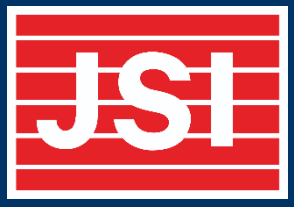
2024 Life Jacket Wear Rate Observation Study

Featuring National Wear Rate Data from 1999 to 2024

Prepared for the U.S. Coast Guard Auxiliary
by JSI Research & Training Institute, Inc.



March 2025

Acknowledgements

Since 2018, the US Coast Guard Auxiliary Life Jacket Wear Observation (AUXLWO) team has served as the primary partner for the Life Jacket Wear Rate Observation Study's data collection effort. To date, a remarkable 213 Auxiliary members from across 20 states have contributed to the study.

JSI Research & Training Institute, Inc. (JSI) wishes to express its gratitude to all of the Auxiliary State Coordinators and observers who have taken part in this important initiative. We especially want to acknowledge the outstanding, multi-year leadership from the following principal United States Coast Guard (USCG) representatives:

Jeffrey Decker, USCG Recreational Boating Management and Operations Branch Chief
William Jefferson, USCG Auxiliary V-Directorate National Division Chief, AUXLWO
Scott Thomas, USCG Auxiliary V-Directorate Branch Chief - Special Programs Outreach East
Randolph Wesson, USCG Auxiliary V-Directorate Branch Chief - Special Programs Outreach West

State Coordinators

Adkins, Aaron
Best, Paul
Chaffee, Pam
Desplaces, David
Esparza, Dave
Gilman, Fred
Grant, Jeff
Heinz, Janet
Hetzel, Fred
Himes, Mark
Huhs, Jeffery
Klacik, Mike
Koleszar, Janice
Norton, Greg
Pearson, Dennis
Schensky, Ron
Statz, Scott
Stuhr, John
Wesson, Randy
Wong, Anthony
Yslas, Robert

Observers

Adkins, Aaron
Anderson, Kevin
Behe, Mark
Best, Paul
Bond, Rosemary
Boone, Robert
Bradley, Joshua
Bridgman, Bob
Burness, Brad
Candogan, Ufuk
Chaffee, Dave
Chaffee, Pam
Clingan, Kathryn
Clingan, Mark
Cromley, Bob
Davis, Carey
Deitz, Tom
Depasquale, Carl
Desplaces, David
Downing, Betty Jean
Dzekan, Mike
Elefonte, Valerie
Esparza, Dave
Esparza, June
Everhart, Katrina
Feinberg, Paul
Fletcher, Stephen
Frassanito, John
Garvey, William
Gilman, Diane
Gilman, Fred
Glas, Randy
Gleeson, Jay
Glover, George
Goodman, Mark
Grant, Jeff
Hallam, Laura
Hamill, Jane
Harmon, Daniel
Hartwig, Eric
Hay, Dan
Hay, Sydney
Heibel, Catherine
Heinz, Janet
Heinz, Robert
Hetzel, Fred
Himes, Mark
Houck, Michael
Huhs, Jeffrey
Jones, Christopher
Klacik, Mike
Koleszar, Janice
Koleszar, John
Lai, Edward
Long, Miguel
Lumsden, Lo
Marking, B.T.
Marks, Laurie
Marsh, Thomas
Martone, Bob
McCarthy, James
McIntyre, Dan
Megel, Robert
Muniga, Jessica
Norton, Greg
Olgin, Ron
Oxer, Bruce
Palfy, Tony
Park, Wendy
Pascale, Michael
Pearson, Dennis
Peek, George
Reichner, Robert
Rippel, Robert
Rodriguez, Rene
Rosenfeld, Isak
Scamardo, Alex
Schensky, Ron
Stevens, Chris
Stuhr, Randy
Swink, John
Sykes, Carol
Sykes, Homer
Tate, George
Thorn, William
Tompkins, Jim
Wesson, Randy
Wong, Anthony
Yslas, Catherine
Yslas, Robert
Zorzi, Alfredo

Table of Contents

A. Executive Summary

Boating safety continues to be a critical concern in the United States, as demonstrated by the 2023 Recreational Boating Statistics from the United States Coast Guard (USCG), which reported that 75% of the 564 boating-related fatalities in 2023 involved drowning,[1] with 87% of those victims not wearing life jackets.[2] These statistics highlight the need for continuous monitoring of life jacket wear rates to identify observable trends that offer valuable insights into life jacket use. This report provides a thorough analysis of specific trends, including the effects of operator age, various recreational watercraft activities, weather, and boat type on life jacket usage.

Since 1999, the United States Coast Guard has partnered with JSI Research & Training Institute, Inc. (JSI) to collect data on life jacket wear rates, observing a total of 364,219 recreational boats and well over one million boaters (1,021,455). This report presents the findings from the 2024 National Life Jacket Wear Rate Observation Study, and it compares these data to those from the past 25 years (1999–2023), excluding the year 2020 due to the COVID-19 pandemic. This year, comparison data are also available for smaller year-to-year intervals to reduce the complexity of such a large longitudinal dataset. Although there are notable and important technical differences between "Personal Floatation Devices" (PFDs) and "Life Jackets", for the purposes of this report the general term "Life Jackets" will be used.

This report provides detailed insights into life jacket wear rates by recreational boat type and size, broken down by age groups—adults (18+) and youth (0–17 years)—given their significant differences in wear rates largely driven by legal requirements for youth life jacket use. The report also includes a comparison of wear rates between the summer and fall seasons, as well as an analysis of how environmental characteristics impact wear rates.

Results show that life jacket wear rates for all boaters—both adults and youth—have increased since 1999 (21.3% to 21.9%). However, this relative increase is small (2.8%) and since 2014, there has been a decrease in life jacket wear rates (23.9% to 21.9%). Thus, even with major advances in life jacket design, the availability of free life jacket loaner boards, and widely available education and training on the importance of wearing a life jacket while boating, the data gathered in this study indicate that they have had limited impact on life jacket wear rates.

Relative change is a way to compare how much something has increased or decreased in relation to its original value. It is typically expressed as a percentage. This metric provides a normalized representation of change, making it useful for comparing variations across years.

An Addendum to this report focuses on the Geofence Study. This study looks at the impact of a geofencing initiative to measure life jacket wear rates in areas where additional safety education campaigns were conducted using online marketing and promotion activities including social media messaging and texting. This project is a partnership between the USCG, the American Canoe Association, and JSI.

Overall, this report offers valuable information for all stakeholders who are involved in the development of public education initiatives, safety programs, and legislation aimed at improving recreational boating safety.

[1] "2023 Recreational Boating Statistics" (2024). Accessed online (December 1st, 2024): https://www.uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2023-Ch1.pdf
[2] "2023 Recreational Boating Statistics" (2024). Accessed online (December 1st, 2024): https://www.uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2023-Ch1.pdf

B. Methods

To provide reliable and valid indicators of changes in life jacket wear rates, it is essential for observation procedures to remain consistent with those used in previous years. Since 1999, observations have been conducted in the same states during the same time period in each year of data collection. The vast majority of the sites in each state observed have remained the same for all years. In 2022 we began to conduct observations at select sites during the fall months of October and November to consider the impact of life jacket wear rates based on weather, along with water and air temperature. This section describes the methods used in all years of data collection.

Time period. Summer observations begin the first weekend in July and end the first weekend in September. Fall observations begin the first weekend of October and end the third weekend of December.

State selection. Observations are conducted in a total of 30 states. The states were originally selected by a stratified random sampling procedure and have remained the same since 1999. About 75% of the coastal states (20 out of 26 states) and 40% of the inland states (10 out of 24 states) across the U.S. are represented.

Site selection. Four water bodies from each state were selected as observation locations, except in California, where, given its size, eight sites were selected. They were selected in consultation with local USCG offices, local USCGAUX or U.S. Power Squadron members, and state boating or fishing law enforcement agencies. The 124 sites represent a wide range of water venues including lakes, rivers, harbors, bays, and intra-coastal waterways. All sites have suitable shore-based viewing locations for conducting life jacket wear observations using high-powered binoculars. To minimize observer travel time, sites are located in close proximity to one another when possible.

Observational procedures. Observations are conducted by JSI staff or USCGAUX staff and volunteers in four-hour shifts on weekends at selected sites. Two-person teams use high-powered binoculars to observe and record recreational boating activity, alternating observation and documentation roles to prevent fatigue. Data recorded include life jacket wear, boating activity, and site conditions such as water and air temperature and apparent water conditions. To ensure consistent and reliable data collection, all JSI and USCGAUX observers must pass an online training course to be eligible to observe.

Observation forms. Two observation forms are used to collect data. The Boat Form records information about the boat (i.e., type, size, operation, and activity) and passengers (i.e., sex, age, life jacket wear, engagement in swimming or towed activity). The Site Form captures site, weather, and water conditions. (See the forms in Appendix A).

The forms have remained largely unchanged, with updates in 1999, 2004, 2007, 2016, and 2021.

- In 1999, the 6- to 17-year-old age category was split into two groups: 6–12 years and 13–17 years. Canoes and kayaks were also separated into distinct categories.
- In 2004, the USCG requested a breakdown of boat sizes into four categories (under 16 feet, 16 to under 21 feet, 21 to under 26 feet, and 26 feet and over).
- In 2007, a new “intent to fish” category was added to distinguish boats with fishing gear, even if not actively fishing.
- In 2016, the boat propulsion type category was removed, and new categories for "powered" and "paddled" inflatables were added. Life jacket wear categories were also updated for clarity, replacing old labels with more explicit terms such as “Buoyant (Trad),” “Inflatable Susp [suspender] or Belt,” and “Not Wear.”

In 2021, a new observation about the use of engine cut-off switches (ECOS) was added, with the answer options, “Y [yes],” “N [no],” and “? [unsure].”

Data processing and data cleaning. Observation forms are collected and processed at JSI's offices in Boston, MA. First, the forms are scanned into electronic file images; next, the images are evaluated using TeleForm[3] software, a forms processing application. The application allows JSI to review the data to ensure all marks are captured correctly. JSI then exports the reviewed data into SPSS,[4] a statistical analysis software program. Finally, the raw SPSS file is imported into SAS,[5] a robust and flexible statical analysis program that allows for more complex and large-scale data analysis.

A series of quality checks are run to identify errors in data processing or recording of observations. Data checks primarily focus on incomplete data on boats and boaters, and inconsistent or conflicting data elements. Data forms flagged in quality checks are manually reviewed. When possible, data correction codes are applied. When a correction is not feasible, the record is removed from the cleaned analytic files. Cleaned data sets from the most recent observation year are then combined with prior years, spanning the entire scope of the project.

C. Results

Life Jacket Wear Rates for All Boaters

Figure A shows trends for wear rates for all recreational boaters (youth and adults), comparing wear rates for "all boats" including personal watercraft (PWCs) and "all boats except PWCs" (excluding PWCs). The data illustrate how PWCs positively influence overall average wear rates, as life jacket use is mandatory for PWC operators and passengers in all states, except for adults in Alaska. To provide a clearer picture of voluntary wear trends, JSI excluded PWCs from subsequent tables.

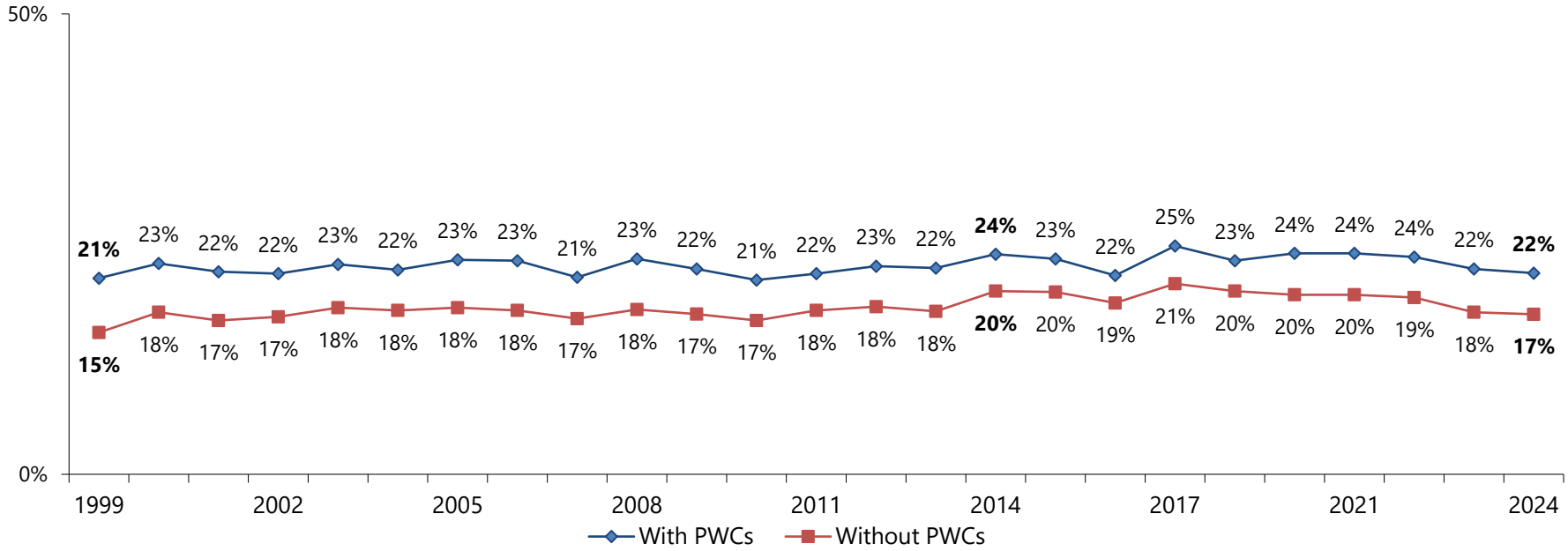
Wear rates for all boats. In 2024, the average wear rate for all boaters and boats combined was 21.9%. This is a relative increase of 2.8% since 1999 (21.3%) and a relative decrease of 8.4% since 2014 (23.9%). The wear rate reached its highest point in 2017 (24.8%), but has slowly declined since 2021 (24.0%).

Wear rates excluding PWCs. In 2024, the average wear rate for all boaters excluding PWCs was 17.4%. This is a relative increase of 13.0% since 1999 (15.4%) and a relative decrease of 12.6% since 2014 (19.9%). The wear rate reached its highest point in 2017 (20.7%), but has slowly declined since then.

Source: Shutterstock

[3] Cardiff TeleForm Version 22.1 (OpenText) is a forms processing software.
[4] SPSS Statistics is a statistical analysis software.
[5] SAS 9.4 (SAS Institute Inc Cary, NC) is an advanced analytics software program.

Figure A. Life Jacket Wear Rates for All Boaters



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study

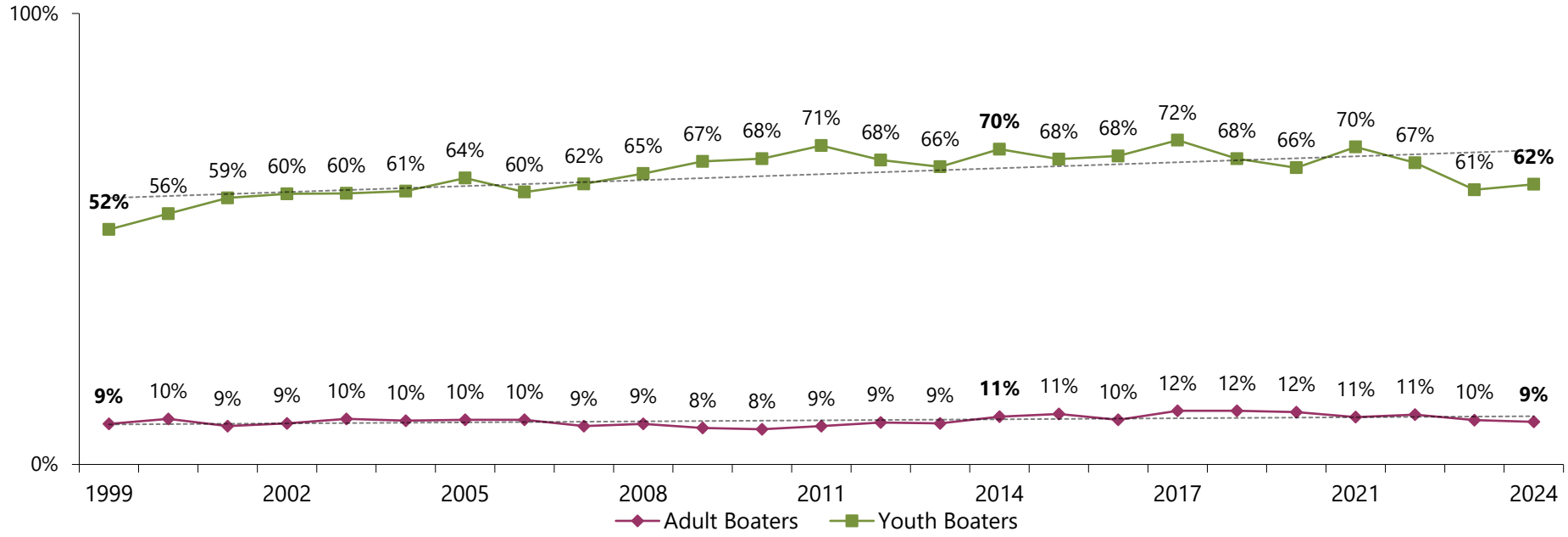
Life Jacket Wear Rates for Adults and Youth Boaters

Figure B shows the wear rate trend for adults and youth on all boats excluding PWCs, and Table 2.1 presents wear rates by the different age categories captured in the study.

Adult wear rates. In 2024, the wear rate for adults was 9.4%. This is a relative increase of 4.5% since 1999 (9.0%) and a relative decrease of 11.3% since 2014 (10.6%). The 2024 rate continues the decline in wear rates since 2017. Wear rates for adults aged 18–64 decreased slightly from 2023 (9.7% to 9.3%), but increased for adults aged 65+ (11.8% to 12.5%).

Youth wear rates. In 2024, the wear rate for youth was 62.1%. This is a relative increase of 19.2% since 1999 (52.1%) and a relative decrease of 11.2% since 2014 (69.9%). The 2024 rate represents a general decline since the high point in 2017 (71.9%). The wear rate for youth aged 0–5 and 13–17 increased slightly since 2023 (88.9% to 91.9% and 30.3% to 33.2%), however the wear rate for youth aged 6–12 decreased slightly (81.5% to 80.0%).

Figure B. Life Jacket Wear Among Adult and Youth Boaters*
(Excluding PWCs)



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type

Table 2.1. Life Jacket Wear Rates by Age*

(Excluding PWCs)

Age	Observation Year										
	1999–2001 % (N)	2002–2004 % (N)	2005–2007 % (N)	2008–2010 % (N)	2011–2013 % (N)	2014–2016 % (N)	2017–2019 % (N)	2021 % (N)	2022 % (N)	2023 % (N)	2024 % (N)
Adult Wear Rates											
18–64	8.7% (83687)	8.9% (92947)	8.7% (91593)	7.8% (101615)	8.8% (96408)	10.8% (94976)	11.8% (96924)	10.3% (26365)	10.8% (23978)	9.7% (28177)	9.3% (26733)
65+	9.2% (3459)	7.7% (3349)	10.1% (2507)	7.6% (3082)	8.9% (3164)	12.3% (4205)	12.1% (3187)	14.6% (1522)	16.2% (982)	11.8% (1438)	12.5% (1295)
18+ (all adults)	8.7% (87146)	8.9% (96296)	8.8% (94100)	7.8% (104697)	8.9% (99572)	10.9% (99181)	11.8% (100111)	10.5% (27887)	11.0% (24960)	9.8% (29615)	9.4% (28028)
Youth Wear Rates											
0–5	87.8% (1921)	91.9% (2077)	93.2% (2568)	93.9% (2603)	95.0% (2325)	93.2% (2071)	92.6% (1960)	91.3% (368)	90.1% (444)	88.9% (586)	91.9% (528)
6–12	73.2% (7917)	80.2% (8111)	81.4% (7707)	87.6% (8200)	86.9% (7719)	86.3% (7168)	85.1% (7179)	88.6% (1889)	84.8% (1807)	81.5% (2117)	80.0% (2006)
13–17	28.9% (7652)	29.4% (7682)	33.2% (7264)	35.3% (7054)	38.2% (5913)	40.4% (5206)	41.3% (6391)	40.7% (2099)	38.7% (1808)	30.3% (2281)	33.2% (2038)
0–17 (all youth)	57.1% (17490)	60.8% (17870)	62.6% (17539)	66.8% (17857)	68.1% (15957)	68.5% (14445)	68.0% (15530)	70.4% (4356)	66.9% (4059)	60.9% (4984)	62.1% (4572)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type

Life Jacket Wear Rates by Boat Type

This study classifies boats into three primary categories: powerboats, paddlecraft, and sailboats. Wear rates are variable across these categories. The subsequent pages provide data on the wear rates for adults and youth boaters, both in aggregate for each category and disaggregated by the specific boat types within them.

