

# 2014 Life Jacket Wear Rate Observation Study

featuring

National Wear Rate Data from 1999 to 2014



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



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National Wear Rate Data from 1999 to 2014

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## I. INTRODUCTION

This report provides data and analysis on the 2014 National Life Jacket Wear Rate Observation Study with comparison information from the previous fifteen years' of studies (1999-2013). 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 2013 Recreational Boating Statistics report, published by the United States Coast Guard (USCG), shows that among the 398 drowning deaths in 2013, approximately 82% (328) 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 2014 marked the sixteenth 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.

This year we are adding a new section to the report which shows the impact of various site and boat characteristics on wear rates. These tables will provide insights into the factors which influence wear rates. The tables show these relationships separately for powerboats, paddlecraft, and sailboats.

Most information in this report is presented separately for adults (18+ years old) and youth (0 to 17 years old). Over the sixteen years of the presented data, the general distribution of ages, 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 period 1999-2014 of data collection.

## II. NATIONAL CORE DATA RESULTS

### Adult Life Jacket Wear Rates on Open Motorboats 2006 to 2014

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 the 2012-2016 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.

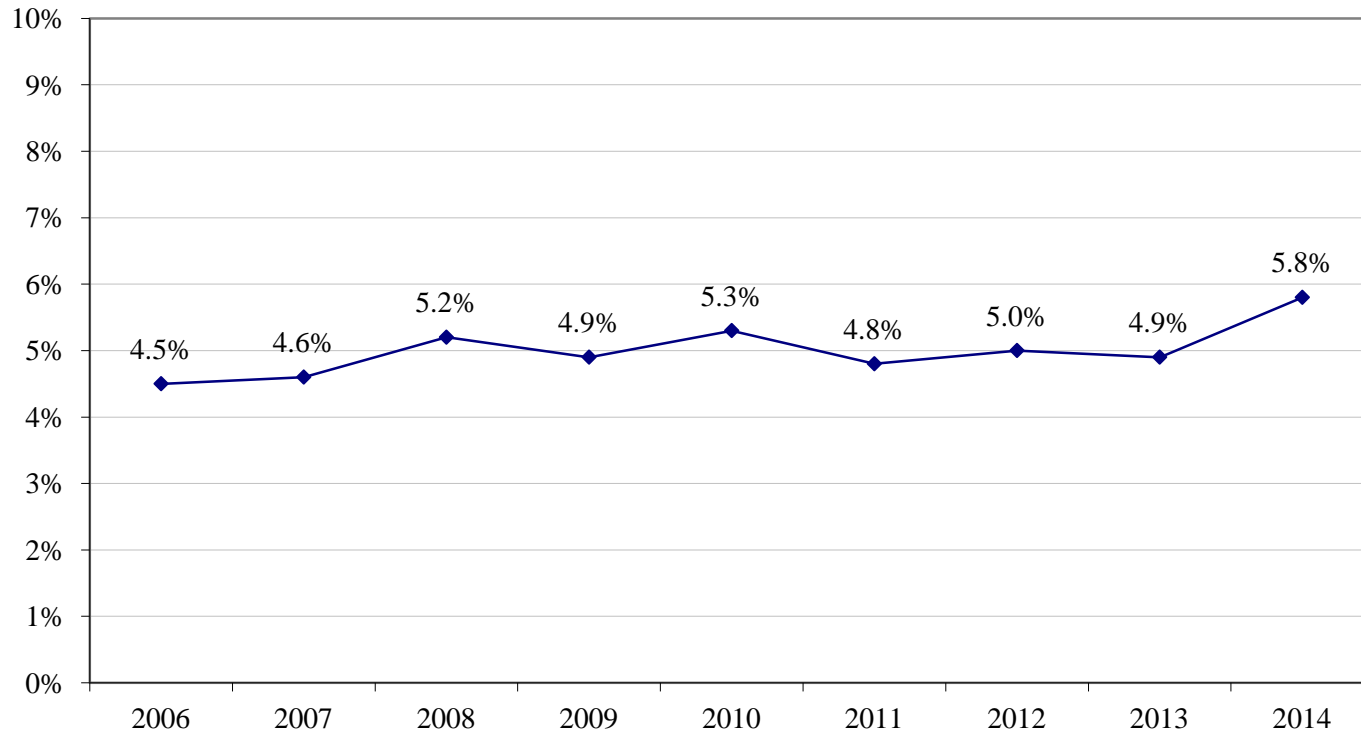
To ensure that comparisons to 2006 are valid, the proportion of skiffs to speedboats in each state for each subsequent year was set to mirror the proportions found in 2006 since the wear rates for skiffs are generally greater than those for speedboats. For example, in 2006 the national proportion across 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 this 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 wear rate for open motorboats in 2014 is 5.8%. (See Figure A for a chart showing these trends and also Table 2.2 on page 11.) This rate is the highest observed by the study to date.





**Figure A – Adult Wear Rates on Open Motorboats\* 2006-2014**  
(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 2014

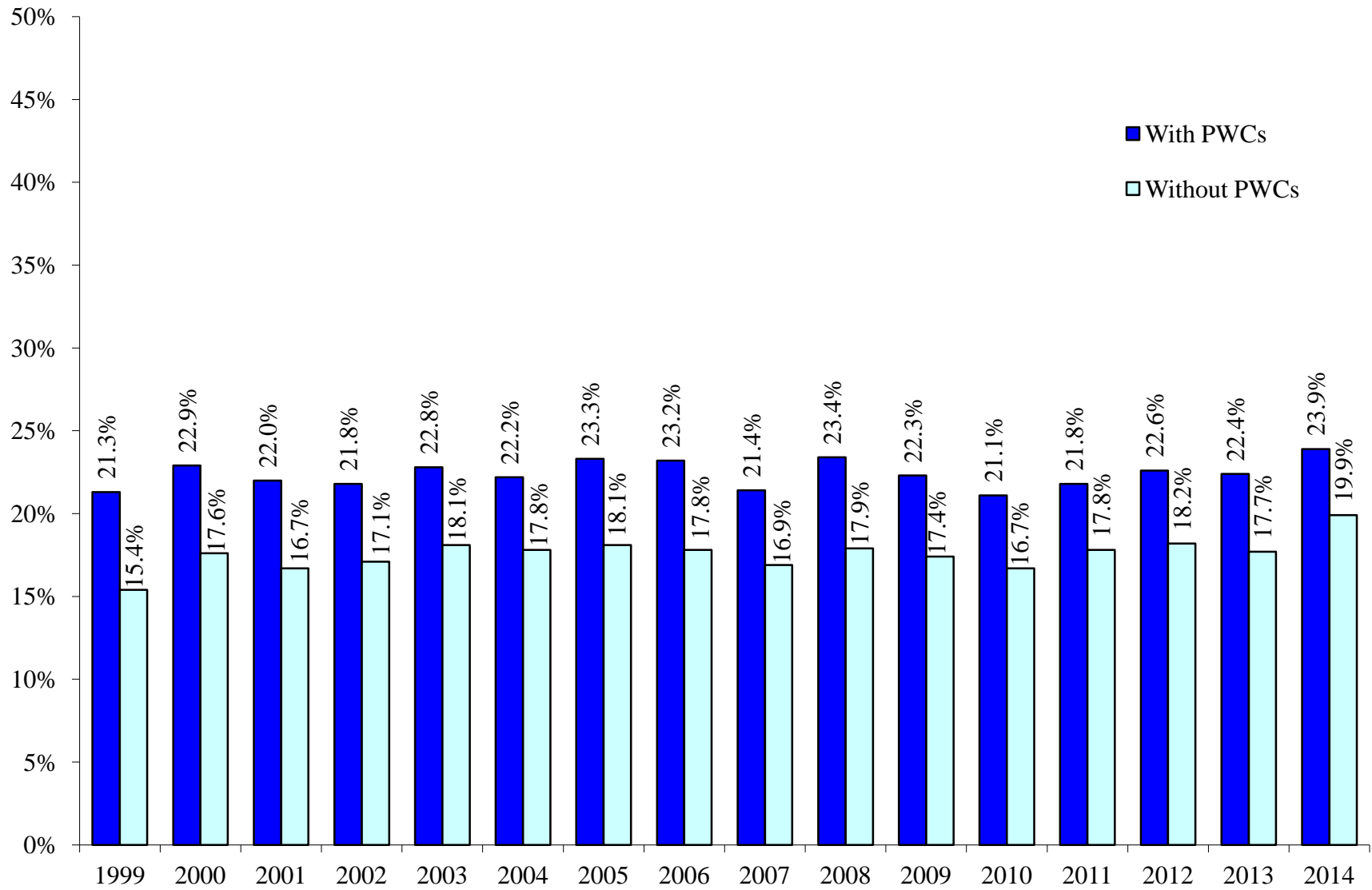
Figure B shows trends for national life jacket wear rates, including all groups of recreational boaters together (youth and adults) for two groups of boats - “all boats” and “all boats except PWCs”. The two sets of data present a clear indication of the impact of PWCs (Personal Watercraft) on the overall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

The average life jacket wear rate for all boats and boaters combined for 2014 was 23.9%, an increase from 2013 (22.4%). This continues a trend of slightly increasing wear rates over four of the last five years (rate in 2013 was down slightly from rate in 2012).

The 2014 average wear rate excluding PWCs was 19.9% and also represents an increase from 2013 (17.7%), continuing the upward trend over four of the last five years; in 2010 the overall wear rate excluding PWCs was 16.7%. This represents a 20% relative increase in wear rates over the past five years.



**Figure B – Life Jacket Wear Rates for ALL Boaters**

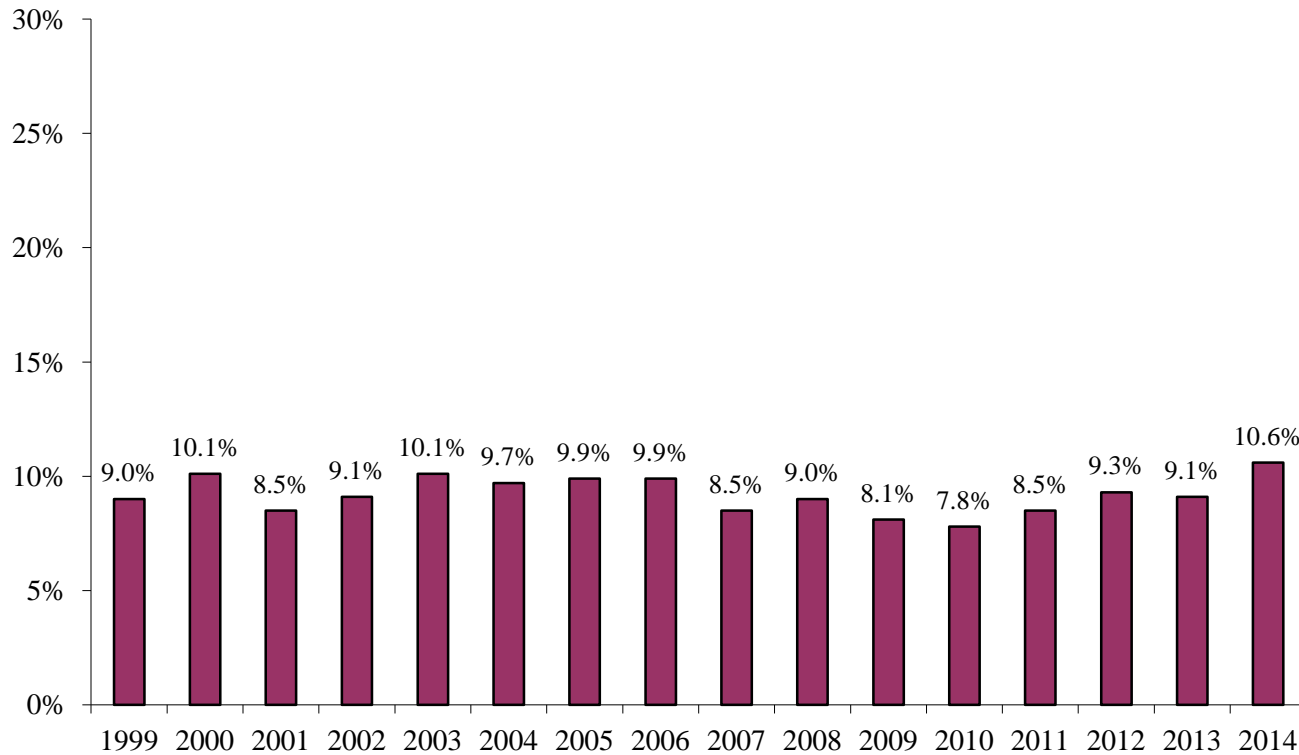


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\*Factors controlled for: Age & Boat Type.

## National Life Jacket Wear Rates for ADULTS (18 years or older) 1999 to 2014

The national average wear rate for all adults on all boats excluding PWCs in 2014 was 10.6%. This overall adult boater wear rate is the highest rate since the study began in 1999 and mirrors the increase reported for all boaters (see Figure C and Table 2.1). This represents over a 25% relative increase in wear rates since 2010.

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

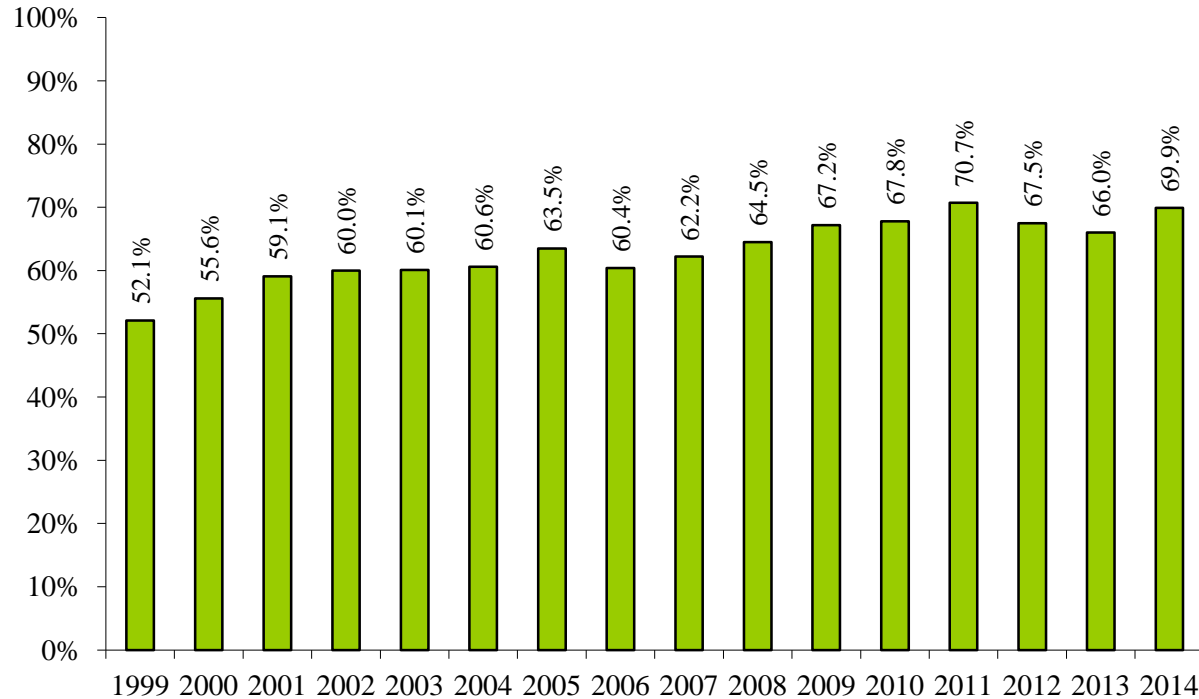


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\*Factors controlled for: Age & Boat Type.

## National Life Jacket Wear Rates for YOUTH (17 years or younger) 1999 to 2014

Figure D and Table 2.1 show the national wear rate trend for all youth (17 years or younger) on all boats excluding PWCs. These rates are relatively high across the sixteen years of data shown with a general upward trend. The rate for 2014 is 69.9%, an increase from 2013 and the second highest rate since the beginning of the study.

**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 2014

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

Compared to last year, the overall youth rate increased from 66.0% in 2013 to 69.9% in 2014. The youth trends showed small increases in all age groups. For the under 6 year olds rates increased from 93.5% in 2013 to 94.5% in 2014; for those between 6 and 12 years of age rates increased from 85.4% in 2013 to 87.3% in 2014 and for teens (ages 13 to 17) rates increased substantially from 34.9% in 2012 to 41.6% in 2014. Future observations will need to confirm that this represents a continuing trend.

For adults ages 18 to 64, the 2014 data is the highest wear rates since the study began (10.4%) and reflects an increase from 9.1% in 2013.

For adults 65 years of age and older, the 2014 data show wear rates of 13.3% up from 6.9% in 2013 (but these rates seem to jump up and down across the years so we cannot put much stock in this one year jump).

As previously indicated in Figure C and in Table 2.1, when both adult groups are combined (18+ years), there is an increase from 9.1% in 2013 to 10.6% in 2014.



