2022 Life Jacket Wear Rate Observation Study

Featuring

National Wear Rate Data from 1999 to 2022

YOUR BOATING DOLLARS AT WORK

Produced under a grant from the Sport Fish Restoration and Boating Trust Fund, administered by the U.S. Coast Guard

2022 Life Jacket Wear Rate Observation Study

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National Wear Rate Data from 1999 to 2022

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JSI Research & Training Institute, Inc.
and
U.S. Coast Guard Auxiliary

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AUXLWO

2022 marks the 7th year of USCG Auxiliary participation in this data collection effort. The AUXLWO (Auxiliary Life Jacket Wear Observation) program launched officially in 2018 by the Coast Guard Office of Auxiliary & Boating Safety (CG-BSX). To date, 271 individual Auxiliary members in 20 states have contributed to the study.

Special thanks for multiple years of leadership from:
Jeff Decker, USCG, Grant Technical Manager
Charles Hurley, USCG Auxiliary National Division Chief, AUXLWO
Bill Jefferson, Branch Chief- Special Programs Outreach East
Randy Wesson, Branch Chief- Special Programs Outreach West

Thank you to all Auxiliary participants in these 20 states: Arizona, California, Florida, Georgia, Kansas, Louisiana, Maryland, Michigan, Minnesota, Missouri, New York, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Wisconsin.

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Table of Contents

I. Introduction

This report provides data and analysis on the 2022 National Life Jacket Wear Rate Observation Study with comparison information from the previous twenty-three years of studies (1999-2021). Life jacket wear rate data was not collected during the 2020 observation year due to the COVID-19 pandemic which accounts for missing year of data collection in the twenty-four-year lifespan of the project. Tracking changes in life jacket wear rates over time provides important statistics for those individuals and groups responsible for educating the public about boating safety, improving boating safety programs, and for legislative efforts targeting safety improvements for recreational boating. The 2021 Recreational Boating Statistics report, published by the United States Coast Guard (USCG), shows that among the 658 drowning deaths in 2021 where life jacket use or nonuse was known, 83% of the individuals were reported as not wearing a life jacket. These statistics make it essential to not only track the national life jacket wear rate among recreational boaters, but also to understand the circumstances and patterns in which life jackets are worn.

Calendar year 2022 marked the twenty-third year of life jacket wear rate data collection efforts conducted by JSI Research & Training Institute. The cumulative years of data allow for a higher level of analysis (i.e., controlling for the impact of influencing factors like age, weather, and boat type) in order to unmask potential trends and indicators of increased or decreased life jacket wear among different groups of recreational boaters.

Beginning April 1, 2021, Congress passed a law requiring the use of an engine cut-off switch (ECOS) for operators of powered recreational vessels less than 26 feet in length. In order to capture use of ECOS, JSI added an additional ECOS data collection point to the data collection forms in 2021. ECOS status is collected for all powerboats regardless of size. The findings for ECOS data collection are provided in this report.

Most data in this report are presented separately for adults (18+ years old) and youth (0 to 17 years old) since wear rates are substantially different for these two groups. This descriptive section of this report provides findings on summer wear rates by age and boat type and initial findings for fall pilot observations. Over the twenty-three years of the presented data, the general distributions of age, gender, boat types, boat characteristics, and site characteristics have remained relatively stable. The appendix contains a detailed description of methods used and proportions of various boaters; boat and site characteristics are shown for the 1999-2022 period of data collection. In order to efficiently present findings throughout all years of the study, tables combine years 2000 – 2002, 2003-2005, and 2006-2008 and use the average value for these years.

II. National Core Data Results

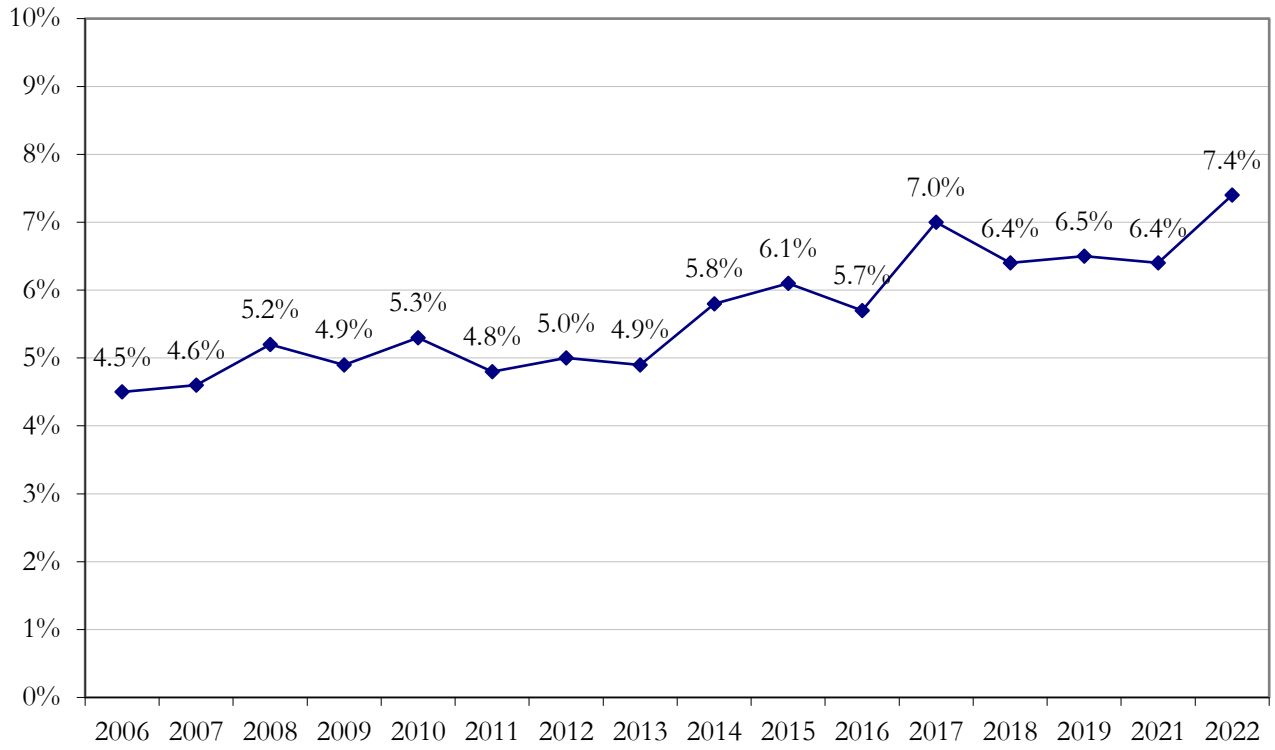
Adult Life Jacket Wear Rates on Open Motorboats 2006 to 2022

The National Boating Safety Advisory Council (NBSAC) recommended the creation of a strategic plan for the National Recreational Boating Safety Program in 2005. The goals, objectives, and strategies in this Plan can help all partners in boating safety work together to reduce the incidents of preventable deaths, injuries, and property damage. One of the objectives of all of the Strategic Plans, since the 2005 Strategic Plan, is to increase the observed life jacket wear rate of adults in open motorboats. For the purposes of this measurement, "open motorboats" are a combination of the skiff/utility (hereafter as "skiffs") and runabout/speedboat (hereafter as "speedboats") categories that are individually presented later in this report. This objective was put in place beginning in 2006.

To ensure that comparisons to 2006 and each subsequent year are valid, the proportion of skiffs to speedboats in each state for each subsequent year was set to mirror the proportions found in 2006 since the wear rates for skiffs are generally greater than those for speedboats. For example, in 2006 the national proportion across all states of the number of skiffs to the number of speedboats was 22% versus 78%, but in 2011 the proportions were 31% to 69%. If proportions of these boat categories were not adjusted, the 2011 combined wear rate would appear more positive simply because JSI observed more skiffs relative to speedboats that year than in 2006. Similarly, the proportions are likely to fluctuate each year in each state.

Weighting each state's data to correspond to the 2006 state ratios, the adult wear rate for open motorboats in 2022 is 7.4% and it represents a generally improving trend since 2006 and is the highest wear rate ever for this type of craft. (See Figure A for a chart showing these trends and Table 2.2 on page 14.) Since 2006 the wear rates for open motorboats have shown a relative increase by 64.4% since 2006 going from 4.5% to 7.4%.

Figure A – Adult Wear Rates on Open Motorboats* 2006-2022
(Weighted to 2006 Skiff-Speedboat Proportions for Each State)



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* 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 national average is weighted to reflect the 2006 proportions.

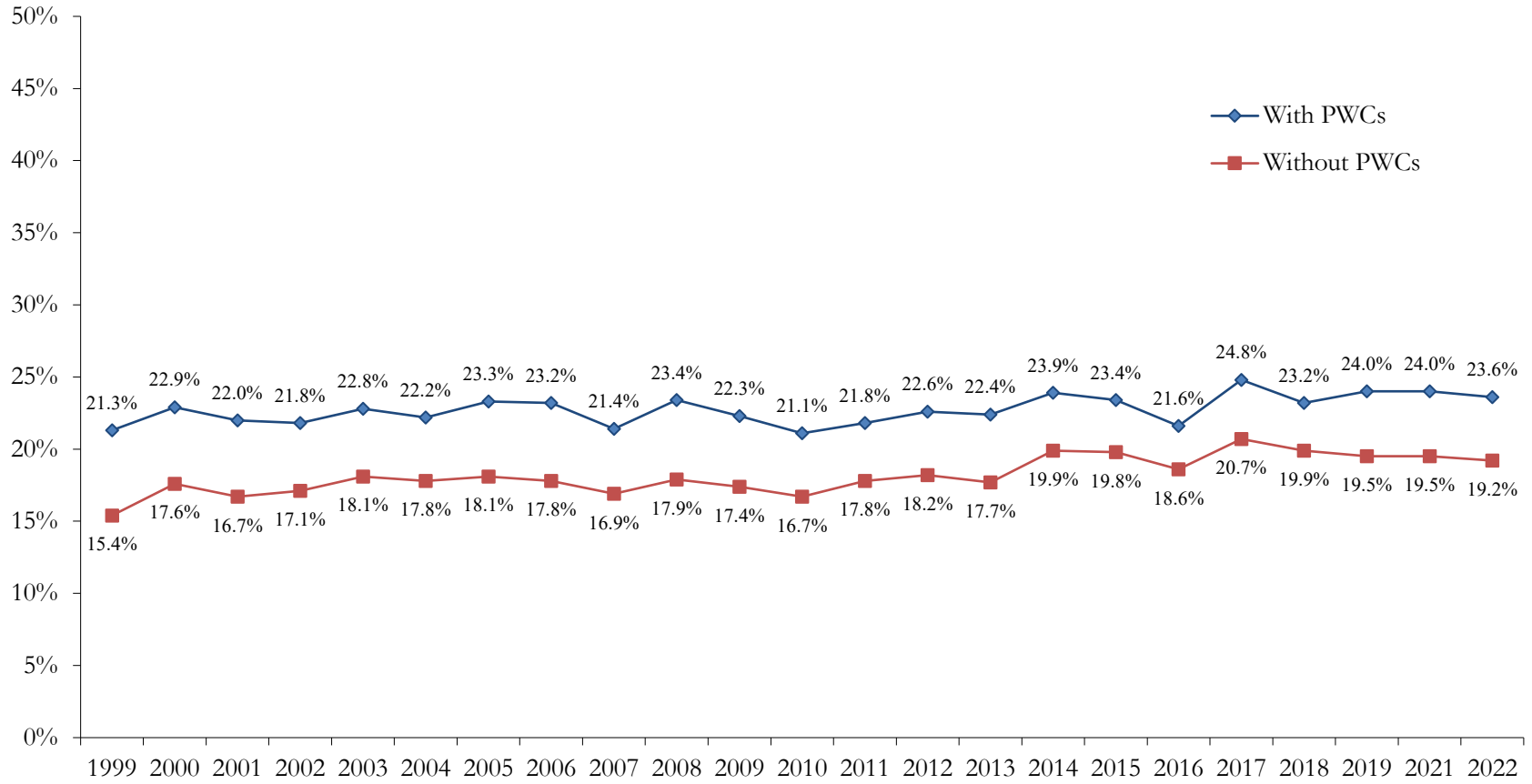
National Life Jacket Wear Rates for ALL Boaters 1999 to 2022

Figure B shows trends for national life jacket wear rates, including all groups of recreational boaters together (youth and adults) for two groups of boats - "all boats" and "all boats except PWCs". The two sets of data present a clear indication of the impact of PWCs (personal watercraft) on the overall average wear rates. In subsequent tables in this report JSI removed PWCs from the findings since this will provide a more valid representation of the trends in voluntary wear rates, since life jacket wear is mandated for operators and passengers of PWCs in almost all the states where observations occur (the exception is Alaska for adults).

The average life jacket wear rate for all boats and boaters combined for 2022 was 23.6%. This is a relative increase of 10.8% since the beginning of the study in 1999 (21.3%).

The 2022 average wear rate excluding PWCs was 19.2%, which represents a relative increase of 24.7% since 1999 (15.4%). However, since a high wear rate in 2017 there has been a slight but steady decline in wear rates from 20.7% to this year's 19.2%.

Figure B – Life Jacket Wear Rates for ALL Boaters



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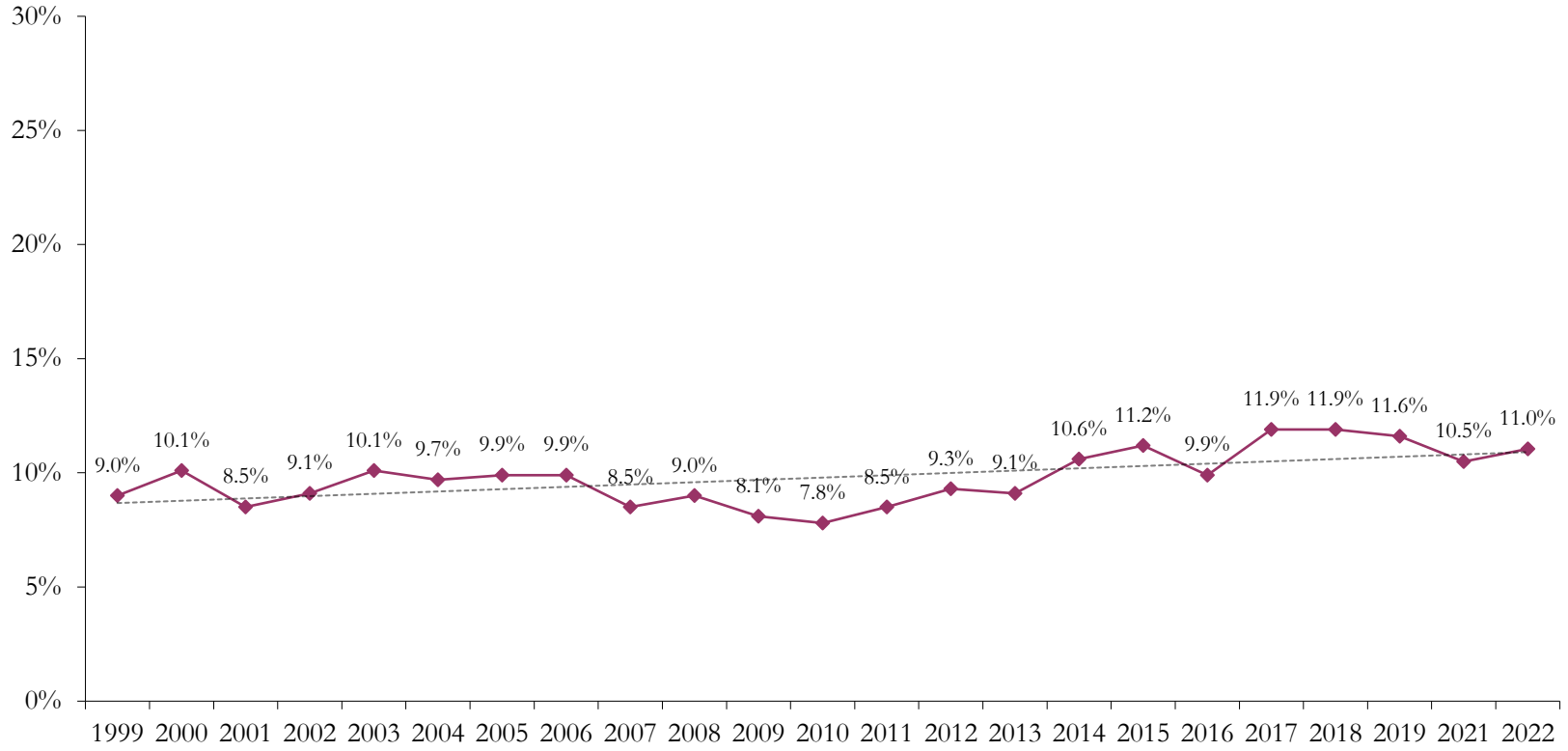
*Factors controlled for: Age & Boat Type.

National Life Jacket Wear Rates for ADULTS (18 years or older) 1999 to 2022

Figure C and Table 2.1 show the national wear rate trend for all adults on all boats excluding PWCs. The national average wear rate for all adults in 2022 was 11.0%. The 2022 rate represents a 22.2% relative increase since 1999 (9.0%) and a 41.0% relative increase since 2010 (7.8%). The 2022 rate shows a slight increase after a short trend since 2017 in small declines in adult wear rates.

Figure C – Life Jacket Wear Among Adult Boaters*
(All boats except PWCs)



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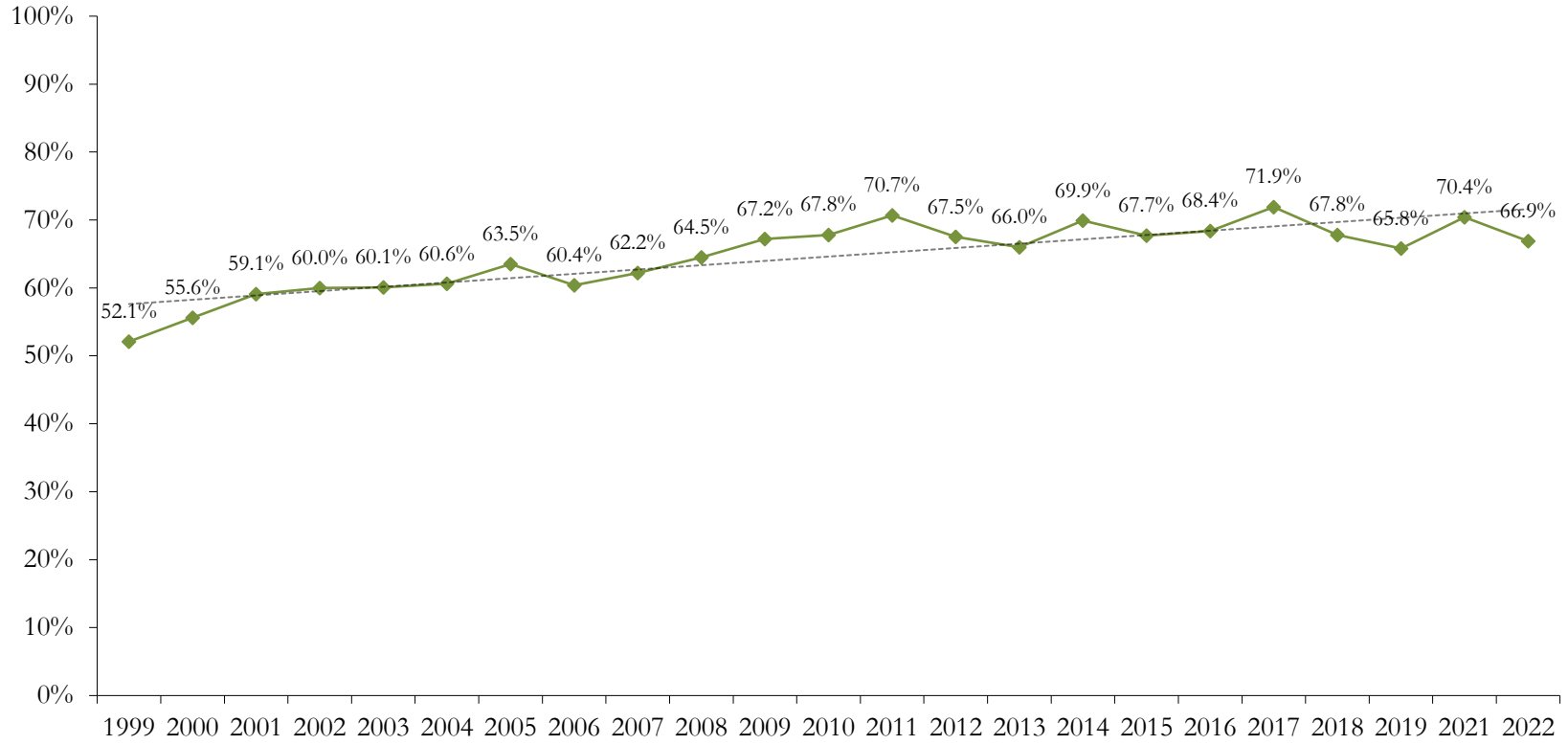
*Factors controlled for: Age & Boat Type.