Source: iStock

Source: iStock

Source: iStock

Source: Shutterstock

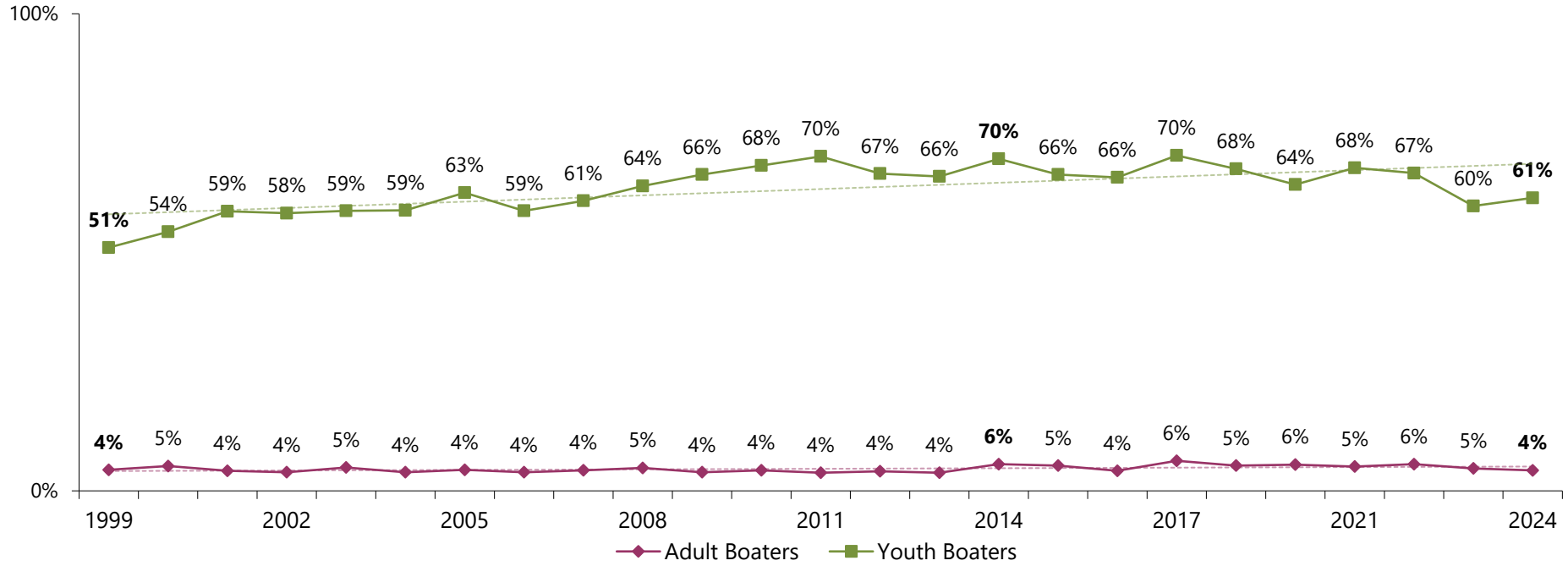
Powerboats

This section looks at powerboat wear rate trends. For the purpose of this study, powerboats include skiffs, runabouts, cabin cruisers, houseboats, pontoons, PWCs, and powered inflatables/rafts. Figure C shows the wear rate trend for adults and youth on all powerboats, and Table 2.2 presents wear rates by the types of powerboats captured in the study.

Adult wear rates. In 2024, the adult wear rate for all powerboats, excluding PWCs, was 4.3%. This is a relative decrease of 2.3% since 1999 (4.4%) and a relative decrease of 23.2% since 2014 (5.6%). Overall, wear rates have been mostly unchanged since the study onset. Wear rates for all powerboats other than runabouts, houseboats, and PWCs have decreased since 2023. The largest relative decrease observed was for powered inflatables/rafts (41.1%).

Youth wear rates. In 2024, the youth wear rate for all powerboats, excluding PWCs, was 61.4%. This is a relative increase of 20.4% since 1999 (51.0%). However, it is a relative decrease of 11.8% since 2014 (69.6%). After sharply declining in 2023, youth wear rates rose slightly (59.7% to 61.4%) in 2024. Since 2023, runabout wear rates had the largest relative increase (4.8%) and powered inflatables/rafts wear rates had the largest relative decrease (47.9%).

Figure C. Wear Rates for All Powerboats*
(Excluding PWCs)



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.2. Life Jacket Wear Rates by Powerboat Type*

Powerboat Type	Observation Year										
	1999–2001 % (N)	2002–2004 % (N)	2005–2007 % (N)	2008–2010 % (N)	2011–2013 % (N)	2014–2016 % (N)	2017–2019 % (N)	2021 % (N)	2022 % (N)	2023 % (N)	2024 % (N)
Adult Wear Rates											
All (no PWC's)	4.4% (69526)	4.1% (78221)	4.2% (78344)	4.3% (88049)	3.9% (83878)	5.1% (81995)	5.6% (84217)	5.1% (23561)	5.6% (21814)	4.7% (25450)	4.3% (24232)
Skiff	9.8% (6241)	8.2% (11833)	7.6% (14456)	8.6% (20524)	7.5% (20697)	10.2% (20706)	7.8% (24911)	8.2% (7392)	8.5% (7127)	6.7% (7702)	6.6% (7388)
Runabout (with towed participants)	4.6% (44643)	4.2% (43754)	4% (42563)	3.6% (43629)	3.2% (39508)	3.7% (36629)	4% (32552)	3.9% (8766)	3.8% (7877)	3.2% (9248)	3.4% (9036)
Runabout (without towed participants)	4.0% (44332)	3.6% (43409)	3.1% (42169)	2.6% (43172)	2.3% (39127)	2.9% (36327)	3.3% (32317)	3.3% (8706)	3.3% (7832)	2.6% (9184)	2.7% (8966)
Cabin Cruiser	1.5% (14012)	1.6% (17468)	1.6% (14682)	1.5% (15672)	1.4% (14687)	2.1% (13869)	2.5% (13404)	2.7% (2839)	4.7% (2617)	3.0% (3681)	2.7% (3027)
Houseboat	0.2% (529)	1.9% (668)	0.3% (377)	0.0% (222)	0.0% (106)	0.7% (288)	0.0% (180)	0.0% (55)	0.0% (57)	0.0% (74)	0.0% (40)
Pontoon	3.6% (4630)	2.7% (5166)	2.8% (6275)	1.6% (7409)	1.7% (8275)	2.2% (10007)	2.9% (12370)	2.4% (4291)	3.3% (3994)	2.4% (4445)	1.8% (4521)
PWC	96.0% (5740)	95.3% (5108)	96.2% (5557)	97.5% (6023)	96.9% (5240)	96.8% (4613)	97.4% (5068)	97.0% (1673)	97.2% (1412)	97.5% (1796)	97.6% (1566)
Powered Inflatable/Raft	.	.	19.2% (368)	15.3% (815)	18.1% (711)	19.9% (784)	17.9% (980)	15.0% (273)	22.1% (199)	35.8% (374)	21.1% (260)
Youth Wear Rates											
All (no PWC's)	55.5% (14548)	59.1% (15396)	61.3% (15313)	66.5% (15795)	67.4% (13992)	66.9% (12572)	66.7% (13700)	67.4% (3681)	66.4% (3524)	59.6% (4539)	61.4% (4131)
Skiff	62.4% (1149)	61.4% (1965)	62.1% (2388)	69.1% (2947)	68.6% (2887)	68.2% (2720)	68.7% (3184)	68.8% (1017)	66.2% (987)	62.4% (1090)	65.3% (1003)
Runabout (with towed participants)	56.5% (10507)	60.9% (10422)	62.9% (9831)	67.9% (9332)	70.0% (7850)	68.2% (6751)	67.3% (6784)	67.4% (1641)	65.6% (1528)	57.9% (1995)	60.7% (1987)
Runabout (without towed participants)	54.8% (9983)	59.4% (9924)	60.0% (9114)	63.5% (8293)	66.6% (7064)	64.9% (6129)	64.0% (6172)	64.7% (1524)	64.0% (1458)	55.9% (1884)	58.0% (1849)
Cabin Cruiser	47.1% (1779)	48.4% (1878)	51.7% (1667)	52.3% (1749)	52.4% (1489)	56.8% (1203)	52.4% (1332)	54.6% (279)	62.7% (269)	47.8% (451)	46.5% (303)
Houseboat	16.9% (154)	24.0% (128)	22.2% (83)	19.4% (23)	42.5% (11)	30.0% (20)	51.0% (7)	. (0)	17.5% (13)	77.7% (13)	51.7% (5)
Pontoon	50.9% (1113)	55.8% (1131)	59.3% (1359)	68.0% (1638)	66.5% (1672)	67.0% (1806)	70.3% (2272)	72.8% (721)	71.3% (718)	65.4% (967)	64.8% (809)
PWC	98.3% (1884)	98.5% (1607)	98.8% (1754)	99.1% (1663)	98.6% (1148)	99.2% (811)	98.9% (946)	99.6% (245)	99.2% (234)	99.7% (295)	100.0% (316)
Powered Inflatable/Raft	.	.	73.7% (68)	77.9% (129)	67.2% (94)	76.4% (92)	72.9% (128)	58.0% (23)	69.5% (22)	82.8% (36)	43.1% (29)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Life Jacket Wear Rates on Open Motorboats 2006 to 2024

In 2005, the National Boating Safety Advisory Council (NBSAC) proposed the development of a comprehensive strategic plan for the National Recreational Boating Safety Program, with the goal of reducing preventable fatalities, injuries, and property damage associated with recreational boating. One of the primary objectives identified in the strategic plan that was implemented in 2006, was to increase the observed wear rate among adults operating open motorboats. For the purposes of this initiative, the term "open motorboats" refers to a combination of the skiff/utility and runabout/speedboat categories.

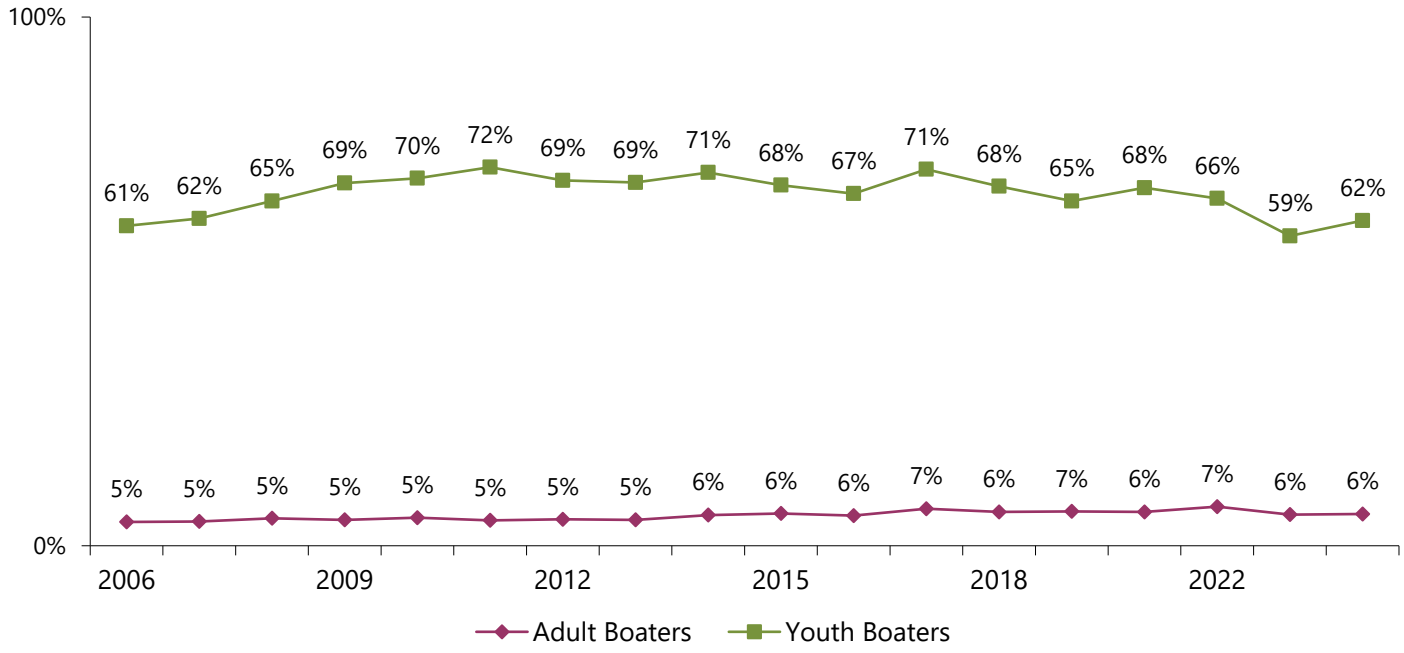
To ensure valid comparisons over time, the distribution of skiffs and speedboats in each state is adjusted to align with the 2006 baseline proportions. For instance, in 2006, the observed distribution across all states was 22% skiffs and 78% speedboats; whereas by 2011, the distribution had shifted to 31% skiffs and 69% speedboats. If these categorical proportions were not standardized, the combined wear rate for 2011 might appear artificially more favorable, as a higher proportion of skiffs—typically associated with higher wear rates—were observed relative to speedboats that year, compared to 2006. Similarly, these proportions are expected to vary annually across states, requiring ongoing adjustments to maintain consistency in comparisons.

Figure D and Table 2.3 show wear rates weighted to align with the 2006 proportions.

Adult wear rates. The 2024 adult wear rates for open motorboats was 6.0%. This is a relative increase of 33.3% since 2006 (4.5%) and a relative increase of 3.4% since 2014 (5.8%). Adult wear rates on open motorboats have remained mostly unchanged since 2006.

Youth wear rates. The 2024 youth wear rates for open motorboats was 61.5%. This is a relative increase of 1.7% since 2006 (60.5%) and a relative decrease of 12.9% since 2014 (70.6%). Wear rates have varied since 2006, but have increased since the lowest recorded wear rate in 2023 (58.6%).

Figure D. Wear Rates on Open Motorboats*
(Weighted to 2006 Skiff-Speedboat Proportions for Each State)



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
* The Open Motorboat category is created by grouping "skiffs" and "speedboat/runabouts" together. Two factors are controlled for in this chart: Age (proportions of 18 to 64 and 65+ adults), and the proportion of skiffs to speedboat/runabouts, which has been set each year within each state to reflect the proportions observed in 2006, the year in which the Strategic Plan goals were first measured. In addition, each state's contribution to the average is weighted to reflect the 2006 proportions.
**Note that lifejacket wear of towed passengers is included in the wear rates.

Table 2.3. Life Jacket Wear Rates on Open Motorboats*

Powerboat Type	Observation Year																	
	2006 % (N)	2007 % (N)	2008 % (N)	2009 % (N)	2010 % (N)	2011 % (N)	2012 % (N)	2013 % (N)	2014 % (N)	2015 % (N)	2016 % (N)	2017 % (N)	2018 % (N)	2019 % (N)	2021 % (N)	2022 % (N)	2023 % (N)	2024 % (N)
Adult Wear Rates																		
Open Motorboat**	4.5% (18603)	4.6% (19754)	5.2% (20534)	4.9% (21892)	5.3% (21727)	4.8% (20911)	5.0% (20377)	4.9% (18917)	5.8% (19816)	6.1% (18445)	5.7% (19074)	7.0% (17750)	6.4% (19684)	6.5% (20029)	6.4% (16158)	7.4% (15004)	5.9% (16803)	6.0% (23127)
Youth Wear Rates																		
Open Motorboat**	60.5% (4009)	61.9% (4464)	65.2% (4244)	68.6% (4230)	69.5% (3805)	71.6% (3553)	69.1% (3766)	68.7% (3418)	70.6% (3597)	68.2% (3069)	66.6% (2805)	71.2% (2019)	68.0% (3345)	65.2% (3624)	67.7% (2658)	65.7% (2515)	58.6% (3085)	61.5% (2990)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.
** The data are weighted to ensure that age groups and types of boat (i.e., skiffs and roundabout/speedboats) are set for each year within each state to reflect the proportions first measured in 2006.

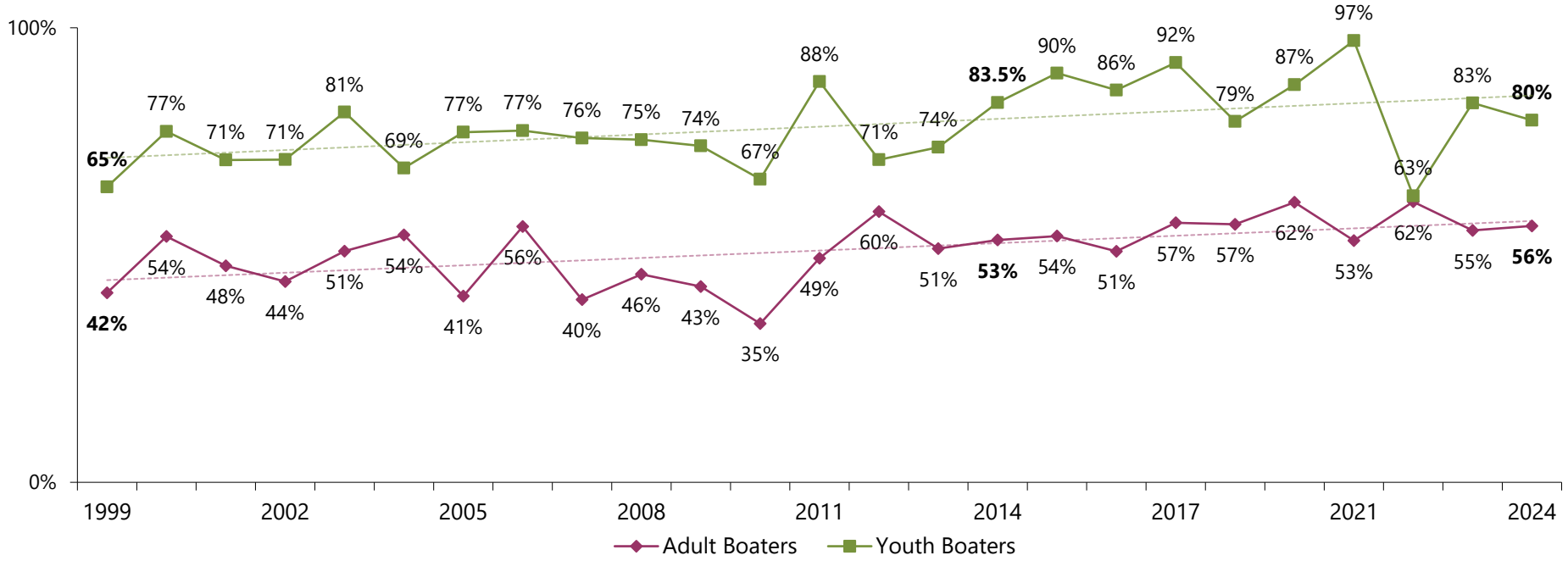
Paddlecraft

This section looks at paddlecraft wear rate trends. For the purpose of this study, paddlecraft includes paddled inflatables/rafts, rowboats/dinghies, canoes, kayaks, and paddleboards (i.e., stand up paddleboards). Figure E shows the wear rate trend for adults and youth on all paddlecraft and Table 2.4 presents wear rates by the types of paddlecraft captured in the study. Changes in wear rates should be viewed with caution due to a low number of boaters observed .

