup> and over 13 million registered recreational vessels in the United States<sup>2</sup>, ensuring accident-free boating activity is a challenge at best. In order to assist agencies in developing intervention strategies to reduce boater risk, the United States Coast Guard has conducted the National Recreational Boating Survey (NRBS). A total of 25,547 completed surveys were completed with individuals who operated boats between September 2001 and September 2002.

### **1. Boating Experience (page 15)**

- The most popular type of boat used was the open motorboat with 48% of respondents reporting that they operated this type of boat. Canoes were used next most often (30%). Houseboats and auxiliary (motor) sailboats were used the least most often (3% and 4% respectively).
- Almost 60 million recreational boats were used between September 2001 and 2002.
- The average number of passengers was 3. Houseboats and pontoon boats averaged the most passengers (6.79 and 4.57 respectively). Rowboats averaged the least number of passengers (1.8).
- Over 209 million operators (primary and secondary) went boating between September 2001 and 2002.
- The estimated number of days primary and secondary boat operators went boating was over 1 billion.
- Houseboats tended to be out on the water longer per day than other types of boats with an average of 14.7 hours a day. Auxiliary sailboats and cabin motorboats were out next longest with about 7 hours a day on average. Smaller vessels such as canoes, kayaks, rowboats, inflatables, and personal watercraft tend to be out on the water an average of 3 hours per day.
- Motorboats were most likely to be owned by boaters, with nearly 65% of cabin motorboats and 71% of open motorboats owned by their primary operators. Houseboats were the least likely to be owned by their operators at 27%.
- About 51% of all boats used were owned or shared, 16% were rented, 13% were borrowed, and in 19% of the time the operator went boating with the owner of the boat.

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<sup>1</sup> National Association of State Boating Law Administrator (NASBLA) estimate.

<sup>2</sup> "Reference Guide to State Boating Laws" page 4.

## **2. Boating Knowledge (page 30)**

- Over 65% of boat operators have never taken a boating safety course. Only 2% have taken a course within the past year while 15% have not taken a course within the past 10 years.
- When a safety course was taken, the most popular type was a classroom course (70%) given by the USCG Auxiliary (32%).
- Over 70% of boat operators using canoes, kayaks, rowboats, inflatables, pontoon boats, and houseboats have never taken a boating safety course. Operators of cabin motorboats and auxiliary sailboats were most likely to have taken a boating safety course (37% and 38% respectively). For the most used boat, open motorboat, over 66% of operators have not taken a boating safety course.
- Over 60% of boat operators have had over 100 hours of boating experience. Only 10% have had less than 10 hours.
- Most boat operators do not belong to a boating-oriented organization. Of those who do, Boat U.S. has the highest percentage of members (11%).
- Approximately 58% of boat operators indicated that they had heard, read, or seen information about boating safety. Television and magazines were the primary sources for information about boating safety, mentioned by 42% of boat operators.
- Boat operators were most likely to have heard, read, or seen information about PFD use and alcohol use (66% and 62% respectively). Over 16% of boat operators remember seeing, reading, or hearing something about the dangers of carbon monoxide poisoning.

## **3. Boating on the Boat Used Most Often (page 43)**

- The type of boat operated most often was an open motorboat (36%). The second most operated boat was the canoe (16%) with personal watercraft a close third (10%).
- Over 43% of the boats used most often were under 16 feet long. Approximately 35% were between 16 and 20 feet long.
- The highest percentage of boat operators were between 40 and 49 years of age (24%). About 6% of boat operators were under 19 years of age while a little over 5% were over 70 years of age.
- The vast majority of boat operators under the age of 19 operated boats under 16 feet in length (74%). A total of 64% of 20 to 29 year olds also operated smaller boats. Older boat operators were more likely to operate longer boats with over 40% (ranging from 37% to 43%) of 40 and older boat operators reporting 16 to 20 feet boats for the one they operated most often.

### *Boating on the Boat Used Most Often Continued*

- Over 40% of boat operators indicated that they carried at least one occupant between the ages of 13 to 19, 20 to 29, 30 to 39, and 40 to 49.
- Boat operators were least likely to have someone over 70 years of age on their boat (9%).
- On average, boat operators tended to carry only one passenger with them when they go boating.
- In general, the smaller the boat, the younger the passenger. Over 70% of passengers under the age of 6 and between 6 and 12 have been passengers on a boat under 16 feet in length. A little over 60% of passengers between the ages of 13 to 19 and 20 to 29 have been on a boat under 16 feet in length as well.
- The majority (55%) of boats operated most often used propellers as its means of propulsion. Manual oars and paddles made up an additional 29% of all boats.
- When the boat operated most often had an engine, the vast majority (88%) had only one engine.
- Over 59% of boats with motors had an outboard engine while 26% had an inboard engine.

#### **4. Activities on the Boat Operated Most Often (page 63)**

- Recreational fishing was the most popular activity on the boat operated most often (51%) and cruising was the second most popular (44%). About 29% of boat operators reported that they swam or dove off their boats.
- Of the boat operators who swam or dove off the boat, the most frequent type of boat used was an inflatable (43%), pontoon boat (48%), houseboat (59%), or cabin motorboat (40%).
- Recreational fishing was popular on all boats, with at least 40% reporting this activity, except kayaks (13%), inflatables (32%), auxiliary sailboats (14%), sail only sailboats (19%) and personal watercraft (14%).
- The majority of boating done on the boat operated most often was on lakes, ponds, reservoirs, and gravel pits (52%). The second most popular type of water was rivers, streams, and creeks (21%).
- The state with the highest percentage of boat operators reporting that they usually boat in that state were California, Florida, Michigan and Texas (ranging from 5% to 7%).

## **5. Boating Safety Knowledge and Experience (page 87)**

- When looking at the relationship between boats operated most often and whether or not the boat operator had taken a boating safety course, over 60% of all boaters had not taken a boating safety course with the exception of auxiliary sailboaters (31%), cabin motorboaters (35%) and sail only sailboaters (46%). Although operators of these three types of boats were much more likely to have taken a safety course, over 20% took the course more than 10 years ago.
- Boat operators who operated cabin motorboats most often were more likely to have taken a safety course within the past 5 years (31%) than other boat operators while operators of rowboats were least likely (6%). Over 20% of both auxiliary and sail only sailboat operators took a boating safety course within the past 5 years.
- Boat operators who operated an auxiliary sailboat (65%) or a cabin motorboat (64%) most often were more likely to have over 500 hours of experience than other boat operators. Over 40% of pontoon boat, houseboat, sail only sailboats, and open motorboat operators had over 500 hours of experience.
- A little over 4% of boat operators who used rowboats, personal watercraft, and inflatables had less than 1 hour of boating experience.
- Of those boat operators who have had less than 10 hours of boating experience, the highest percentages were for inflatables (27%), personal watercraft (23%), and rowboats (20%). Seventeen percent (17%) of canoe and kayak operators had less than 10 hours of boating experience.
- The types of equipment most likely to be carried on a boat were PFDs (96%), paddles and oars (79%), anchors and lines (70%), safety ropes (65%), flashlights (63%), first aid kits (60%), cellular phones (60%), and tool kits (60%).

## **6. Personal Flotation Devices on the Boat Operated Most Often (page 95)**

- Over 95% of boat operators reported that they carried enough PFDs for every passenger including themselves on the boat they operated most often.
- Inflatable boat operators were most likely to not have enough PFDs for everyone on board (11%). Around 4% of canoe, kayak, and rowboat operators also did not carry enough PFDs for all aboard.
- A total of 34% of boat operators reported that they wore a PFD whenever they boat. Conversely 20% report that they never wore a PFD.
- Of all boat operators, those that went boating on personal watercraft (PWC) (88%), kayaks (76%), and canoes (64%) were most likely to have worn a PFD most of the time while on the water.

### *Personal Flotation Devices on the Boat Operated Most Often Continued*

- Boat operators that went boating on cabin motorboats (12%), houseboats (20%), pontoon boats (25%), and auxiliary sailboats (26%) were the least likely to have worn a PFD most of the time while on the water.
- In general, the younger the boat operator, the more likely they wore a PFD most of the time on the water. About 73% of boat operators under 19 years of age wore a PFD most of the time while a little over 35% of those older than 60 wore a PFD most of the time.
- In general, the younger the boat passenger, the more likely they were to have worn a PFD most of the time on the water. A total of 96% of passengers under 6 and 89% of passengers 6 to 12 wore a PFD most of the time. A little over 30% of passengers over 60 wore a PFD most of the time.
- The activity where boat operators were most likely to have worn a PFD most of the time was when water-skiing or tubing (82%). Operators boating in rough water (65%), in strong currents (62%), and under strong winds (62%) were also highly likely to have worn a PFD.
- The least likely time to have worn a PFD most of the time was when the boat operator was anchored or moored (24%) or fishing (30%).

## **7. Boating Incidents (page 105)**

- The average number of hours on the water when one or more people were injured that required medical treatment was 14.9 (median hours was 2). The average number of hours on the water when one or more boats or property was damaged was 8.0 (median hours was 3).
- When boats or property were damaged the cause was something that the boat operator or passenger did 34% of the time. A hazard or people in the water accounted for 30% of boat or property damage.
- There was a wide variety of reasons why a person was injured requiring treatment beyond first aid, but the largest single reason (26%) was that there was a problem with something that the boat operator or a passenger did. A problem with something that another boater did accounted for an additional 18% of this type of incident.
- The primary problem with a boat when people were injured and required medical treatment was engine failure (44%). The second most frequent problem was a steering failure (19%).
- The type of boat being operated when property or boat damage (49%), or injury beyond first aid occurred (36%) tended to be an open motorboat. The second most frequently used boat when these types of accidents occurred was a personal watercraft, with 13% for boat or property damage and 21% for people injured.

### *Boating Incidents Continued*

- About 50% of the people who reported they fell overboard wore a PFD.

## **8. Predictors of Involvement in a Boating Incident (page 121)**

The following characteristics were correlated with having been involved in a *boating incident*:

- Younger boat operators tended to report experiencing more incidents overall and more serious incidents than older boaters.
- Boat operators with higher awareness of boating safety (i.e., those who completed a safety course or heard, saw, or read about boating safety in the past year) were more likely to report they thought a dangerous situation might develop while boating although it did not.
- Registered boaters were more likely to report that they thought a dangerous situation might develop while boating compared with nonregistered boaters. Nonregistered boaters, on the other hand, were three times more likely to report that they experienced an incident in which people were in danger in the water.
- Operators who reported alcohol was “always” consumed on board were three times more likely to report being involved in an incident which resulted in property damage and five times more likely to report being involved in an incident which resulted in serious injuries compared with those who report alcohol was “never” consumed on board.

## **9. Predictors of Participation in a Boating Safety Course (page 131)**

The following characteristics were correlated with having taken a *boating safety course*:

- Younger boat operators were less likely to have completed a safety course than older boaters.
- Registered boaters were more likely to have completed a boating safety course than nonregistered boaters.
- Operators with higher levels of awareness of boating safety issues were more likely to have completed a boating safety course than those with lower levels of awareness.
- Alcohol use while boating was also related to safety course completion, but in a complex way. Operators who reported moderate levels of alcohol consumption on board their vessels were slightly more likely to have completed a safety course compared with operators who report alcohol was “always” or “never” consumed on board.

### *Predictors of Participation in a Boating Safety Course Continued*

- Boat operators who completed a boating safety course were somewhat more likely to agree that people who operate boats should be required to pass a test to demonstrate their knowledge of boating laws.
- Operators who have not completed a safety course were more likely to agree that persons of all ages should be required to wear a life jacket or PFD while on a boat.
- If a boat operator has completed a safety course, he or she was less likely to agree that the amount and/or type of boating traffic should be restricted in certain areas.

### **10. Predictors of PFD Use (page 138)**

The following characteristics were correlated with *wearing a PFD*:

- Although younger boat operators were less likely to have completed a safety course, younger boat operators were actually *more* likely to report that they have worn PFDs.
- Female boat operators were more likely to report they wore PFDs regularly compared to males.
- Although education was positively correlated with safety course completion, it was *inversely* related to PFD use. That is, boat operators with lower levels of education were *more* likely to report that they use a PFD regularly.
- Respondents who reported that they were not able to swim were significantly more likely to have worn PFDs all or most of the time compared to boaters who know how to swim.
- Registered boaters were less likely to report having worn PFDs regularly compared to nonregistered boaters.
- Boat operators with increased exposure to safety information (those who completed a safety course or who remember seeing, hearing, or reading safety information) were less likely to report having worn PFDs regularly.
- Frequency of alcohol consumption on board while boating and PFD use appear to be inversely related; almost half of operators who reported that alcohol was “always” consumed while boating indicated that they “never” wore PFDs while boating (48%).

*Predictors of PFD Use Continued*

- Operators who reported having worn PFDs “always” or “most of the time” were more likely to agree that people who operate boats should be required to have licenses.
- Self-reported PFD use was correlated with the attitude that all boaters should be required to wear a life jacket/PFD while on a boat, especially children under age 13.
- Operators who wore PFDs regularly were also more likely to agree that the amount and/or type of boating traffic should be restricted in certain areas.

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## **I. METHODOLOGY**

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The National Recreational Boating Survey (NRBS) was conducted using a retrospective survey design that takes into account research approaches that enhance participants' recall, thus increasing accuracy of the resulting estimates. A total of 25,547 surveys were completed with individuals who went boating between September 2001 and September 2002. This section provides an overview of the survey methodology.

### ***A. Questionnaire Development***

The NRBS questionnaire covered boating experiences between September 2001 and September 2002. Questions were developed to enhance accuracy and reliability of recall information. Topics covered included boating experiences, boat characteristics, safety equipment available, opinions regarding boating issues, and unsafe boating incidences. The mail-out survey questionnaire is presented in Appendix A. Questions for the survey were collected from a variety of sources and then tested in four focus groups. Survey questions were also reviewed by State and national boating administrators, United States Coast Guard personnel, State boating law administrators, State boating agency staff, and boating association staff.

### ***B. Data Collection***

A stratified sampling method was used such that 500 eligible boaters within each State were surveyed; 250 of those boaters owned registered boats and 250 did not own registered boats. Two different data collection methodologies were used depending on the type of boater: individuals with a boat registered with their State (registered boaters) or boaters who did not own a boat registered with their State (nonregistered boaters).

For the State sample of registered boaters, stratified random sampling was conducted by completing approximately 250 surveys with registered boaters from each State, stratified by the size of the vessel. All States were asked to provide a list of boaters registered in that State. Nineteen States declined to provide lists. Registered boater lists were obtained from Polk International for fourteen of those States. Registered boater information was not obtained in five States.

The mail-out survey strategy consisted of an initial mailing of a questionnaire, a follow-up reminder postcard, a second mail-out of the questionnaire, and a final follow-up telephone call for nonresponders in States that had not provided 250 completed surveys. The response rate for the mail-out surveys was 49%. The mail-out response rate was calculated using the number of completed surveys divided by the number of eligible households. Ineligible households consisted of households who returned the survey having checked off the box indicating that no one in the household had operated a boat, the questionnaire was returned undeliverable, and the average percent of individuals identified as ineligible during the follow-up telephone reminder call.

Nonregistered boaters were sampled using a Random Digit Dialing telephone sampling procedure such that households were contacted and asked if anyone in the household had operated a boat for recreational purposes between September 2001 and September 2002. Residents who indicated that someone had operated a boat were then asked several questions regarding whether or not they owned a registered boat, and then what type of boat they owned or used while boating. Eligible households were then asked to identify the person in the household who had operated a boat the most. This individual is considered the “primary operator” of the boat. Primary operators were also asked to indicate whether other people operated their boat(s) and if so, how often this occurred. Anyone who operated the primary operator’s boat when the primary operator was not on board is considered a “secondary operator” in this report.

Telephone samples were generated using a list-assisted sampling method. Prospective respondents were first interviewed regarding household boating status. If the household was eligible, the primary boat operator was identified and interviewed. The response rate for the telephone survey was 61% for the nonregistered boater survey of 46 states (including Washington DC) and 66% for the five States where both registered and nonregistered boaters were sampled. The response rate is calculated by combining all individuals who responded to the screening survey (registered boaters, nonboaters, and nonregistered boaters) and dividing by the total number of eligible households contacted by SRG.

No registered boater data was obtained for the following States:

- Oklahoma
- Hawaii
- South Dakota
- Vermont
- Louisiana

It was determined that these States were very important to include in the analyses so a different sampling strategy was devised. For these five states registered and nonregistered boaters were surveyed using an RDD telephone survey.

The final number of completed surveys per State are:

<b>STATE</b>	<b>Total per State</b>
ALABAMA	496
ALASKA	514
ARIZONA	502
ARKANSAS	491
CALIFORNIA	495
COLORADO	516
CONNECTICUT	524
DELAWARE	499
DISTRICT OF COLUMBIA	513
FLORIDA	515
GEORGIA	504
HAWAII	302
IDAHO	507
ILLINOIS	504
INDIANA	562
IOWA	525
KANSAS	505
KENTUCKY	511
LOUISIANA	300
MAINE	507
MARYLAND	560
MASSACHUSETTS	577
MICHIGAN	509
MINNESOTA	510
MISSISSIPPI	508
MISSOURI	495
MONTANA	523
NEBRASKA	527
NEVADA	501
NEW HAMPSHIRE	605
NEW JERSEY	544
NEW MEXICO	502
NEW YORK	515
NORTH CAROLINA	515
NORTH DAKOTA	523
OHIO	505
OKLAHOMA	301
OREGON	505
PENNSYLVANIA	577

<b>STATE</b>	<b>Total per State</b>
RHODE ISLAND	547
SOUTH CAROLINA	528
SOUTH DAKOTA	300
TENNESSEE	548
TEXAS	504
UTAH	526
VERMONT	300
VIRGINIA	518
WASHINGTON	519
WEST VIRGINIA	535
WISCONSIN	571
WYOMING	550
TOTAL	25,540

### ***C. Report Presentation***

This report presents the findings for this study. Data are presented in two ways. First, data are presented in table and graphical form along with narrative summaries in the main body of the report. The question label from the questionnaire (appendix A) is displayed following the table or graph title. The percentages referenced in the main body are also presented in the Technical Report. Data presented are weighted to be representative of State populations and to reflect the actual portion of registered, nonregistered, and nonboaters obtained during the telephone screening process for each State.

In addition to the use of general percentages, mean averages, and chi-square for data representation, there are also general population estimates. These estimates were obtained by using the full weighted data on the national level. Please remember that these data were collected from boat operators and therefore may not reflect all boating experiences by nonoperators. An additional caveat regarding population estimates of the number of boats must also be considered when reviewing these findings. Because nonregistered boaters are included in this calculation, it is a possibility that more than one respondent could have used the same boat and hence the boat could be counted twice in the estimate.

### ***D. Calculation of Exposure Statistics***

In order to calculate the population estimates for the number of boating days for primary operators (Table 3.3) the sample data were weighted to reflect the population for each state. Next frequencies were obtained for the question "For each type of boat, how many total days did you go boating?" (B5). The number of days, ranging from 0 to 365, was then multiplied by the estimated number of operators who gave that response. Finally, the sum of these products was

calculated to give the total estimated number of boating days for each type of boat.

In order to calculate the population estimates for the number of boating days for secondary operators (Table 3.3) the sample data were weighted to reflect the population for each state. Next frequencies were obtained for the question “How many days did someone *in your household* take this boat out when you were not with them between September 2001 and September 2002?” (B9a). The number of days, ranging from 0 to 365, was then multiplied by the estimated number of respondents who gave that response. Finally, the sum of these products was calculated to give the total estimated number of boating days for secondary operators of each type of boat.

Likewise, calculations for the population estimates for the number of boating hours between September 2001 and September 2002 (Table 3.4) for primary operators used data weighted to reflect the population for each state. Next frequencies were obtained for the question “On average, how many hours per day did you spend on the water aboard each type of boat?” (B7). The number of hours, ranging from 0 to 24, was first multiplied by the estimates number of days boating (B5) then multiplied by the estimated number of operators who gave that response. Finally, the sum of these products was calculated to give the total estimated number of boating hours between September 2001 and September 2002 for each type of boat.

Population estimates for the number of boating hours between September 2001 and September 2002 for secondary operators (Table 3.4) also used data weighted to reflect the population for each state. Next frequencies were obtained for the question “On average, how many hours per day was the boat taken out without you on board?” (B9b). The number of hours per day, ranging from 0 to 24, was first multiplied by the estimated number of days boating (B9a) then multiplied by the estimated number of respondents who gave that response. Finally, the sum of these products was calculated to give the total estimated number of boating hours September 2001 and September 2002 for secondary operators of each type of boat.

### ***E. Term Definitions***

The following is a list of terms and definitions used in this report.

**Boat operator:** Individual in the household who operated the boat most often.

**Boat type:** Each primary boat operator was asked to report on the type of boat used between September 2001 and September 2002. The type reported is based on the operator's opinion.

**Boat used most often:** Boat operator was asked to name the one type of boat that they used the most often between September 2001 and September 2002.

**Nonregistered boater:** Boat operator who did not own a registered boat but went boating on a boat between September 2001 and September 2002.

**Operating:** Driving or controlling the course of the boat.

**PFD:** Personal flotation device.

**Recreational boating:** All boating for recreational purposes excluding boating on chartered boats with crews or commercial boats and boating done as part of the respondent's job.

**Registered boater:** Boat operator who owned a boat that was registered with a State.

**Secondary boat operator:** Person who took the boat out on the water without the primary boat operator onboard.

**Vessel:** Is used synonymous with the term boat.

**Water type:** Each primary boat operator was asked to report on the type of water they usually went boating on between September 2001 and September 2002. The type reported is based on the operator's opinion.

## II. BOATING ATTITUDES

---

Boat operators were first asked their opinion about whether they thought that certain issues would improve their enjoyment of recreational boating. Boaters were asked if they agreed or disagreed with seven statements and were given the choice to state whether they strongly agreed, agreed, disagreed, or strongly disagreed with each statement listed below.

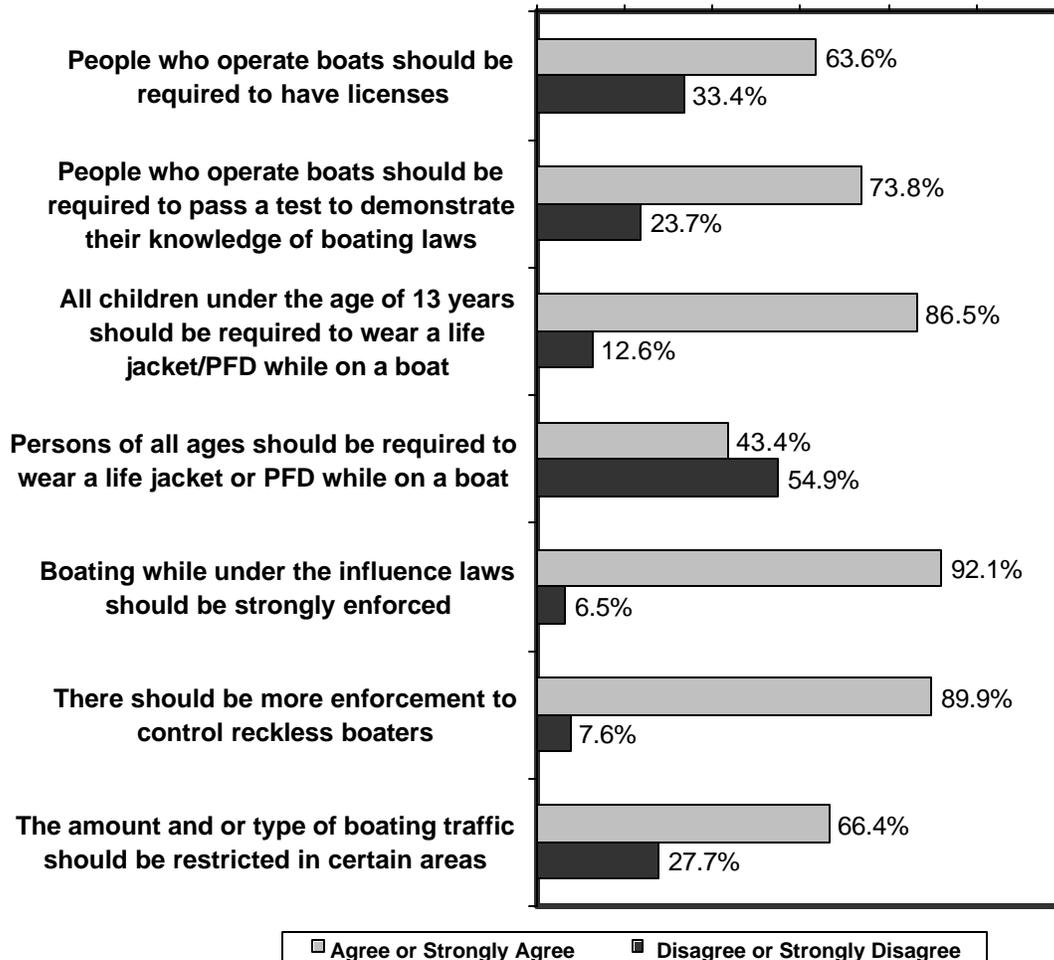
- People who operate boats should be required to have licenses, which could be revoked if they commit a violation.
- People who operate boats should be required to pass a test to demonstrate their knowledge of boating laws and the Navigation Rules.
- All children under the age of 13 years should be required to wear a life jacket/PFD while on a boat.
- Persons of all ages should be required to wear a life jacket or PFD while on a boat.
- Boating while under the influence laws should be strongly enforced.
- There should be more enforcement to control reckless boaters.
- The amount and or type of boating traffic should be restricted in certain areas, even if it meant you might be restricted from traveling in certain areas.

Figure 2.1 presents the percentages of primary boat operators' responses to each statement. Again, these are the individuals who operated the boat(s) the most from September 2001 to September 2002. To get a general sense of how boaters felt about these statements, the response choices were collapsed to two categories: "Agree or Strongly Agree" and "Disagree or Strongly Disagree."

In general, primary boat operators tended to agree with these statements, believing that following these guidelines would make their boating experiences more enjoyable. All of the statements, except one, achieved agreement by over 60% of the primary boat operators. The only issue that did not receive a majority agreement was the suggestion that people of all ages should be required to wear a life jacket or PFD while boating. Only 43% of respondents polled thought that this was a good idea, while 55% disagreed. Safety issues received the greatest support, with over 85% of primary operators agreeing with three issues: requiring children under 13 years to wear life jackets while boating; strong enforcement of boating under the influence laws; and more enforcement for the control of reckless boaters.

Notably, boat operators were more likely to agree that people who operate boats should have to pass a test to demonstrate their competency (74% agreement) than they were to agree that boat operators should be required to have licenses (64% agreement).

**Figure 2.1 Do you agree or disagree that the following things would improve your enjoyment of recreational boating? (A1)**



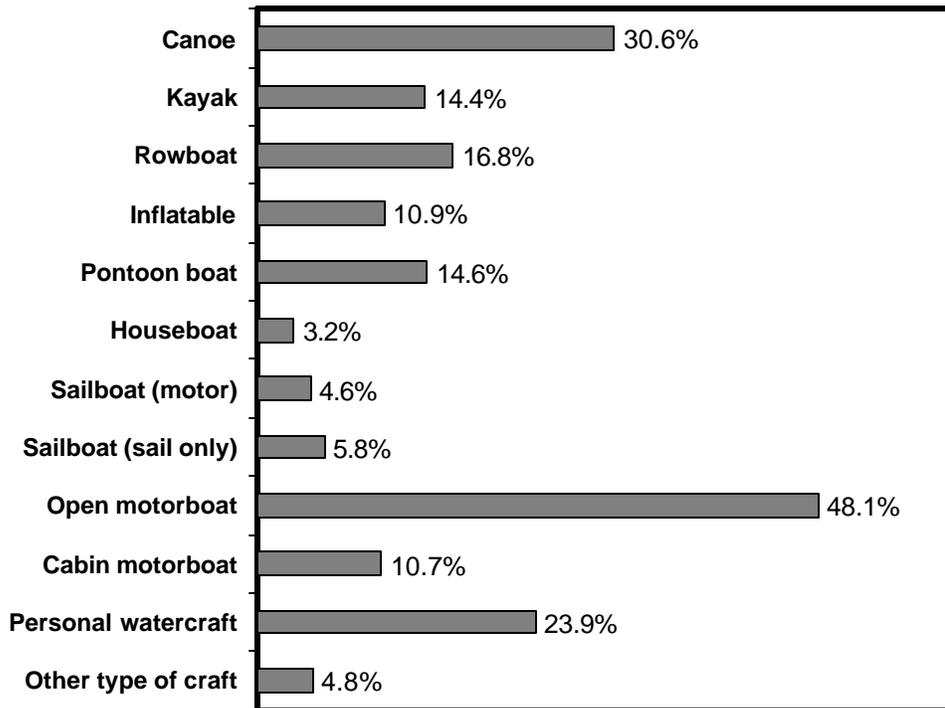
- ❖ Safety issues (except personal lifejacket and PFD use for all boaters) had over 85% agreement.
- ❖ 55% disagreed that all people should be required to wear a life jacket or PFD while boating.
- ❖ Boat operators were more likely to agree that people who operate boats should have to pass a test to demonstrate their competency than they were to agree that boat operators should be required to have licenses.

### III. BOATING EXPERIENCE

---

Primary boat operators were asked to report the types of boats that they personally used for recreational purposes between September 2001 and September 2002. This includes boats that the primary operator owned, rented, or borrowed but does not include boating on chartered boats with crews or commercial boats. Figure 3.1 presents the percentage of the population that used each type of boat for recreation in the nation. As illustrated, open motorboats were the most used vessel with 48% of the responses. Canoes were the second most used vessel (31% use) with personal watercraft a close third (24% use). Sailboats and houseboats were the least popular recreational craft, used by 6% or fewer of boat operators.

**Figure 3.1 What types of boats did you personally use for recreational purposes? (A10)**



- ❖ Almost one half of boat operators used open motorboats for recreation.
- ❖ Almost one-third of boat operators used canoes for recreation.
- ❖ Almost one-fourth of boat operators used personal watercraft for recreation.
- ❖ Sailboats and houseboats were the least popular recreational craft, used by 6% or fewer of boat operators.

Table 3.1 estimates the number of times an operator went out on each type of boat in the 2001-2002 year based on weighted averages from the sample. The total number of times any boat was used for recreation between September 2001 and September 2002 is **59,151,846**. Among the most popular types of “other craft” that primary operators reported using were bass boats, fishing boats, and paddle boats.

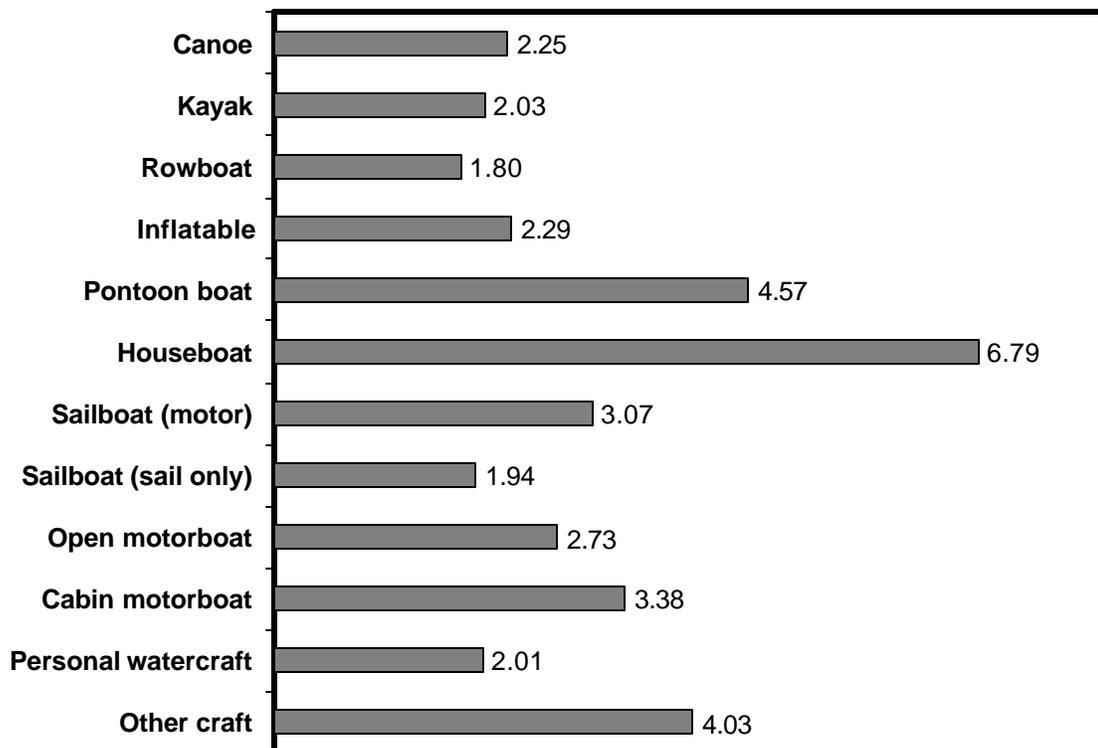
**Table 3.1 Number of reported uses based on population weights.**

	<b>Number of Reported Uses</b>
Canoe	9,594,813
Kayak	4,534,624
Rowboat	5,290,063
Inflatable	3,411,878
Pontoon boat	4,595,531
Houseboat	1,004,883
Sailboat (motor)	1,455,718
Sailboat (sail only)	1,808,064
Open motorboat	15,086,229
Cabin motorboat	3,346,806
Personal watercraft	7,508,829
Other type of craft	1,514,408
<b>Total</b>	<b>59,151,846</b>

- ❖ These estimates of the number of boat usages are based on estimates of the percentage of households containing boaters for each State.
- ❖ Open motorboats were the most popular, being taken out on the water more than 15 million times between September 2001 and September 2002.
- ❖ An estimated 60 million recreational boats were used between September 2001 and September 2002.

The following chart and tables address the question of how many people participated during the nearly 60 million boating trips from September 2001 to September 2002. Figure 3.2 presents the average number of people who usually went boating with the primary operator, not including the primary operator. Collapsing across all types of boats, on average, three additional people usually accompanied boat operators while boating. The type of boat where the most people went boating together was a houseboat, with an average of 6.79 additional boaters. Pontoon boats had the second highest number of people boating together, an average of 4.57. Operators of smaller craft (canoes, kayaks, rowboats, and personal watercraft) tended to boat with fewer people boating together, each averaging 2.

**Figure 3.2 About how many other people usually went boating with you for each type of boat used (mean number of people)? (B8)**



- ❖ The average number of people boating together on houseboats was 6.79.
- ❖ Pontoon boats had the second highest number of people boating simultaneously, an average of 4.57.
- ❖ Operators of smaller craft (canoes, kayaks, rowboats, and personal watercraft) tended to boat with fewer additional people, averaging 2.
- ❖ The average number of additional boaters across all boats was 3.

The final assessment of the number of people that usually went boating is presented in Table 3.2. This table provides the estimated number of people on these boating excursions and includes the primary operator, representing the total number of people that went boating for each type of boat. These estimates include only boating excursions on which the primary operator was present on the boat. Although there is no way to determine how many boating excursions primary operators took in a particular boat, the estimates in Table 3.3 give an approximate number of people that went boating in each type of boat. Houseboats and pontoons carried the most people, but did not necessarily have the highest numbers of people on those boats across all boating experiences. Over 54 million people were in an open motorboat at least once between September 2001 and September 2002. Personal watercraft carried the least number of people, but over 20 million people were on a personal watercraft at least once.

**Table 3.2 Estimated number of boaters.**

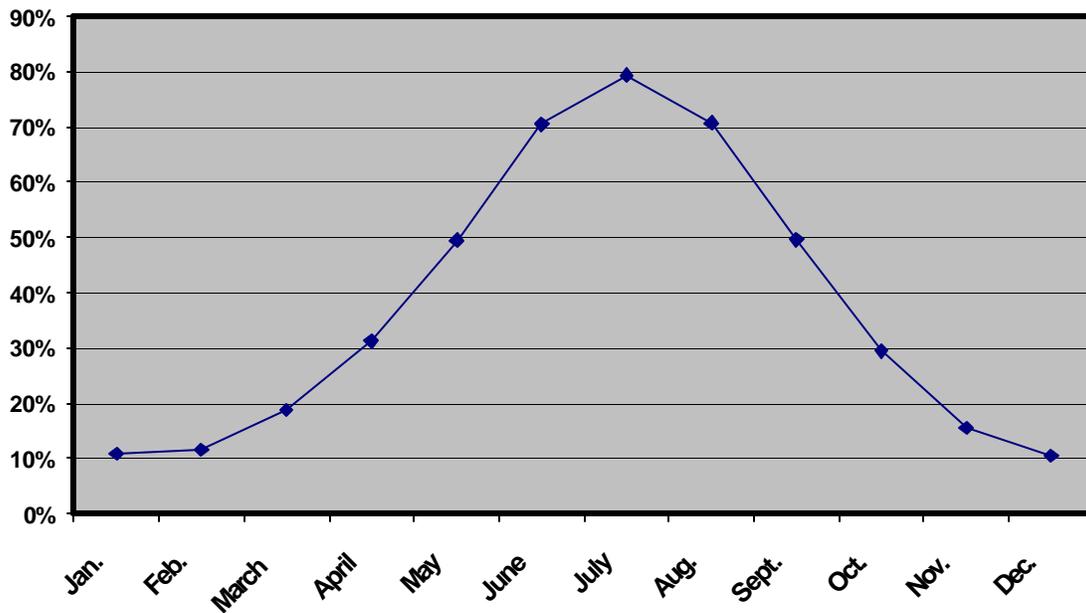
	Estimated Number of Boaters
Canoe	30,690,654
Kayak	13,223,069
Rowboat	14,209,060
Inflatable	10,757,190
Pontoon boat	24,522,334
Houseboat	7,399,621
Sailboat (motor)	5,651,156
Sailboat (sail only)	5,187,126
Open motorboat	54,920,828
Cabin motorboat	13,952,795
Personal watercraft	21,313,033
Other craft	7,710,841
<b>Total<sup>3</sup></b>	<b>209,537,707</b>

- ❖ Houseboats and pontoons carried the most people, but did not necessarily have the highest numbers of people on those boats across all boating experiences.
- ❖ Over 54 million people were in an open motorboat at least once between September 2001 and September 2002.
- ❖ Personal watercraft carried the least number of people but over 20 million people were on a personal watercraft at least once.

<sup>3</sup> The estimate for the total may be inflated if a person went boating on more than one kind of boat.

The next aspect of boating behavior examined is the months in which people go boating. Primary boat operators were asked to indicate all of the months during which they went boating for recreational purposes between September 2001 and September 2002. Figure 3.3 shows the national percentage of primary operators estimated to have went boating for recreation each month. Notice that the lowest percent of people boating in the winter months and the highest percent boating in the summer months, with the peak percentage in July. Because the chart is centered on July, which is the middle of the summer, the distribution of the percentages looks approximately like a normal distribution, with almost perfect symmetry. Almost 80% of boaters went boating in July while only about 11% went boating each month in the winter months of December, January, and February. Of course, these results are computed on a national level, and some regional variation is expected across the United States.

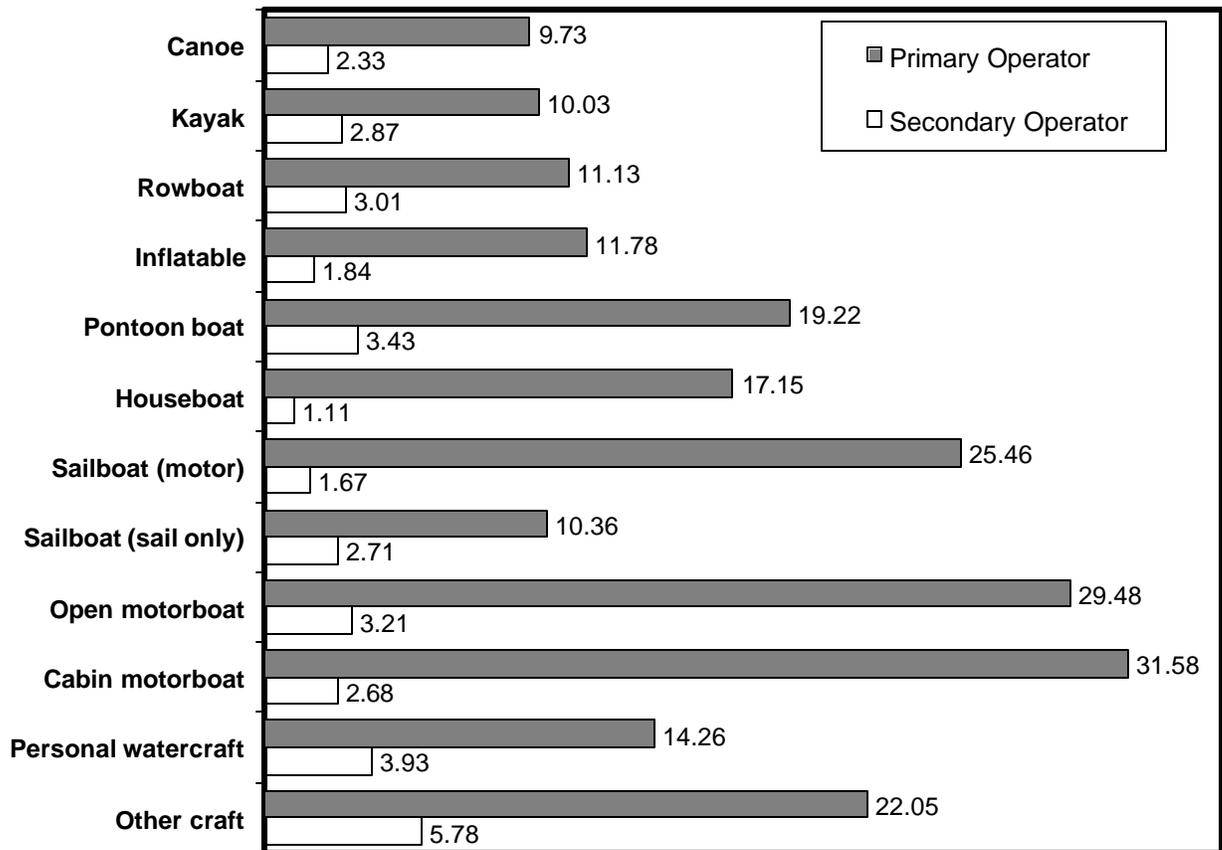
**Figure 3.3 During which months did you boat for recreational purposes? (A11)**



- ❖ Most boating was done in the summer months with the most in July.
- ❖ Still, just under 11% of primary boat operators went boating in January and December.

Figures 3.4 and 3.5 display the average number of days boats were taken out on the water. The first figure represents the average number of days the primary and secondary operators went boating for each type of boat. This graph presents two interesting findings. First, the primary boat operator tended to operate the boat in question much more than any other individuals, but this varied somewhat based on type of boat. For example, primary operators operated houseboats and sailboats with auxiliary motors 15 times more than any secondary operator. Comparatively, primary operators went boating on kayaks and personal watercraft approximately 3.5 times as much as secondary operators. The second notable finding was that individuals who use motorboats tended to boat more days per year than other types of boaters, averaging 31 days for cabin motorboats and 29 for open motorboats. Canoeing averaged the least number of days for the primary boat operator at 9.

**Figure 3.4 Mean number of days boating. (B5/B9a)**



- ❖ Primary operators tended to operate their boats considerably more than any other individuals.
- ❖ Motorboats were taken out on the water most frequently, an average of 31 days per year for cabin motorboats and 29 days per year for open motorboats.

The data provided by respondents on the number of days their boats were taken out on the water were weighted to reflect the population for each State. The following table uses these data to provide an estimate for the total number of boating days for primary and secondary operators that took place during September 2001 to September 2002. These data represent the cumulative number of days that each type of boat went out on the water during the year. Two findings are notable. First, primary operators spent over **one billion** days boating; this is approximately 7 times the days spent boating by secondary operators. Second, open motorboats tended to be on the water many more days than other types of boats, with a cumulative total of more than 422 million days of operation. Personal watercraft, cabin motorboats, canoes, and pontoon boats followed, with more than 90 million days of operation each.