National Life Jacket Wear Rates for YOUTH (17 years or younger) 1999 to 2022

Figure D and Table 2.1 show the national wear rate trend for all youth (17 years or younger) on all boats except PWCs. These rates are relatively high across the twenty-one years of data shown, with a general upward trend. The wear rate for 2022 is 66.9%. This is a relative increase of 28.4% since the beginning of the study in 1999 (52.1%). However, this year's data represents a noticeable drop from the 2021 data and as tables in the next section show how each youth age group contributes to that decline.

Figure D – Life Jacket Wear Among Youth Boaters*
(All boats except PWCs)



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*Factors controlled for: Age & Boat Type.

Life Jacket Wear Rates by Age Categories 1999 to 2022

Table 2.1 presents wear rates by the different age categories captured in the study.

The youth (0-17) wear rate for 2022 was 66.9%, a 28.4% relative increase since 1999 (52.1%). Wear rates for the under 6 age group have always been high; the 2022 rate of 90.1% represents a 11.8% relative increase since 1999 (80.6%). Wear rates for the 6-12 year olds were 84.8% and represent a 22.7% relative increase since 1999 (69.1%). Teenagers (13-17) wear rates of 38.7% represents a 60.6% relative increase since 1999 (24.1%). All youth age groups decline a bit from the 2021 data levels, however.

For adults ages 18 to 64, the 2022 wear rate is 10.8% and represents a 22.7% relative increase since 1999 (8.8%).

For adults 65 years of age and older, the 2022 data show a wear rate of 16.2% the highest that it has ever been and represents a 26% increase from 1999 (12.9%).

As indicated in Figure C and in Table 2.1, for the combined adult group (18+ years), there has been a relative increase in wear rates of 22.2% since 1999 (9.0% to 11.0%).

Table 2.1 – Life Jacket Wear Rates by Age Excluding Boaters on PWCs*

Age	Observation Year																
	1999 % (N's)	2000-2002 % (N's)	2003-2005 % (N's)	2006-2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)
0-5 yrs	80.6% (500)	90.3% (2096)	92.9% (2115)	93.3% (2792)	93.6% (854)	94.8% (811)	96.6% (874)	94.7% (662)	93.5% (789)	94.5% (804)	92.1% (694)	92.9% (573)	94.1% (555)	90.4% (615)	93.2% (790)	91.3% (368)	90.1% (444)
6-12 yrs	69.1% (2104)	76.0% (8579)	80.7% (7834)	83.5% (7806)	86.5% (2812)	89.1% (2809)	90.7% (2381)	84.9% (2844)	85.4% (2494)	87.3% (2757)	87.2% (2227)	84.1% (2184)	87.3% (2131)	86.2% (2575)	82.2% (2473)	88.6% (1889)	84.8% (1807)
13-17 yrs	24.1% (2244)	30.0% (8101)	31.5% (7390)	31.8% (7551)	38.9% (2420)	35.1% (2127)	41.4% (1817)	37.6% (2163)	34.9% (1933)	41.6% (1837)	37.2% (1694)	41.5% (1675)	46.5% (2077)	38.3% (2138)	38.9% (2176)	40.7% (2099)	38.7% (1808)
0-17 yrs (all youth)	52.1% (4624)	59.3% (18776)	62.2% (17339)	63.2% (18149)	67.2% (6086)	67.8% (5747)	70.7% (5072)	67.5% (5669)	66.0% (5216)	69.9% (5398)	67.7% (4615)	68.4% (4432)	71.9% (4763)	67.8% (5328)	65.8% (5439)	70.4% (4356)	66.9% (4059)
18-64 yrs	8.8% (24321)	8.8% (91135)	9.0% (91246)	8.5% (92407)	8.1% (34632)	7.7% (36420)	8.5% (33267)	9.2% (32298)	9.1% (30843)	10.4% (33058)	11.1% (31012)	9.9% (30906)	11.9% (29760)	11.9% (34246)	11.6% (32918)	10.3% (26365)	10.8% (23978)
65+ yrs	12.9% (1147)	7.3% (3236)	8.9% (3255)	8.1% (2874)	7.0% (1129)	10.7% (763)	7.2% (951)	11.8% (1122)	6.9% (1091)	13.3% (1634)	12.3% (1232)	11.0% (1339)	12.2% (1134)	11.7% (975)	12.0% (1078)	14.6% (1522)	16.2% (982)
18+ yrs (all adults)	9.0% (25468)	8.7% (94371)	9.0% (94501	7.8% (95281)	8.1% (35761)	7.8% (37003)	8.5% (34218)	9.3% (33420)	9.1% (31934)	10.6% (34692)	11.2% (32244)	9.9% (32245)	11.9% (30894)	11.9% (35221)	11.6% (33996)	10.5% (27887)	11.0% (24960)

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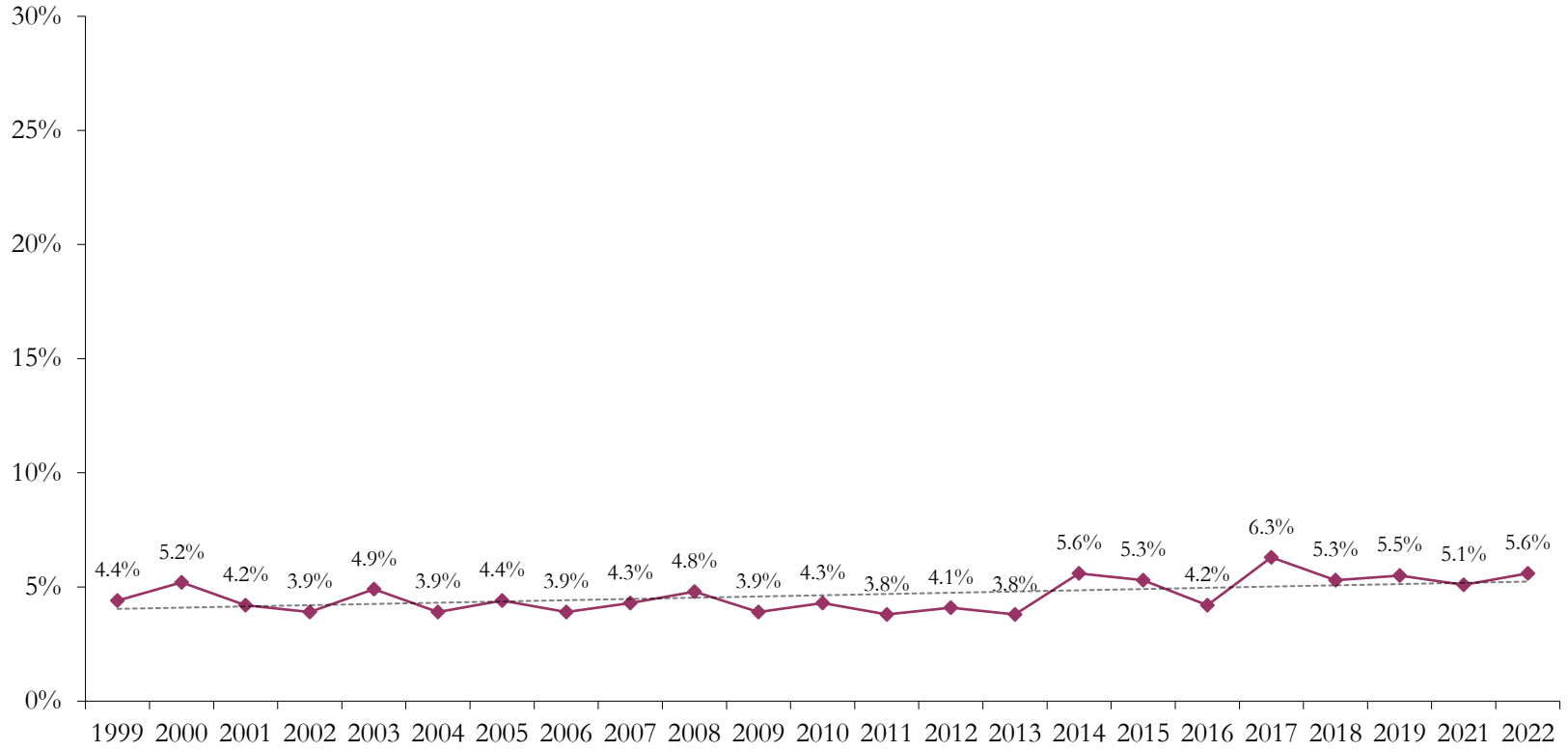
*Factors controlled for: Age & Boat Type.

Powerboats for Adults (18 years or older)

Figure E and Table 2.2 present information for all powerboats for adults. The 2022 rate for all powerboats, excluding PWCs, is 5.6%, a relative increase of 27.2% compared to 1999 rates (4.4%). Wear rates in 2022 for skiff/utility (8.2% to 8.5%) and powered inflatables/rafts (15.0% to 22.1%) are higher than the observed wear rates in 2021 for those boat types. Cabin cruisers show a wear rate of 4.7%, the highest wear rate ever observed and represents a 74.1% increase than the previous year (2.7%) and a 261% increase since 1999 (1.8%).

Figure E – Adult Wear Rates for ALL Powerboats Except PWCs*



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*Factors controlled for: Age & Boat Type.

Table 2.2 - Life Jacket Wear Rates by Powerboats for Adults*

Boat Type	Observation Year																
	1999 % (N's)	2000-2002 % (N's)	2003-2005 % (N's)	2006-2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)
All Powerboats (no PWC's)	4.4% (19894)	4.2% (76000)	4.3% (77632)	4.3% (80007)	3.9% (29924)	4.3% (30894)	3.8% (28954)	4.1% (27890)	3.8% (26786)	5.6% (28766)	5.3% (26444)	4.2% (26774)	6.3% (25823)	5.3% (29602)	5.5% (28792)	5.1% (23561)	5.6% (21814)
Skiff/Utility	10.0% (1867)	8.2% (7564)	8.4% (13680)	8.4% (16052)	6.9% (7257)	9.7% (6634)	8.2% (6530)	7.8% (6936)	6.4% (7231)	13.1% (6776)	10.2% (6592)	7.4% (7338)	10.8% (7558)	10.8% (8407)	9.0% (8946)	8.2% (7392)	8.5% (7127)
Runabout/ Speedboat	4.2% (13195)	4.7% (45514)	4.4% (43325)	3.8% (42827)	3.5% (14635)	3.2% (15093)	3.0% (14381)	3.3% (13441)	3.5% (11686)	3.5% (13040)	4.1% (11853)	3.5% (11736)	4.6% (10192)	3.4% (11277)	4.1% (11083)	3.9% (8766)	3.8% (7877)
Runabout/ Speedboat (excluding towed participants)	3.6% (13096)	4.0% (45205)	3.6% (42920)	2.9% (42433)	2.5% (14481)	2.2% (14947)	2.3% (14279)	2.3% (13294)	2.4% (11554)	2.6% (12923)	3.5% (11766)	2.7% (11638)	3.7% (10101)	3.0% (11218)	3.5% (10998)	3.3% (8706)	3.3% (7832)
Open Motorboats**	5.5% (15062)	.	.	.	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)
Cabin Cruiser	1.8% (3396)	1.6% (17727)	1.3% (15408)	1.7% (14061)	1.6% (5342)	1.5% (5900)	1.6% (5085)	1.6% (4611)	1.0% (4719)	2.2% (4669)	2.7% (4782)	1.4% (4418)	3.9% (4301)	1.1% (4920)	2.8% (4183)	2.7% (2839)	4.7% (2617)
Houseboat	0.0% (151)	0.4% (502)	1.7% (763)	0.0% (209)	0.0% (31)	0.0% (140)	1.2% (309)	0.0% (18)	0.0% (51)	0.8% (131)	1.6% (64)	0.0% (93)	0.0% (32)	0.0% (63)	0.0% (85)	0.0% (55)	0.0% (57)
Pontoon	4.0% (1231)	3.2% (5195)	3.2% (5219)	2.0% (6477)	2.1% (2436)	1.5% (2922)	1.4% (2734)	2.3% (2624)	1.4% (2917)	2.4% (3966)	2.6% (2961)	1.5% (3080)	3.4% (3438)	3.3% (4695)	2.3% (4237)	2.4% (4291)	3.3% (3994)
PWC	94.2% (1899)	96.6% (5639)	95.2% (5168)	97.0% (5708)	97.4% (2093)	97.5% (1921)	97.7% (1524)	96.9% (1811)	96.3% (1905)	96.9% (1856)	97.6% (1501)	95.6% (1256)	97.9% (1625)	97.4% (1483)	97.0% (1960)	97.0% (1673)	97.2% (1412)
Powered Inflatable/ Raft	15.7% (205)	18.6% (590)	14.3% (814)	21.1% (797)	11.9% (254)	16.7% (345)	14.3% (224)	14.1% (278)	27.2% (233)	22.9% (315)	12.8% (256)	23.8% (223)	13.1% (334)	13.1% (303)	26.8% (343)	15.0% (273)	22.1% (199)

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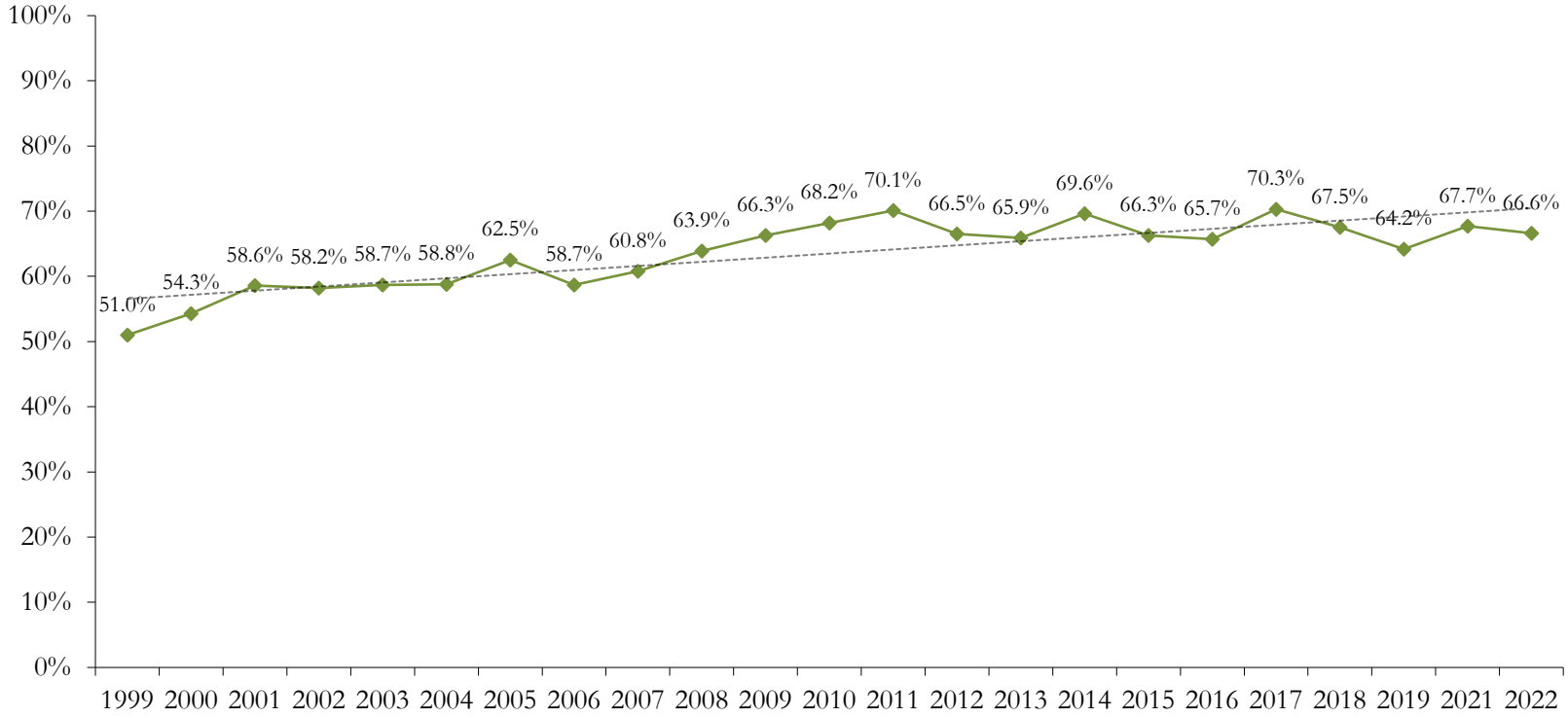
*Factors controlled for: Age & Boat Type.
** The Open Motorboat category was created by grouping "skiffs" and "speedboat/runabouts" together. Factors controlled for in this line of the chart are Age (proportions of 18 to 64 and 65+ adults) and the proportion of skiffs to speedboat/runabouts has been set in 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 national average was weighted to reflect the 2006 proportion.

Powerboats for Youth (17 years or younger)

Figure F and Table 2.3 present data for all powerboats for the three age groups of youth combined (17 years or younger). Wear rates for youth had generally increased over the years however; they have leveled off or even slightly decreased since the highest wear rates of 2011 (70.1%). The 2022 wear rate is 66.6%, a relative increase of 30.6% since 1999 (51.0%). Pontoon boats have had the largest increase in wear rates for youth over the life of this project. Skiff/utility and runabout/speedboat showed a slight decrease in wear rates from the previous year (68.8% to 66.2% and 67.4% to 65.5%, respectively) while cabin cruisers showed a 14.3% increase from the previous year (55.2% to 63.1%). Even though individual years may not always show increases from previous years, on all types of boats, wear rates have improved since 1999 for youth.

Figure F – Youth Wear Rates for ALL Powerboats Except PWCs*



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*Factors controlled for: Age & Boat Type.