Adult wear rates. In 2024, the adult wear rate for all paddlecraft was 56.4%. This is a relative increase of 35.3% since 1999 (41.7%) and a relative increase of 5.8% since 2014 (53.3%). Overall wear rates have varied since 1999. Since 2023, wear rates for paddled inflatables/rafts, rowboats/dinghies, and canoes have increased, with the largest relative increase observed for rowboats/dinghies (49.6%). Wear rates for kayaks and paddleboards have decreased, with the largest relative decrease observed for paddleboards (8.1%).

Youth wear rates. In 2024, the youth wear rate for all paddlecraft was 79.7%. This is a relative increase of 22.6% since 1999 (65.0%) and a relative decrease of 4.5% since 2014 (83.5%). Overall wear rates have varied since 1999. Since 2023, youth wear rates for all paddlecraft types decreased, with the largest relative decrease observed for rowboats/dinghies (24.1%).

Figure E. Wear Rates for All Paddlecraft*



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.4. Life Jacket Wear Rates by Paddlecraft

Paddlecraft Type	Observation Year										
	1999–2001 % (N)	2002–2004 % (N)	2005–2007 % (N)	2008–2010 % (N)	2011–2013 % (N)	2014–2016 % (N)	2017–2019 % (N)	2021 % (N)	2022 % (N)	2023 % (N)	2024 % (N)
Adult Wear Rates											
All Paddlecraft	47.7% (4540)	49.5% (4290)	44.5% (4569)	40.3% (5902)	53.8% (5377)	52.6% (7311)	58.4% (6690)	52.9% (2523)	58.2% (1853)	54.5% (2023)	53.8% (1953)
Paddled Inflatable/Raft	.	.	23.5% (475)	14.5% (1371)	28.8% (916)	34.3% (997)	52.1% (810)	38.6% (516)	40.4% (265)	29.5% (253)	31.9% (358)
Rowboat/ Dinghy	27.5% (314)	22.6% (345)	23.5% (220)	30.1% (162)	32.5% (197)	31.0% (172)	28.5% (211)	8.4% (62)	33.3% (25)	11.9% (36)	17.8% (11)
Canoe	24.8% (2273)	23.9% (1930)	19.7% (1811)	21.3% (2233)	35.4% (1393)	23.7% (2065)	27.4% (1707)	32.6% (360)	28.7% (250)	29.8% (291)	34.3% (220)
Kayak	84.3% (1953)	84.7% (2015)	74.6% (2063)	71.5% (2136)	70.7% (2871)	72.3% (4077)	75.0% (3962)	64.1% (1179)	77.5% (816)	70.1% (983)	67.9% (909)
Canoe/ Kayak Combined	59.7% (4226)	60.0% (3945)	52.9% (3874)	52.0% (4369)	56.1% (4264)	53.5% (6142)	56.4% (5669)	48.1% (1539)	57.7% (1066)	52.6% (1274)	51.8% (1129)
Paddleboard** (SUPs)	.	.	.	.***	54.1% (505)	53.6% (1152)	52.8% (1382)	52.7% (406)	48.5% (497)	50.9% (460)	46.8% (455)
Youth Wear Rates											
All Paddlecraft	71.9% (871)	74.6% (678)	76.3% (837)	71.8% (1173)	75.7% (1043)	86.8% (1018)	86.9% (1044)	94.6% (605)	66.9% (396)	82.2% (272)	76.4% (339)
Paddled Inflatable/Raft	.	.	58.3% (220)	55.2% (381)	56.9% (304)	85.1% (283)	80.2% (288)	94.0% (293)	45.3% (101)	72.5% (49)	67.5% (92)
Rowboat/ Dinghy	58.6% (55)	69.2% (64)	64.4% (55)	86.5% (48)	91.5% (35)	83.5% (42)	76.3% (14)	. (6)	47.5% (8)	66.0% (13)	50.1% (8)
Canoe	69.1% (545)	70.8% (374)	76.9% (273)	73.8% (459)	80.7% (310)	78.0% (205)	81.3% (250)	80.0% (66)	52.0% (86)	94.4% (33)	83.3% (44)
Kayak	91.0% (271)	91.2% (240)	90.5% (289)	85.7% (285)	83.8% (394)	89.2% (488)	91.9% (492)	86.8% (165)	87.1% (114)	87.6% (108)	88.3% (114)
Canoe/ Kayak Combined	78.9% (816)	80.3% (614)	84.5% (562)	80.3% (744)	81.9% (704)	83.8% (693)	86.5% (742)	82.2% (231)	71.0% (200)	85.6% (141)	83.7% 158)
Paddleboard** (SUPs)	.	.	.	.***	67.6% (70)	75.6% (168)	72.1% (234)	78.7% (75)	80.5% (87)	78.3% (69)	67.0% (81)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.
**First observed in 2010.
***Not observed or too few to report.

Source: Shutterstock

Source: Shutterstock

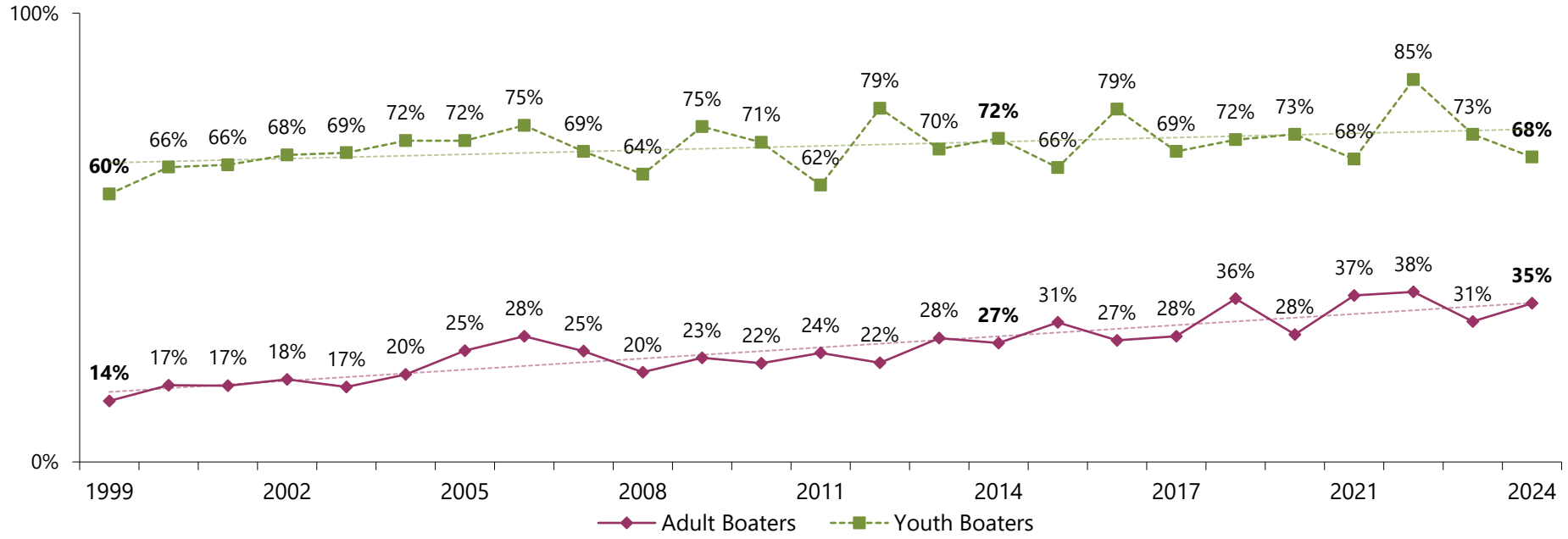
Sailboats

This section looks at sailboat wear rate trends. For the purpose of this study, sailboats include sailboards, day sailors, and cabin sailboats. Figure F shows the wear rate trend for adults and youth on all sailboats and Table 2.5 presents wear rates by the types of sailboats captured in the study.

Adult wear rates. In 2024, the adult wear rate for all sailboats was 35.4%. This is a relative increase of 160.3% since 1999 (13.6%) and a relative increase of 33.6% since 2014 (26.5%). Wear rates have varied since the study's onset, but have generally increased. While wear rates for sailboards and day sailors decreased from 2023, they increased for cabin sailboats (19.3% to 26.4%).

Youth wear rates. In 2024, the youth wear rate for all sailboats was 67.9%. This is a relative increase of 13.7% since 1999 (59.7%) and a relative decrease of 5.8% since 2014 (72.1%). The wear rate reached its highest point in 2022 (85.2%) and has declined since then. All observed boaters on day sailors were wearing life jackets. Wear rates decreased for cabin sailboats (66.4% to 55.6%).

Figure F. Wear Rates for All Sailboats*



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.5. Life Jacket Wear Rates by Sailboats*

Sailboat Type	Observation Year										
	1999–2001 % (N)	2002–2004 % (N)	2005–2007 % (N)	2008–2010 % (N)	2011–2013 % (N)	2014–2016 % (N)	2017–2019 % (N)	2021 % (N)	2022 % (N)	2023 % (N)	2024 % (N)
Adult Wear Rates											
All Sailboats	15.6% (10825)	17.6% (11390)	25.7% (9586)	21.7% (10148)	24.4% (9368)	28.2% (8143)	31.1% (7603)	37.1% (1742)	37.9% (1154)	31.3% (2057)	35.4% (1763)
Sailboard	52.8% (91)	89.0% (117)	82.1% (45)	85.2% (53)	97.2% (33)	93.6% (30)	89.9% (74)	92.8% (13)	76.3% (26)	90.5% (10)	89.3% (9)
Day Sailor	34.5% (2134)	45.5% (2927)	55.9% (1742)	55.9% (2032)	60.1% (1887)	62.0% (1727)	69.2% (1527)	80.1% (249)	79.7% (251)	78.8% (348)	68.0% (344)
Cabin Sailboat	10.3% (8600)	9.9% (8346)	17.2% (7799)	12.3% (8063)	14.5% (7448)	18.7% (6386)	20.8% (6002)	26.6% (1480)	26.9% (877)	19.3% (1699)	26.4% (1410)
Youth Wear Rates											
All Sailboats	63.5% (1100)	69.3% (1027)	71.7% (969)	69.8% (781)	70.4% (752)	72.0% (576)	71.5% (532)	67.5% (64)	85.2% (101)	73.0% (153)	67.9% (93)
Sailboard	58.7% (16)	95.1% (9)	87.5% (13)	. (4)	. (1)	. (0)	. (4)	. (1)	. (0)	. (0)	. (1)
Day Sailor	78.2% (280)	83.6% (346)	85.4% (243)	88.2% (241)	94.2% (259)	95.0% (184)	94.6% (134)	85.7% (11)	100.0% (55)	88.3% (37)	100.0% (17)
Cabin Sailboat	58.3% (804)	63.2% (672)	65.6% (713)	62.4% (536)	58.8% (492)	61.3% (392)	61.4% (394)	61.6% (52)	67.5% (46)	66.4% (116)	55.6% (75)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Source: iStock


Source: Shutterstock

Life Jacket Wear Rates by Boat Type and Size

Table 2.6 shows adult wear rates by boat size for powerboats, sailboats, and paddlecraft, with data since 2004 when observations were split into two size categories (16–20.9 feet and 21–25.9 feet), replacing the previous 16–25.9 feet category.

Wear rates showed an inverse relationship with boat size. That is, as boat size increased across all three boat types, wear rates declined. In 2024, the wear rate for powerboats <16 feet was 9.9% and dropped steadily to 2.2% for boats over 26 feet. Wear rates for paddlecraft <16 feet were 61.2% compared to 30.3% for crafts 16–20.9 feet. Finally, wear rates for sailboats <16 feet were 78.3% and dropped steadily to 23.6% for boats over 26 feet.

When comparing wear rates for each size category to rates seen in 2004 almost every length within the general boat types shows marked increases over those 20 years of the study. However, because there is also a trend during that period to a greater proportion of boaters using bigger boats (with their lower wear rates), the overall relative increase of wear rates for all sizes combined are less than observed for the individual size categories within the general boat types.

Table 2.6. Life Jacket Wear Rates by Boat Type and Size for Adults*

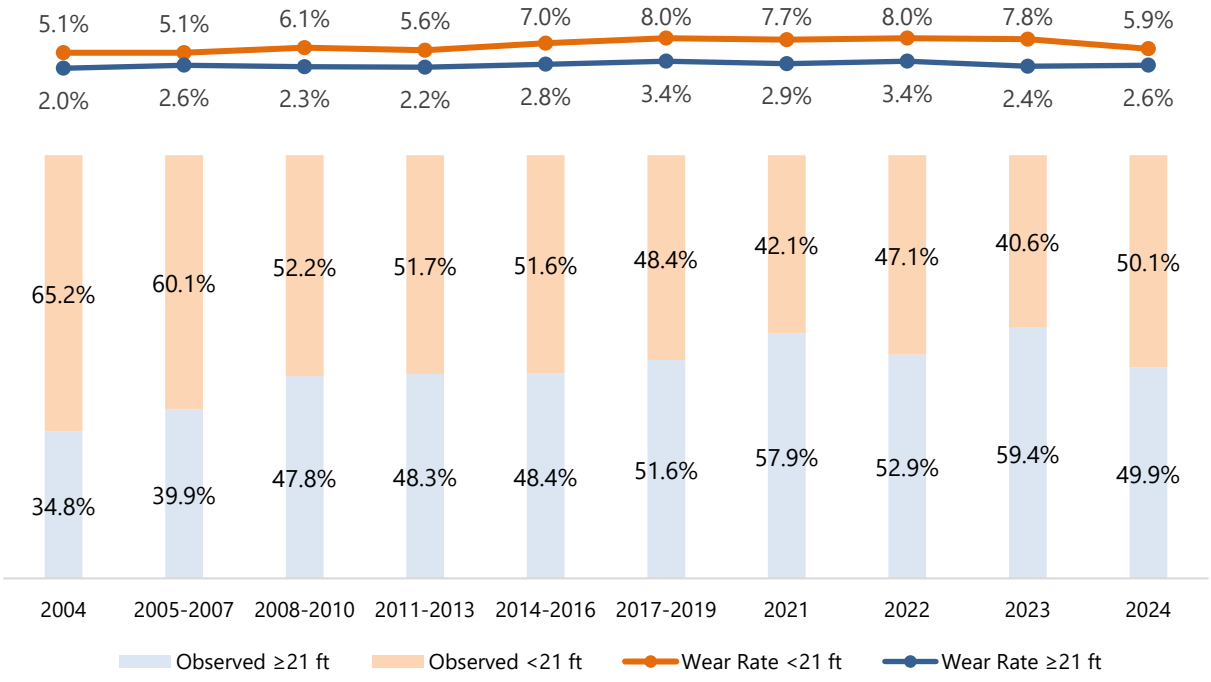
	Observation Year										
Boat Size	**2004** % (N)	**2005–2007** % (N)	**2008–2010** % (N)	**2011–2013** % (N)	**2014–2016** % (N)	**2017–2019** % (N)	**2021** % (N)	**2022** % (N)	**2023** % (N)	**2024** % (N)	**Total** % (N)
Powerboats (no PWCs)											
<16 ft.	8.7% (2131)	8.1% (7922)	9.6% (6438)	9.1% (5879)	9.1% (7124)	12.4% (5260)	16.5% (1623)	13.6% (958)	18.8% (1203)	9.9% (1142)	10.2% (37549)
16–20.9 ft.	4.7% (16276)	4.9% (39413)	5.4% (39655)	4.9% (37575)	6.8% (35319)	7.3% (35553)	6.0% (8322)	7.2% (9332)	6.0% (9155)	5.5% (11028)	5.8% (225352)
21–25.9 ft.	2.4% (6218)	3.1% (21094)	2.7% (29260)	2.4% (27471)	3.3% (26851)	3.9% (29632)	3.2% (9957)	2.9% (8532)	2.4% (10940)	2.9% (8894)	3.1% (172631)
≥26 ft.	0.8% (3407)	1.5% (9915)	1.5% (12669)	1.8% (12948)	1.9% (12692)	2.3% (13739)	2.1% (3659)	5.2% (2982)	2.6% (4121)	2.2% (3167)	2.1% (75892)
Paddlecraft (excluding SUPs)											
<16 ft.	60.7% (1212)	57.9% (2910)	41.9% (4483)	53.7% (4036)	55.9% (5799)	64.4% (5087)	66.4% (1284)	62.4% (1188)	55.6% (1253)	61.2% (1212)	56.9% (27252)
16–20.9 ft.	45.8% (490)	25.5% (1302)	57.2% (583)	52.2% (1337)	35.4% (1502)	36.6% (1558)	30.1% (783)	49.1% (166)	52.2% (304)	30.3% (280)	36.6% (8085)
Sailboats											
<16 ft.	75.2% (481)	75.6% (718)	69.0% (709)	75.7% (490)	82.0% (662)	76.1% (662)	70.3% (75)	72.8% (79)	83.4% (88)	78.3% (68)	62.4% (3551)
16–20.9 ft.	34.1% (357)	54.0% (1114)	53.5% (873)	59.2% (1083)	49.9% (848)	63.3% (954)	74.9% (357)	80.9% (186)	75.2% (270)	63.6% (285)	48.0% (5970)
21–25.9 ft.	11.6% (1428)	23.1% (3117)	16.9% (2626)	25.7% (2571)	31.2% (1806)	35.1% (1954)	43.8% (462)	52.0% (253)	35.7% (538)	32.8% (539)	29.1% (13866)
≥26 ft.	9.6% (1864)	11.6% (4637)	12.1% (594)	10.3% (5224)	15.4% (4818)	14.9% (4030)	14.7% (848)	17.6% (636)	12.5% (1159)	23.6% (871)	16.3% (28157)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Figure G illustrates the relationship between powerboat size and wear rate. The bar graph highlights the changing proportions of smaller and larger powerboats, while the line graph shows the wear rates associated with each size category.

Notably, the proportion of smaller powerboats fell from 65.2% in 2004 to 50.1% in 2024, with a corresponding increase in the proportion of larger powerboats. During the same time period, the wear rate for smaller powerboats has increased from 5.1% to 5.9% and the wear rate for larger powerboats has increased from 2.0% to 2.6%. Despite the increase in wear rate across small and large boats since 2004, the shift in proportion of observed small and large boats has likely resulted in fewer observed instances of life jacket use, as individuals on larger vessels are less likely to wear life jackets.