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

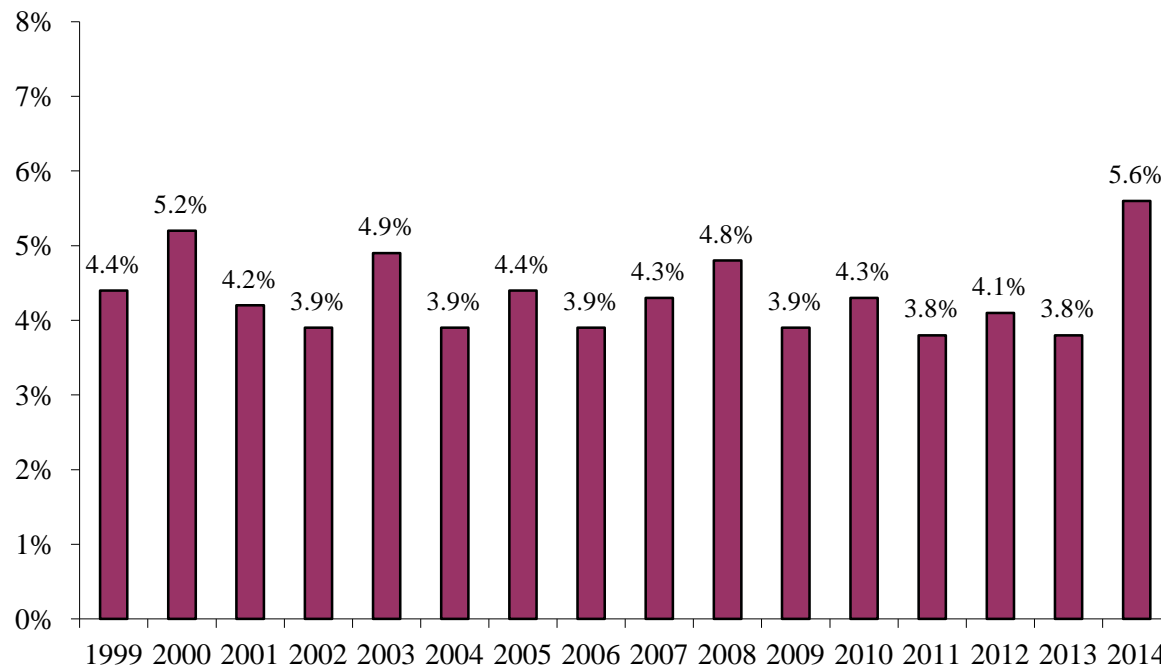
Age	Observation Year															
	1999 % (N's)	2000 % (N's)	2001 % (N's)	2002 % (N's)	2003 % (N's)	2004 % (N's)	2005 % (N's)	2006 % (N's)	2007 % (N's)	2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)
<b>0-5 yrs</b>	80.6%	89.1%	91.7%	90.1%	90.3%	94.9%	93.1%	94.4%	92.2%	93.5%	93.6%	94.8%	96.6%	94.7%	93.5%	94.5%
	(500)	(716)	(703)	(676)	(658)	(743)	(714)	(921)	(930)	(938)	(854)	(811)	(874)	(662)	(789)	(804)
<b>6-12 yrs</b>	69.1%	72.1%	76.6%	79.2%	79.7%	81.6%	80.6%	79.1%	84.1%	87.3%	86.5%	89.1%	90.7%	84.9%	85.4%	87.3%
	(2104)	(2696)	(3122)	(2752)	(2627)	(27411)	(2487)	(2403)	(2819)	(2579)	(2812)	(2809)	(2381)	(2844)	(2494)	(2757)
<b>13-17 yrs</b>	24.1%	30.5%	31.2%	32.4%	32.0%	29.8%	32.8%	33.5%	31.5%	33.2%	38.9%	35.1%	41.4%	37.6%	34.9%	41.6%
	(2244)	(2725)	(2893)	(2575)	(2767)	(2572)	(2230)	(2403)	(2652)	(2507)	(2420)	(2127)	(1817)	(2163)	(1933)	(1837)
<b>0-17 yrs (all youth)</b>	52.1%	55.6%	59.1%	60.0%	60.1%	60.6%	63.5%	60.4%	62.2%	64.5%	67.2%	67.7%	70.7%	67.5%	66.0%	69.9%
	(4624)	(6094)	(6695)	(5924)	(5970)	(5955)	(5414)	(5713)	(6401)	(6024)	(6086)	(5747)	(5072)	(5669)	(5216)	(5398)
<b>18-64 yrs</b>	8.8%	10.1%	8.5%	9.2%	10.1%	9.7%	9.9%	10.0%	8.4%	9.1%	8.1%	7.7%	8.5%	9.2%	9.1%	10.4%
	(24321)	(27100)	(32528)	(31742)	(28551)	(33319)	(30176)	(29591)	(32108)	(30743)	(34632)	(36420)	(33267)	(32298)	(30843)	(33058)
<b>65+ yrs</b>	12.9%	9.9%	6.9%	6.8%	9.4%	8.3%	11.0%	8.3%	11.7%	6.1%	7.0%	10.7%	7.2%	11.8%	6.9%	13.3%
	(1147)	(1040)	(1276)	(922)	(1106)	(1331)	(823)	(803)	(881)	(1190)	(1129)	(763)	(951)	(1122)	(1091)	(1634)
<b>18+ yrs (all adults)</b>	9.0%	10.1%	8.5%	9.1%	10.1%	9.7%	9.9%	9.9%	8.5%	9.0%	8.1%	7.8%	8.5%	9.3%	9.1%	10.6%
	(25468)	(28140)	(33804)	(32664)	(29657)	(34650)	(30999)	(30394)	(32989)	(31933)	(35761)	(37003)	(34218)	(33420)	(31934)	(34692)

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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 2014 rate for all powerboats reached 5.6% interrupting a slight but generally decreasing trend since 1999. The 2014 rate for all powerboats is the highest it has been in the sixteen years of observations. This is primarily due to a big increase in skiff wear rates and smaller increases on cabin cruisers and pontoon boats. Speedboats, the most popular type of powerboat, however, did not show any significant increase. When towed watersports participants who are required to wear life jackets are removed from the calculations, only 2.6% of adult boaters in speedboats were seen wearing life jackets in 2014.

**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 % (N's)	2001 % (N's)	2002 % (N's)	2003 % (N's)	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)
All Powerboats	4.4%	5.2%	4.2%	3.9%	4.9%	3.9%	4.4%	3.9%	4.3%	4.8%	3.9%	4.3%	3.8%	4.1%	3.8%	5.6%
(no PWC's)	(19894)	(22448)	(27864)	(26304)	(24190)	(28285)	(25741)	(25412)	(27623)	(27315)	(29924)	(30894)	(28954)	(27890)	(26786)	(28766)
Skiff/Utility	10.0%	10.3%	9.7%	5.9%	10.4%	7.9%	7.2%	7.3%	8.5%	9.2%	6.9%	9.7%	8.2%	7.8%	6.4%	13.1%
	(1867)	(1903)	(2469)	(3177)	(4214)	(4429)	(5038)	(4091)	(5340)	(6633)	(7257)	(6634)	(6530)	(6936)	(7231)	(6776)
Runabout/Speedboat	4.2%	5.3%	4.5%	4.3%	4.6%	3.9%	4.7%	3.7%	3.6%	4.1%	3.5%	3.2%	3.0%	3.3%	3.5%	3.5%
	(13195)	(14463)	(16985)	(14066)	(13057)	(16633)	(13643)	(14512)	(14414)	(13901)	(14635)	(15093)	(14381)	(13441)	(11686)	(13040)
Runabout/Speedboat (Excluding Towed Participants)	3.6%	4.6%	3.9%	3.6%	3.9%	3.2%	3.7%	2.8%	2.9%	3.05	2.5%	2.2%	2.3%	2.3%	2.4%	2.6%
	(13096)	(14364)	(16872)	(13969)	(12963)	(16477)	(13480)	14376)	(14313)	(13744)	(14481)	(14947)	(14279)	(13294)	(11554)	(12923)
Open Motorboats** (Skiff/Utility+ Runabout/Speedboat)	5.5%	6.4%	5.6%	4.7%	5.9%	4.8%	5.3%	4.5%	4.6%	5.2%	4.9%	5.3%	4.8%	5.0%	4.9%	5.8%
	(15062)	(16366)	(19454)	(17243)	(17271)	(21052)	(18681)	(18603)	(19754)	(20534)	(21892)	(21727)	(20911)	(20377)	(18917)	(19816)
Cabin Cruiser	1.8%	1.6%	1.2%	1.9%	1.7%	1.0%	1.1%	1.7%	2.0%	1.4%	1.6%	1.5%	1.6%	1.6%	1.0%	2.2%
	(3396)	(4391)	(6222)	(7111)	(5119)	(5242)	(5054)	(4280)	(5353)	(4430)	(5342)	(5900)	(5085)	(4611)	(4719)	(4669)
Houseboat	0.0%	0.0%	0.6%	0.8%	0.0%	5.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.8%
	(151)	(216)	(162)	(124)	(328)	(216)	(219)	(112)	(43)	(51)	(31)	(140)	(309)	(18)	(51)	(131)
Pontoon	4.0%	6.2%	1.9%	2.7%	2.9%	2.9%	4.1%	2.4%	2.7%	1.1%	2.1%	1.5%	1.4%	2.3%	1.4%	2.4%
	(1231)	(1458)	(1929)	(1796)	(1610)	(1770)	(1849)	(2276)	(2150)	(2051)	(2436)	(2922)	(2734)	(2624)	(2917)	(3966)
PWC	94.2%	97.4%	96.0%	95.8%	94.7%	95.5%	95.3%	97.1%	96.1%	97.6%	97.4%	97.5%	97.7%	96.9%	96.3%	96.9%
	(1899)	(1761)	(2091)	(1798)	(1589)	(1721)	(1858)	(1962)	(1736)	(2009)	(2093)	(1921)	(1524)	(1811)	(1905)	(1856)
Powered Inflatable/Raft	15.7%	22.3%	13.5%	27.2%	14.8%	9.0%	1.9%	11.0%	19.1%	17.6%	11.9%	16.7%	14.3%	14.1%	27.2%	22.9%
	(205)	(233)	(259)	(154)	(190)	(211)	(157)	(253)	(366)	(228)	(254)	(345)	(224)	(278)	(233)	(315)

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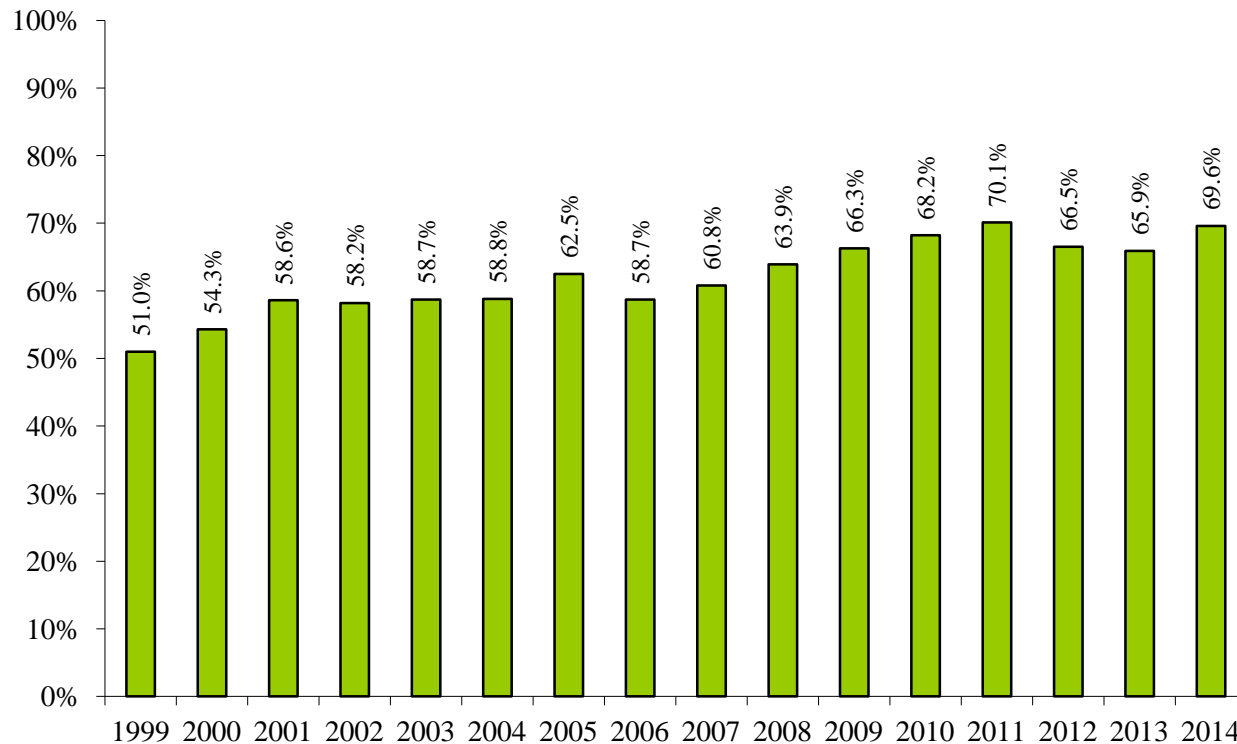
\*Factors controlled for: Age & Boat Type.

\*\* The Open Motorboat category is 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 is 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 have been generally increasing with the overall rate for powerboats. 2014 is the second highest it has been (69.6%) since the study began, down slightly from the highest rate in 2011 of 70.1%, but an increase from 2012 (66.5%) and 2013 (65.9%). Compared to last year's rates for youth, increases were observed in each of the types of powerboats.

**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 % (N's)	2001 % (N's)	2002 % (N's)	2003 % (N's)	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)
<b>All Powerboats</b>	51.0%	54.3%	58.6%	58.2%	58.7%	58.8%	62.5%	58.7%	60.8%	63.9%	66.3%	68.2%	70.1%	66.5%	65.9%	69.6%
(no PWCs)	(3834)	(5179)	(5717)	(5162)	(5170)	(5191)	(4737)	(5043)	(5583)	(5257)	(5451)	(5090)	(4589)	(4846)	(4546)	(4798)
<b>Skiff/Utility</b>	52.7%	49.5%	68.2%	54.9%	63.2%	60.7%	63.3%	58.4%	63.1%	68.4%	70.4%	68.1%	75.4%	65.1%	66.3%	70.8%
	(338)	(369)	(441)	(557)	(768)	(641)	(781)	(661)	(947)	(988)	(1097)	(862)	(929)	(1022)	(936)	(901)
<b>Runabout/Speedboat</b>	51.6%	55.2%	58.8%	59.4%	60.0%	60.0%	63.5%	60.9%	61.7%	64.6%	68.2%	69.7%	71.0%	69.9%	69.2%	70.5%
	(2744)	(3776)	(3987)	(3479)	(3369)	(3574)	(2966)	(3348)	(3517)	(3256)	(3133)	(2943)	(2624)	(2744)	(2482)	(2696)
<b>Open Motorboats**</b>	51.8%	54.3%	60.1%	58.7%	60.5%	60.1%	63.5%	60.5%	61.9%	65.2%	68.6%	69.5%	71.6%	69.1%	68.7%	70.6%
(Skiff/Utility+ Runabout/Speedboat)	(3082)	(4145)	(4428)	(4036)	(4137)	(4215)	(3747)	(4009)	(4464)	(4244)	(4230)	(3805)	(3553)	(3766)	(3418)	(3597)
<b>Cabin Cruiser</b>	42.6%	48.2%	48.3%	50.7%	45.3%	49.6%	54.6%	50.7%	52.0%	51.0%	51.2%	58.8%	61.6%	50.6%	48.9%	56.6%
	(418)	(587)	(774)	(690)	(659)	(529)	(528)	(501)	(639)	(581)	(644)	(524)	(507)	(465)	(505)	(364)
<b>Houseboat</b>	8.7%	12.7%	25.7%	30.3%	17.8%	24.7%	12.9%	28.2%	37.6%	0.0%	25.8%	19.1%	39.9%	6.9%	84.9%	0.0%
	(46)	(64)	(44)	(30)	(63)	(35)	(38)	(40)	(5)	(1)	(4)	(18)	(19)	(3)	(1)	(2)
<b>Pontoon</b>	38.3%	46.3%	54.8%	55.6%	51.8%	48.5%	64.6%	50.3%	64.1%	65.9%	66.2%	68.4%	65.7%	67.3%	66.7%	71.9%
	(272)	(379)	(455)	(399)	(338)	(394)	(440)	(505)	(414)	(392)	(530)	(716)	(494)	(580)	(598)	(787)
<b>PWC</b>	96.0%	99.1%	99.1%	98.8%	98.0%	98.5%	98.3%	99.2%	98.7%	99.4%	98.6%	99.4%	99.1%	98.7%	98.0%	99.7%
	(551)	(649)	(691)	(502)	(562)	(543)	(652)	(580)	(522)	(664)	(572)	(427)	(376)	(401)	(371)	(365)
<b>Powered Inflatable/Raft</b>	59.3%	69.7%	79.5%	72.8%	66.8%	65.8%	71.2%	70.6%	71.1%	79.7%	70.3%	78.2%	73.1%	58.5%	65.4%	68.9%
	(62)	(68)	(60)	(37)	(36)	(53)	(22)	(28)	(66)	(39)	(47)	(45)	(35)	(35)	(25)	(50)

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\*Factors controlled for: Age & Boat Type.

\*\* The Open Motorboat category is 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 and in addition we control for age of youth as we do for the other boat types in this table.

## All 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 is a relatively recent type of boat to be seen). The rates for all paddlecraft excluding paddleboards increased from last year's rate (46.0% to 47.9%). Most types of crafts in this category showed increases but wear rates for canoes and paddleboards remained below 2013 rates. The rates for kayaks increased the most over 2013 rates (67.9% to 74.9%). These changes in rates should be viewed with caution, however, since paddlecraft activity is mostly observed at only a few sites and therefore the overall averages can be highly influenced by local factors such as weather or special events at these sites.

In Table 2.4 we added a row of data for paddleboards first observed in 2010 and also for an all paddlecraft rate including standup paddleboards. The number of boaters observed have increased since 2010 and wear rates for paddleboards have exceeded 50% since 2012.

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



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\*Factors controlled for: Age & Boat Type.

**Table 2.4 – Life Jacket Wear Rates by Paddlecraft for Adults\***

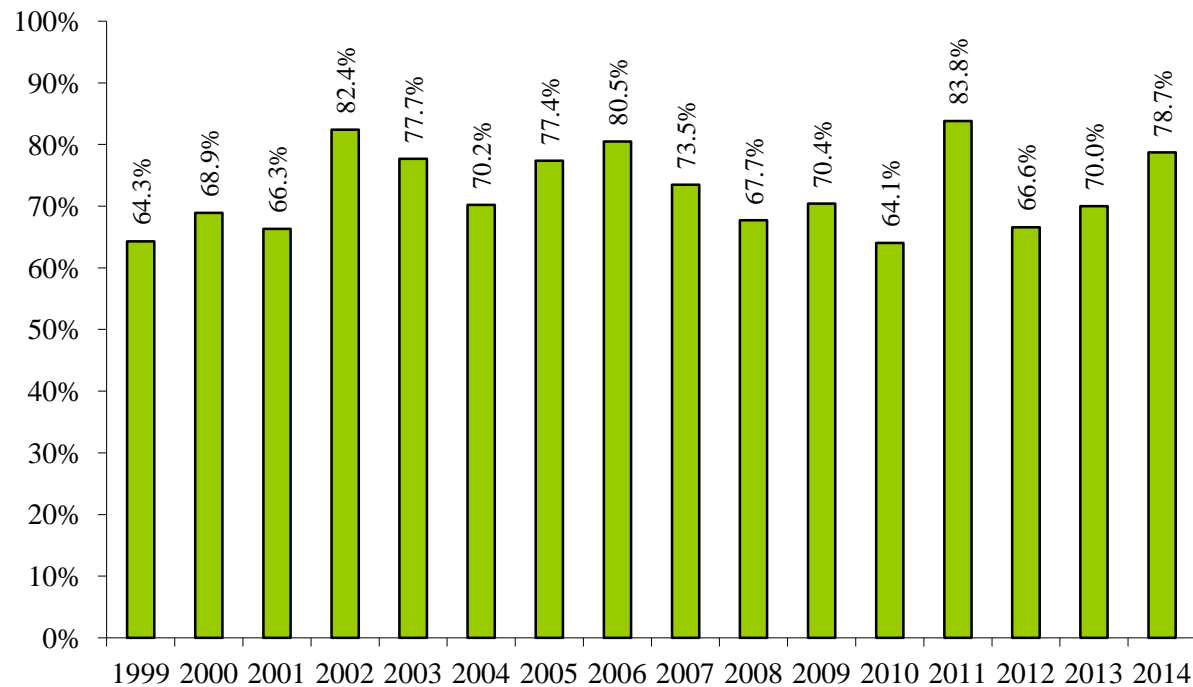
Boat Type	Observation Year															
	1999 % (N's)	2000 % (N's)	2001 % (N's)	2002 % (N's)	2003 % (N's)	2004 % (N's)	2005 % (N's)	2006 % (N's)	2007 % (N's)	2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)
<b>All Paddlecraft</b>	46.2%	50.7%	51.9%	50.7%	55.4%	56.7%	47.0%	62.8%	40.1%	43.1%	41.4%	35.4%	46.5%	56.1%	46.0%	47.9%
<b>(excluding Paddleboards)</b>	(1676)	(1676)	(1816)	(1864)	(1672)	(1637)	(1616)	(1456)	(2065)	(1523)	(1939)	(2551)	(1608)	(2014)	(1919)	(2555)
<b>Paddled Inflatable/Raft</b>	71.8%	13.0%	65.1%	65.6%	60.5%	57.8%	76.0%	77.8%	23.9%	38.4%	8.2%	6.9%	10.9%	39.4%	15.8%	18.2%
	(174)	(198)	(250)	(307)	(290)	(283)	(225)	(308)	(526)	(311)	(340)	(813)	(324)	(485)	(271)	(337)
<b>Rowboat/Dinghy</b>	24.4%	37.2%	18.7%	27.3%	22.8%	10.1%	59.2%	26.7%	15.0%	23.0%	35.3%	34.8%	34.3%	60.2%	17.8%	29.0%
	(82)	(118)	(119)	(193)	(117)	(38)	(71)	(78)	(92)	(65)	(51)	(46)	(87)	(35)	(75)	(79)
<b>Canoe</b>	17.7%	33.8%	23.6%	15.4%	30.4%	26.7%	14.8%	29.2%	19.4%	19.7%	25.0%	19.1%	37.4%	32.7%	35.7%	24.9%
	(809)	(714)	(750)	(701)	(607)	(622)	(679)	(364)	(764)	(481)	(758)	(994)	(386)	(438)	(569)	(744)
<b>Kayak</b>	82.7%	85.7%	84.4%	85.7%	81.4%	87.0%	74.1%	77.9%	72.0%	65.5%	72.6%	75.9%	68.6%	74.9%	67.9%	74.9%
	(611)	(646)	(697)	(663)	(658)	(694)	(675)	(706)	(683)	(648)	(790)	(698)	(811)	(1056)	(1004)	(1395)
<b>Canoe/Kayak Combined</b>	45.9%	58.6%	53.1%	49.7%	56.8%	58.6%	44.4%	61.2%	44.3%	46.0%	49.1%	47.3%	49.4%	52.8%	50.9%	51.9%
	(1420)	(1360)	(1447)	(1364)	(1265)	(1316)	(1354)	(1070)	(1447)	(1129)	(1548)	(1692)	(1197)	(1494)	(1573)	(2139)
<b>Paddleboards</b>												27.8%	41.7%	52.9%	58.7%	53.9%
												(54)	(84)	(157)	(264)	(397)
<b>All Paddlecraft</b>												30.9%	47.3%	56.6%	50.3%	51.8%
<b>(including Paddleboards)</b>												(2605)	(1692)	(2171)	(2183)	(2952)

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 \*Factors controlled for: Age & Boat Type.