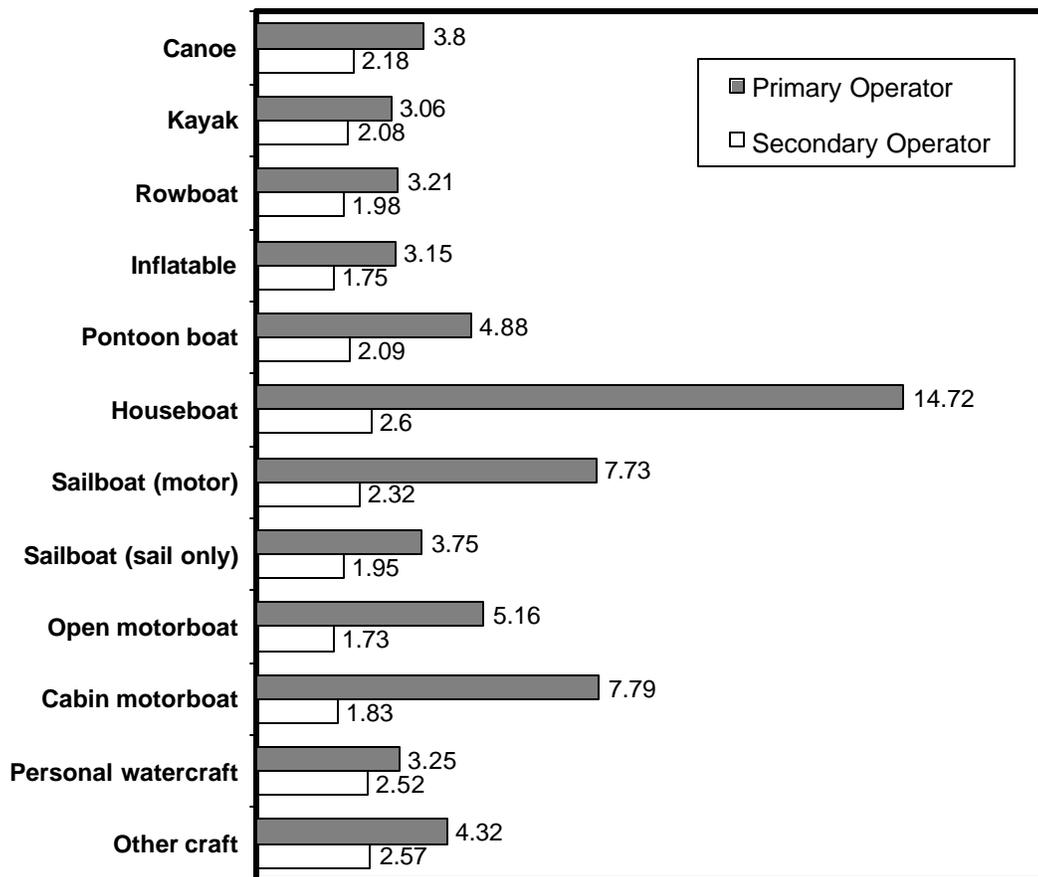
**Table 3.3 Estimated number of boating days.**

	Population Estimate of Number of Boating Days	
	Primary Operator	Secondary Operator
Canoe	90,541,272	20,046,177
Kayak	44,010,431	11,667,426
Rowboat	55,413,193	13,648,776
Inflatable	38,319,210	5,443,151
Pontoon boat	80,314,775	12,645,453
Houseboat	15,166,156	858,307
Auxiliary sailboat	35,179,894	2,011,183
Sail-only sailboat	18,148,196	4,243,335
Open motorboat	422,637,680	42,724,146
Cabin motorboat	97,143,019	7,249,006
Personal watercraft	99,375,750	24,742,166
Other craft	33,133,491	8,116,981
<b>Total</b>	<b>1,029,383,067</b>	<b>153,396,107</b>

- ❖ Primary operators spent over **one billion** days boating between September 2001 and September 2002.
- ❖ Open motorboats were on the water 422 million days of operation, much more than other types of boats.
- ❖ Personal watercraft, cabin motorboats, canoes, and pontoon boats were each used more than 90 million days of operation.

Figure 3.5 presents the average number of hours per day boats were taken out on the water. Houseboats were clearly used for the most hours per day of boating, used on average for approximately 15 hours per day of boating. Houseboats were followed by cabin motorboats and auxiliary sailboats, each of which were used, on average, for nearly 8 hours per day of boating. Other types of vessels tended to be used, on average, for between 1 and 5 hours per day. There is also a sizeable difference between primary operators and secondary operators in terms of the average number of hours spent boating per day, which indicates that primary operators spend considerably more time on their boats than any secondary operators.

**Figure 3.5 Mean number of hours per day boating. (B7, B9b)**



- ❖ Houseboats are clearly used for the most hours per day of boating, with an average of approximately 15 hours per day.
- ❖ Auxiliary sailboats and cabin motorboats were used, on average, for nearly 8 hours per day of boating.
- ❖ Other types of vessels tended to be used, on average, for between 1 and 5 hours per day.

Using the weighted sample data, the total number of hours spent boating were estimated for primary and secondary operators during September 2001 and 2002. These estimates are shown in Table 3.4. Together, primary and secondary operators spent an estimated 6 billion hours on the water in various types of watercraft. Open motorboats tended to be on the water for approximately 2.5 billion hours—about one-third of the total number of hours spent by all watercraft combined. This amount is considerably greater than the total time spent in any other type of vessel. Canoes, pontoon boats, auxiliary motor sailboats, cabin motorboats, and personal watercraft were all operated for more than 300 million hours between September 2001 and September 2002.

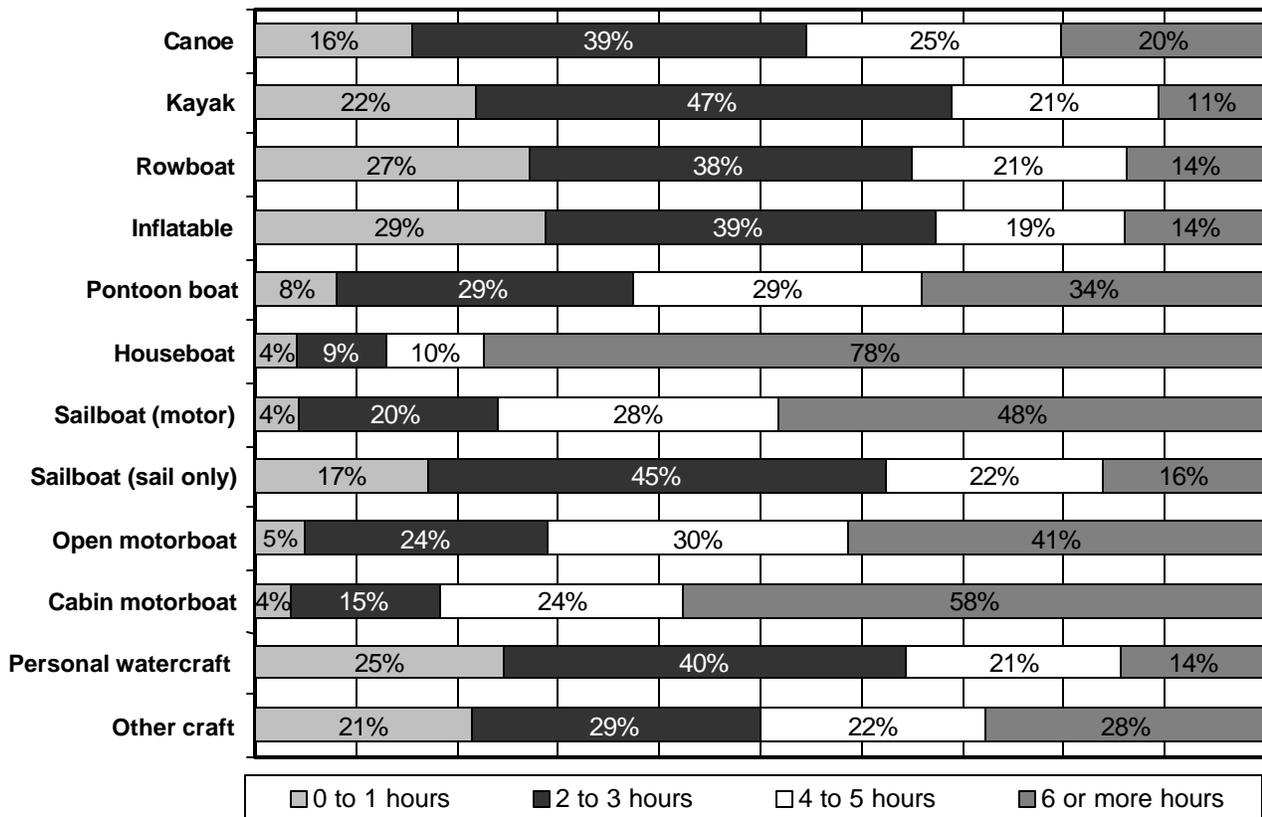
**Table 3.4 Estimated number of boating hours.**

	Population Estimate of Number of Boating Hours	
	Primary Operator	Secondary Operator
Canoe	372,860,701	51,883,311
Kayak	152,429,017	27,389,045
Rowboat	205,011,965	39,563,798
Inflatable	118,931,101	14,230,843
Pontoon boat	389,841,010	41,536,656
Houseboat	217,442,573	10,028,247
Sailboat (motor)	352,870,242	18,264,844
Sailboat (sail only)	74,073,045	11,763,968
Open motorboat	2,299,021,929	165,475,756
Cabin motorboat	835,529,635	45,806,701
Personal watercraft	381,726,139	83,717,199
Other craft	179,630,386	26,838,797
<b>Total</b>	<b>5,579,367,743</b>	<b>536,499,165</b>

- ❖ Together, primary and secondary operators spent an estimated 6 billion hours on the water in various types of watercraft.
- ❖ Just under 2.5 billion hours were spent boating in open motorboats, which is over one-third of all hours spent boating.
- ❖ Canoes, pontoon boats, auxiliary motor sailboats, cabin motorboats, and personal watercraft were all operated for more than 300 million hours between September 2001 and September 2002.

Figures 3.6 and 3.7 compare, graphically, the number of hours per day of boating spent by primary and secondary operators on various types of vessels. In these figures the hours spent per day of boating have been grouped into categories. Comparing the hours spent on each type of vessel, houseboats were clearly used for the longest excursions, predominately by primary operators, with almost 80% of primary operators spending 6 or more hours per day boating on this type of craft. Cabin motorboats were also used for longer excursions, with nearly 60% of primary operators spending 6 or more hours per day when boating. Inflatable boats, rowboats, personal watercraft, and kayaks were more likely to be used by primary operators for shorter excursions under one hour. Furthermore, kayaks, inflatable boats, rowboats, personal watercraft, sail-only sailboats, and canoes were most likely to be used by primary operators for excursions under 3 hours.

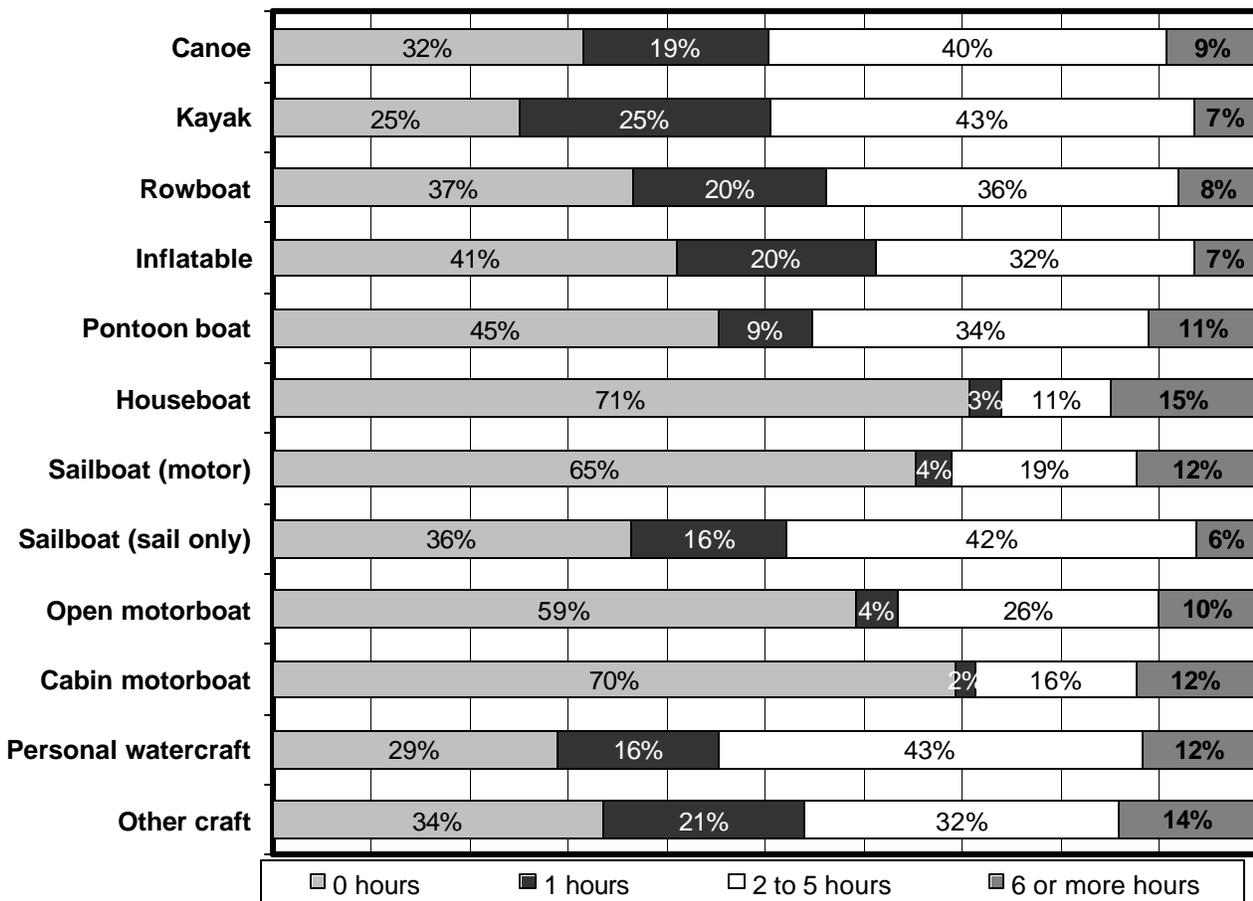
**Figure 3.6 On average, how many hours per day did you spend on the water aboard each type of boat? (B7)**



- ❖ Houseboats and cabin motorboats were most likely to be used for long excursions over 6 hours.
- ❖ Inflatable boats, rowboats, personal watercraft, and kayaks were more likely to be used by primary operators for shorter excursions under 1 hour.

Compared to primary operators, secondary operators spent fewer hours per day of boating on all types of vessels. Some types of boats were operated almost exclusively by the primary operator. For example, whereas nearly 80% of primary operators spent 6 or more hours per day boating on houseboats, 71% of secondary operators did not spend any time operating houseboats. In addition, auxiliary motor sailboats, cabin motorboats, and open motorboats were unlikely to be operated by a secondary operator. Kayaks, personal watercraft, canoes, and sail-only sailboats were most likely to be operated by a secondary operator, although the duration of these excursions was usually short (i.e., 5 hours or less).

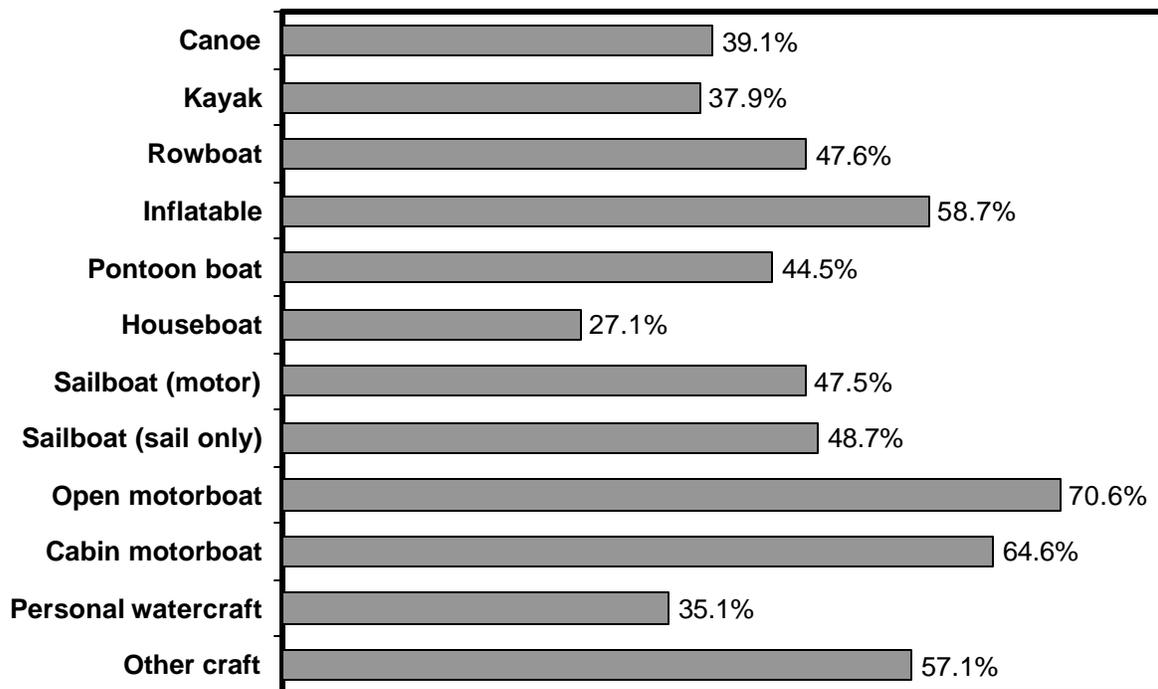
**Figure 3.7 How many hours per day did someone in your household take this boat out when you were not with them? (B9b)**



- ❖ Kayaks, personal watercraft, canoes, and sail-only sailboats were most likely to be operated by a secondary operator, although the duration of these excursions was largely short (i.e., 5 hours or less).
- ❖ Houseboats, auxiliary motor sailboats, and motorboats (open and cabin) were least likely to be operated by a secondary operator.

Next, vessel ownership was examined, first by calculating the percentage of boats of each type that are owned by their boaters. The percent of each type of boat owned by primary boat operators can be seen in Figure 3.8. Ownership tends to vary as a function of type of boat. Motorboats are most likely to be owned by primary boat operators, with nearly 71% of open motorboats owned and nearly 65% of cabin motorboats owned. More than one-third of all vessel types are owned by primary boat operators with the exception of houseboats, which are the least likely to be owned by their primary boat operators.

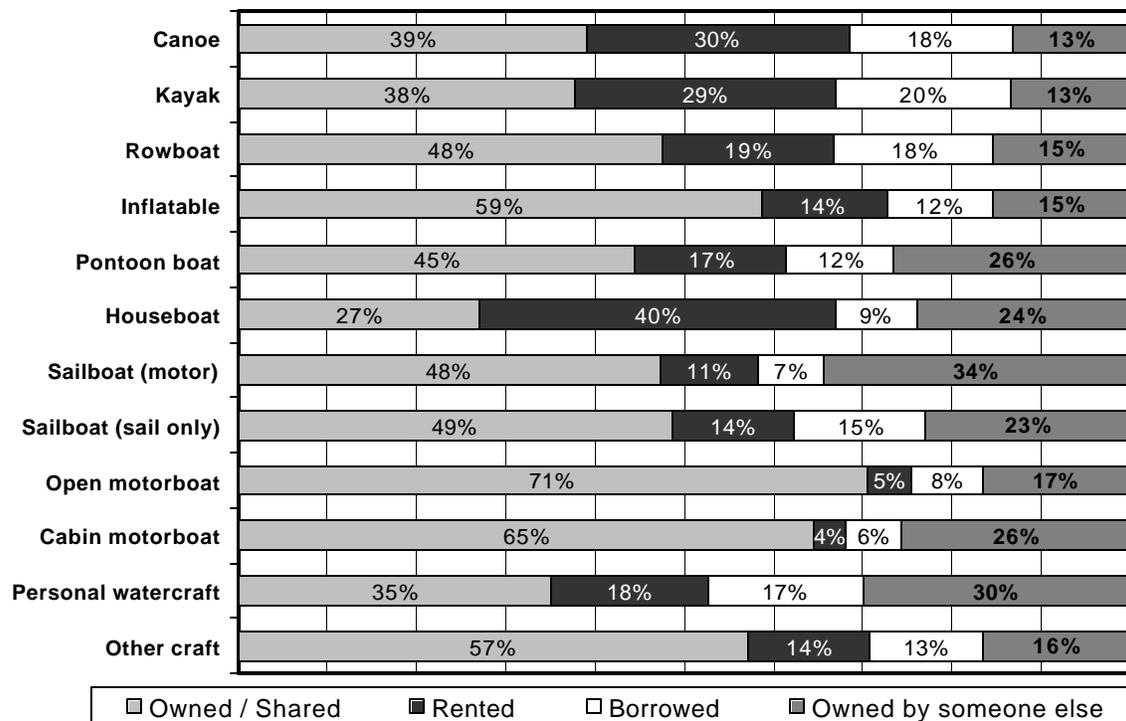
**Figure 3.8 Percent of boats owned by boaters. (B2)**



- ❖ Motorboats are most likely to be owned by boaters, with nearly 65% of cabin motorboats and nearly 71% of open motorboats owned by their boaters.
- ❖ More than one-third of all vessel types are owned, except for houseboats, which are owned by just 27% of boaters.

Primary operators were asked, for each type of boat they operated, whether that boat was owned or shared by them, borrowed from someone else, rented, or owned by someone else (boating with someone else on his or her boat). Figure 3.9 presents, for each type of craft, the percentage of boaters that owned or shared the boat, rented the boat, borrowed the boat, or went boating with someone else who owned the boat. Although houseboats are the least likely to be owned by their boaters (owned by 27%), they are the most likely to be rented (rented by 40%). Canoes and kayaks are rented often, approximately 30% of the time. Canoes and kayaks are also borrowed frequently, approximately 20% of the time. The type of vessel that is most often owned by someone else is a sailboat with auxiliary motor (34%). Overall, 51% of primary operators went boating on boats that they owned or shared, 16.3% went boating on rented craft, 13.4% borrowed boats, and 19.3% went boating on boats owned by another operator.

**Figure 3.9 Did you or someone in your household go boating on a boat that you owned/shared, rented, borrowed, or was owned by someone else? (B2)**



- ❖ Houseboats are the least likely to be owned by their boaters but they are the most likely to be rented.
- ❖ Aside from houseboats, canoes and kayaks are most often rented; and they are also often borrowed.
- ❖ The type of vessel that is most often owned by someone else is a sailboat with auxiliary motor.

Using the weighted sample data, the total number of boating excursions were estimated based on the ownership of the vessel and who operated the boat. The possibilities were boating on boats that were owned/shared by the primary operator, rented, borrowed, or owned by another boat operator. These estimates are shown in Table 3.5. Open motorboats were most likely to be owned—owned by more than 10.6 million primary operators. An additional 2.5 million boaters also went boating on an open motorboat owned by someone else. With the previous population estimates presented, this finding provides further evidence that open motorboats have the highest levels of exposure. Canoes were next most often owned, with more than 3.8 million boaters owning a canoe. Canoes were the most often rented and borrowed vessel, rented by more than 2.8 million boaters and borrowed by an additional nearly 1.8 million.

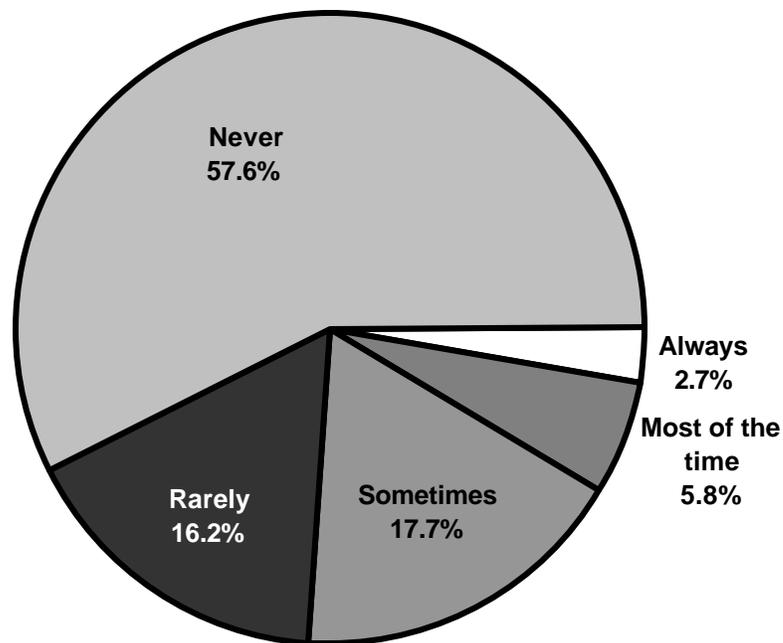
**Table 3.5 Population estimate of boating excursions by vessel ownership.**

	Population Estimate of Number of Boating Excursions on Boats Owned/Shared by Primary Operator, Rented, Borrowed, or Owned by Another Boat Operator			
	Owned/ Shared by Primary Operator	Rented	Borrowed	Owned by Another Boat Operator
<b>Canoe</b>	3,820,851	2,882,891	1,781,065	1,286,155
<b>Kayak</b>	1,724,884	1,327,060	897,956	605,715
<b>Rowboat</b>	2,541,375	1,029,893	948,021	819,483
<b>Inflatable</b>	2,039,075	486,676	414,781	534,184
<b>Pontoon boat</b>	2,054,017	780,125	560,434	1,220,213
<b>Houseboat</b>	271,711	398,543	90,969	239,600
<b>Sailboat (motor)</b>	685,351	156,780	103,995	496,221
<b>Sailboat (sail only)</b>	914,729	257,004	276,393	431,300
<b>Open motorboat</b>	10,654,310	757,492	1,196,018	2,490,260
<b>Cabin motorboat</b>	2,157,803	115,725	211,188	856,325
<b>Personal watercraft</b>	2,613,224	1,322,989	1,291,730	2,225,790
<b>Other craft</b>	899,341	216,341	200,734	257,325

- ❖ Open motorboats, the craft with the highest level of exposure, were most likely to be owned—owned by more than 10.6 million boaters.
- ❖ Canoes were next most often owned, with more than 3.8 million boaters owning a canoe. Canoes were the most often rented and borrowed vessel, rented by more than 2.8 million boaters and borrowed by an additional nearly 1.8 million.

To attempt to estimate how frequently alcohol is consumed while boating, respondents were asked, in general, how often alcohol was consumed on board when they went boating. Boat operators were asked to respond on a five-point scale: “always,” “most of the time,” “sometimes,” “rarely,” or “never.” As shown in Figure 3.10, more than half of boaters indicated alcohol was “never” consumed on board. Alcohol was consumed “always” or “most of the time” in about 9% of cases. It is important to note, however, that these data are self-reported by boaters and thus may underrepresent the actual frequency of alcohol use while boating.

**Figure 3.10 How often was alcohol consumed on board when you went boating? (A12)**



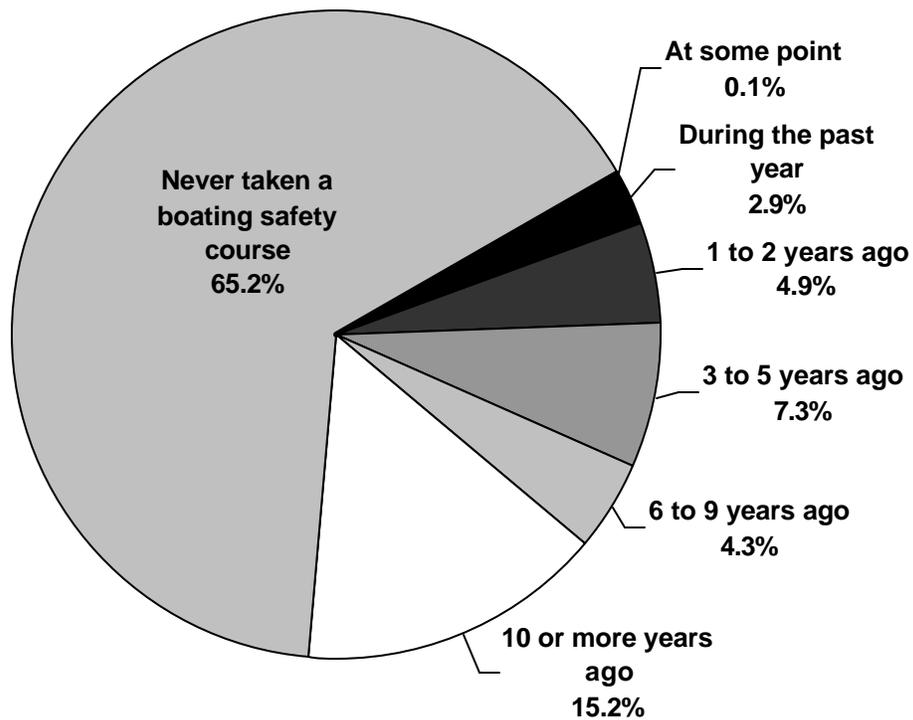
- ❖ More than half of boaters indicated alcohol was “never” consumed on board.
- ❖ Alcohol was consumed “always” or “most of the time” in about 9% of cases.
- ❖ Alcohol use was self-reported by boaters and thus may underrepresent the actual frequency of alcohol use while boating.

## IV. BOATING KNOWLEDGE

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A series of survey questions assessed boat operators' knowledge and experience with various aspects of boating, including safety course experience, hours of experience boating, and membership in boating organizations. First, respondents were asked to indicate how long ago, if ever, they had taken a boating safety course: During the past year, 1 to 2 years ago, 3 to 5 years ago, 6 to 9 years ago, 10 or more years ago, or never. Boat operators' responses to this question are summarized in Figure 4.1. According to these self-report data, 65% of boat operators had never taken a boating safety course. Of those who indicated they had taken a safety course, less than 10% had taken a course within the past two years. Twelve percent had taken courses between 3 and 9 years ago and 15% of boat operators had not taken a safety course in 10 years.

**Figure 4.1** When was the last time you took a boating safety course? (A2)



- ❖ 65% of boat operators have never taken a boating safety course.
- ❖ Of those who indicated they had taken a safety course, less than 10% had taken a course within the past two years.
- ❖ 15% of boat operators had not had a safety course in 10 years.

Population estimates of individuals' safety course experience were generated using the weighted sample data, and these estimates are presented in Table 4.1. Based on respondents' own reports of their safety course experience, it is estimated that over twenty million boat operators have operated a boat without ever having taken a formal boating safety course. However, over 10.8 million boat operators have taken a safety course at some point, with almost 900,000 completing a safety course within the past year.

**Table 4.1 Population estimates of most recent boating safety course.**

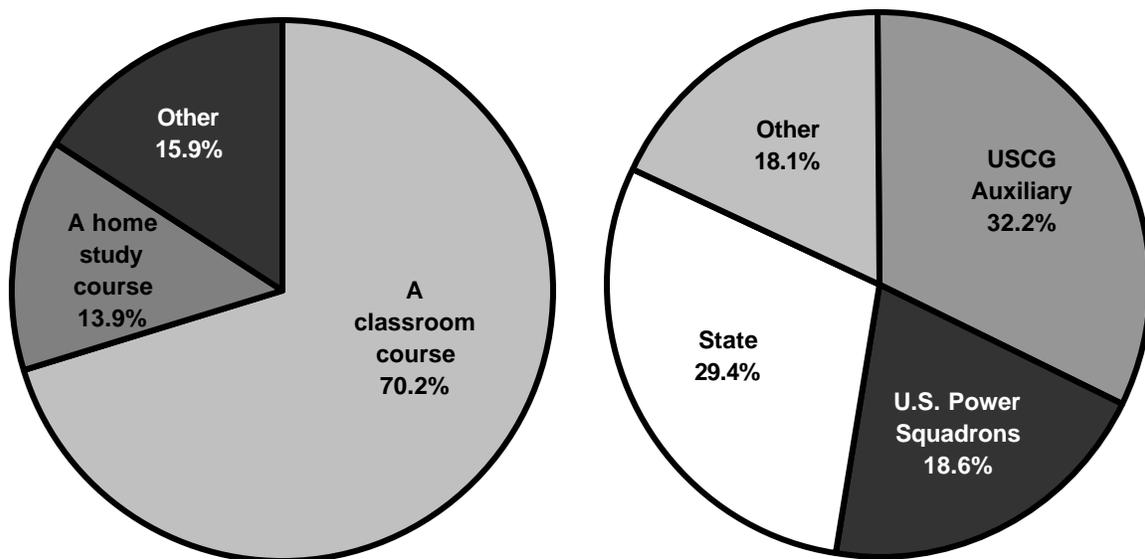
<b>When was the last time you took a boating safety course?</b>	<b>Population Estimates</b>
During the past year	898,426
1 to 2 years ago	1,528,974
3 to 5 years ago	2,271,848
6 to 9 years ago	1,341,105
10 or more years ago	4,732,782
Have taken a safety course at some point	41,892
Never taken a boating safety course	20,224,550
<b>Total</b>	<b>31,039,578</b>

- ❖ Over 20 million boat operators have operated a boat without taking a formal boating safety course.
- ❖ Over 10.8 million boat operators have taken a safety course at some point.
- ❖ Almost 900,000 completed a safety course within the past year.

The 35% of boat operators who have taken a boating safety course were asked to indicate what type of course they completed the last time they took a course. As seen in Figure 4.2, the vast majority of respondents, 70%, indicated that their most recent course was a classroom course. A small group, 14%, completed home study courses, which would include correspondence courses or web-based courses. The remainder, 16%, took another type of course, primarily Girl Scouts/Boy Scouts and “on the water” courses.

Boat operators were also asked to indicate whether they took a boating safety course through the U.S. Coast Guard, the State, the U.S. Power Squadrons, or some other type of course. Of those who took courses, nearly a third took a USCG auxiliary course (32%), 20% took a U.S. Power Squadrons course, and nearly 30% took a State course.

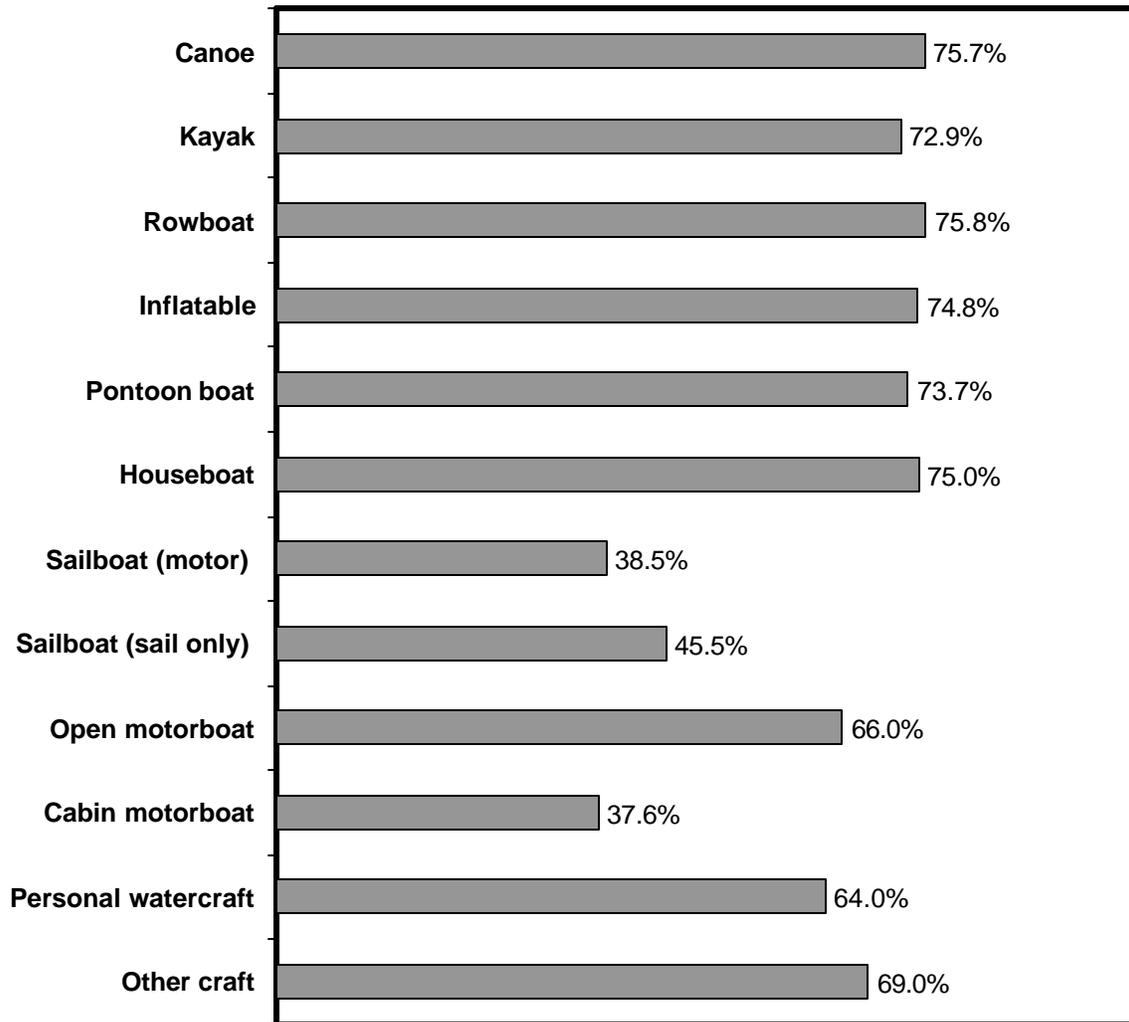
**Figure 4.2 What type of boating safety course did you take the last time?/Which of the following courses did you take? (A3, A4)**



- ❖ 70% of boat operators who have completed a boating safety course indicated that their most recent course was a classroom course.
- ❖ 14% completed home study courses and the remainder, 16%, took another type of course, including Girl Scouts/Boy Scouts or “on the water” courses.
- ❖ Of those who took courses, a third took a USCG auxiliary course (32%), 20% took a U.S. Power Squadrons course, and nearly 30% took a State course.

Figure 4.3 on the following page presents boat operators' experience with boating safety courses as a function of the type of vessel operated. There was a significant difference in likelihood of completing a safety course as a function of type of boat operated. Approximately three-quarters of boat operators who used canoes, kayaks, rowboats, inflatable boats, pontoon boats, and houseboats reported they had never completed a safety course. In contrast, more than half of boat operators using sailboats or cabin motorboats reported completing a safety course. Notably, 66% of operators of open motorboats indicated they had never taken a boating safety course; this is significant because, as mentioned earlier, open motorboats receive significantly greater use than other types of boats. Open motorboats were used by over 54 million boat operators for more than 73 million hours between September 2001 and September 2002.

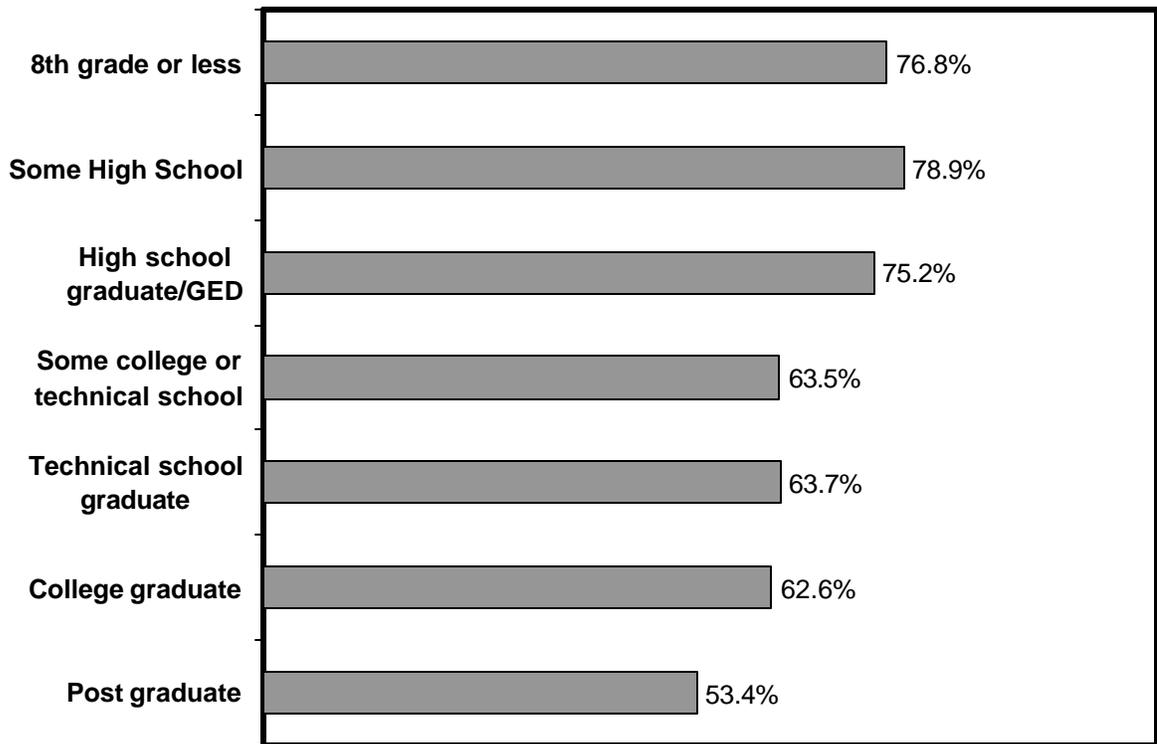
**Figure 4.3 Percent of operators who have never taken a boating safety course by type of boat. (A2, A10)**



- ❖ Approximately three-quarters of boat operators who used canoes, kayaks, rowboats, inflatable boats, pontoon boats, and houseboats had never completed a safety course.
- ❖ More than half of boat operators using sailboats and cabin motorboats indicated that they had taken a safety course at some point.
- ❖ 66% of operators of open motorboats indicated they had never taken a boating safety course; open motorboats receive more use than any other type of boat.

Boat operators' experience with boating safety courses was also examined in the context of their experience with education in general. As illustrated in Figure 4.4, boat operators with higher levels of education were more likely to report having completed a safety course. Boat operators with college experience were significantly more likely to have taken a boating safety course than those with no college experience. However, even among those with the highest levels of education, more than half had never taken a boating safety course.

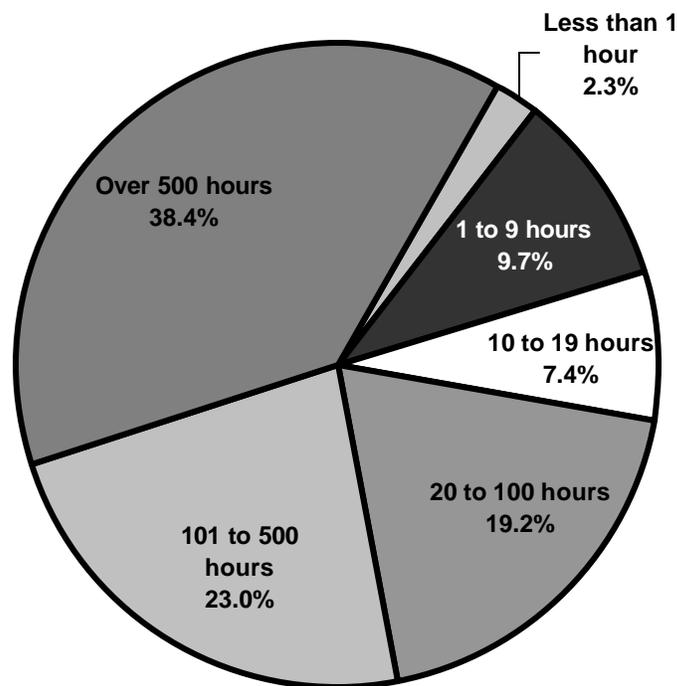
**Figure 4.4 Percent of operators who have never taken a boating safety course by highest level of education completed. (A2, G6)**



- ❖ Boat operators with higher levels of education in general were more likely to have completed a boating safety course.
- ❖ Boat operators with college experience were more likely to have taken a boating safety course than those with no college experience.
- ❖ Still, more than half of boat operators with the highest levels of education had never taken a boating safety course.

To determine boat operators' levels of experience with boating, respondents were asked to indicate how many total hours of boat operating experience they have had over their lifetimes. "Operating" was defined as driving or controlling the course of the boat, not just being on the boat as a passenger. This included driving a motorized boat, sailing a sailboat, or paddling a canoe or kayak. Figure 4.5 presents boat operators' reported level of experience. Approximately 38% of boat operators had extensive experience, with over 500 hours of boat operation. About one-quarter of operators had between 101 and 500 hours, and 39% had less than 100 hours of experience over the course of their lifetimes. Of this 39%, almost half had between 20 and 100 hours of operation.