Figure G. Life Jacket Wear Rates and Proportions of Boaters on Larger and Smaller Powerboats for Adults*



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

D. Engine Cut-off Switch

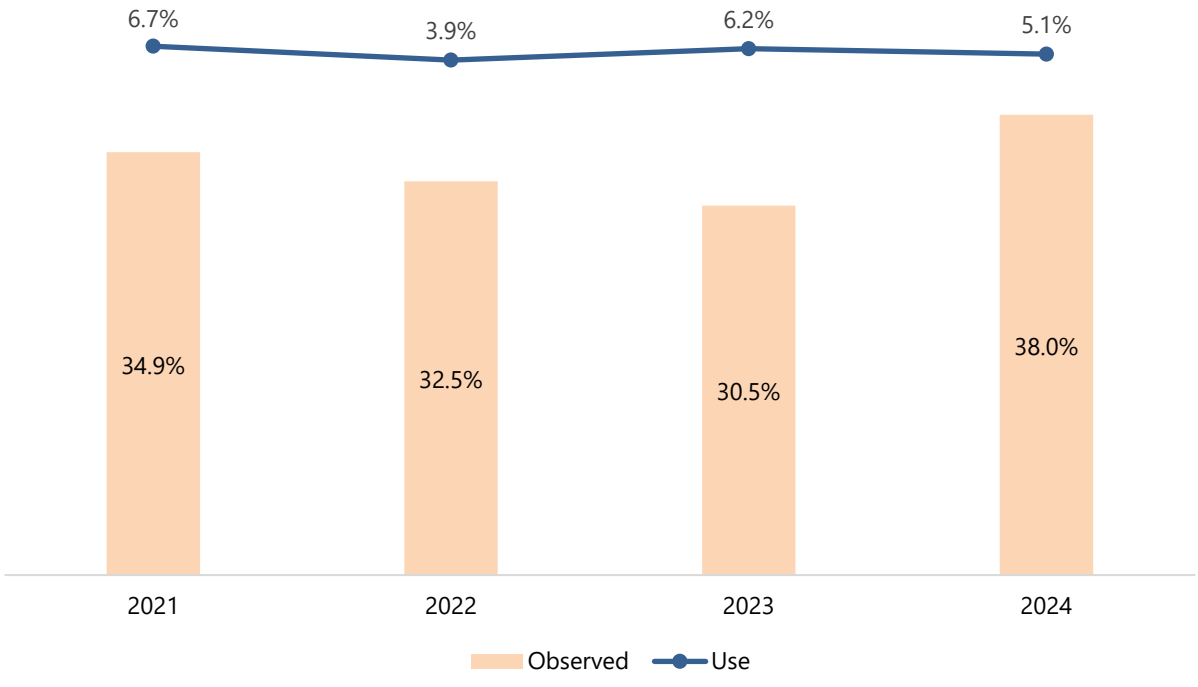
Since December 2019, the U.S. Coast Guard has required engine cut-off switches (ECOS) on recreational powerboats under 26 feet to prevent propeller strikes and runaway and/or circling boats (i.e., "Circle of Death") if the operator goes overboard. In addition, a federal law effective April 1, 2022, mandates those operating powerboats under 26 feet to use an ECOS while on plane (i.e., the boat reaches a speed that allows it to ride over its bow wave rather than plowing through it). This law applies only when the helm is not in a cabin and when the boat is operating on a plane or above displacement speed (i.e., the speed at which a boat's bow wave equals the length of the boat's waterline). Use of the ECOS is not required while the boat is docking, launching, loading on a trailer, trolling. In 2021, observers began tracking ECOS use on powerboats of all sizes and activities.

Figure H shows the trend of ECOS visibility and use and Table 2.7 presents ECOS visibility and use by the types of powerboats captured in the study. Data should be viewed with caution due to the difficulty in clearly observing whether or not the ECOS is being used.

Observed ECOS. The data highlight the challenge in observing ECOS use due to obstructions like the vessel itself, operator positioning, or the rise of wireless systems. In 2024, ECOS visibility varied by boat type, with the highest rates for PWCs (84.0%, down 2.9% from 2021) and lower rates for skiffs (49.7%), runabouts (28.9%), cabin cruisers (20.8%), pontoons (38.5%), and powered inflatables/rafts (43.4%).

Using ECOS. When ECOS use was clearly observed, the overwhelming majority of operators were not using it, with the exception of PWC operators who had an ECOS use rate of 95.3%. Other powerboat types showed ECOS use between 4.1% and 7.6%. Since 2021, the largest relative increase (300.0%) of ECOS use was for cabin cruisers (1.1% to 4.4%), and the largest relative decrease (60.6%) was for runabouts (10.4% to 4.1%).

Figure H. ECOS Use Observed and Actual Use*



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.7. ECOS Use Observed and Actual Use by Boat Type*

(2021 to 2024)

Boat Type	Observation Year			
	2021 % (N)	2022 % (N)	2023 % (N)	2024 % (N)
Observable				
Skiff	46.6% (2960)	43.2% (2864)	42.3% (3040)	49.7% (2802)
Runabout	22.8% (2868)	22.5% (2619)	22.0% (2999)	28.9% (2969)
Cabin Cruiser	22.6% (403)	20.9% (277)	19.0% (464)	20.8% (438)
Houseboat	. (3)	. (3)	. (4)	. (2)
Pontoon	36.9% (1019)	29.3% (1052)	23.9% (1047)	38.5% (1133)
Powered Inflatable/Raft	53.8% (145)	48.1% (129)	42.9% (76)	43.4% (152)
PWC	87.1% (1334)	85.6% (1177)	73.1% (1438)	84.0% (1321)
Total**	34.9% (7398)	32.5% (6944)	30.5% (7731)	38.0% (7496)
Using				
Skiff	5.0% (1380)	5.4% (1237)	6.4% (1285)	5.8% (1392)
Runabout	10.4% (653)	1.5% (589)	5.0% (660)	4.1% (859)
Cabin Cruiser	1.1% (91)	0.0% (58)	6.8% (88)	4.4% (91)
Houseboat	. (1)	. (1)	. (1)	. (2)
Pontoon	8.0% (376)	2.9% (308)	6.4% (250)	4.8% (436)
Powered Inflatable/Raft	7.7% (78)	6.5% (62)	10.5% (76)	7.6% (66)
PWC	90.5% (1162)	94.5% (1007)	91.3% (1051)	95.3% (1109)
Total**	6.7% (2579)	3.9% (2255)	6.2% (2360)	5.1% (2846)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Data are for boats not boaters; n's are denominators.
**Totals do not include PWC data.

E. Fall Season Observations

Beginning in 2022, the study was expanded to include wear rate observations during the fall season at 19 sites within five established summer observation states. The purpose of this expansion was to explore possible changes in wear rates and boater activity as a result of changes in water and air temperature and water conditions. These observations were expanded in 2023 to include 10 established summer observation states covering 40 observation sites. In 2024, fall observations were conducted at 10 established summer observation states covering 36 observation sites.

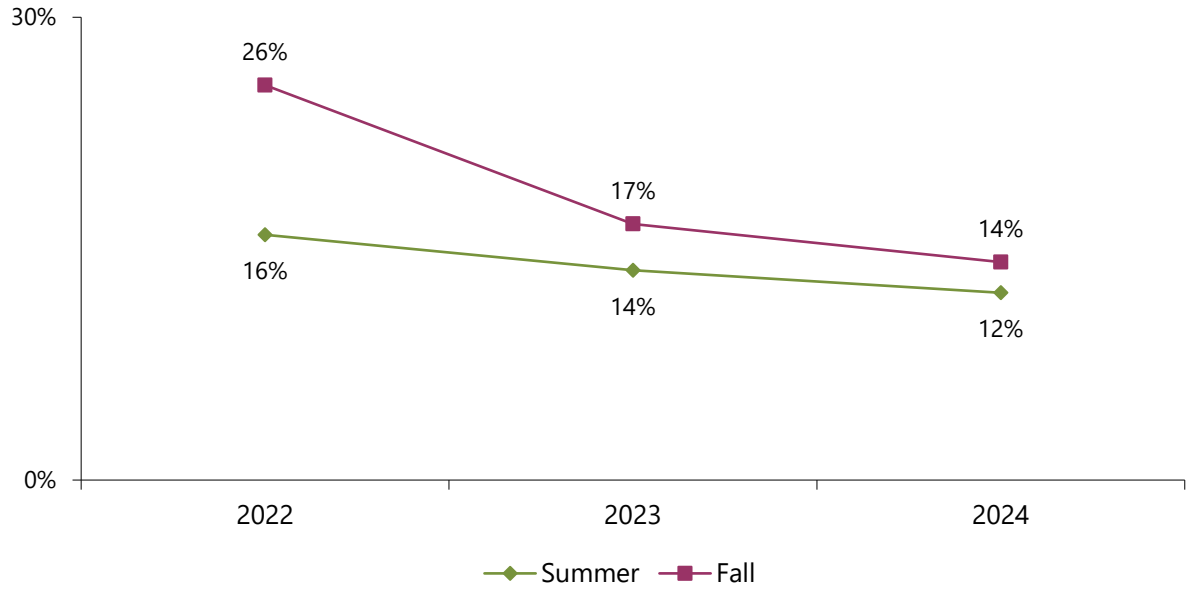
Figure I shows the comparison of summer and fall overall wear rates and Table 2.8 presents summer and fall adult and youth wear rates by boat type. Comparisons of wear rates between summer and fall observations provide evidence of seasonal variability; however, the observed differences are not consistent across years and vary depending on boat type. Further data collection is needed to clarify the trends and clarify the directional nature of these seasonal changes.

Wear rates during the fall remain consistently higher than those observed in the summer, although both have shown a declining trend since 2022. The 2024 fall wear rate was 14.1%. This is a relative decrease of 44.9% since 2022 (25.6%) and a relative decrease of 15.1% since 2023 (16.6%). Since 2022, fall powerboat wear rates have shown the largest relative decrease (48.6%), followed by paddlecraft (25.0%), and sailboats (0.8%).

Adult wear rates. The comparison of wear rates between summer and fall continues to exhibit variation among adult boaters, with fall 2024 boaters showing higher wear rates on powerboats (5.7% vs 3.2%), while summer boaters demonstrate higher wear rates on paddlecraft (48.5% vs 48.4%) and sailboats (32.9% vs 24.5%).

Youth wear rates. After varied results in 2022, youth summer wear rates have been higher than fall wear rates across boat types. In 2024, the largest relative decrease from summer to fall wear rates was observed in powerboats (22.7%).

Figure I. Summer and Fall Observed Wear Rates*
(Excluding PWCs)



JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.8. Summer and Fall Observed Wear Rates by Boat Type*

(Excluding PWCs)

Boat Type	Observation Year					
	2022 % (N)		2023 % (N)		2024 % (N)	
	Summer	Fall	Summer	Fall	Summer	Fall
Adult Wear Rate						
Powerboats	5.7% (4396)	11.1% (1523)	4.7% (7166)	6.0% (3807)	3.2% (9363)	5.7% (4278)
Paddlecraft	61.2% (91)	64.5% (109)	48.2% (174)	27.3% (383)	48.5% (138)	48.4% (159)
Sailboats	30.7% (89)	24.7% (44)	19.0% (858)	34.4% (816)	32.9% (741)	24.5% (836)
Total	8.1% (4666)	16.4% (2121)	7.6% (8268)	11.2% (4889)	6.6% (10387)	9.3% (5317)
Youth Wear Rate						
Powerboats	64.3% (879)	73.9% (165)	60.1% (1117)	59.6% (381)	60.7% (1337)	46.9% (419)
Paddlecraft	80.2% (26)	96.8% (27)	77.1% (18)	68.8% (6)	36.6% (17)	. (5)
Sailboats	100.0% (8)	. (4)	77.9% (56)	74.6% (26)	66.5% (44)	57.2% (31)
Total	64.7% (929)	78.3% (201)	61.4% (1204)	60.9% (415)	60.2% (1410)	48.8% (455)

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

F. Summary of Life Jacket Wear Rates

Overall Wear Rates

Table 2.9 presents wear rates on all boats (excluding PWCs) by the age of boaters observed in 2024 (current year), 2014, and 1999 (study onset). Overall, the wear rates have increased since 1999, but these rates have also decreased since 2014. This suggests that while the overall trend from the inception of the study reflects improved wear rates, more recent years have seen a stagnation or reversal of this progress.

Adult wear rates. Adult wear rates have relatively increased 8.0% since 1999, and relatively decreased 11.3% since 2014.

Youth wear rates. Youth wear rates have relatively increased 19.2% since 1999, and relatively decreased 11.2% since 2014. Wear rates for youth aged 6–12 and 13–17 followed a similar pattern, while wear rates for youth aged 0–5 have decreased since 1999 and since 2014.

Table 2.9. Life Jacket Wear Rate on All Boats by Age*
(Excluding PWCs)

Age	Observation Year				
	1999	2014	2024	Relative Change	
				1999–2024	2014–2024
All Boaters	15.4%	19.9%	17.4%	13.0%	-12.6%
All Adults (18+)	8.7%	10.6%	9.4%	8.0%	-11.3%
All Youth (0–17)	52.1%	69.9%	62.1%	19.2%	-11.2%
Youth (0–5)	80.6%	94.5%	80.0%	-0.7%	-15.3%
Youth (6–12)	69.1%	87.0%	81.5%	17.9%	-6.3%
Youth (13–17)	24.1%	41.6%	33.2%	37.8%	-20.2%

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.
Green text indicates a relative increase between time periods.
Red text indicates a relative decrease between time periods.

Wear Rates by Boat Type

Table 2.10 presents wear rates by boat type (excluding PWCs) by the age of boaters observed in 2024 (current year), 2014, and 1999 (study onset).

Adult wear rates. Adult wear rates on all powerboats have decreased since 1999 and since 2014. However, adult wear rates on all paddlecraft and sailboats have increased since 1999 and 2024.

Youth wear rates. Youth wear rates on all powerboats, paddlecraft, and sailboats have increased since 1999 and decreased since 2014.

Table 2.10. Life Jacket Wear Rate by Boat Type by Age*
(Excluding PWCs)

Boat Type	Observation Year				
	1999	2014	2024	Relative Change	
				1999–2024	2014–2024
Adult Wear Rate					
All Powerboats (excluding PWCs)	4.4%	5.6%	4.3%	-2.3%	-23.2%
All Paddlecraft	41.7%	53.3%	56.4%	35.3%	5.8%
All Sailboats	13.6%	26.5%	35.4%	160.3%	33.6%
Youth Wear Rate					
All Powerboats (excluding PWCs)	51.0%	69.6%	61.4%	20.4%	-11.8%
All Paddlecraft	65.0%	83.5%	79.7%	22.6%	-4.6%
All Sailboats	59.7%	72.1%	67.9%	13.7%	-5.8%

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.
Green text indicates a relative increase between time periods.
Red text indicates a relative decrease between time periods.

Wear Rates by Boat Size

Table 2.11 presents adult wear rates by powerboat (excluding PWCs) size observed in 2024 (current year), 2014, and 1999 (study onset). Adult powerboat wear rates have increased across all boat sizes since 1999, but have decreased for all sizes except ≥26 ft. since 2014.

Table 2.11. Adult Life Jacket Wear Rate by Powerboat Size*
(Excluding PWCs)

Boat Size	Observation Year				
	2004	2014	2024	Relative Change	
				1999–2024	2014–2024
<16 ft.	8.7%	12.4%	9.9%	13.8%	-20.2%
16–20.9 ft.	4.7%	7.2%	5.5%	17.0%	-23.6%
21–25.9 ft.	2.4%	3.4%	2.9%	20.8%	-14.7%
≥26 ft.	0.8%	1.4%	2.2%	175.0%	57.1%

JSI Research & Training Institute, Inc.
2024 Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.
Green text indicates a relative increase between time periods.
Red text indicates a relative decrease between time periods.

Conclusion

Since the initiation of the Life Jacket Wear Rate Observation Study in 1999, there has been a increase in life jacket wear rates among both adults and youth boaters. However, data from the past decade has shown a decline in wear rates across all age groups, as well as for certain boat types and sizes. These findings indicate that, even with efforts to encourage life jacket use, there has not been a significant, lasting change in wear rates across all observed states. Therefore, we recommend further investigation into the factors that may be hindering consistent life jacket wear. Additionally, it is crucial to explore new, innovative strategies to foster more sustained behavioral changes, including targeted educational campaigns, community engagement initiatives, and potential policy interventions that encourage consistent life jacket use across all boating populations.

Appendix A. Data Collection Forms

JSI Data Collection Form: 2024 Boat Form

TIME: ○ 7:59 or earlier ○ 8:00 - 9:59 am ○ 10:00 - 11:59 am ○ 12:00 - 1:59 pm ○ 2:00 - 3:59 pm ○ 4:00 - 5:59 pm ○ 6:00 or later

740

POWER BOAT: ○ Skiff/Utility ○ Pontoon ○ Runabout ○ Inflatable/Raft ○ Cabin cruiser ○ Houseboat ○ PWC ECOS ○ Y ○ N ○ ?

SAIL: ○ Day sailor ○ Cabin sailboat ○ Sailboard

PADDLE: ○ Kayak ○ Paddle board ○ Canoe ○ Inflatable ○ Rowboat

SIZE: ○ Under 16 ○ 16 - 20.9 ○ 21 - 25.9 ○ 26 - 45.9 ○ 46 +

OPERATION: ○ Cruising/Motoring ○ Sailing ○ Rowing/Paddling ○ Drifting ○ Anchored

ACTIVITY: ○ Pleasure ○ Fishing ○ Water skiing ○ Intent to Fish ○ White water ○ Swimming ○ High Speed ○ Other

	SEX			AGE(years)					PFD			WS SW
	M	F	?	0-5	6-12	13-17	18-64	65+	Buoyant (Trad)	Inflatable Susp	Inflatable Belt	Not Wear	Yes
OP	○	○	○	○	○	○	○	○	○	○	○	○	
P1	○	○	○	○	○	○	○	○	○	○	○	○	○
P2	○	○	○	○	○	○	○	○	○	○	○	○	○
P3	○	○	○	○	○	○	○	○	○	○	○	○	○
P4	○	○	○	○	○	○	○	○	○	○	○	○	○
P5	○	○	○	○	○	○	○	○	○	○	○	○	○
P6	○	○	○	○	○	○	○	○	○	○	○	○	○
P7	○	○	○	○	○	○	○	○	○	○	○	○	○
P8	○	○	○	○	○	○	○	○	○	○	○	○	○

POWER BOAT: ○ Skiff/Utility ○ Pontoon ○ Runabout ○ Inflatable/Raft ○ Cabin cruiser ○ Houseboat ○ PWC ECOS ○ Y ○ N ○ ?

SAIL: ○ Day sailor ○ Cabin sailboat ○ Sailboard

PADDLE: ○ Kayak ○ Paddle board ○ Canoe ○ Inflatable ○ Rowboat

SIZE: ○ Under 16 ○ 16 - 20.9 ○ 21 - 25.9 ○ 26 - 45.9 ○ 46 +

OPERATION: ○ Cruising/Motoring ○ Sailing ○ Rowing/Paddling ○ Drifting ○ Anchored

ACTIVITY: ○ Pleasure ○ Fishing ○ Water skiing ○ Intent to Fish ○ White water ○ Swimming ○ High Speed ○ Other

	SEX			AGE(years)					PFD			WS SW
	M	F	?	0-5	6-12	13-17	18-64	65+	Buoyant (Trad)	Inflatable Susp	Inflatable Belt	Not Wear	Yes
OP	○	○	○	○	○	○	○	○	○	○	○	○	
P1	○	○	○	○	○	○	○	○	○	○	○	○	○
P2	○	○	○	○	○	○	○	○	○	○	○	○	○
P3	○	○	○	○	○	○	○	○	○	○	○	○	○
P4	○	○	○	○	○	○	○	○	○	○	○	○	○
P5	○	○	○	○	○	○	○	○	○	○	○	○	○
P6	○	○	○	○	○	○	○	○	○	○	○	○	○
P7	○	○	○	○	○	○	○	○	○	○	○	○	○
P8	○	○	○	○	○	○	○	○	○	○	○	○	○

POWER BOAT: ○ Skiff/Utility ○ Pontoon ○ Runabout ○ Inflatable/Raft ○ Cabin cruiser ○ Houseboat ○ PWC ECOS ○ Y ○ N ○ ?

SAIL: ○ Day sailor ○ Cabin sailboat ○ Sailboard

PADDLE: ○ Kayak ○ Paddle board ○ Canoe ○ Inflatable ○ Rowboat

SIZE: ○ Under 16 ○ 16 - 20.9 ○ 21 - 25.9 ○ 26 - 45.9 ○ 46 +

OPERATION: ○ Cruising/Motoring ○ Sailing ○ Rowing/Paddling ○ Drifting ○ Anchored

ACTIVITY: ○ Pleasure ○ Fishing ○ Water skiing ○ Intent to Fish ○ White water ○ Swimming ○ High Speed ○ Other

	SEX			AGE(years)					PFD			WS SW
	M	F	?	0-5	6-12	13-17	18-64	65+	Buoyant (Trad)	Inflatable Susp	Inflatable Belt	Not Wear	Yes
OP	○	○	○	○	○	○	○	○	○	○	○	○	
P1	○	○	○	○	○	○	○	○	○	○	○	○	○
P2	○	○	○	○	○	○	○	○	○	○	○	○	○
P3	○	○	○	○	○	○	○	○	○	○	○	○	○
P4	○	○	○	○	○	○	○	○	○	○	○	○	○
P5	○	○	○	○	○	○	○	○	○	○	○	○	○
P6	○	○	○	○	○	○	○	○	○	○	○	○	○
P7	○	○	○	○	○	○	○	○	○	○	○	○	○
P8	○	○	○	○	○	○	○	○	○	○	○	○	○

PFD Study 2024

CODE State | Site | Block | Group | Phase | Page Number

JSI Data Collection Form: 2024 Site Form

PFD Study 2024

# of Boats Observed | ID: State | Site | Block | Group | Phase

1. Site Information

Observer Names: _____ City: _____

Site Name: _____ Water: _____

Date of Observation: ☐☐ / ☐☐ / ☐☐ Day of the week: © Sat. © Sun.