## All 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 cautiously because of the relatively small number of youth who use these types of craft. For all paddlecraft combined excluding standup paddleboards, wear rates have fluctuated across the years. In 2014, rates were 78.7% which represents an upward trend since 2012 (66.6%, 70.0% and 78.7% respectively). In 2014 wear rates for youth on paddleboards was 75%, however, this should be viewed with caution since relatively few youth were observed on paddleboards.

**Figure H – Youth Wear Rates for ALL Paddlecraft\***



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\*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 % (N's)	2001 % (N's)	2002 % (N's)	2003 % (N's)	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)
All Paddlecraft (excluding SUPs)	64.3% (317)	68.9% (457)	66.3% (457)	82.4% (312)	77.7% (372)	70.2% (360)	77.4% (281)	80.5% (225)	73.5% (520)	67.7% (487)	70.4% (319)	64.1% (419)	83.8% (231)	66.6% (476)	70.0% (371)	78.7% (337)
Paddled Inflatable/Raft	62.4% (82)	45.8% (124)	52.3% (153)	90.3% (136)	68.9% (113)	68.4% (118)	77.5% (79)	77.9% (87)	58.4% (244)	55.6% (218)	59.0% (76)	41.9% (139)	68.5% (49)	50.2% (192)	55.1% (98)	68.7% (100)
Rowboat/Dinghy	11.1% (9)	47.1% (15)	60.3% (32)	54.7% (31)	88.6% (21)	58.0% (11)	77.1% (17)	67.3% (26)	61.0% (21)	77.8% (25)	91.1% (9)	98.0% (14)	94.0% (15)	88.0% (10)	90.6% (10)	74.2% (23)
Canoe	57.7% (142)	74.6% (222)	62.4% (181)	71.1% (98)	75.0% (130)	60.3% (146)	69.4% (101)	68.9% (49)	81.0% (123)	78.0% (158)	70.6% (132)	68.0% (169)	95.2% (82)	66.5% (89)	78.0% (139)	78.4% (87)
Kayak	83.3% (84)	89.2% (96)	94.3% (91)	83.7% (47)	91.6% (108)	91.2% (85)	88.7% (94)	89.0% (63)	90.1% (132)	83.5% (86)	85.3% (102)	85.4% (97)	89.3% (85)	84.8% (185)	77.0% (124)	90.7% (127)
Canoe/Kayak Combined	67.3% (226)	78.9% (318)	73.1% (272)	74.5% (145)	82.9% (238)	71.3% (231)	79.6% (195)	82.2% (112)	85.7% (255)	80.0% (244)	76.0% (234)	75.1% (266)	88.8% (167)	74.6% (274)	77.2% (263)	83.3% (214)
Paddleboards (SUPs)										0.0% (3)	100% (1)	33.3% (9)	100% (5)	92.3% (13)	51.9% (52)	75.0% (44)
All Paddlecraft (including SUPs)										67.4% (490)	72.4% (320)	65.0% (428)	89.8% (236)	69.5% (489)	72.8% (423)	83.7% (381)

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 \*Factors controlled for: Age & Boat Type.

## Sail Craft for Adults (18 years or older)

Figure I and Table 2.6 document observations of adults in sail craft. For all sail craft combined, there was slight decrease in wear rates from 27.6% in 2013 to 26.5% in 2014. The overall rate is the third highest ever observed for sail craft below the all time high rate of 28.0% observed in 2006 and 27.6% in 2013. Wear rates for day sailors fell between 2013 and 2014 (67.1% to 55.1%) while the rates for cabin sailboats increased in the same period (17.3% to 18.3%). The wear rate for cabin sailboats is the highest it has ever been since observations began.

**Figure I – Adult Wear Rates for ALL Sail Craft\***



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\*Factors controlled for: Age & Boat Type.



**Table 2.6 – Life Jacket Wear Rates by Sail Craft for Adults\***

Boat Type	Observation Year															
	1999 % (N's)	2000 % (N's)	2001 % (N's)	2002 % (N's)	2003 % (N's)	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)
<b>All Sail Craft</b>	13.6%	17.1%	17.0%	18.4%	16.7%	19.5%	24.8%	28.0%	24.7%	20.0%	23.2%	22.0%	24.3%	22.1%	27.6%	26.5%
	(3420)	(3565)	(3843)	(4087)	(3149)	(4149)	(3084)	(3279)	(3217)	(3079)	(3733)	(3336)	(3231)	(3297)	(2840)	(2786)
<b>Sailboard</b>	16.4%	94.0%	80.6%	83.2%	96.7%	92.9%	53.0%	92.1%	83.7%	94.6%	71.9%	83.2%	100%	93.3%	100%	100%
	(46)	(30)	(15)	(55)	(27)	(40)	(20)	(12)	(18)	(17)	(7)	(29)	(9)	(14)	(10)	(3)
<b>Day Sailor</b>	30.7%	35.6%	37.9%	46.7%	38.4%	49.7%	56.4%	59.1%	50.4%	48.3%	61.7%	57.5%	61.3%	54.0%	67.1%	55.1%
	(739)	(791)	(604)	(1124)	(815)	(984)	(736)	(607)	(397)	(649)	(652)	(731)	(736)	(682)	(469)	(630)
<b>Cabin Sailboat</b>	9.1%	11.3%	10.2%	9.5%	10.2%	10.1%	15.4%	19.1%	17.1%	12.0%	13.0%	11.7%	13.4%	12.9%	17.3%	18.3%
	(2635)	(2744)	(3224)	(2908)	(2307)	(3125)	(2328)	(2660)	(2802)	(2413)	(3074)	(2576)	(2486)	(2601)	(2361)	(2153)

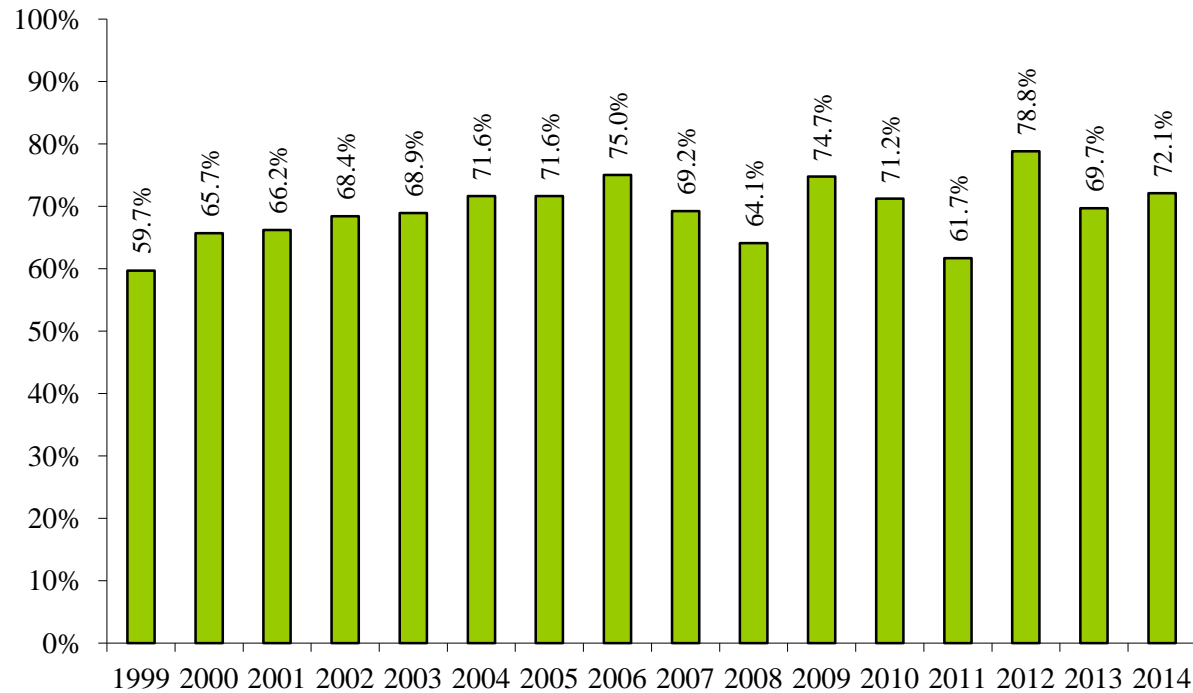
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 \*Factors controlled for: Age & Boat Type.



## Sail Craft for Youth (17 years or younger)

Figure J and Table 2.7 show that the national average wear rates on all sail craft for all youth increased from last year (from 69.7% in 2013 to 72.1% in 2014) but did not return to the historically highest rates observed in 2012. However, relatively few youth are found on any type of sail craft and, therefore, fluctuations in rates should be interpreted with caution.

**Figure J – Youth Wear Rates for ALL Sail Craft\***



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\*Factors controlled for: Age & Boat Type.

**Table 2.7 – Life Jacket Wear Rates by Sail Craft for Youth\***

Boat Type	Observation Year															
	1999 % (N's)	2000 % (N's)	2001 % (N's)	2002 % (N's)	2003 % (N's)	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)
<b>All Sail Craft</b>	59.7%	65.7%	66.2%	68.4%	68.9%	71.6%	71.6%	75.0%	69.2%	64.1%	74.7%	71.2%	61.7%	78.8%	69.7%	72.1%
	(347)	(329)	(424)	(381)	(323)	(323)	(327)	(371)	(270)	(274)	(305)	(202)	(219)	(313)	(220)	(206)
<b>Sailboard</b>	0.0%	100%	66.7%	75.0%	--	92.1%	100%	100%	82.2%	--	--	100%	--	100%	--	100%
	(3)	(7)	(6)	(4)	(0)	(48)	(1)	(4)	(8)	(0)	(0)	(1)	(0)	(1)	(0)	(1)
<b>Day Sailor</b>	71.1%	81.6%	92.0%	82.1%	84.3%	87.5%	73.4%	93.2%	86.5%	88.0%	92.5%	85.2%	80.2%	98.2%	91.5%	97.2%
	(114)	(81)	(85)	(113)	(107)	(83)	(67)	(122)	(54)	(75)	(80)	(86)	(57)	(166)	(36)	(54)
<b>Cabin Sailboat</b>	58.3%	61.5%	58.2%	63.5%	60.6%	68.3%	69.4%	65.7%	62.4%	56.4%	66.4%	65.9%	54.9%	60.3%	61.7%	61.0%
	(230)	(241)	(333)	(264)	(216)	(192)	(259)	(245)	(208)	(196)	(225)	(115)	(162)	(146)	(184)	(152)

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 \*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 boats: powerboats, sailboats, and paddlecraft. Data are presented only for 2004 to 2014, 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.

As might be expected, wear rates and boat size show a dependent relationship: wear rates decrease as the size of the boat increases. However, the general level of wear is also highly influenced by the type of craft. Powerboat wear rates using an 11 year average go from 9.0% for boats less than 16 feet to 1.5% for boats over 26 feet in length. For sailboats, the 11 year average goes from 73.0% for sailboats less than 16 feet to 11.8% for sailboats over 26 feet in length. For paddlecraft the 11 year average for boats less than 16 feet is 51.4% and for boats in the 16 to 21 foot category it is 43.1%.



**Table 2.8 – Life Jacket Wear Rates by Boat Type and Size for Adults\*  
2004 to 2014**

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)	Total % (N's)
<b>Powerboats</b>												
<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)	9.0% (25924)
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)	5.2% (145188)
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)	2.8% (93576)
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)	1.5% (43004)
<b>Sailboats</b>												
<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)	73.0% (2663)
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)	52.7% (3711)
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)	21.1% (10335)
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)	11.8% (19303)
<b>Paddlecraft (excluding SUP)</b>												
<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)	51.4% (15053)
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)	43.1% (4852)

JSI Research & Training Institute, Inc.  
2014 National Observational Life Jacket Wear Rate Study  
\*Factors controlled for: Age & Boat Type.

### III. CHANGES IN INFLATABLE LIFE JACKET USE

#### Changes in Inflatable Life Jacket Use for All Adult Boaters

In 2002 a change was made to the observation procedures to distinguish between wearing an inflatable life jacket or a traditional type of life jacket. In this section we examine whether the use of inflatable life jackets increased across time, and if so, are inflatables contributing to an increase in life jacket use overall.

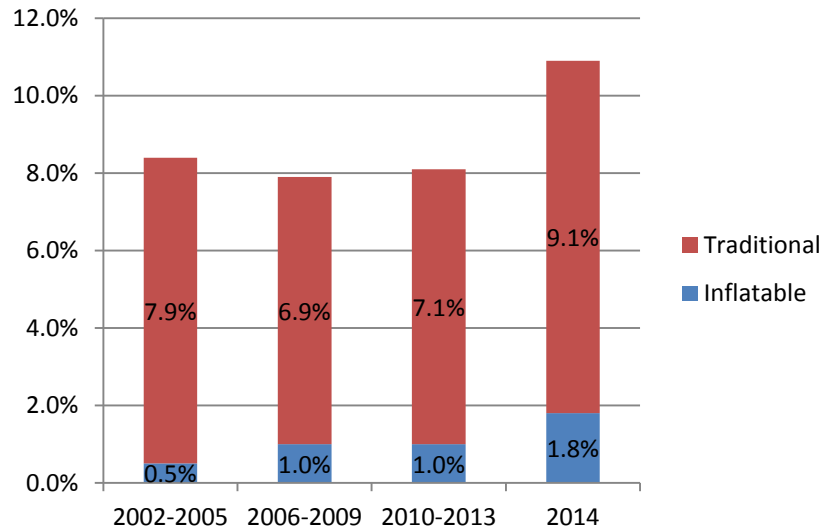
Charts K1 and K2, indicate the differences in inflatable use for four periods of time—2002 to 2005; 2006 to 2009; 2010 to 2013; and 2014 alone. (This is a change from the 2013 report which presented data in three groups and earlier reports in which data were only presented for two groups of years.) Chart K1 shows the absolute percent of all adult boaters (minus PWCs and towed watersports participants) wearing either traditional style or inflatable style life jackets. Chart K2 is limited to only those adult boaters wearing any type of life jacket and indicates the proportion of life jacket users who are wearing either traditional or inflatable styles.

For all boaters, the absolute percent wearing inflatable life jackets has increased from 0.5% in the early years to 1.8% in 2014. This increase in part contributed to the overall increase in life jacket use observed in 2014.

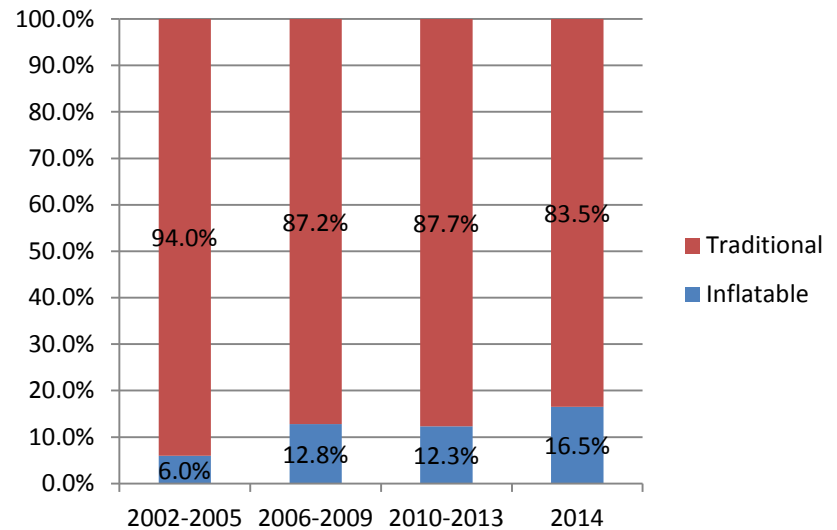
Chart K2 shows more clearly the increase in the proportion of life jacket users choosing an inflatable style. In the 2002-2005 period, 6.0% of the users were wearing inflatables, and this rate increases to about 12% in the 2006 to 2013 periods but in 2014 this proportion jumps to 16.5%.

Additional charts in this section show changes in the use of inflatable styles for specific types of boats that have a sizeable absolute number of inflatable life jacket users or proportion of all users---skiffs, speedboats, cabin sailboats, and cabin cruisers.