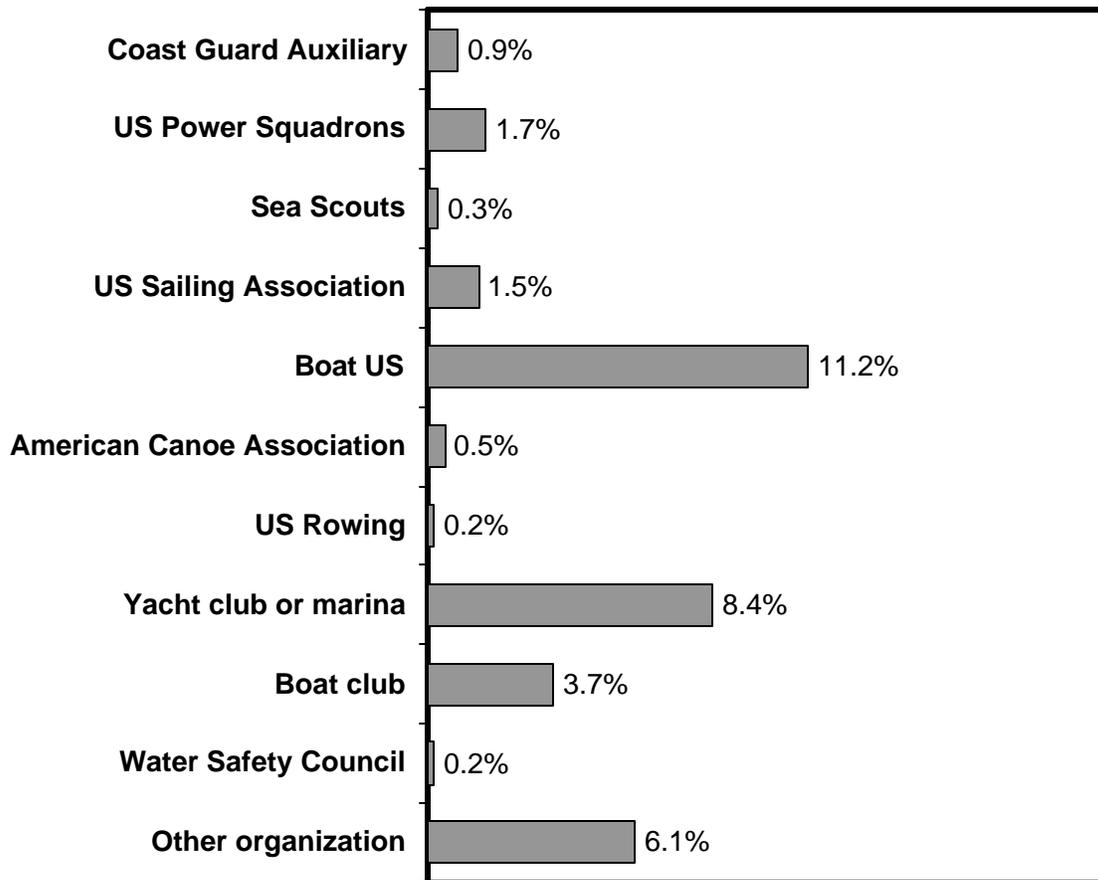
**Figure 4.5 How many total hours of boat operating experience have you had in your lifetime? (A5)**



- ❖ Approximately 38% of boat operators had over 500 hours of boat operation experience in their lifetimes.
- ❖ About one-quarter of boat operators had between 101 and 500 hours.
- ❖ 39% had less than 100 hours of experience over the course of their lifetimes; of this group, almost half had between 20 and 100 hours of operation.

Another feature of boating experience examined was whether or not the boat operator belonged to any boating clubs or other boating organizations. This is summarized in Figure 4.6. Overall, participation in these organizations was low, with fewer than 5% participation in most and less than 1% participation in many. The most frequently held membership was in the Boat Owners Association of the United States (Boat U.S.), although just 11% of boat operators indicated they belonged to this association. Membership in a yacht club or marina was the next most frequent, with 8% of boat operators belonging to such an organization.

**Figure 4.6 Are you a member of any of the following organizations? (A6)**

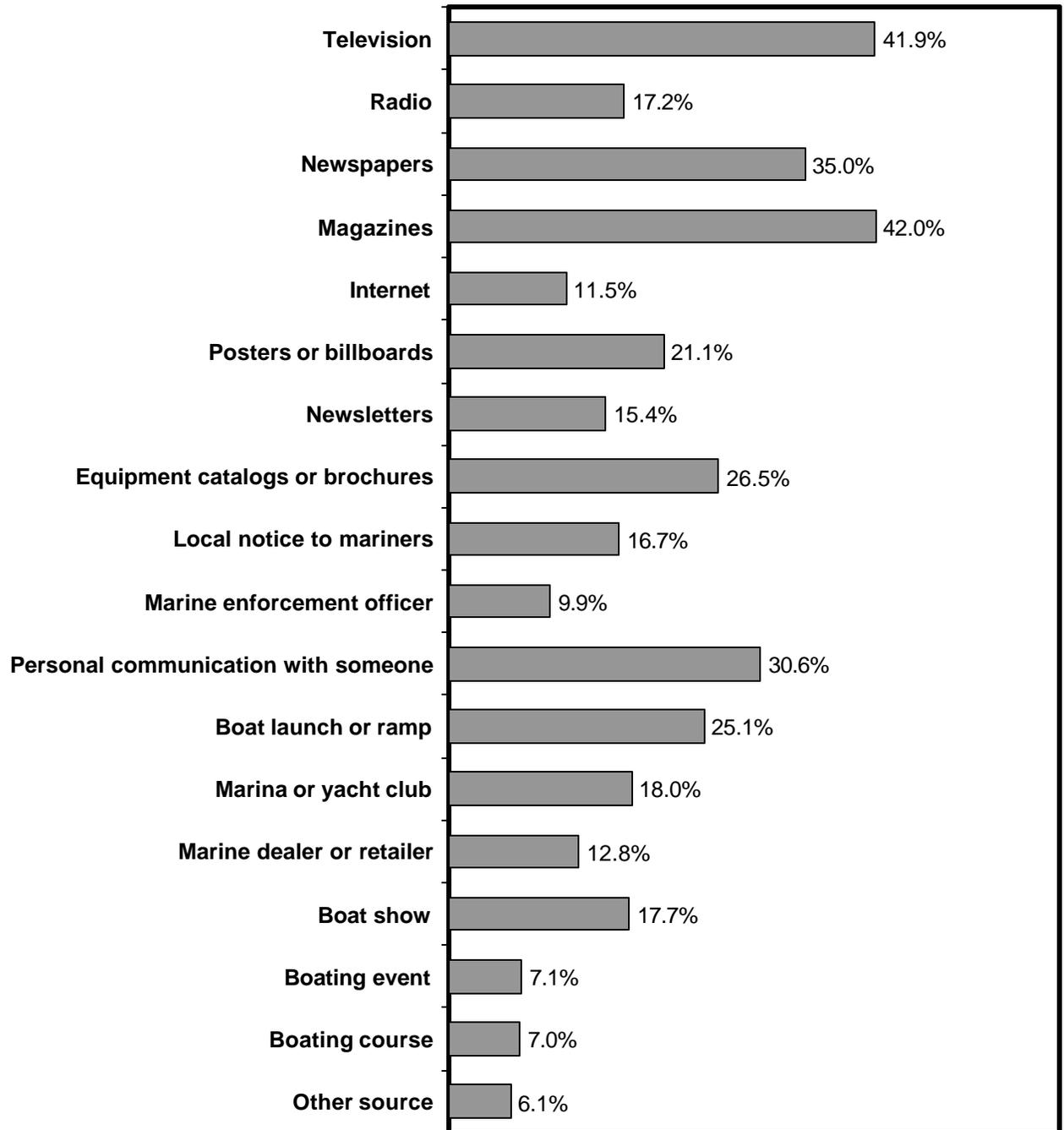


- ❖ Overall, participation in boating organizations was low, with fewer than 5% participation in most and less than 1% participation in many.
- ❖ The most often held membership was in the Boat Owners Association of the United States (Boat U.S.), with 11% participation.
- ❖ Membership in a yacht club or marina was the next most frequent, with 8% participation.

Boat operators were asked whether they had seen, read, or heard any information about boating safety between September 2001 and September 2002; if they had they were asked to indicate the source(s) of that information. Approximately 58% of boat operators indicated they had heard, read, or seen some information about boating safety. The results for the sources of this information are summarized in Figure 4.7 on the following page. Television and magazines were the primary sources for information about boating safety, with 42% of boat operators naming them as a source of safety information in the past year. Newspapers were the next most frequently mentioned, cited by 35% of boat operators, and personal communication followed, mentioned by 31%. Interestingly, posters or billboards were mentioned more frequently at 21% than radio (17%) or the Internet (12%).

- ❖ Television and magazines were the primary sources for information about boating safety, mentioned by 42%.
- ❖ Newspapers were the next most frequently mentioned, cited by 35%, followed by personal communication, mentioned by 31%.
- ❖ Posters or billboards were mentioned more frequently at 21% than radio (17%) or the Internet (12%).

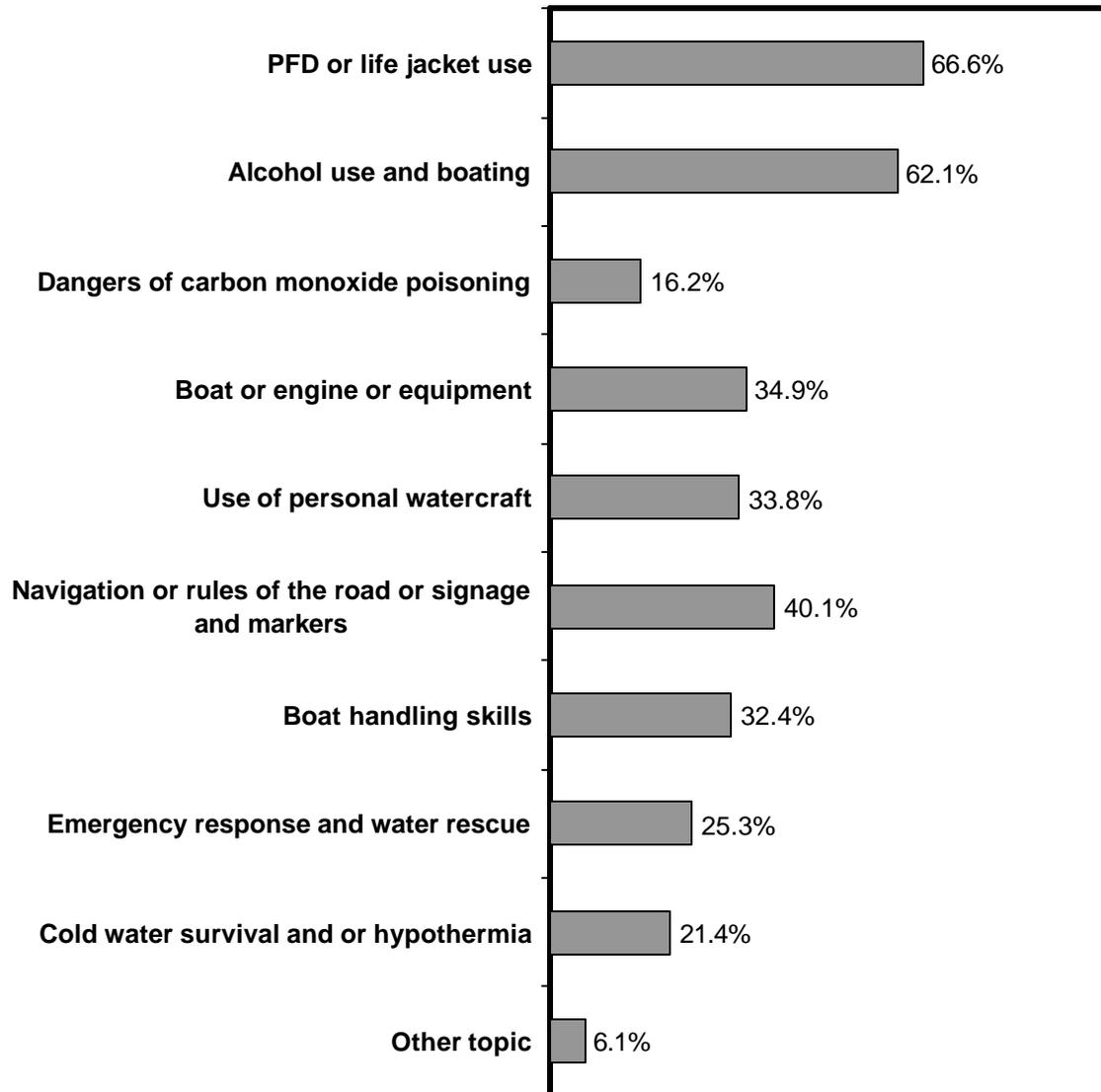
**Figure 4.7 From where did you see, read, or hear information about boating safety? (A8)**



In addition to the source of the boating safety information, boat operators were also asked to recall the topic of the information they saw, read, or heard over the previous year. The specific topics about which they were asked are presented on the following page in Figure 4.8. Two topics were perceived as dominating boating safety news: PFD or life jacket use and alcohol use while boating. Both of these topics were remembered by more than 60% of boat operators who had seen, read, or heard boating safety information in the previous year. The next most commonly remembered topics were navigation (40%), engine or equipment maintenance (35%), use of personal watercraft (34%), and boat handling skills (32%). The danger of carbon monoxide poisoning was remembered least often, seen, heard, or read about by just 16% of boat operators in the previous year.

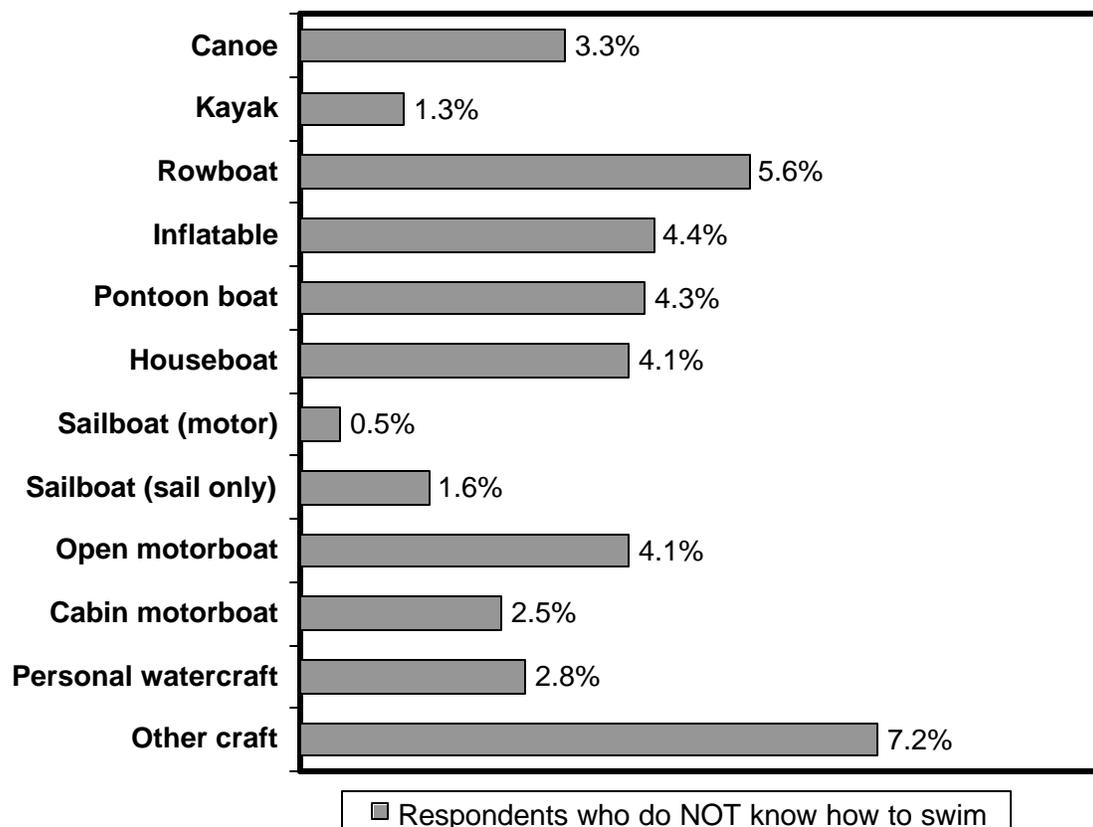
- ❖ Two topics were perceived as dominating boating safety news: PFD or life jacket use and alcohol use while boating.
- ❖ The next most commonly remembered topics were navigation (40%), engine or equipment maintenance (35%), use of personal watercraft (34%), and boat handling skills (32%).
- ❖ The danger of carbon monoxide poisoning was remembered by just 16% of boat operators in the previous year.

**Figure 4.8 What were the topics of the boating safety information you saw, read, or heard? (A9)**



The last aspect of boating experience considered was boat operators' ability to swim. Operators were asked whether or not they know how to swim, and this is examined as a function of vessel type in Figure 4.9. The vast majority of boat operators—96%—can swim, but there were some small differences as a function of the type of boat used. More than 5% of operators of rowboats are unable to swim. Conversely, less than 2% of operators of kayaks and sail only sailboats are unable to swim. Less than 1% of operators of sailboats with a uxiliary motors are unable to swim.

**Figure 4.9 Do you know how to swim? (G7)**

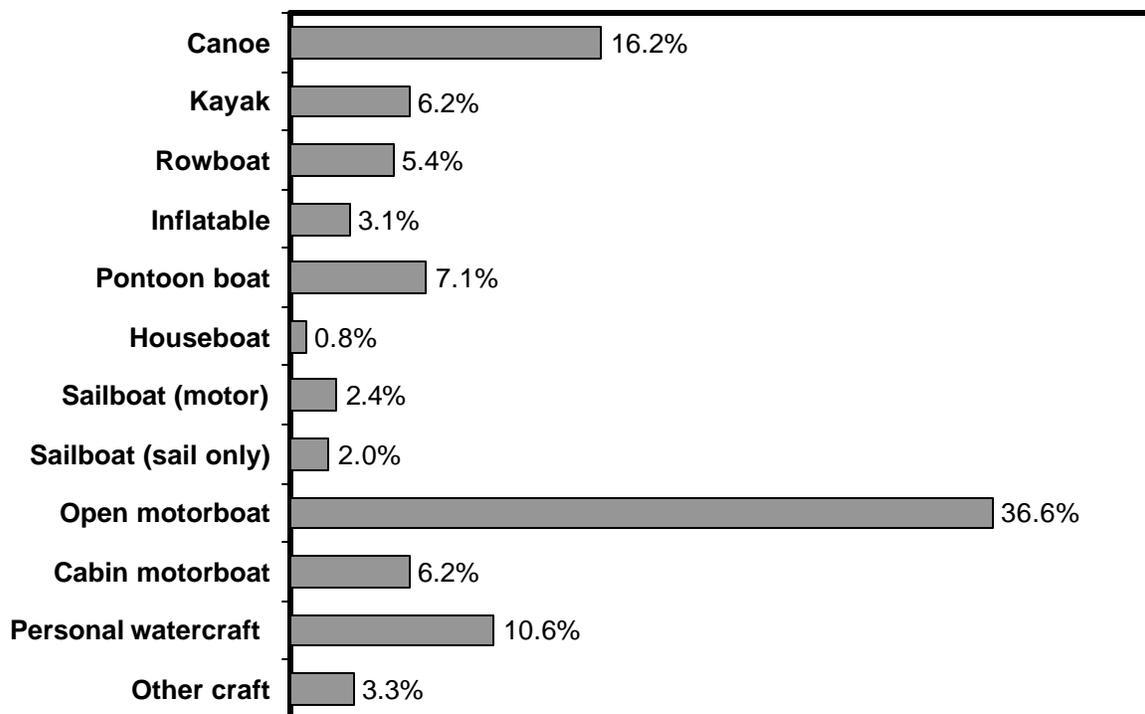


- ❖ Overall, 96% of boat operators reported that they are able to swim.
- ❖ More than 5% of operators of rowboats are unable to swim.
- ❖ Less than 2% of operators of kayaks and sail-only sailboats are unable to swim, and less than 1% of operators of sailboats with auxiliary motors are unable to swim.

## V. BOAT OPERATED MOST OFTEN

The previous analyses have taken into account all boats operated by individual respondents. The next series of analyses, however, focus specifically on the one type of boat operated most often by respondents. As seen in Figure 5.1, the single type of boat operated most often was the open motorboat, used by over a third of all boat operators in the United States (37%). The next most frequently operated type of boat was the canoe, with about 16% of boat operators using this type of boat most frequently. Personal watercraft—such as Jet-skis and Waverunners—were used by 11%.

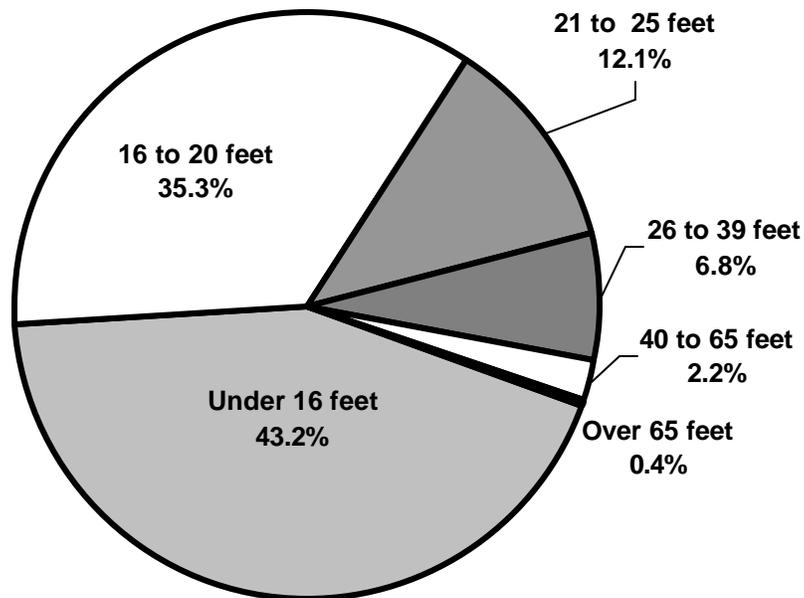
**Figure 5.1** When you went boating, what kind of boat did you operate most often? (C1)



- ❖ For 37% of boat operators, open motorboats were the type of boat used most often.
- ❖ The next most frequently operated type of boat was the canoe, used most often by 16% of boat operators.
- ❖ Personal watercraft were used by 11%.

Boat operators were next asked to indicate the actual length of the boat they operated most often in feet. Figure 5.2 summarizes the overall responses for length of vessel. Collapsing across all boat types, 43% of all boats were less than 16 feet long, and 90.6% were less than 26 feet long. Of the 9.4% that were longer than 26 feet in length, 72% were less than 40 feet long.

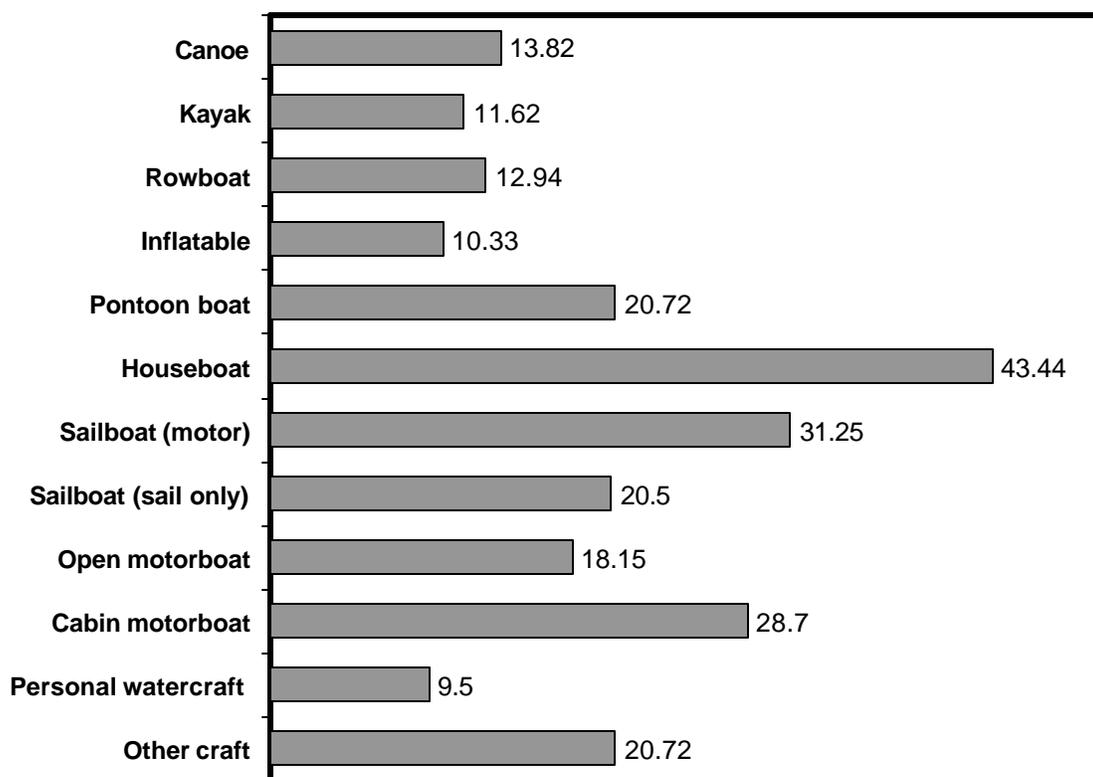
**Figure 5.2 How long is the boat you operate most often? (C2)**



- ❖ Collapsing across all boat types, 43% of all boats are less than 16 feet long.
- ❖ 90.6% of all boats are less than 26 feet long.
- ❖ Of the 9.4% that are longer than 26 feet in length, 72% are less than 40 feet long.

As would be expected, there was a great deal of variability in length of vessel as a function of vessel type. Figure 5.3 compares the average length of various types of watercraft. Houseboats, on average, tended to be longest in length, with a mean of 43 feet. This is consistent with the finding that houseboats tended to accommodate more passengers than other types of boats (see Figure 3.2). Sailboats with auxiliary motors also tended to be longer boats, with a mean length of 31 feet. Cabin motorboats averaged 29 feet long and pontoon boats averaged 21 feet long. Personal watercraft and inflatables tended to be the smallest craft, on average, at about 10 feet.

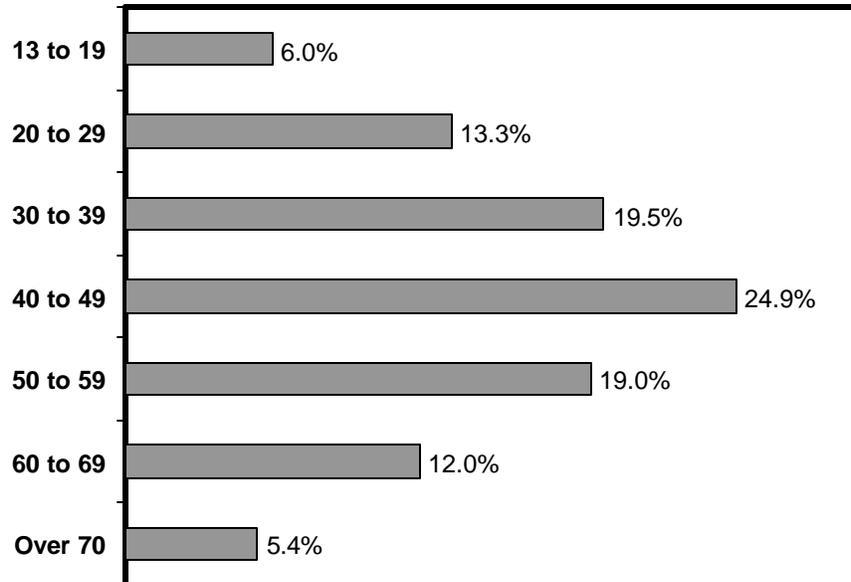
**Figure 5.3 Mean length in feet of boat operated most often by type of vessel. (C1, C2)**



- ❖ Houseboats, on average, were longest in length, with a mean of 43 feet.
- ❖ The next longest boats were sailboats with auxiliary motors (31 feet), cabin motorboats (29 feet) and pontoon boats (21 feet).
- ❖ Personal watercraft and inflatables tended to be the smallest craft, on average, at about 10 feet.

Boat operators who operated the boat used most often were asked to indicate their age in one of nine categories. The results for this question are summarized in Figure 5.4. About a quarter of primary operators were between 40 and 49 years of age. Thirty-three percent were between 20 and 40, and 36% were 50 or over. Just 6% of primary operators were under 20 years old.

**Figure 5.4 What is your age? (The person who usually operated the boat used most often) (D4)**



- ❖ About a quarter of primary operators were between 40 and 49 years of age.
- ❖ 33% of primary operators were between 20 and 40, and 36% were 50 or over.
- ❖ Just 6% were under 20 years old.

Age of primary operator tended to vary as a function of the length of the boat operated most often, as seen in Table 5.1. Younger boat operators tended to use boats that were very small (74% operated a boat under 16 feet). As age of operator increases, however, length of boat becomes more moderate; operators 50 and older were most likely to use a boat 16-20 feet long. Statistical tests find that there are significant differences between the different age groups and the length of boats they operate most often, with less than a 1% possibility that the results are due to chance.

**Table 5.1 Length of boat operated most often by the age of operator.**  
(C2, D4)

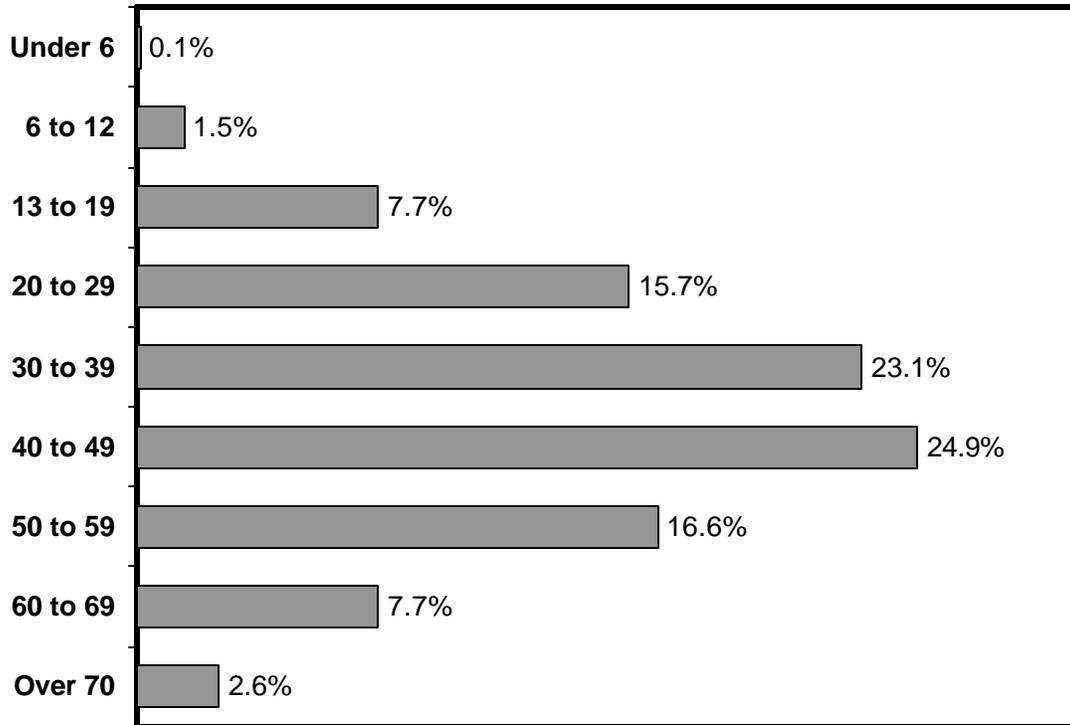
	Age of Operator						
	13 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 and Older
<b>Under 16 feet</b>	74.1%	64.4%	49.1%	39.9%	32.0%	29.5%	34.2%
<b>16 to 20 feet</b>	17.1%	23.7%	33.2%	37.7%	40.2%	41.3%	43.3%
<b>20 to 25 feet</b>	4.8%	7.0%	10.6%	13.3%	14.8%	15.3%	11.8%
<b>26 to 39 feet</b>	3.2%	3.3%	5.1%	6.9%	9.4%	9.2%	8.2%
<b>40 to 65 feet</b>	.7%	1.3%	1.5%	1.8%	3.3%	3.6%	2.2%
<b>Over 65 feet</b>	.0%	.3%	.4%	.4%	.3%	1.1%	.3%
<b>Total</b>	100%	100%	100%	100%	100%	100%	100%

p ≤ 0.01

- ❖ Younger boat operators were more likely to use boats that were very small (under 16 feet).
- ❖ As age of operator increases, however, length of boat becomes more moderate; operators 50 and older were most likely to use a boat 16 to 20 feet long.

Along with their own ages, boat operators were asked to indicate the age of a secondary operator of the boat operated most often. The results are summarized in Figure 5.5. These data follow the same pattern as the age of the primary operator, with about one-quarter of alternate operators age 40 to 49, 39% between 20 and 39 years old, 27% age 50 or over, and 9% under age 20.

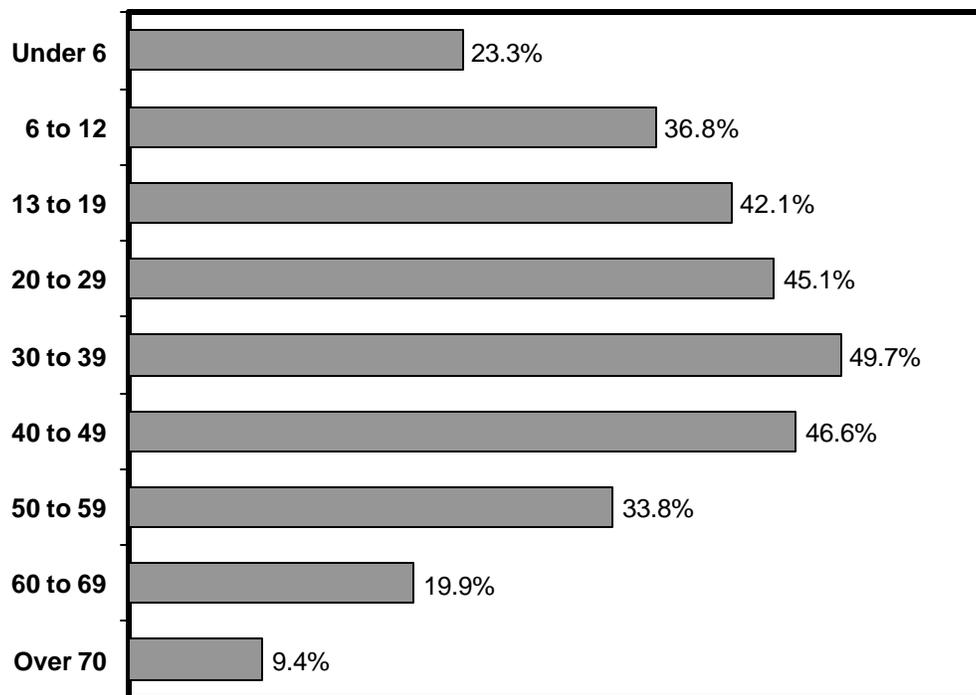
**Figure 5.5 What age is the person who usually was the alternate operator of the boat used most often? (D4a)**



- ❖ The data for age of secondary operator follow the same pattern as the age of the primary operator.
- ❖ One-quarter of secondary operators were age 40 to 49.
- ❖ 39% of secondary operators were between 20 and 39 years old, and 27% age 50 or over.
- ❖ 9% of secondary operators were under age 20.

In addition to the age of the primary and secondary operators, respondents were asked to report the age of additional occupants who usually traveled on the boat operated most often. Figure 5.6 displays whether the respondent indicated that any occupants on the boat operated most often fell into the nine age categories below. Nearly half of all boat operators indicated that they carried at least one occupant between 30 and 39 years old. Nearly half indicated that they carried at least one occupant between 20 and 29 (45%) or 40 and 49 (47%). Nearly one-quarter (23%) indicated that they carried at least one occupant under age 6, and 37% carried at least one occupant age 6 to 12. Boat operators were least likely to carry occupants over age 70, with just 9% of operators indicating they carried at least one occupant in this age group.

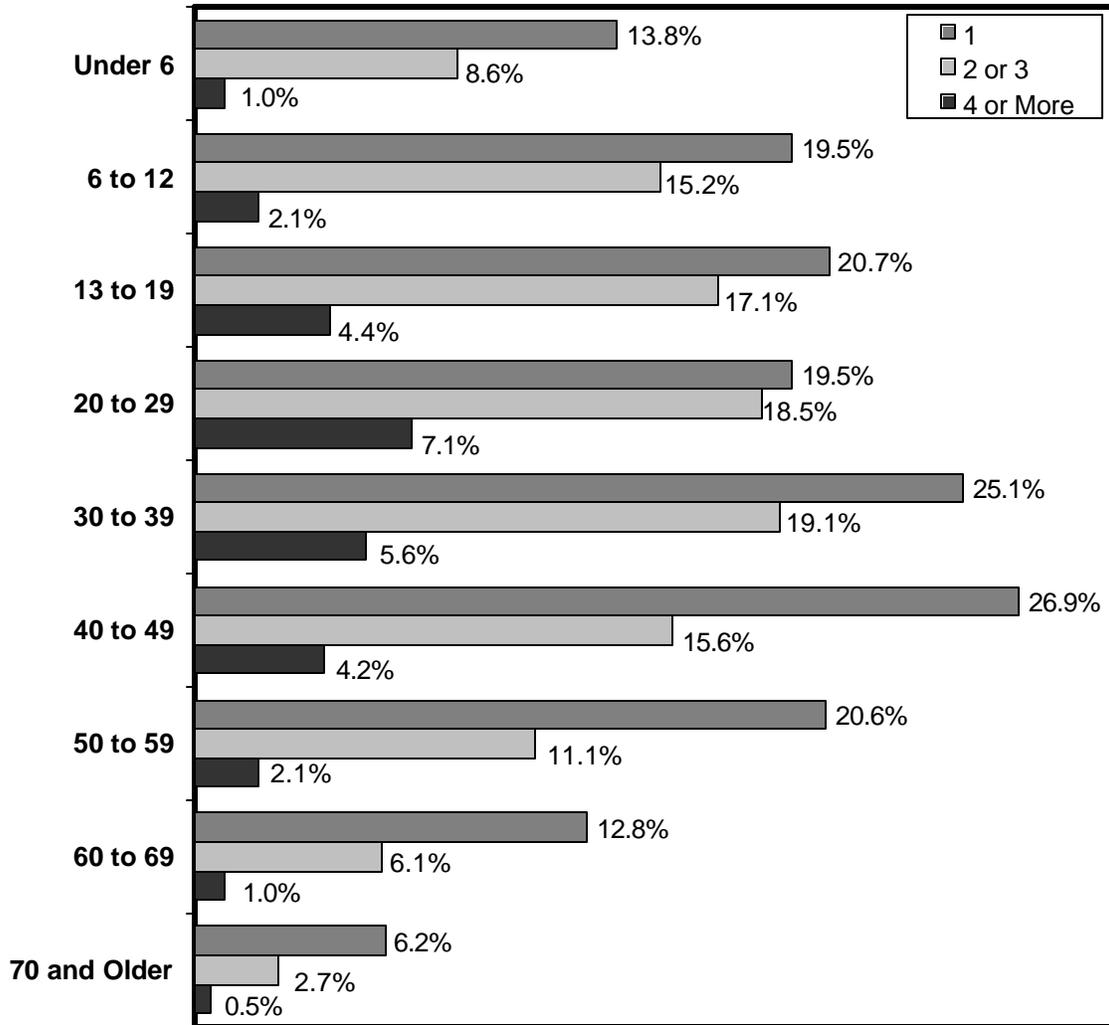
**Figure 5.6 Age of occupants on boat operated most often. (D5)**



- ❖ Half of all boat operators indicated that they carried at least one occupant between 30 and 39 years old.
- ❖ Nearly half indicated that they carried at least one occupant between 20 and 29 (45%) or 40 and 49 (47%).
- ❖ Nearly one-quarter (23%) carried at least one occupant under age 6, and 37% carried at least one occupant age 6 to 12.
- ❖ Boat operators were least likely to carry occupants over age 70.

Figure 5.7 breaks down the results presented in Figure 5.6 in terms of the number of additional passengers usually carried in each of nine age groups. As can be seen in this figure, boat operators who carried occupants on board were most likely to carry just a single passenger. When boat operators carried multiple occupants, the passengers' ages tended to be younger. Groups of 4 or more are rare, but when they occur, the passengers' ages were often under age 29.

**Figure 5.7 When you operated this boat, how many people in each of the age groups below usually went boating with you? (D5)**



- ❖ When boat operators carried occupants on board, they were most likely to carry just a single additional passenger.
- ❖ Boaters rarely carry 4 or more passengers, but when they do the passengers tend to be younger, often under age 29.

The final analysis involving length of boat examined the age of additional occupants as a function of the length of the boat operated most often. Occupants on smaller vessels were more likely to be younger, with 74% of occupants under 6 and 70% of occupants between 6 and 12 boating on vessels under 16 feet. Comparatively, just 28% of occupants age 60-69 went boating in vessels under 16 feet long. Conversely, occupants on larger vessels were more likely to be older. The linear trend peaks with 57% of occupants between 60 and 69 boating in vessels 16 to 25 feet long compared with just 21% of occupants under 6 and 26% of occupants between 6 and 12. Again, statistical tests find that there are significant differences between the different age groups on occupants and the length of the boat operated most often, with less than a 1% possibility that the results are due to chance.

In addition to the data in Table 5.2, the Technical Report contains a complete breakdown of length of boat operated most often by number of occupants in each of nine age groups.

**Table 5.2 Length of boat operated most often by the age of occupants.**  
(C2, D5)

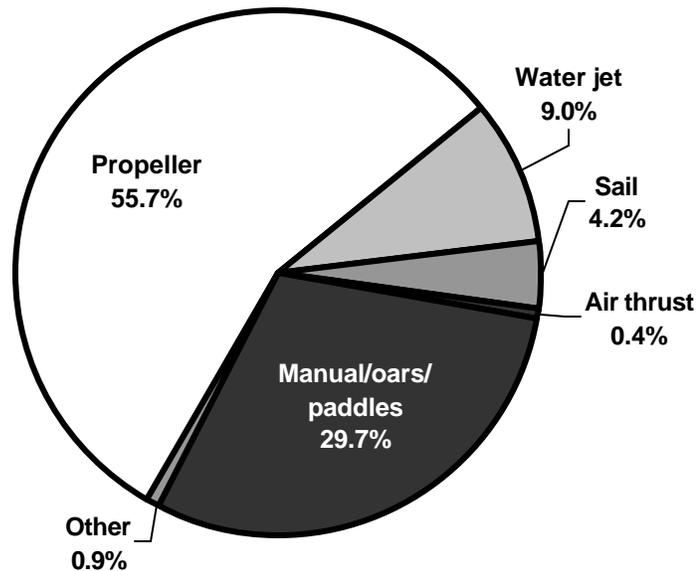
	Age of Additional Occupants								
	Under 6	6 to 12	13 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 and Older
<b>Under 16 feet</b>	74.6%	70.5%	63.4%	62.9%	47.0%	37.6%	30.4%	28.0%	43.9%
<b>16 to 20 feet</b>	13.1%	22.8%	28.0%	26.2%	36.0%	39.1%	38.9%	41.4%	34.3%
<b>20 to 25 feet</b>	8.2%	3.1%	6.2%	6.8%	10.4%	12.9%	16.8%	16.1%	12.5%
<b>26 to 39 feet</b>	2.5%	2.9%	1.5%	2.7%	5.1%	7.8%	10.0%	10.1%	6.3%
<b>40 to 65 feet</b>	1.6%	.6%	.5%	1.2%	1.2%	2.4%	3.3%	3.5%	2.4%
<b>Over 65 feet</b>		.0%	.4%	.2%	.4%	.3%	.6%	.8%	.6%
<b>Total</b>	100%	100%	100%	100%	100%	100%	100%	100%	100%

p ≤ 0.01

- ❖ Occupants on smaller vessels were more likely to be younger, 74% of occupants on boats under 16 feet are under 6 years old and 70% of occupants on boats under 16 feet are between 6 and 12.
- ❖ Comparatively, just 28% of occupants between 60 and 69 went boating in vessels under 16 feet long.
- ❖ Conversely, occupants on larger vessels were more likely to be older; 57% of occupants between 60 and 69 went boating in vessels 16 to 25 feet long compared with just 21% of occupants under 6 and 26% of occupants age 6 and 12.

Boat operators were asked about the primary means of propulsion for the boat they operated most often. The results are shown in Figure 5.8. Collapsing across all types of boats, the most common primary means of propulsion was a propeller, with 56% of boats reported to have had this type of propulsion mechanism. The next most common mechanism was manual propulsion (i.e., oars or paddles), the primary means of propulsion for 30% of boats. Air thrust was the least common means of propulsion, occurring in less than one-half of one percent of boats.