Observation start time: ☐☐:☐☐ © AM © PM Observation end time: ☐☐:☐☐ © AM © PM

★★ Loaner Board: © Yes (COMPLETE 'Loaner Board' section on back of page.) © No

2. Type of Body of Water

© Bay, inlet or sound © River, stream, creek or canal © Other: _____

© Harbor © Lake, pond, or reservoir (not Great Lakes)

© Intracoastal waterway © Great lake (not including tributaries)

3. Site Conditions

Water temperature: ☐☐ degrees F

A. First Weather Observation (to be completed during 1st time block of boat observations)

Time:

© 7:59 or before © 8-9:59 AM © 10-11:59 AM © 12-1:59 PM © 2-3:59 PM © 4-5:59 PM © 6 PM or later

Air Temp. ☐☐☐ F	Water Conditions	Current	Visibility	Weather Conditions
Wind Speed ☐☐ knots	© Calm (less than 6")	© Strong	© Good	© Sunny © Raining
	© Choppy (6" to 2')	© Moderate	© Fair	© Partly Cloudy © Stormy
	© Rough (over 2')	© Weak/None	© Poor	© Cloudy

B. Second Weather Observation (to be completed during 2nd time block of boat observations)

Time:

© 7:59 or before © 8-9:59 AM © 10-11:59 AM © 12-1:59 PM © 2-3:59 PM © 4-5:59 PM © 6 PM or later

Air Temp. ☐☐☐ F	Water Conditions	Current	Visibility	Weather Conditions
Wind Speed ☐☐ knots	© Calm (less than 6")	© Strong	© Good	© Sunny © Raining
	© Choppy (6" to 2')	© Moderate	© Fair	© Partly Cloudy © Stormy
	© Rough (over 2')	© Weak/None	© Poor	© Cloudy

C. Third Weather Observation (to be completed during 3rd time block of boat observations)

Time:

© 7:59 or before © 8-9:59 AM © 10-11:59 AM © 12-1:59 PM © 2-3:59 PM © 4-5:59 PM © 6 PM or later

Air Temp. ☐☐☐ F	Water Conditions	Current	Visibility	Weather Conditions
Wind Speed ☐☐ knots	© Calm (less than 6")	© Strong	© Good	© Sunny © Raining
	© Choppy (6" to 2')	© Moderate	© Fair	© Partly Cloudy © Stormy
	© Rough (over 2')	© Weak/None	© Poor	© Cloudy

TURN TO BACK PAGE FOR ADDITIONAL QUESTIONS ➡

3675

LOANER BOARD

If a loaner board was present at this site, please answer the following questions:

A. Number of available life jackets: ☐☐ Infant ☐☐ Child ☐☐ Youth ☐☐ Adult

B. Distance from boat launch: ○ Right next to launch area ○ Within 50 yards ○ More than 50 yards

C. Provides instructions on how to put on a lifejacket: ○ Yes ○ No

D. Information is provided in additional languages: ○ Yes ○ No

If yes, which languages: ○ Spanish ○ Other, please specify: _____

E. PLEASE TAKE A PHOTO OF THE LOANER BOARD SIGN AND EMAIL TO JSI. ○ Took photo and will email to JSI.

1. DID YOU HAVE ANY TROUBLE GETTING TO THE OBSERVATION POINT AT THIS SITE?

○ Yes ○ No

If yes, please email JSI with issue(s) encountered and updates to the current directions.

2. WAS A FISHING TOURNAMENT HAPPENING AT THIS SITE DURING YOUR OBSERVATIONS?

○ Yes ○ No ○ Don't know/Not sure

3. DID THE WEATHER AFFECT YOUR ABILITY TO CONDUCT YOUR OBSERVATIONS AT THIS SITE IN ANY WAY?

○ Yes ○ No

If yes, please specify:

_____

_____

4. TO YOUR KNOWLEDGE, DID THE WEATHER AFFECT THE LEVEL OF BOATING ACTIVITY AT THIS SITE IN ANY WAY?

○ Yes ○ No

If yes, please specify:

_____

_____

5. Please note any special events (e.g., a race or regatta) or other conditions (e.g., the presence of a Coast Guard boat, harbor master or enforcement boat) that may have influenced the type of boats, volume of boats, or boaters' use of PFDs.

_____

_____

3675

Appendix B. Information on Boats and People Observed

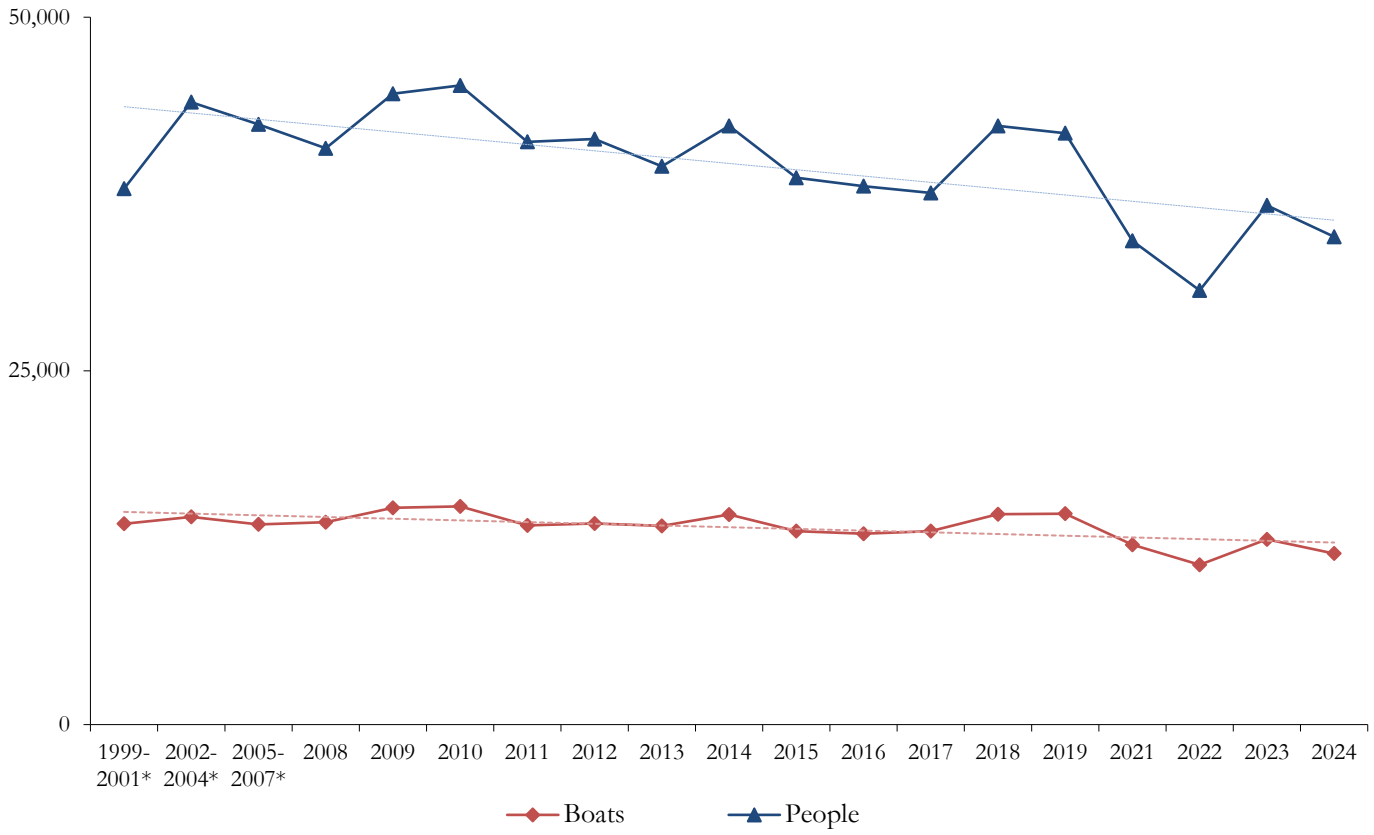
Appendix B examines the consistency of observed boat types, boater demographics, and environmental conditions across years, as well as any potential impact on reported life jacket wear rates.

Figures J through S detail the proportions of different boat types, boat lengths, operations, activities, and the age and sex of boaters. These data show that the diversity and representativeness of boats and boaters at the observed sites have remained mostly stable over the lifespan of the study.

Figures T through Z present the weather and water conditions at observation sites. Similar to the boat and boater data, these figures demonstrate that weather and water conditions were consistent across years, ensuring they did not influence overall changes in life jacket wear rates. However, fluctuations in these factors at individual sites could contribute to variations in wear rates locally.

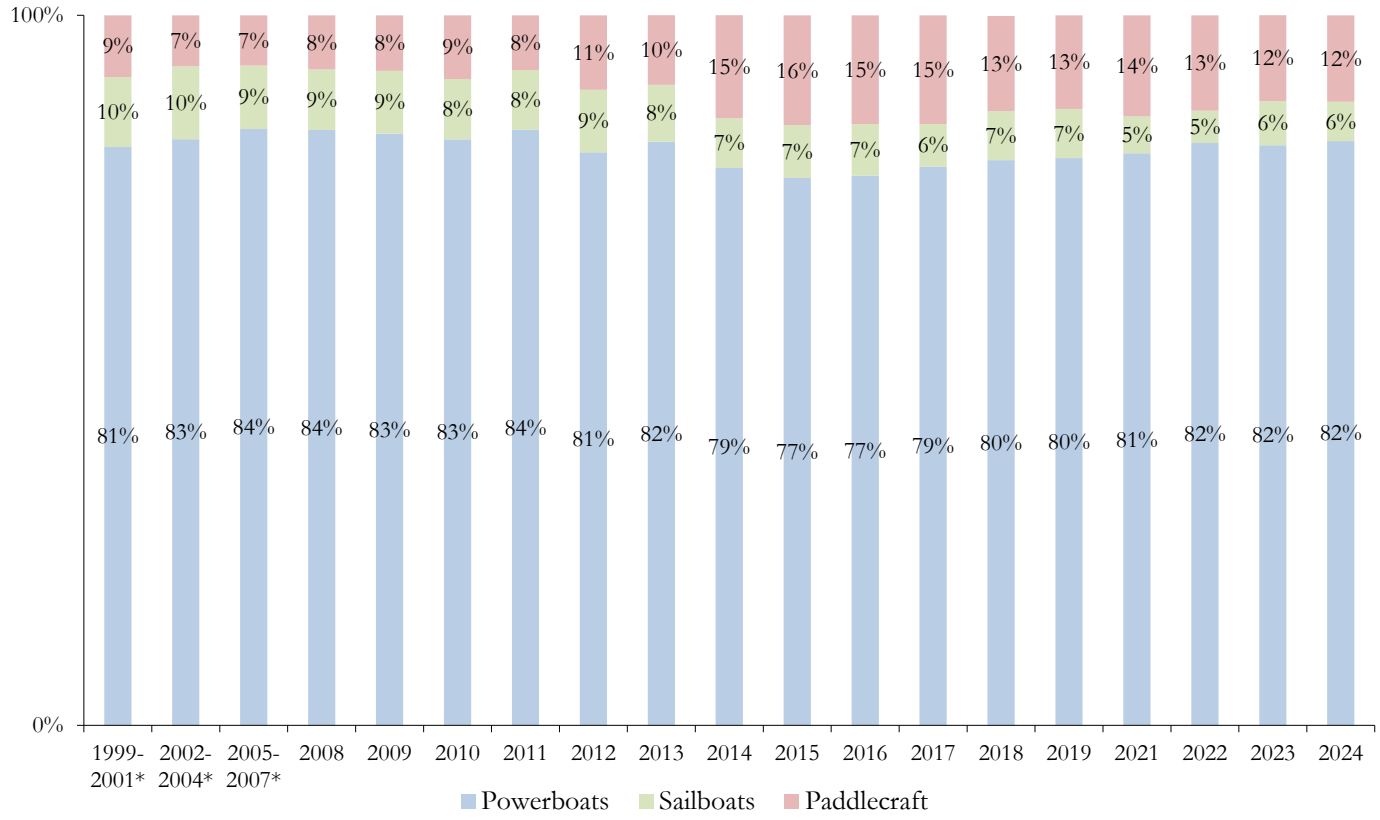
Lastly, all figures in this section have been slightly modified compared to reports prior to 2011. Percentages now exclude missing observations for specific characteristics, though this change has minimal impact due to the rarity of missing data.

Figure J. Number of Boats and People



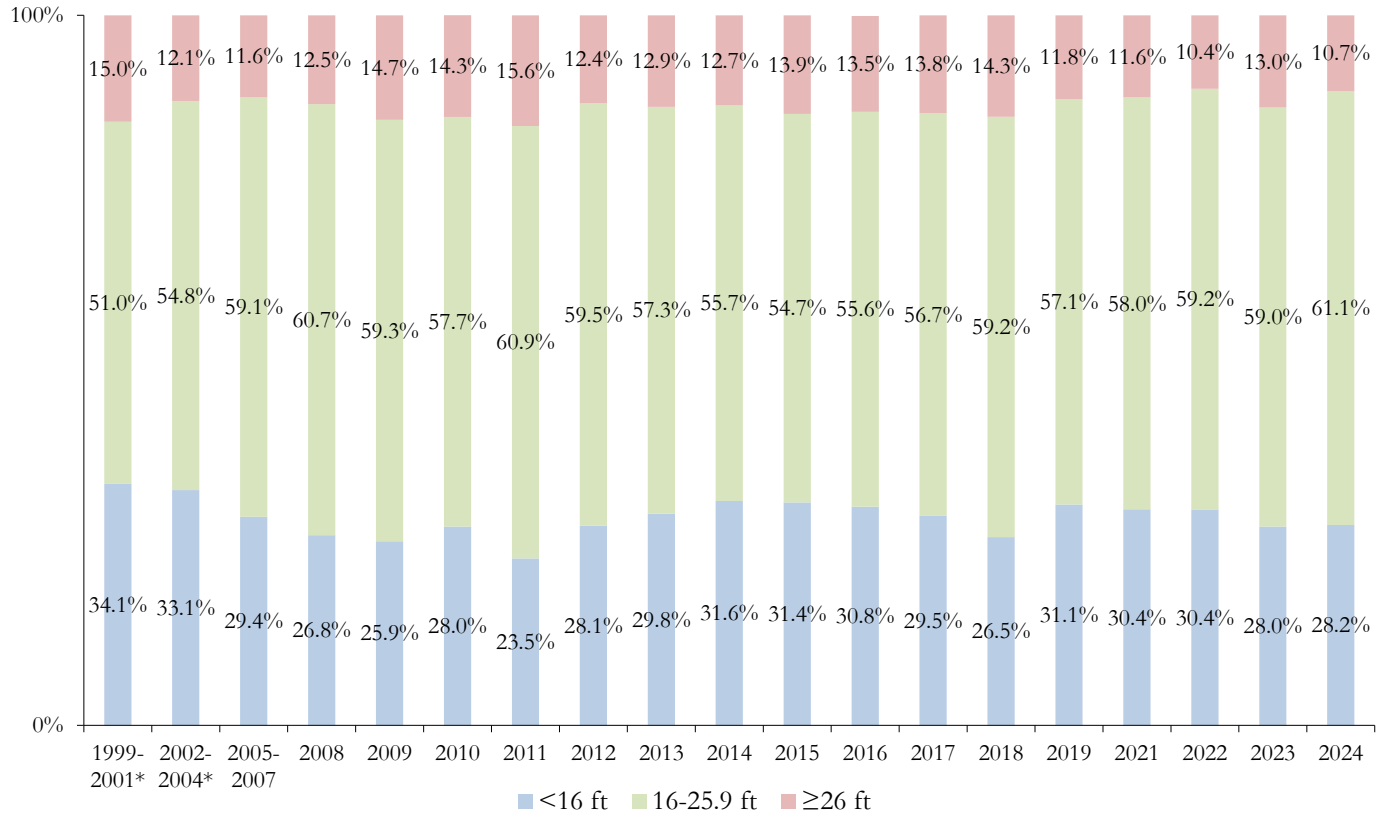
*Three-year average

Figure K. Types of Boats



*Three-year average

Figure L. Length of Boats



*Three-year average

Figure M. Length of Boats (2004-2024)