Table 2.3 – Life Jacket Wear Rates by Powerboats for Youth*

Boat Type	Observation Year																
	1999 % (N's)	2000-2002 % (N's)	2003-2005 % (N's)	2006-2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)
All Powerboats (no PWCs)	51.0% (3834)	57.8% (15902)	60.8% (14983)	62.1% (15855)	66.3% (5451)	68.2% (5090)	70.1% (4589)	66.5% (4846)	65.9% (4546)	69.6% (4798)	66.3% (4028)	65.7% (3750)	70.3% (4118)	67.5% (4762)	64.2% (4820)	67.7% (3681)	66.6% (3524)
Skiff/Utility	52.7% (338)	61.1% (1369)	63.7% (2187)	64.3% (2596)	70.4% (1097)	68.1% (862)	75.4% (929)	65.1% (1022)	66.3% (936)	70.8% (901)	68.2% (948)	65.6% (871)	73.7% (980)	68.4% (1116)	66.0% (1088)	68.8% (1017)	66.2% (987)
Runabout/ Speedboat	51.6% (2744)	58.9% (11242)	62.4% (9909)	63.4% (10121)	68.2% (3133)	69.7% (2943)	71.0% (2624)	69.9% (2744)	69.2% (2482)	70.5% (2696)	68.1% (2121)	66.3% (1934)	70.6% (2019)	67.% (22929)	65.1% (2536)	67.4% (1641)	65.6% (1528)
Open Motorboats** (Skiff/Utility/ Runabout/ Speedboat)	51.8% (3082)	.	.	.	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)
Cabin Cruiser	42.6% (418)	49.5% (2051)	49.8% (1715)	50.6% (1721)	51.2% (644)	58.8% (524)	61.6% (507)	50.6% (465)	48.9% (505)	56.6% (364)	58.9% (430)	58.7% (409)	59.7% (473)	49.1% (459)	50.6% (400)	55.2% (279)	63.1% (269)
Houseboat	8.7% (46)	21.7% (138)	19.1% (136)	28.5% (46)	. (4)	19.1% (18)	39.9% (19)	. (3)	. (1)	. (2)	. (10)	. (8)	. (1)	. (4)	. (2)	. (0)	17.5% (13)
Pontoon	38.3% (272)	56.4% (1240)	57.7% (1172)	61.0% (1311)	66.2% (530)	68.4% (716)	65.7% (494)	67.3% (580)	66.7% (598)	71.9% (787)	63.2% (511)	65.5% (508)	72.2% (606)	75.0% (908)	65.8% (758)	72.8% (721)	71.3% (718)
PWC	96.0% (551)	99.2% (1835)	98.3% (1757)	99.2% (1766)	98.6% (572)	99.4% (427)	99.1% (376)	98.7% (401)	98.0% (371)	99.7% (365)	99.0% (292)	98.7% (154)	98.2% (275)	99.3% (269)	99.3% (402)	99.6% (245)	99.2% (234)
Powered Inflatable/ Raft	59.3% (62)	76.1% (106)	76.6% (125)	68.1% (106)	70.3% (47)	78.2% (45)	73.1% (35)	58.5% (35)	65.4% (25)	68.9% (50)	69.5% (18)	84.0% (28)	68.9% (40)	71.4% (50)	80.6% (38)	58.0% (23)	69.5% (22)

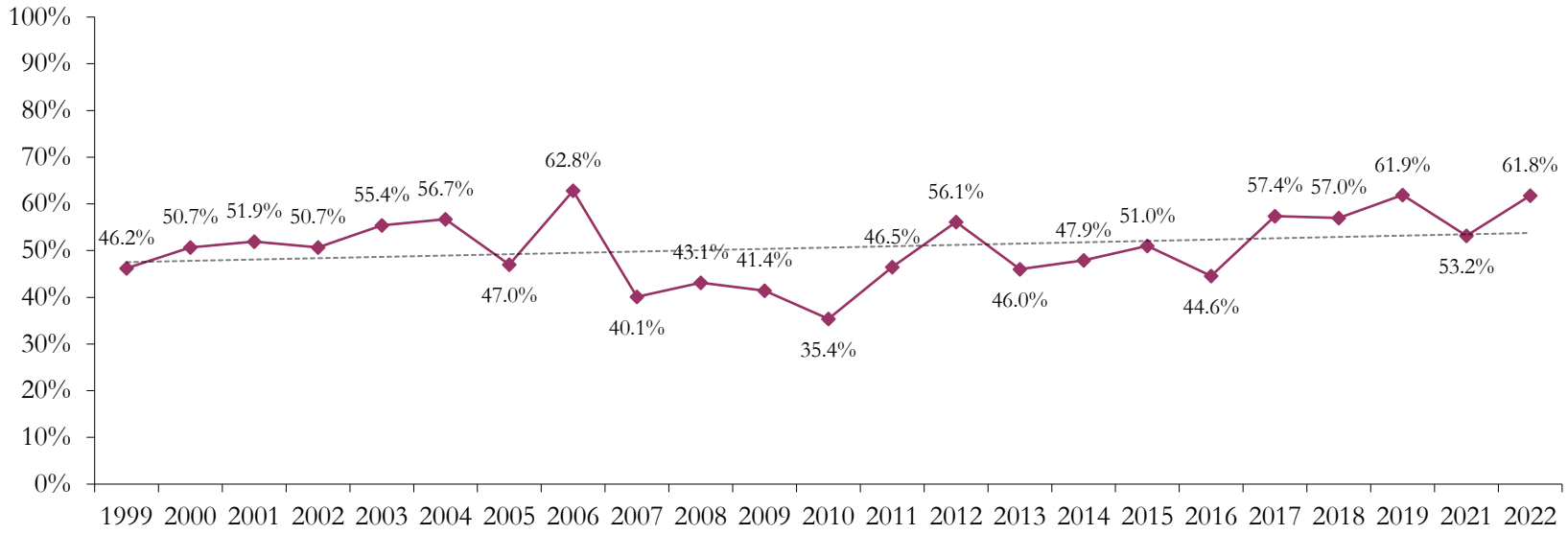
JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.
** The Open Motorboat category was created by grouping "Skiffs" and "Speedboat/Runabouts" together. The proportion of Skiffs to Speedboat/Runabouts has been set to reflect the national proportions observed in 2006, the year in which the Strategic Plan goals were first measured. In addition, JSI controls for age of youth as JSI does for the other boat types in this table.

Paddlecraft for Adults (18 years or older)

Table 2.4 presents results for adults in all types of paddlecraft and Figure G shows the trends for all paddlecraft excluding standup paddleboards (since this boat type began to be counted in 2010). The 2022 rates for all paddlecraft excluding standup paddleboards is 61.8%, representing a relative increase of 33.8% from 1999 (46.2%) rates and a relative increase of 16.2% from the previous observation year (2021, 53.2%). These changes in rates should be viewed with caution, since paddlecraft activity is mostly observed at only a few sites–mainly the Provo River in Utah where life jacket use is mandatory and the Illinois River in Oklahoma, where life jacket use is traditionally very low. Uneven changes from year to year are highly influenced by the relative number of boaters observed at these two sites.

In 2015, JSI added two rows of data to Table 2.4. One for standup paddleboards (first observed in 2010) and one for an all paddlecraft wear rate including standup paddleboards. The number of boaters observed has increased since 2010 and wear rates for standup paddleboards have hovered around 50% since 2012 (56.1%), and the 2022 rate of 48.5% represents a 74.5% relative increase since 2010 (27.8%). There has been an increase of 63.9% in all paddlecraft including paddleboards since 2010 (35.5% to 58.2%). While kayaking had a 20.9% increase in wear rates from 2021 (64.1% to 77.5%), canoeing had a slight relative decrease of 12.0% in wear rates since the previous year (32.6% to 28.7%).

Figure G – Adult Wear Rates for ALL Paddlecraft (excluding Paddleboards)*



JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.4 – Life Jacket Wear Rates by Paddlecraft for Adult*

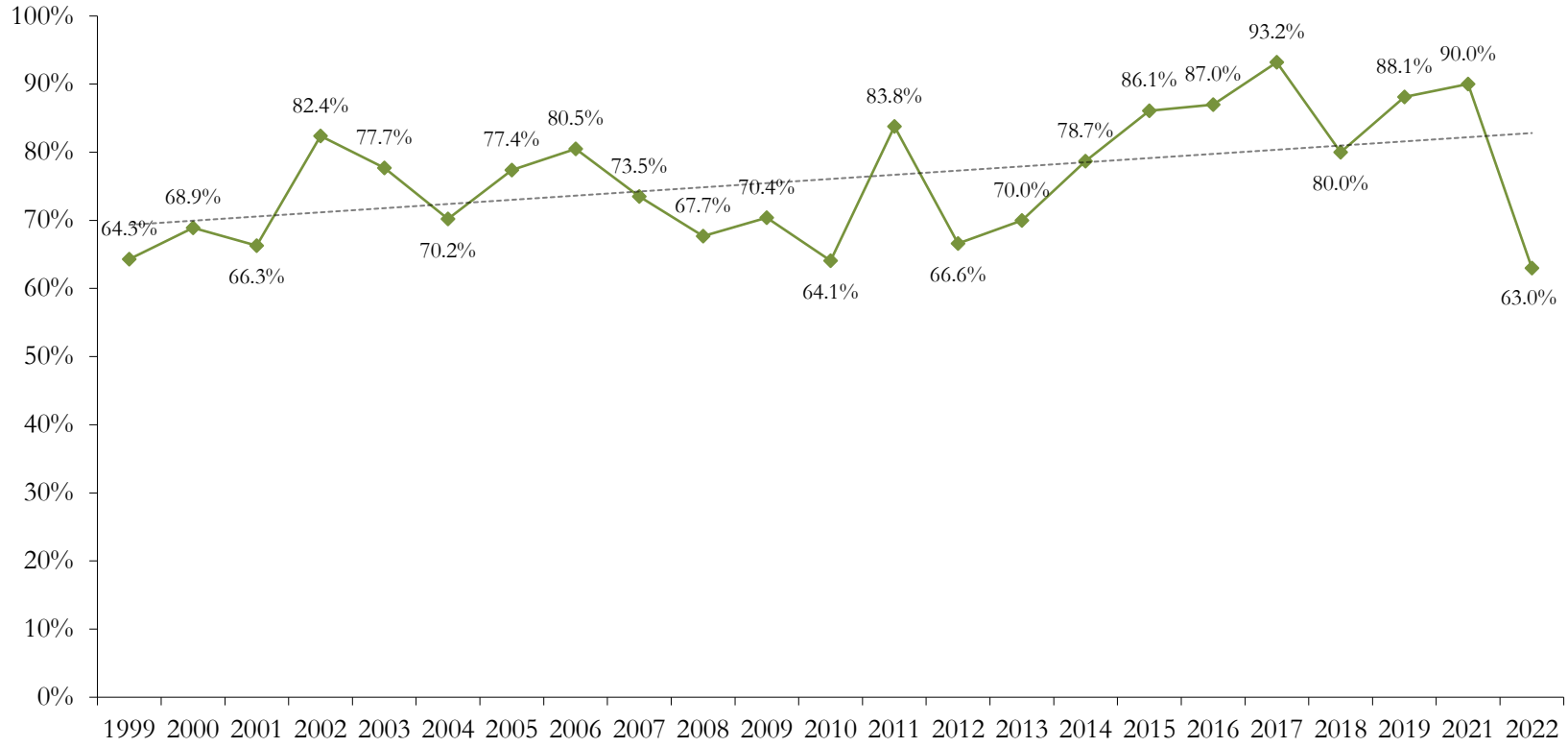
Boat Type	Observation Year																
	1999 % (N's)	2000-2002 % (N's)	2003-2005 % (N's)	2006-2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)
All Paddlecraft (excluding SUPs)	46.2% (1676)	17.0% (11492)	19.6% (10393)	24.4% (9575)	41.4% (1939)	35.4% (2551)	46.5% (1608)	56.1% (2015)	46.0% (1919)	47.9% (2555)	51.0% (2531)	44.6% (2391)	57.4% (2251)	57.0% (2353)	61.9% (2086)	53.2% (2117)	61.8% (1356)
Paddled Inflatable/ Raft	.	.	.	30.9% (739)	8.2% (340)	6.9% (813)	10.9% (324)	39.4% (485)	15.8% (271)	18.2% (337)	39.1% (455)	28.2% (371)	45.9% (354)	41.7% (247)	74.0% (209)	38.6% (516)	40.4% (265)
Rowboat/ Dinghy	24.4% (82)	27.7% (412)	18.9% (203)	23.7% (247)	35.3% (51)	34.8% (46)	34.3% (87)	60.2% (35)	17.8% (75)	29.0% (79)	22.1% (37)	40.2% (56)	43.0% (73)	32.3% (64)	11.0% (74)	8.4% (62)	33.3% (25)
Canoe	17.7% (809)	24.4% (2165)	23.7% (1910)	21.8% (1611)	25.0% (758)	19.1% (994)	37.4% (386)	32.7% (438)	35.7% (569)	24.9% (744)	30.0% (716)	14.6% (605)	30.0% (532)	28.1% (677)	23.6% (498)	32.6% (360)	28.7% (250)
Kayak	82.7% (611)	85.3% (2005)	80.8% (2027)	71.9% (2036)	72.6% (790)	75.9% (698)	68.6% (811)	74.9% (1056)	67.9% (1004)	74.9% (1395)	70.7% (1323)	71.5% (1359)	71.3% (1292)	75.6% (1365)	78.1% (1305)	64.1% (1179)	77.5% (816)
Canoe/Kayak Combined	45.9% (1420)	60.0% (4170)	57.7% (3937)	52.1% (3647)	49.1% (1548)	47.3% (1692)	49.4% (1197)	52.8% (1494)	50.9% (1573)	51.9% (2139)	51.6% (2039)	47.3% (1964)	52.3% (1824)	55.4% (2042)	56.1% (1803)	48.1% (1539)	57.7% (1066)
Paddleboards (SUPs)	.	.	.	.	.	27.8% (54)	41.7% (84)	52.9% (157)	58.7% (264)	53.9% (397)	52.0% (348)	54.6% (407)	50.9% (509)	55.3% (492)	50.3% (457)	52.7% (406)	48.5% (497)
All Paddlecraft (including SUPs)	.	.	.	.	.	35.5% (2605)	46.0% (1692)	55.0% (2171)	45.4% (2183)	48.7% (2952)	51.1% (2879)	46.0% (2798)	56.2% (2760)	56.7% (2845)	59.8% (2543)	52.9% (2523)	58.2% (1853)

JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Paddlecraft for Youth (17 years or younger)

Figure H and Table 2.5 present results for youth in paddlecraft. Data in this table should be viewed with caution because of the relatively small number of youth who use these types of craft. For all paddlecraft combined excluding standup paddleboards, the wear rate in 2022 was 63.0%, the lowest wear rate ever observed and represents a 2.1% relative decrease since 1999 (64.3%) but a 70% relative decrease from 2021. The steep decrease in wear rates for youth is in part due to a significant decrease in observations at a specific observation site (Provo River site) that has mandatory regulations for all boaters. The N changes between 2021 and 2022 were 249 to 30 youth paddlecraft users perhaps due to windy conditions and much colder water temperatures than the previous year bringing down the wear rate average.

Figure H – Youth Wear Rates for ALL Paddlecraft (excluding Paddleboards)*



JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.5 – Life Jacket Wear Rates by Paddlecraft for Youth*

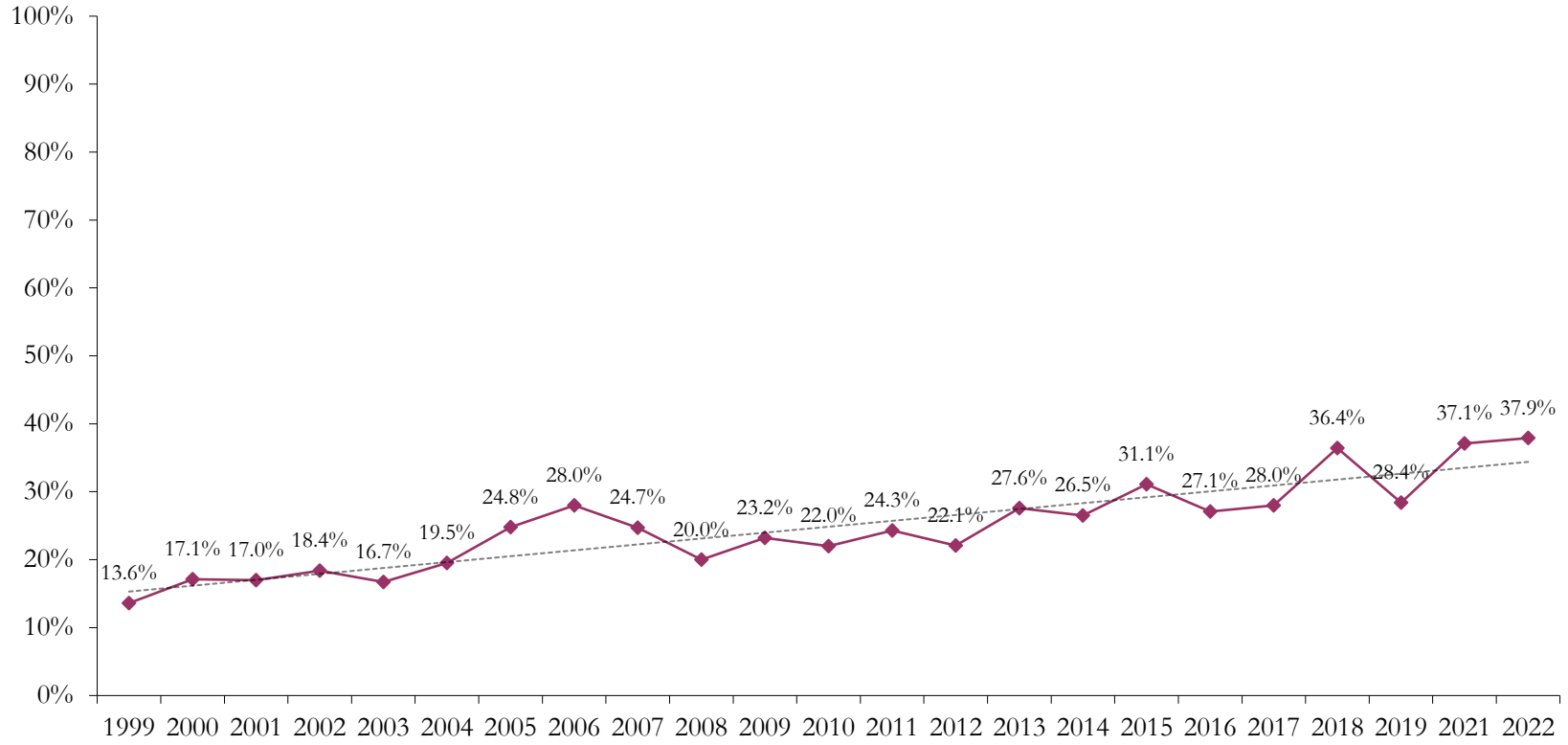
Boat Type	Observation Year																
	1999 % (N's)	2000-2002 % (N's)	2003-2005 % (N's)	2006-2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)
All Paddlecraft (excluding SUPs)	64.3% (317)	73.6% (811)	76.1% (706)	75.8% (1076)	70.4% (319)	64.1% (419)	83.8% (231)	66.6% (476)	70.0% (371)	78.7% (337)	86.1% (340)	87.0% (389)	93.2% (414)	80.0% (327)	88.1% (303)	90.0% (530)	63.0% (309)
Paddled Inflatable/ Raft	.	.	.	60.3% (393)	59.0% (76)	41.9% (139)	68.5% (49)	50.2% (192)	55.1% (98)	68.7% (100)	83.5% (112)	84.4% (119)	85.0% (127)	69.7% (88)	89.7% (73)	94.0% (293)	45.3% (101)
Rowboat/ Dinghy	11.1% (9)	63.9% (76)	74.3% (42)	71.1% (72)	. (9)	. (14)	94.0% (15)	. (10)	. (10)	74.2% (23)	. (4)	99.3% (15)	. (3)	. (6)	. (5)	. (6)	47.5% (8)
Canoe	57.7% (142)	72.6% (501)	70.5% (377)	79.9% (330)	70.6% (132)	68.0% (169)	95.2% (82)	66.5% (89)	78.0% (139)	78.4% (87)	82.1% (61)	70.0% (57)	92.6% (102)	71.5% (105)	77.2% (43)	80.0% (66)	52.0% (86)
Kayak	83.3% (84)	91.9% (234)	91.7% (287)	88.8% (281)	85.3% (102)	85.4% (97)	89.3% (85)	84.8% (185)	77.0% (124)	90.7% (127)	91.9% (163)	85.4% (198)	94.5% (182)	90.6% (128)	89.9% (182)	86.8% (165)	87.1% (114)
Canoe/Kayak Combined	67.3% (226)	81.2% (735)	81.0% (664)	85.1% (611)	76.0% (234)	75.1% (266)	88.8% (167)	74.6% (274)	77.2% (263)	83.3% (214)	85.6% (224)	78.3% (255)	92.0% (284)	81.0% (233)	82.7% (225)	82.2% (231)	71.0% (200)
Paddleboards (SUPs)	.	.	.		. (1)	. (9)	. (5)	. (13)	51.9% (52)	75.0% (44)	77.5% (40)	73.4% (84)	75.0% (80)	77.1% (61)	64.3% (98)	78.7% (75)	80.5% (87)
All Paddlecraft** (including SUPs)	.	.	.	.	70.5% (320)	63.5% (428)	84.1% (236)	67.3% (489)	63.8% (423)	78.3% (381)	85.2% (380)	84.6% (473)	90.3% (494)	79.6% (388)	82.3% (401)	94.6% (605)	66.9% (396)

JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.
**Data for this line in the table have been corrected on 5-21-2015 from the earlier published version.