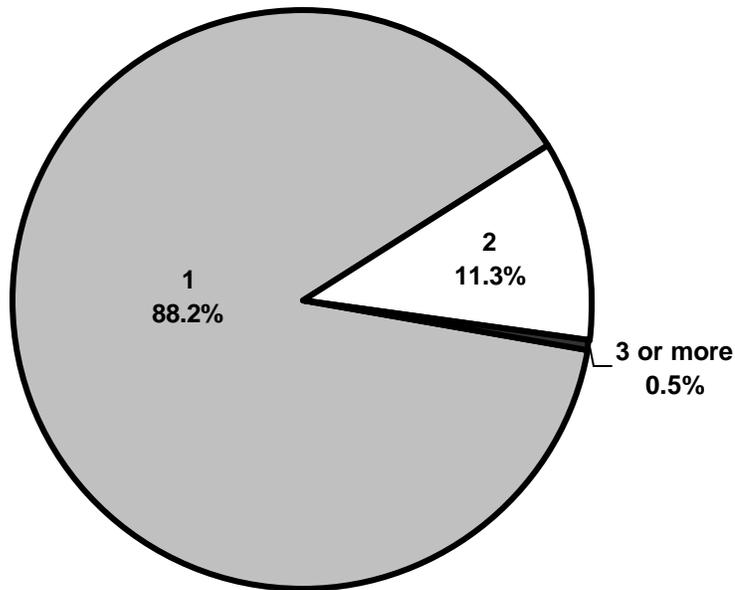
**Figure 5.8 What is the boat's primary means of propulsion? (C3)**



- ❖ Collapsing across all types of boats, the most common primary means of propulsion was a propeller, present on 56% of boats.
- ❖ Manual propulsion (i.e., oars or paddles) was the primary means of propulsion for 30% of boats.
- ❖ Air thrust was the least common means of propulsion, occurring in less than one-half of one percent of boats.

If the boat had a motor or engine, respondents were also asked how many motors or engines were present. The results are shown in Figure 5.9. The vast majority of boats with motors or engines (88%) had just one engine. Eleven percent had two engines, and less than 1% had 3 or more engines.

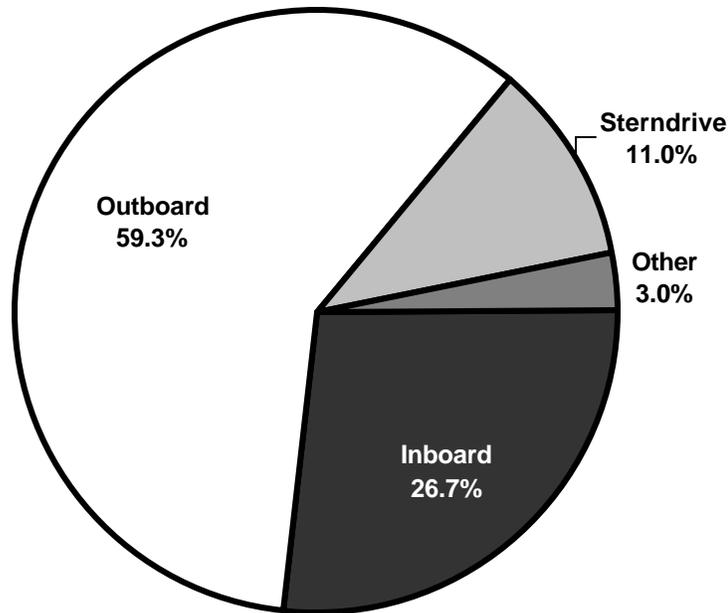
**Figure 5.9 How many primary motor(s) or engines does this boat have?**  
(C4)



- ❖ The vast majority of boats with motors or engines—88%—had just one engine.
- ❖ 11% had two engines, and less than 1% had 3 or more engines.

In addition to the number of engines, respondents were asked to indicate what type of engine is present on the boat they operated most often. The results are shown in Figure 5.10. Collapsing across all types of motorboats, outboard engines were the most common type of engine, present on almost 60% of boats with engines. Inboard engines were next most common, present on 27% of boats with engines. Sterndrive engines were present on 11% of boats with engines.

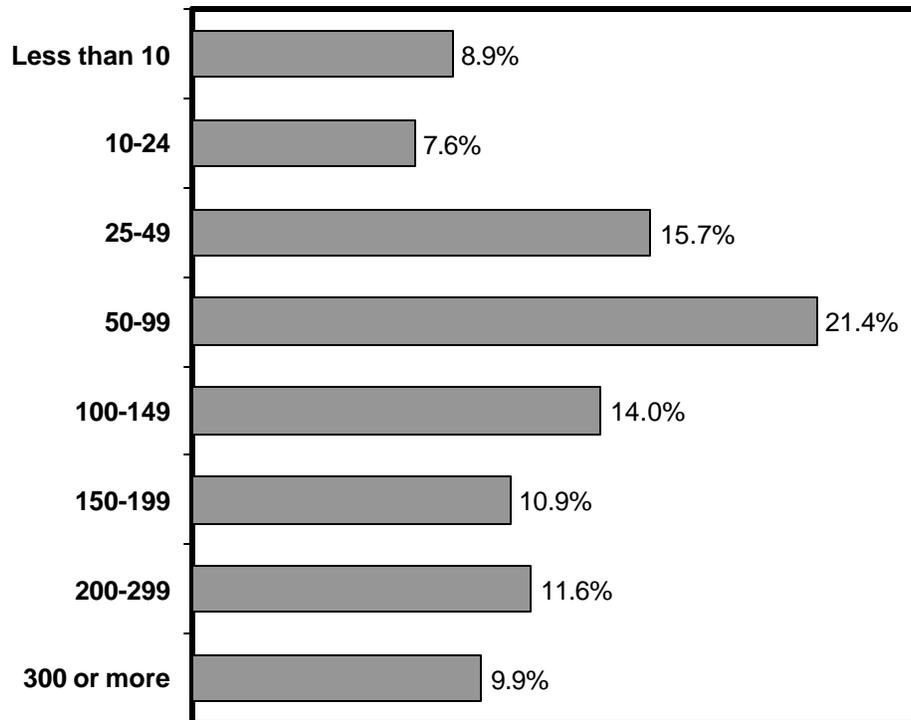
**Figure 5.10 What kind(s) of engine(s)/motor(s) does this boat have? (C5)**



- ❖ Outboard engines were the most common type of engine, present on almost 60% of boats with engines.
- ❖ Inboard engines were present on 27% of boats with engines.
- ❖ Sterndrive engines were present on 11%.

Operators of boats with engines were also asked to indicate the total horsepower of the boat's engine or engines. The results are shown in Figure 5.11. Approximately half of boats with engines (54%) have total horsepower of 99 or below, with 21% of motorboats having total horsepower between 50 and 99. Twenty-two percent have over 200 horsepower.

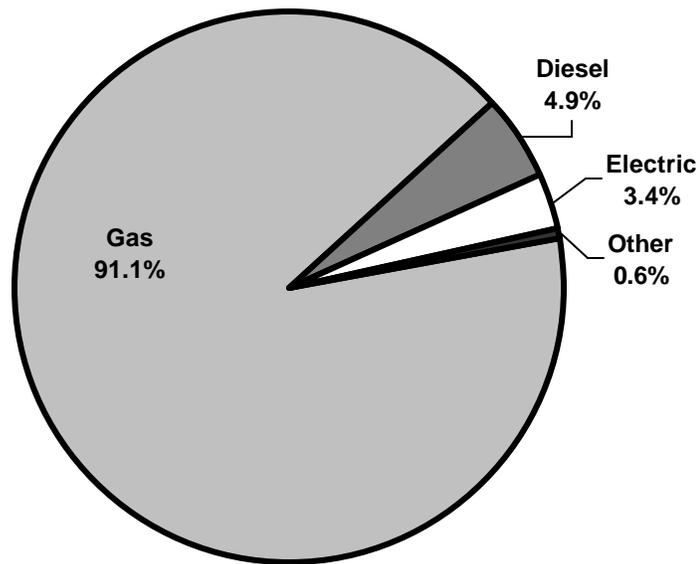
**Figure 5.11 What is the total horsepower of the boat's engine(s)/motor(s)? (C6)**



- ❖ Approximately half of boats with engines (54%) have total horsepower of 99 or below.
- ❖ 21% of boats with engines have total horsepower between 50 and 99.
- ❖ 22% have over 200 horsepower.

The last aspect of the boat's engine to be considered was the fuel source. Respondents were asked to indicate how the primary engine(s)/motor(s) of the boat operated most often was fueled: gasoline, diesel, electric, or another type of fuel. The results are shown in Figure 5.12. Engines were almost exclusively gas powered, with 91% operating on gasoline. Five percent of engines were diesel and 3% were electric.

**Figure 5.12 How is(are) the primary motor(s) or engine(s) on this boat fueled? (C7)**



- ❖ Engines were almost exclusively gas powered, with 91% operating on gasoline.
- ❖ Five percent of engines were diesel and 3% were electric.

Finally, the primary means of propulsion of the boat operated most often was examined in greater detail. First, Table 5.3 gives a breakdown of the types of activities in which boat operators engaged for each type of propulsion. Note that the columns do not sum to 100% because operators of each type of boat could engage in more than one activity on that boat. Over 60% of operators of boats with propellers as the primary means of propulsion engaged in recreational fishing and cruising using the engine. Over 80% of operators of boats propelled primarily by water jets engaged in cruising using the engine and over 44% also engaged in waterskiing or tubing on these boats. As would be expected, the most common activity for operators of boats propelled primarily by sails was sailing, with over 94% of operators of the boats reporting they sailed on these boats. However, operators of these boats also reported cruising (22%) and swimming or diving off the boat (24%). Over 78% of operators of boats using air thrust as the primary means of propulsion reported cruising using the engine and over 35% reported waterskiing or tubing on these boats. Over 85% of operators of boats propelled manually, using oars or paddles, engaged in paddling while boating.

**Table 5.3 Boating activity by primary means of propulsion. (C3, D1)**

	Primary Means of Propulsion					
	Propeller	Water jet	Sail	Air thrust	Manual-oars /paddles	Other
<b>Cruising using engine</b>	61.4%	81.5%	21.8%	78.4%	5.4%	33.4%
<b>Sailing</b>	2.4%	3.1%	94.4%	14.9%	5.0%	2.7%
<b>Paddling</b>	3.7%	4.0%	6.9%	15.2%	85.7%	25.4%
<b>Swimming or diving off boat</b>	32.7%	29.7%	23.9%	24.1%	23.2%	25.4%
<b>Recreational fishing</b>	67.8%	18.2%	14.8%	29.8%	38.6%	68.0%
<b>Tournament fishing</b>	8.3%	1.7%	1.7%	8.7%	2.8%	12.2%
<b>Hunting</b>	3.7%	1.5%	.0%	9.1%	2.6%	8.0%
<b>Racing</b>	1.2%	16.0%	15.2%	23.9%	4.2%	3.0%
<b>Waterskiing or tubing</b>	31.8%	44.6%	1.7%	35.5%	3.7%	11.3%
<b>Whitewater sports</b>	1.5%	5.2%	.6%	5.2%	7.9%	4.2%

- ❖ Over 60% of operators of boats propelled mainly by propellers engage in recreational fishing and cruising using the engine.
- ❖ 81.5% of operators of boats propelled mainly by water jets engaged in cruising using the engine and 44.6% engaged in waterskiing or tubing.
- ❖ 94.4% of operators of boats propelled mainly by sails engaged in sailing, while 22% reported cruising and 24% swimming or diving.
- ❖ 78.4% of operators of boats propelled mainly by air thrust engaged in cruising using the engine and 35.5% engage in waterskiing or tubing.
- ❖ 85.7% of operators of boats propelled manually, using oars, or paddles, engaged in paddling.

Next, the age of the primary and secondary boat operator was examined for each type of means of propulsion. Tables 5.4 and 5.5 give the age of the primary and secondary boat operator by type of primary means of propulsion. Propeller and manually propelled boats were the most commonly operated boats for all age groups. The percent of boat operators boating on boats with water jets or oars/paddles as the primary means of propulsion decreased as the age of the primary or secondary operator increased. This indicates that younger people were more likely to operate boats with water jet or manual propulsion. The percent of boat operators using boats with propellers as the primary means of propulsion increased significantly as the age of the primary or secondary operator increased, going from 30% for primary operators ages 13 to 19 to 75.5% for primary operators over 70. Additionally, the percent of boat operators using boats with sails as the primary means of propulsion increased slightly as the age of the primary or secondary operator increased.

**Table 5.4 Primary means of propulsion by age of primary operator.**  
(C3,D4)

	Age of Primary Operator						
	13 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	Over 70
Propeller	30.1%	37.4%	49.4%	56.6%	64.5%	73.7%	75.5%
Water jet	17.3%	17.2%	11.1%	8.1%	5.5%	3.4%	2.0%
Sail	2.9%	2.6%	3.4%	4.4%	5.4%	5.4%	5.5%
Air thrust	1.3%	.9%	.4%	.2%	.4%	.1%	.2%
Manual/oars/paddles	47.5%	41.3%	34.8%	29.8%	23.4%	16.3%	15.7%
Other	.9%	.7%	1.0%	1.0%	.8%	1.1%	1.1%
Total	100%	100%	100%	100%	100%	100%	100%

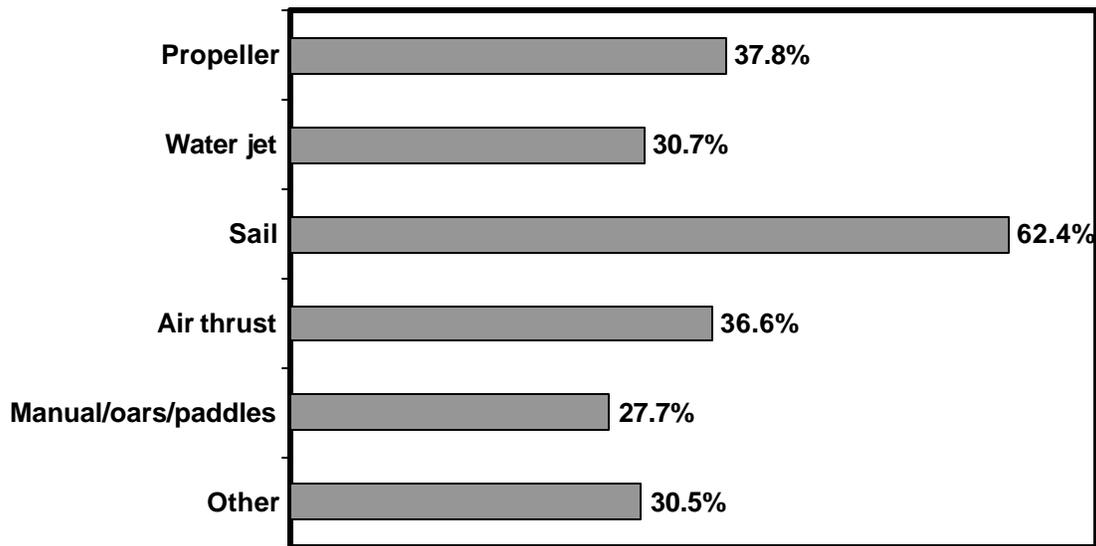
**Table 5.5 Primary means of propulsion by age of secondary operator.**  
(C3, D4a)

	Age of Secondary Operator						
	13 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	Over 70
Propeller	42.4%	45.5%	55.5%	61.1%	64.4%	72.1%	69.3%
Water jet	13.9%	15.8%	10.8%	8.0%	4.9%	3.0%	2.6%
Sail	2.3%	2.4%	3.3%	4.0%	7.0%	5.9%	9.1%
Air thrust	1.1%	.6%	.4%	.2%	.3%		.1%
Manual/oars/paddles	38.9%	35.0%	29.2%	26.0%	22.7%	17.6%	17.4%
Other	1.2%	.7%	.9%	.7%	.8%	1.4%	1.5%
Total	100%	100%	100%	100%	100%	100%	100%

- ❖ Propeller and manually propelled boats are the most commonly operated boats for all age groups.
- ❖ The percent of boat operators boating on boats with water jets or oars/paddles as the primary means of propulsion *decrease* as the age of the primary or secondary operator increase.
- ❖ The percent of boat operators using boats with propellers as the primary means of propulsion *increase* significantly as the age of the primary or secondary operator increase.
- ❖ The percent of boat operators using boats with sails as the primary means of propulsion *increase* slightly as the age of the primary or secondary operator increase.

Figure 5.13 presents the percent of primary boat operators who have taken a safety course by the primary means of propulsion of the boat that they operated most often. Primary operators of boats propelled primarily by sails are the most likely to have taken a safety course; over 62% have done so. Primary operators of manually propelled boats were the least likely to have taken a boating safety course, with only 27.7% having done so. Between 30% and 38% of the primary operators of boats with primary means of propulsion *other than* propeller or manual had taken a boating safety course.

**Figure 5.13 Have ever taken a boating safety course by primary means of propulsion. (C3, A2)**



- ❖ Primary operators of boats propelled primarily by sails were the most likely to have taken a safety course; 62.4% have done so.
- ❖ Primary operators of manually propelled boats were the least likely to have taken a boating safety course; only 27.7% have done so.
- ❖ Between 30% and 38% of the primary operators of boats with primary means of propulsion *other than* propeller or manual had taken a boating safety course.

Next, the total number of hours of lifetime boat operating experience was examined for boats with each type of primary means of propulsion. Table 5.6 shows the breakdown of lifetime boat operating experience of primary boat operators by propulsion type. Primary boat operators who most often operated boats with propellers and sails as the primary means of propulsion had the most lifetime boat operating experience. Over 50% of primary operators of these boats had more than 500 hours of lifetime boat operating experience. Primary operators of boats that were primarily manually propelled had the least amount of lifetime boat operating experience. Over 61% of these operators had 100 or less total hours of boat operating experience.

**Table 5.6 Total hours of lifetime boat operating experience by primary means of propulsion. (A5, C3)**

	Primary Means of Propulsion					
	Propeller	Water jet	Sail	Air thrust	Manual/oars /paddles	Other
<b>Less than 1 hour</b>	1.2%	2.2%	2.0%	4.9%	3.6%	5.1%
<b>1 to 9 hours</b>	4.8%	15.4%	3.6%	8.4%	16.7%	13.9%
<b>10 to 19 hours</b>	3.9%	10.3%	5.1%	16.2%	12.9%	6.8%
<b>20 to 100 hours</b>	14.1%	23.7%	12.8%	16.8%	28.1%	19.8%
<b>101 to 500 hours</b>	25.2%	23.7%	22.6%	20.5%	19.7%	21.6%
<b>Over 500 hours</b>	50.8%	24.7%	53.9%	33.2%	19.0%	32.7%
<b>Total</b>	100%	100%	100%	100%	100%	100%

- ❖ Primary boat operators of boats with propellers and sails as the primary means of propulsion had the most lifetime boat operating experience; over 50% had more than 500 hours of lifetime boat operating experience.
- ❖ Primary operators of boats that were primarily manually propelled had the least amount of lifetime boat operating experience; over 61% had 100 or less total hours of boat operating experience.

Lastly, total horsepower of each type of boat was examined. Table 5.7 gives the horsepower of the boat by the type of primary propulsion. Boats propelled primarily by propeller, water jet, or air thrust were most likely to have a total horse power between 50 and 99. Boats propelled primarily by sail or manually were mostly likely to have a total horsepower of less than 10.

**Table 5.7 Total horsepower of boat by primary means of propulsion.**  
(C3, C6)

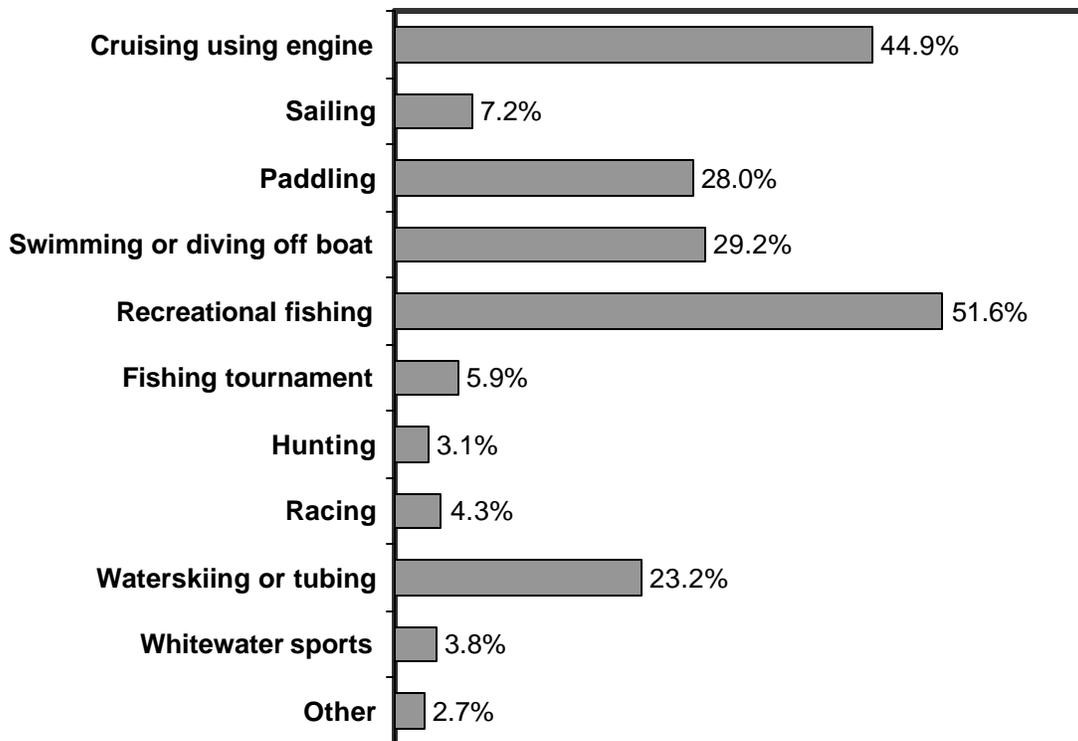
	Primary Means of Propulsion					
	Propeller	Water jet	Sail	Air thrust	Manual/oars /paddles	Other
<b>Less than 10</b>	7.0%	3.2%	31.0%	2.3%	62.5%	31.4%
<b>10-24</b>	6.4%	9.5%	24.3%	13.9%	16.7%	9.3%
<b>25-49</b>	15.7%	12.5%	27.3%	10.3%	8.1%	14.0%
<b>50-99</b>	21.3%	29.3%	12.4%	25.0%	6.1%	22.8%
<b>100-149</b>	14.0%	22.3%	2.2%	13.3%	3.6%	5.7%
<b>150-199</b>	12.0%	8.2%	.7%	.8%	1.3%	6.6%
<b>200-299</b>	13.2%	4.8%	.9%	12.7%	1.0%	4.6%
<b>300 or more</b>	10.4%	10.2%	1.3%	21.7%	.8%	5.5%
<b>Total</b>	100%	100%	100%	100%	100%	100%

- ❖ Boats propelled primarily by propeller, water jet, or air thrust were most likely to have a total horsepower between 50 and 99.
- ❖ Boats propelled primarily by sail or manually were most likely to have a total horsepower of less than 10.

## VI. Activities on the Boat Operated Most Often

Respondents were asked about the type of boating experiences in which they engaged while on the water in the boat used most often. Boat operators were presented with a number of activities and were asked to indicate all of those in which they engaged over the past year. The percent of boaters who engaged in each activity is summarized in Figure 6.1. About half of all boat operators cruised using the boat's engine or engaged in recreational fishing while boating. About one-fourth of boaters engaged in water-skiing or tubing, paddling, and swimming or diving off the boat.

**Figure 6.1 Which of the following activities did you usually do while on the water? (D1)**



- ❖ Almost half of all boaters cruised using the boat's engine and just over half engaged in recreational fishing while boating.
- ❖ About one-fourth of boaters engaged in water-skiing or tubing, paddling, or swimming or diving off the boat.

The type of activities in which boaters engaged varied as a function of the type of boat used. Table 6.1 and Figures 6.2a-l show the activities in which boaters engaged for each type of vessel. These data have been analyzed two ways. First, as presented in Table 6.1, the total percent of all respondents who engaged in each activity was determined. As respondents may have engaged in more than one activity over the course of the year, these percentages total to more than 100%.

**Table 6.1 Percent of all respondents engaging in each activity on the boat operated most often. (C1, D1)**

	Boating Activity					
	Cruising using engine	Sailing	Paddling	Swimming or diving off boat	Recreational fishing	Fishing tournament
Canoe	6.7%	5.1%	85.7%	23.9%	42.5%	4.0%
Kayak	3.1%	2.9%	92.4%	16.9%	13.9%	.8%
Rowboat	14.7%	8.3%	53.9%	14.7%	68.3%	4.2%
Inflatable	14.1%	6.4%	75.6%	43.5%	32.2%	1.7%
Pontoon boat	79.4%	2.5%	4.5%	48.7%	61.2%	3.6%
Houseboat	73.4%	8.6%	1.7%	59.3%	42.5%	5.6%
Sailboat (motor)	40.5%	95.4%	2.2%	26.7%	14.3%	.7%
Sailboat (sail only)	12.0%	93.5%	9.0%	25.5%	19.4%	2.0%
Open motorboat	55.1%	1.5%	3.0%	28.8%	72.8%	10.1%
Cabin motorboat	78.6%	1.6%	1.1%	40.6%	58.9%	7.4%
Personal watercraft	81.6%	2.9%	5.3%	29.1%	14.4%	1.2%
Other craft	35.6%	6.0%	31.8%	26.4%	56.0%	6.6%

Cruising, paddling, swimming or diving off the boat, and recreational fishing were the most popular boating activities. However, these activities were enjoyed primarily by operators of different types of boats. Cruising was most popular with operators of boats with engines. Eighty-two percent of operators of personal watercraft, 79% of pontoon boat operators, 79% of cabin motorboat operators, and 73% of houseboat operators enjoyed cruising. Not surprisingly, sailing was enjoyed almost exclusively by sailboat operators, including 95% of auxiliary motor sailboat operators and 94% of sail-only sailboat operators. Paddling was enjoyed by operators of smaller boats without motors; 92% of kayak operators, 86% of canoe operators, 76% of inflatable operators, and 54% of rowboat operators enjoyed paddling. Swimming or diving off the boat was an activity that operators of all boats enjoyed; however, it was most popular with operators of

houseboats (59%), pontoon boats (49%), and inflatables (44%). Recreational fishing was another activity popular among operators of all types of boats. Recreational fishing was most popular with operators of open motorboats (73%), rowboats (68%), pontoon boats (61%), and cabin motorboats (59%). Although tournament fishing was not a popular boating activity, 10% of open motorboat operators and 7% of cabin motorboat operators enjoyed this activity.

**Table 6.1 – cont.**

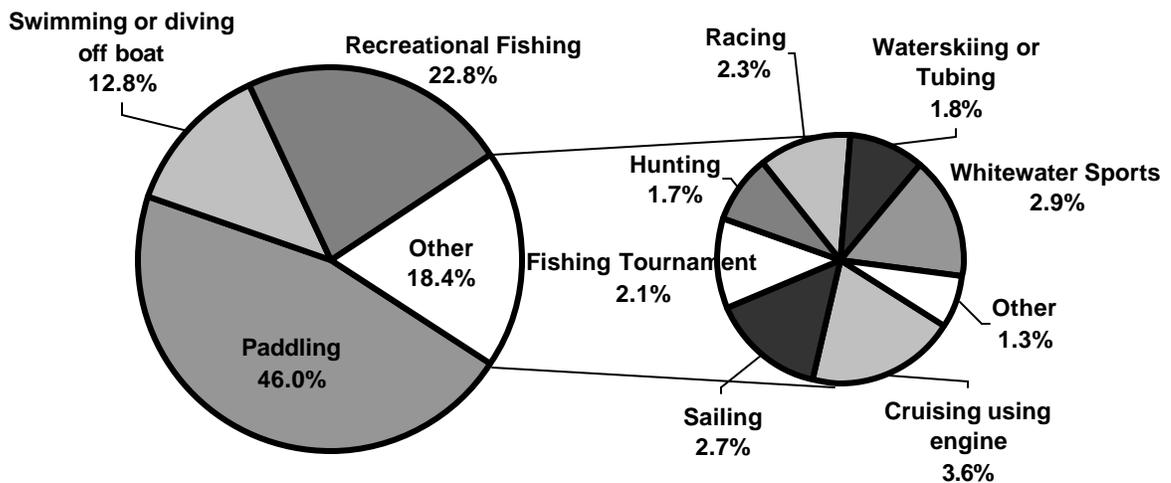
	Boating Activity				
	Hunting	Racing	Waterskiing or tubing	Whitewater sports	Other
Canoe	3.1%	4.2%	3.4%	5.4%	2.4%
Kayak	1.0%	5.0%	3.2%	12.5%	6.3%
Rowboat	3.7%	1.7%	2.5%	1.3%	1.6%
Inflatable	1.3%	4.1%	9.5%	20.4%	3.9%
Pontoon boat	1.6%	.5%	23.9%	.9%	2.6%
Houseboat	7.1%	4.2%	18.2%	1.1%	8.8%
Sailboat (motor)	.2%	13.9%	2.9%	.4%	2.6%
Sailboat (sail only)	.5%	16.2%	3.4%	1.7%	.3%
Open motorboat	4.8%	1.1%	36.1%	1.7%	2.1%
Cabin motorboat	.7%	.6%	20.9%	1.0%	4.6%
Personal watercraft	1.0%	16.6%	44.5%	5.8%	2.2%
Other craft	5.5%	4.4%	20.4%	2.6%	3.9%

Hunting was one of the least popular boating activities; however 7% of houseboat operators and 6% of boaters operating other types of craft engaged in hunting. Operators of sailboats and personal watercraft enjoyed racing more than other boat operators. Sixteen percent of personal watercraft and sail only sailboat operators engaged in racing and 14% of operators of auxiliary motor sailboat operators also do so. Water-skiing or tubing was one of the more popular boating activities and was most popular with operators of boats with engines. Operators of personal watercraft were the most likely to engage in waterskiing or tubing (45%), followed by 36% of open motorboat operators, 24% of pontoon boat operators, and 21% of cabin motorboat operators. Finally, whitewater sports were enjoyed by 20% of operators of inflatable craft and 13% of kayak operators.

The boating activity data were also analyzed to focus on the percent of activities that occur on each type of boat. These data are based on 100% of all activities that occurred between September 2001 and September 2002 and are depicted in the Figures 6.2a-l.

Total activity for canoes is depicted in Figure 6.2a. As may be expected, boaters operating canoes typically engaged in lower-speed recreational activities. In fact, 82% of all activities performed on canoes fall into three categories: paddling (46%), recreational fishing (23%), and swimming or diving off the boat (13%).

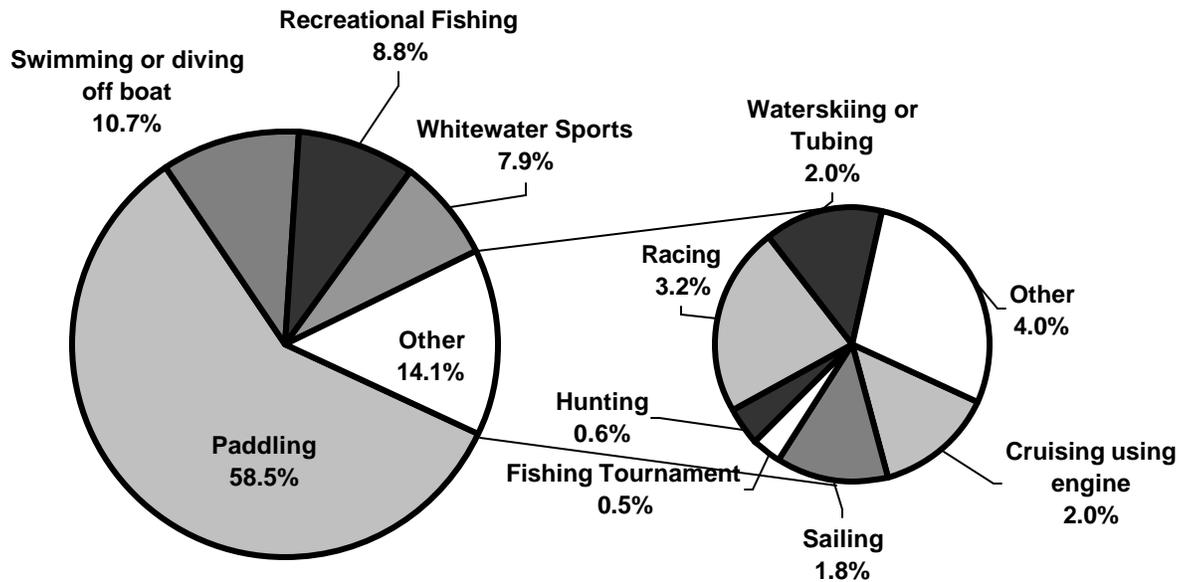
**Figure 6.2a Boating activities on canoes. (C1, D1)**



- ❖ 44% of the activity on canoes involved pleasure paddling.
- ❖ Almost one-quarter of all activity on canoes involved recreational fishing.
- ❖ Swimming and diving off the boat represented 12% of the activity on canoes.

Like canoes, boaters operating kayaks predominantly engaged in lower-speed recreational activities. Figure 6.2b reflects boating activities in kayaks. More than half of the activity on kayaks involved paddling (59%). Also similar to canoes, 11% of the activity on kayaks involved swimming or diving off the boats. However, recreational fishing represented 9% of the activity on this type of boat. In addition, kayaks were also used for whitewater sports, representing 8% of the total activity on kayaks.

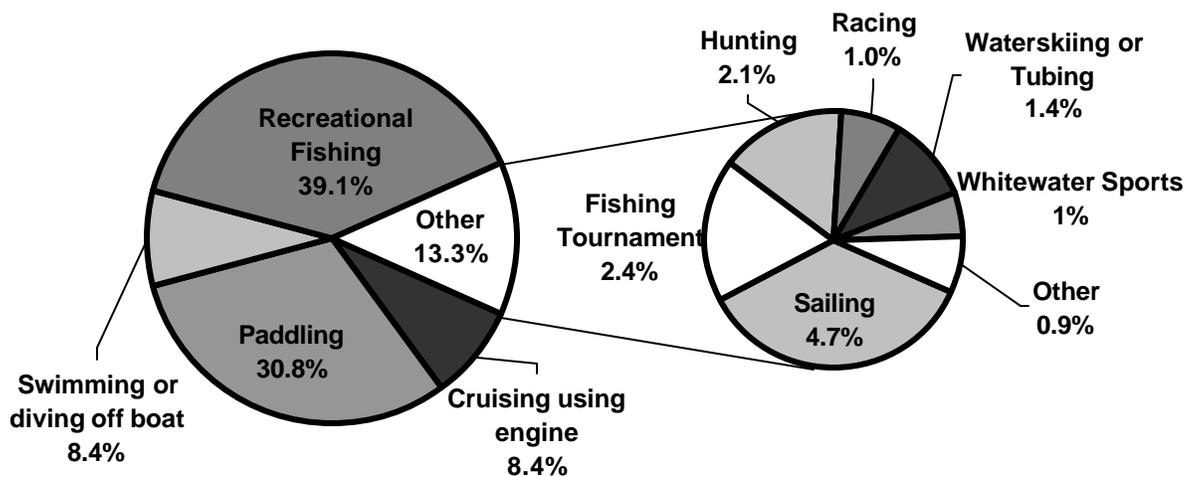
**Figure 6.2b Boating activities on kayaks. (C1, D1)**



- ❖ 59% of all activity on kayaks involved paddling.
- ❖ Swimming or diving off the boat represented 11% of all activity on kayaks.
- ❖ Kayaks were also frequently used for recreational fishing (9%) and whitewater sports (8%).

Figure 6.2c reflects boating activities on rowboats. Rowboats were used most often for fishing, with 41.5% of all activity involving recreational (39.1%) or tournament (2.4%) fishing. Paddling was also a common activity for rowboaters, representing 31% of all activity. A small percentage of boaters using rowboats cruise using the boat's engine and use the boat for swimming and diving; these activities each made up about 8% of the total activity on rowboats. Of the other activities performed on rowboats, 5% involved sailing.

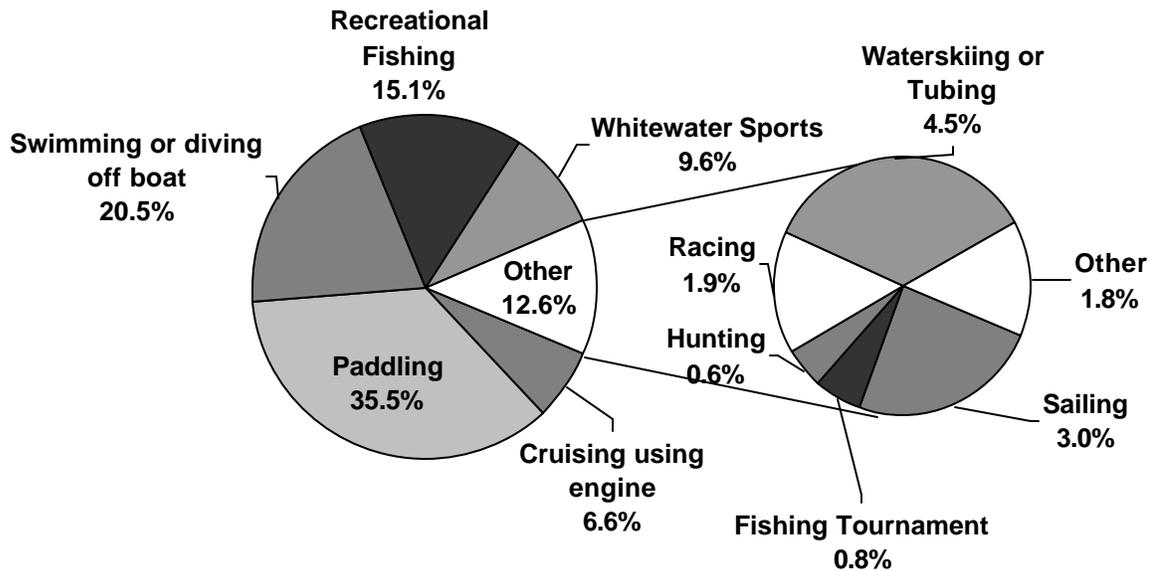
**Figure 6.2c Boating activities on rowboats. (C1, D1)**



- ❖ Rowboats were most often used for fishing, with 41.5% of all activity involving recreational or tournament fishing.
- ❖ Paddling was also a common activity for rowboaters, representing 31% of all activity.
- ❖ Swimming or diving and cruising each made up about 8% of the total activity on rowboats.

Figure 6.2d reflects boating activities in inflatables. Inflatable boats were used for a variety of activities, ranging from low to high speeds. They were most often used for paddling, which represents 36% of the total activity on inflatables. Other common activities for boaters using inflatables were swimming or diving off boat (21% of all activity) and recreational fishing (15% of all activity). Inflatables were also used for activities involving higher speeds. Ten percent of the time, this type of boat was used for whitewater sports, 7% of the time they were used for cruising, and 5% of the time they were used for water-skiing or tubing.

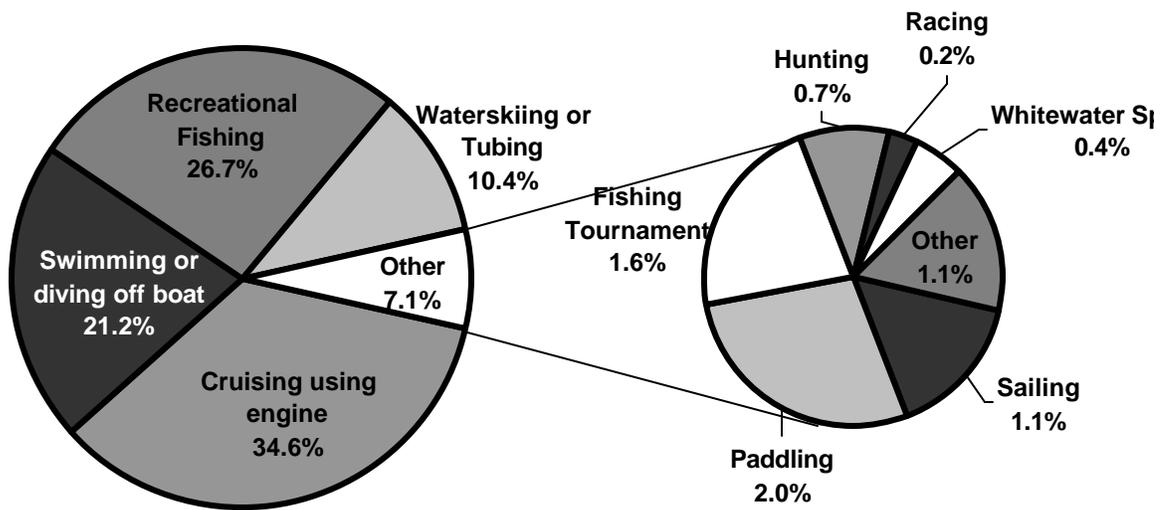
**Figure 6.2d Boating activities on inflatables. (C1, D1)**



- ❖ 36% of all activity on inflatable boats involved paddling.
- ❖ 21% of the time inflatables were used for swimming or diving, and 15% of the time they were used for recreational fishing.
- ❖ Inflatables were also used for higher-speed activities; 10% of the time they were used for whitewater sports, 7% of the time they were used for cruising, and 5% of the time they were used for water-skiing or tubing.

Figure 6.2e reflects boating activities in pontoon boats. Ninety-three percent of all activity on pontoon boats fell into one of four categories: cruising; swimming or diving; recreational fishing; and water-skiing or tubing. More than one-third of all activity on pontoon boats involved cruising, representing 35% of all activity on pontoon boats. Also, 21% of the time pontoon boats were used for swimming or diving. Further, more than a quarter of the activity on this type of boat involved recreational fishing, and 10% of the time they were used for waterskiing or tubing.

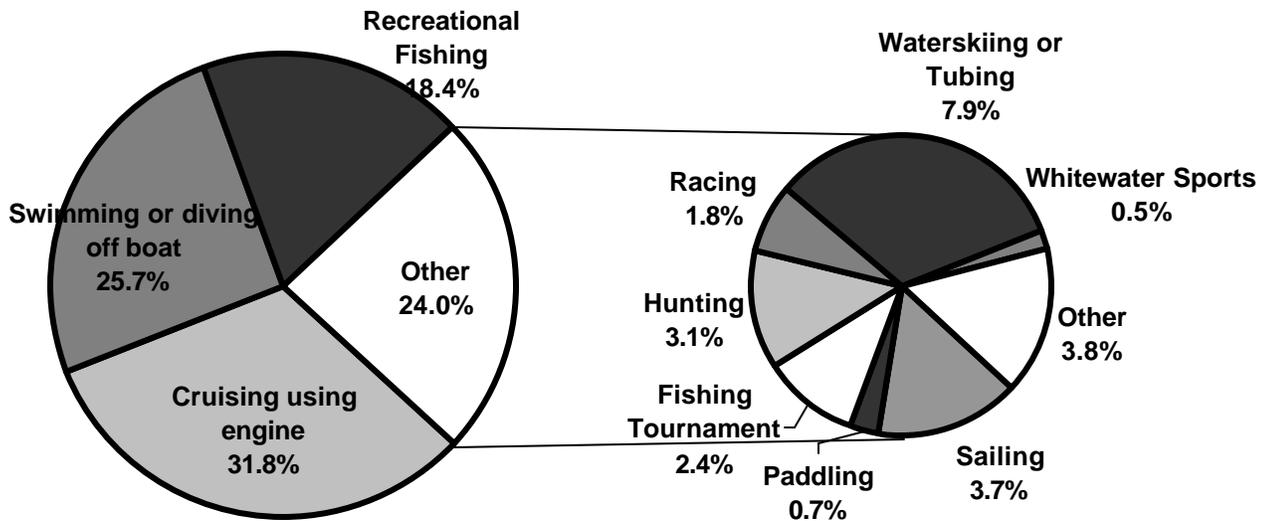
**Figure 6.2e Boating activities on pontoon boats. (C1, D1)**



❖ Ninety-four percent of all activity on pontoon boats fell into one of four categories: cruising (35%), swimming or diving (21%), recreational fishing (27%), and waterskiing or tubing (10%).

Figure 6.2f reflects boating activities in houseboats. Houseboats were predominantly used for three activities, with 76% of the activity on houseboats involving cruising (32%), swimming or diving (26%), and recreational fishing (18%). Of the other 24% of activities, water-skiing or tubing represented 8% of the total activity.