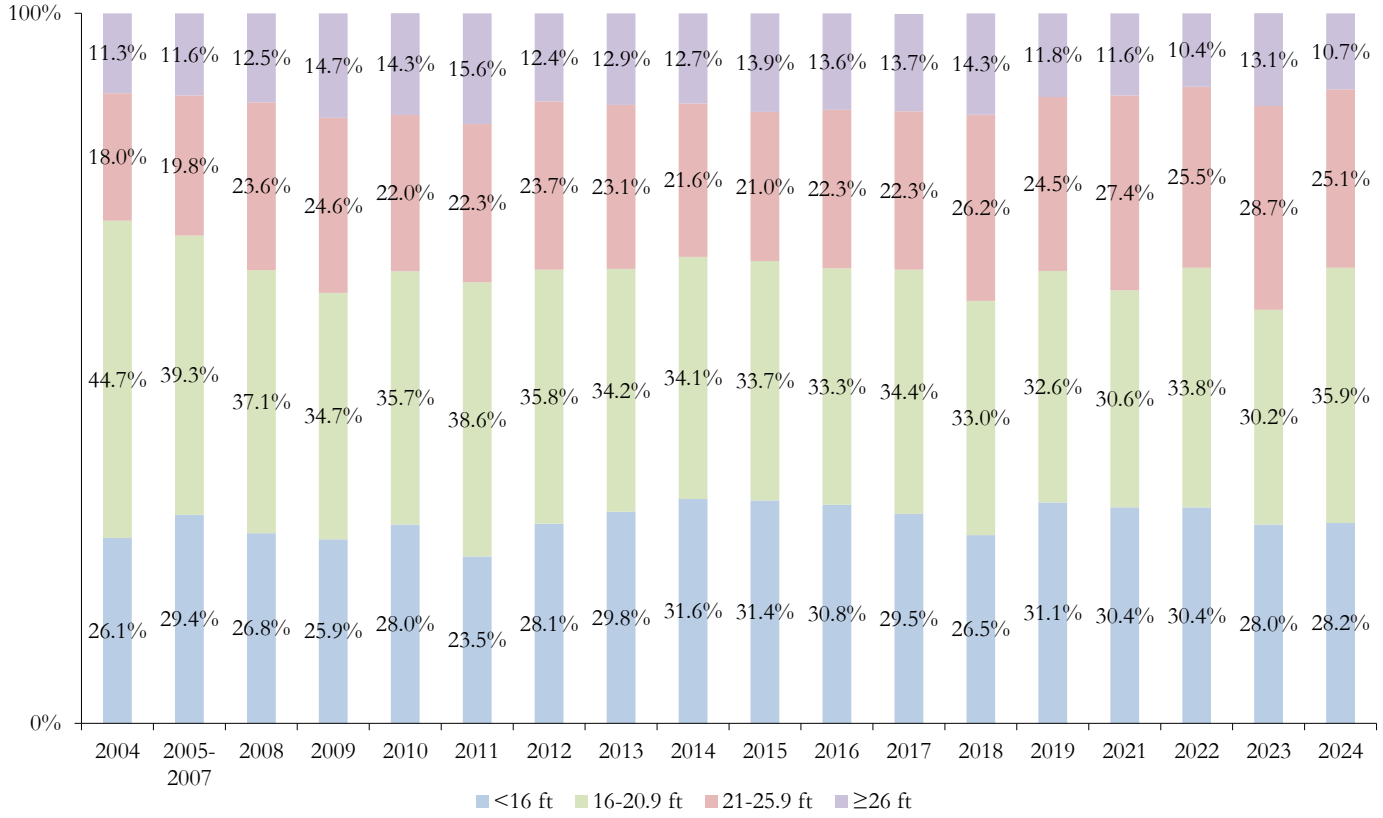
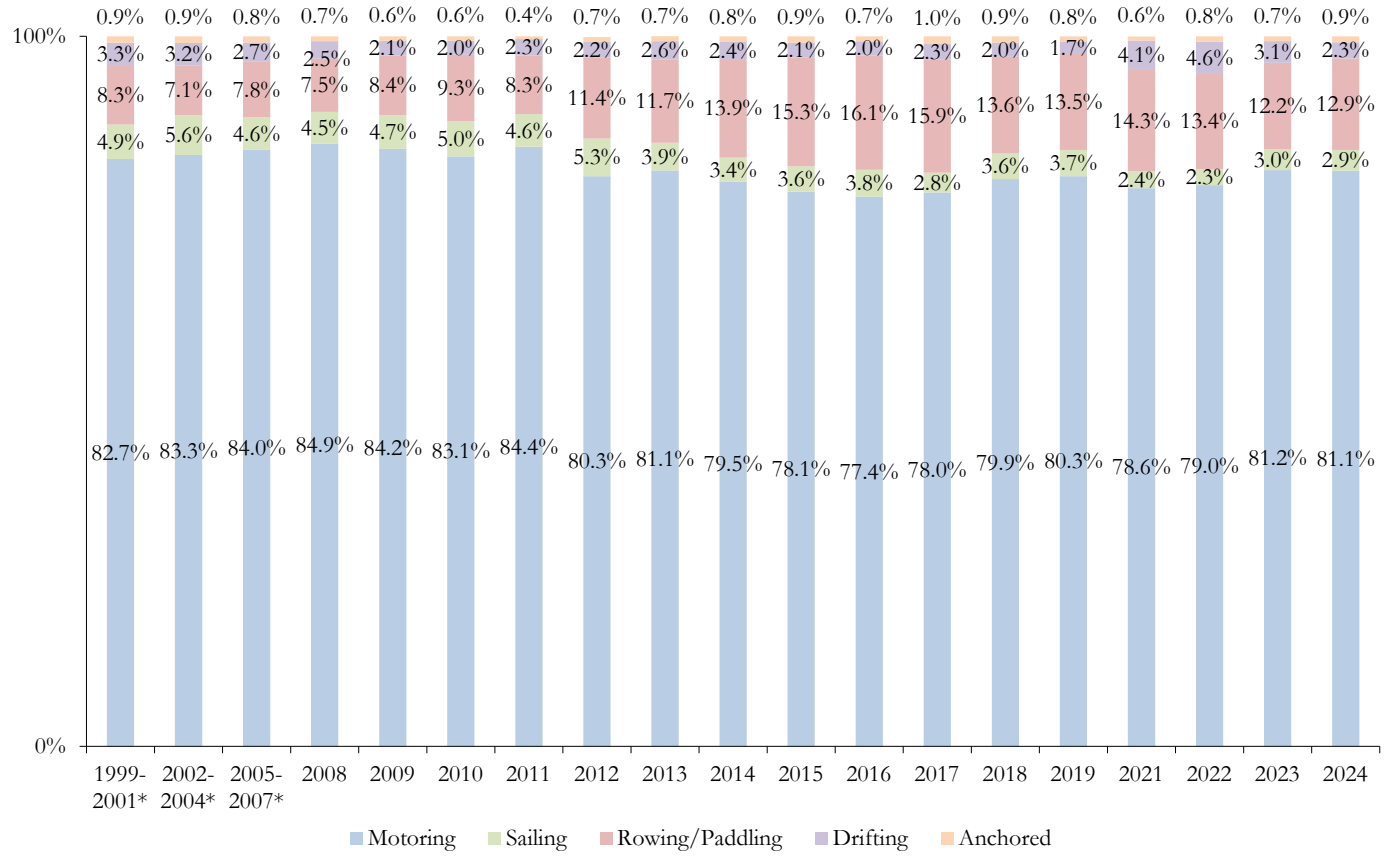
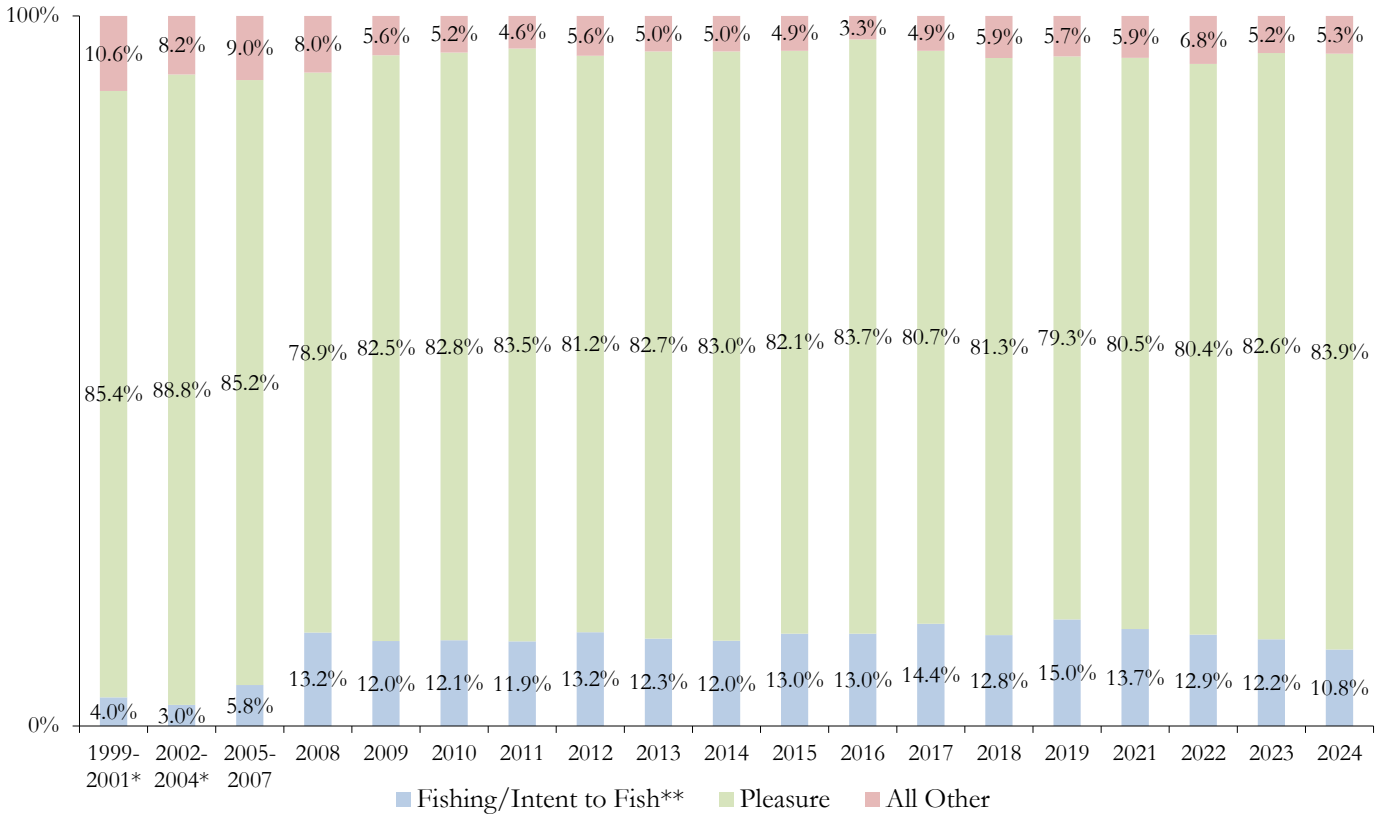


Figure N. Operation of Boats



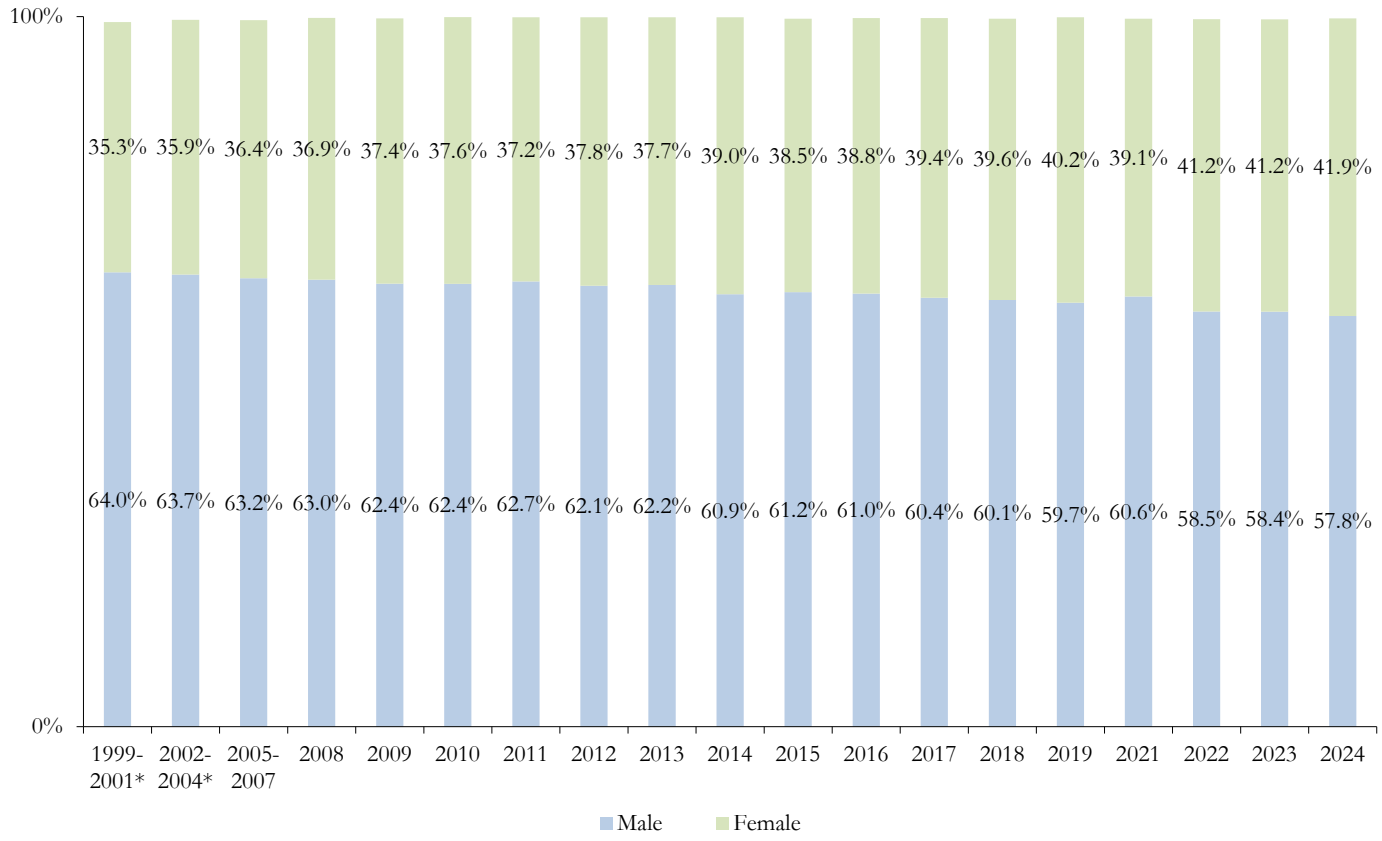
*Three-year average

Figure 0. Activity of Boaters (1999-2024)



*Three-year average
**Includes recreational fishing only

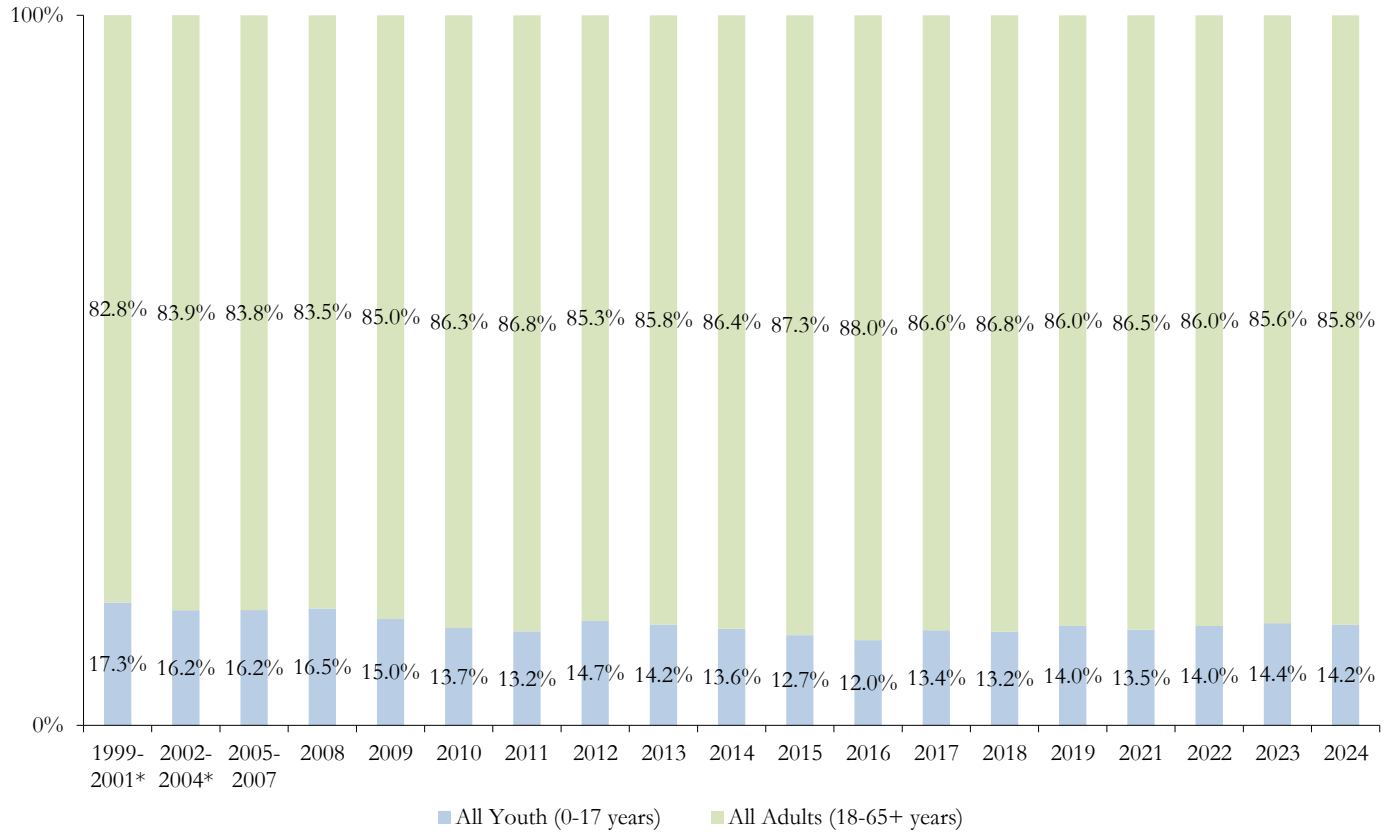
Figure P. Sex of Boaters



*Three-year average

**Note that percentages do not add up to 100% due to instances where the sex of the boater could not be identified due to visibility issues.