Sailboats for Adults (18 years or older)

Figure I and Table 2.6 document observations of adults in sailboats. For all sailboats combined, the wear rate of 37.9% represents a 178.7% relative increase since 1999 (13.6%) and is the highest wear rate ever recorded. Sailboat wear rates for both day sailors and cabin sailboats have increased over the twenty-three years of observations. Day sailors have shown a relative increase of 159.6% from 1999 to 2022 (30.7% to 79.7%). Cabin sailboats have shown a relative increase of 195.6% from 1999 to 2022 (9.1% to 26.9%).

Figure I – Adult Wear Rates for ALL Sailboats*



JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.6 – Life Jacket Wear Rates by Sailboats for Adults*

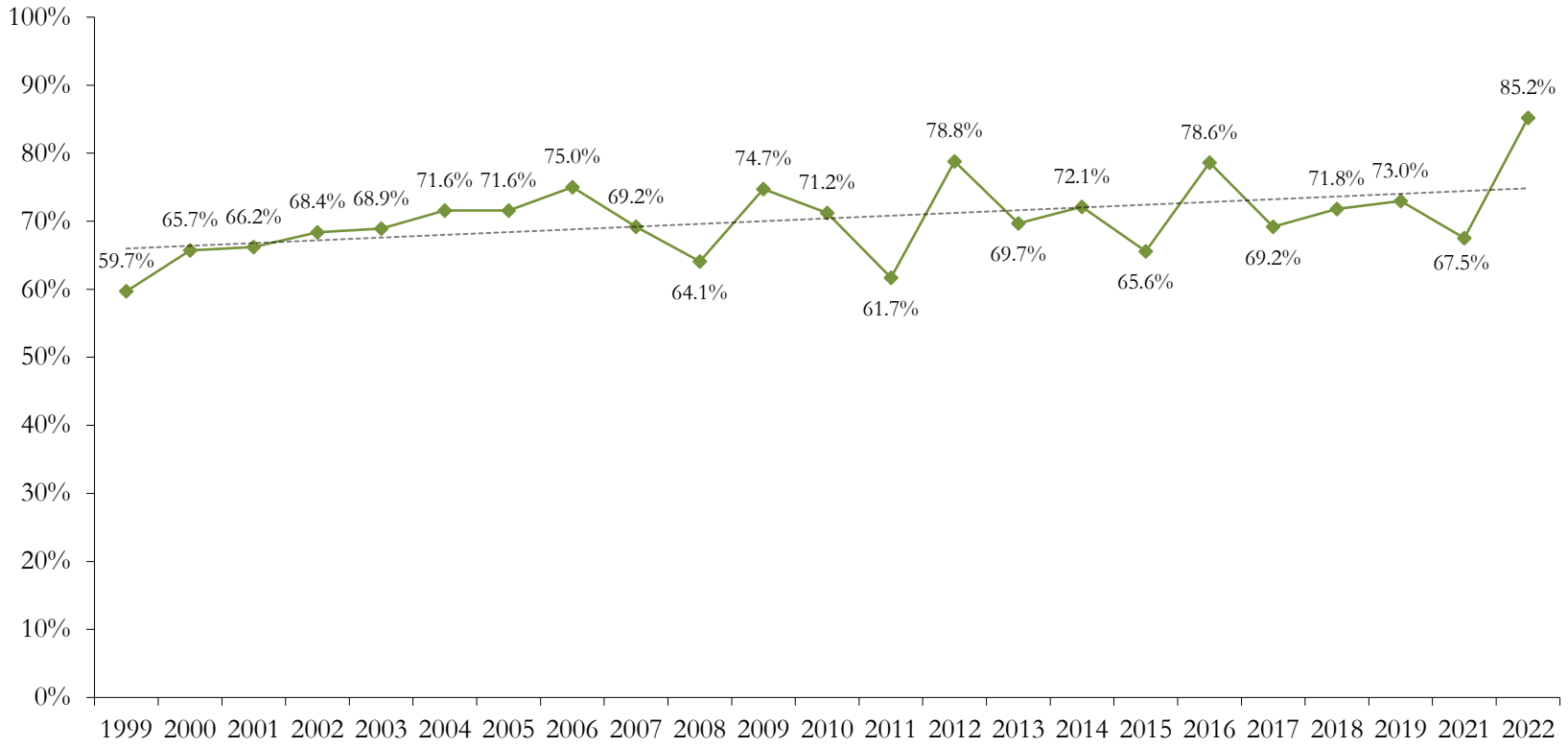
Boat Type	Observation Year																
	1999 % (N's)	2000-2002 % (N's)	2003-2005 % (N's)	2006-2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)
All Sailboats	13.6 (3420)	17.0% (11492)	19.6% (10393)	24.4% (9575)	23.2% (3733)	22.0% (3336)	24.3% (3231)	22.1% (3297)	27.6% (2840)	26.5% (2786)	31.1% (2800)	27.1% (2557)	28.0% (2269)	36.4% (2766)	28.4% (2568)	37.1% (1742)	37.9% (1154)
Sailboard	16.4% (46)	86.1% (100)	89.7% (77)	89.6% (47)	. (7)	83.2% (29)	. (9)	. (14)	. (10)	. (3)	94.5% (17)	. (10)	. (10)	92.0% (36)	82.0% (28)	92.8% (13)	76.3% (26)
Day Sailor	30.7% (739)	41.1% (2519)	48.1% (2543)	52.8% (1651)	61.7% (652)	57.5% (731)	61.3% (736)	54.0% (682)	67.1% (469)	55.1% (630)	69.6% (565)	62.4% (532)	61.9% (365)	70.4% (560)	72.6% (602)	80.1% (249)	79.7% (251)
Cabin Sailboat	9.1% (2635	10.3% (8873)	11.7% (7773)	16.2% (7877)	13.0% (3074)	11.7% (2576)	13.4% (2486)	12.9% (2601)	17.3% (2361)	18.3% (2153)	20.5% (2218)	17.2% (2015)	18.8% (1894)	27.1% (2170)	15.7% (1938)	26.6% (1480)	26.9% (877)

JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Sailboats for Youth (17 years or younger)

Figure J and Table 2.7 show that the national average wear rate on all sailboats for all youth in 2022 was the highest ever recorded at 85.2% and represents a relative increase of 42.7% since 1999 (59.7%). View wear rates with caution since relatively few youth, particularly younger youth, participate on these types of boats.

Figure J – Youth Wear Rates for ALL Sailboats*



JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Table 2.7 – Life Jacket Wear Rates by Sailboats for Youth*

Boat Type	Observation Year																
	1999 % (N's)	2000-2002 % (N's)	2003-2005 % (N's)	2006-2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)
All Sailboats	59.7% (347)	66.2% (1134)	70.5% (974)	69.3% (915)	74.7% (305)	71.2% (202)	61.7% (219)	78.8% (313)	69.7% (220)	72.1% (206)	65.6% (170)	78.6% (200)	69.2% (147)	71.8% (174)	73.0% (211)	67.5% (64)	85.2% (101)
Sailboard	0.0% (3)	77.2% (17)	. (6)	82.3% (15)	. (0)	. (1)	. (0)	. (1)	. (0)	. (1)	. (0)	. (1)	. (0)	. (1)	. (3)	. (1)	. (0)
Day Sailor	71.1% (114)	82.9% (279)	82.2% (300)	89.3% (251)	92.5% (80)	85.2% (86)	80.2% (57)	98.2% (166)	91.5% (36)	97.2% (54)	87.7% (27)	96.4% (103)	90.7% (25)	95.2% (39)	96.7% (70)	85.7% (11)	100.0% (55)
Cabin Sailboat	58.3% (230)	59.8% (838)	65.3% (668)	61.4% (649)	66.4% (225)	65.9% (115)	54.9% (162)	60.3% (146)	61.7% (184)	61.0% (152)	58.6% (143)	66.7% (97)	66.2% (122)	61.5% (134)	60.3% (138)	61.6% (52)	67.5% (46)

JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

Boat Type and Size for Adults (18 years or older)

Table 2.8 shows the breakdown of adult wear rates by boat size for three general categories of boat types: powerboats, sailboats, and paddlecraft. Data are presented only for 2004 to 2022, since 2004 was the first year that observations were divided into two size categories of 16 to 21 feet and 21 to 26 feet, from one category (16 to 26 feet that was used in prior years.)

Wear rates and boat size show an inverse relationship: wear rates decrease as the size of the boat increases. This is true for all three general types of boats. In 2022, for powerboats under 16 feet in length wear rates are at 9.7% but dropped steadily to 1.9% for boats over 26 feet in length. In 2022, for sailboats under 16 feet in length wear rates are 75.3% but dropped to 12.7% for those over 26 feet in length although this is confounded by a shift in types of sailboats as larger boats are almost all cabin cruisers whereas the small boats are day sailers. In 2022, for paddlecraft under 16 feet in length wear rates are 56.1% whereas for paddlecraft greater than 16 feet wear rates are 39.9%. Part of the explanation for this drop is the marked change in the proportions of different types of paddlecraft in the two size groups. There are many more kayaks with high wear rates in the under 16 foot category.

It should be noted that for almost every size category of powerboats and sailboats there are increases in wear rates when comparing 1999 data to 2022 wear rates. For paddlecraft that have always had relatively higher wear rates the wear rates have not increased over the years.

When comparing wear rates for each size category to rates seen in 2004 almost every length within the general boat types show marked increases over those 16 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 relative increases of wear rates for all sizes combined are less than observed for the individual size categories within the general boat types.

Table 2.8 – Life Jacket Wear Rates by Boat Type and Size for Adults*
2004 to 2022

Boat Type and Size	Observation Year																		
	2004 % (N's)	2005 % (N's)	2006 % (N's)	2007 % (N's)	2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)	2015 % (N's)	2016 % (N's)	2017 % (N's)	2018 % (N's)	2019 % (N's)	2021 % (N's)	2022 % (N's)	Total % (N's)
Powerboats (no PWCs)																			
<16 ft.	8.2% (2320)	7.6% (2734)	7.1% (3395)	8.7% (2173)	7.6% (1862)	8.5% (1824)	11.5% (2764)	8.4% (2183)	9.3% (1599)	9.3% (2119)	12.4% (2951)	6.6% (2174)	6.5% (2008)	9.4% (1483)	13.0% (1691)	13.7% (2086)	16.5% (1623)	13.6% (958)	9.7% (37335)
16-20.9 ft.	4.7% (16298)	5.1% (14629)	4.4% (11778)	4.9% (13034)	6.1% (12586)	5.0% (13125)	5.0% (13944)	5.2% (13255)	5.1% (12898)	4.3% (11424)	7.2% (12217)	6.9% (11763)	6.3% (11340)	8.3% (11416)	7.8% (11696)	5.9% (12441)	6.0% (8322)	7.2% (9332)	5.8% (221445)
21-25.9 ft.	2.4% (6218)	3.2% (5503)	2.4% (6957)	3.7% (8634)	3.4% (9127)	2.3% (10420)	2.4% (9713)	2.0% (8718)	2.7% (9389)	2.5% (9364)	3.4% (9533)	4.2% (8270)	2.2% (9048)	4.2% (8467)	3.0% (11050)	4.7% (10115)	3.2% (9957)	2.9% (8532)	3.1% (159015)
26+ ft.	0.8% (3407)	1.4% (2865)	1.6% (3268)	1.5% (3782)	1.5% (3650)	1.8% (4546)	1.3% (4473)	1.3% (4798)	2.0% (4004)	2.1% (3874)	1.4% (4065)	2.5% (4234)	1.8% (4393)	3.5% (4442)	1.7% (5153)	1.8% (4144)	2.1% (3659)	5.2% (2982)	1.9% (72011)
Sailboats																			
<16 ft.	75.0% (481)	74.0% (376)	79.7% (265)	67.6% (77)	73.2% (163)	70.2% (247)	65.5% (299)	74.6% (160)	74.2% (194)	78.7% (136)	70.3% (265)	89.6% (200)	89.0% (197)	81.5% (136)	70.5% (198)	77.0% (328)	70.3% (75)	72.8% (79)	75.3% (3876)
16-20.9 ft.	34.2% (357)	41.9% (312)	57.7% (609)	51.8% (193)	46.8% (370)	58.0% (157)	57.4% (346)	63.8% (390)	48.6% (379)	66.3% (314)	43.6% (248)	63.1% (225)	47.8% (339)	51.3% (239)	70.4% (398)	65.2% (317)	74.9% (357)	80.9% (186)	56.6% (5772)
21-25.9 ft.	12.2% (1428)	24.1% (1527)	21.0% (793)	25.5% (797)	14.0% (911)	21.5% (949)	16.7% (766)	27.5% (846)	24.3% (989)	27.6% (736)	23.8% (593)	41.1% (654)	29.4% (559)	39.1% (541)	37.9% (685)	30.1% (728)	43.8% (462)	52.0% (253)	25.2% (14217)
26+ ft.	9.9% (1864)	3.2% (875)	11.5% (1614)	15.2% (2148)	11.6% (1629)	13.1% (2380)	11.0% (1925)	9.6% (1835)	8.3% (1735)	13.4% (1654)	17.7% (1644)	15.1% (1721)	13.3% (1453)	11.6% (1353)	23.1% (1485)	8.4% (1192)	14.7% (848)	17.6% (636)	12.7% (27991)
Paddlecraft (excluding SUPs)																			
<16 ft.	60.4% (1056)	68.4% (1012)	70.6% (1147)	44.8% (1306)	38.2% (1319)	42.7% (1296)	38.0% (1953)	42.6% (1021)	57.2% (1647)	43.0% (1532)	55.3% (1760)	52.5% (2126)	49.8% (2079)	61.9% (1694)	64.1% (1671)	67.0% (1722)	66.4% (1284)	62.4% (1188)	56.1% (25602)
16-20.9 ft.	49.4% (531)	11.1% (488)	53.0% (171)	35.7% (672)	67.9% (180)	64.4% (347)	42.0% (331)	53.2% (587)	47.3% (367)	56.2% (383)	32.2% (795)	44.0% (395)	38.2% (312)	41.3% (541)	36.6% (674)	33.0% (343)	30.1% (783)	49.1% (166)	39.9% (7991)

JSI Research & Training Institute, Inc.
2022 National Observational Life Jacket Wear Rate Study
*Factors controlled for: Age & Boat Type.

III. Engine Cut-off Switch

Engine cut-off switches (ECOS) are US Coast Guard-required equipment on recreational powerboats less than 26 feet since December 2019. Even before this regulation took effect, manufacturers started to fit recreational powerboats of this size with ECOS links to help prevent runaway vessels when the operator goes overboard. In addition to boats of this size category being fitted with this equipment, a new federal law effective April 1, 2022, required those operating powerboats under 26 feet to use an ECOS while under way. This law only applies when the helm is not in a cabin and when the boat is operating on plane or above displacement speed. Use of the ECOS link is not required while the boat is docking, launching, loading on a trailer, trolling and operating in no-wake zones.

In 2021 JSI expanded data collection to include observations of the use of ECOS on powerboats. ECOS status was collected for all powerboats regardless of size and boating activity. Table 2.9 and Table 2.10 show results of the first two years of ECOS observations. Table 2.9 shows the proportion of observations for each boat type where the observer was able or not able to determine if the operator was using ECOS equipment. This may happen in situations when the view of the operator is partially obstructed, the boat is too far away, or moving at a speed that limits the detail the observer is able to obtain. Table 2.10 shows observations when use or non-use was visible and could be recorded by the observers.

Table 2.9 shows the difficulty in capturing ECOS use during observations as an ECOS is usually attached to the operator's wrist, belt, or life jacket, a view often obstructed by the vessel itself. Distance from the vessel can also prevent an observer from making a clear ECOS observation. As can be seen, visibility decreases as length increases. While there are slight fluctuations in visibility within boat type in 2021 and 2022, the overall visibility for each boat type remains relatively constant between years. Visibility was only possible in about 45% of skiffs; about a quarter of speedboats, a third of houseboats and pontoons and half of powered inflatables. ECOS for PWCs was visible, however, in about 85% of observations.

As shown in Table 2.10, when ECOS use was clearly observed (yes), the overwhelming majority of operators were not using an ECOS with the exception of PWC operators that showed ECOS use at a rate of 94.5%. Other powerboat types showed ECOS use between 0% and 10.4%. The largest fluctuation was a relative decrease of 85.6% in runabouts/speedboats (10.4% to 1.5%) and a 63.8% relative decrease in pontoons (8.0% to 2.9%). The total for powerboats using ECOS is almost entirely due to PWCs being included in the average. Data should be viewed with caution due to the difficulty in clearly observing this data point.

Table 2.9 – 2021 and 2022 ECOS Use Visibility (Yes) by Boat Type and Size

(Data are for boats not boaters; n's are denominators)

Boat Type	Boat Size							
	<16 ft. % (N's)	<16 ft. % (N's)	16 to <21 ft. % (N's)	16 to <21 ft. % (N's)	21 to <26 ft. % (N's)	21 to <26 ft. % (N's)	TOTAL % (N's)	TOTAL % (N's)
	2021	2022	2021	2022	2021	2022	2021	2022
Skiff/Utility	48.9 (519)	46.2 (377)	48.7 (1488)	41.5 (1542)	42.1 (953)	44.8 (9450)	46.6 (2960)	43.2 (2864)
Runabout/ Speedboat	35.2 (108)	19.0 (58)	23.8 (1516)	22.4 (1648)	20.4 (1244)	22.9 (913)	22.8 (2868)	22.5 (2619)
Cabin Cruiser	0.0 (0)	100.0 (1)	32.2 (87)	10.3 (29)	19.9 (316)	21.9 (247)	22.6 (403)	20.9 (277)
Houseboat	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	33.3 (3)	33.3 (3)	33.3 (3)	33.3 (3)
Pontoon	45.5 (11)	40.0 (5)	42.5 (233)	29.2 (394)	35.1 (775)	29.3 (653)	36.9 (1019)	29.3 (1052)
Powered Inflatable/Raft	54.3 (129)	50.0 (114)	57.1 (14)	69.2 (13)	0.0 (2)	50.0 (2)	53.8 (145)	48.1 (129)
PWC	87.1 (1334)	85.6 (1177)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	87.1 (1334)	85.6 (1177)
All Powerboats	72.8 (2101)	72.3 (1732)	36.6 (3338)	31.2 (3626)	30.1 (3293)	31.8 (2763)	42.8 (8732)	40.2 (8121)

Table 2.10 – 2021 and 2022 Observed ECOS Use Rates by Boat Type and Size

(Data are for boats not boaters where ECOS observation was possible; n's are denominators)

Boat Type	Boat Size							
	<16 ft. % (N's)	<16 ft. % (N's)	16 to <21 ft. % (N's)	16 to <21 ft. % (N's)	21 to <26 ft. % (N's)	21 to <26 ft. % (N's)	TOTAL % (N's)	TOTAL % (N's)
	2021	2022	2021	2022	2021	2022	2021	2022
Skiff/Utility	2.8 (254)	12.6 (174)	5.7 (725)	5.0 (640)	5.2 (401)	3.7 (423)	5.0 (1380)	5.4 (1237)
Runabout/ Speedboat	2.6 (38)	9.1 (11)	9.7 (361)	1.9 (369)	12.6 (254)	0.5 (209)	10.4 (653)	1.5 (589)
Cabin Cruiser	0.0 (0)	0.0 (1)	3.6 (28)	0.0 (3)	0.0 (63)	0.0 (54)	1.1 (91)	0.0 (58)
Houseboat	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (1)	0.0 (1)	0.0 (1)	0.0 (1)
Pontoon	0.0 (5)	0.0 (2)	8.1 (99)	5.2 (115)	8.1 (272)	1.2 (191)	8.0 (376)	2.9 (308)
Powered Inflatable/Raft	7.1 (70)	5.3 (57)	12.5 (8)	12.5 (4)	0.0 (0)	0.0 (1)	7.7 (78)	6.5 (62)
PWC	90.5 (1162)	94.5 (1007)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	90.5 (1162)	94.5 (1007)
All Powerboats	65.6 (1529)	78.1 (1252)	7.0 (1221)	4.1 (1131)	7.6 (991)	1.9 (879)	32.8 (3741)	31.9 (3262)

IV. Fall Observations

Beginning in 2022, JSI began fall life jacket wear rate observations at 19 sites within 5 established summer observation states to explore changes in life jacket wear rates and boater activity. Initial findings from the fall observation pilot should be viewed with caution until data is gathered from additional sites and future observations.

a. Table 2.11 shows the difference in wear rates for major boat types in summer and fall observations. There is a relative increase of 94.0% on powerboats (5.1% to 11.1%). This can be explained by two factors, an increase in the proportion of boaters engaged in fishing or intent to fish and also an increase in wear rates for boaters involved in those activities from summer to fall. During fall 2022 observations compared to summer there was a significant increase in types of activities for intent to fish (35.1% to 64.9%) and an increase in fishing activity (46.5% to 53.5%). A significant increase of life jacket wear rates for boaters with intent to fish from summer to fall of 127.5% (9.1% to 20.7%) was observed. Additionally, colder fall weather likely influences higher life jacket wear rates and for boaters not involved in fishing or intent to fish we saw a small increase in wear rates from summer to fall.
b. Wear rates on sail boats and paddle boats remain relatively constant.