**Figure 6.2f Boating activities on houseboats. (C1, D1)**

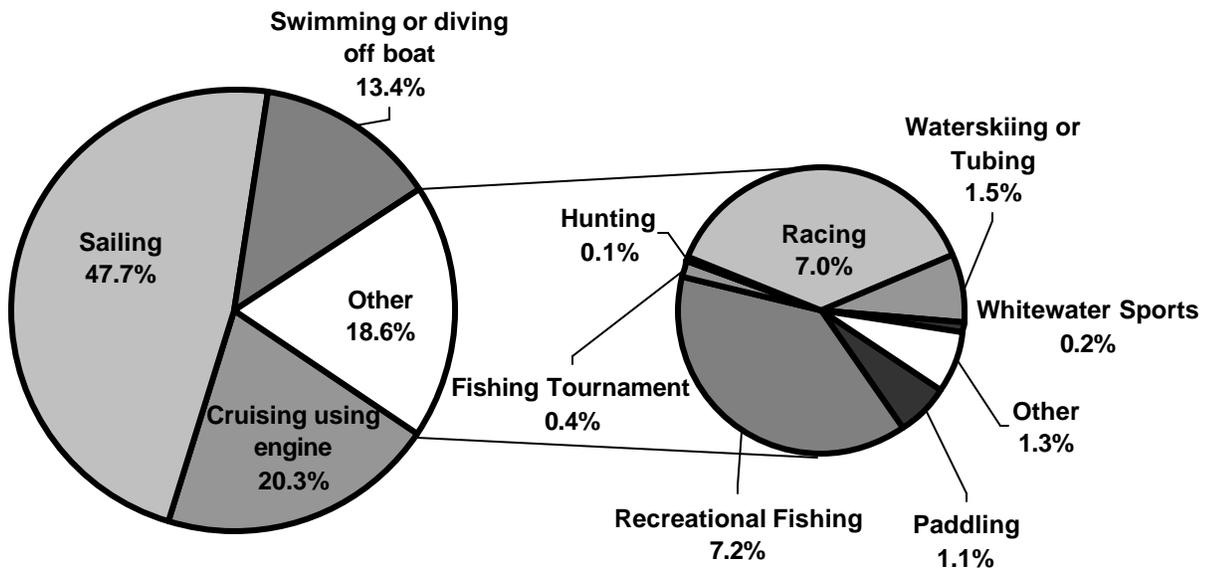


- ❖ 76% of the activity on houseboats involved cruising (32%), swimming or diving (26%), and recreational fishing (18%).
- ❖ Of all other activities, water-skiing or tubing represents 8%.

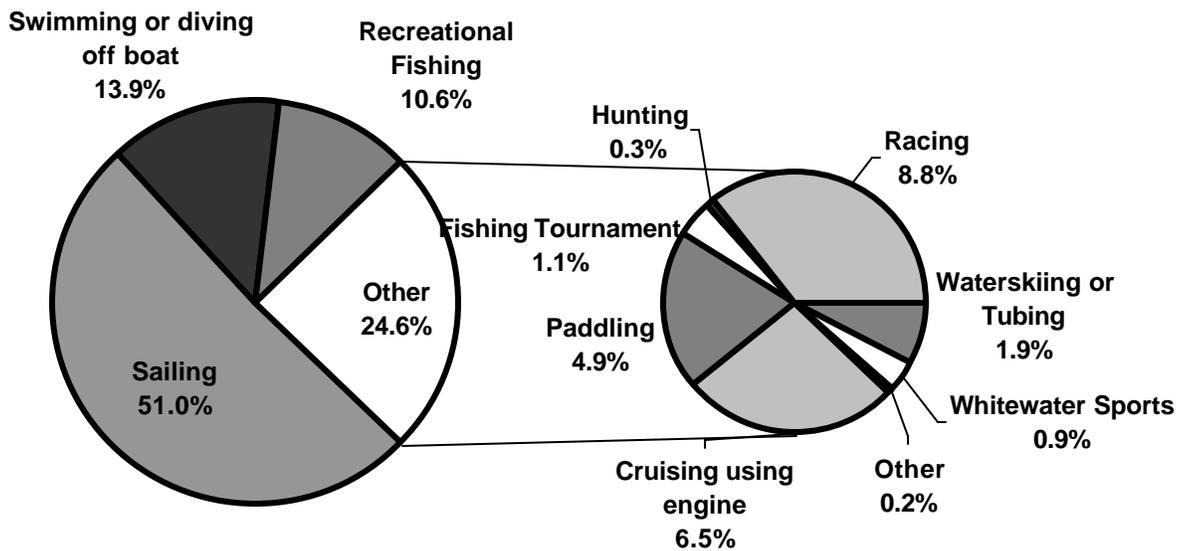
Figures 6.2g and 6.2h on the following page depict the activities performed on sailboats. Unsurprisingly, the primary activity in which boaters using sailboats engaged was sailing—recall from Table 6.1 that 95% of boaters using sailboats with auxiliary motors and 94% of boaters using sail-only sailboats engaged in sailing. For both types of craft, this represents about half of the total activity occurring on these boats. Also for both types of craft, about 13% of the total activity on these boats involved swimming or diving. Sailboats with auxiliary motors were also often used for cruising—representing 20% of the total activity on this type of boat. Both types of sailboats were also used for racing, representing 9% of the total activity on sail-only sailboats and 7% of the activity on sailboats with auxiliary motors. Sail-only sailboats were used slightly more often for recreational fishing (11%) compared with sailboats with auxiliary motors (7%).

- ❖ Sailing represented about half of the total activity on these types of boats.
- ❖ Sailboats with auxiliary motors were also often used for cruising.
- ❖ For both types of craft, about 13% of the total activity on these boats involved swimming or diving.
- ❖ Sail-only sailboats were used slightly more often for recreational fishing (11%) compared with sailboats with auxiliary motors (7%).

**Figure 6.2g Boating activities on sailboats with auxiliary motor. (C1, D1)**



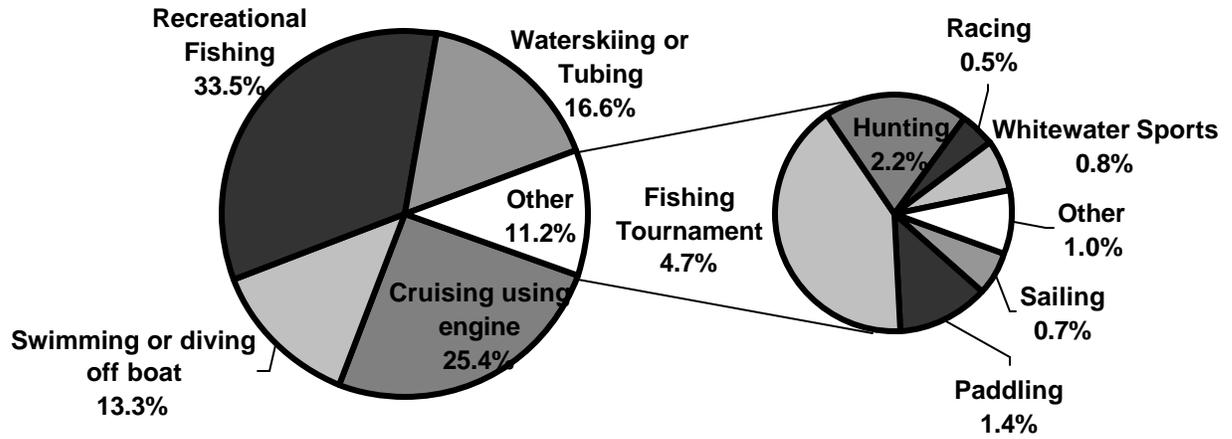
**Figure 6.2h Boating activities on sail only sailboats. (C1, D1)**



Figures 6.2i and 6.2j on the following page compare the activities performed on motorboats. Both open motorboats and cabin motorboats were commonly used for cruising, recall from table 6.1 that 79% of cabin motorboaters and 55% of those using open motorboats engaged in cruising. This translates to 36% of the total activity on cabin motorboats and 25% of the activity on open motorboats. Conversely, open motorboats were used more often for recreational fishing. Thirty-four percent of the activity on open motorboats involved fishing compared with 27% of the activity on cabin motorboats. Cabin motorboats were used slightly more often for swimming or diving, which represented 19% of the activity for this type of boat, compared with 13% of the activity on open motorboats. Open motorboats were used by 17% for waterskiing or tubing, which exceeded the use of cabin motorboats for this activity (used by 10%). Neither of these types of boats were used for whitewater sports or racing; these activities represented less than 1% of activity on motorboats.

- ❖ Both types of motorboats were used for cruising, although this represented a larger proportion of the activity on cabin motorboats (36%) compared with open motorboats (25%).
- ❖ Conversely, open motorboats were used more often for recreational fishing; this activity comprised 34% of all activity on open motorboats but 27% of all activity on cabin motorboats.
- ❖ Cabin motorboats were used slightly more often for swimming or diving (19% of the time) compared with open motorboats (13%), although open motorboats were used slightly more often for waterskiing or tubing (17% of the time) compared with cabin motorboats (10%).

**Figure 6.2i Boating activities on open motorboats. (C1, D1)**



**Figure 6.2j Boating activities on cabin motorboats. (C1, D1)**

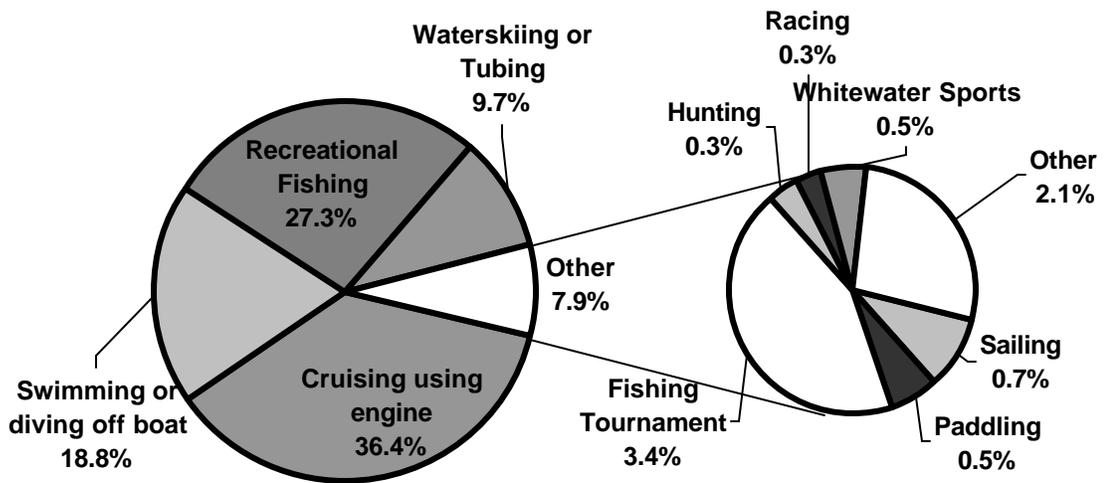
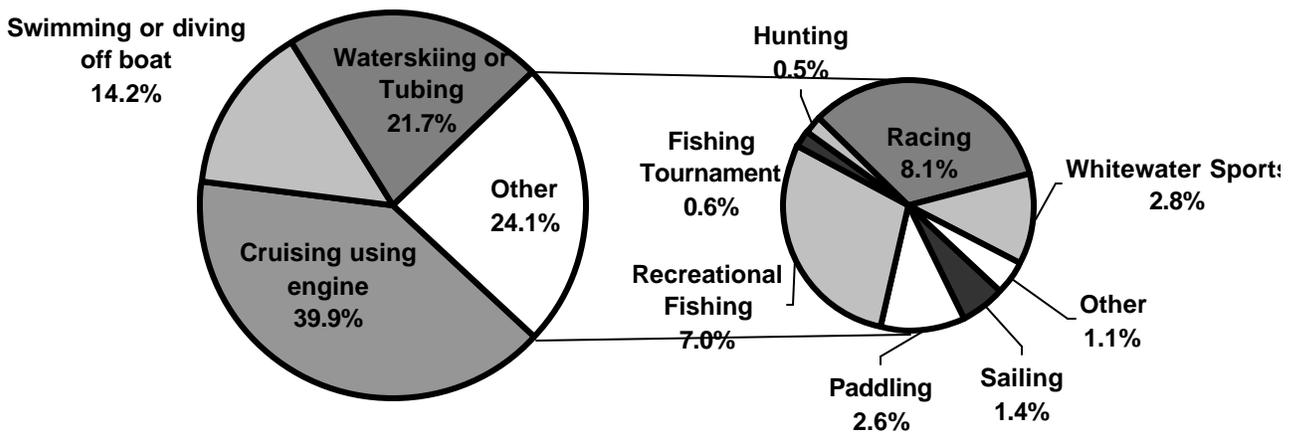


Figure 6.2k depicts boating activities on personal watercraft. Personal watercraft, such as Jet-skis or Waverunners, were used most often for cruising; representing 40% of all activity on personal watercraft. Personal watercraft were also used frequently for water-skiing or tubing, which represents 22% of all activity on this type of boat. Another 14% of the activity on personal watercraft involved swimming or diving. A smaller proportion of activity involved recreational fishing (7%) and racing (8%).

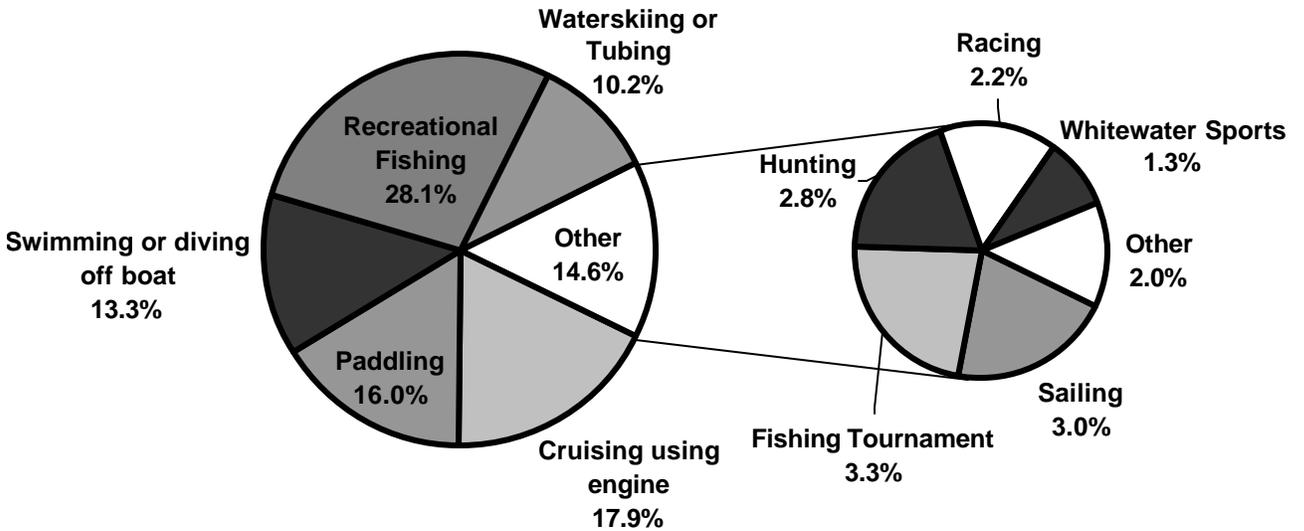
**Figure 6.2k Boating activities on personal watercraft. (C1, D1)**



- ❖ Cruising represented 40% of all activity on this type of craft.
- ❖ Waterskiing or tubing represented 22% of all activity on personal watercraft.
- ❖ Another 14% of the activity on personal watercraft involved swimming or diving.

Figure 6.2I depicts boating activities on crafts that did not fit into the other boating categories. These types of watercraft were used for a wide range of activities. Other craft were used most often for recreational fishing, which represented 28% of all activity on these types of craft. An additional 3% used them for fishing tournaments. They were also often used for cruising (18% of all activity), paddling (16% of all activity), and swimming or diving (13% of all activity).

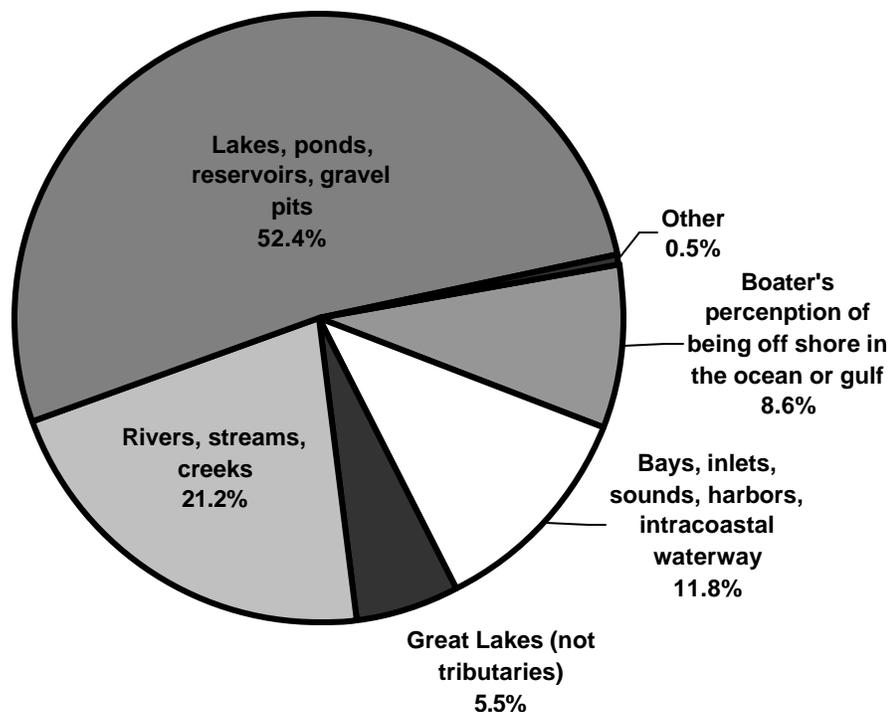
**Figure 6.2I Boating activities on other craft. (C1, D1)**



- ❖ Other craft were used most often for recreational fishing, which represented 28% of all activity on these types of craft. Another 3% used them for fishing tournaments.
- ❖ Other craft were also used for cruising (18% of all activity), paddling (16% of all activity), and swimming or diving (15% of all activity).

After describing the activities in which they engaged while boating, respondents were asked to indicate the one type of water on which they went boating most often. The categories provided are shown in Figure 6.3. Although “off shore” is normally defined as being more than three miles from shore, it should be noted that the results shown here actually reflect boaters’ *perceptions* and may not adhere entirely to the usual definition of “off shore.” Just over half of all boaters went boating on lakes, ponds, reservoirs, or gravel pits. An additional 21% went boating most often on rivers, streams, or creeks. About 12% went boating on bays, inlets, sounds, or harbors. Less than 10% went boating most often off shore on the ocean or on the Great Lakes.

**Figure 6.3 When you went boating, what type of water did you usually boat on most of the time? (D2)**



- ❖ Just over half of all boaters went boating on lakes, ponds, reservoirs, or gravel pits.
- ❖ An additional 21% went boating most often on rivers, streams, or creeks.
- ❖ Less than 10% went boating most often off shore on the ocean or on the Great Lakes.

Figures 6.4a-f displays the type of water on which each boat was used most often between September 2001 and September 2002. First, Figure 6.4a compares canoes and kayaks, both of these types of boats were most often used on rivers or lakes/ponds, although canoes tended to be used on these types of water slightly more often. Kayaks also tended to be used off shore and in bays, inlets, or sounds.

**Figure 6.4a-f Type of water by the type of boat operated most often.**  
(C1, D2)

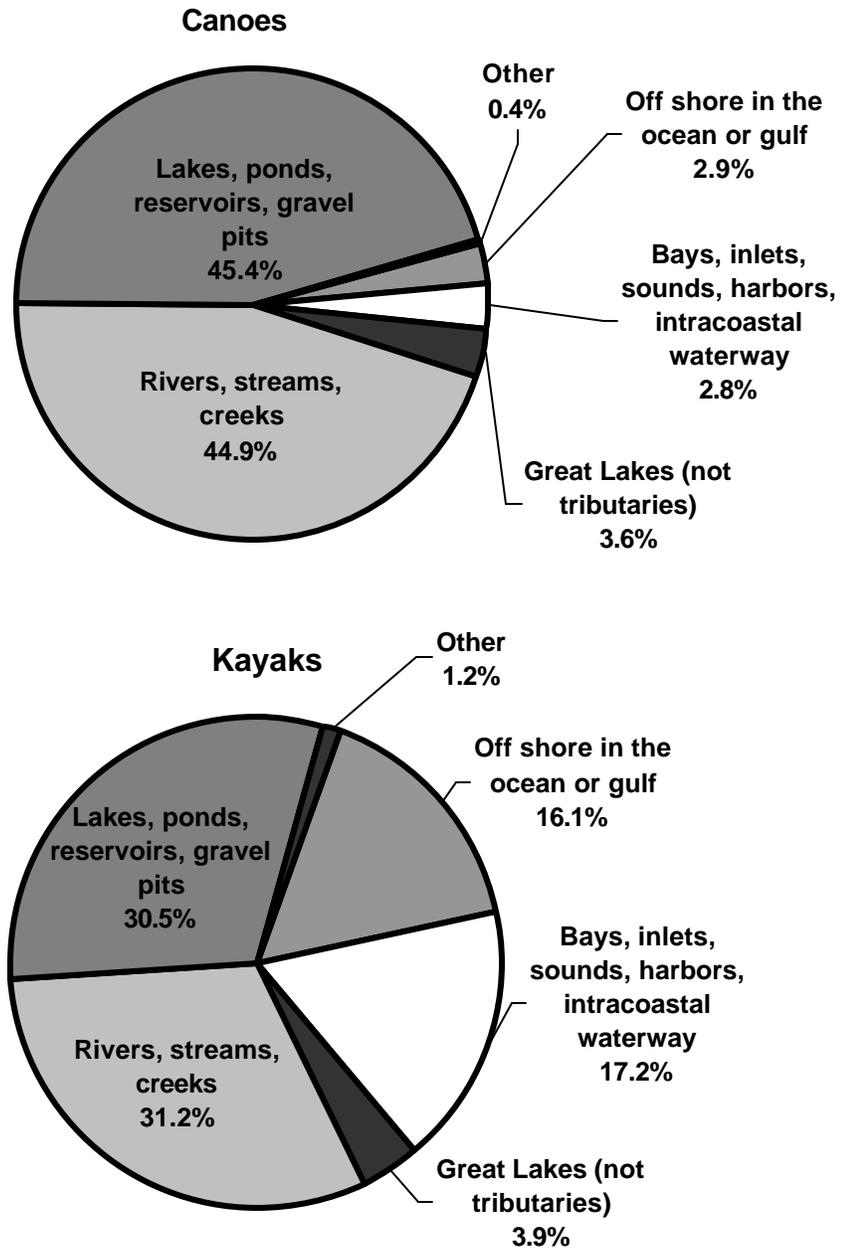
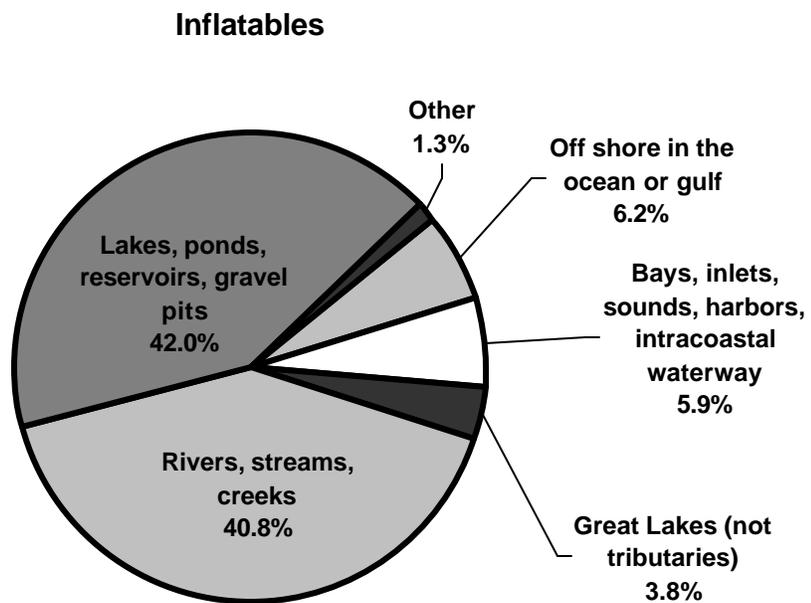
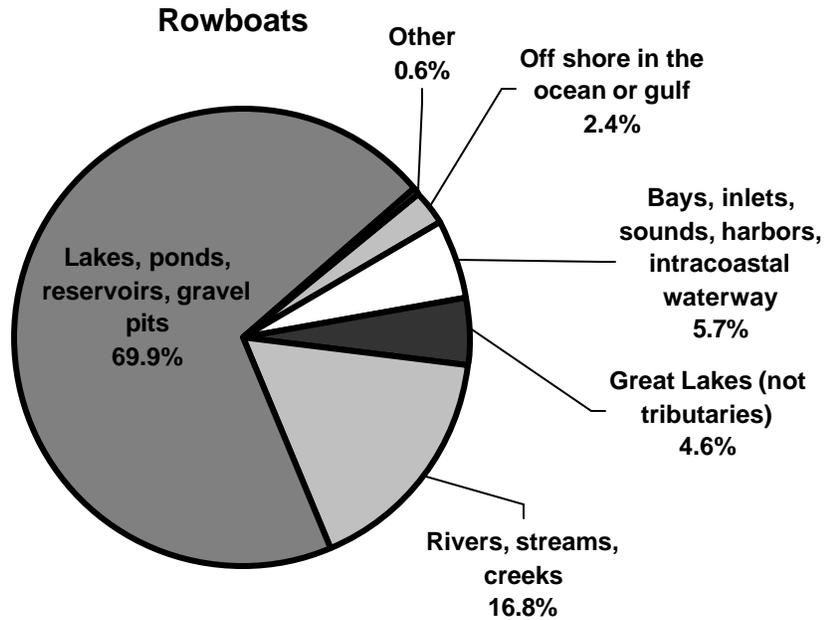
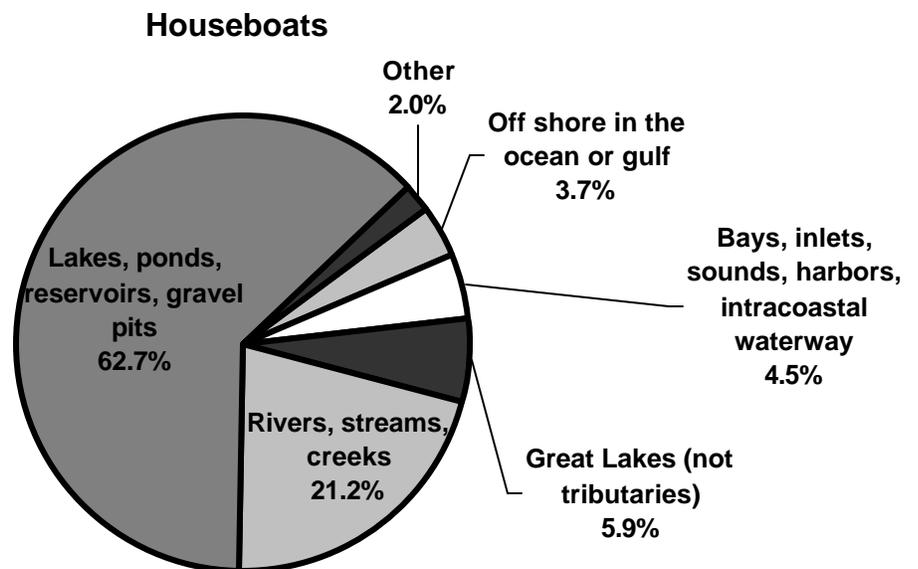
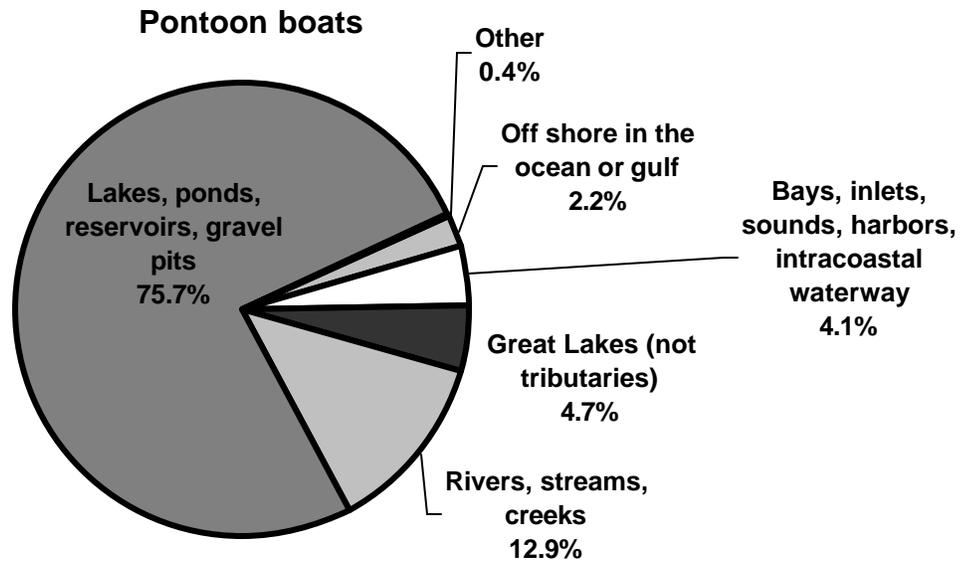


Figure 6.4b shows that rowboats were used most often on lakes or ponds, where 70% of boaters operating this type of craft tended to boat. Inflatables were also used on this type of water, albeit somewhat less frequently—42% of the time. Conversely, inflatables were used more than twice as often as rowboats on rivers or streams, where 41% of inflatables were used but just 17% of rowboats were used.

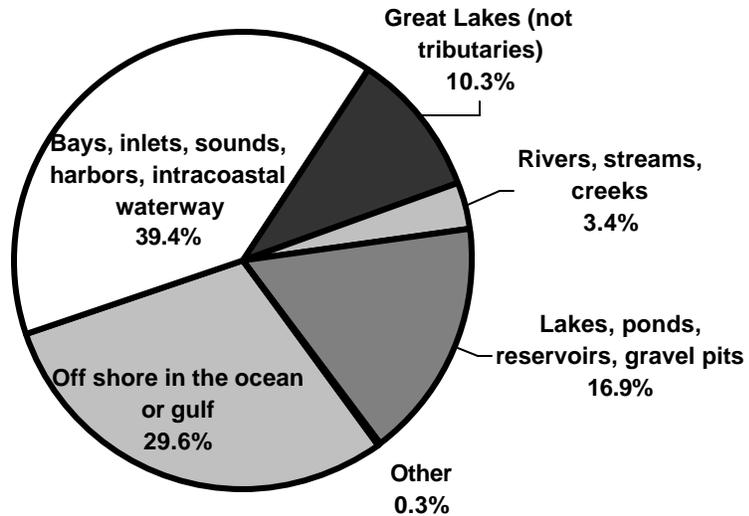


Pontoon boats and houseboats were used with great frequency on lakes and ponds, with 76% of pontoon boats and 63% of houseboats used on this type of water. Shown in Figure 6.4c. Some boats of this type were also used on rivers, streams, and creeks—13% of pontoon boats and 21% of houseboats. A total of 11% of pontoon boats and 14% of houseboats were used in the remaining types of water—off shore in the ocean or gulf; in bays, inlets, or sounds; and on the Great Lakes.

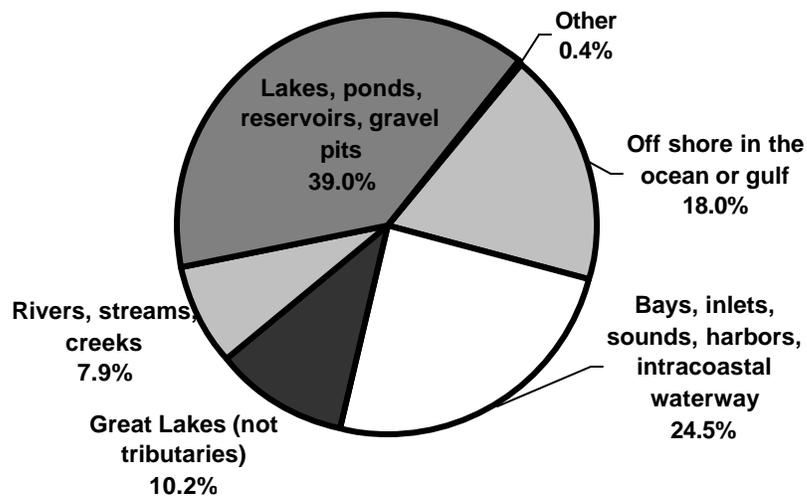


Sailboats were used on a variety of types of water. Shown in Figure 6.4d. Sailboats with auxiliary motors were used most often on bays, harbors, or inlets (39%), as well as off shore (30%) and on lakes or ponds (17%). Sail-only sailboats were used most often on lakes or ponds (39%), and also on bays or inlets (25%) and off shore (18%). Sailboats were rarely used on rivers.

**Sailboats (motor)**

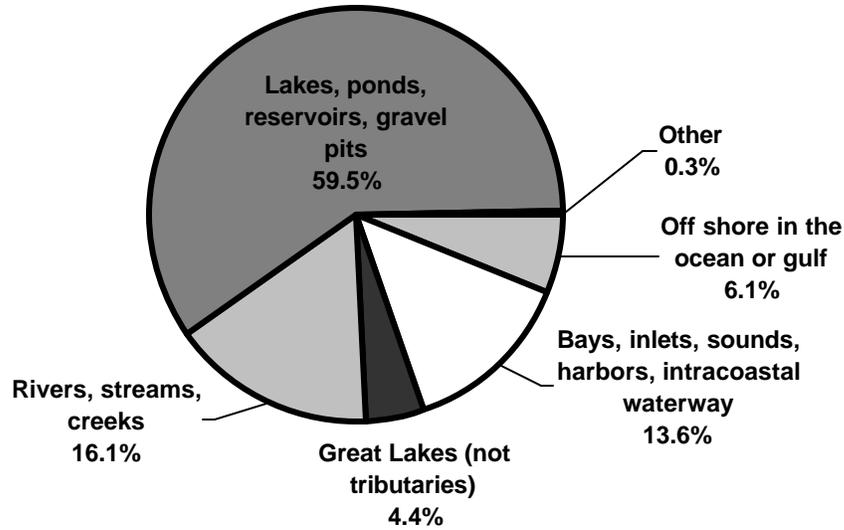


**Sailboats (sail only)**

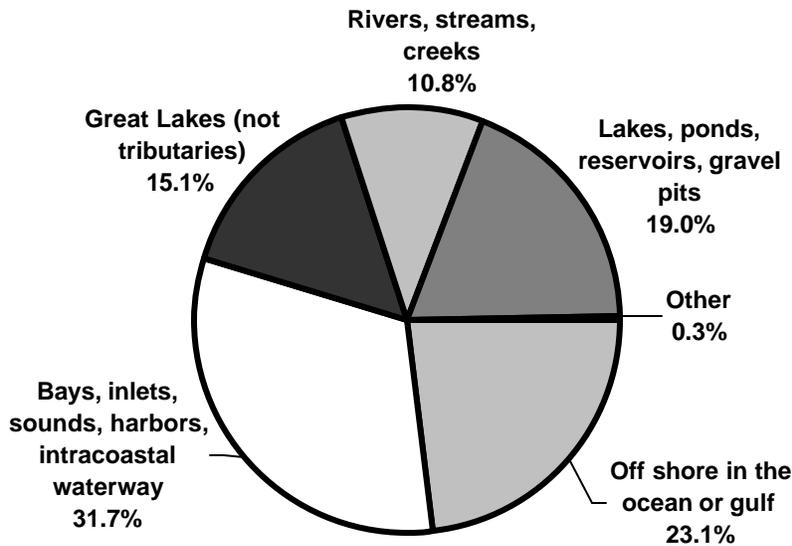


Motorboats also tended to be used on a variety of types of water, as shown in Figure 6.4e. Open motorboats were predominantly used on lakes or ponds (59.5%), but were also used on bays or inlets (14%) and on rivers or streams (16%). In contrast, cabin motorboats were used most frequently on bays or inlets (32%) and off shore (23%), but were also used on lakes or ponds (19%) and the Great Lakes (15%).

### Open motorboats

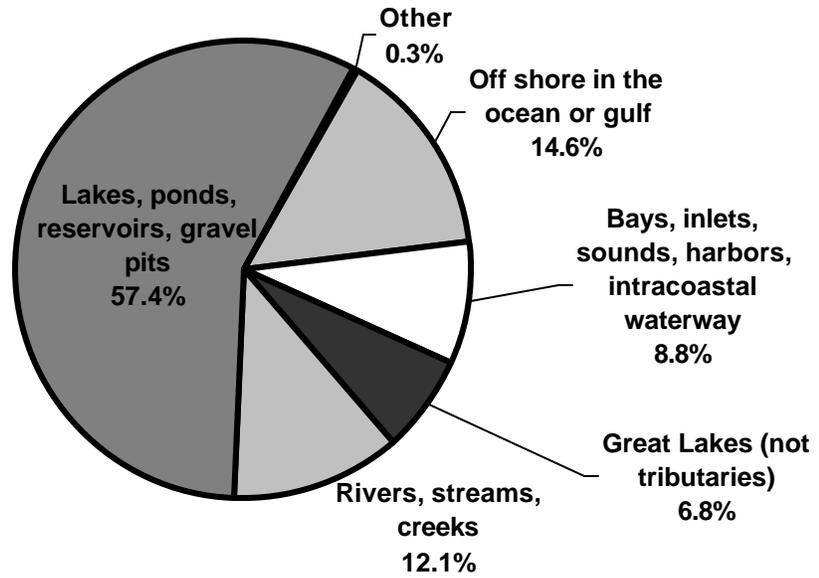


### Cabin motorboats

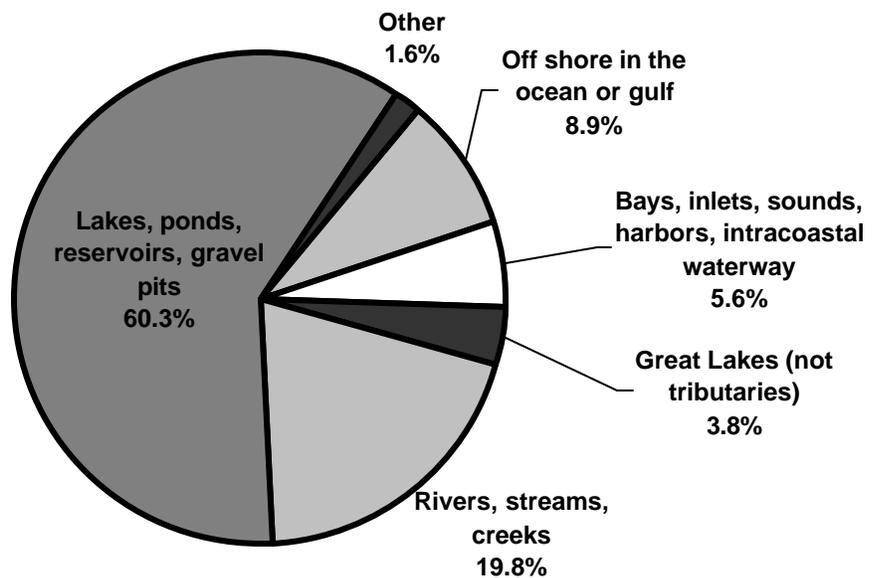


The final types of boats considered were personal watercraft (Jet-skis, Waverunners, etc.) and other types of watercraft reflected in Figure 6.4f. Both personal watercraft and other types of craft were most commonly used on lakes and ponds, although they were also used on rivers and streams, albeit less often (less than 20% of the time). About 15% of personal watercraft were used off shore in the ocean or gulf, and 9% were used in bays, inlets, and sounds.

**Personal watercraft**



**Other craft**



- ❖ Both canoes and kayaks were used most often on rivers or lakes/ponds, with 90% of canoes and 62% of kayaks being used on these types of water.
- ❖ Kayaks also tended to be used off shore and in bays, inlets, or sounds.
- ❖ 70% of rowboats were used on lakes or ponds; 42% of inflatables were also used on this type of water.
- ❖ Inflatables were used more than twice as often as rowboats on rivers or streams.
- ❖ Rowboats, pontoon boats and houseboats were used with greatest frequency on lakes and ponds—70% of rowboats, 76% of pontoon boats, and 63% of houseboats were used on lakes and ponds.
- ❖ Sailboats with auxiliary motors were used most often on bays, harbors, or inlets (39%), as well as off shore (30%) and on lakes or ponds (17%).
- ❖ Sail-only sailboats were used most often on lakes or ponds (39%), and also on bays or inlets (25%) and off shore (18%).
- ❖ Sailboats were rarely used on rivers.
- ❖ Open motorboats were used on lakes or ponds 59% of the time but were also used on bays or inlets and on rivers or streams.
- ❖ In contrast, cabin motorboats were used most frequently on bays or inlets (32% of the time) and off shore (23% of the time), but were also used on lakes or ponds (19%) and the Great Lakes (15%).
- ❖ More than half of personal watercraft (57%) and other craft (60%) were used on lakes and ponds, although they were also used on rivers and streams, albeit less often.
- ❖ About 15% of personal watercraft were used off shore, and another 9% were used in bays, inlets, and sounds.

The last question relating to boating activities concerned the location where respondents usually went boating. Boaters were asked to indicate the one State or Territory where they went boating most often. The results are summarized in Table 6.2. As would be expected, more boating took place in coastal States like Florida, California, North Carolina, and Texas, in States with a major river like Missouri, and in States bordering the Great Lakes like Michigan, Minnesota, Ohio, New York, and Wisconsin.

**Table 6.2 In what State, Territory, or Country did you usually go boating? (D3)**

<b>State</b>	<b>Percent</b>			<b>Percent</b>
Alabama	1.6%		New York	3.9%
Alaska	0.4%		North Carolina	3.4%
Arkansas	1.5%		North Dakota	0.3%
Arizona	1.4%		Ohio	3.4%
California	7.0%		Oklahoma	0.9%
Colorado	1.2%		Oregon	1.5%
Connecticut	1.3%		Pennsylvania	3.2%
Delaware	0.4%		Rhode Island	0.5%
DC	0.1%		South Carolina	1.7%
Florida	7.9%		South Dakota	0.3%
Georgia	2.2%		Tennessee	2.3%
Hawaii	0.4%		Texas	5.7%
Idaho	0.8%		Utah	1.0%
Illinois	2.6%		Vermont	0.4%
Indiana	2.0%		Virginia	2.5%
Iowa	1.1%		Washington	2.3%
Kansas	0.8%		West Virginia	0.5%
Kentucky	1.7%		Wisconsin	3.7%
Louisiana	1.0%		Wyoming	0.3%
Maine	1.4%			
Maryland	2.3%		<b>Territory</b>	
Massachusetts	2.4%		American Samoa	0.04%
Michigan	6.1%		Guam	0.01%
Minnesota	3.4%		Northern Marianas	0.02%
Mississippi	0.9%		Puerto Rico	0.04%
Missouri	2.7%		Virgin Islands	0.1%
Montana	0.5%			
Nebraska	0.6%		<b>Country</b>	
Nevada	0.6%		Canada	1.2%
New Hampshire	1.1%		Mexico	0.4%
New Jersey	1.9%		Other	0.8%
New Mexico	0.4%			

## VII. BOATING SAFETY KNOWLEDGE AND EXPERIENCE

Several survey questions attempted to gauge boat operators' level of experience and their knowledge of safety issues. The results are shown in Table 7.1. First, boat operators were asked to indicate whether they had ever completed a safety course, and if so, how long ago they completed it. As reported in Section IV, 65% of respondents overall reported they never completed a safety course. This percentage varies, however, as a function of the type of boat operated most often. Statistical tests find significant differences between the types of boats operated most often and when safety courses were taken, with less than a 1% possibility of these differences being due to chance. Operators who boat most often in smaller boats such as canoes, rowboats, inflatables, open motorboats, and personal watercraft were less likely to have ever taken a boating safety course. Operators of sailboats (sail only and with auxiliary motor) and cabin motorboats were most likely to have completed a safety course, but more than half of these individuals completed the course more than three years ago; in the case of sailboat operators, for 24 to 29% the course was taken more than 10 years ago.