Figure Q. Age of Boaters

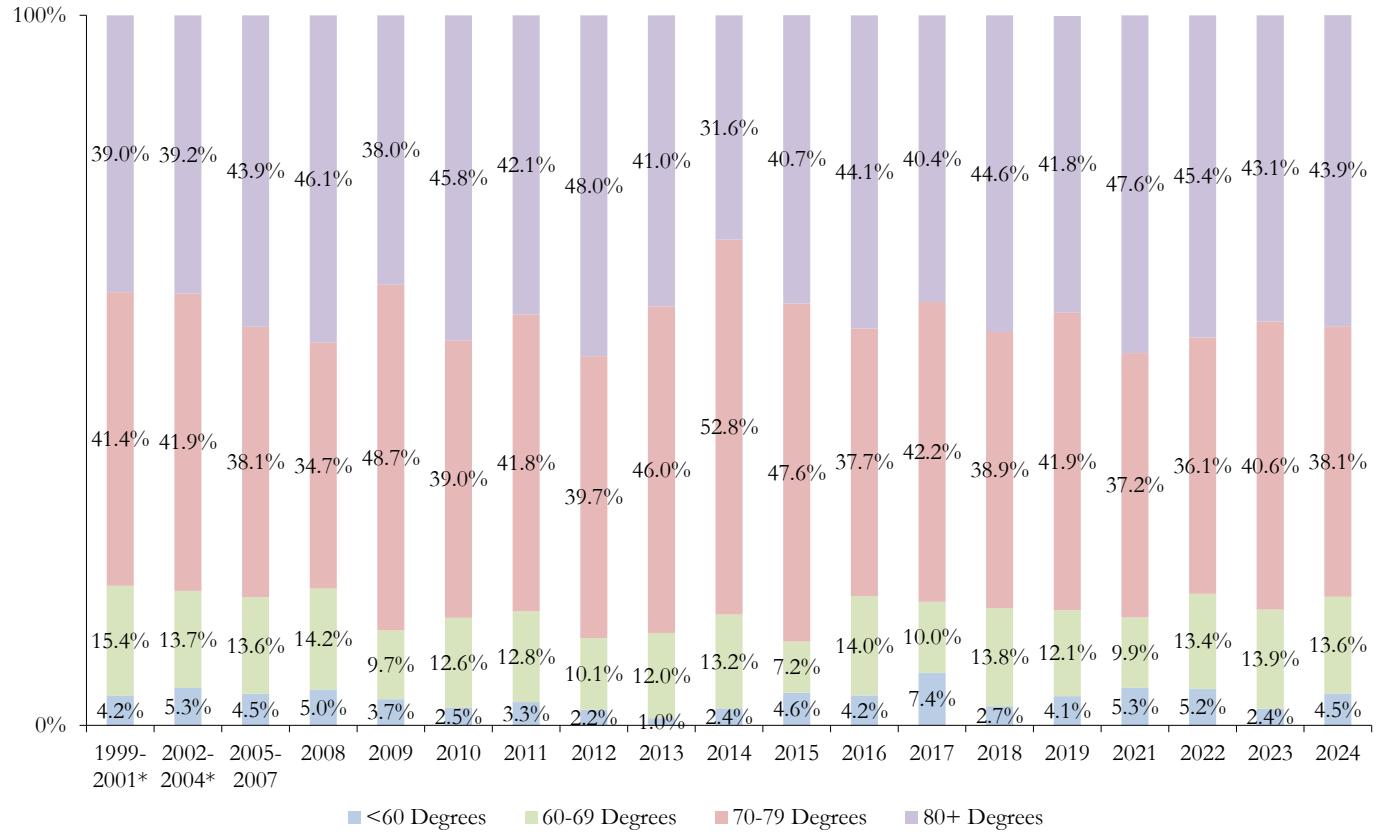


*Three-year average

Figure R. Age of Youth Boaters

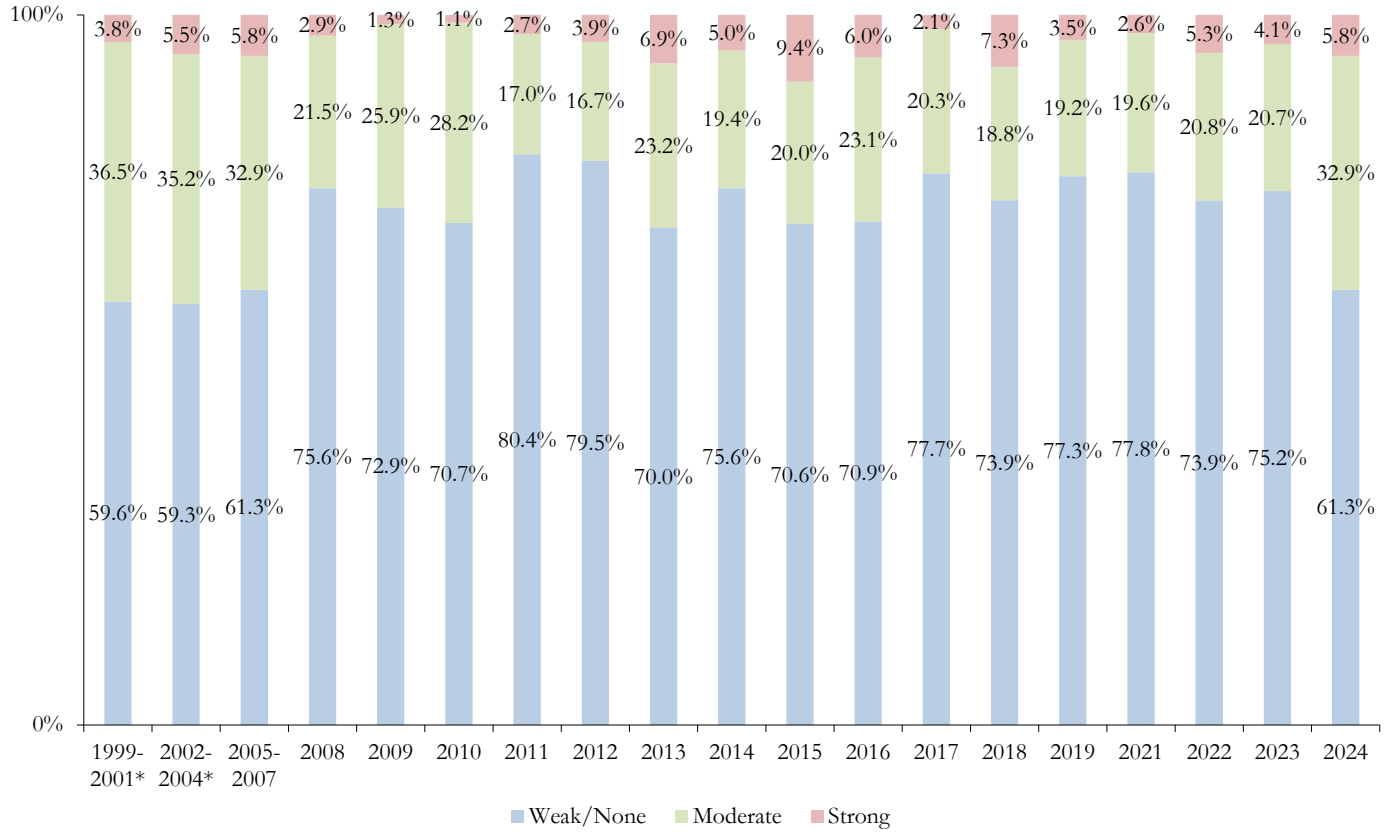
*Three-year average

Figure S. Water Temperature in which All Boaters were Observed



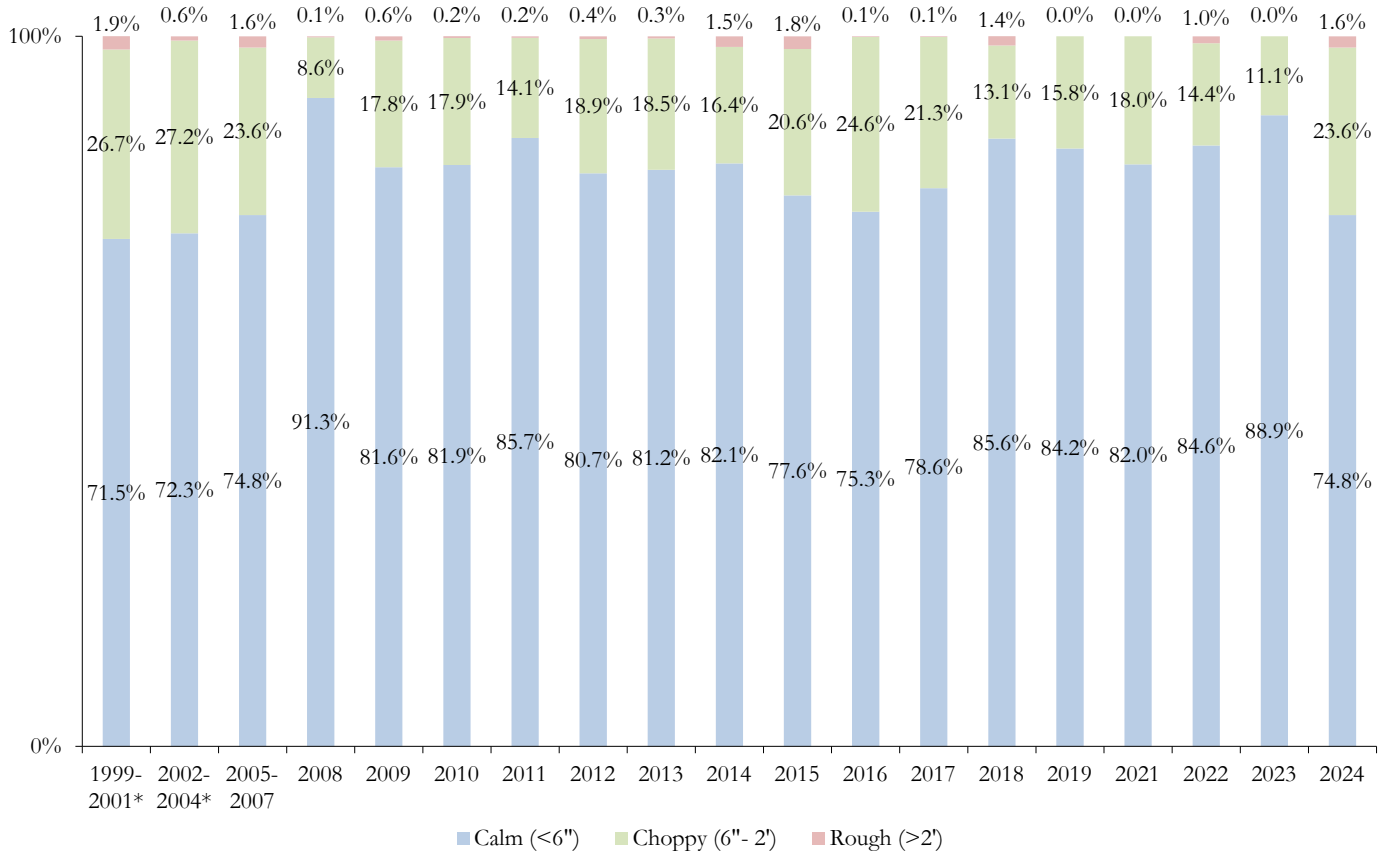
*Three-year average

Figure T. Water Current in which All Boaters were Observed



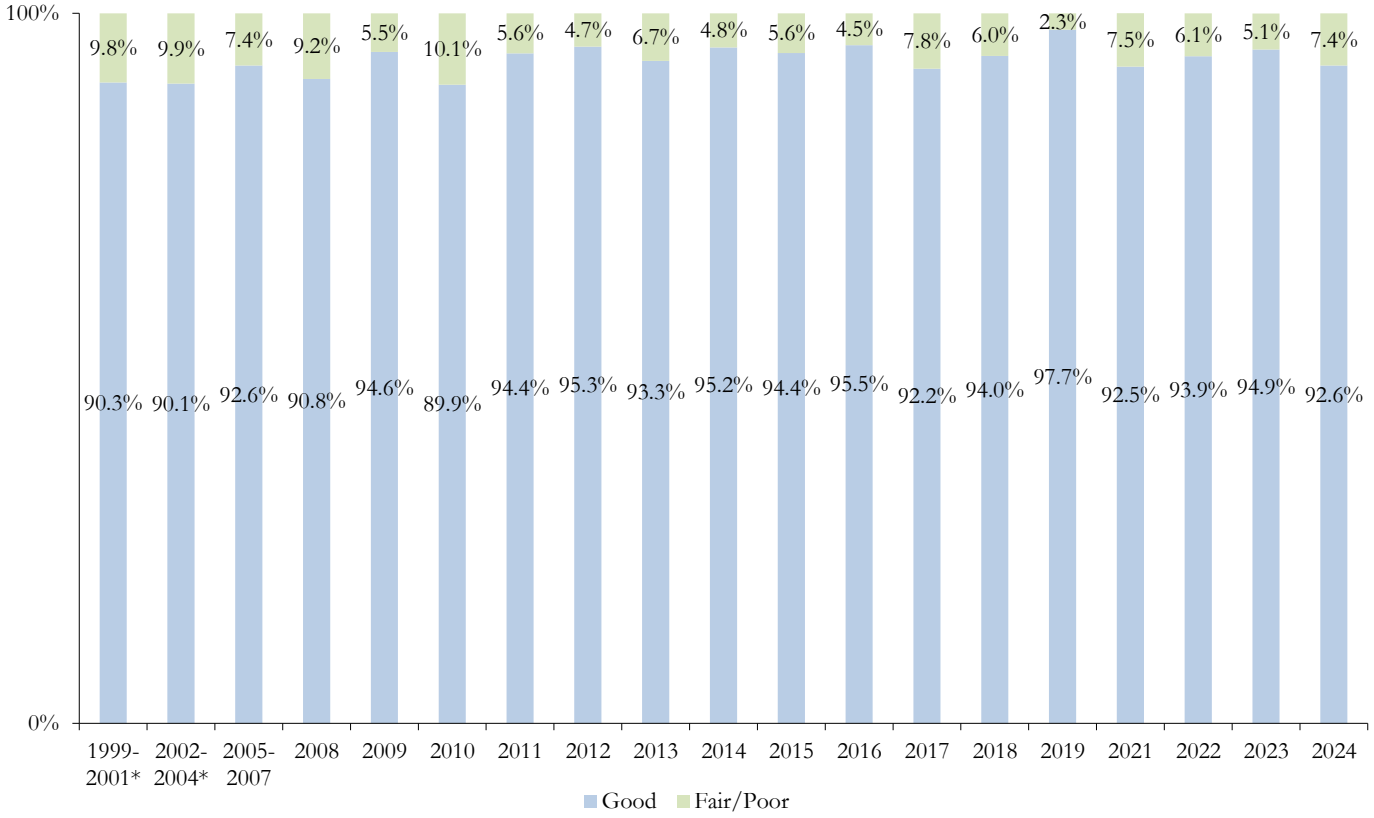
*Three-year average

Figure U. Wave Height in which All Boaters were Observed



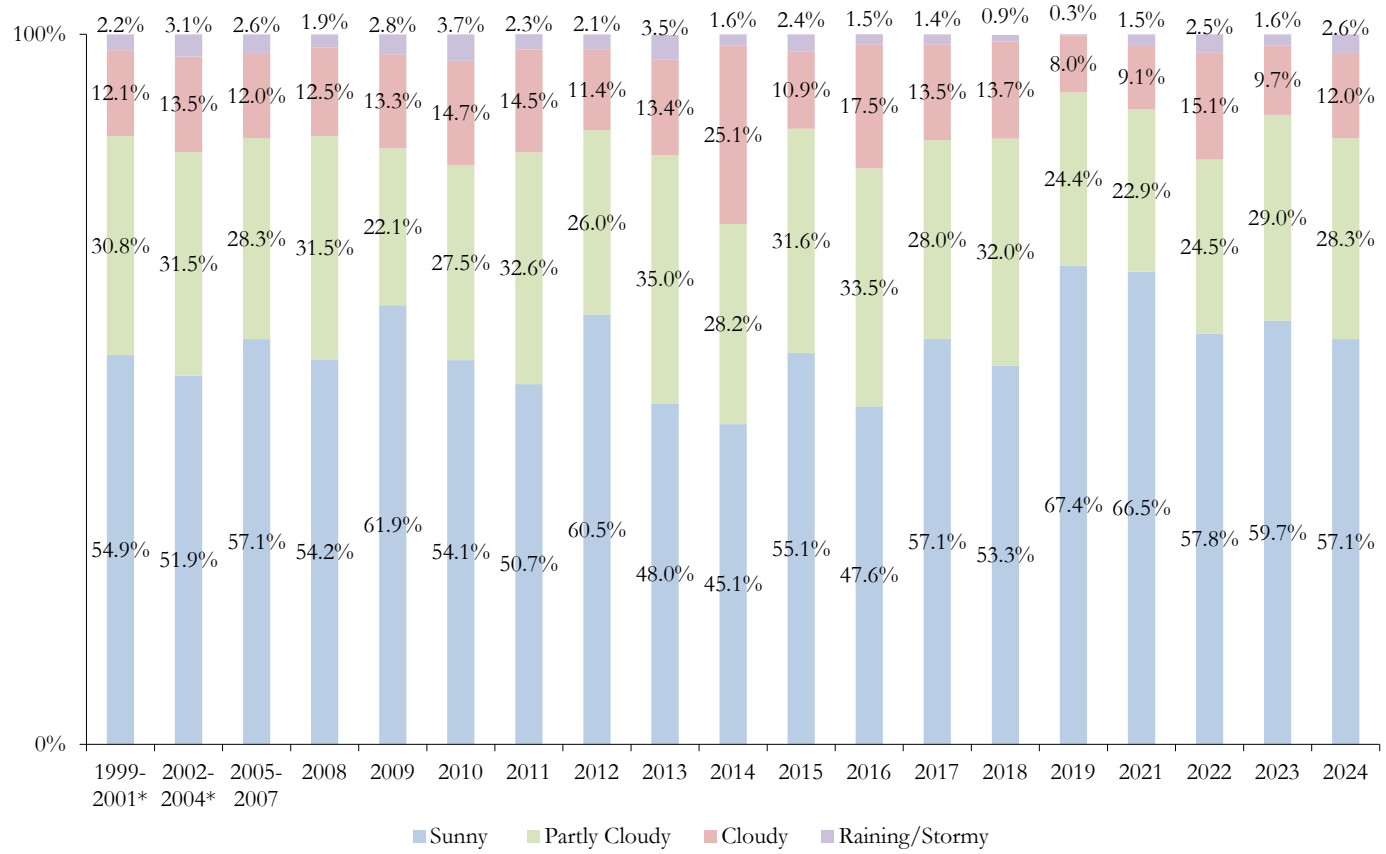
*Three-year average

Figure V. Visibility in which All Boaters were Observed



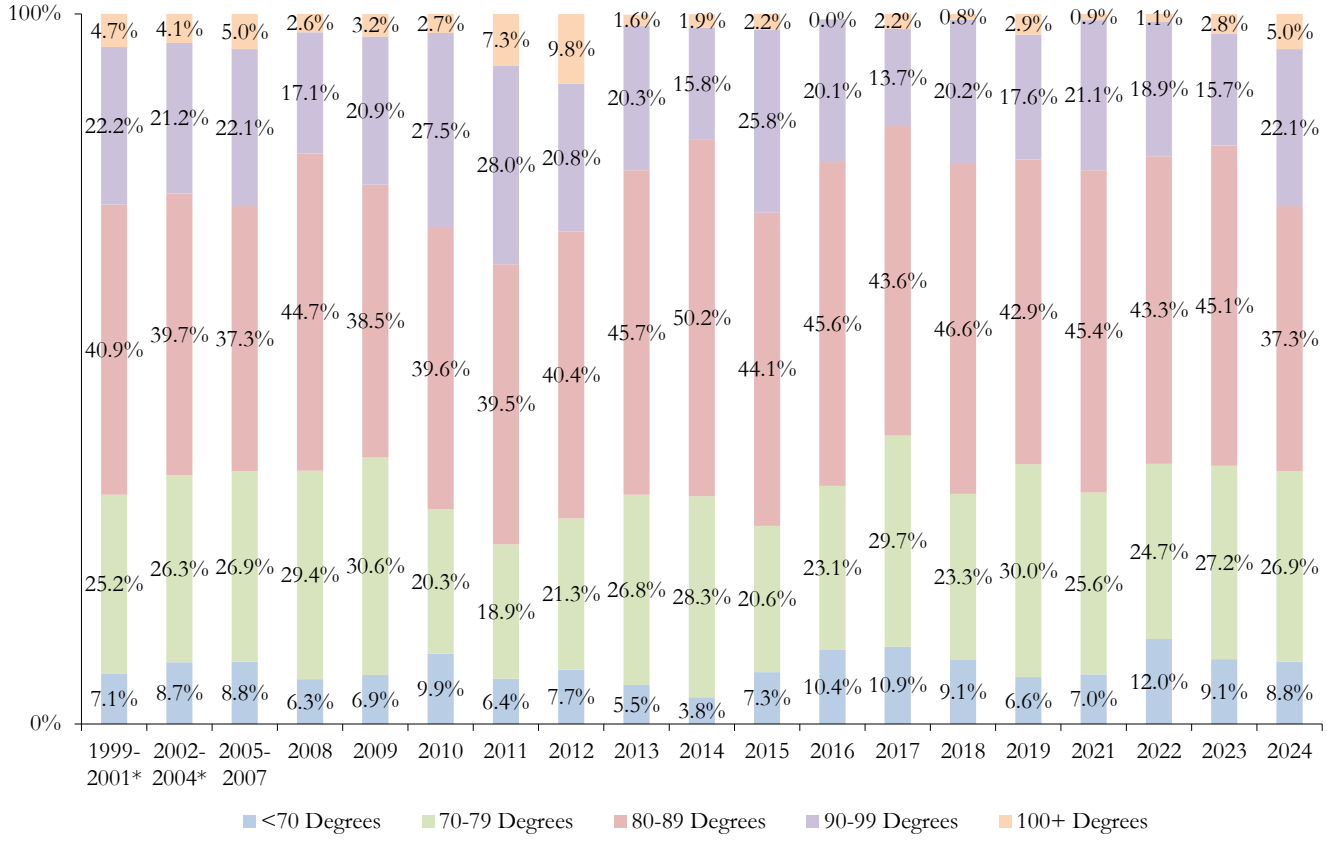
*Three-year average

Figure W. Weather in which All Boaters were Observed



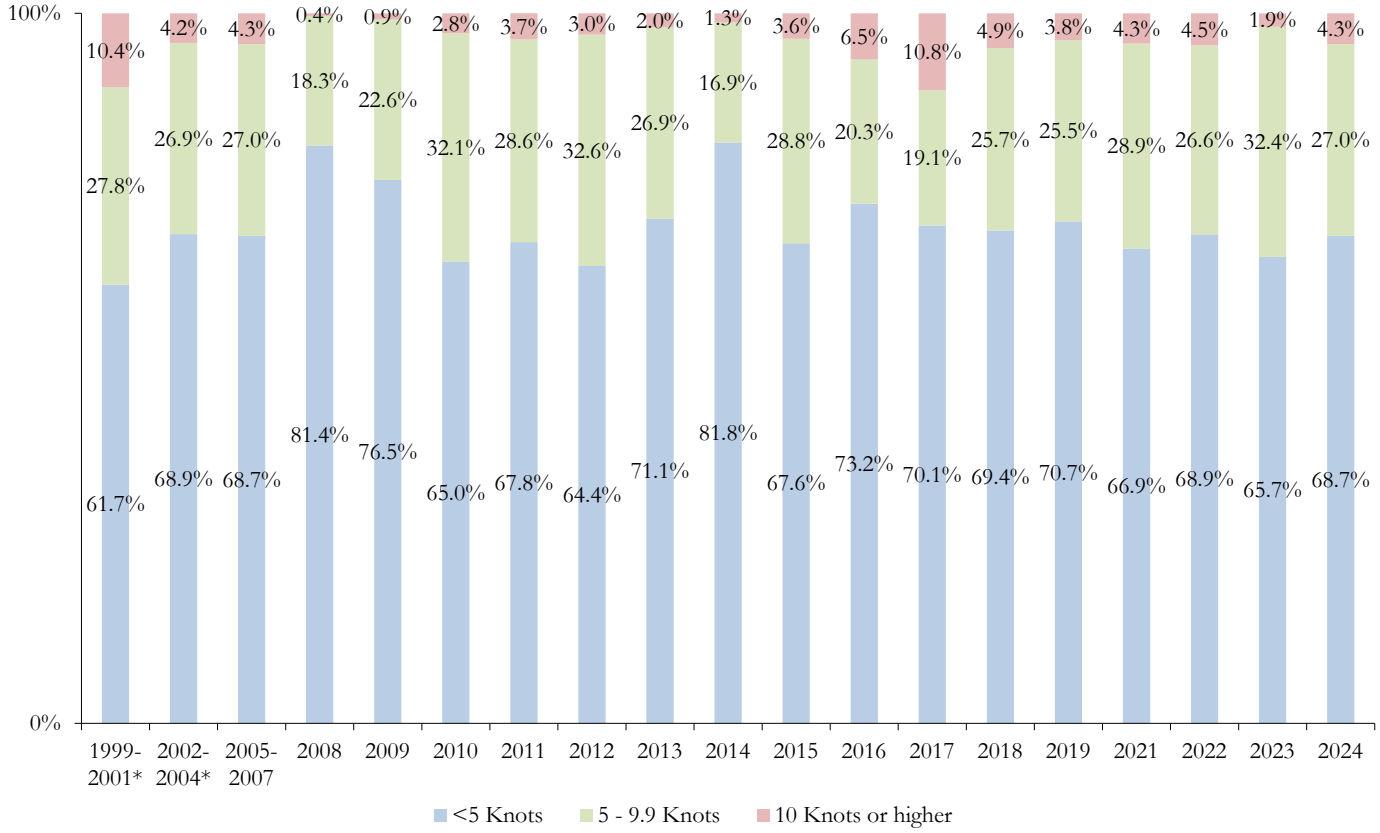
*Three-year average

Figure X. Air Temperature in which ALL Boaters were Observed



*Three-year average

Figure Y. Wind Speed in which ALL Boaters were Observed



*Three-year average

Addendum. The Geofence Study: Impacting Life Jacket Wear Rate

Through a purposeful partnership between the USCG, the American Canoe Association (ACA), and JSI, a unique endeavor which leverages emerging technology and traditional research methods was implemented since 2022. The supplemental research initiative, called the Geofence Study, measures the success of a strategic geofencing safety education campaign – the Geofence "Wear Your Life Jacket" campaign – focused upon proper life jacket wear during on-water boating activities. The study uses geofencing technology (via mobile ad networks) to send interactive media/messages about proper life jacket wear to people via their mobile applications of choice which include social media platforms like Facebook, Instagram, and Snapchat, and real time information applications, like 'The Weather Channel' and web browsers like Firefox, Safari, and Google Chrome, etc.