**K1. Comparison of Types of Life Jacket Use on All Boats (minus PWCs & Towed Watersports Participant) by Adults  
2002-2005, 2006-2009, 2010-2013, 2014**



**K2. Proportional Comparisons of Types of Life Jacket Use on All Boats (minus PWCs & Towed Watersports Participants) among Adult Life Jacket Users  
2002-2005, 2006-2009, 2010-2013, 2014**



## Changes in Inflatable Life Jacket Use for Boaters on Skiffs

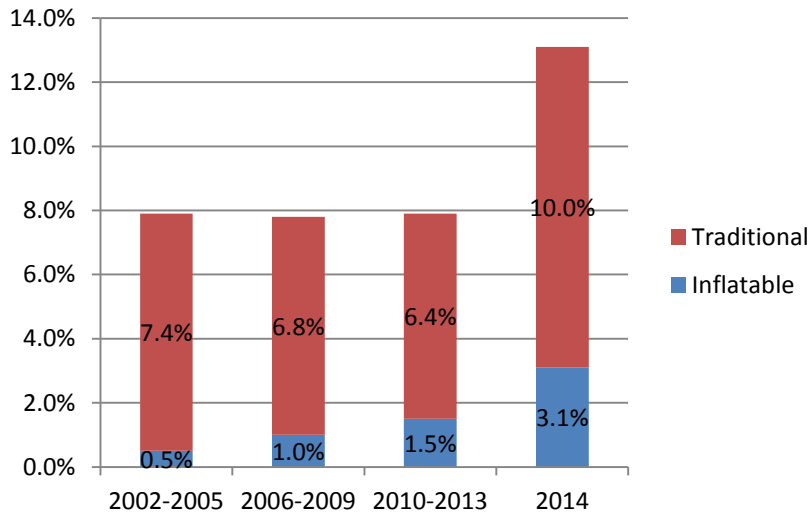
Inflatable and traditional style life jacket use is shown for skiffs in charts K3 and K4. Over the four time periods, inflatable life jacket use has steadily increased in absolute wear rates from 0.5% to 1.0% to 1.5% and in 2014 jumping to 3.1%. Chart K4 shows the steady increase of use of inflatable life jackets on boaters in skiffs among those wearing life jackets moving from 5.9% of users in the 2002 to 2005 time period to 13.2% in the 2006 to 2009 period and then to 18.9% of users in the 2010 to 2013 time period and finally increasing to 23.4% of life jacket users in 2014.

In Charts K3b and K4b we show data only for skiffs involved in fishing or intent to fish. (Intent to fish was only separated out as a specific activity category in 2007 so only three time periods are shown in these charts.) Since more and more fishing tournaments are requiring life jacket use, we thought it instructive to characterize changes for these types of boaters. In K3b actual wear rates of inflatables increase steadily and at higher rates than skiffs in general (1.6% to 2.4% to 5.6%). In K4b the higher relative proportional increase in life jacket wear is easier to see for those involved in fishing or intent to fish. Inflatable life jackets accounted for 16.6% of use in the earliest period and then 27.1% of use in the 2010-2013 time period. In 2014 inflatable life jackets accounted for nearly a third of all life jacket users on skiffs involved in fishing or intent to fish activities.

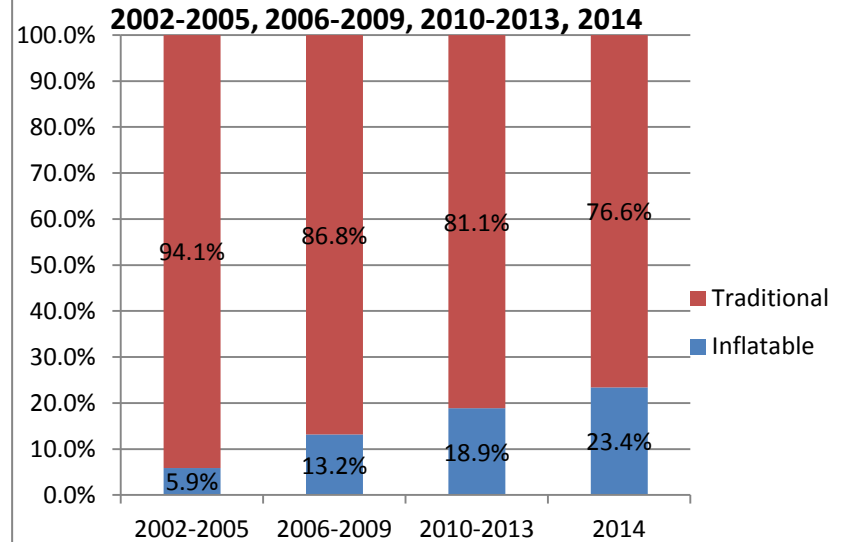




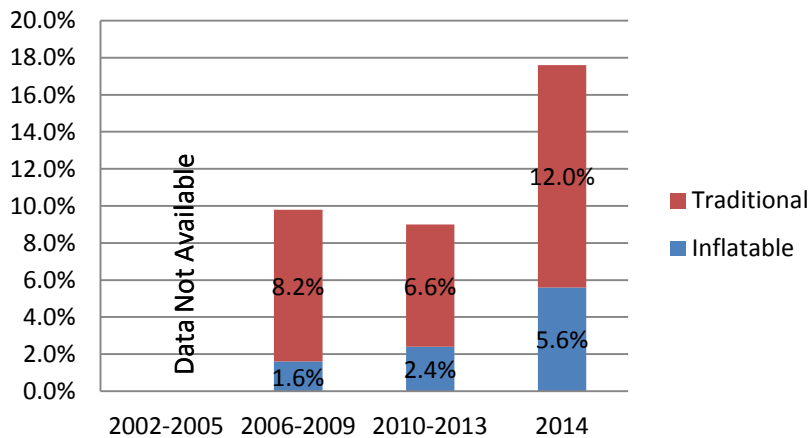
**K3. Comparison of Types of Life Jacket Use on Skiffs by Adults  
2002-2005, 2006-2009, 2010-2013, 2014**



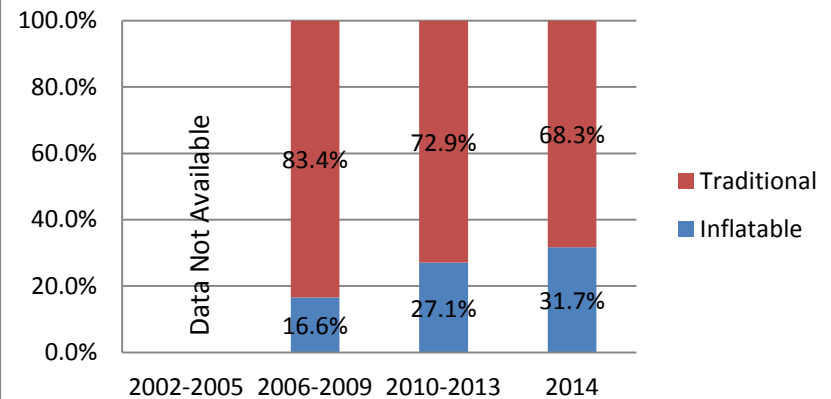
**K4. Proportional Comparisons of Types of Life Jacket Use on Skiffs among Adult Life Jacket Users  
2002-2005, 2006-2009, 2010-2013, 2014**



**K3b. Comparison of Types of Life Jacket Use on Skiffs by Adults  
2006-2009, 2010-2013, 2014  
(only for those involved in fishing or intent to fish)**



**K4b. Proportional Comparison of Types of Life Jacket Use on Skiffs among Adult Life Jacket Users  
2006-2009, 2010-2013, 2014  
(only for those involved in fishing or intent to fish)**



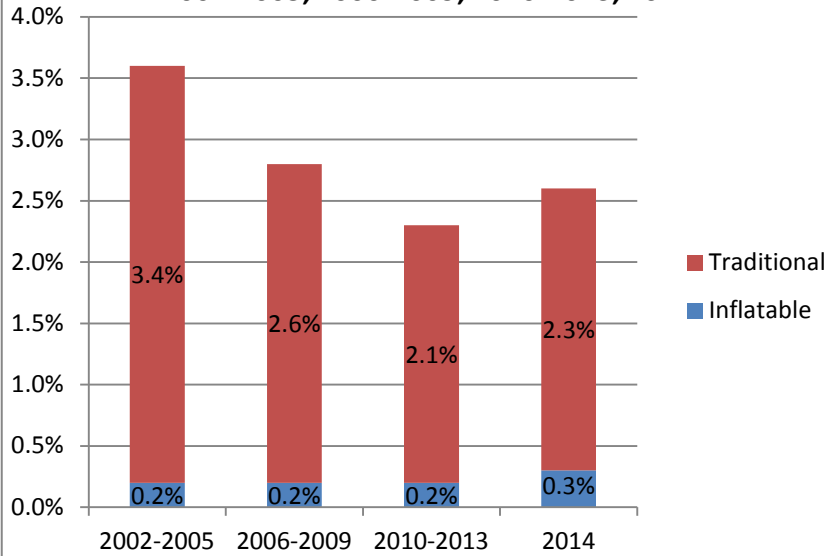
## Changes in Inflatable Life Jacket Use for Boaters on Speedboats/Runabouts

Inflatable and traditional style life jacket use is shown for speedboats/runabouts in charts K5 and K6. Over the four time periods, the rate of inflatable life jacket use has stayed pretty constant and very low at 0.2% in earlier periods and 0.3% for 2014.

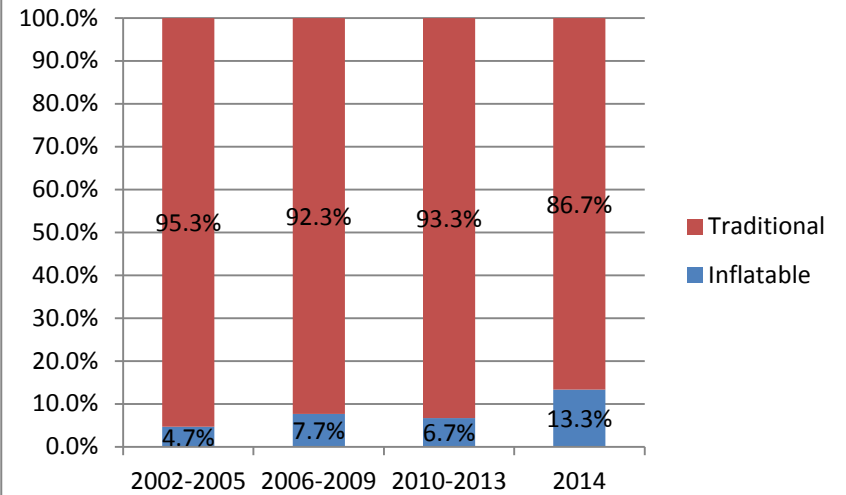
Chart K6 shows the relative use is significantly higher, moving from less than 8% in the earlier years to 13.3% in 2014.



**K5. Comparison of Types of Life Jacket Use on Speedboats/Runabouts by Adults (excluding towed watersports participants) 2002-2005, 2006-2009, 2010-2013, 2014**



**K6. Proportional Comparisons of Types of Life Jacket Use on Speedboats/Runabouts among Adult Life Jacket Users (excluding towed watersports participants) 2002-2005, 2006-2009, 2010-2013, 2014**



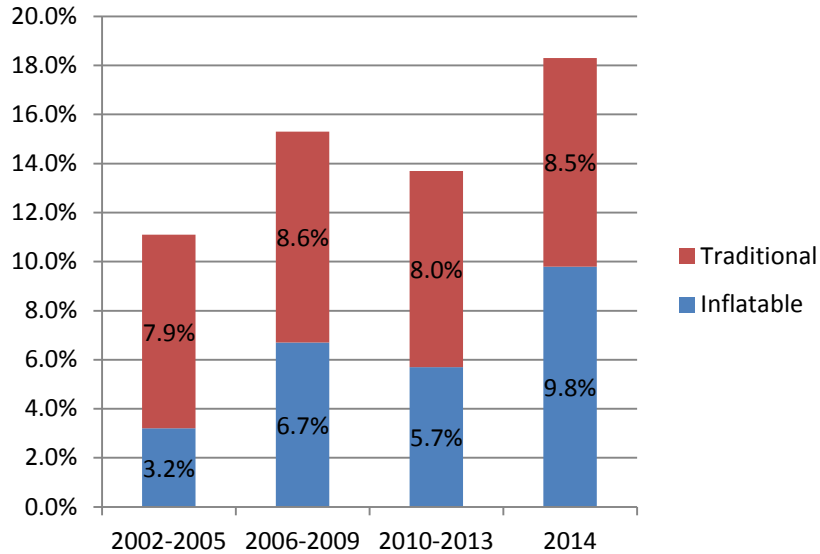
## Changes in Inflatable Life Jacket Use for Boaters on Cabin Sailboats

Inflatable and traditional style life jacket use is shown for cabin sailboats in charts K7 and K8. Over the four time periods, the rate of use of any life jacket increases from 11.1% to 18.3% in 2014. Inflatable life jacket use has increased substantially and for 2014 represents 9.8% absolute use.

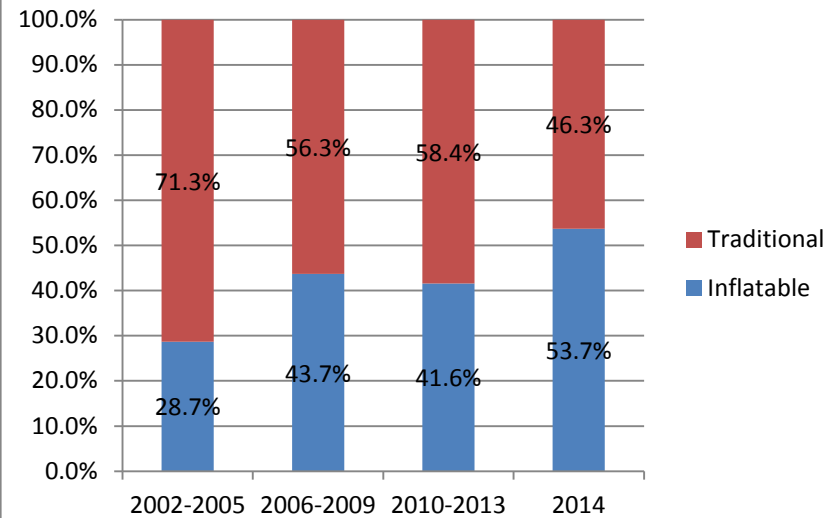
Chart K8 shows the relative increase moving from 28.7% of users in the 2002 to 2005 time period to 53.7% of users in 2014. For this type of craft, it seems that increasing use of inflatable life jackets accounts for a lot of the increase in overall wear rates.



**K7. Comparison of Types of Life Jacket Use on Cabin Sailboats by Adults  
2002-2005, 2006-2009, 2010-2013, 2014**



**K8. Proportional Comparisons of Types of Life Jacket Use on Cabin Sailboats among Adult Life Jacket Users  
2002-2005, 2006-2009, 2010-2013, 2014**



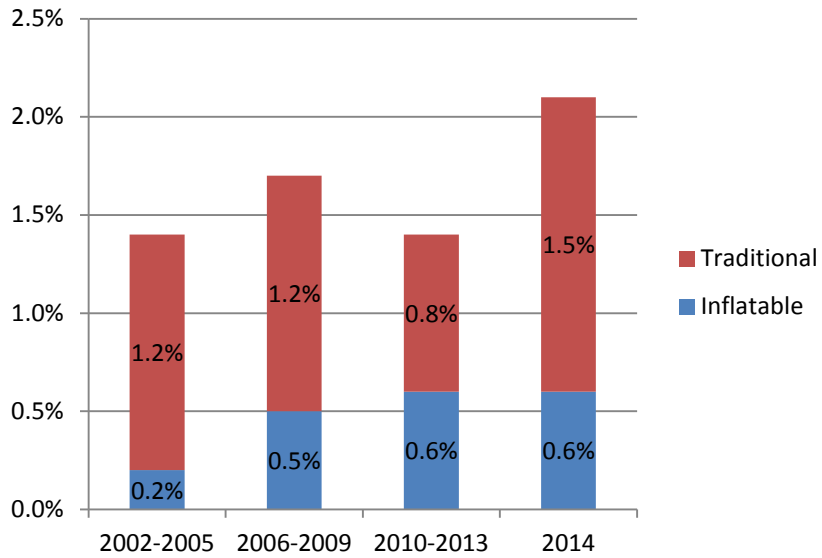
## Changes in Inflatable Life Jacket Use for Boaters on Cabin Cruisers

Inflatable and traditional style life jacket use is shown for cabin cruisers in charts K9 and K10. Over the four time periods, the rate of use of any life jacket essentially stayed the same (low of 1.4% to a high of 2.1%) and relatively low. However, inflatable life jacket use increased from 0.2% to 0.6%.

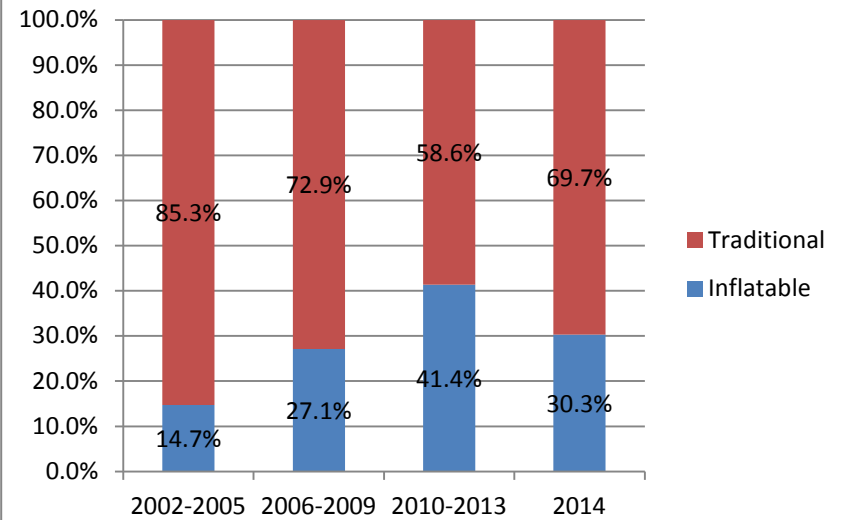
Chart K10 shows the relative increase moving from 14.7% of users in the 2002 to 2005 time period to 27.1% of users in the 2006 to 2009 time period and then moving to 41.4% of users in 2010 to 2013 and in 2014 representing 30.3% of those wearing.



**K9. Comparison of Types of Life Jacket Use on Cabin Cruisers by Adults  
2002-2005, 2006-2009, 2010-2013, 2014**



**K10. Proportional Comparisons of Types of Life Jacket Use on Cabin Cruisers among Adult Life Jacket Users  
2002-2005, 2006-2009, 2010-2013, 2014**



## IV. ENVIRONMENTAL AND SITUATIONAL INFLUENCES ON LIFE JACKET WEAR RATES

This section of the report looks at influences of environmental and situational factors on wear rates. The tables present information separately for powerboats, sailboats and paddlecraft. Significance of the relationships are reported in the footnotes at the bottom of each table.

**Wave Height.** The roughness of the water that the boating activity is taking place in might be expected to affect wear rates. The study classified wave heights as “calm” (< 6 inches), “choppy” (6 inches to 2 feet) and “rough” (over 2 feet). There is relatively little impact for powerboats until wave heights are 2 feet or greater. Sailboats show increases in wear rates as wave height increases (19.8% to 24.7%). Paddlecraft are the most influenced by wave height from 41.4% in calm water to 72.4% in choppy waters and 89.1% in rough waters.