**Table 7.1 Most recent boating safety course by the type of boat operated most often. (A2, C1)**

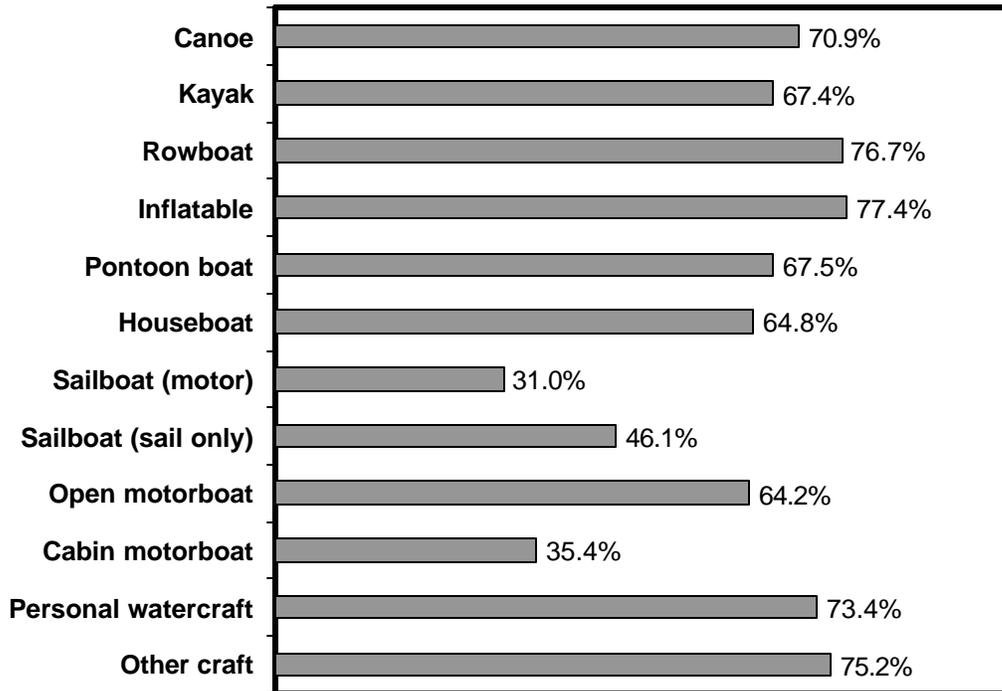
	When was the last time you took a boating safety course?							Total
	During the past year	1 to 2 years ago	3 to 5 years ago	6 to 9 years ago	10 or more years ago	At some point	Never	
Canoe	2.3%	3.4%	5.3%	3.2%	14.9%		70.9%	100%
Kayak	3.7%	3.6%	6.2%	3.7%	15.4%		67.4%	100%
Rowboat	0.6%	2.6%	3.6%	2.9%	13.6%		76.7%	100%
Inflatable	1.6%	2.9%	4.8%	2.5%	10.8%	0.0%	77.4%	100%
Pontoon boat	3.6%	3.5%	6.3%	3.6%	15.3%	0.2%	67.5%	100%
Houseboat	1.5%	7.1%	10.2%	4.1%	12.2%		64.8%	100%
Sailboat (motor)	8.3%	8.5%	12.9%	10.0%	29.4%	0.0%	31.0%	100%
Sailboat (sail only)	5.0%	8.7%	11.0%	4.8%	24.4%	0.2%	46.1%	100%
Open motorboat	2.5%	5.0%	8.0%	4.5%	15.5%	0.2%	64.2%	100%
Cabin motorboat	5.9%	10.9%	14.6%	8.3%	24.7%	0.1%	35.4%	100%
Personal watercraft	2.9%	5.3%	6.1%	3.9%	8.0%	0.3%	73.4%	100%
Other craft	1.2%	3.7%	6.1%	3.3%	10.4%		75.2%	100%

$p \leq 0.01$

- ❖ Operators who boat most often in smaller boats such as canoes, rowboats, inflatables, open motorboats, and personal watercraft were less likely to have ever taken a boating safety course.
- ❖ Operators of sailboats (sail only and with auxiliary motor) and cabin motorboats were most likely to have completed a safety course, for many the course was taken over 10 years ago.

Figure 7.1 below focuses on the individuals who have never completed a safety course. Note that this analysis differs from the analysis presented in Figure 4.3, which also examined boating safety course experience as a function of type of boat operated. In the present analysis only the one boat the respondent operated most often is considered, not all boats used for recreation over the course of the year. Still, most boat operators had not taken a safety course. However, a majority of boat operators who primarily used sailboats with auxiliary motors, sail-only sailboats, and cabin motorboats had completed safety courses.

**Figure 7.1 Percent of operators who have never taken a boating safety course by the boat operated most often. (A2, C1)**



- ❖ Focusing on the single type of boat used most often, most boat operators had not taken a safety course.
- ❖ A majority of boat operators who primarily used sailboats and cabin motorboats had completed safety courses.

As reported earlier (see Figure 4.2), 70% of boat operators who had completed a boating safety course completed a classroom course, 14% completed a home study course, and 16% completed another type of course. As can be seen in Table 7.2, however, this varies as a function of the type of boat operated most often. For example, a slightly greater proportion of respondents who operate houseboats or open motorboats most often have completed a home study safety course. Also, a slightly greater proportion of respondents who operate canoes, kayaks, sail-only sailboats, and other craft most often are more likely to have completed another type of course; this includes safety training provided by Girl Scouts/Boy Scouts or “on the water” courses.

**Table 7.2 Type of safety course by the type of boat operated most often.**  
(A3, C1)

	What type of boating safety course did you take the last time?			
	A classroom course	A home study course	Other	Total
Canoe	67.3%	5.6%	27.1%	100%
Kayak	67.0%	7.9%	25.1%	100%
Rowboat	71.6%	9.7%	18.7%	100%
Inflatable	71.7%	8.7%	19.7%	100%
Pontoon boat	74.0%	13.8%	12.2%	100%
Houseboat	67.1%	20.0%	12.9%	100%
Sailboat (motor)	74.0%	11.9%	14.1%	100%
Sailboat (sail only)	65.6%	11.3%	23.0%	100%
Open motorboat	68.5%	19.2%	12.3%	100%
Cabin motorboat	79.2%	13.3%	7.4%	100%
Personal watercraft	68.0%	14.6%	17.5%	100%
Other craft	65.8%	10.2%	24.0%	100%

$p \leq 0.01$

- ❖ Overall, 70% of boat operators who had completed a boating safety course had completed a classroom course, 14% completed a home study course, and 16% completed another type of course. This varied as a function of type of boat operated most often.
- ❖ A slightly greater proportion of respondents who operated houseboats or open motorboats most often have completed a home study safety course.
- ❖ A slightly greater proportion of respondents who operated canoes, kayaks, and other craft most often were more likely to have completed another type of course.

The final aspect of boating experience and knowledge considered is hours of lifetime boating experience shown in Table 7.3. This factor also tended to vary as a function of the type of boat used most often. For some types of boats, around half of boat operators had extensive experience—over 500 hours. This includes boat operators who usually went boating on pontoon boats, houseboats, sailboats with auxiliary motors, and motorboats. More than half of boat operators who usually went boating on canoes, kayaks, rowboats, inflatables, and personal watercraft had less than 100 hours of experience.

**Table 7.3 Total hours of lifetime boating experience by type of boat used most often. (A5, C1)**

	Total Hours of Lifetime Boat Operating Experience						Total
	Less than 1 hour	1 to 9 hours	10 to 19 hours	20 to 100 hours	101 to 500 hours	Over 500 hours	
Canoe	2.8%	15.1%	12.1%	29.1%	20.4%	20.6%	100%
Kayak	2.7%	14.5%	12.6%	27.2%	23.0%	20.0%	100%
Rowboat	4.8%	16.1%	11.3%	25.8%	18.1%	23.9%	100%
Inflatable	4.8%	23.0%	15.8%	25.1%	15.4%	15.8%	100%
Pontoon boat	1.3%	6.8%	5.1%	18.8%	26.0%	42.0%	100%
Houseboat	0.5%	11.1%	6.6%	13.6%	19.2%	49.0%	100%
Sailboat (motor)	1.0%	2.3%	0.8%	7.5%	22.8%	65.6%	100%
Sailboat (sail only)	2.6%	6.3%	7.7%	20.6%	22.6%	40.1%	100%
Open motorboat	1.1%	3.7%	3.7%	13.1%	26.3%	52.2%	100%
Cabin motorboat	0.7%	3.5%	2.1%	8.5%	20.8%	64.4%	100%
Personal watercraft	4.2%	18.9%	12.3%	25.1%	20.8%	18.6%	100%
Other craft	5.7%	14.9%	7.5%	21.6%	19.8%	30.6%	100%

$p \leq 0.00$

- ❖ Around half of boat operators who usually went boating on pontoon boats, houseboats, sailboats, and motorboats had extensive experience—over 500 hours in their lifetimes.
- ❖ More than half of boat operators who usually went boating on canoes, kayaks, inflatables, rowboats, and personal watercraft had less than 100 hours of experience.

## VIII. EQUIPMENT ON THE BOAT OPERATED MOST OFTEN

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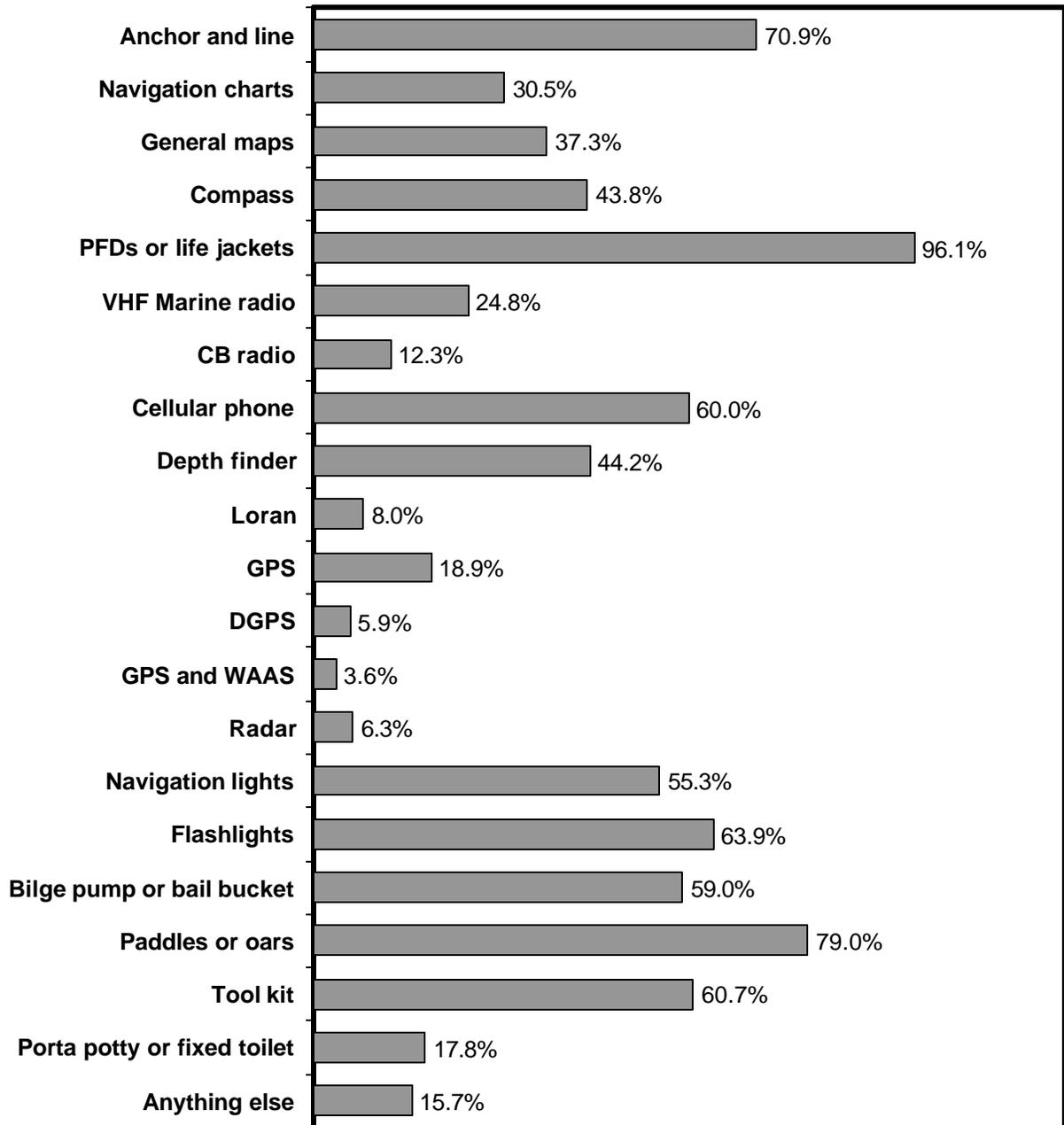
Boat operators were asked if, when boating between September 2001 and September 2002, they carried any specific types of equipment on the boat that they used most often. The items examined are summarized in Figure 8.1 on the following page. The percentages indicate how many boat operators usually carried at least one item on board when boating. Almost all boat operators (96%) carried at least some PFDs or life jackets. A significant majority also carried paddles or oars (79%) and an anchor and line (71%). More than half carried a cellular phone (60%), navigation lights (55%), flashlights (64%), a bilge pump or bail bucket (59%), or a tool kit (61%).

About a third of boat operators carried maps or charts for navigation—31% carried navigation charts, 37% carried general maps, and 44% carried a compass. VHF marine radios were carried by 25%, more often than boat operators who carried CB radios (12%).

More advanced navigational equipment was used less often. Global positioning systems (GPS) or radar were carried infrequently; although GPS was carried by 19%, digital GPS was carried by just 6%. GPS and WAAS (wide angle augmentation system) was carried on just 4% of boats. Radar was carried on 6% of boats.

- ❖ Almost all boat operators (96%) carried PFDs or life jackets.
- ❖ A significant majority also carried paddles or oars (79%) and an anchor and line (71%).
- ❖ More than half carried a cellular phone, navigation lights, flashlights, a bilge pump or bail bucket, or a tool kit.
- ❖ About a third of boat operators carried maps or charts for navigation.
- ❖ VHF marine radios were carried by 25%, more often than boat operators who carried CB radios (12%).
- ❖ More advanced navigational equipment was used less often. Global positioning systems (GPS) or radar were carried infrequently; although GPS was carried by 19%, digital GPS, GPS and WAAS, or radar was carried on less than 10% of boats.

**Figure 8.1 When you went boating, did you carry the following pieces of equipment? (E1)**



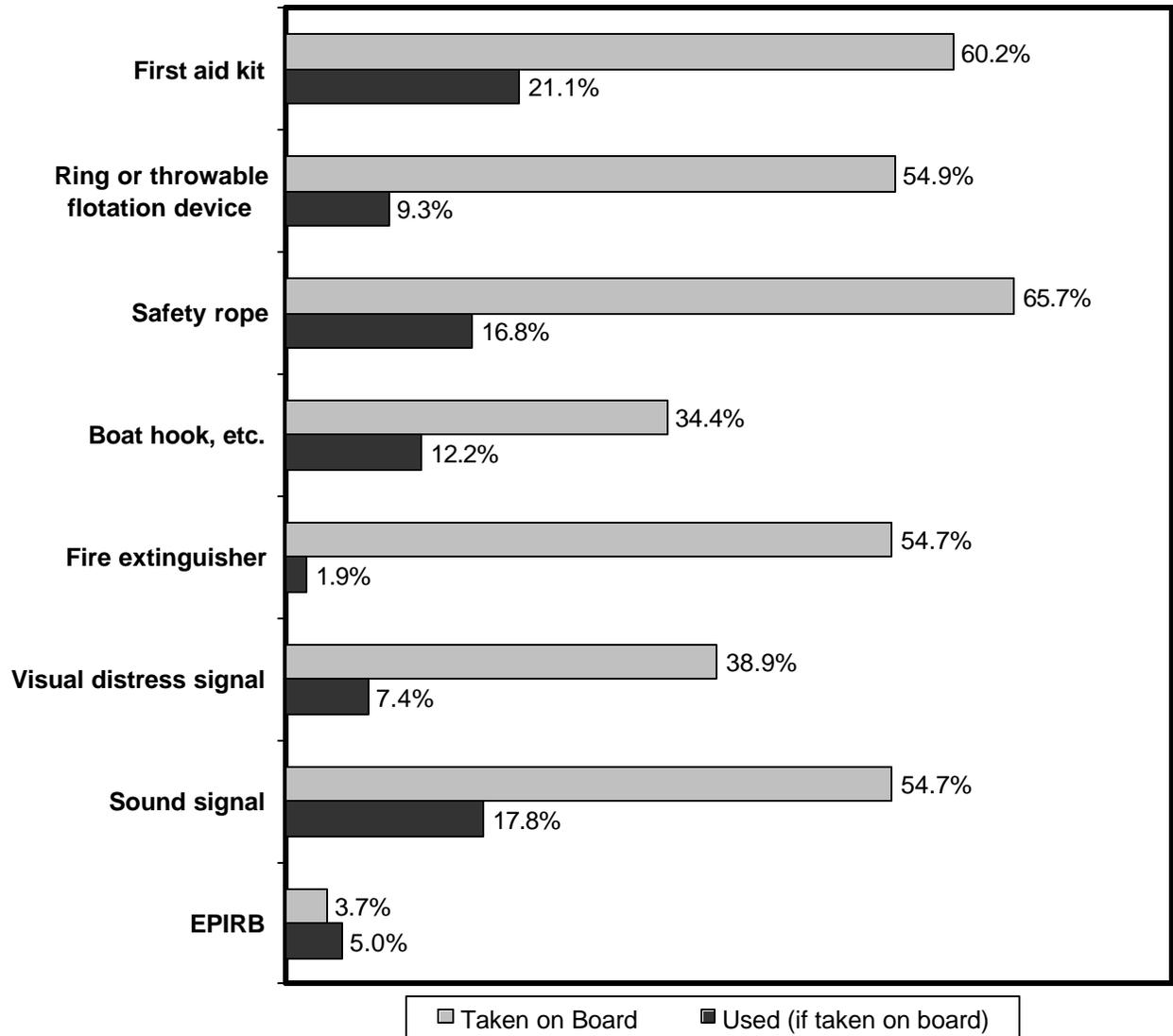
In addition to general equipment, boat operators were asked what safety equipment they carried with them while boating. Furthermore, boat operators were asked to indicate whether they used each type of safety equipment. The safety equipment included a first aid kit, a ring or other throwable flotation device, a safety rope, equipment for reaching someone in the water such as a boat hook or similar piece of equipment, a fire extinguisher, visual distress signals such as flags or flares, sound signals such as horns or whistles, or an EPIRB—emergency position indicating radio beacon. The frequency with which each of these items is carried and used is summarized in Figure 8.2 on the following page.

The most commonly carried safety equipment includes a safety rope (carried by 66%), a first aid kit (carried by 60%), ring or throwable flotation device, fire extinguisher, and sound signal (all carried by 55%). EPIRB was the least common equipment, carried by less than 4% of boats.

Of those who carried safety equipment, first aid kits were most likely to be used when boating, used by 21% of those who carried them. Sound signals were used by 18% of boat operators who carried them, and safety ropes were used by 17% of boat operators who carried them. EPIRB was not only rarely carried, but also rarely used—just 5% of those who carried EPIRB used this equipment. The least often used safety equipment was fire extinguishers. Although they were carried by more than half of boats, they were used by less than 2%.

- ❖ Safety ropes were the most often carried safety equipment, carried by 66% of boat operators and used by 17% of those who carry them.
- ❖ First aid kits were carried by 60%, but they were most likely to be used—used by 21% of boat operators carrying them.
- ❖ More than half of boat operators carried rings or throwable flotation devices, fire extinguishers, and sound signals. Less than 20% used sound signals, less than 10% used rings, and less than 2% used fire extinguishers.
- ❖ EPIRB is the least common equipment, carried by less than 4% of boats. It was used by just 5% of those who carry it.

**Figure 8.2 When you went boating, did you usually carry and/or have the occasion to use the following pieces of emergency equipment? (E2)**

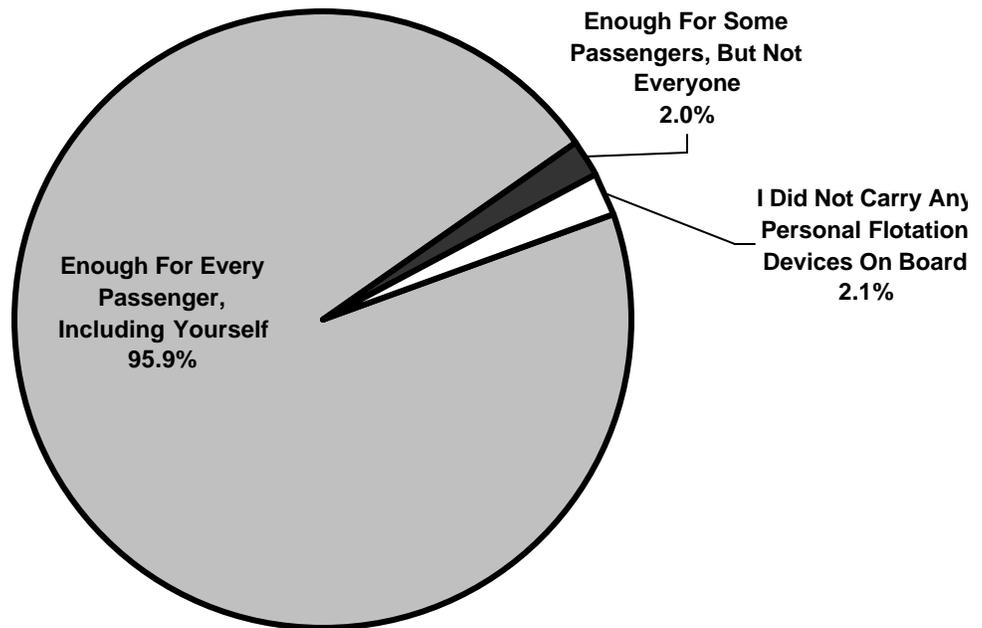


## IX. PERSONAL FLOTATION DEVICES ON THE BOAT OPERATED MOST OFTEN

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A series of questions asked about boaters' use of personal flotation devices (PFDs). First, boat operators were asked how many PFDs they usually carried on board their vessel. The three response categories are summarized in Figure 9.1. Virtually all respondents (96%) indicated that they carried enough PFDs for every passenger, including the operator. Two percent reported that they carried some PFDs, but not enough for every passenger, and another 2% reported that they did not carry any PFDs. Importantly, however, because these data are self-reported by respondents, they are likely inflated and overrepresent to some extent how often PFDs are carried.

**Figure 9.1 How many wearable Personal Flotation Devices (PFDs), or life jackets, did you usually carry on board? (E3)**



- ❖ Virtually all boat operators (96%) indicated that they carried enough PFDs for every passenger, including the operator.
- ❖ 2% reported that they carried some PFDs, but not enough for every passengers.
- ❖ 2% reported that they did not carry any PFDs.

The number of PFDs usually carried was also examined as a function of boat operated most often. As can be seen in Table 9.1, almost all operators carried enough PFDs for all passengers, including themselves. This same basic pattern held true across all vessel types, with a few exceptions. Boat operators using inflatables were less likely to carry PFDs for all passengers; 9% carried enough for some passengers but not all, and an additional 12% did not carry any PFDs on board. Boat operators using houseboats were also less likely to carry PFDs for all passengers. Six percent of boat operators using houseboats carried some PFDs—but not enough for all. Boat operators using pontoon boats, sailboats, motorboats, and personal watercraft were most likely to carry PFDs for every passenger.

**Table 9.1 Number of wearable PFDs, or life jackets usually carried by vessel. (C1, E3)**

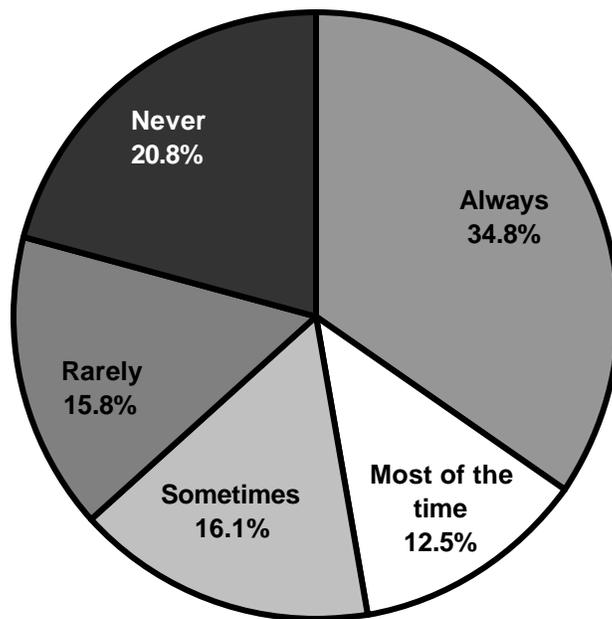
	Number of PFDs Usually Carried			
	Enough for every passenger, including yourself	Enough for some passengers, but not everyone	I did not carry any PFDs on board	Total
Canoe	94.5%	2.1%	3.4%	100%
Kayak	93.9%	1.6%	4.5%	100%
Rowboat	92.7%	2.7%	4.6%	100%
Inflatable	79.3%	8.9%	11.8%	100%
Pontoon boat	97.1%	2.1%	0.8%	100%
Houseboat	91.8%	5.6%	2.6%	100%
Sailboat (motor)	97.5%	2.0%	0.5%	100%
Sailboat (sail only)	95.2%	2.6%	2.2%	100%
Open motorboat	98.7%	1.0%	0.3%	100%
Cabin motorboat	98.2%	1.4%	0.4%	100%
Personal watercraft	95.9%	2.4%	1.7%	100%
Other craft	90.1%	2.9%	7.0%	100%

- ❖ Boat operators using pontoon boats, sailboats, motorboats, and personal watercraft were most likely to carry PFDs for every passenger.
- ❖ Boat operators using inflatables and houseboats were less likely to carry PFDs for all passengers

In terms of the frequency with which PFDs are used, boat operators were asked how often they usually wear a life jacket or PFD while boating: always, most of the time, sometimes, rarely, or never. The results are shown in Figure 9.2.

More than three-quarters reported wearing a PFD to some extent while boating (79%), and nearly half of all respondents (47%) reported wearing a life jacket or PFD “always” or “most of the time.” However, 21% reported that they “never” wear a PFD.

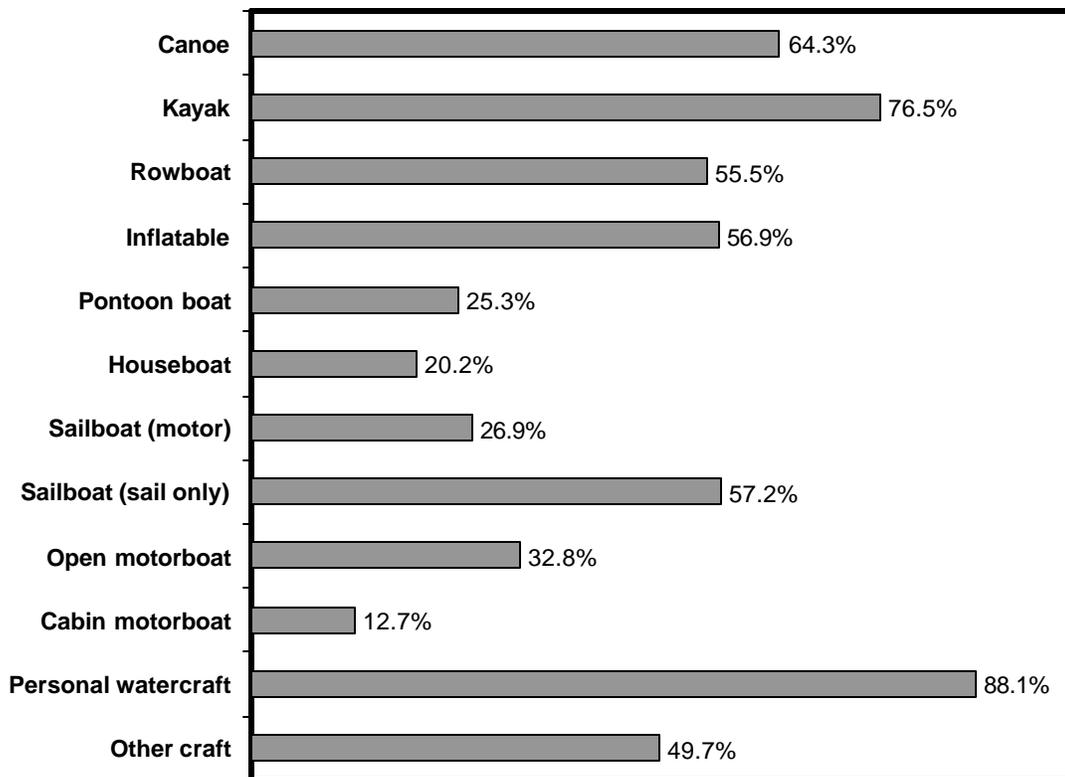
**Figure 9.2 When you operated this boat, how often did you usually wear a life jacket/PFD? (E4)**



- ❖ 79% reported wearing a PFD to some extent while boating.
- ❖ Nearly half of all boat operators (47%) reported they usually wear a life jacket or PFD “always” or “most of the time” when boating.
- ❖ 37% reported that they “never” or “rarely” wear a PFD.

To determine whether PFD use varies as a function of type of boat used while boating, Figure 9.3 compares the percentage of boat operators in each of the 12 boat types who indicated that they wore a PFD “always” or “most of the time” when boating. Boat operators on personal watercraft such as Jet-skis and Waverunners were most likely to wear PFDs, with 88% wearing life jackets “always” or “most of the time.” Boat operators using kayaks were also likely to wear PFDs, with more than three-quarters of boat operators (77%) wearing PFDs “always” or “most of the time.” Boat operators in cabin motorboats were least likely to report wearing PFDs with just 13% wearing them “always” or “most of the time.”

**Figure 9.3 How often a life jacket or PFD is worn by boat operator always or most of the time by type of vessel. (C1, E4)**

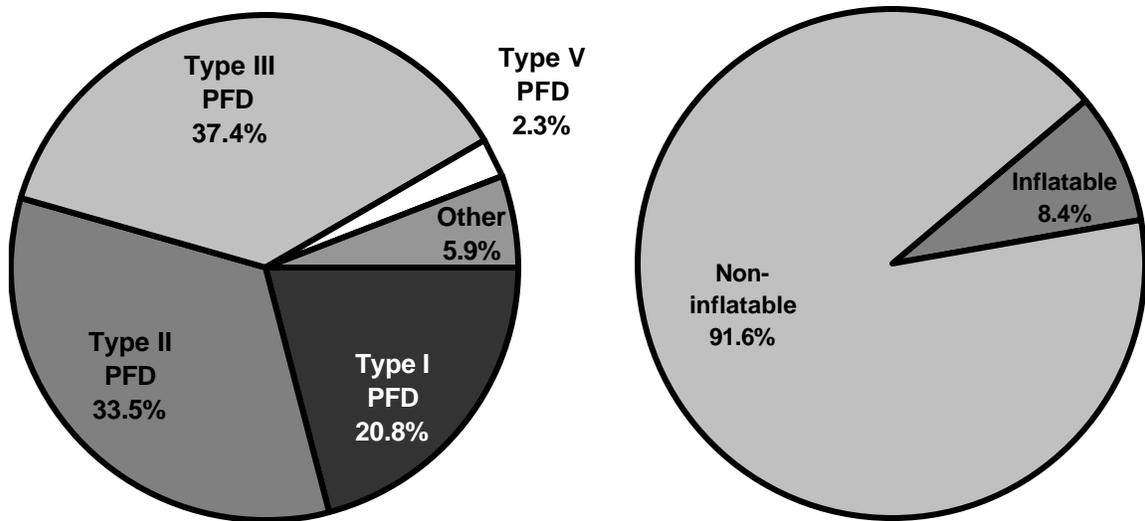


- ❖ Primary boat operators on personal watercraft were most likely to wear PFDs, with 88% wearing life jackets “always” or “most of the time.”
- ❖ More than three-quarters of boaters using kayaks (77%) wore PFDs “always” or “most of the time.”
- ❖ Just 13% of boaters in cabin motorboats reported wearing PFDs “always” or “most of the time.”

Boat operators who reported that they wear a PFD while boating (79% of all respondents) were next asked what type of PFD they usually wore. The choices presented to respondents included the Type I PFD, off-shore life jacket; Type II PFD, near-shore buoyancy vest; Type III PFD, flotation aid; Type V PFD, special use device; or another type of device. The mail-out version of the survey incorporated pictures of each type of device to aid respondents' recall. In addition, respondents who use PFDs were asked whether the device is inflatable or noninflatable (inherently buoyant). The results are presented in Figure 9.4. Just over one-third of respondents reported using Type II PFDs (34%) and Type III PFDs (37%). Of the remaining 29% of respondents, 72% use a Type I PFD. Furthermore, collapsing across all types of PFDs, the vast majority used by respondents, 92%, were noninflatable (inherently buoyant).

Significantly, 22% of respondents who reported that they carried a PFD aboard did not know what type of PFD it was. Although they knew they carried a PFD, these respondents were not familiar enough with the device to name the specific type. Although these respondents are not reflected in the figures below, they represent a substantial proportion of boat operators.

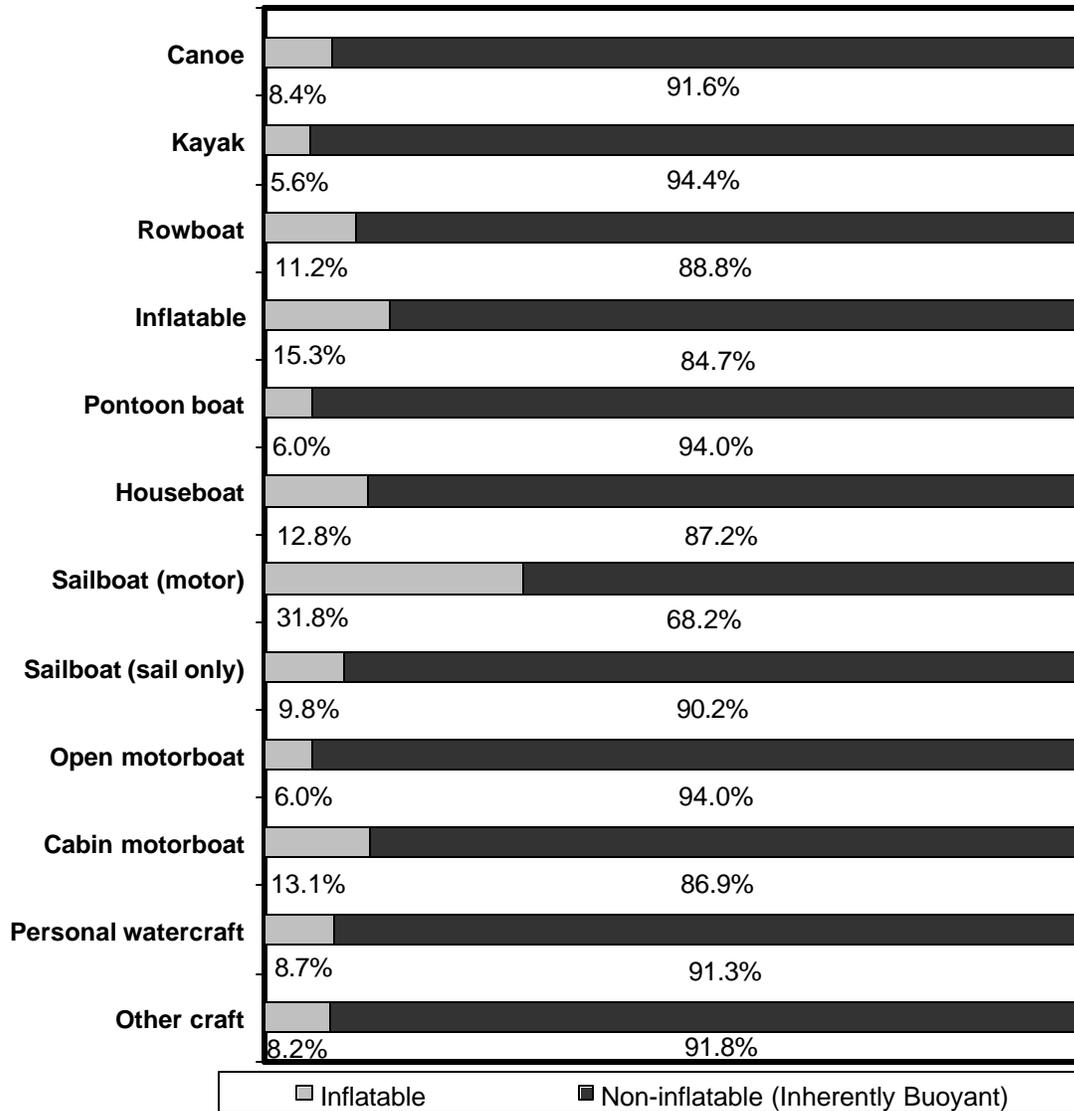
**Figure 9.4 When you wore a life jacket/PFD while operating this boat, what type of PFD did you usually wear?/Was it inflatable or noninflatable? (E5, E5a)**



- ❖ Just over one-third of boat operators reported using Type II PFDs (34%) and Type III PFDs (37%). Of the remaining 29% of boat operators, 72% used a Type I PFD.
- ❖ 22% did not know what type of PFD they carry aboard their boat.
- ❖ Collapsing across all types of PFDs, 92% of PFDs were noninflatable (inherently buoyant).

Noninflatable (inherently buoyant) PFDs, most common overall at 92% use, were also most common on all vessel types. However, use of inflatable PFDs was notably greater for sailboats with auxiliary motors, where they were used by 32% of respondents who operate this type of craft most often. Also, inflatable PFDs were slightly more likely to be used on inflatable boats (15%) and cabin motorboats (13%).

**Figure 9.5 Inflatable and noninflatable PFDs worn by type of boat.**  
(C1, E5a)



- ❖ Noninflatable (inherently buoyant) PFDs were the most common on all vessel types.
- ❖ Inflatable PFDs were used most on sailboats with auxiliary motors, inflatable boats, and cabin motorboats.

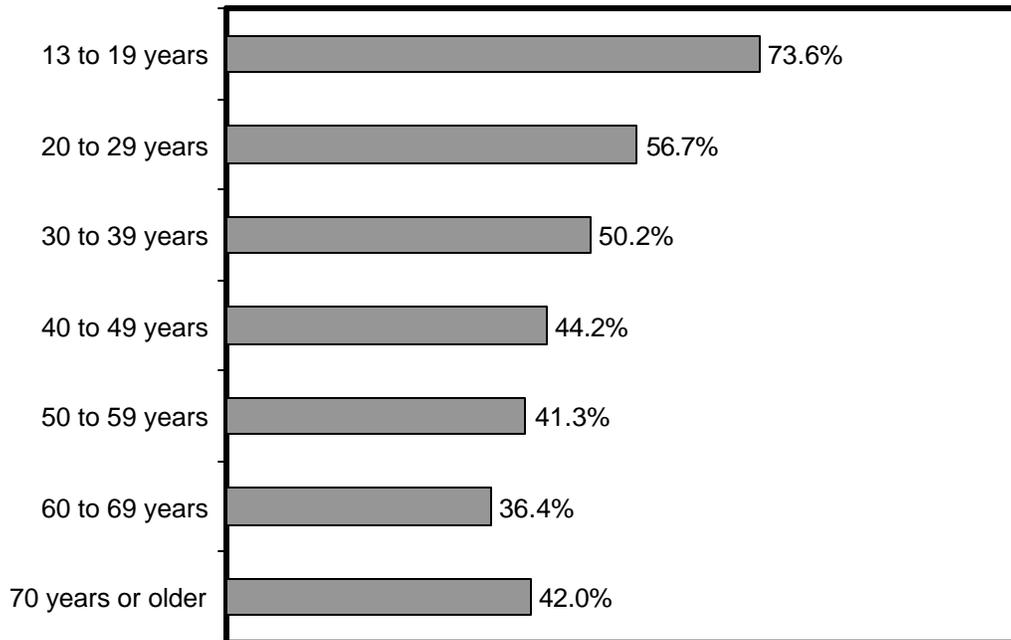
Figures 9.6 and 9.7 on the following page summarize the results of boat operators' self-reported PFD use as a function of the age of operator and age of occupants<sup>4</sup>. Both figures contain the percent of respondents who answered that they wore a PFD "always" or "most of the time" while boating. As can be seen PFD use was greatest for younger boat operators and occupants. Notably, however, the percentage of both operators and occupants who "always" used PFDs when boating steadily and substantially declined as age increased (up to age 70), as the percentage of occupants who "never" used PFDs gradually increased with age. Although more than half of operators under 20 claimed they "always" wore PFDs, approximately one-quarter of operators over 50 "always" wore them. Fewer than half of operators over 40 reported wearing PFDs "always" or "most of the time." Furthermore, occupants in all age groups were less likely to use PFD compared with operators.

- ❖ The percentage of both operators and occupants who "always" use PFDs when boating steadily and substantially declined as age increased, while the percent of occupants who "never" wore them increased with age.
- ❖ Occupants in all age groups were less likely to use PFDs compared to operators.

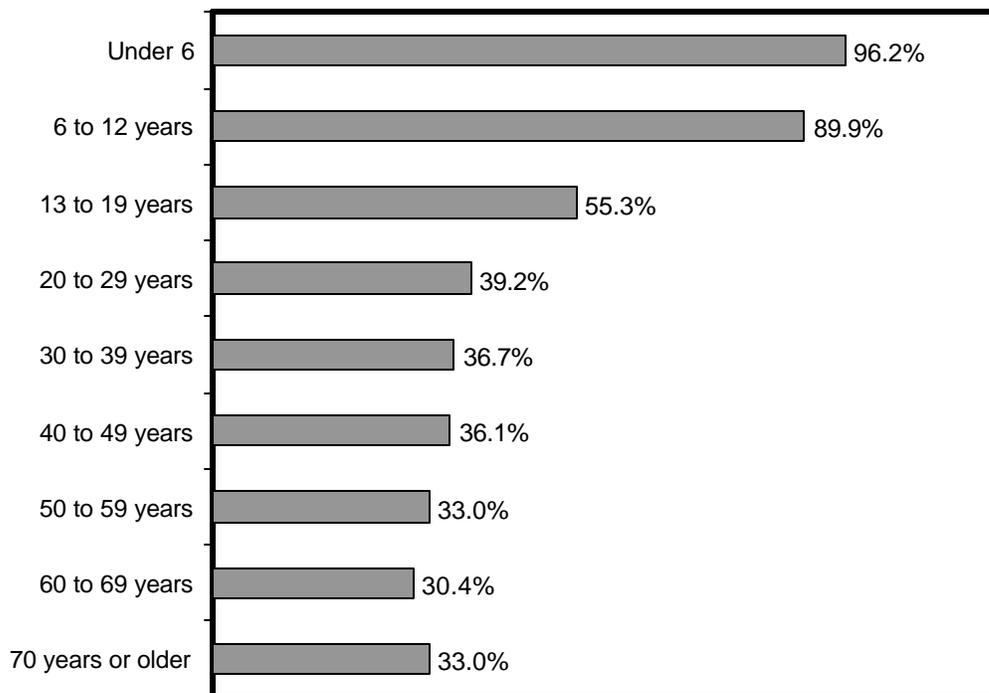
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<sup>4</sup>The reader will note that there were no respondents (i.e., primary boat operators) under age 13.