Geofencing technology has the ability to provide real time data capture while identifying trends in the delivery and use of the messaging content. Customization of content coupled with popular and accessible delivery outlets broadcast life jacket education safety messages to a strategically chosen group. Geofencing is a direct-to-mobile, location-based information sharing technology which serves information to people based on their physical activities and the places they go. It is based on regional targeting which includes zip code and radius and uniquely serves information to people that walk inside of individual buildings, event grounds and locations, convention centers, conferences, or other specific physical places. This form of outreach provides the ability to focus on exact targeted audiences. In addition to hitting selected areas in real time (when people enter the "fenced" area), geofencing technology has the ability to send content to the user up to 30 days after they have left the fenced area; this allows the message or outreach to have a longer lifespan.

The central objective of the Geofence Study is to establish and enable geofences at the top five (5) life jacket wear rate observation locations (determined by boater population/volume) as identified in the USCG annual observation study for three consecutive years. Tables 2.12–2.14 list the "Intervention Sites", which include all sites with a geofence and all "Control Sites", which include all observation sites without a geofence from 2021–2024. Of note, in 2023, the number of intervention sites was reduced from 15 to five. In Seattle, Washington, Ivar's Restaurant was included as an intervention site even though the geofences are technically located at Ballard Locks. This is because it is likely that those who are at Ballard Locks would also travel to the Ivar's Restaurant site, given their proximity on Lake Union. Additionally, we excluded two sites in Seattle (Kirkland and Mercer Island) from controls, since it is technically possible that boats can move from Lake Union into these other two sites that are on Lake Washington because there is a major waterway connection. Promotions at each location ramped up two weeks prior to the observation date. Table 2.15 shows the Geofence "Wear Your Life Jacket" campaign metrics for May 18, 2024–September 20, 2024.

Table 2.12. Control Sites include all sites except for the following sites for 2017–2024*

Site Name	Body of Water	City	State
Ballard Locks	Puget Sound	Seattle	WA
Breakwater Park	Lake Pontchartrain South	New Orleans	LA
Causeway Drawbridge	Wrightsville Intracoastal	Wrightsville Beach	NC
Channel on Shadywood Rd/CR 19	Lake Minnetonka	Spring Park	MN
Cherry Creek Marina	Cherry Creek Reservoir	Greenwood Village	CO
Hemenway Harbor	Lake Mead	Boulder City	AZ
High Point & Anna Point Marina	Lake Anna	Mineral	VA
Ivar's Restaurant	Lake Union	Seattle	WA
Lake View Marina	Lake Conroe	Conroe	TX
Lamplighter Resort	Lake of the Ozarks	Camdenton	MO
Point Breeze	Lake of the Ozarks	Osage Beach	MO
Sanders Ferry Park	Old Hickory Lake	Hendersonville	TN
Shelter Island	San Diego Bay	San Diego	CA
Vacation Island	Mission Bay	San Diego	CA
West End Boat Basin	Jones Inlet	Long Beach	NY
Willamette Sailing Club	Willamette River	Portland	OR

*Note: Two Washington sites were left out of all analyses - Kirkland Lake and Mercer Island.

Table 2.13. Intervention Sites include the following sites for 2017–2019 Baseline, 2021, and 2022

Site Name	Body of Water	City	State
Ballard Locks	Puget Sound	Seattle	WA
Breakwater Park	Lake Pontchartrain South	New Orleans	LA
Causeway Drawbridge	Wrightsville Intracoastal	Wrightsville Beach	NC
Channel on Shadywood Rd/CR 19	Lake Minnetonka	Spring Park	MN
Cherry Creek Marina	Cherry Creek Reservoir	Greenwood Village	CO
Hemenway Harbor	Lake Mead	Boulder City	AZ
High Point & Anna Point Marina	Lake Anna	Mineral	VA
Ivar's Restaurant	Lake Union	Seattle	WA
Lake View Marina	Lake Conroe	Conroe	TX
Lamplighter Resort	Lake of the Ozarks	Camdenton	MO
Point Breeze	Lake of the Ozarks	Osage Beach	MO
Sanders Ferry Park	Old Hickory Lake	Hendersonville	TN
Shelter Island	San Diego Bay	San Diego	CA
Vacation Island	Mission Bay	San Diego	CA
West End Boat Basin	Jones Inlet	Long Beach	NY
Willamette Sailing Club	Willamette River	Portland	OR

*Note: Two Washington sites were left out of all analyses - Kirkland Lake and Mercer Island.

Table 2.14. Intervention Sites include the following sites for 2023 and 2024

Site Name	Body of Water	City	State
Ballard Locks	Puget Sound	Seattle	WA
Causeway Drawbridge	Wrightsville Intracoastal	Wrightsville Beach	NC
Ivar's Restaurant	Lake Union	Seattle	WA
Kent Narrows	Chesapeake Bay	Kent	MD
Shelter Island	San Diego Bay	San Diego	CA
West End Boat Basin	Jones Inlet	Long Beach	NY

Table 2.15. Geofence "Wear Your Life Jacket" Campaign Metrics
(May 18, 2024 to September 20, 2024)

Metric	Result	Description
Total Campaign Impressions	10,900,987	Wear Your Lifejacket campaign creative received 10,900,987 impressions from the start of the campaign
Total Campaign Reach	6,145,335	Wear Your Lifejacket campaign creative reached 6,145,335 people from the start of the campaign.
Total Impressions: Facebook and Instagram	7,680,987	Wear Your Lifejacket campaign creative received 7,680,987 impressions in the 5 Geo Target Regions on Facebook and Instagram from the start of the campaign.
Total Reach: Facebook and Instagram	3,550,894	Wear Your Lifejacket campaign creative reached 3,550,894 people in the 5 Geo Target Regions on Facebook and Instagram from the start of the campaign.
Total YouTube Views: Wear Your Lifejacket Commercial	267,086	Wear Your Lifejacket commercials were watched 267,086 times by people in the 5 Geo Target Regions on YouTube from the start of the campaign.
Total TikTok Reach: Wear Your Lifejacket Commercial	152,895	Wear Your Lifejacket commercials reached 152,895 people in the 5 Geo Target Regions on TikTok from the start of the campaign.
Total Impressions: Television	3,220,000	Wear Your Lifejacket TV commercials received 3,220,000 impressions on Television from the start of the campaign.
Total unique pieces of creative (ads, posts, commercials, etc.)	25	There were 25 unique creative pieces (ads, videos, commercials, etc.) developed for the Wear Your Lifejacket campaign.

Analysis Methods. The analysis explored changes in life jacket wear rate across time in each individual intervention site, as well as compared changes in all intervention sites to changes in control sites. The analysis accounted for the mixture of specific types of boats in the different time periods, as this may be a confounding factor that affects overall wear rates. To do this, proportions of each boat type that were included in the baseline period (2017–2019) were then mirrored in the intervention years by weighting. For instance, in power boats the same proportions were set for skiffs, runabouts and cabin cruisers in 2021, 2022, 2023, and 2024 as there were in 2017–2019.

In several instances the number of observations in some intervention sites each year was very small, especially for sail boats. Therefore, extreme caution should be used when interpreting these results. Statistically significant differences are represented by an asterisk as are differences between control and intervention sites within each year. Statistical significance was tested using non-overlapping 95% confidence intervals.

Individual Sites. Table 2.16 demonstrates changes across time in each site. It is important to note that many of these percentages are based on very small numbers, so there should be caution in interpreting these findings. There is no clear pattern overall, with the exception of powerboats in Maryland, where there has been a steady increase in wear rates over time. There was a noticeable drop in wear rates among paddlecraft in Washington (Ivar's Restaurant) over the past two years. Overall, North Carolina has the lowest wear rates across time and boat type in comparison to other intervention sites.

Control vs Intervention. Table 2.17 and Figures AA–AC compare changes across all intervention sites to all control sites over time. Among powerboats, wear rates were significantly lower among intervention sites compared to control sites at baseline, as well as in 2021, 2023 and 2024. Among sailboats we see a similar finding. However, this is based on a very small number of sailboats in the intervention sites in 2023 and 2024, so may be unreliable. Among paddlecraft, we see a different story. Here, the wear rate in control and interview sites was not significantly different at baseline; however, there was a significantly higher wear rate in 2021 and 2022 in intervention sites. Unfortunately, as the wear rate in intervention sites decreased in 2023 and 2024, that significant difference disappeared.

The Geofence Study showed high engagement with the interactive media/messages about proper life jacket wear rate sent via mobile applications. While there are some differences by boat type and observation site, we do not see a consistent correlation with increased life jacket wear rate in the intervention sites overall. This may be due to a small number of observations in some of the intervention sites. Future studies might consider conducting a higher number of observations in intervention sites and comparing observations at intervention sites before and after the strategic geofencing safety education media campaign. Comparisons to a subset of control sites with similarities to the intervention sites (e.g., similar types of boats, ages, and regions of the country) may also be beneficial.

Table 2.16. Intervention Used by Boat Type
(2017 to 2024)

Year	Boat Type								
	Powerboat			Sailboat			Paddlecraft		
	# of boaters observed	# of boaters wearing life jackets	%	# of boaters observed	# of boaters wearing life jackets	%	# of boaters observed	# of boaters wearing life jackets	%
Kent Narrows, Chesapeake Bay, Kent, Maryland									
2017–2019	1126	18	1.6	57	1	1.8	20	3	15.0
2021	488	7	1.4	5	3	60.0	16	15	93.8
2022	538	19	3.4	26	2	7.7	1	0	0.0
2023	212	8	3.8	11	0	0.0	11	7	63.6
2024	373	22	5.9	17	7	41.2	5	0	0.0
Shelter Island, San Diego Bay, San Diego, California									
2017–2019	699	24	3.4	393	16	4.1	30	13	43.3
2021	121	23	19.0	92	2	2.2	9	2	22.2
2022	58	3	5.2	40	1	2.5	7	4	57.1
2023	299	8	2.7	172	6	3.5	7	5	71.4
2024	356	13	3.7	189	4	2.1	11	5	45.5
Causeway Drawbridge, Wrightsville Intracoastal, Wrightsville Beach, North Carolina									
2017–2019	1630	33	2.0	5	0	0.0	121	52	43.0
2021	718	4	0.6	0	0	0.0	8	1	12.5
2022	650	4	0.6	0	0	0.0	18	1	5.6
2023	826	2	0.2	6	0	0.0	9	2	22.2
2024	695	1	0.1	0	0	0.0	3	0	0.0
West End Boat Basin, Jones Inlet, Long Beach, New York									
2017–2019	766	80	10.4	15	6	40.0	11	8	72.7
2021	7	7	1.8	0	0	0.0	3	1	33.3
2022	252	53	21.0	4	0	0.0	8	6	75.0
2023	388	17	4.4	0	0	0.0	4	2	50.0
2024	150	11	7.3	1	1	100.0	2	2	100.0
Ballard Locks, Puget Sound, Seattle, Washington									
2017–2019	595	51	8.6	62	14	22.6	29	26	89.7
2021	80	33	41.3	7	5	71.4	14	14	100.0
2022	162	19	11.7	26	9	34.6	31	18	58.1
2023	123	19	15.4	21	5	23.8	6	6	100.0
2024	160	19	11.9	16	5	31.3	25	20	80.0
Ivar's Restaurant, Lake Union, Seattle, Washington									
2017–2019	2478	37	1.5	10	4	40.0	70	62	88.6
2021	223	29	13.0	5	3	60.0	67	61	91.0
2022	873	9	1.0	2	0	0.0	41	38	92.7
2023	501	5	1.0	0	0	0.0	33	24	72.7
2024	910	12	1.3	14	2	14.3	37	25	67.6

Table 2.17. Percent Wear Rate by Boat Type for Intervention and Control Sites

	Site	
Year	**Intervention Sites**	**Control Sites**
Powerboats Wear Rate		
2017–2019 (baseline)*	4.7	6.0
2021*	3.9	5.2
2022	5.9	5.5
2023*	2.3	4.9
2024*	2.9	4.7
Sailboats Wear Rate**		
2017–2019 (baseline)*	20.9	32.5
2021*	14.4	40.8
2022	26.1	39.3
2023*	5.0	34.9
2024*	8.3	40.0
Paddlecraft Wear Rate		
2017–2019 (baseline)*	54.9	56.5
2021*	67.4	46.1
2022	71.3	53.0
2023*	64.2	50.4
2024*	60.6	51.0

*Significant difference between intervention and control sites
**NOTE: n<20 in intervention sites in 2023 and 2024 and may be unreliable.

Figure AA. Percent Wear Rate for Powerboats for Intervention and Control Sites

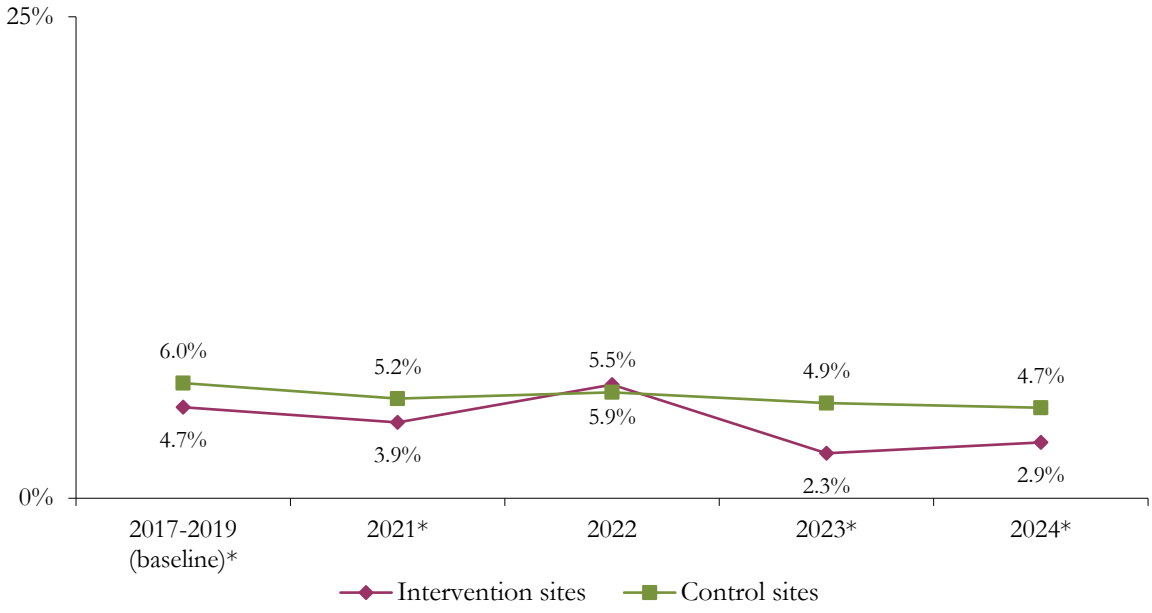


Figure AB. Percent Wear Rate for Sailboats for Intervention and Control Sites

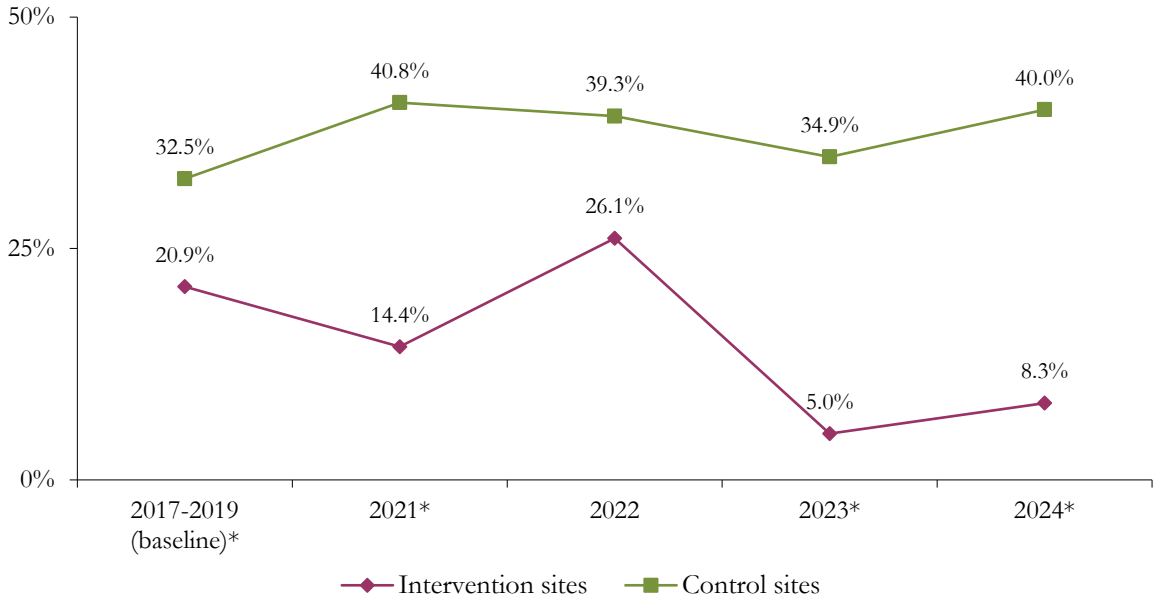


Figure AC. Percent Wear Rate for Paddlecraft for Intervention and Control Sites