**Table 4.1 – Wear Rates by Wave Height 1999-2014 – Adult Only**

Condition	Boat Type		
	Powerboats % (N)	Sailboats % (N)	Paddlecraft % (N)
Calm (less than 6 in)	3.9% (330993)	19.8% (35478)	41.4% (24246)
Choppy (6 in to 2 ft)	3.7% (90544)	23.9% (17390)	72.4% (5304)
Rough (over 2 ft)	4.4% (2974)	24.7% (948)	89.1% (836)

*Powerboats (p=.0003) Sailboats (p<.0001) Paddlecraft (p<.0001)*



**Visibility.** As visibility worsens it would be sensible if wear rates increased. For all three general types of boats, we see increases in wear rates from good visibility to poor visibility. Powerboats go from 3.8% to 5.9%; sailboats from 20.9% to 24.4%; and paddlecraft from 47.3% to 77.7%.

**Table 4.2 – Wear Rates Observed by Visibility 1999-2014 – Adult Only**

Condition	Boat Type		
	Powerboats % (N)	Sailboats % (N)	Paddlecraft % (N)
Good Visibility	3.8%	20.9%	47.3%
	(390111)	(47217)	(28900)
Fair Visibility	5.0%	23.1%	62.1%
	(30309)	(6135)	(1238)
Poor Visibility	5.9%	24.4%	77.7%
	(2609)	(303)	(197)

*Powerboats (p<.0001) Sailboats (p=.0002) Paddlecraft(p<.0001)*

**Weather Conditions.** As weather conditions worsen from sunny to stormy weather we might expect to see wear rates increase. For all three general types of boats, wear rates increase as weather conditions worsen. Powerboats move from 3.8% to 8.2%; sailboats move from 20.0% to 31.5% and paddlecraft move from 51.4% to 72.8%.

**Table 4.3 – Wear Rates Observed by Weather Conditions 1999-2014 – Adult Only**

Condition	Boat Type		
	Powerboats % (N)	Sailboats % (N)	Paddlecraft % (N)
Sunny	3.8%	20.0%	51.4%
	(228923)	(27737)	(15314)
Partly Cloudy	3.5%	22.4%	41.2%
	(123920)	(16736)	(10145)
Cloudy	4.2%	22.2%	49.9%
	(59312)	(7963)	(4162)
Raining	6.5%	24.7%	65.2%
	(9312)	(1043)	(679)
Stormy Weather	8.2%	31.5%	72.8%
	(2188)	(340)	(114)

*Powerboats (p<.0001) Sailboats (p<.0001) Paddlecraft(p<.0001)*

**Air Temperature.** Wear rates are affected by air temperatures for all three general types of boats. For powerboats and paddlecraft the highest wear rates are seen when air temperatures are below 60 degrees. For sailboats the highest wear rates are when air temperatures are below 70 degrees.

**Table 4.4 – Wear Rates Observed by Air Temperature 1999-2014 – Adult Only**

Condition	Boat Type		
	Powerboats % (N)	Sailboats % (N)	Paddlecraft % (N)
Air Temp Below 60°	11.0%	27.4%	78.7%
	(5968)	(507)	(535)
60-69°	7.8%	31.0%	57.3%
	(27782)	(4204)	(2647)
70-79°	4.8%	22.4%	56.2%
	(100604)	(19131)	(9405)
80-89°	3.3%	19.7%	46.6%
	(172996)	(21946)	(11998)
90-99°	2.6%	15.1%	33.5%
	(97094)	(7131)	(5157)
100° or Above	2.7%	13.2%	17.2%
	(19668)	(619)	(680)

*Powerboats (p<.0001) Sailboats (p<.0001) Paddlecraft (p<.0001)*

**Wind Speed.** Wind speed does not affect wear rates on power boats. However, it does affect wear rates on sailboats and paddlecraft. For sailboats the wear rates are lowest when wind speeds are 2 knots or less (20.4%) and when 3 knots or greater the wear rates are 24%. For paddlecraft, wear rates are lowest when the winds are 2 knots or less (40.7%) and higher when 3-10 knots (53.6%) or 11 knots or more (46.8%).

**Table 4.5 – Wear Rates Observed by Wind Speed 1999-2014 – Adult Only**

Condition	Boat Type		
	Powerboats % (N)	Sailboats % (N)	Paddlecraft % (N)
Wind Speed Calm (0 to 2 knots)	3.9% (81660)	20.4% (6457)	40.7% (9057)
Breezy (sustained 3-10 knots)	3.8% (115649)	24.2% (15619)	53.6% (5848)
Windy (11 or more knots)	4.1% (2333)	24.0% (225)	46.8% (222)

*Powerboats (p=.1625) Sailboats (p<.0001) Paddlecraft (p<.0001)*

**Wear Rates by Activity.** Table 4.6 below shows the impact of fishing or intent to fish activities on wear rates from 2007 when JSI first began classifying activities as intent to fish (visible fishing gear even though not fishing at the moment). Data are shown separately for both skiffs and speedboats/runabouts. Almost without exception wear rates are higher when boaters are participating in fishing or intent to fish activities compared to any other activity. The role of fishing tournaments that require wearing life jackets may be influencing wear rates not only during the tournament itself, but also when boaters are fishing outside of a tournament.

**Table 4.6 – Wear Rates Observed on Skiffs and Runabouts by Activity 2007-2014 – Adult Only**

Boat Type	Activity	Observation Year							
		2007 % (N's)	2008 % (N's)	2009 % (N's)	2010 % (N's)	2011 % (N's)	2012 % (N's)	2013 % (N's)	2014 % (N's)
Skiff/Utility	Fishing/Intent to Fish	8.7%	12.3%	8.3%	10.7%	8.6%	9.1%	7.7%	17.3%
		(1967)	(2944)	(3133)	(3264)	(2689)	(3309)	(3027)	(3163)
	All other Activities	8.2%	6.6%	5.6%	8.7%	7.9%	6.5%	5.2%	9.1%
		(3370)	(3682)	(4116)	(3364)	(3839)	(3620)	(4194)	(3603)
Runabout/ Speedboat	Fishing/Intent to Fish	5.2%	2.5%	4.9%	3.4%	2.5%	6.2%	4.5%	6.0%
		(1313)	(1015)	(862)	(687)	(939)	(671)	(521)	(560)
	All other Activities	2.7%	3.1%	2.3%	2.2%	2.3%	2.0%	2.3%	2.4%
		(13000)	(12729)	(13619)	(14260)	(13340)	(12623)	(11033)	(12363)

## **V. CONCLUSIONS FOR LIFE JACKET WEAR RATES - NATIONAL TREND DATA 1999 TO 2014 (THE NEEDLE IS MOVING IN MANY AREAS OF BOATING)**

This report includes observational data collected from 1999 to 2014. The 2014 data show evidence of significant progress in life jacket use in many sectors of the boating public. There still remains much work to be accomplished and in some types of boating wear rates are particularly low and seem resistant to change. A summary of key findings are:

1. A long standing trend of increased life jacket use for children under the age of six continued with wear rates in 2014 at 94.5%. Rates have steadily increased since 1999 when wear rates were 80.6% for this group.
2. Another long standing trend of increased life jacket use was seen for children between the ages of 6 and 12 with wear rates in 2014 of 87.3%. A steadily increasing trend since 1999 when wear rates were 69.1% for this group.
3. Wear rates for teenagers in 2014 were the highest they have ever been (41.6%).
4. Wear rates for all adults (18+) on all types of boats in 2014 were the highest ever at 10.6%
5. Cabin sailboat wear rates in 2014 were the highest ever at 18.3%. This is a doubling of wear rates since 1999 when they were 9.1%.
6. Use of inflatable life jackets on Cabin Sailboats has increased dramatically from the 2002-2005 period where they made up 28.7% of users to 2014 when they represented 53.7% of users.
7. Day sailor rates have also climbed dramatically since 1999 when wear rates were 30.7%. In 2014 the wear rate was 55.1% down somewhat from last year when they were 67.1%.
8. Use of inflatable life jackets has increased substantially among adult boaters on skiffs who are involved in either fishing or intent to fish activities. Inflatables in 2006-2009 were used by 16.6% of these boaters but in 2014 the use of inflatables for this type of boat activity was 31.7% among life jacket users.
9. The number of standup paddleboarders has increased each year since 2010 and wear rates have been in excess of 50% since 2011. In 2014 the wear rate was 53.9%.
10. Wear rates on PWCs for both adults and children are almost universal.

11. Boaters participating in fishing or intent to fish activities have higher wear rates compared to all other activities; this finding is true for skiffs as well as speedboats/runabouts.
12. For all types of boats, as boat length decreases, wear rates increase.
13. Adult boaters on powerboats show increased wear rates when weather or water conditions are poorer: wear rates are 3.8% in good visibility and 5.9% in poor visibility; 3.8% in sunny weather and 8.2% in stormy weather; 2.7% when air temperatures are above 100 degrees but 11.0% when temperatures are below 60 degrees; 3.9% in calm waters and 4.4% in rough waters.
14. Adult boaters on sailboats also respond with increased life jacket wear when weather or water conditions are poorer: in good visibility 20.9% and poor visibility 24.4%; 20.0% in sunny weather and 31.5% in stormy weather; 13.2% when temperatures are above 100 degrees but 27.4% when below 60 degrees; 19.8% in calm waters but 24.7% in rough waters.
15. Adult boaters on paddlecraft also respond with increased life jacket use when weather or water conditions are poorer; in good visibility 47.3% but in poor visibility 77.7%; in sunny weather 51.4% but in stormy weather 72.8%; 17.2% when air temperatures are above 100 degrees but 78.7% when temperatures are below 60 degrees; 41.4% in calm waters but 89.1% in rough waters.
16. The one type of boat that shows no increases in wear rates since 1999 are speedboats, especially when not involved in fishing or intent to fish activities.

## VI. APPENDIX: 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 data collection.

**Time period** - Observations were conducted during the summer months of each year, beginning the weekend of July 4<sup>th</sup> 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 for four-hour periods either 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 binoculars and called out the information, which was then 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 the observers during two half-day sessions. The first half-day training consisted of reviewing the observation manual, observation forms, and required equipment. The observation manual contained procedures, definitions, and pictures of various types of boats to facilitate consistent classification by the observers. The second half-day of training allowed observation team members an opportunity to practice using the required equipment and observation forms with the assistance and guidance of an experienced JSI project staff member.



**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. 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, sailboat, day sailor, cabin sailboat, rowboat, inflatable, canoe, kayak, and other); the **type of propulsion** (outboard engine, sterndrive/inboard engine, sail only, sail and auxiliary engine/motor, paddles/oars/manual, air thrust, and other); **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** (wearing or not wearing); **life jacket type** (traditional=old or inflatable=new). 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.

**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 15 years of observations only three 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. Finally, in 2007, we 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.

# JSI Data Collection Form: 2014 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

59293



POWER BOAT:		SAIL:	PADDLE:	OTHER:	GENDER			AGE(years)					PFD			WS				
<input type="radio"/> Skiff/Utility <input type="radio"/> PWC <input type="radio"/> Runabout/Speedboat <input type="radio"/> Pontoon <input type="radio"/> Cabin cruiser		<input type="radio"/> Day sailor <input type="radio"/> Cabin sailboat <input type="radio"/> Sailboard	<input type="radio"/> Kayak <input type="radio"/> Canoe <input type="radio"/> Rowboat <input type="radio"/> Paddle board	<input type="radio"/> Inflatable/Raft <input type="radio"/> Houseboat <input type="radio"/> Other	M	F	?	0-5	6-12	13-17	18-64	65+	Old	New	No	Yes				
<b>SIZE (ft):</b>		<b>PROPULSION:</b>		<b>OPERATION:</b>		<b>ACTIVITY:</b>														
<input type="radio"/> Under 16 <input type="radio"/> 16 - 20.9 <input type="radio"/> 21 - 25.9 <input type="radio"/> 26 - 45.9 <input type="radio"/> 46 +		<input type="radio"/> Outboard <input type="radio"/> Stemdrive/Inboard <input type="radio"/> Sail Only <input type="radio"/> Sail and Motor <input type="radio"/> Paddles, Oars/Manual <input type="radio"/> Air Thrust <input type="radio"/> Other		<input type="radio"/> Cruising/Motoring <input type="radio"/> Sailing <input type="radio"/> Rowing/Paddling <input type="radio"/> Drifting <input type="radio"/> Anchored		<input type="radio"/> Pleasure <input type="radio"/> Fishing <input type="radio"/> Water skiing <input type="radio"/> Intent to Fish <input type="radio"/> White water <input type="radio"/> Swimming <input type="radio"/> Racing or High Speed <input type="radio"/> Other		P1	P2	P3	P4	P5	P6	P7	P8	P9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

POWER BOAT:		SAIL:	PADDLE:	OTHER:	GENDER			AGE(years)					PFD			WS				
<input type="radio"/> Skiff/Utility <input type="radio"/> PWC <input type="radio"/> Runabout/Speedboat <input type="radio"/> Pontoon <input type="radio"/> Cabin cruiser		<input type="radio"/> Day sailor <input type="radio"/> Cabin sailboat <input type="radio"/> Sailboard	<input type="radio"/> Kayak <input type="radio"/> Canoe <input type="radio"/> Rowboat <input type="radio"/> Paddle board	<input type="radio"/> Inflatable/Raft <input type="radio"/> Houseboat <input type="radio"/> Other	M	F	?	0-5	6-12	13-17	18-64	65+	Old	New	No	Yes				
<b>SIZE (ft):</b>		<b>PROPULSION:</b>		<b>OPERATION:</b>		<b>ACTIVITY:</b>														
<input type="radio"/> Under 16 <input type="radio"/> 16 - 20.9 <input type="radio"/> 21 - 25.9 <input type="radio"/> 26 - 45.9 <input type="radio"/> 46 +		<input type="radio"/> Outboard <input type="radio"/> Stemdrive/Inboard <input type="radio"/> Sail Only <input type="radio"/> Sail and Motor <input type="radio"/> Paddles, Oars/Manual <input type="radio"/> Air Thrust <input type="radio"/> Other		<input type="radio"/> Cruising/Motoring <input type="radio"/> Sailing <input type="radio"/> Rowing/Paddling <input type="radio"/> Drifting <input type="radio"/> Anchored		<input type="radio"/> Pleasure <input type="radio"/> Fishing <input type="radio"/> Water skiing <input type="radio"/> Intent to Fish <input type="radio"/> White water <input type="radio"/> Swimming <input type="radio"/> Racing or High Speed <input type="radio"/> Other		P1	P2	P3	P4	P5	P6	P7	P8	P9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

POWER BOAT:		SAIL:	PADDLE:	OTHER:	GENDER			AGE(years)					PFD			WS				
<input type="radio"/> Skiff/Utility <input type="radio"/> PWC <input type="radio"/> Runabout/Speedboat <input type="radio"/> Pontoon <input type="radio"/> Cabin cruiser		<input type="radio"/> Day sailor <input type="radio"/> Cabin sailboat <input type="radio"/> Sailboard	<input type="radio"/> Kayak <input type="radio"/> Canoe <input type="radio"/> Rowboat <input type="radio"/> Paddle board	<input type="radio"/> Inflatable/Raft <input type="radio"/> Houseboat <input type="radio"/> Other	M	F	?	0-5	6-12	13-17	18-64	65+	Old	New	No	Yes				
<b>SIZE (ft):</b>		<b>PROPULSION:</b>		<b>OPERATION:</b>		<b>ACTIVITY:</b>														
<input type="radio"/> Under 16 <input type="radio"/> 16 - 20.9 <input type="radio"/> 21 - 25.9 <input type="radio"/> 26 - 45.9 <input type="radio"/> 46 +		<input type="radio"/> Outboard <input type="radio"/> Stemdrive/Inboard <input type="radio"/> Sail Only <input type="radio"/> Sail and Motor <input type="radio"/> Paddles, Oars/Manual <input type="radio"/> Air Thrust <input type="radio"/> Other		<input type="radio"/> Cruising/Motoring <input type="radio"/> Sailing <input type="radio"/> Rowing/Paddling <input type="radio"/> Drifting <input type="radio"/> Anchored		<input type="radio"/> Pleasure <input type="radio"/> Fishing <input type="radio"/> Water skiing <input type="radio"/> Intent to Fish <input type="radio"/> White water <input type="radio"/> Swimming <input type="radio"/> Racing or High Speed <input type="radio"/> Other		P1	P2	P3	P4	P5	P6	P7	P8	P9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**PFD Study 2014**

**CODE**

State	Site	Block	Group	Phase	Page Number

# JSI Data Collection Form: 2014 Site Form

**PFD Study 2014**

# of Belt Pack PFD's

# 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

## 2. Type of Body of Water

- Bay, inlet or sound       River, stream, creek or canal       Other: \_\_\_\_\_  
 Harbor       Lake, pond, or reservoir (not Great Lakes)  
 Intercoastal 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

<b>Air Temp.</b> <input type="text"/> <input type="text"/> <input type="text"/> F	<b>Water Conditions</b> <input type="radio"/> Calm (less than 6") <input type="radio"/> Choppy (6" to 2') <input type="radio"/> Rough (over 2')	<b>Current</b> <input type="radio"/> Strong <input type="radio"/> Moderate <input type="radio"/> Weak/None	<b>Visibility</b> <input type="radio"/> Good <input type="radio"/> Fair <input type="radio"/> Poor	<b>Weather Conditions</b> <input type="radio"/> Sunny <input type="radio"/> Raining <input type="radio"/> Partly Cloudy <input type="radio"/> Stormy <input type="radio"/> Cloudy
<b>Wind Speed</b> <input type="text"/> <input type="text"/> knots				