Table 2.11– Summer and Fall 2022 Observed Adult Wear Rates by Boat Type

	Observation Period	
Boat Type	Summer 2022 % (N's)	Fall 2022 % (N's)
Powerboats Sail Boats	5.7% (4396)	11.1% (1523)
Paddle Boats	27.0% (89)	25.5% (447)
Powerboats Sail Boats	61.2% (91)	64.5% (109)
All Boat Types	8.1% (4666)	16.4% (2121)

V. Conclusions for Life Jacket Wear Rates

For the twenty-three years of the Life Jacket Wear Rate Observation Study there have been increases in wear rates on many types of boats and for all age groups. The average wear rate in 2022 for all boaters on all types of boats except PWCs was 19.2%, which is a relative increase of 24.7% over the 1999 wear rate of 15.4%.

Some boat types show greater increases than other boat types. The same is true for age groups. Below JSI summarizes the relative increases in wear rates for age groups and for boat types.

2. For many different age groups of boaters on all types of boats taken together, wear rates in 2022 mark substantial relative increases in wear rates since the 1999 baseline year.

    a. All adults (18+) on all types of boats excluding PWCs: 22.2% relative increase (9.0% to 11.0%)
    b. All youth (0-17) on all types of boats excluding PWCs: 28.4% relative increase (52.1% to 66.9%)
    c. Children (0-5) on all types of boats excluding PWCs: 11.8% relative increase (80.6% to 90.1%)
    d. Children (6-12) on all types of boats excluding PWCs: 22.7% relative increase (69.1% to 84.8%)
    e. Teenagers (13-17) on all types of boats excluding PWCs: 60.6% relative increase (24.1% to 38.7%)

3. For adults there have been notable relative increases in wear rates by specific types of boats comparing 2022 levels to the baseline year of 1999.

    a. All powerboats except PWCs: 27.2% relative increase (4.4% to 5.6%)
    b. Open motorboats: 64.4% relative increase from 2006 (4.5% to 7.4%)
    c. All paddlecraft except paddleboards: 33.8% relative increase (46.2% to 61.8%)
    d. All sailboats: 178.7% relative increase (13.6% to 37.9%)
    e. Day sailors: 159.6% increase (30.7% to 79.7%)
    f. Cabin sailboats: 195.6% increase (9.1% to 26.9%)

4. Over the twenty-three-year span of this study, there has been a trend for a larger proportion of the boating public to use longer boats. This is particularly true for the powerboat category. In 2004, about a third of the occupants (34%) were on powerboats less than 21 feet in length, but in 2022, 59.2% of the boating public were on powerboats of greater than 21 feet. However, since wear rates tend to be lower on larger boats, this trend of increasing boat sizes, masks the actual relative proportion of increases of wear rates observed if one only looked at improvements within a boat category.

5. Fall observations, piloted in 2022, provided initial insight into wear rates and boater activity within 5 states included in yearly summer observations.
    a. Relative increase of wear rates from summer to fall on powerboats of 94.0% (5.1% to 11.1%).
    b. Relative increase of intent to fish activity from summer to fall of 84.9% (35.1% to 64.9%).
    c. Relative increase of life jacket wear rates for boaters with intent to fish from summer to fall of 127.5% (9.1% to 20.7%).

VI. Information on Boats & People Observed

From 1999 to 2022, JSI has observed a total of 325,898 boats and 915,441 boaters during summer observations. This year, 2022, 11,295 boats carrying 30,689 boaters were observed. This is the lowest boat and boater count in the history of the study. Multiple sites had low boat counts or cancelled observations due to poor weather including rain, storms, and high heat. The proportions of the different types of boats, length of boat, operation and activity of boats, as well as the age and gender of the boaters observed has remained fairly consistent (see Figures K through V2). This indicates not only that the sites chosen yielded diversity in the boats and boaters observed each year, but also that diversity has remained relatively consistent across the years. These figures demonstrate that the degree of representativeness of the sample of recreational boaters and their boating habits remained relatively constant across this twenty-three year span.

Figures W through AC illustrate the weather and water conditions across the sites from year to year. Like the boat and boater data, across all of the sites, the mixture of the weather and water conditions remained fairly constant over the years. Therefore, any overall changes reported in life jacket wear rates were not due to changes in types of boats or boaters observed from year to year, and most likely not due to fluctuations in weather or water conditions across the sites. Of course, at individual site locations changes in these factors from year to year could account for sizable fluctuations in wear rates at individual sites.

All figures in this section have been modified slightly from reports prior to 2011. The percentages now exclude (like the 2011 report) any missing observations on a particular characteristic. Since missing observations are relatively rare, this switch in presentation does not result in any major shifts in proportions shown in previous reports (before 2011).

V1. Appendix A: Methods & Descriptive Information

To provide reliable and valid indicators of changes in life jacket wear rates, it was essential for observation procedures to remain as close as possible to those used in previous years. The same states were observed for each of the years of data collection efforts, during the same period of time (July and August). The vast majority of the sites in each of 30 states observed have remained the same for all years. The following is a detailing of the methods used in all years of summer data collection.

Time period - Observations were conducted during the summer months of each year, beginning the weekend of July 4th and ending on Labor Day weekend.

Site selection - A total of 30 states were chosen in which to conduct observations. The states were originally selected by a stratified random sampling procedure. Approximately three-fourths of the coastal states (20 out of 26 states) were chosen, and approximately 40% of the inland states (10 out of 24) were selected. Four sites from each state were visited, except in California, where eight sites were observed due to the size of the state. The 124 sites represented a wide range of water venues including lakes, rivers, harbors and bays, and intra-coastal waterways. The sites were selected based on consultations with local offices of the USCG, members of the local Coast Guard Auxiliary or U.S. Power Squadrons, and state boating or fishing law enforcement agencies. Sites were selected to roughly represent a variety of available boating venues in the state, as well as their proximity to one another to allow for relatively short travel time between sites. In addition, sites needed to have suitable shore-based viewing locations from which observations of life jacket wear could be made using high-powered binoculars.

Observational procedures - Observations were conducted by JSI or USCGAUX staff for four-hour periods in the morning or the afternoon of a Saturday or Sunday. The goal was to observe as many boats as possible during a four-hour time frame. Viewing locations were on shore at a narrowing, bridge, or near a marina to facilitate observations. Two-person teams observed boating activity. One team member made the observations using high-powered, image-stabilizing binoculars and called out the information, recorded on observation forms by the second team member. Team members alternated responsibilities frequently to ward off fatigue. In addition to recording information on boating activity and life jacket wear, observers recorded data about the site. This included information on weather and water conditions. JSI project staff trained JSI and USCGAUX observers via web instruction and an on-line quiz. The training curriculum covered procedures, definitions, and pictures of various types of boats and passengers to facilitate consistent classification by observers. The e-learning web course also explained how to complete the data collection forms, including new data points, and use project equipment to take weather observations.

Observation Forms - There were two observation forms designed. The first was the boat observation form, which was intended to record information about the boat and people on the boat. The second form was the site form, which was designed to record information about the site, weather and water conditions. The forms have remained the same from year to year, with the exception of two changes made in 1999, one change made in 2004, one change made in 2007, three changes made in 2016, and one change made in 2022. These changes are discussed in detail below.

A) Boat Forms - Observers recorded the observation **time period** in two hour blocks of time (7:59 or earlier, 8am – 9:59am, 10am – 11:59pm, 12pm – 1:59pm, 2pm – 3:59pm, 4pm – 5:59pm, 6pm or later); the **type of boat** observed (skiff, speedboat/runabout, cabin cruiser, personal watercraft (PWC), pontoon boat, houseboat, sailboard, day sailor, cabin sailboat, rowboat, inflatable, canoe, kayak, and other); **ECOS status** (Y, N, ? (unsure)); **length of boat** (less than 16 feet, 16-20.9 feet, 21-25.9 feet, 26-45.9, and 46+ feet); **type of operation** (motoring, sailing, paddling, drifting, or at anchor); and **activity** engaged in (fishing, intent to fish, water-skiing, white-water, high speed racing, swimming, pleasure boating, and other). Observers also recorded **operator/passenger status**; **gender** (male, female, or unknown); **age** (less than six, 6 - 12, 13 - 17, 18 - 64, 65 or older); **life jacket wear** and **life jacket type** (buoyant/traditional, inflatable suspender or belt pack, or not wearing). In addition, if the boat was involved in water-skiing or a towing sport, observers indicated which **boaters were skiing** (or being towed) at the time. Also, when boaters were swimming off of the boat, those boaters in the water were identified as well as their life jacket use.

B) Site Forms - At each site, the observers recorded the beginning time and ending **time of the observation period**, **water type** (lake, river, harbor/bay, Great Lake, intra-coastal waterway), and **water temperature**. The following environmental factors were measured by observers at each two hour time block during the observation period: **air temperature**; **wind speed**; **wave height** (less than six inches, six inches up to two feet, or over two feet); **weather** (sunny, partly cloudy, cloudy, raining, or stormy); and **visibility** (good, fair, or poor).

Over the past 23 years of observations five categories of information have changed. In 1999, the original 6 to 17 year old age category was divided into a 6 to 12 year old group and a 13 to 17 year old group. Also in 1999, the boat category of canoes/kayaks was separated to record canoes and kayaks individually. In 2004 the USCG requested that JSI breakout the boat size categories from three (less than 16 feet, 16-25 feet and over 26 feet) to four categories (less than 16 feet, 16-20 feet, 21-25 feet and over 26 feet). Observations made in 2004 to 2011 are the only years to record observations using the expanded boat size categories. In 2007, JSI added an "intent to fish" category distinct from "pleasure". Intent to fish was indicated when a boat could be observed with obvious fishing gear (fishing rods, trolling motors, etc.) even though at the moment of observation, the boaters were not fishing. In 2016 JSI removed the type of propulsion category from the form because it was not adding value to our analysis. Instead JSI added separate boat type categories for "powered" inflatables and "paddled" inflatable the only ambiguous category. Finally, JSI updated the life jacket wear and type categories for the first time. Until 2016, options read "Old," meaning inherently buoyant, "New," meaning inflatable and "No," for not wearing. In order to prevent confusion about these categories, they were renamed more explicitly to "Buoyant (Trad)," "Inflatable" "Susp" (suspender) and "Belt," and "Not Wear."

JSI Data Collection Form: 2022 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

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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

	GENDER			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

	GENDER			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

	GENDER			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 2022

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

JSI Data Collection Form: 2022 Site Form

PFD Study 2022

# 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)

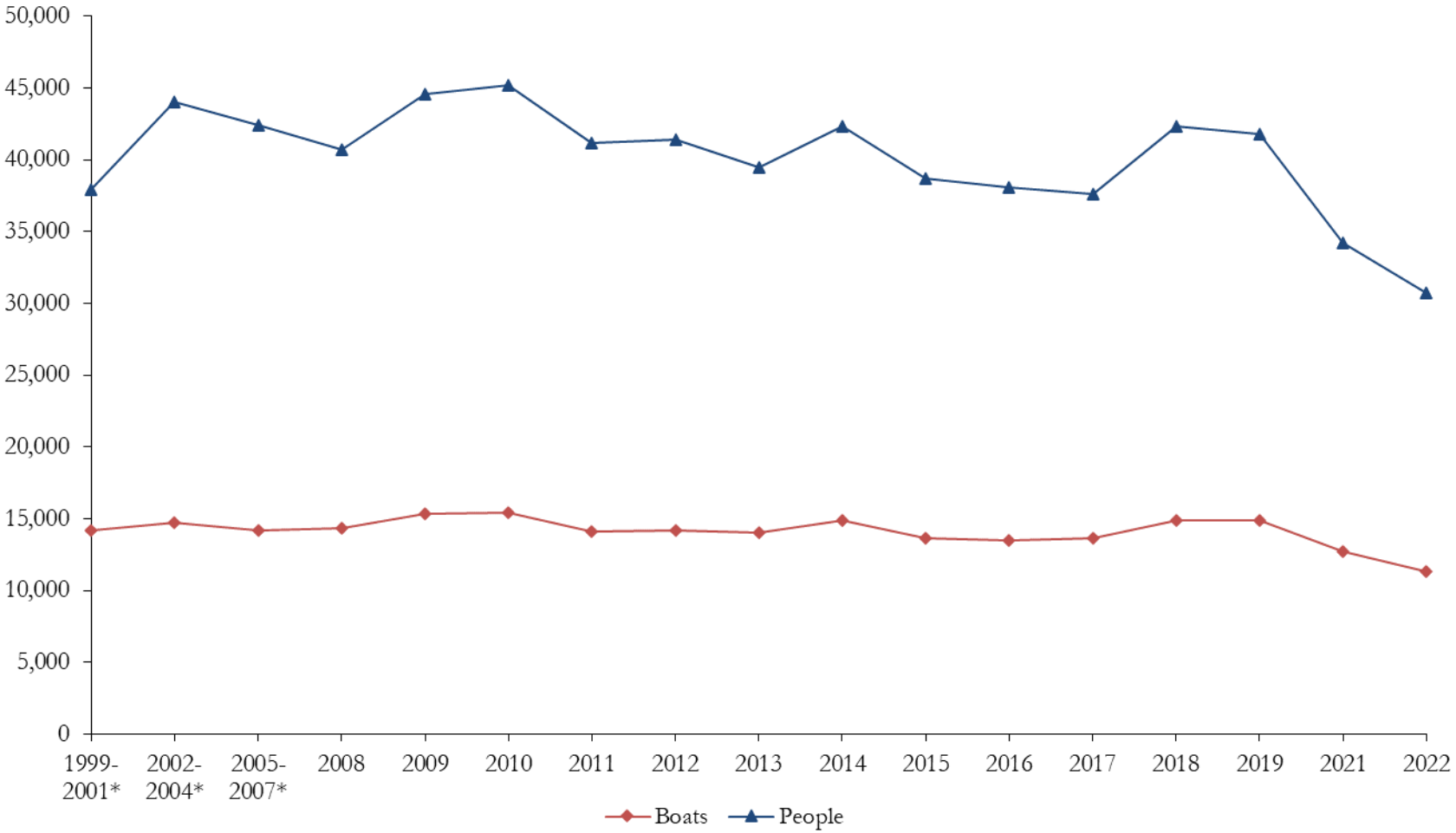
Time:

○ 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

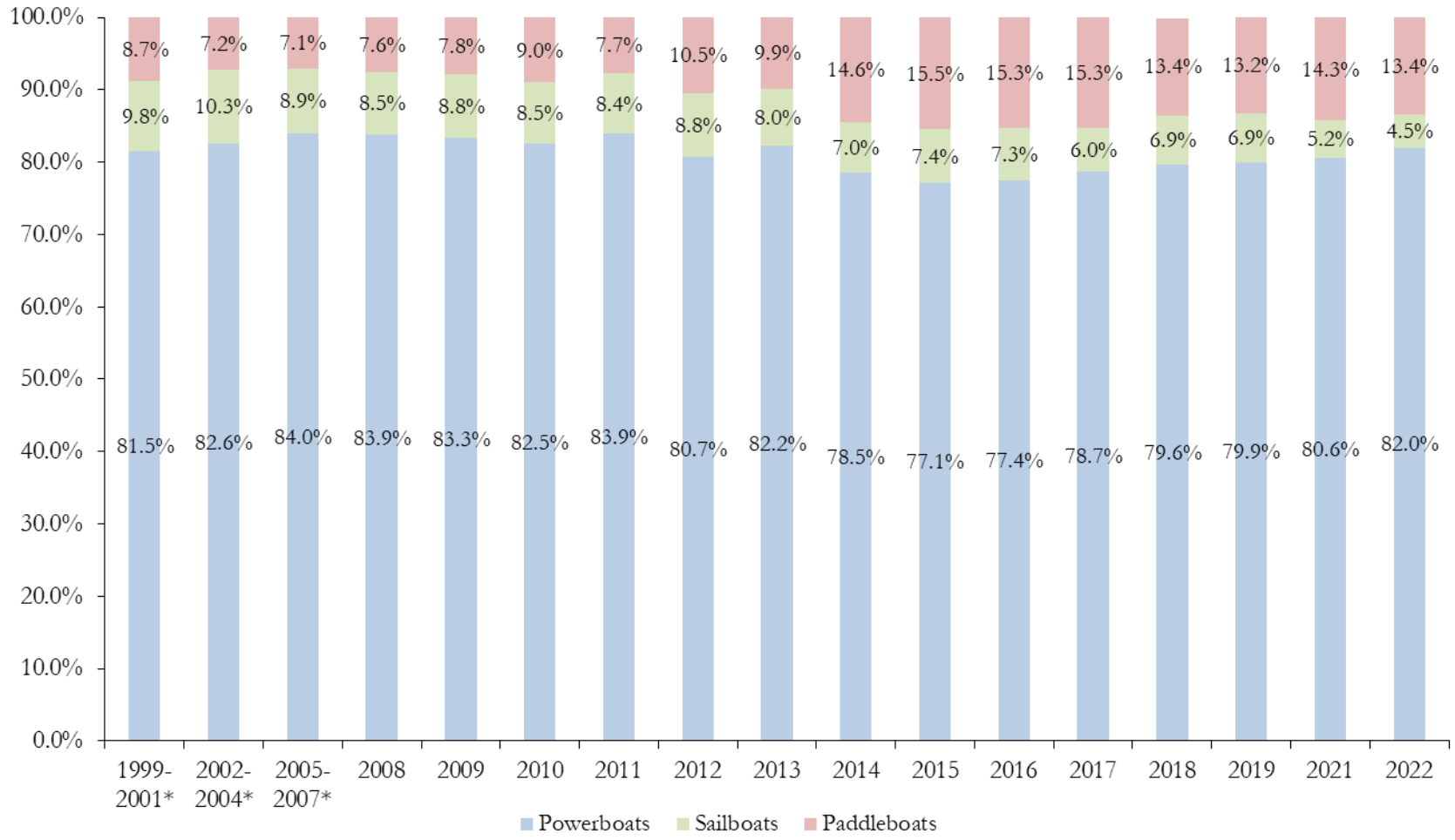
*Actual form provides 3 blocks to record Weather Observations across the 4 hours of data collection