**Figure 9.6 Percent of operators using life jackets or PFD “always” or “most of the time” by age. (D4, E4)**



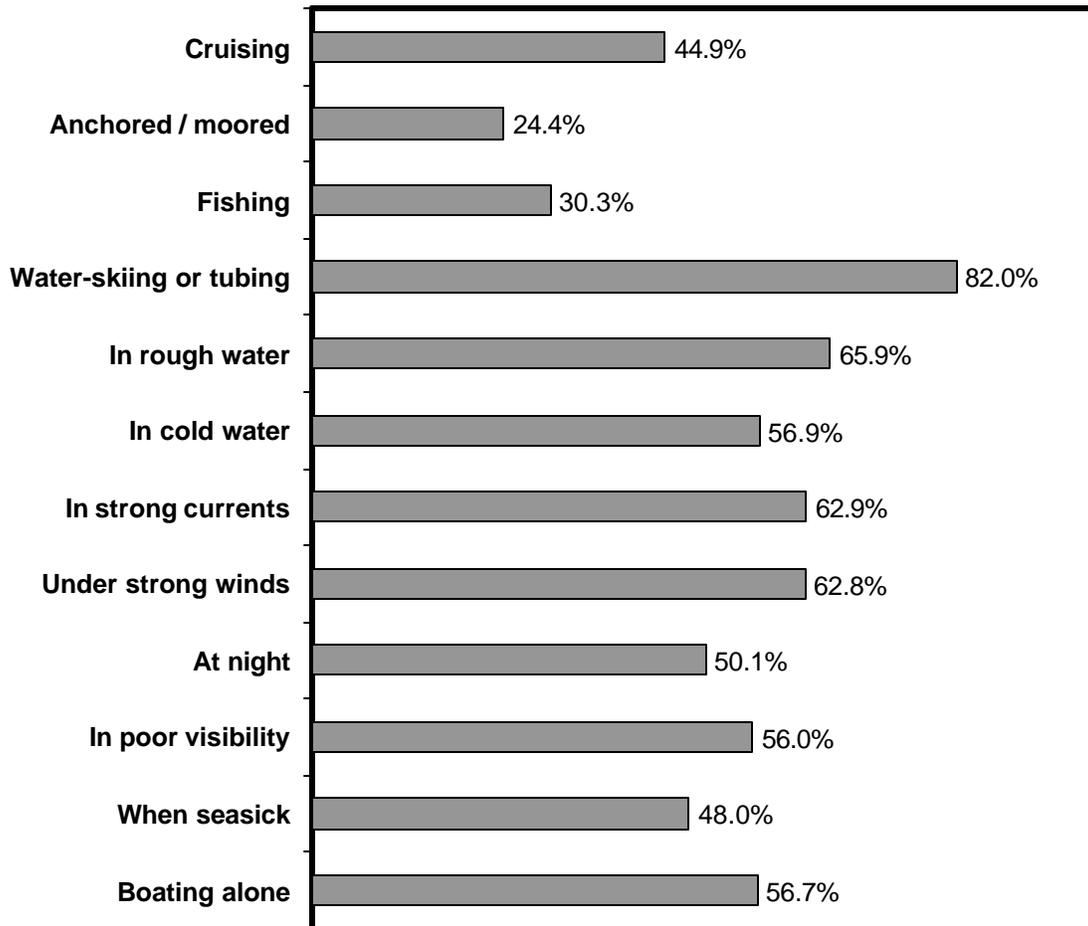
**Figure 9.7 Percent of occupants using life jackets or PFD “always” or “most of the time” by age. (E6)**



The final aspect of PFD use examined in the survey was how often boat operators wore PFDs in various boating conditions, which includes typical boating activities such as cruising, fishing, or being moored, as well as potentially dangerous situations, such as boating in rough water, strong currents, or strong winds. PFD use in each of these conditions is summarized in Figure 9.8; this figure contains the percent of respondents who answered that they wore a PFD “always” or “most of the time” while boating in each condition.

Recall from Figure 9.2 that overall 34% of boat operators reported they “always” wear a PFD. Notably, in potentially dangerous conditions (i.e., rough water, strong currents, strong winds, poor visibility), PFD use was slightly higher than the overall average use. For example, in rough water, 56% of boat operators say they “always” wore a PFD, and in strong currents, 55% say they “always” wore a PFD. Conversely, when anchored/moored, fewer than 19% of boat operators “always” wore a PFD. Across all conditions examined in the survey, fewer than 60% of boat operators in all conditions reported that they “always” wore a PFD. The only exception is waterskiing or tubing, when 78% of boat operators “always” wore a PFD.

**Figure 9.8 How often operators wore life jackets or PFD “always” or “most of the time” by boating activity. (F1)**



- ❖ In potentially dangerous conditions (i.e., rough water, strong currents, strong winds, poor visibility), self-reported PFD use was slightly higher than the overall average.
- ❖ During typical activities such as fishing or when anchored or moored, self-reported PFD use was below the overall average.
- ❖ Fewer than 60% of boat operators in all conditions report they “always” wore a PFD. Fewer than two thirds in all conditions wore a PFD “always” or “most of the time”.
- ❖ The only exception is waterskiing or tubing, when 82% of boat operators wore a PFD “always” or “most of the time.”

## X. BOATING INCIDENTS

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To determine how many respondents were involved in boating incidents over the previous year, boat operators were asked to report whether or not they were involved in various types of incidents. If they had experienced an incident, they were asked how many times they were involved in that incident. Also, if applicable, respondents were asked whether or not they reported the incident. The incidents presented in the survey are shown in Figure 10.1 on the following page. Although respondents were asked if a fatality occurred during boating these data are not presented because the number of respondents reporting a fatality was so low that the findings are unreliable.

Fifteen percent of respondents indicated that at least once in the previous year while boating they thought a dangerous situation might develop but it did not. This was the most frequent type of incident respondents recorded. The next most frequently experienced incident, noted by 9% of all boat operators, was that the boat needed help to get out of a difficult situation or needed help from others to reach shore. In addition, approximately 7% remembered feeling a sense of urgency about not being able to return to shore.

More dangerous incidents occurred with lower frequency. About 4% of boat operators experienced an incident in which one or more people were in danger because of falling overboard, because of trouble getting back in the boat, or because the boat overturned. Three percent thought they were lost at least once during the year, and another 3% experienced an accident, but the accident did not result in loss of life, injury or property damage.

The most serious incidents occurred among less than 2% of boat operators. Two percent of boat operators were involved in accidents involving damage to a boat or property, 1% were involved in an incident where one or more people were seriously injured and required medical attention beyond first aid.

- ❖ Over the course of the year from September 2001 to September 2002, 15% of boat operators thought a dangerous situation might develop although it did not.
- ❖ 9% needed help to get out of a difficult situation, and 7% experienced a situation that made them feel a sense of urgency to return to shore.
- ❖ The most serious incidents occurred with the lowest frequency. Less than 2% were involved in an accident resulting in property damage and 1% experienced a serious injury.

**Figure 10.1 Have you personally been involved in a boating incident when any of the following happened? (F2.1-8)**

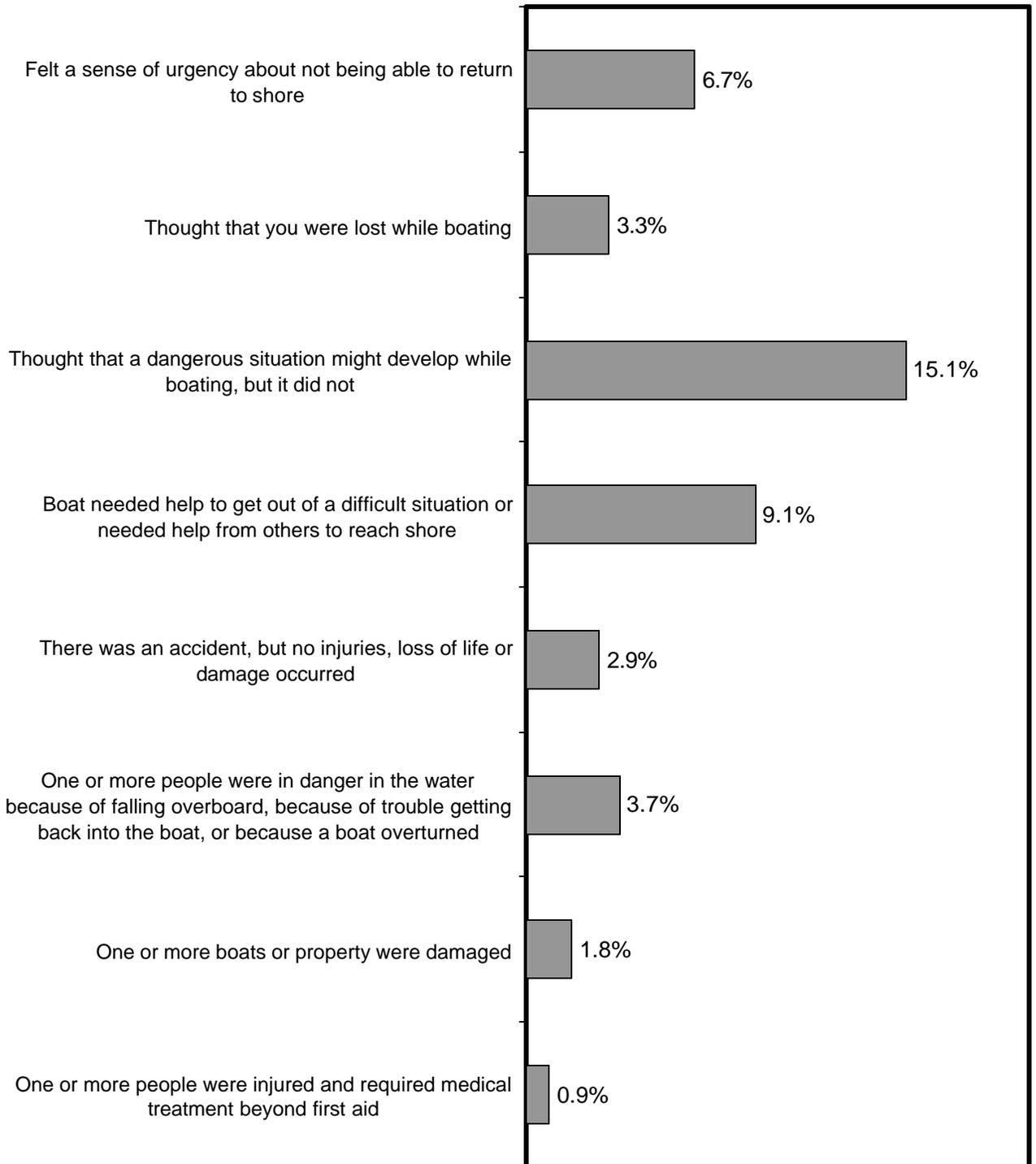


Table 10.1 presents the estimated number of boat operators who reported having been involved in each type of boating incident.

**Table 10.1 Population estimates of boating incidents experienced by boat operators. (F2.1-8)**

Incident	Population Estimates
Felt a sense of urgency while boating about not being able to return to shore	2,057,751
Thought that you were lost while boating	1,023,083
Thought that a dangerous situation might develop while boating, but it did not	4,648,516
Your boat needed help to get out of a difficult situation or needed help from others to reach shore	2,807,301
There was an accident, but no injuries, loss of life or damage occurred as a result	877,778
One or more people were in danger in the water because of falling overboard, because of trouble getting back into the boat, or because a boat overturned	1,116,330
One or more boats or property were damaged	550,371
One or more people were injured and required medical treatment beyond first aid	271,470

Once the type of incidents boat operators experienced was established, respondents were asked how many times each of the incidents occurred. Table 10.2 presents the mean number of times an incident was experienced. Note that this analysis is limited to only those boat operators who experienced one or more of these incidents between September 2001 and September 2002. The incident experienced by the most boat operators was also the incident experienced most often; respondents who thought a dangerous situation might develop while boating, although it did not, experienced this situation an average of three times. Operators who thought they were lost experienced this situation an average of two times, and operators who experienced a person falling overboard also experienced this situation an average of two times. The most serious incidents, a serious injury, were experienced, on average, once.

**Table 10.2 Mean number of boating incidents experienced. (F3.1-8)**

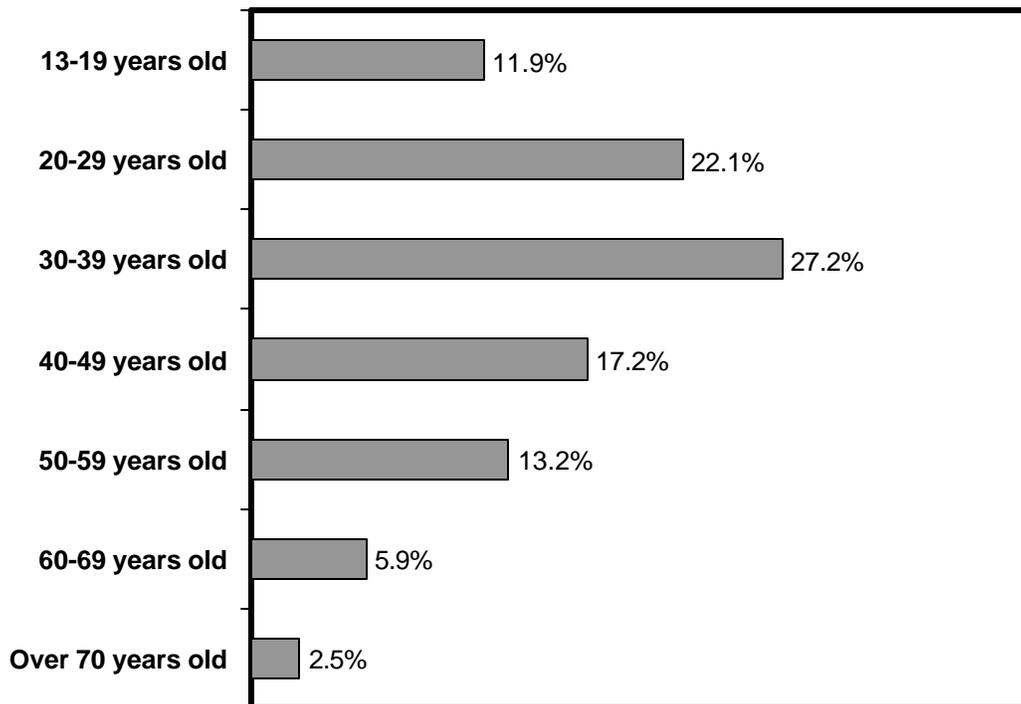
Incident	Mean Number of Incidents
Felt a sense of urgency while boating about not being able to return to shore	1.62
Thought that you were lost while boating	1.97
Thought that a dangerous situation might develop while boating, but it did not	2.99
Your boat needed help to get out of a difficult situation or needed help from others to reach shore	1.65
There was an accident, but no injuries, loss of life or damage occurred as a result	1.74
One or more people were in danger in the water because of falling overboard, because of trouble getting back into the boat, or because a boat overturned	2.21
One or more boats or property were damaged	1.35
One or more people were injured and required medical treatment beyond first aid	1.08

- ❖ The incident experienced by the most boaters was also the incident experienced most often; boaters who thought a dangerous situation might develop while boating, although it did not, experienced this situation an average of three times.
- ❖ Boaters who thought they were lost experienced this situation twice, on average; boaters who experienced a person falling overboard also experienced this situation twice.
- ❖ The most serious incidents—involving a serious injury— were experienced, on average, once.

To explore the two most serious types of boating incidents further, the age of the boat's operator when the incident occurred was examined. If more than one incident occurred, the most recent incident was used in the analysis. Figures 10.2a-b show the age of the operator of the boat when the most recent incident occurred. First, shown in Figure 10.2a, considering only incidents in which damage was sustained by a boat or other property, operators were most likely to be between 30 and 39; 27% of operators who were involved in an incident of this type fell into this age group. Thirty-four percent of operators were under age 29, and 39% of operators were over age 40.

**Figure 10.2a Age of operator when boat or property was damaged.**

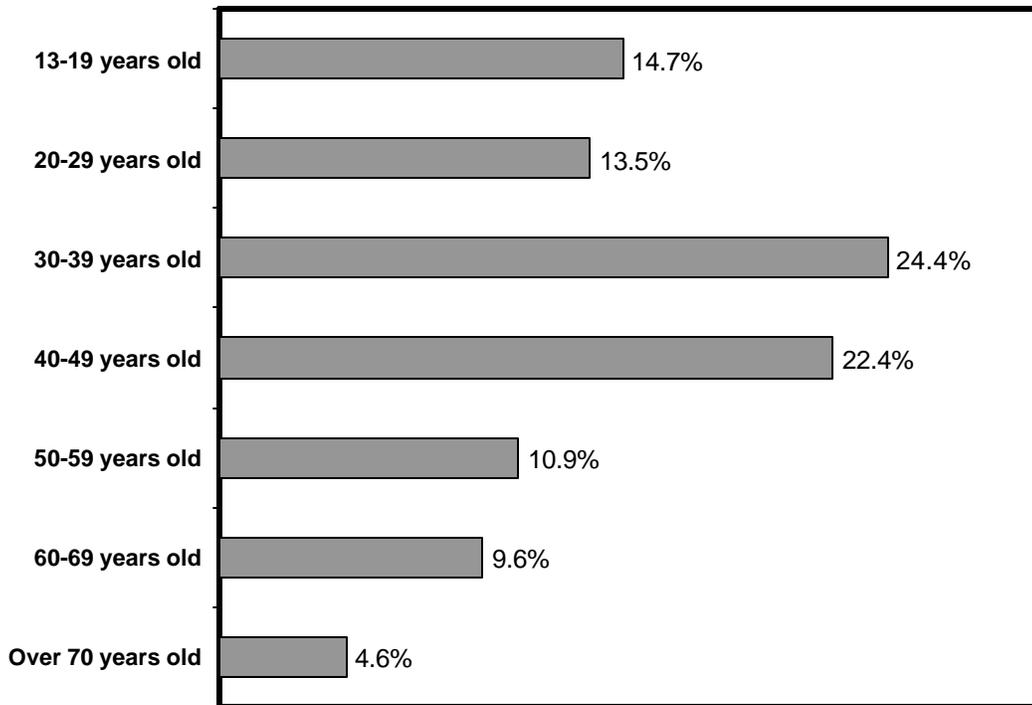
(F5, F6)



- ❖ Considering only incidents in which damage was sustained by a boat or other property, 27% of operators were between 30 and 39 years old.
- ❖ 34% of operators were under age 29.
- ❖ 39% of operators were over age 40.

Next, considering only incidents in which someone sustained an injury that required medical treatment beyond first aid, again, operators were most likely to be age 30 to 39; 24% of operators who experienced this type of incident fell into this age group. Operators involved in this type of incident were less likely to fall into the youngest age categories, with 28% of operators under age 29. Forty-eight percent of operators were over age 40. See Figure 10.2b for details.

**Figure 10.2b Age of operator when people were injured and required treatment. (F5, F6)**



- ❖ Considering only incidents in which someone sustained an injury that required medical treatment beyond first aid, 24% of operators were between 30 and 39 years old.
- ❖ 28% of operators were under age 29.
- ❖ 48% of operators were over age 40.

Boat operators were asked how many hours they had been out on the water at the time the incident occurred. Table 10.3 shows the mean and median number of hours boats had been out on the water. In all cases, on average, the boats had been out on the water for more than 8 hours at the time the incident occurred. In the case of incidents involving injury, the average time out on the water was 15 hours. However, the median number of hours is also provided. This is important because it reflects the 50<sup>th</sup> percentile, meaning that half of all cases in each category fall above and below this point. Whereas means may be strongly affected by a few extremely large or small values, the median is less sensitive to such extreme cases and may more accurately reflect the central tendency of the data. Notably, although the average number of hours out on the water for incidents involving property damage is 8, the median is 3. This means that half of all incidents of this type occurred after the boat was on the water for 3 hours or less. Similarly, although the average number of hours boats were on the water when serious injury accidents occurred is 15, 50% of these incidents occurred in 2 hours or less.

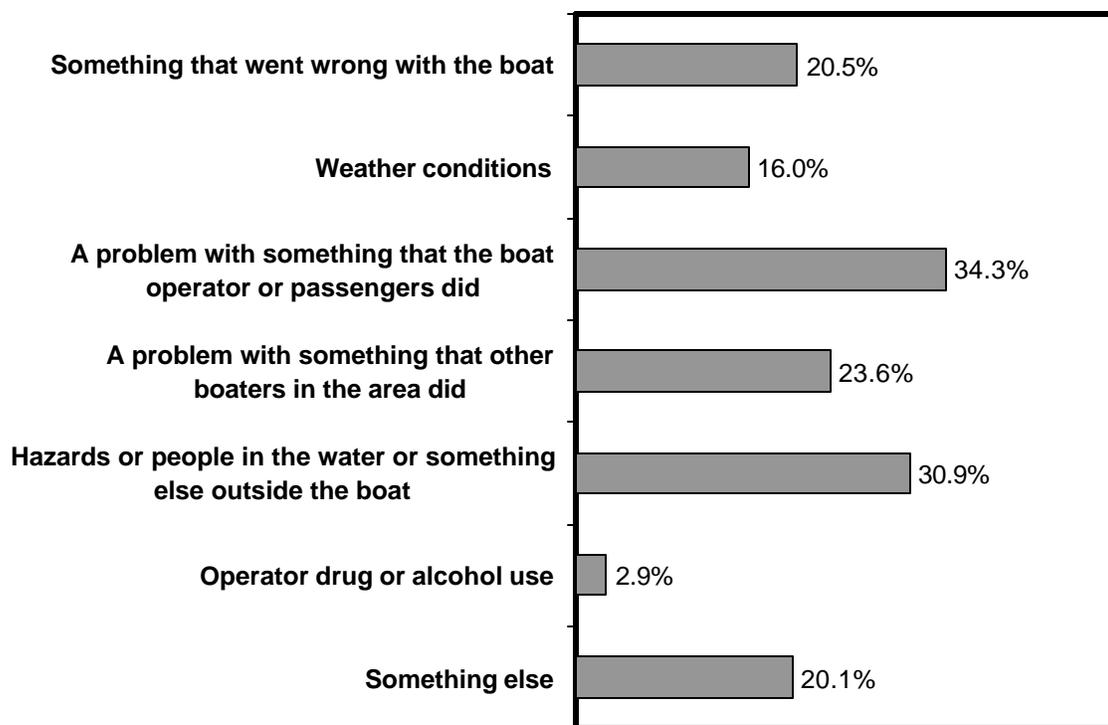
**Table 10.3 Number of hours out on water when incident occurred.**  
(F5, F7)

Type of incident	Mean number of hours on water when incident occurred	Median number of hours on water when incident occurred
One or more boats or property were damaged	8.05	3.00
One or more people were injured and required medical treatment beyond first aid	14.97	2.00

- ❖ The average number of hours out on the water for incidents involving property damage was 8, but 50% of all incidents of this type occurred after the boat was on the water for 3 hours or less.
- ❖ The average number of hours boats were on the water when serious injury accidents occurred was 15, but 50% of these incidents occurred after 2 hours or less.

To attempt to assess the causes of the most serious types of incidents, boat operators were asked to indicate the cause of the incident by selecting all that apply from a set of seven options. These options are presented in Figure 10.3a-b below. First, shown in Figure 10.3a, for incidents involving damage to a boat or other property, the most likely cause of the accident was something the operator or passengers did. This was the case for 34% of incidents involving property damage only. Something outside the boat (i.e., hazards or people in the water) was the cause of 31% of incidents of this type. Operator drug or alcohol use was the least common cause reported in the survey, noted in just 3% of incidents which involved boat or property damage.

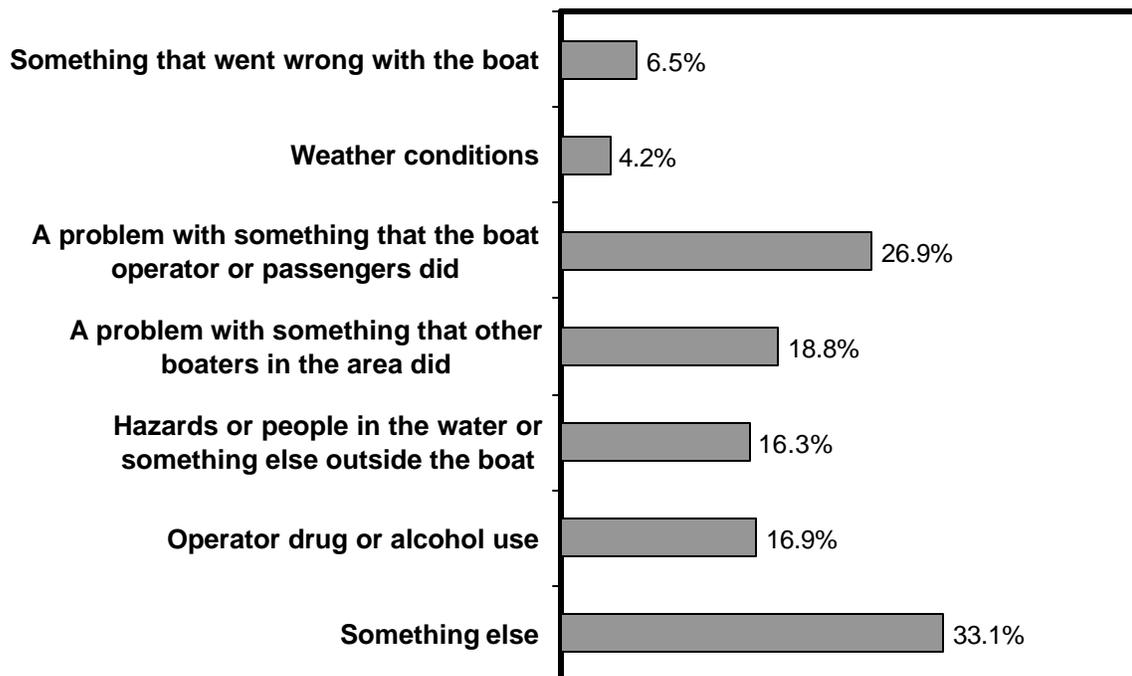
**Figure 10.3a Cause of damage to boat or property. (F5, F8)**



- ❖ The most likely cause of accidents involving property damage was something the operator or passengers did. This was the case for 34% of these incidents.
- ❖ Something outside the boat (i.e., hazards or people in the water) was the cause of 31% of incidents of this type.
- ❖ Operator drug or alcohol use was the least common cause, reported by operators in just 3% of incidents of this type.

Next, shown in Figure 10.3b, considering accidents that involve an injury that required medical treatment beyond first aid, the single most common cause was something the operator or passengers did. This was the cause in 27% of incidents involving serious injury. Alcohol or drug use by the operator was the cause of significantly more incidents of this type—17%. Also, beyond the causes listed on the survey, 33% reported some other cause for the incident. Based on examination of open-ended responses, this primarily involved hitting something in the water, such as a log, refuse, or a buoy.

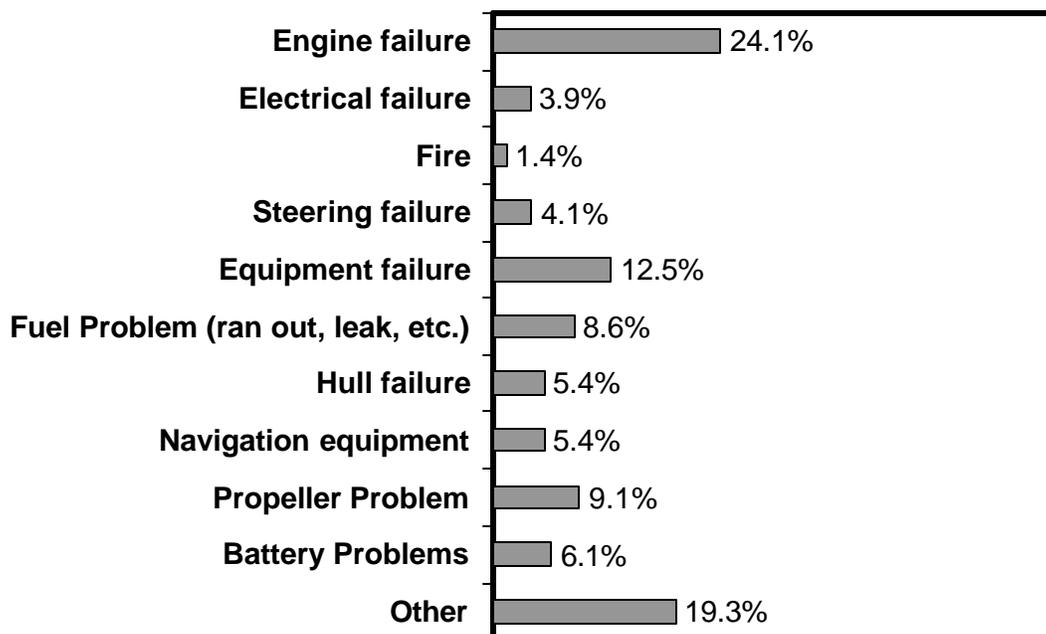
**Figure 10.3b Cause of persons injured and requiring treatment beyond first aid. (F5, F8)**



- ❖ For incidents involving serious injuries, something the operator or passengers did was the cause in 27% of incidents.
- ❖ Alcohol or drug use by the operator was the cause of significantly more incidents of this type—17%.
- ❖ 33% reported some other cause for the incident, including hitting something in the water.

If operators selected “something went wrong with the boat” when reporting the cause of an incident involving property damage, a serious injury, or a fatality, they were asked to indicate what, specifically, went wrong with the boat. The results are shown in Figure 10.4a. Among boating incidents, when something went wrong with the boat, the single most common problem with the boat was engine failure. This occurred in 24% of incidents. In 12.5% of incidents, equipment failure was the problem with the boat and in 9% of incidents the problem was with the boat’s propeller. However, in almost 20% of these incidents, when something went wrong with the boat, it was some other problem, such as running aground.

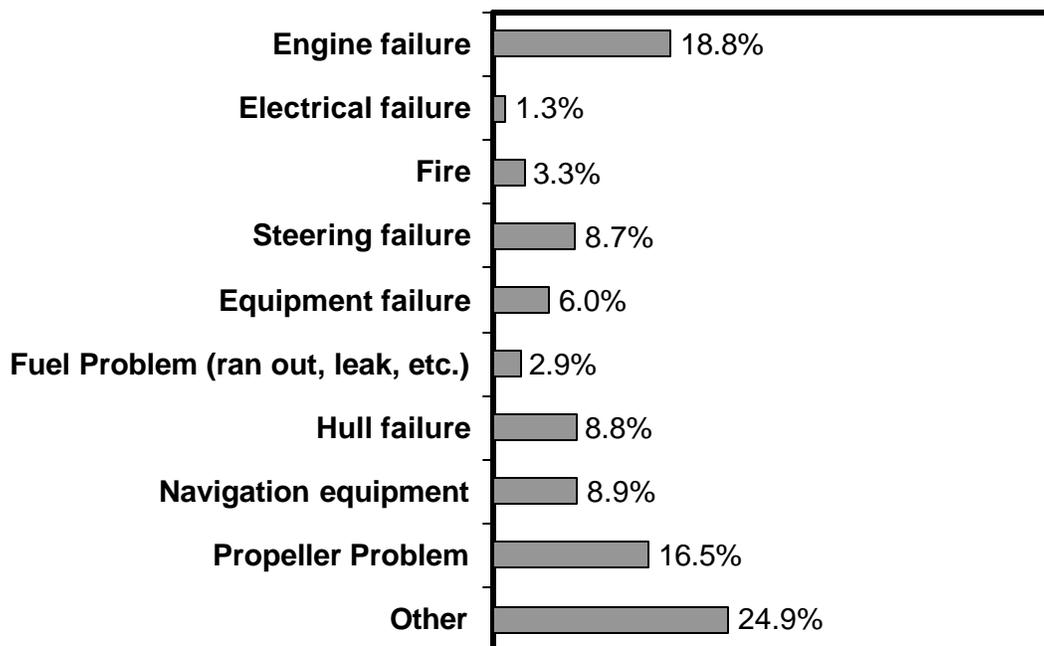
**Figure 10.4a What went wrong with the boat? (F9)**



- ❖ Among boating incidents, when something went wrong with the boat, the single most common problem with the boat was engine failure - occurring in 24% of incidents.
- ❖ In 12.5% of incidents, equipment failure was the problem with the boat. In 9% of incidents the problem was the boat’s propeller.
- ❖ For almost 20% of these incidents, when something went wrong with the boat, it was some other problem, including running aground.

Among incidents involving boat or property damage, when something went wrong with the boat, the single most common problem was engine failure shown in Figure 10.4b. This occurred in almost 19% of incidents. In 16.5% of incidents, the problem was with the boat's propeller. Steering failure, hull failure, and problems with the navigation equipment each occurred in almost 9% of incidents. However, in almost 25% of these incidents, when something went wrong with the boat, it was some other problem, such as running aground.

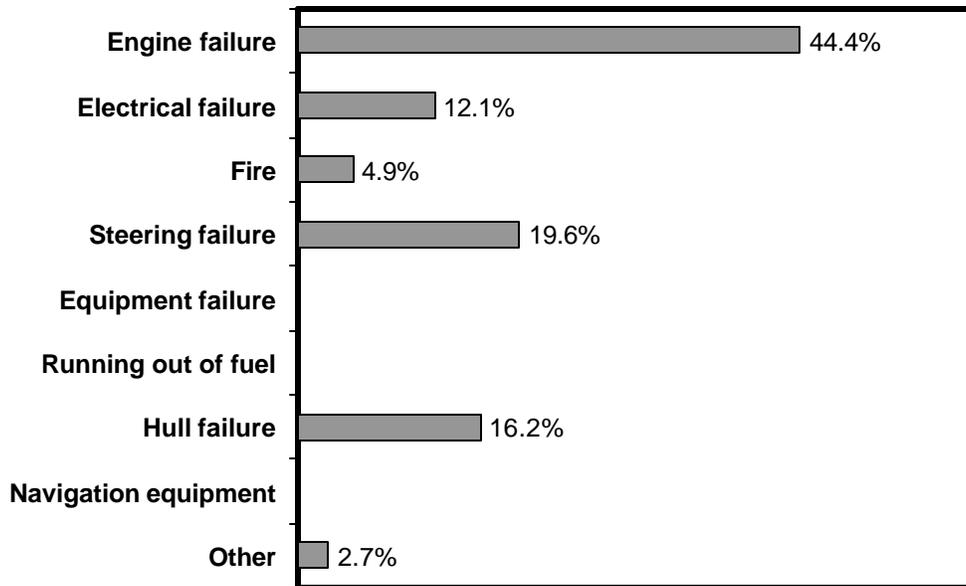
**Figure 10.4b What went wrong with the boat when boat or property damage occurred? (F5, F9)**



- ❖ Among incidents involving property damage, when something went wrong with the boat, the single most common problem with the boat was engine failure - occurring in almost 19% of incidents of this type.
- ❖ In 16.5% of incidents involving property damage, trouble with the boat's propeller was the problem with the boat.
- ❖ Steering failure, hull failure, and problems with the navigation equipment each occurred in almost 9% of incidents involving property damage.
- ❖ Almost 25% of the time the boat or property damage was caused by some other problem.

For incidents involving serious injury (requiring treatment beyond first aid), when something went wrong with the boat, 44% of the time the problem with the boat was engine failure. Steering failure was the problem in 20% of incidents of this type. Electrical failure (12%) and hull failure (16%) were also the cause of such incidents. See Figure 10.4c for more information.

**Figure 10.4c What went wrong with the boat when people were injured and required treatment beyond first aid? (F5, F9)**



- ❖ For incidents involving serious injury that involved a problem with the boat, 44% of the time the problem was engine failure.
- ❖ Steering failure was the problem in 20% of incidents of this type.
- ❖ Electrical failure (12%) and hull failure (16%) were also the cause of such incidents.

The final analysis involving the type of incidents experienced examines the type of boat operated when the incident occurred depicted in Table 10.4. Among incidents involving damage to boats or other property, 37% of the time the vessel operated was an open motorboat. Open motorboats were also the type of vessel most likely to be involved in an incident in which someone was seriously injured; 50% of incidents involving serious injuries occurred in open motorboats. Personal watercraft were also likely to be involved in serious incidents. Fourteen percent of incidents involving property damage and 21% of incidents involving serious injury happened to individuals operating personal watercraft.

**Table 10.4 Type of boat operated when most recent incident occurred.**

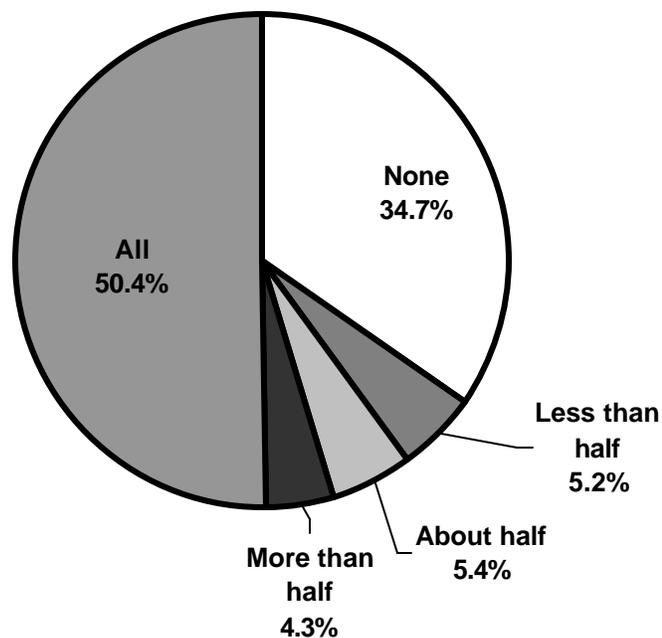
(F5, F10)

	Incident that occurred most recently	
	Boats or property damaged	People injured and required treatment
Canoe	11.1%	1.2%
Kayak	2.2%	1.0%
Rowboat	1.0%	.3%
Inflatable	1.6%	2.4%
Pontoon boat	4.6%	.8%
Houseboat	3.0%	.8%
Sailboat (motor)	5.7%	2.3%
Sailboat (sail-only)	4.8%	4.4%
Open motorboat	36.9%	49.7%
Cabin motorboat	12.0%	12.6%
Personal watercraft	13.8%	21.2%
Other craft	3.2%	3.2%
Total	100%	100%

- ❖ 37% of incidents involving property damage and 50% of incidents involving serious injury occurred in open motorboats.
- ❖ 14% of incidents involving property damage and 21% of incidents involving serious injury happened to boaters on personal watercraft. No survey respondents experienced fatal incidents on this type of craft.

Respondents who were involved in incidents were asked if any boaters fell overboard, how many of them were wearing life jackets or PFDs. Respondents were asked to choose from five categories: “none”, “less than half”, “about half”, “more than half”, and “all”. The results are provided in Figure 10.5, and illustrate a pattern of “all or none” when it comes to PFD use. When an incident occurred and boaters fell overboard, 50% of the time everyone who fell into the water was wearing a PFD. However, 35% of the time, none of the boaters who fell overboard was wearing PFDs. Fourteen percent of the time, some boaters who fell overboard were wearing PFDs but others were not.

**Figure 10.5 If anyone fell overboard, how many of them were wearing life jackets/PFDs? (F11)**



- ❖ When an incident occurred and boaters fell overboard, 50% of the time everyone who fell into the water was wearing a PFD.
- ❖ 35% of the time, none of the boaters who fell overboard were wearing PFDs.

Lastly, PFD use for boaters who fell overboard was compared between those who fell overboard and required medical treatment beyond first aid and those who did not. Table 10.5 suggests that PFD use was greater among those who were involved in incidents where injuries occurred that required medical treatment beyond first aid. Only 13% of boat operators involved in incidents where more serious injuries occurred reported that none of the people who fell overboard wore PFDs, compared to 35% of incidents where serious injuries did not occur.

**Table 10.5 Number of people who fell overboard during incident wearing life jackets or PFDs by incidents with injuries requiring treatment beyond first aid. (F2.8, F11)**

	Was someone injured and required medical treatment beyond first aid?	
	Yes	No
None	13.2%	35.0%
Less than half	18.1%	4.8%
About half	9.6%	5.4%
More than half	8.4%	4.1%
All	50.7%	50.7%
Total	100.0%	100.0%

❖ PFD use is higher among boater operators involved in incidents where more serious injuries occurred. Only 13% reported no PFD use, as opposed to 35% among those not involved in serious injury incidents.

## **XI. BOAT OPERATOR PROFILES**

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Respondents' demographic characteristics and other response variables were analyzed in an effort to determine what factors predict various boating incidents, completion of boating safety courses, and PFD or life jacket use.

First, it is important to note that all of these analyses are correlational in nature; this means that the factors described below may be *related* to the occurrence of boating incidents, completion of safety courses, or PFD use; however, the presence of a correlation does *not* imply a causal relationship. That is, simply because two factors are related does not mean that one variable, such as safety course completion, causes a change in another variable, such as PFD use. Other factors not measured in the present survey may be driving this relationship.

The value in the analyses offered below is in their ability to predict to some extent the type of boater likely to experience a dangerous incident, complete a boating safety course, or wear a PFD, based on respondents' responses and other demographic characteristics.

### ***A. Predictors of Involvement in Boating Incidents***

In an attempt to profile the type of boat operator likely to be involved in boating incidents, the type of incident experienced was examined as a function of boat operators' survey responses and demographic characteristics. Overall, incidents are very rare, involving fewer than 15% of boat operators and in many cases just 1 to 2% (see Figure 10.1). Thus, caution should be used in examining the following tables as the low frequencies for the types of incidents experienced lead to limited variance across incidents.

Nonetheless, there are several general trends seen in the following tables. First, examining Table 11.1, younger boat operators tend to report experiencing more incidents overall and more serious incidents when compared with older boaters. For example, boat operators under age 20 were more than two times as likely as boaters over age 30 to experience an incident in which they thought the boat was lost, and they were also twice as likely to experience an incident in which people were in danger in the water. Younger boaters were more likely to be involved in incidents involving damage to property or boats, as well as serious injury requiring treatment beyond first aid.

**Table 11.1 Percent of respondents involved in boating incidents by age group. (F2.1-9, G4)**

Type of Incident	Age								
	18 years or younger	19 or 20 years	21 to 24 years	25 to 29 years	30 to 39 years	40 to 49 years	50 to 59 years	60 to 69 years	70 years or older
Worried about not getting back to shore	7.7%	7.3%	8.5%	6.8%	6.5%	6.9%	6.6%	5.9%	5.4%
Thought the boat was lost	7.9%	6.8%	5.1%	3.2%	3.1%	3.0%	3.0%	2.5%	1.0%
Thought a dangerous situation might develop	14.8%	9.4%	16.2%	12.2%	14.8%	16.9%	16.9%	13.1%	11.4%
Boat needed help getting out of a difficult situation	13.2%	12.7%	13.3%	9.8%	9.9%	8.3%	8.7%	6.8%	6.5%
Accident (no injuries or damage)	7.6%	4.3%	5.3%	4.3%	2.5%	2.0%	2.8%	1.7%	2.2%
People in danger in water	9.5%	7.3%	6.5%	5.9%	4.6%	2.6%	2.8%	1.3%	1.2%
Boat or property damage	3.0%	3.0%	3.2%	2.2%	2.1%	1.2%	1.8%	1.3%	1.5%
People injured beyond first aid treatment	1.2%	2.4%	.9%	.9%	1.0%	0.8%	0.6%	0.8%	0.4%
People died		0.2%		0.3%	0.3%	0.1%	0.1%	0.1%	0.4%

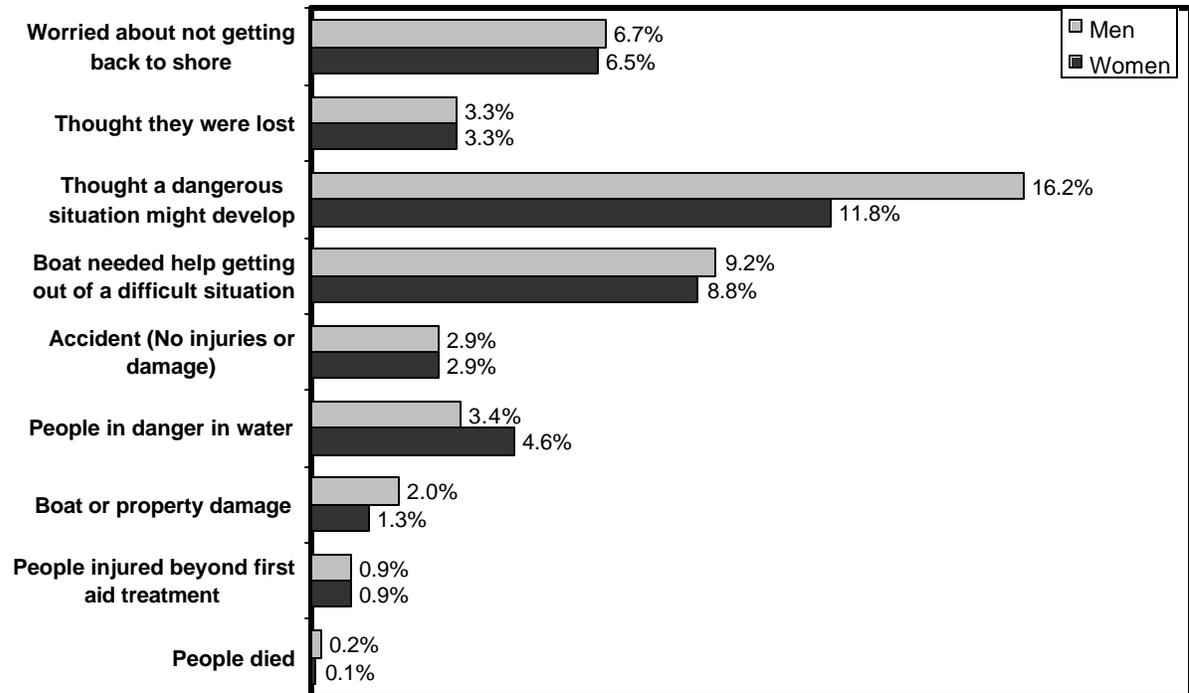
Considering not just age of boat operator but rather the experience of the boat operator, the trend is that boat operators with the most experience on the water were most likely to experience some kinds of incidents. For example, as shown in Table 11.2, boat operators with over 500 hours of experience were nearly twice as likely to have believed a dangerous situation was going to develop while boating compared with boat operators who have less than 10 hours of experience. However, amount of boating experience was not associated with increased involvement in the most serious types of incidents—those involving property damage, serious injury, or death.