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

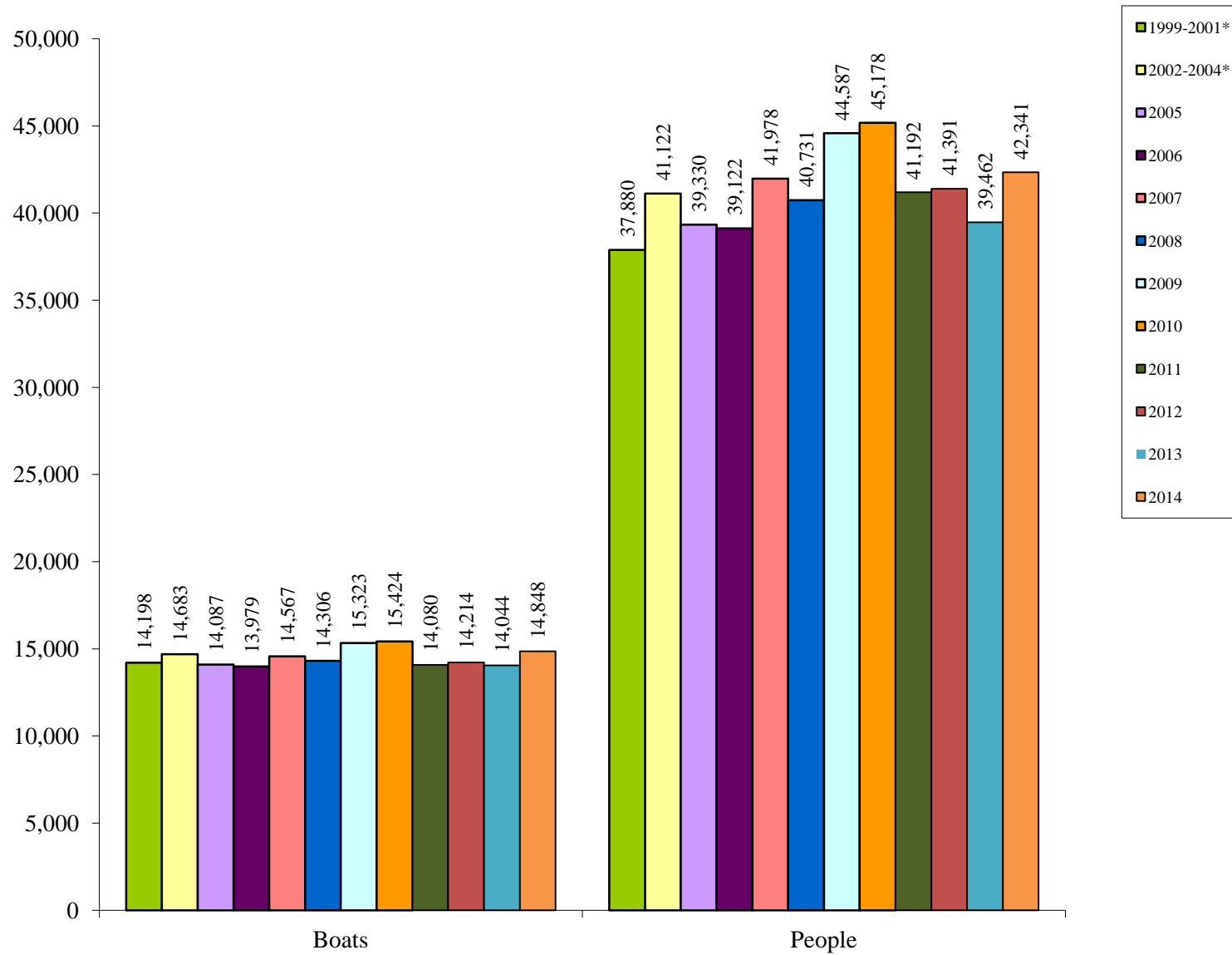
## VIII. INFORMATION ON BOATS & PEOPLE OBSERVED

From 1999 to 2014, JSI has observed a total of 231,515 boats and 652,318 boaters (Figure L1). This year, 2014, 14,848 boats carrying 42,341 boaters were observed. Across the sixteen years, the number of boats, and the number of boaters observed in the later years have generally been greater than in the earlier years. However, the proportions of the different types of boats, operation and activity of boats, as well as the age and gender of the boaters observed has remained fairly consistent (see Figures L2 through R2). 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 sixteen year span.

Figures S through Y 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.

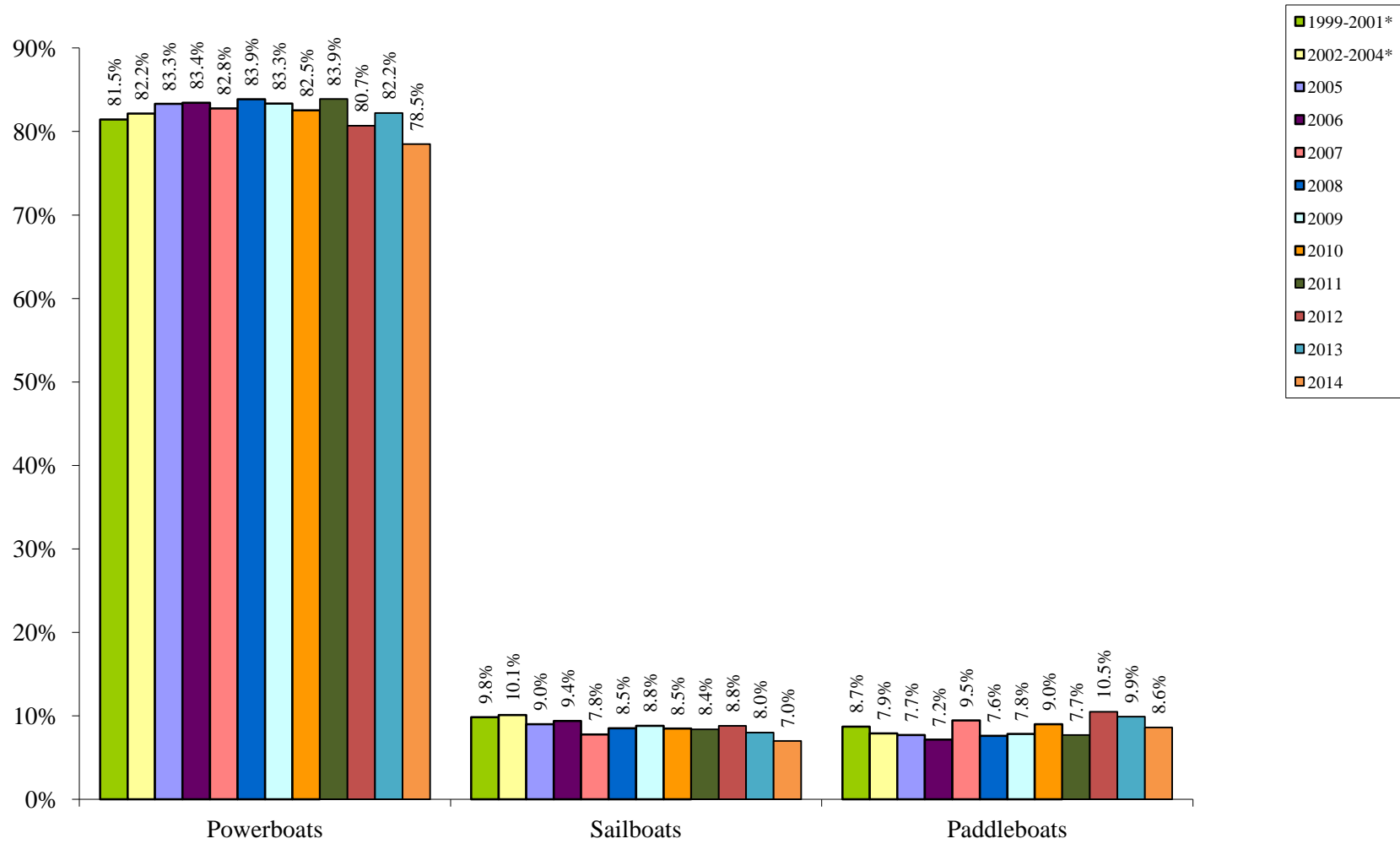
All Figures in this section have been modified slightly from previous years' reports prior to 2011. The percentages now exclude (like the 2011 report) any missing observations on a particular characteristic. Since missing observations are relatively rare, this switch in presentation does not result in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

Figure L1 – Number of Boats and People



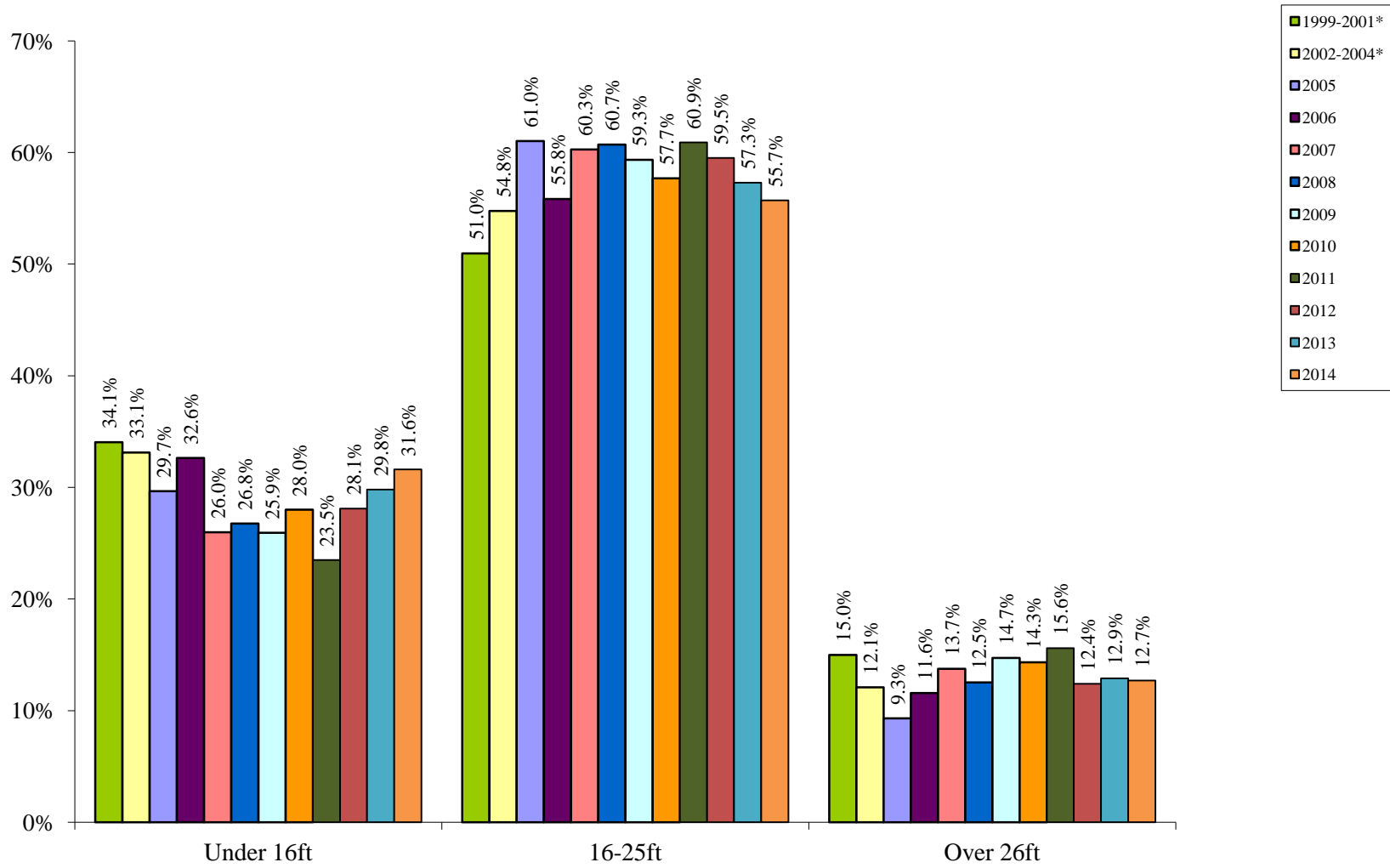
\*Three-year average

Figure L2 – Types of Boats



\*Three-year average

Figure M – Length of Boats



\*Three-year average

Figure N – Length of Boats 2004-2014 Data Only

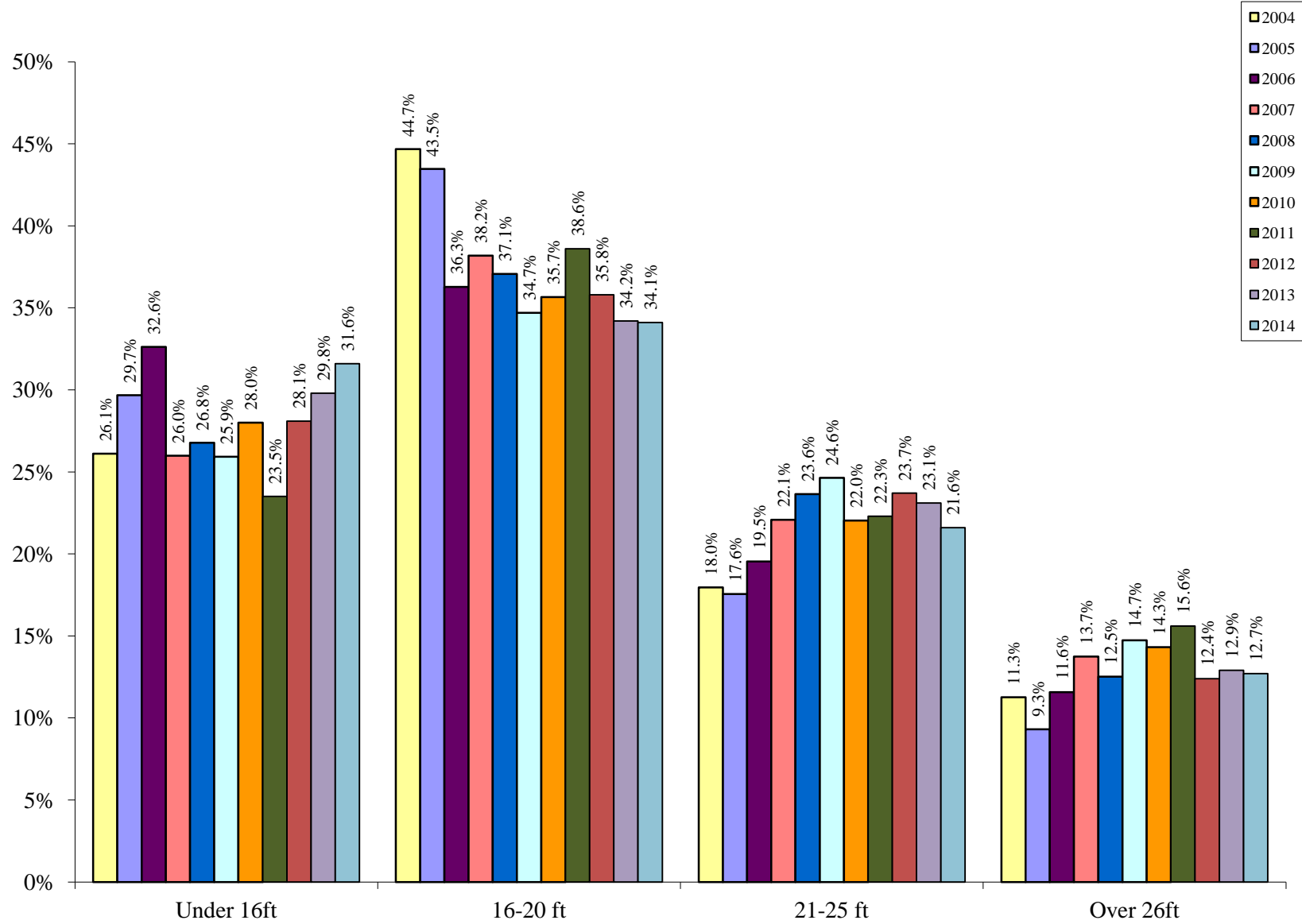
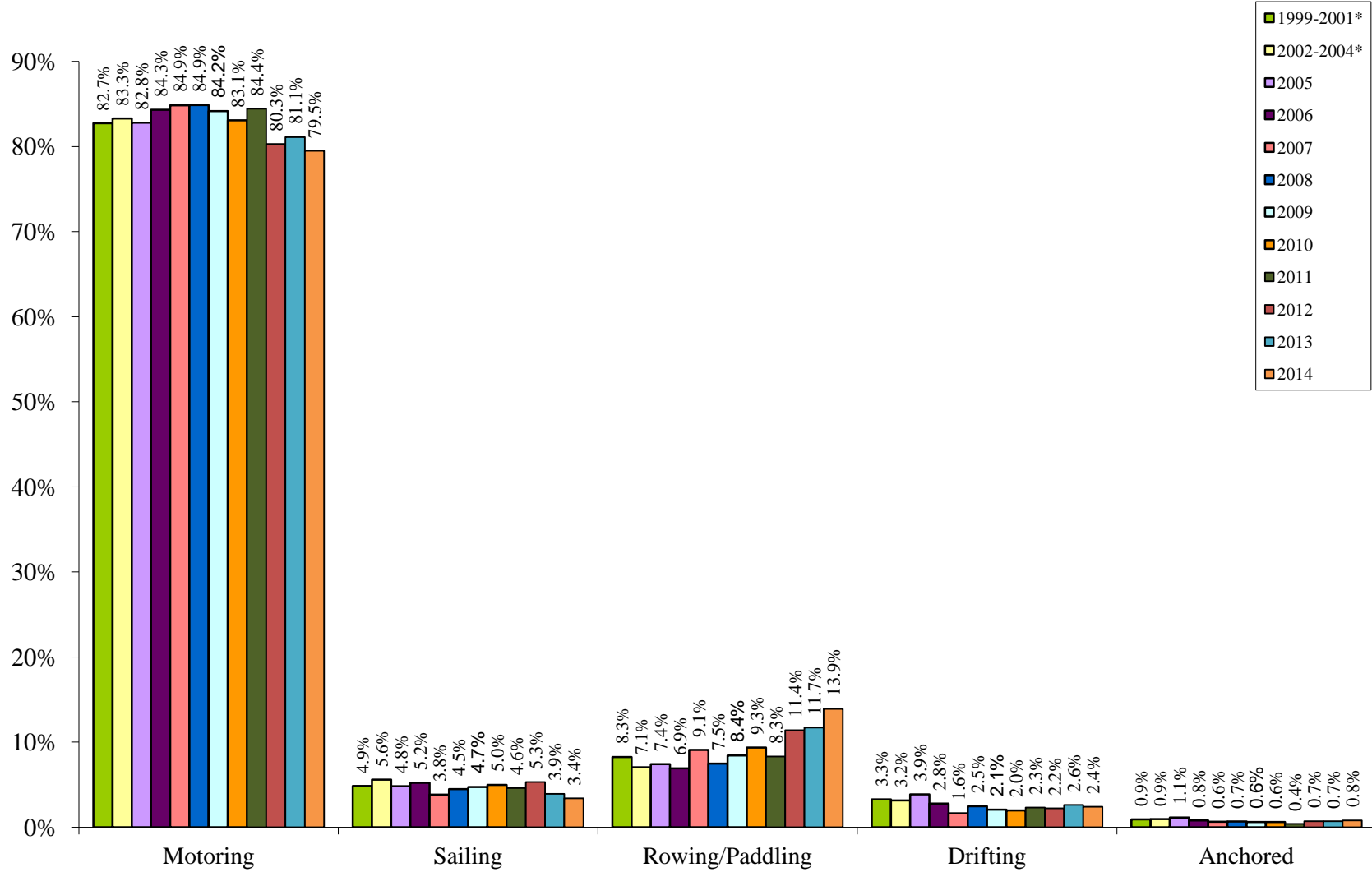