Figure K – Number of Boats and People



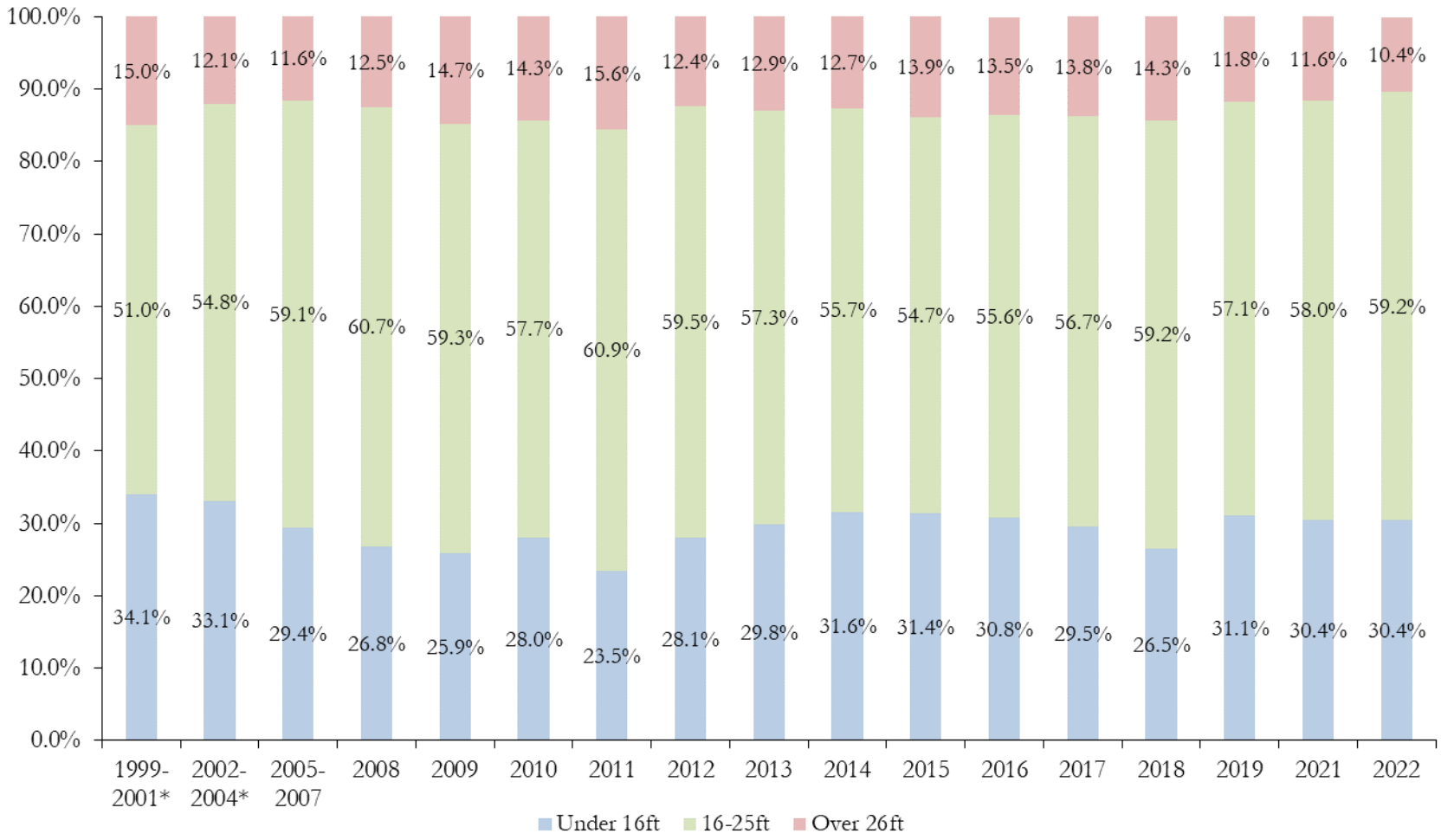
*Three-year average

Figure L – Types of Boats



*Three-year average

Figure M – Length of Boats



*Three-year average

Figure N – Length of Boats 2005-2022 Data Only

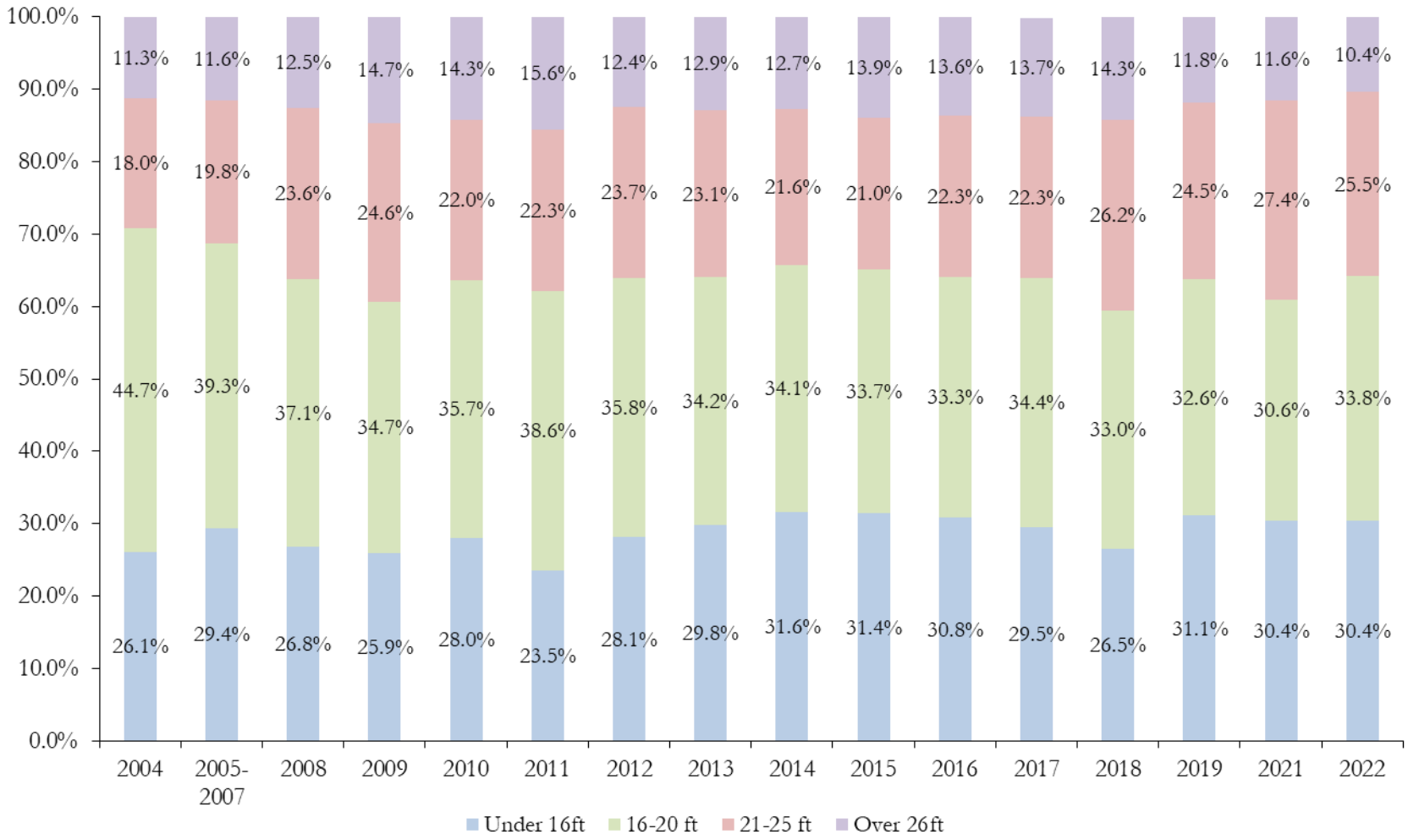
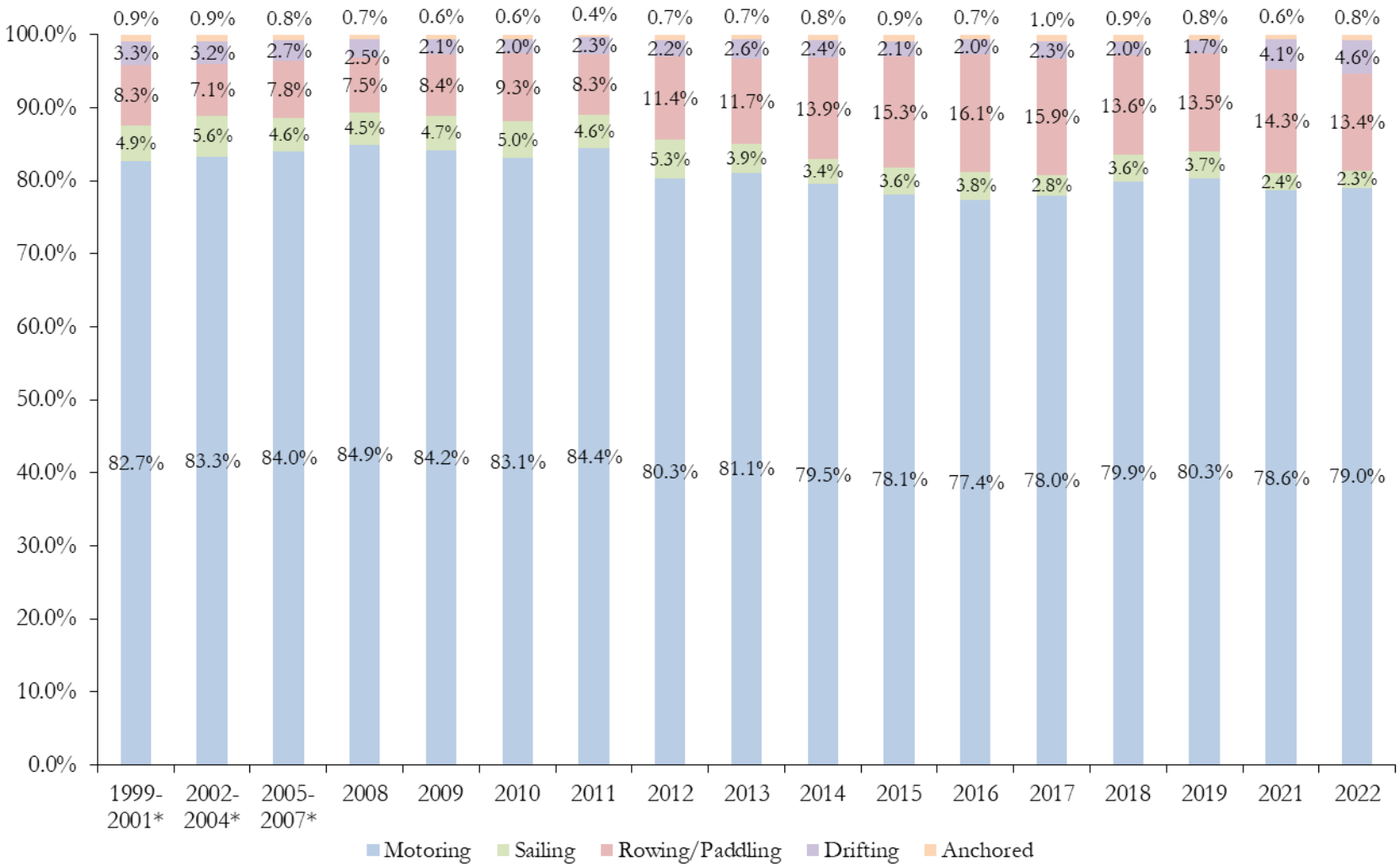
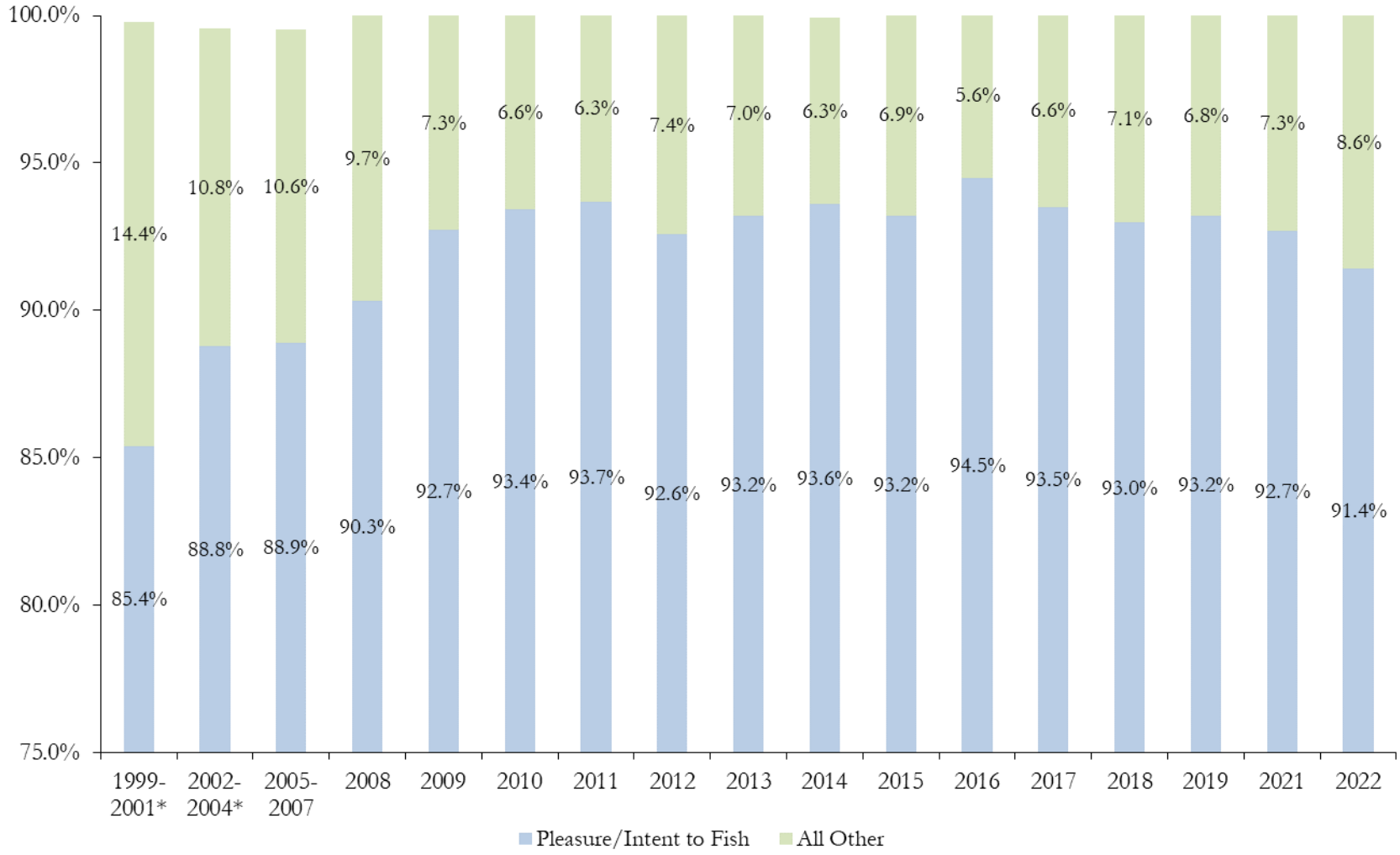


Figure O – Operation of Boats



*Three-year average

Figure T1 – Activity of Boaters—ALL YEARS*



*Three-year average

Figure T2 – Activity of Boaters 2007-2022 Data

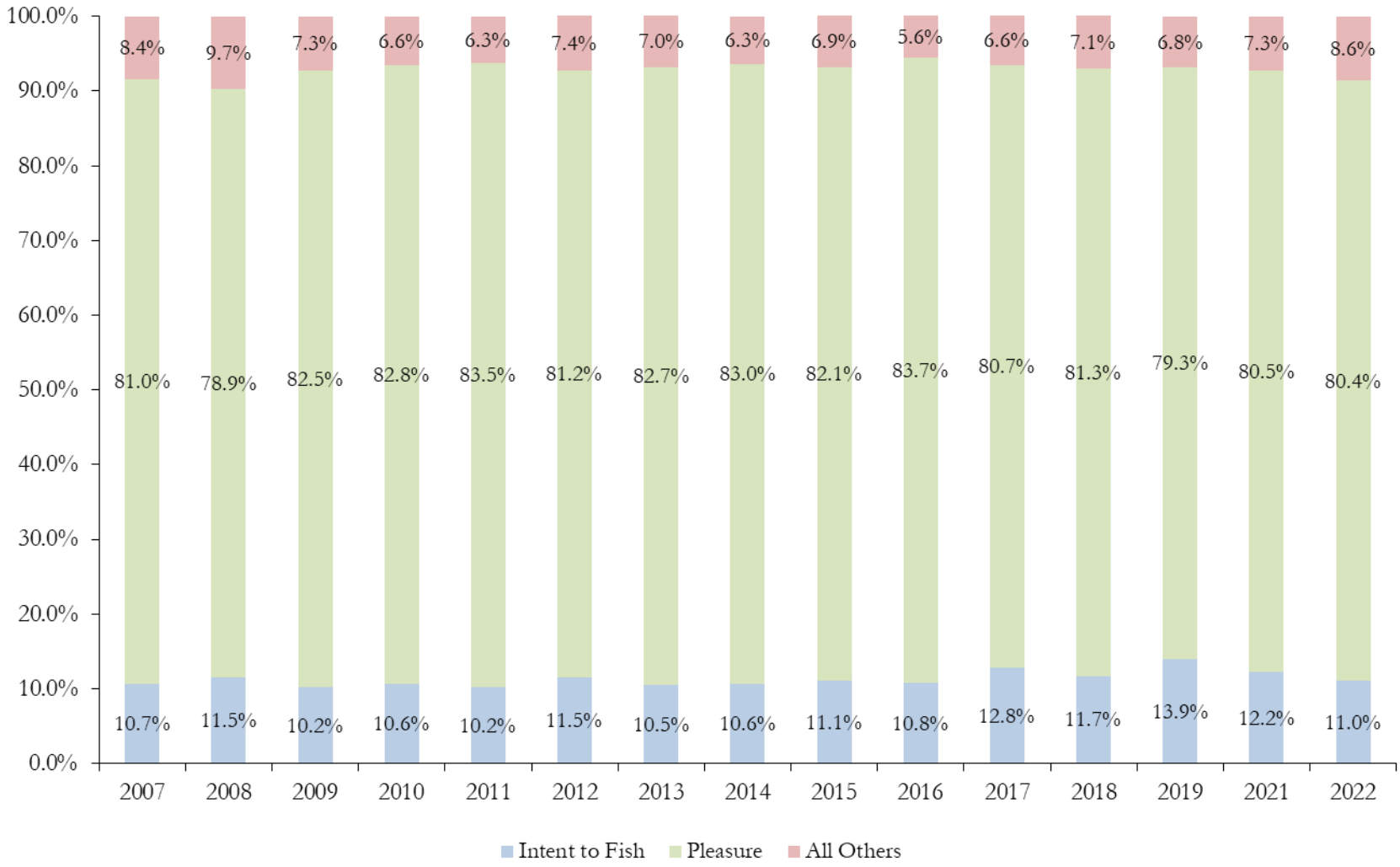
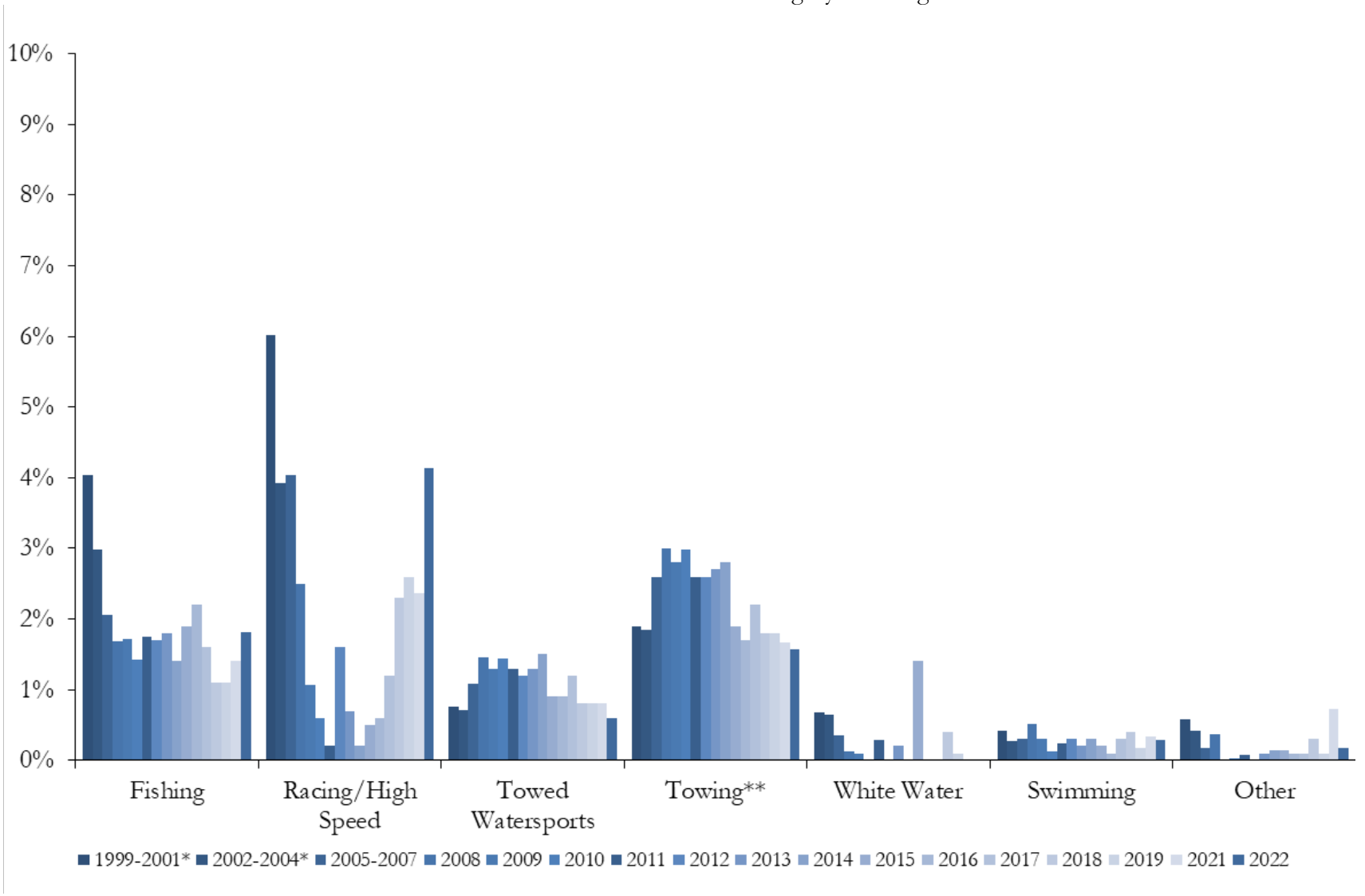