**Table 11.2 Percent of respondents involved in boating incidents by hours of boat operating experience. (A5, F2.1-9)**

Type of Incident	Total Hours of Lifetime Boat Operating Experience					
	Less than 1 hour	1 to 9 hours	10 to 19 hours	20 to 100 hours	101 to 500 hours	Over 500 hours
Worried about not getting back to shore	3.7%	5.8%	6.1%	6.6%	7.0%	7.0%
Thought the boat was lost	1.8%	2.3%	3.0%	3.9%	3.7%	3.3%
Thought a dangerous situation might develop	5.1%	9.9%	9.6%	12.6%	16.9%	18.5%
Boat needed help getting out of a difficult situation	5.3%	5.8%	7.9%	10.1%	9.8%	9.7%
Accident (no injuries or damage)	2.7%	2.3%	3.0%	2.6%	3.7%	2.7%
People in danger in water	2.8%	4.1%	4.9%	4.5%	4.1%	2.8%
Boat or property damage	1.4%	0.7%	1.0%	1.5%	2.2%	2.2%
People injured beyond first aid treatment		0.6%	1.2%	0.8%	0.8%	1.1%
People died			0.4%		0.1%	0.2%

As shown in Figure 11.1, men were slightly more likely than women to report that they thought a dangerous situation might develop while boating, but otherwise there were no significant differences in involvement as a function of gender. Similarly, there was no substantial difference in likelihood of involvement in incidents as a function of education, nor as a function of operators' ability to swim.

**Figure 11.1 Percent of respondents involved in boating incidents by gender.**  
(F2, G5)



**Table 11.3 Percent of respondents involved in boating incidents by highest level of schooling completed. (F2.1-9, G6)**

Type of Incident	Highest Grade or Level of School Completed						
	8th grade or less	Some High School	High school graduate/ GED	Some college or technical school	Technical school graduate	College graduate	Post graduate
Worried about not getting back to shore	7.8%	7.5%	5.3%	7.4%	5.8%	6.6%	7.6%
Thought they were lost	6.6%	6.3%	3.4%	3.0%	4.2%	2.8%	2.5%
Thought a dangerous situation might develop	9.5%	13.8%	12.3%	18.0%	17.8%	14.1%	17.0%
Boat needed help getting out of a difficult situation	11.8%	11.2%	9.3%	11.4%	7.9%	8.1%	7.5%
Accident (No injuries or damage)	4.2%	4.4%	2.7%	3.1%	3.4%	2.7%	2.5%
People in danger in water	3.6%	6.1%	2.9%	4.0%	4.5%	3.3%	3.8%
Boat or property damage	2.3%	1.7%	1.9%	2.2%	1.7%	1.4%	2.3%
People injured beyond first aid treatment	.0%	.9%	1.0%	.8%	1.4%	.8%	.9%
People died	.3%		.2%	.1%	.6%	.1%	.2%

**Table 11.4 Involvement in boating incidents by respondents' ability to swim. (F2.1-9, G7)**

Type of incident	Do you know how to swim?	
	Yes	No
Worried about not getting back to shore	6.6%	8.2%
Thought they were lost	3.3%	3.3%
Thought a dangerous situation might develop	15.1%	13.8%
Boat needed help getting out of a difficult situation	9.2%	7.1%
Accident (No injuries or damage)	2.9%	3.2%
People in danger in water	3.7%	3.8%
Boat or property damage	1.8%	1.1%
People injured beyond first aid treatment	.9%	1.1%
People died	.1%	.6%

Two aspects of awareness of safety issues were also examined as they relate to involvement in boating incidents. The results are shown in Table 11.5. First, involvement in incidents was examined as a function of safety course completion (i.e., whether or not respondents had ever completed a safety course). Second, involvement in incidents was examined as a function of whether or not the respondent remembered hearing, seeing, or reading any information about boating safety in the past year. The results for both of these indicators of safety awareness were the same; overall, there was little difference between the groups in terms of involvement in various types of incidents. There were two types of incidents, however, where a difference was observed. First, boat operators who completed safety courses and who remembered hearing, seeing, or reading safety information were more likely to report that they thought a dangerous situation might develop while boating. Second, operators with higher awareness of safety information were more likely to report that their boat needed help getting out of a dangerous situation. Together, these results may indicate that boat operators who have completed a safety course and who attend to boating safety information were more aware of potential dangers while boating. Again, this finding is correlational, so the direction of the effect is unclear. For example, experiencing a potentially dangerous situation may make boaters more aware of boating safety in the news, or exposure to boating safety information in the news may make boat operators more aware of potentially dangerous situations.

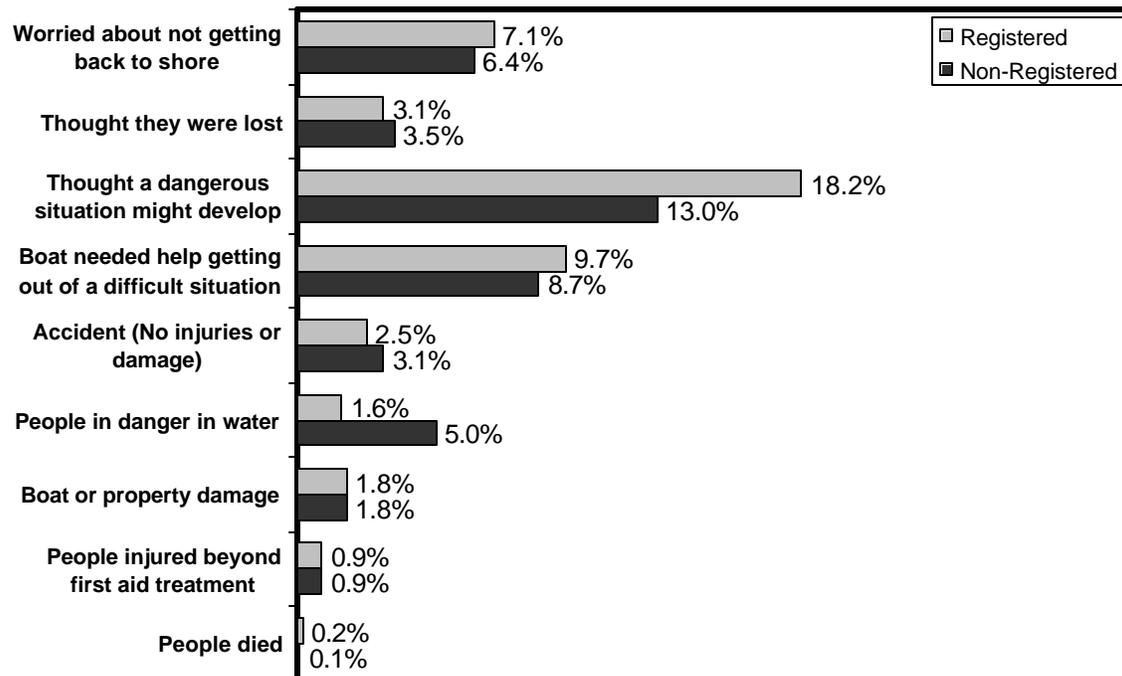
An analysis of younger boat operators, those under 21, are more likely to boat on smaller boats, under 26 feet, and are therefore more likely to have boating incidents on smaller boats. However, there does not seem to be any statistically significant difference in the likelihood of younger boaters involved in these incidents to have taken a safety course or seen, read, or heard information about boating safety.

**Table 11.5 Involvement in boating incidents by safety course completion and exposure to safety information. (A2, A7, F2.1-9)**

	Safety Course Taken		Seen, Read, or Heard Information about Boating Safety	
	Yes	No	Yes	No
Worried about not getting back to shore	7.5%	6.2%	7.9%	5.0%
Thought they were lost	3.7%	3.1%	3.4%	3.1%
Thought a dangerous situation might develop	19.5%	12.8%	19.0%	10.0%
Boat needed help getting out of a difficult situation	10.8%	8.2%	10.3%	7.6%
Accident (no injuries or damage)	3.3%	2.7%	3.1%	2.7%
People in danger in water	3.6%	3.7%	3.6%	3.8%
Boat or property damage	2.2%	1.6%	1.9%	1.7%
People injured beyond first aid treatment	1.0%	.9%	1.0%	.8%
People died	.1%	.1%	.2%	.1%

In addition, as shown in Figure 11.2, registered boaters were more likely to report that they thought a dangerous situation might develop while boating (18%) compared with nonregistered boaters (13%). Non-registered boaters, on the other hand, were three times more likely to report that at least once in the previous year, one or more people were in danger in the water because of falling overboard, trouble getting back in the boat, or because the boat overturned. This type of incident was experienced by 5% of nonregistered boaters and 1.6% of registered boaters.

**Figure 11.2 Involvement in boating incidents by registered boater status. (F2)**



Finally, involvement in incidents was crosstabulated with respondents' self-reported alcohol use. The results are depicted in Table 11.6. Although all these data were self-reported and likely underestimate to some degree actual involvement in boating incidents and alcohol use, there is a clear trend such that boat operators who reported frequently using alcohol while boating were more likely to experience various types of boating incidents compared with those who "never" used alcohol while boating. For example, boat operators who reported that alcohol was "always" consumed on board while boating were twice as likely to report that at least once in the previous year they were worried about getting back to shore or thought they were lost. Further, compared with operators who indicated alcohol was "never" consumed on board, operators who "always" carried alcohol were three times more likely to report being involved in an incident which resulted in property damage and five times more likely to report being involved in an incident which resulted in serious injuries.

**Table 11.6 Involvement in boating incidents by frequency of alcohol consumption on board. (A12, F2.1-9)**

	How often alcohol was consumed on board when boating				
	Always	Most of the time	Sometimes	Rarely	Never
Worried about not getting back to shore	11.0%	10.7%	8.0%	7.1%	5.5%
Thought they were lost	7.5%	3.9%	4.5%	3.2%	2.7%
Thought a dangerous situation might develop	17.3%	20.6%	19.3%	17.8%	12.3%
Boat needed help getting out of a difficult situation	13.5%	12.2%	11.1%	10.6%	7.6%
Accident (no injuries or damage)	5.9%	4.3%	3.4%	3.3%	2.3%
People in danger in water	6.5%	4.7%	3.6%	3.8%	3.4%
Boat or property damage	4.5%	3.4%	2.1%	1.9%	1.4%
People injured beyond first aid treatment	3.0%	1.3%	1.2%	1.0%	.6%
People died	.3%	.4%	.2%	.0%	.1%

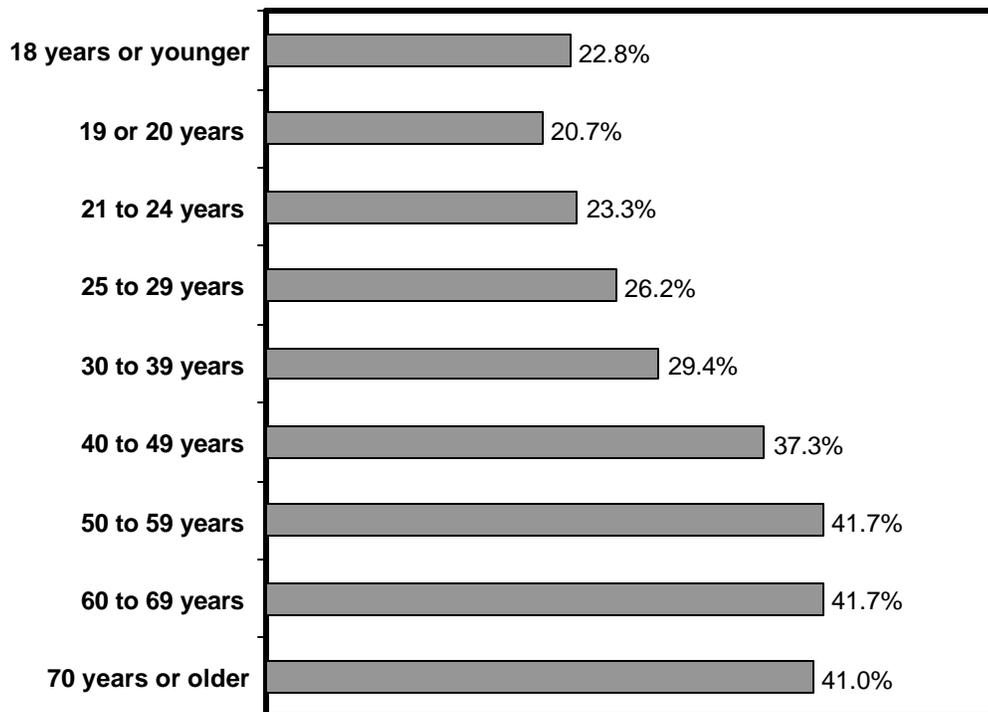
- ❖ Younger boat operators tended to report experiencing more incidents overall and more serious incidents when compared with older boaters.
- ❖ Boat operators with the most experience on the water were most likely to be involved in some kinds of incidents, but experience was not correlated with involvement in the most serious types of incidents.
- ❖ Men were slightly more likely than women to report that they “thought a dangerous situation might develop” while boating, but otherwise there were no significant differences in incidents as a function of gender.
- ❖ Educational attainment was not related to involvement in boating incidents, nor was boat operators’ ability to swim.
- ❖ Boat operators with higher awareness of boating safety (i.e., those who completed a safety course or heard, saw, or read about boating safety in the past year) were more likely to report they thought a dangerous situation might develop while boating although it did not. They were also slightly more likely to report that their boat needed help getting out of a dangerous situation.
- ❖ Registered boaters were more likely to report that they thought a dangerous situation might develop while boating compared with nonregistered boaters. Nonregistered boaters, on the other hand, were three times more likely to report that they experienced an incident in which people were in danger in the water.
- ❖ Operators who reported alcohol was “always” consumed on board were three times more likely to report being involved in an incident which resulted in property damage and five times more likely to report being involved in an incident which resulted in serious injuries compared with those who report alcohol is “never” consumed on board.

### **B. Predictors of Boating Safety Course Completion**

Similar to the previous analyses, an attempt was made to profile the type of boat operator likely to have completed a boating safety course. Safety course completion at any time in the past was examined as a function of boat operators' responses and demographic characteristics—age, gender, and education.

First, in terms of boat operators' age, younger boat operators were less likely to have completed a safety course. For example, just 23% of boat operators under 18 had completed a safety course compared with 29% of operators age 30 to 39, 37% of operators age 40 to 49, and 42% of operators over 50. These results are summarized in Figure 11.3.

**Figure 11.3 Percent of respondents who have taken a safety course by age group. (A2, G4)**



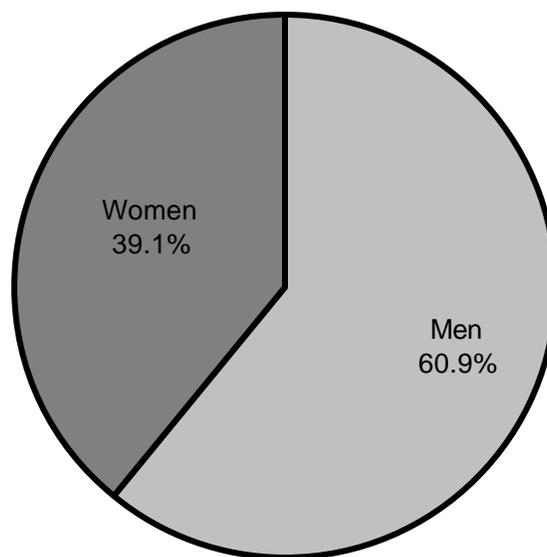
In terms of hours of experience boating, as shown in Table 11.7, operators with the most experience (i.e., over 500 hours) were most likely to have completed a safety course at some point. About half (48%) of operators with more than 500 hours of experience have completed a safety course compared with just 12% of operators with 1 to 9 hours of experience and 17% of operators with 10 to 19 hours of experience.

**Table 11.7 Safety course completion by hours of boating experience. (A2, A5)**

		Total Hours of Lifetime Boat Operating Experience					
		Less than 1 hour	1 to 9 hours	10 to 19 hours	20 to 100 hours	101 to 500 hours	Over 500 hours
<b>Have you ever taken a safety course?</b>	No	93.8%	87.9%	83.4%	73.0%	60.5%	52.3%
	Yes	6.2%	12.1%	16.6%	27.0%	39.5%	47.7%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

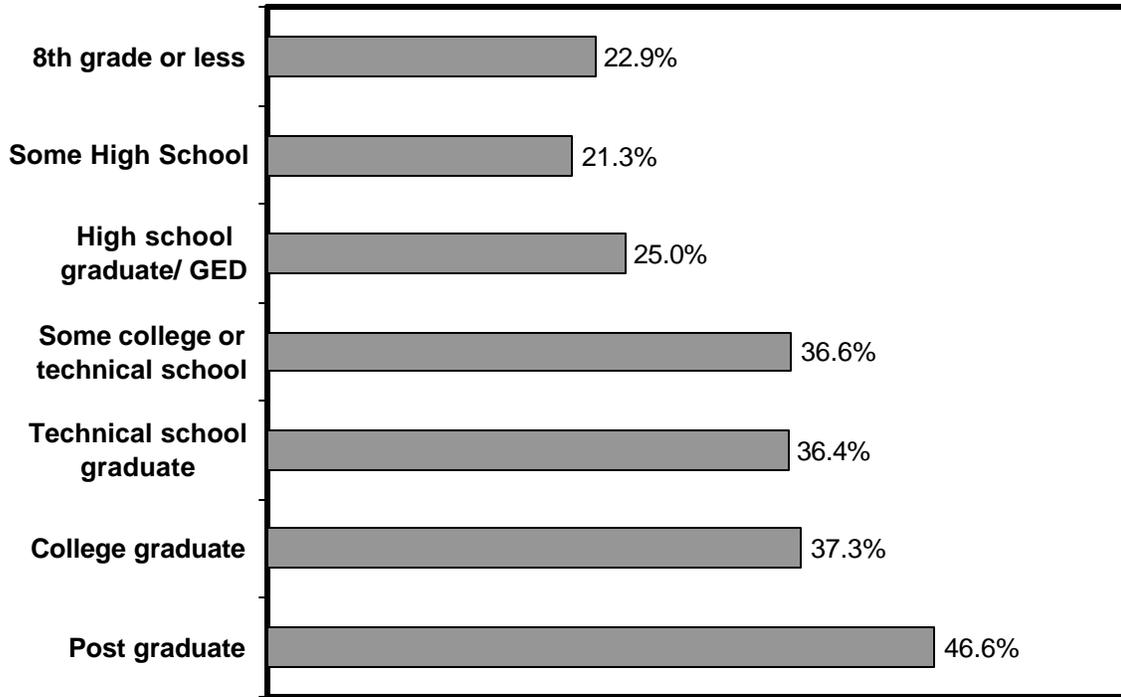
Likelihood of course completion also varies as a function of boat operators' sex. Male boat operators were more likely to have completed a safety course than females. As can be seen in Figure 11.4, 61% of all boat operators who have completed a safety course are male. However, it is important to note that these data do not adjust for the fact that boat operators overall are more likely to be male. Adjusting for this fact and comparing males and females separately, 38% of male boat operators have completed a safety course compared with 25% of female boat operators.

**Figure 11.4 Percent of respondents who have taken a safety course by gender. (A2, G5)**



Further, as may be expected, boat operators with higher levels of education overall were also more likely to have completed a boating safety course. The results are shown in Figure 11.5. Almost half of boat operators with a post-graduate education (47%) completed boating safety courses, compared with just 25% of boat operators with a high school education only and 37% of boat operators with a college degree.

**Figure 11.5 Percent of respondents who have taken a safety course by highest level of schooling completed. (A2, G6)**



Boat operators' self-reported ability to swim was also taken into consideration as a predictor of boating safety course completion. As seen in Table 11.8, boat operators who reported they were able to swim were twice as likely to have completed a safety course; 35% of boat operators who can swim completed safety courses compared with 17% of boat operators who cannot swim.

**Table 11.8 Safety course completion by respondents' ability to swim. (A2, G7)**

		Do you know how to swim?	
		Yes	No
Have you ever taken a safety course?	No	64.7%	82.7%
	Yes	35.3%	17.3%
	Total	100.0%	100.0%

Registered boaters were more likely to have completed a boating safety course than nonregistered boaters. Forty-four percent of registered boaters completed safety courses compared with 29% of nonregistered boaters as seen in Table 11.9. Furthermore, operators with higher levels of awareness of boating safety issues (as indicated by whether or not they remembered seeing, hearing, or reading information about boating safety in the previous year) were also more likely to have completed a boating safety course, as seen in Table 11.10. Forty-three percent of operators who remembered being exposed to boating safety information had completed a boating safety course compared to 24% of operators who did not remember seeing any boating safety information.

**Table 11.9 Safety course completion by registered boater status. (A2)**

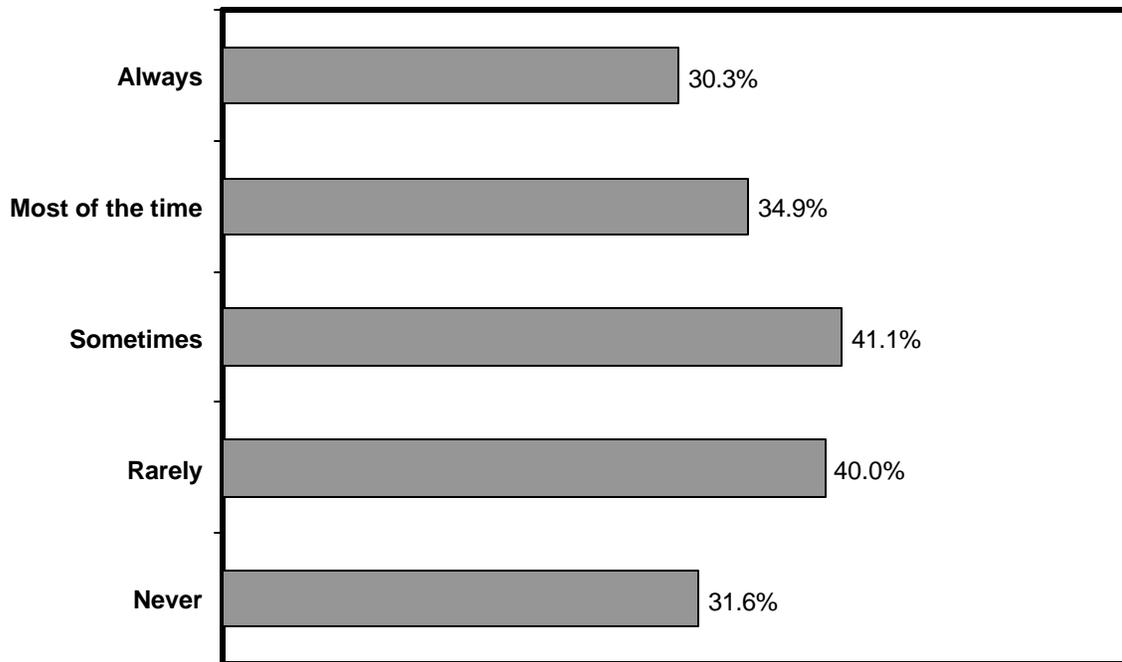
		Are you a Registered Boater?	
		Yes	No
Have you ever taken a safety course?	No	56.2%	71.1%
	Yes	43.8%	28.9%
	Total	100.0%	100.0%

**Table 11.10 Safety course completion by exposure to safety information. (A2, A7)**

		Seen, Read, or Heard Information about Boating Safety	
		Yes	No
Have you ever taken a safety course?	No	56.8%	76.5%
	Yes	43.2%	23.5%
	Total	100.0%	100.0%

Alcohol use while boating was also related to safety course completion, but in a complex way. Operators who responded that alcohol was “always” or “never” consumed on board were less likely to have completed a boating safety course than operators who reported that alcohol was “sometimes” or “rarely” consumed on board. Thus, operators who reported moderate levels of alcohol consumption on board their vessels were slightly more likely to have completed a safety course. Still, only 41% of operators who reported alcohol consumption “sometimes” occurs and 40% of operators who reported alcohol consumption “rarely” occurs have completed safety courses. These results are shown in Figure 11.6.

**Figure 11.6 Percentage of boat operators who have completed safety courses by frequency of alcohol consumption on board.**  
(A2, A12)



Finally, boat operators' responses to the seven statements regarding attitudes towards boating safety issues were examined as a function of whether or not operators completed a boating safety course. First, operators who completed a boating safety course were somewhat more likely to agree that people who operate boats should be required to pass a test to demonstrate their knowledge of boating laws. Of those who completed a safety course, 80% agreed or strongly agreed with this statement. Of those who had not completed a safety course, 71% agreed or strongly agreed. Second, operators who had not completed a safety course were more likely to agree that persons of all ages should be required to wear a life jacket or PFD while on a boat. Forty-eight percent of operators who had not completed safety courses agreed or strongly agreed with this statement, compared with 36% of operators who had completed safety courses. Lastly, if a boat operator had completed a safety course, he or she was less likely to agree that the amount and/or type of boating traffic should be restricted in certain areas; 59% of operators who had completed a safety course agreed or strongly agreed with this statement compared with 70% of operators who had not completed a safety course.

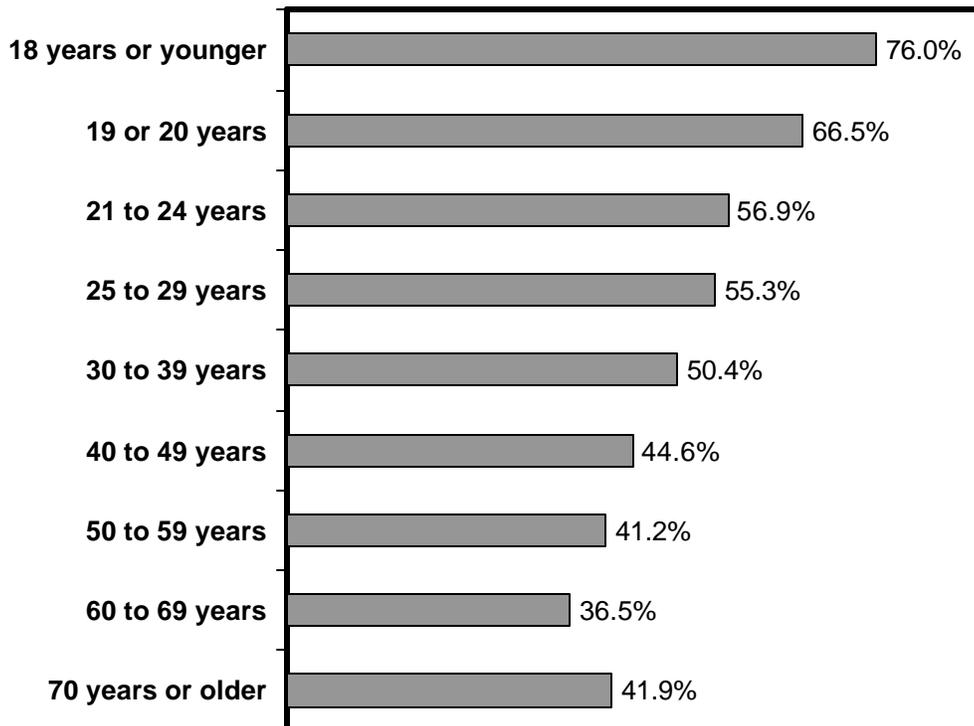
- ❖ Younger boat operators were less likely to have completed a safety course.
- ❖ Male boat operators were more likely to have completed a safety course than females.
- ❖ Examining the highest level of schooling completed, boat operators with higher levels of education overall were also more likely to have completed a boating safety course.
- ❖ Boat operators who report they are able to swim were twice as likely to have completed a safety course.
- ❖ Registered boaters were more likely to have completed a boating safety course than nonregistered boaters.
- ❖ Operators with higher levels of awareness of boating safety issues were more likely to have completed a boating safety course.
- ❖ Alcohol use while boating was also related to safety course completion, but in a complex way. Operators who report moderate levels of alcohol consumption on board their vessels were slightly more likely to have completed a safety course compared with operators who report alcohol is “always” or “never” consumed on board.
- ❖ Boat operators who completed a boating safety course were somewhat more likely to agree that people who operate boats should be required to pass a test to demonstrate their knowledge of boating laws.
- ❖ Operators who had not completed a safety course were more likely to agree that persons of all ages should be required to wear a life jacket or PFD while on a boat.
- ❖ If a boat operator had completed a safety course, he or she was less likely to agree that the amount and/or type of boating traffic should be restricted in certain areas.

### C. Predictors of PFD Use

The third and final profile was conducted to predict the type of boat operator likely to wear a PFD.

Although in the previous analysis younger boat operators were found to be less likely to have completed safety courses, younger boat operators were actually *more* likely to report that they wore PFDs as shown in Figure 11.7. More than three-quarters of boat operators under age 18 reported that they wore PFDs “always” or “most of the time.” Further, two-thirds of boat operators age 19 or 20 wore PFDs “always” or “most of the time.” PFD use decreased as age increased, however; just 37% of boat operators age 60 to 69 and 42% of boat operators 70 and over wore a PFD “always” or “most of the time” while boating.

**Figure 11.7 Percent of respondents who wear PFDs always or most of the time by age group. (E4, G4)**



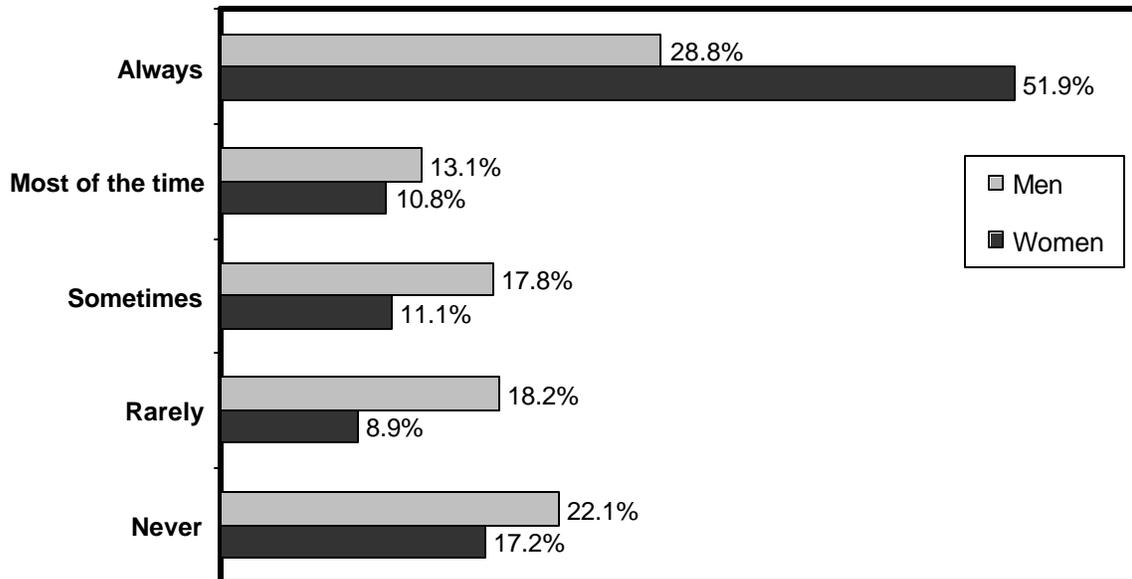
Taking hours of boating experience into consideration, boat operators with the greatest amount of experience were least likely to wear PFDs regularly as shown in Table 11.11. Just 21% of boat operators with more than 500 hours of experience reported “always” wearing PFDs while boating compared with 62% of boat operators who have between 1 and 9 hours of experience and 55% of operators with between 10 and 19 hours of experience.

**Table 11.11 PFD use by hours of boat operating experience. (A5, E4)**

		Total Hours of Lifetime Boat Operating Experience					
		Less than 1 hour	1 to 9 hours	10 to 19 hours	20 to 100 hours	101 to 500 hours	Over 500 hours
<b>When you operated this boat, how often did you usually wear a life jacket or PFD?</b>	Always	58.2%	61.8%	54.8%	44.1%	29.6%	21.0%
	Most of the time	10.1%	11.7%	13.4%	13.2%	13.0%	12.1%
	Sometimes	8.4%	8.1%	11.2%	13.2%	18.7%	19.3%
	Rarely	7.3%	4.6%	5.8%	10.7%	16.9%	23.0%
	Never	16.0%	13.8%	14.7%	18.8%	21.7%	24.5%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

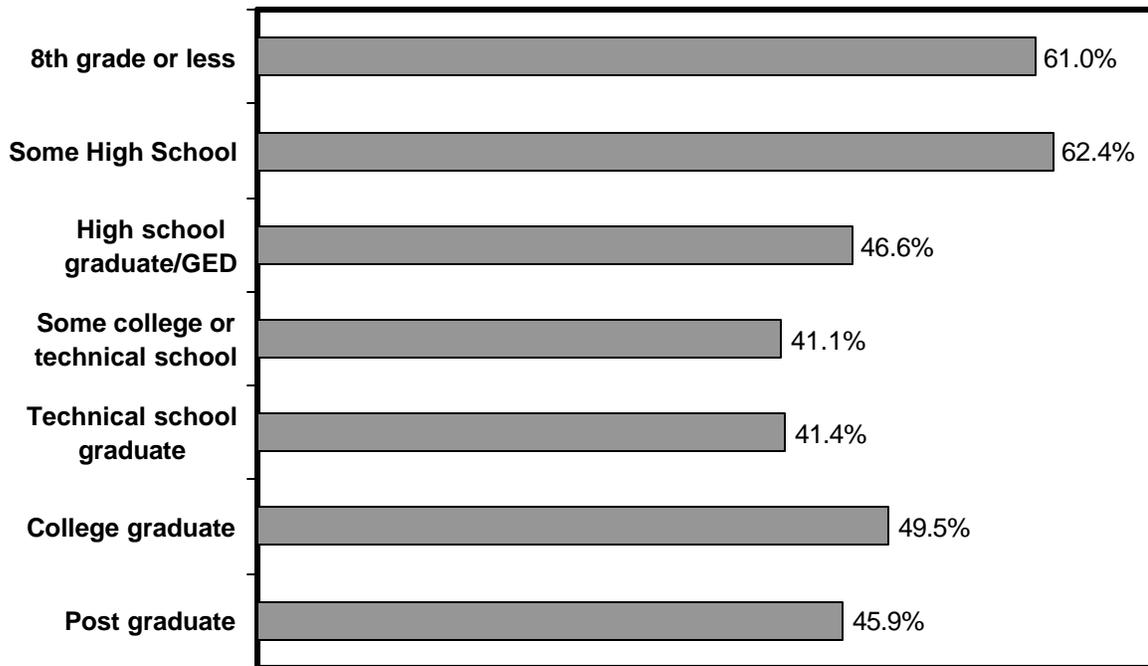
Female boat operators were more likely to report wearing PFDs regularly compared to males as seen in Figure 11.8. Forty-two percent of males and 63% of females wore PFDs “always” or “most of the time.”

**Figure 11.8 How often respondents wore PFDs by gender. (E4, G5)**



Interestingly, although education was positively correlated with safety course completion, it is *inversely* related to PFD use. That is, boat operators with lower levels of education were *more* likely to report that they used a PFD regularly. See Figure 11.9. Self-reported PFD use was highest for boat operators who had not completed high school—62% wore PFDs “always” or “most of the time.” Comparatively, 50% of college graduates and 46% of those with post-graduate education reported wearing PFDs “always” or “most of the time.”

**Figure 11.9 Percent of respondents who wore PFDs always or most of the time by highest level of schooling completed. (E4, G6)**



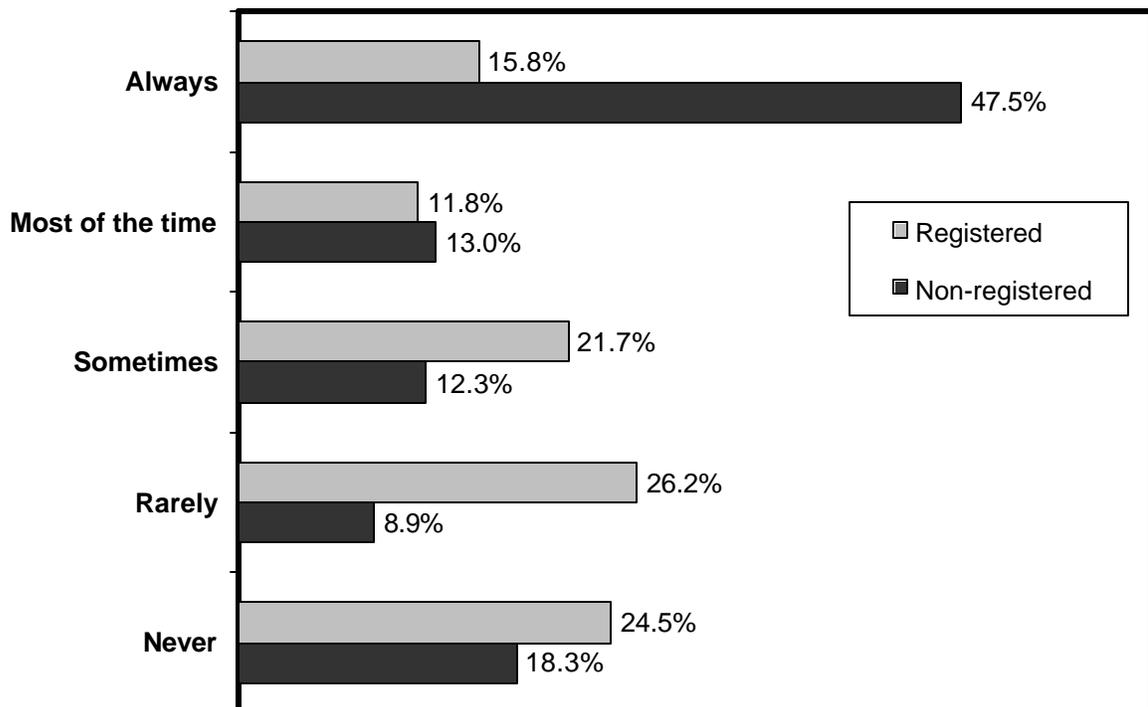
In addition, respondents who reported that they are not able to swim were significantly more likely to wear PFDs all or most of the time compared to boaters who knew how to swim as shown in Table 11.12. Approximately 66% of boat operators who cannot swim wore PFDs “always” or “most of the time,” with 47% reporting they wore PFDs all the time. Comparatively, 47% of boat operators who can swim wore PFDs “always” or “most of the time.”

**Table 11.12 PFD use by respondents’ ability to swim. (E4, G7)**

		Do you know how to swim?	
		Yes	No
<b>When you operated this boat, how often did you usually wear a life jacket or PFD?</b>	Always	34.5%	50.6%
	Most of the time	12.4%	15.8%
	Sometimes	16.2%	12.9%
	Rarely	16.0%	9.3%
	Never	21.0%	11.4%
	Total	100.0%	100.0%

There was also a difference in PFD use observed as a function of whether or not the boater had a boat that was registered with his or her State. Registered boaters were less likely to report wearing PFDs regularly compared with non-registered boaters as shown in Figure 11.10. Twenty-eight percent of registered boaters reported wearing a PFD “always” or “most of the time,” compared with 61% of nonregistered boaters.<sup>5</sup> This trend holds even when the length of the boat operated most often is taken into account. Nonregistered boaters were more likely to boat on smaller boats and PFD use is higher on smaller boats. Nevertheless, registered boaters were less likely than nonregistered boaters to wear PFDs on even the smaller boats.

**Figure 11.10 PFD use by registered boater status. (B4)**



<sup>5</sup> Hours of boating experience may be mediating this relationship, however. Registered boaters tend to have more hours of lifetime boating experience than nonregistered boaters. For example, 62% of registered boaters have 500 hours or more of boating experience in their lifetimes compared with just 22% of nonregistered boaters.

Respondents' awareness of safety issues was also related to PFD use while boating as depicted in Table 11.13. Boat operators were considered to have higher levels of awareness if they completed a safety course or remembered hearing, seeing, or reading information about boating safety in the previous year. Operators who had completed safety courses were less likely to report wearing a PFD "always" or "most of the time" (41%) compared with operators who had not completed a safety course (51%). Furthermore, those who remembered being exposed to safety information were also less likely to report wearing a PFD "always" or "most of the time" (42%) compared with operators who did not remember seeing such information (55%). Thus, boat operators with increased exposure to safety information were less likely to report wearing a PFD regularly.

**Table 11.13 PFD use by safety course completion and exposure to safety information. (A2, A7, E4)**

		Safety Course Taken		Seen, Read, or Hear Information about Boating Safety	
		Yes	No	Yes	No
<b>When you operated this boat, how often did you usually wear a life jacket or PFD?</b>	Always	29.3%	37.7%	29.1%	42.5%
	Most of the time	11.6%	13.0%	12.4%	12.6%
	Sometimes	17.1%	15.5%	18.4%	13.2%
	Rarely	19.4%	13.8%	19.1%	11.4%
	Never	22.4%	20.0%	21.1%	20.3%
	Total	100.0%	100.0%	100.0%	100.0%

Further, alcohol consumption was also related to respondents' reported PFD use as shown in Table 11.14. Almost half of operators who reported that alcohol was "always" consumed while boating (48%) indicated that they "never" wore a PFD while boating. Conversely, a similar proportion of operators who reported that alcohol was "never" consumed while boating reported that they "always" wore a PFD (47%). Thus, frequency of alcohol consumption on board while boating and PFD use appear to be inversely related.

**Table 11.14 Operator PFD use by frequency of alcohol consumption on board. (A12, E4)**

		In general, how often was alcohol being consumed on board when you went boating?				
		Always	Most of the time	Sometimes	Rarely	Never
<b>When you operated this boat, how often did you usually wear a life jacket or PFD?</b>	Always	20.0%	13.8%	17.5%	21.7%	46.5%
	Most of the time	6.2%	9.5%	9.8%	13.6%	13.7%
	Sometimes	12.6%	15.2%	21.1%	20.6%	13.6%
	Rarely	13.5%	24.8%	23.5%	23.4%	10.6%
	Never	47.7%	36.6%	28.1%	20.6%	15.7%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%

Lastly, there were several differences in terms of the attitudes of boat operators who wore or did not wear PFDs regularly. First, operators who reported wearing PFDs "always" or "most of the time" were more likely to agree that people who operate boats should be required to have licenses compared with operators who reported wearing PFDs "sometimes," "rarely," or "never." Operators who wore PFDs regularly were also more likely to agree that all children under the age of 13 years should be required to wear a life jacket/PFD while on a boat. Further, self-reported PFD use was also positively correlated with the attitude that persons of all ages should be required to wear PFDs at all times; although 68% of operators who wore PFDs "always" or "most of the time" agreed or strongly disagreed with this statement, just 17% of operators who reported wearing PFDs "rarely" or "never" agreed or strongly agreed with it. Regardless of reported levels of PFD use, though, agreement was high that boating while under the influence laws should be strongly enforced and there should be more enforcement to control reckless boaters. However, compared with operators who "rarely" or "never" wore PFDs, operators who wore PFDs regularly were more likely to agree that the amount and/or type of boating traffic should be restricted in certain areas.

- ❖ Although younger boat operators were less likely to have completed a safety course, younger boat operators were actually *more* likely to report that they wore PFDs.
- ❖ Female boat operators were more likely to report wearing PFDs regularly compared to males.
- ❖ Interestingly, although education was positively correlated with safety course completion, it is *inversely* related to PFD use. That is, boat operators with lower levels of education were *more* likely to report that they used PFDs regularly.
- ❖ Respondents who reported that they are not able to swim were significantly more likely to wear PFDs all or most of the time compared to boaters who know how to swim.
- ❖ Registered boaters were less likely to report wearing PFDs regularly compared to nonregistered boaters.
- ❖ Boat operators with increased exposure to safety information (those who completed a safety course or who remember seeing, hearing, or reading safety information) were less likely to report wearing PFDs regularly.
- ❖ Frequency of alcohol consumption on board while boating and PFD use appear to be inversely related; almost half of operators who reported that alcohol was “always” consumed while boating indicated that they “never” wear PFDs while boating (48%).
- ❖ Operators who reported wearing PFDs “always” or “most of the time” were more likely to agree that people who operate boats should be required to have licenses.
- ❖ Self-reported PFD use is correlated with the attitude that all boaters should be required to wear a life jacket/PFD while on a boat, especially children under age 13.
- ❖ Operators who wore PFDs regularly were also more likely to agree that the amount and/or type of boating traffic should be restricted in certain areas.

## **APPENDIX A: QUESTIONNAIRE**

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See following pages.