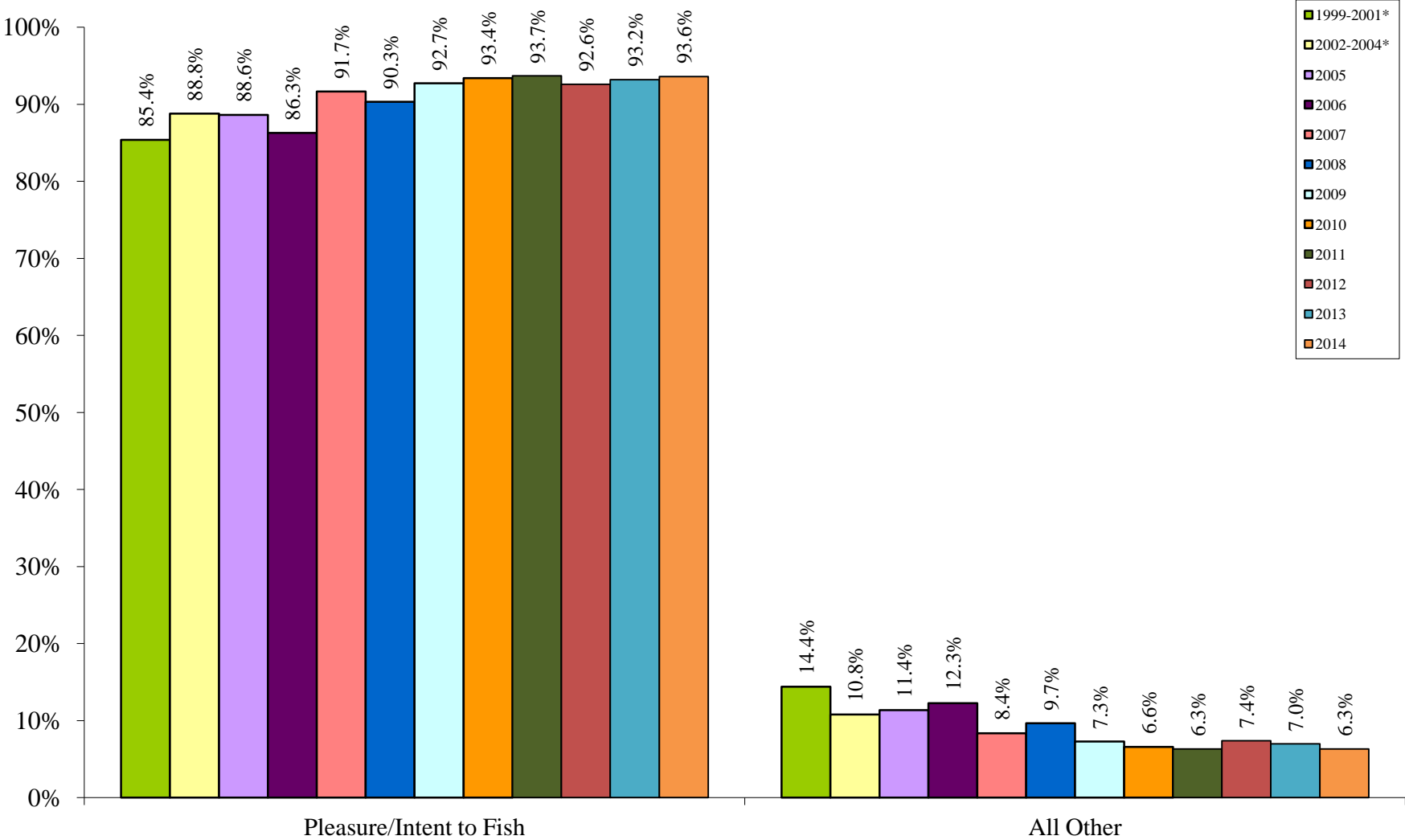


Figure O – Operation of Boats



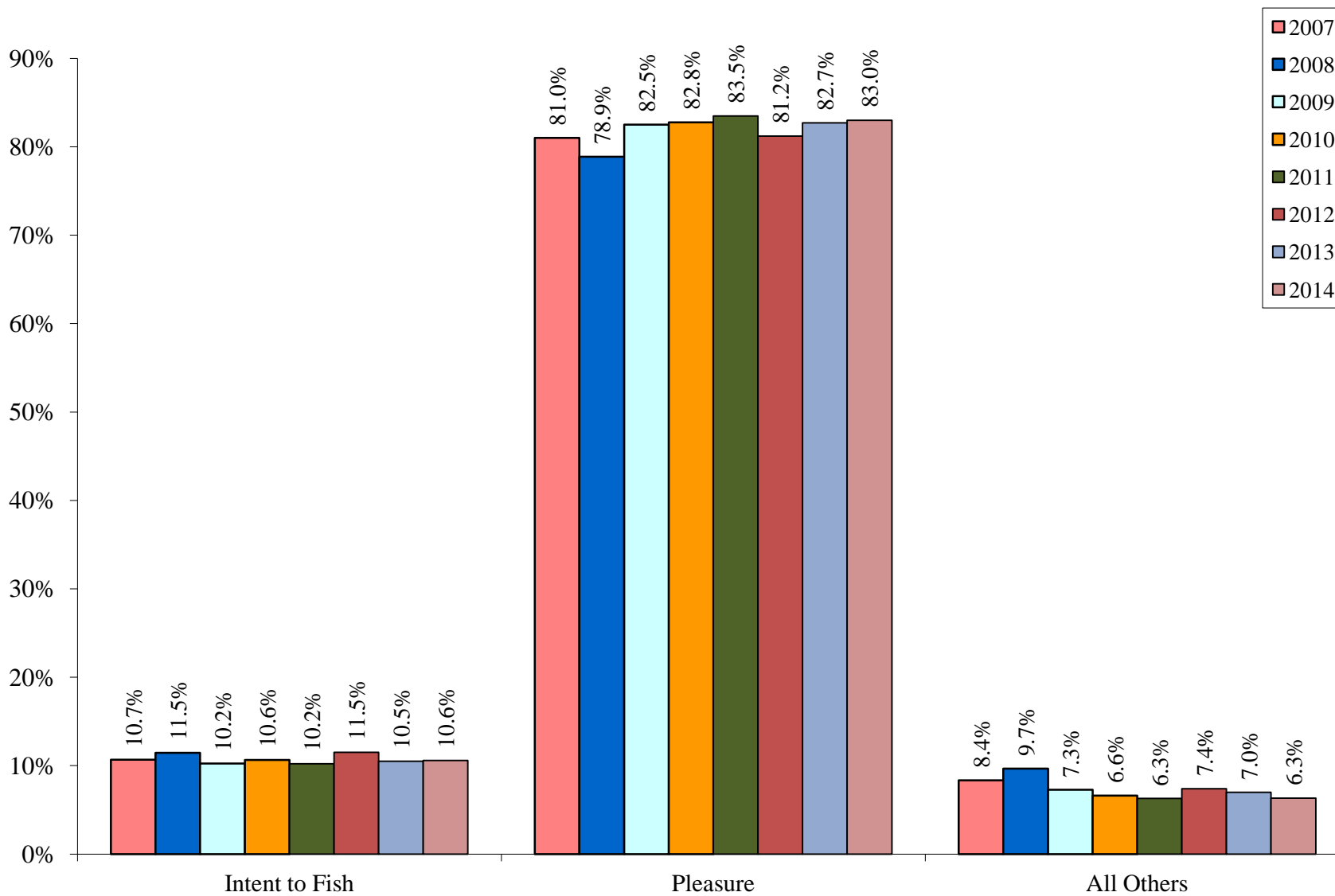
\*Three-year average

Figure P1 – Activity of Boaters—ALL YEARS\*

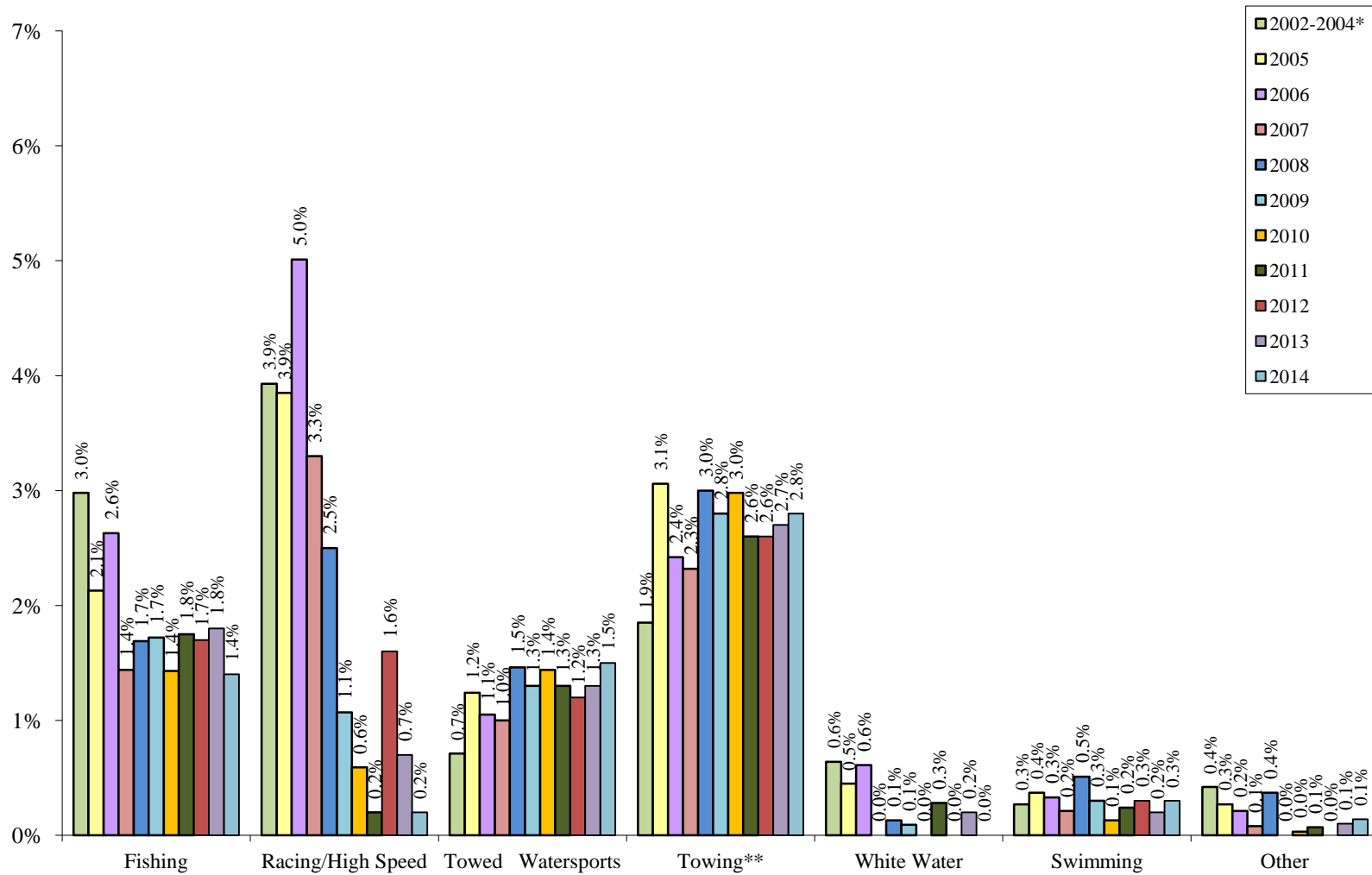


\*Three-year average

Figure P2 – Activity of Boaters 2007-2014 Data



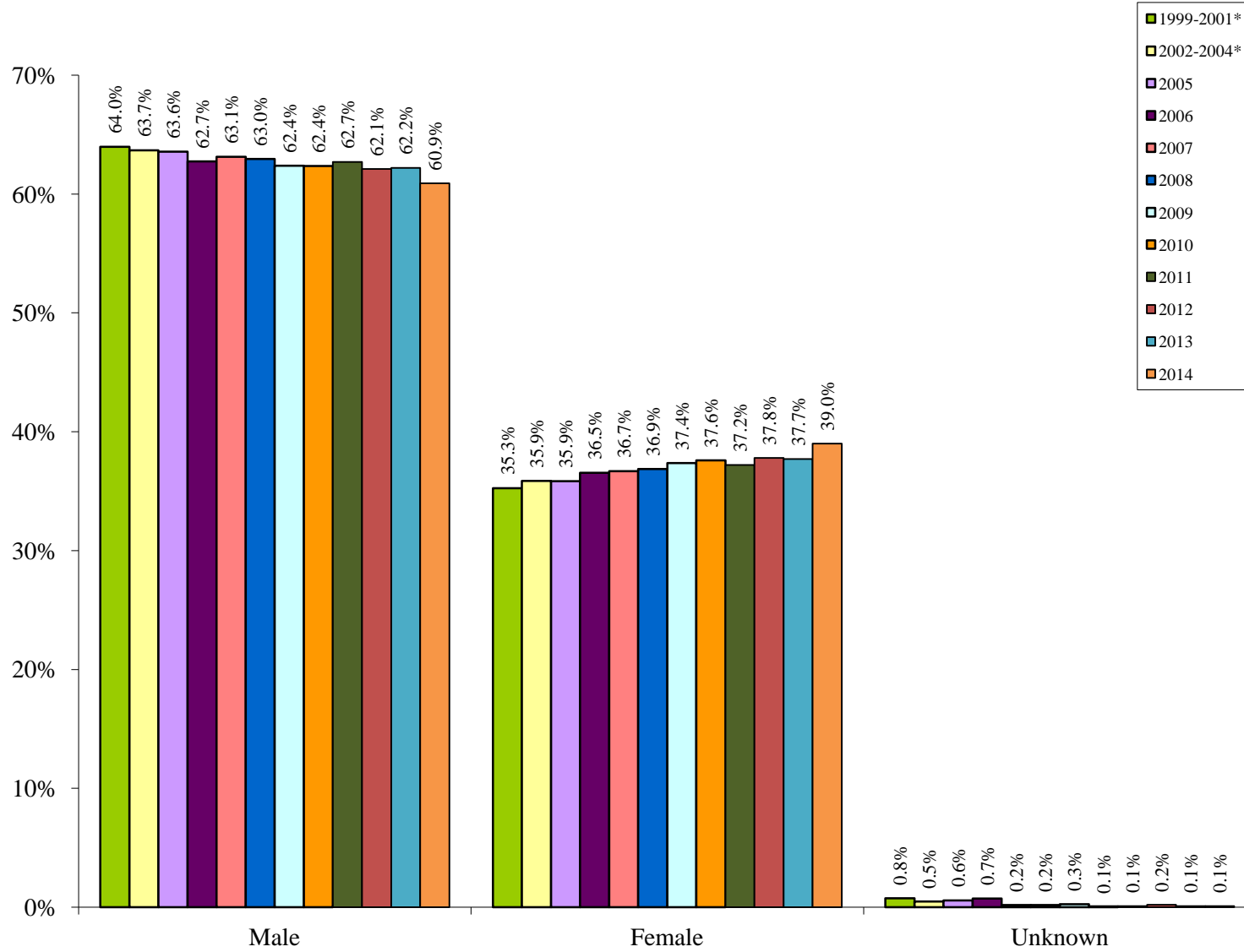
**Figure P3 – Activity of Boaters 2002-2014**  
**Detailed Breakdown of ALL OTHER Category from Figure P1**



\*Three-year average

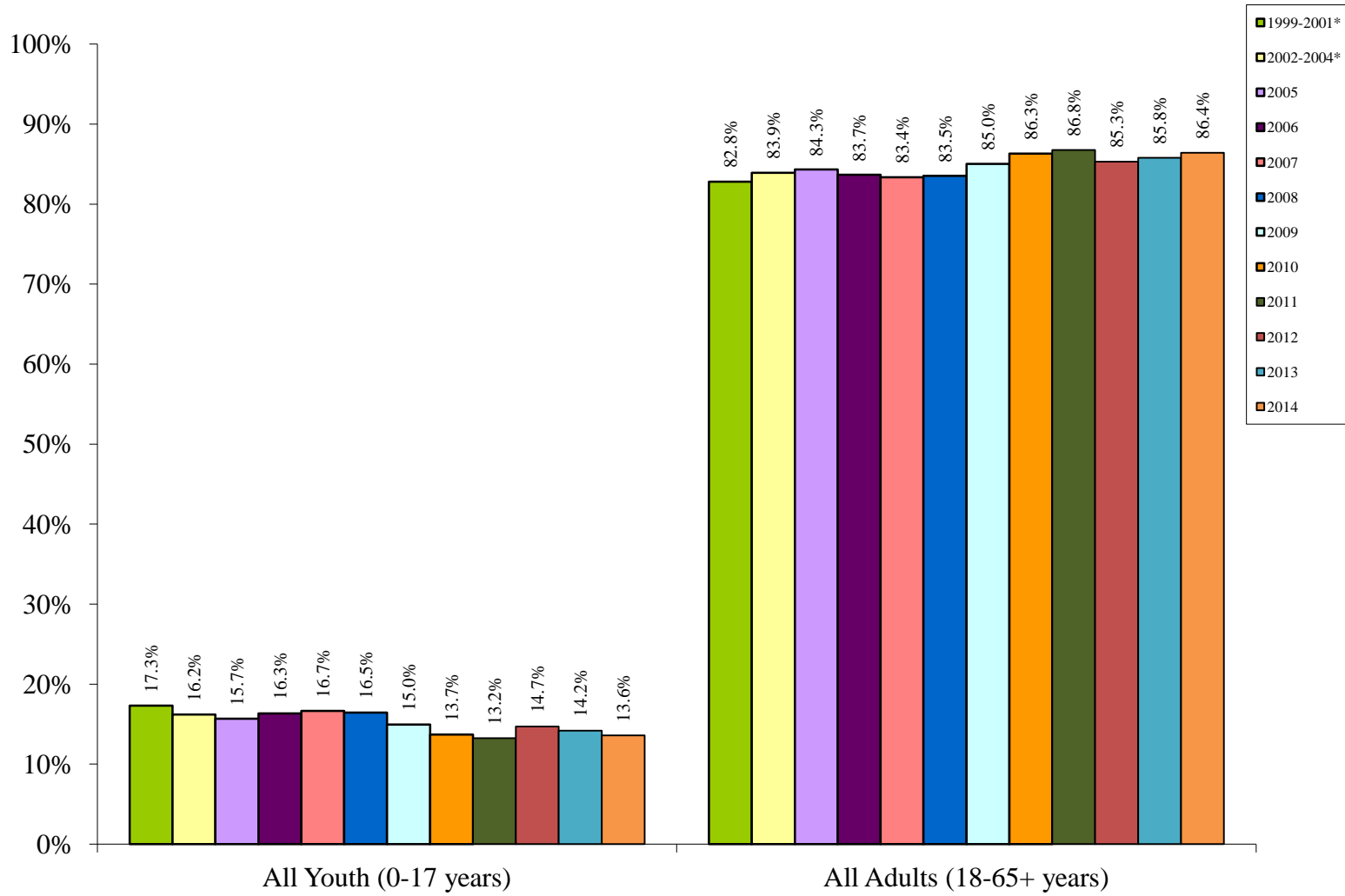
\*\*The activity “Towing” indicates that these boaters were passengers in a boat towing water-skiers or other towing activities. Likewise, “Towed Watersports” includes all towing sports and is reserved for the boaters in the water being towed. The label was changed in April 2010.