Figure T3 – Activity of Boaters 2002-2022

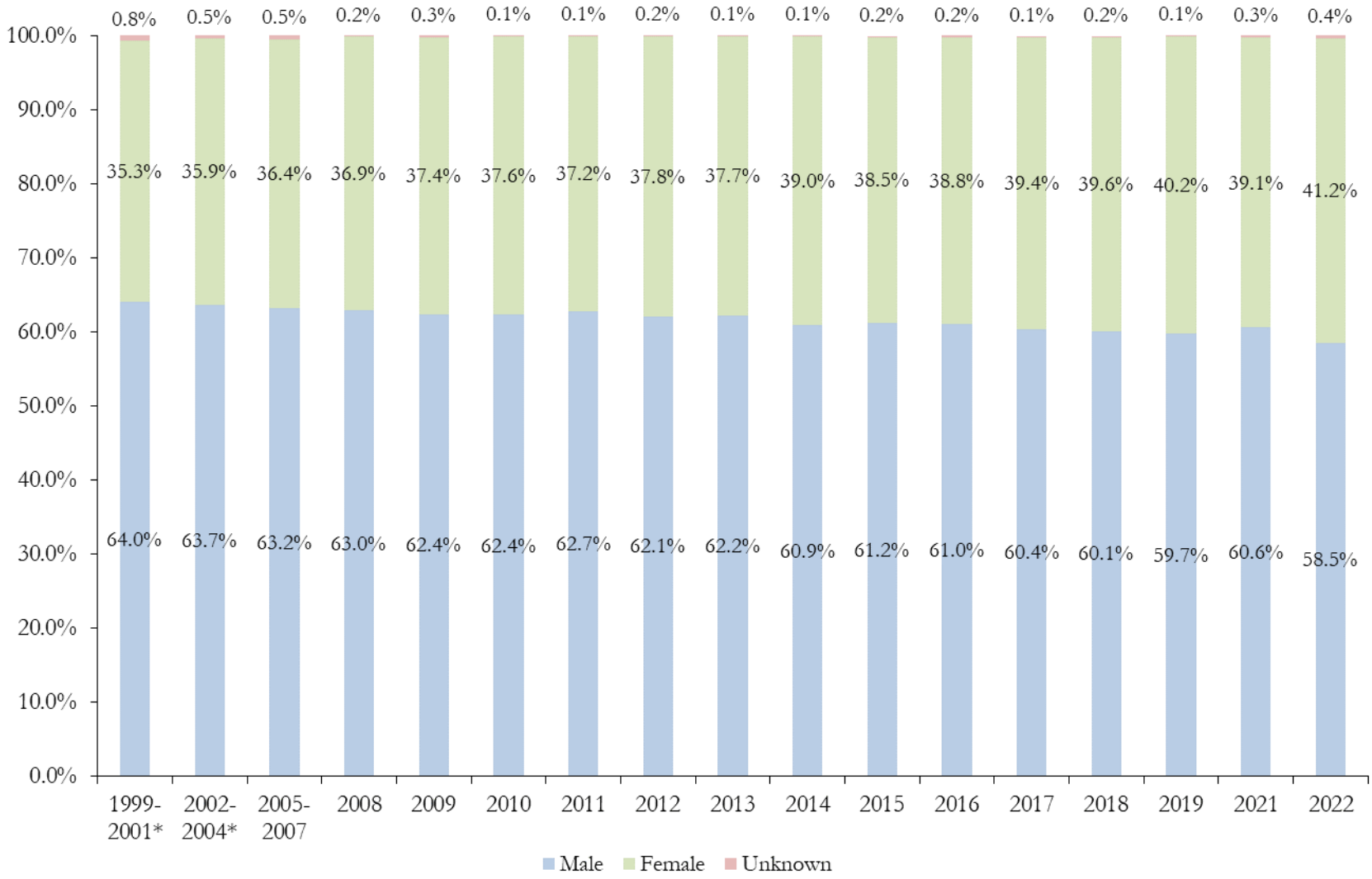
Detailed Breakdown of ALL OTHER Category from Figure T2



*Three-year average

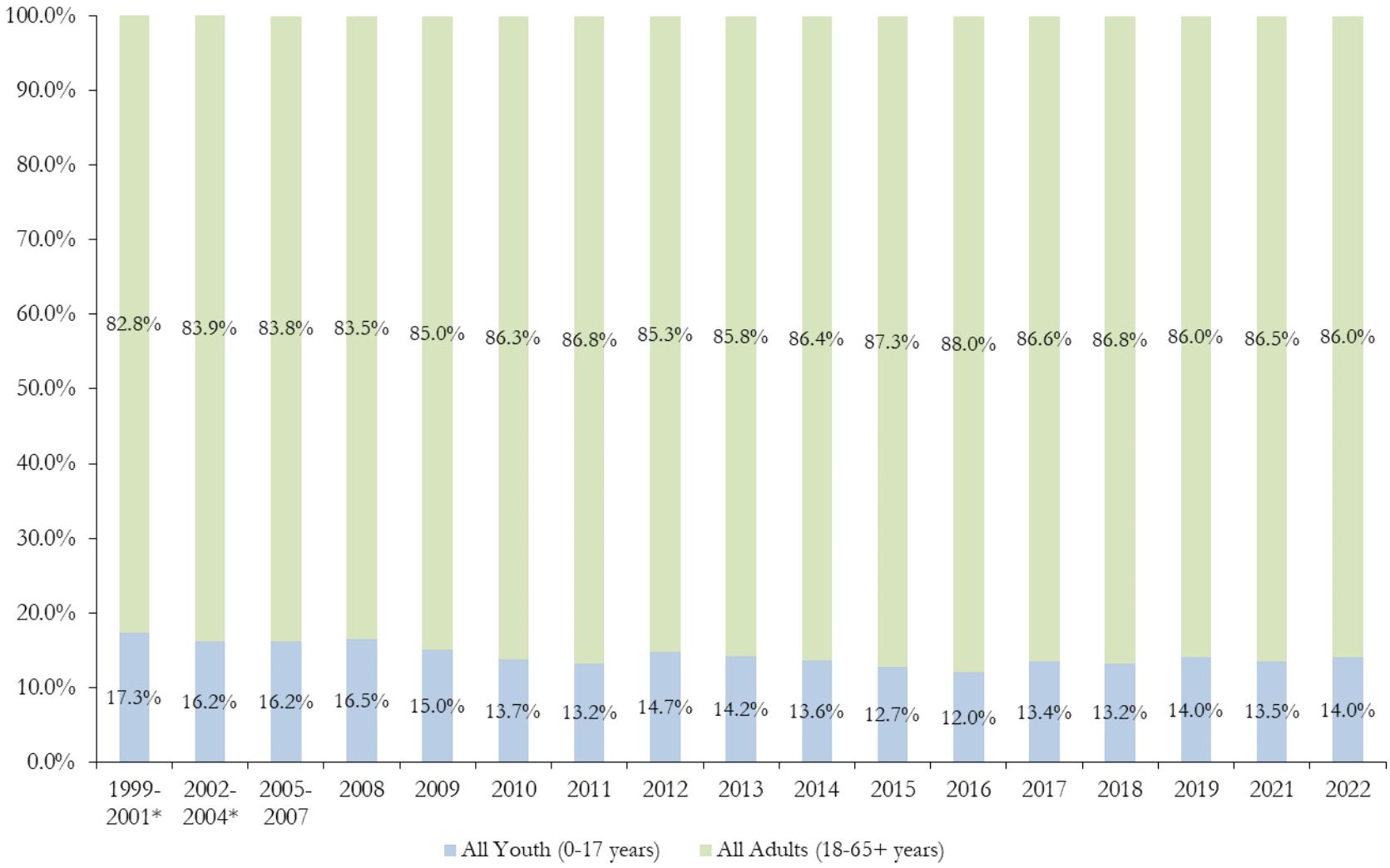
**The activity "Towing" indicates that these boaters were passengers in a boat towing water-skiers or other towing activities. Likewise, "Towed Watersports" includes all towing sports and is reserved for the boaters in the water being towed. The label was changed in April 2010.

Figure U – Gender of Boaters



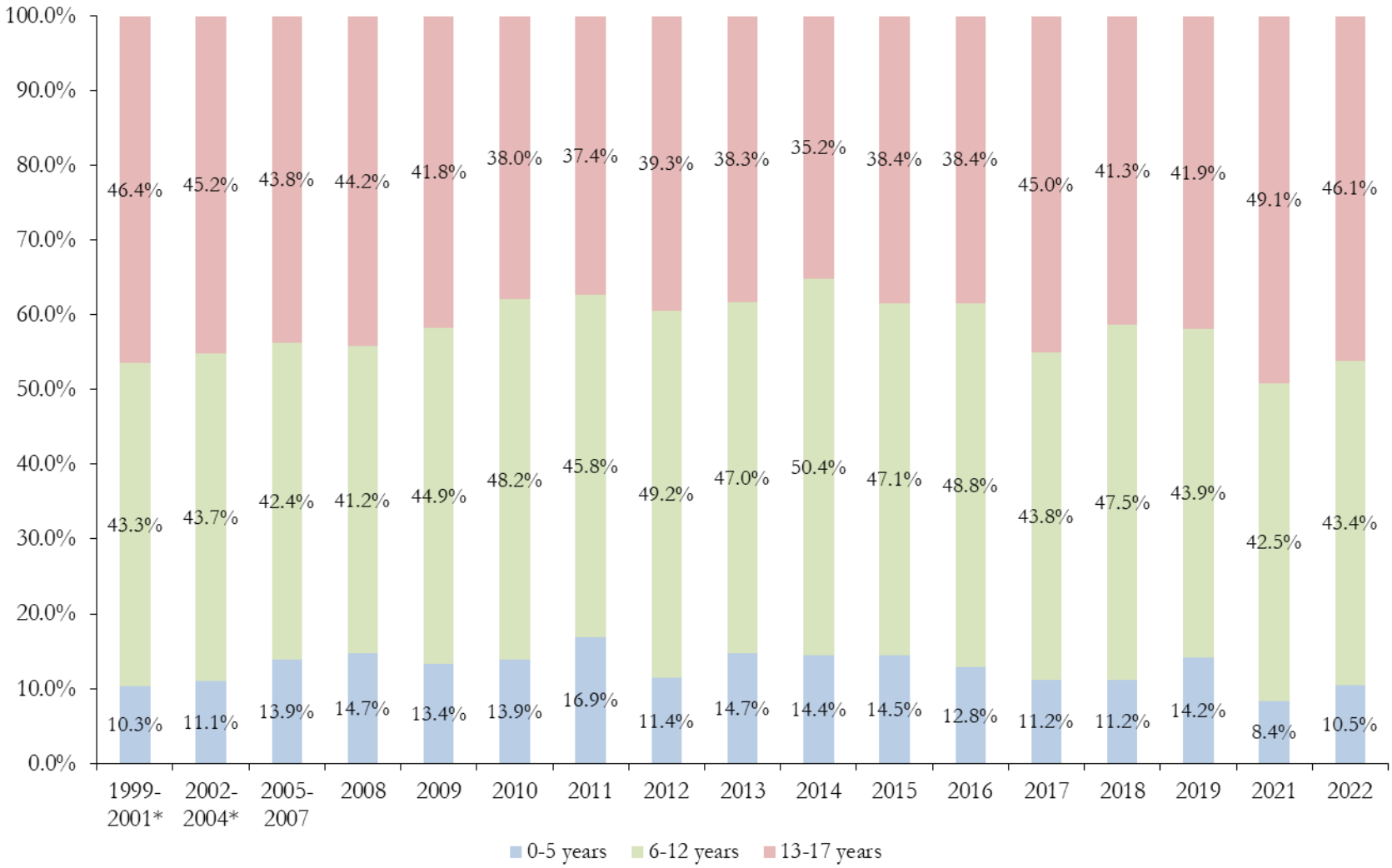
*Three-year average

Figure V1 – Age of Boaters



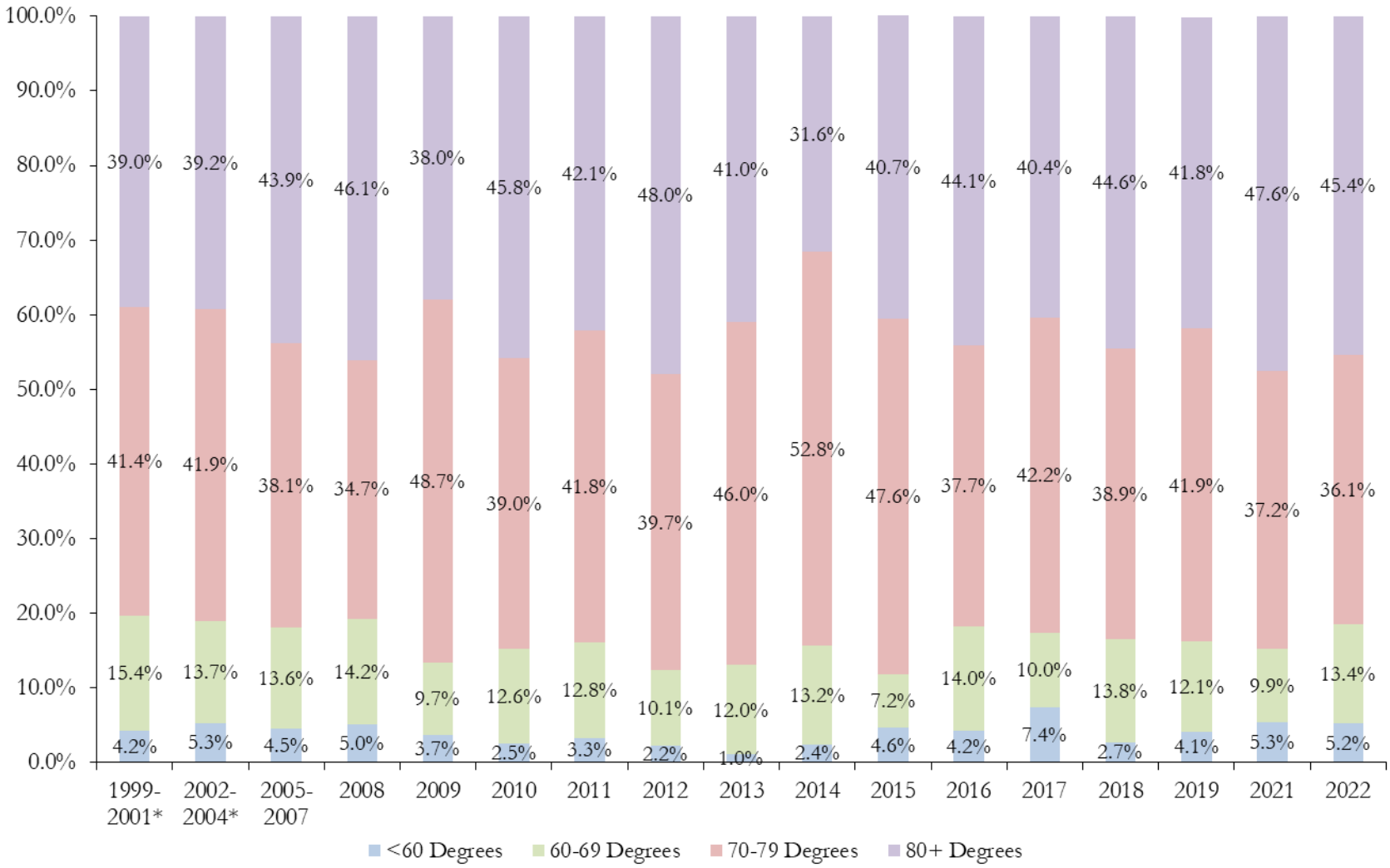
*Three-year average

Figure V2 – Age of Youth Boaters



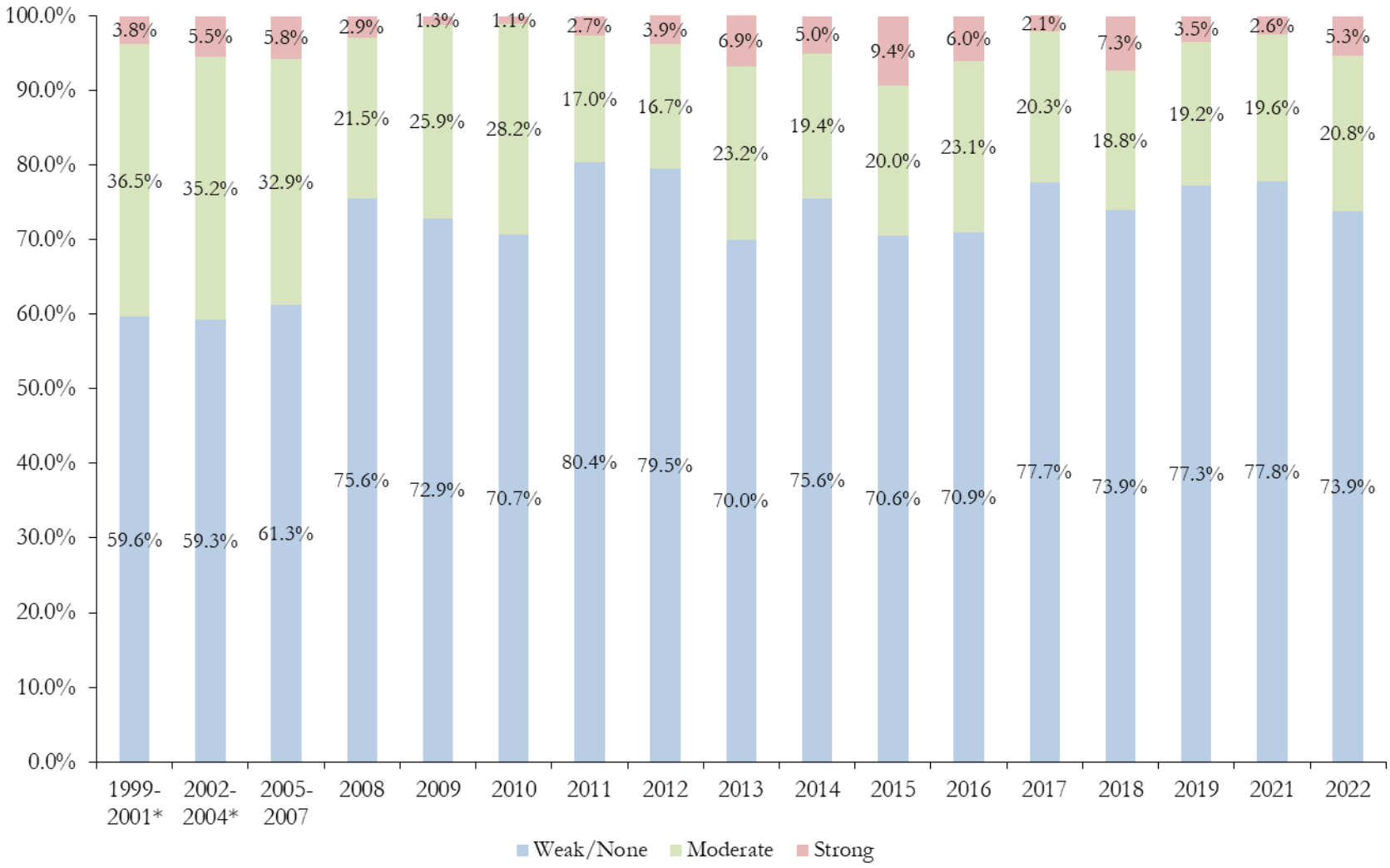
*Three-year average

Figure W – Water Temperature in which ALL Boaters were Observed



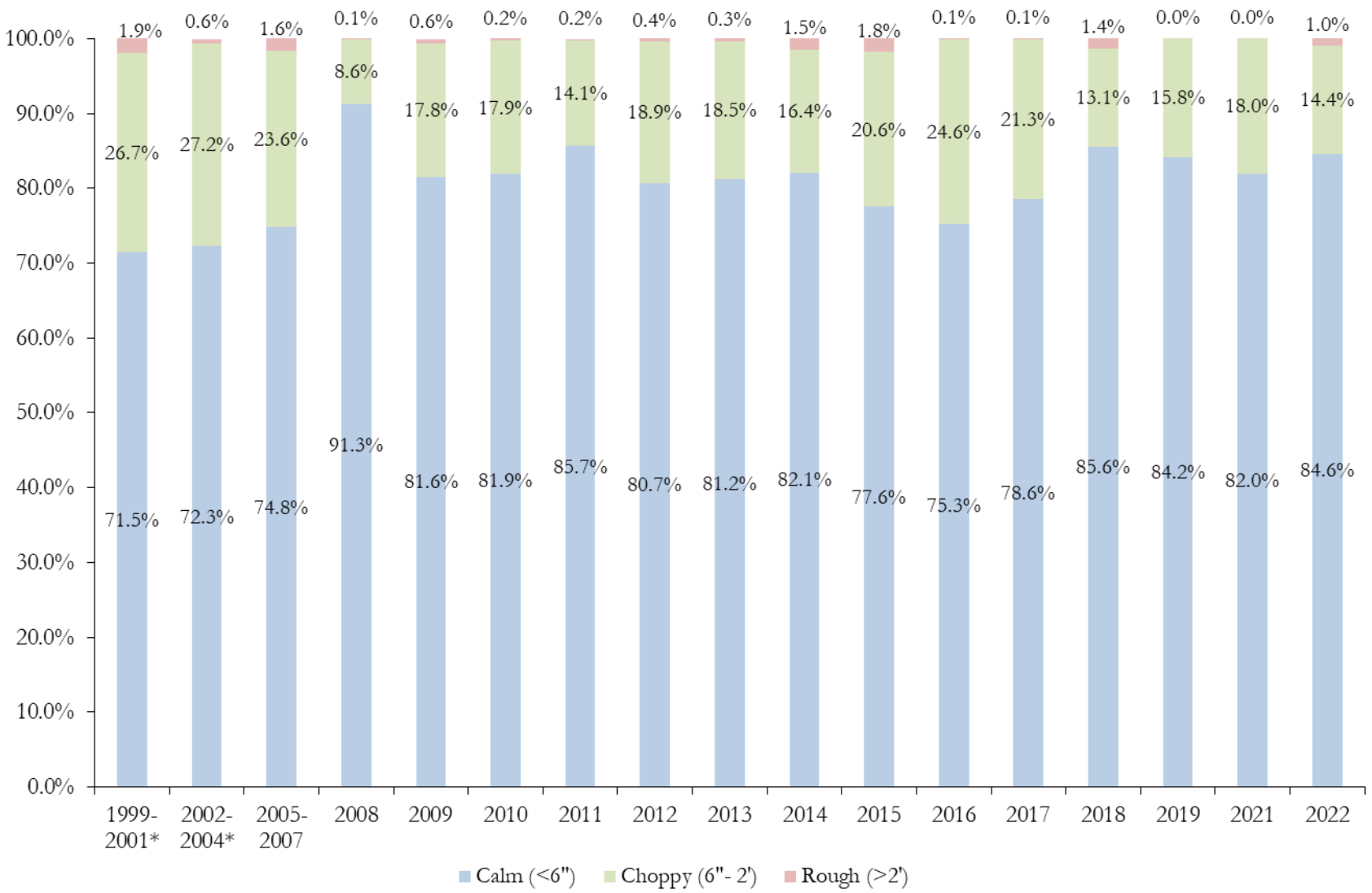
*Three-year average

Figure X – Water Current in which ALL Boaters were Observed



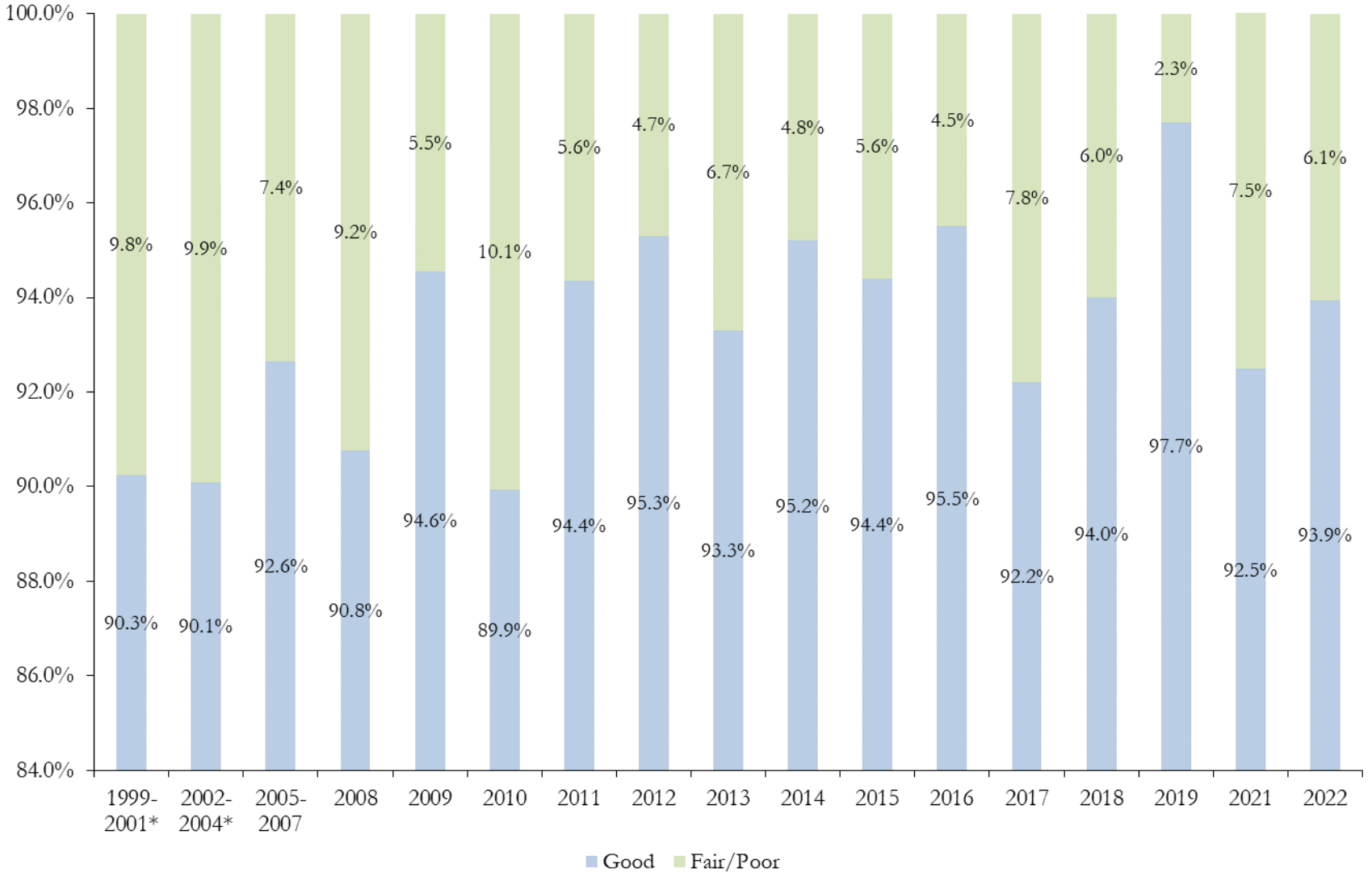
*Three-year average

Figure Y – Wave Height in which ALL Boaters were Observed



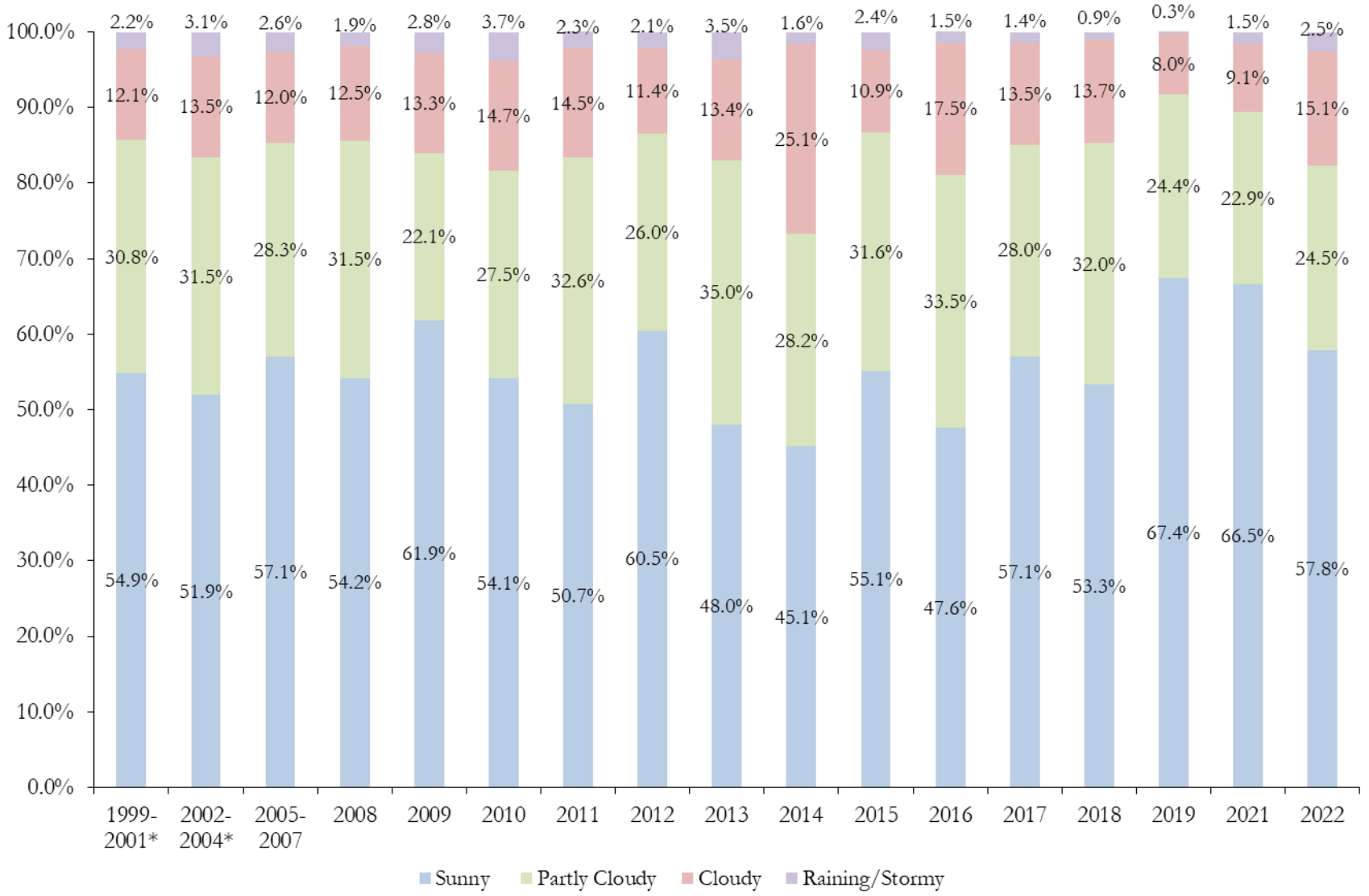
*Three-year average

Figure Z – Visibility in which ALL Boaters were Observed



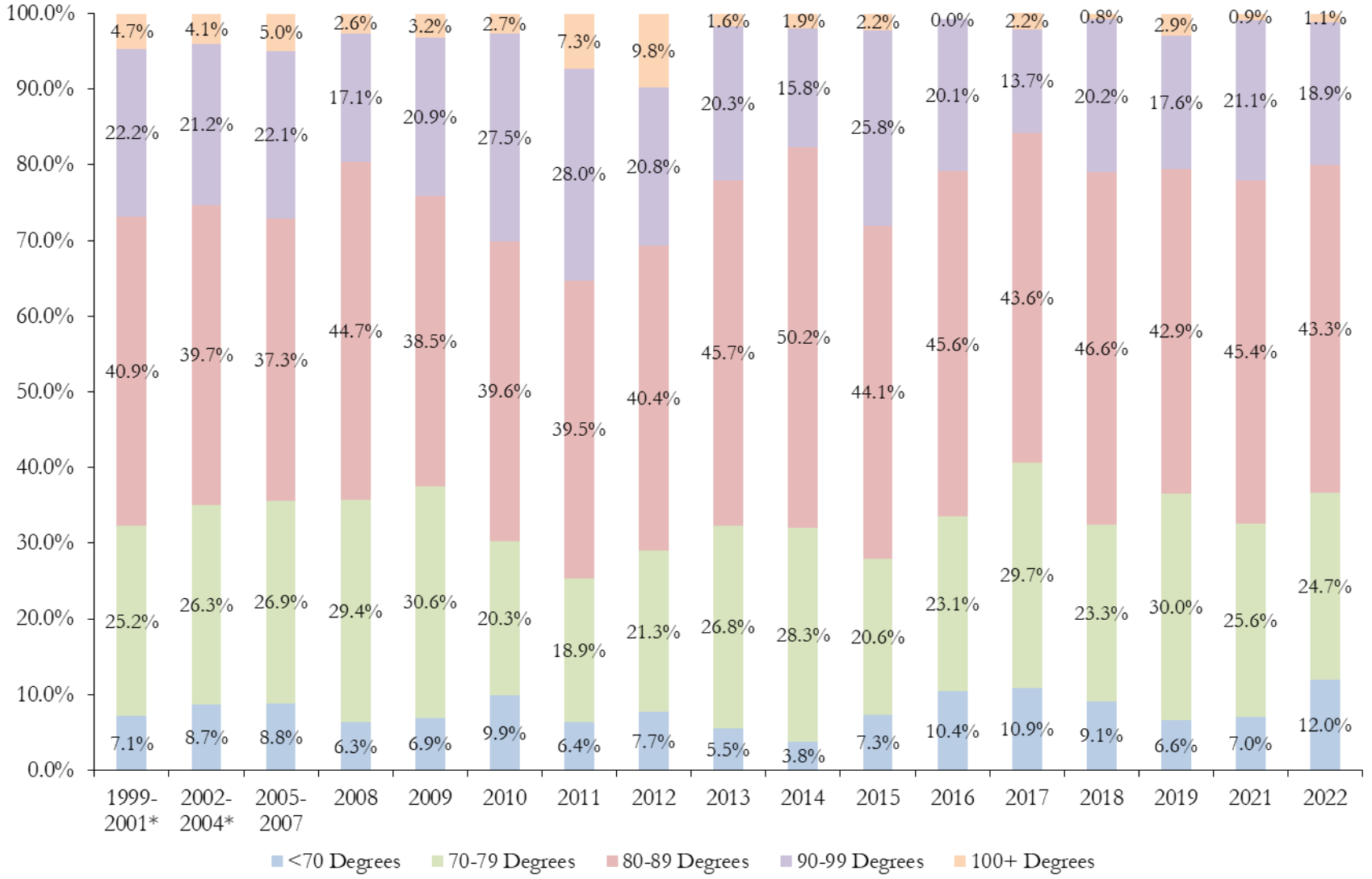
*Three-year average

Figure AA – Weather in which ALL Boaters were Observed



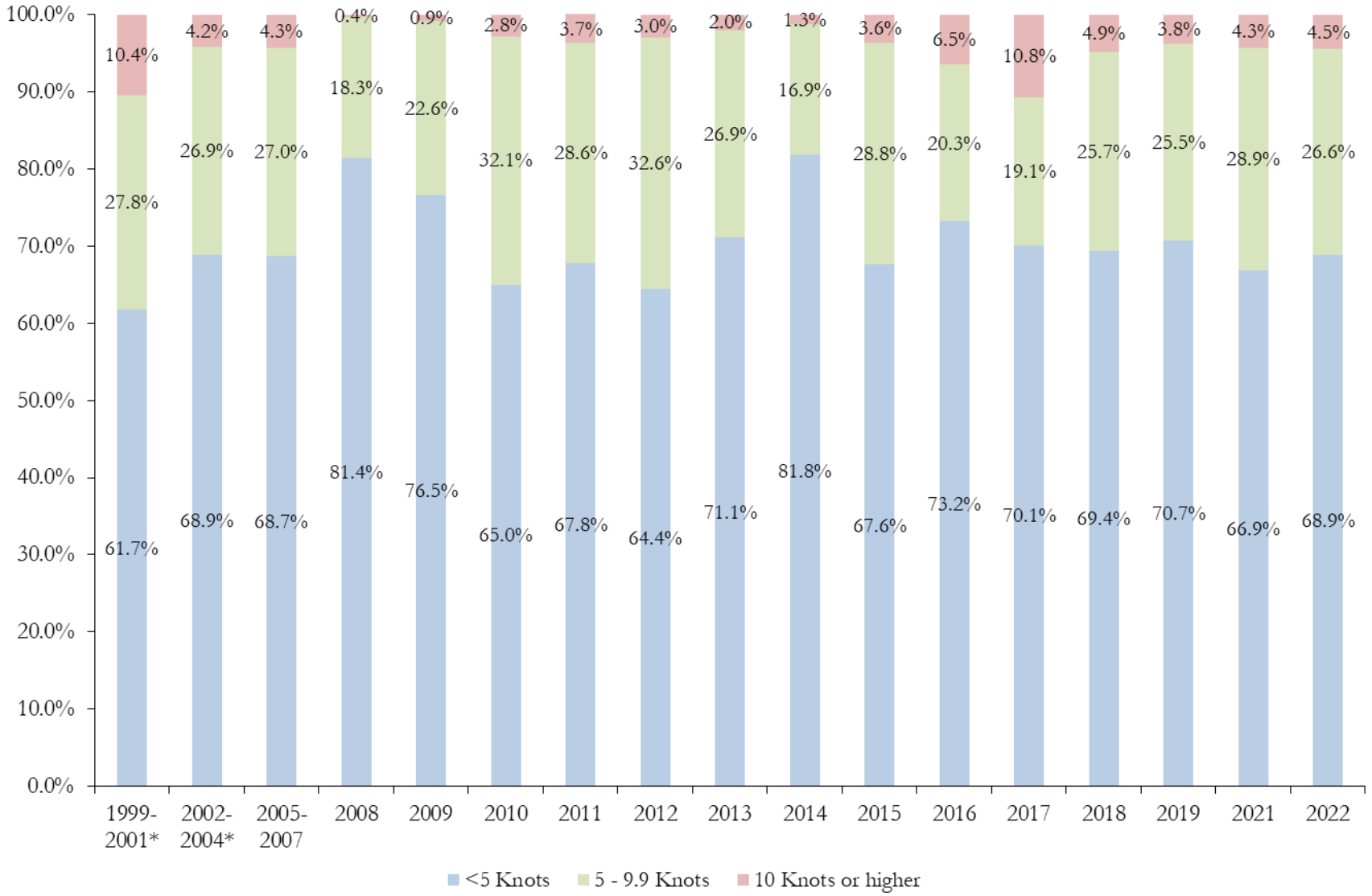
*Three-year average

Figure AB – Air Temperature in which ALL Boaters were Observed



*Three-year average

Figure AC – Wind Speed in which ALL Boaters were Observed



*Three-year average