Figure Q – Gender of Boaters



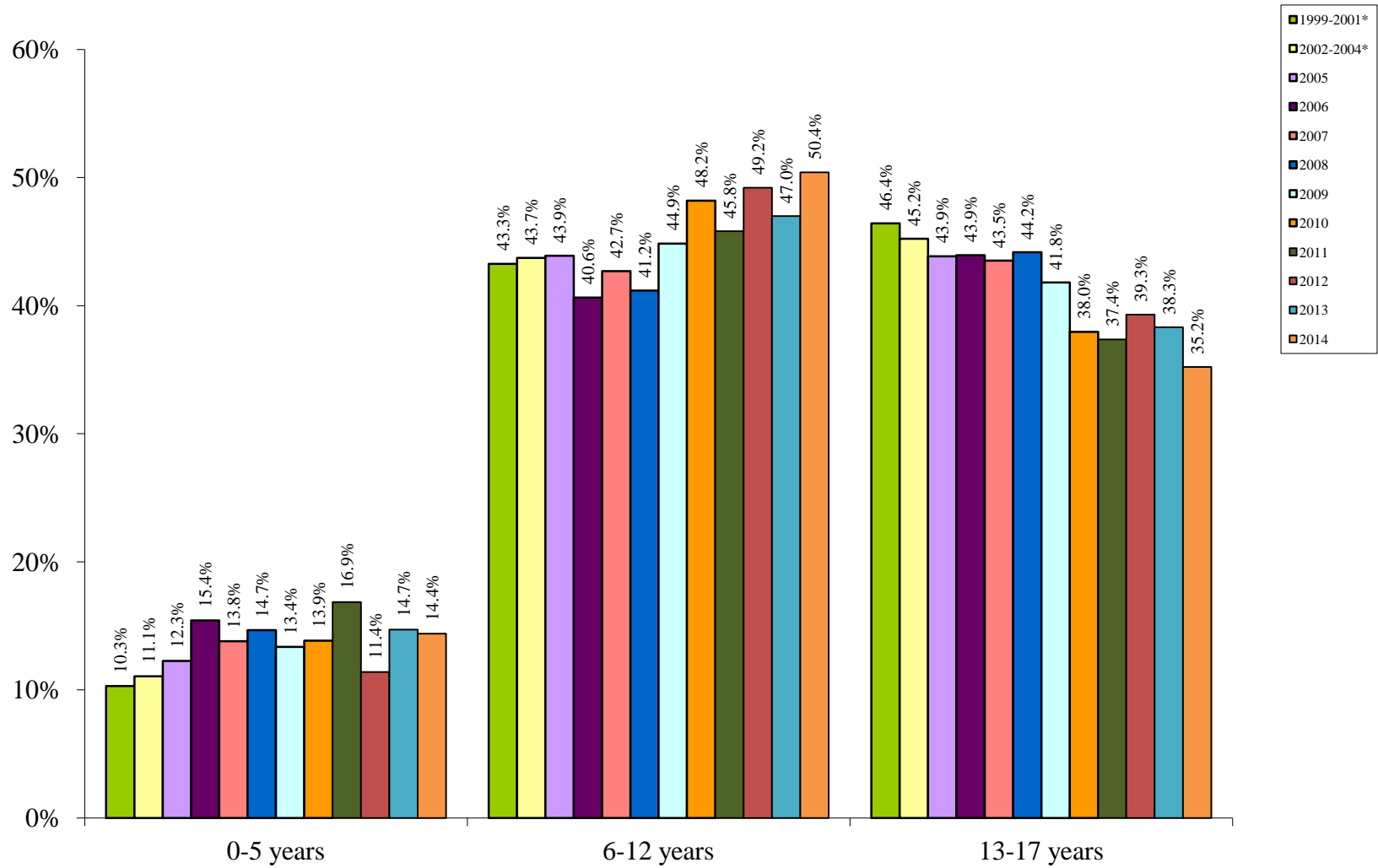
\*Three-year average

Figure R1 – Age of Boaters



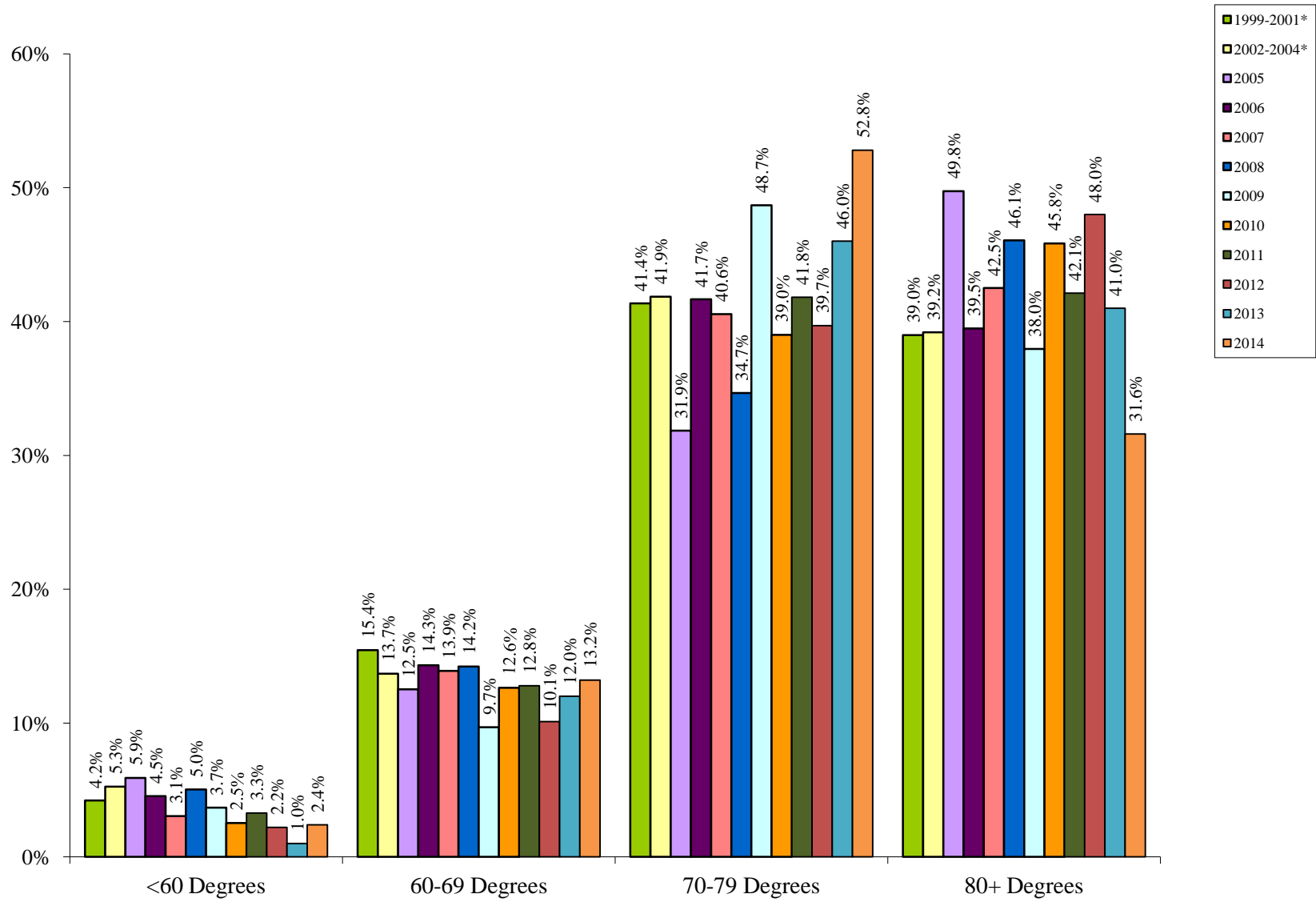
\*Three-year average

Figure R2 – Age of Youth Boaters



\*Three-year average

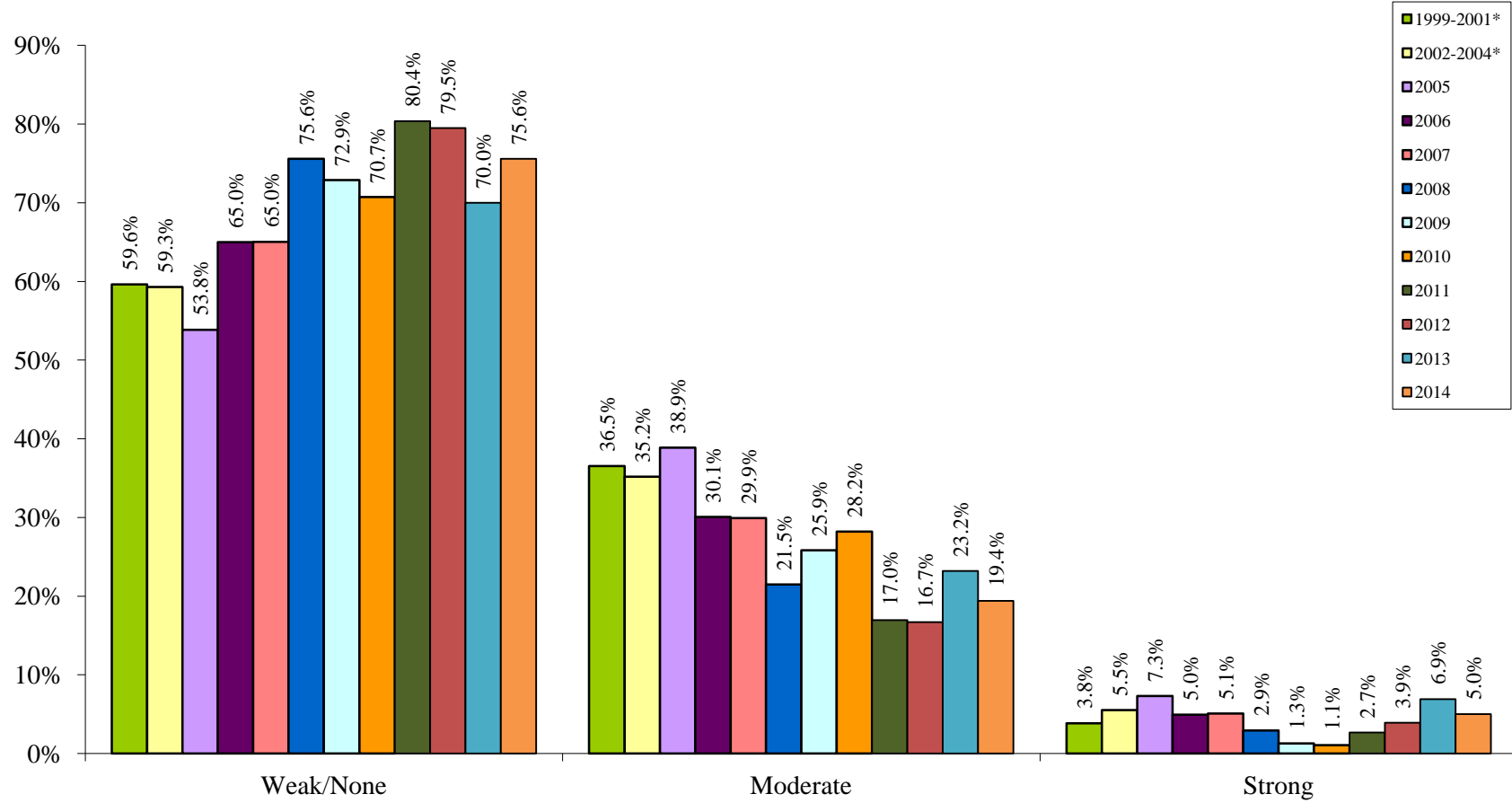
Figure S – Water Temperature in which ALL Boaters were Observed



\*Three-year average

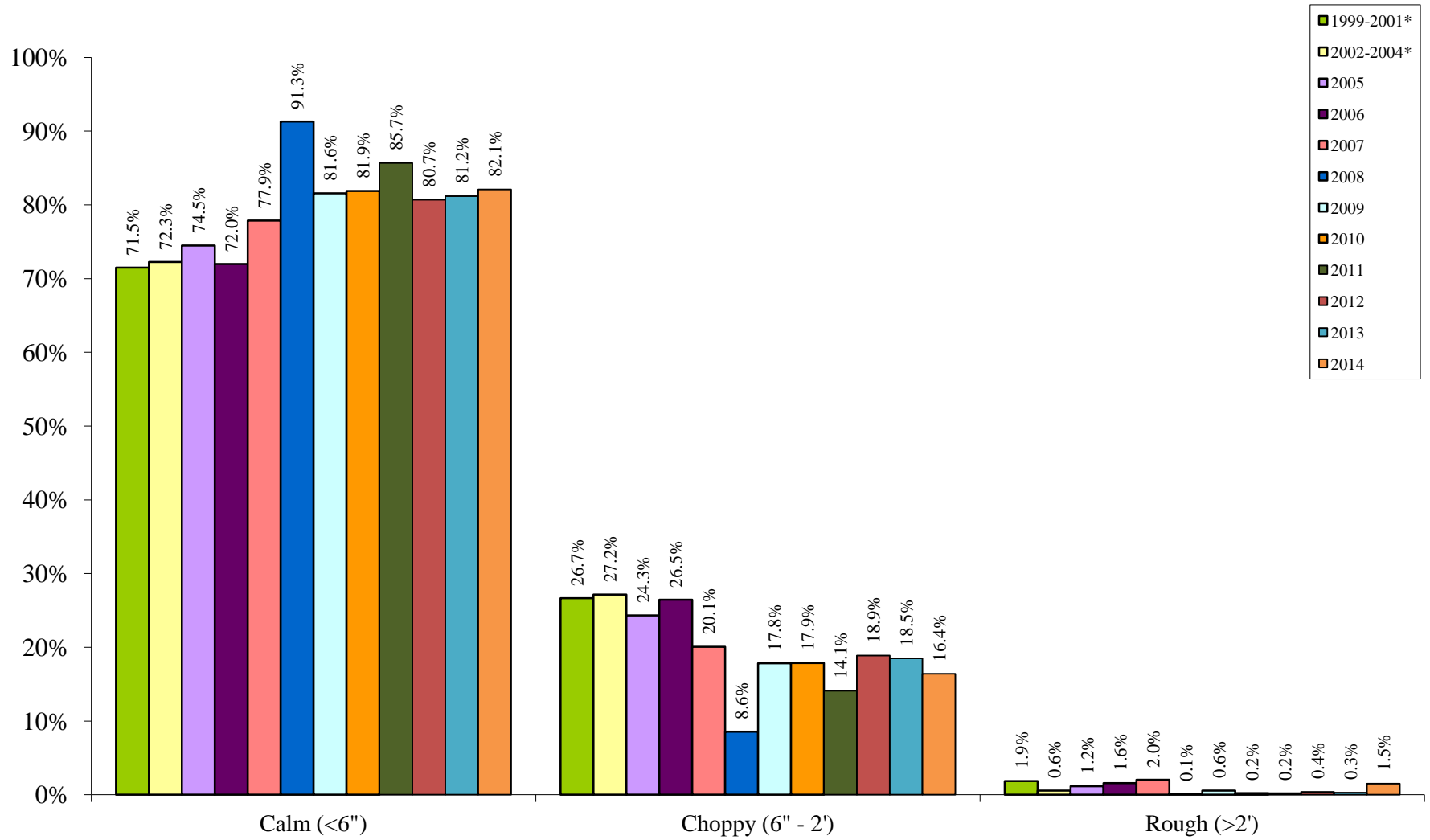


Figure T – Water Current in which ALL Boaters were Observed



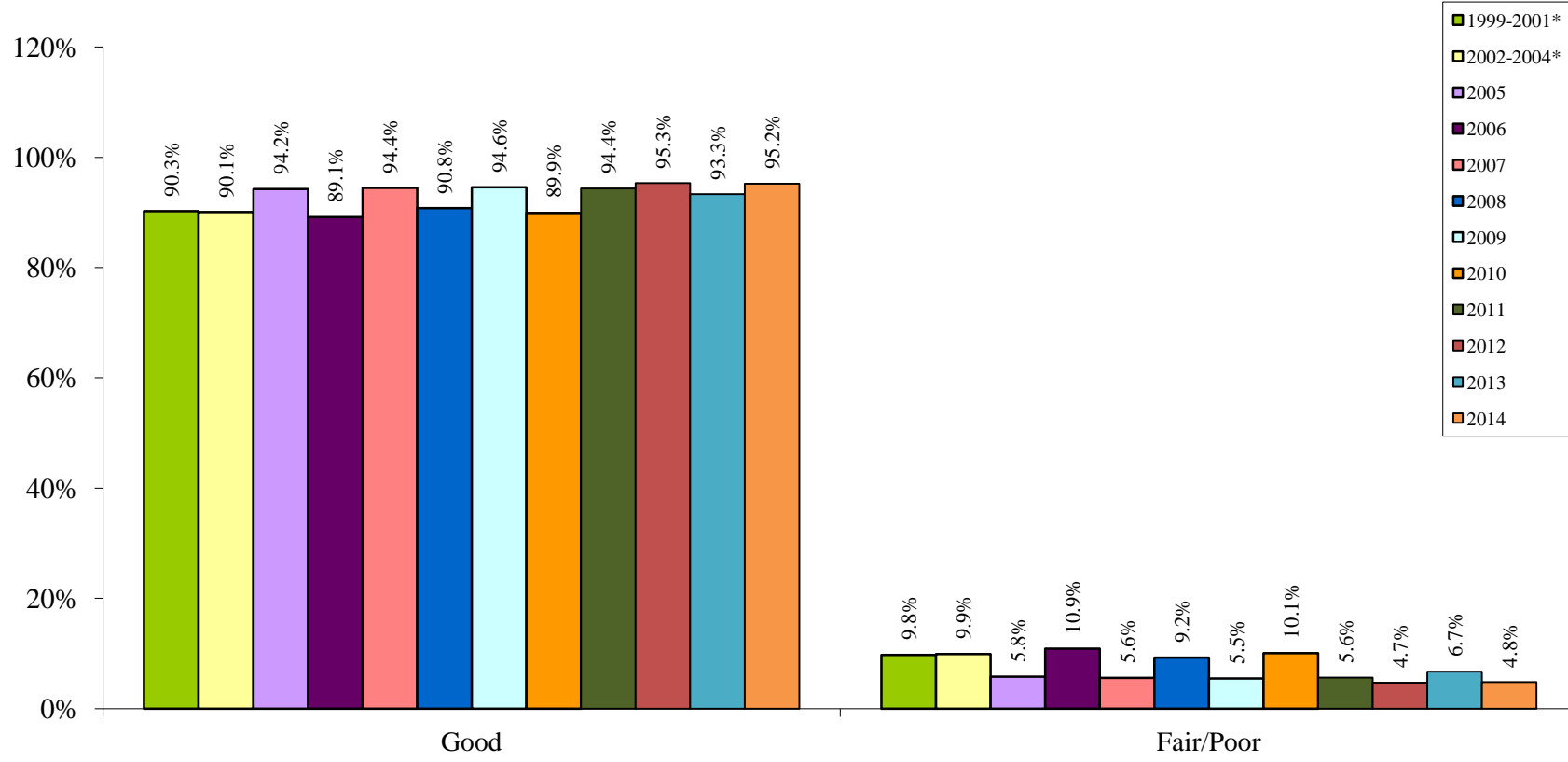
\*Three-year average

Figure U – Wave Height in which ALL Boaters were Observed



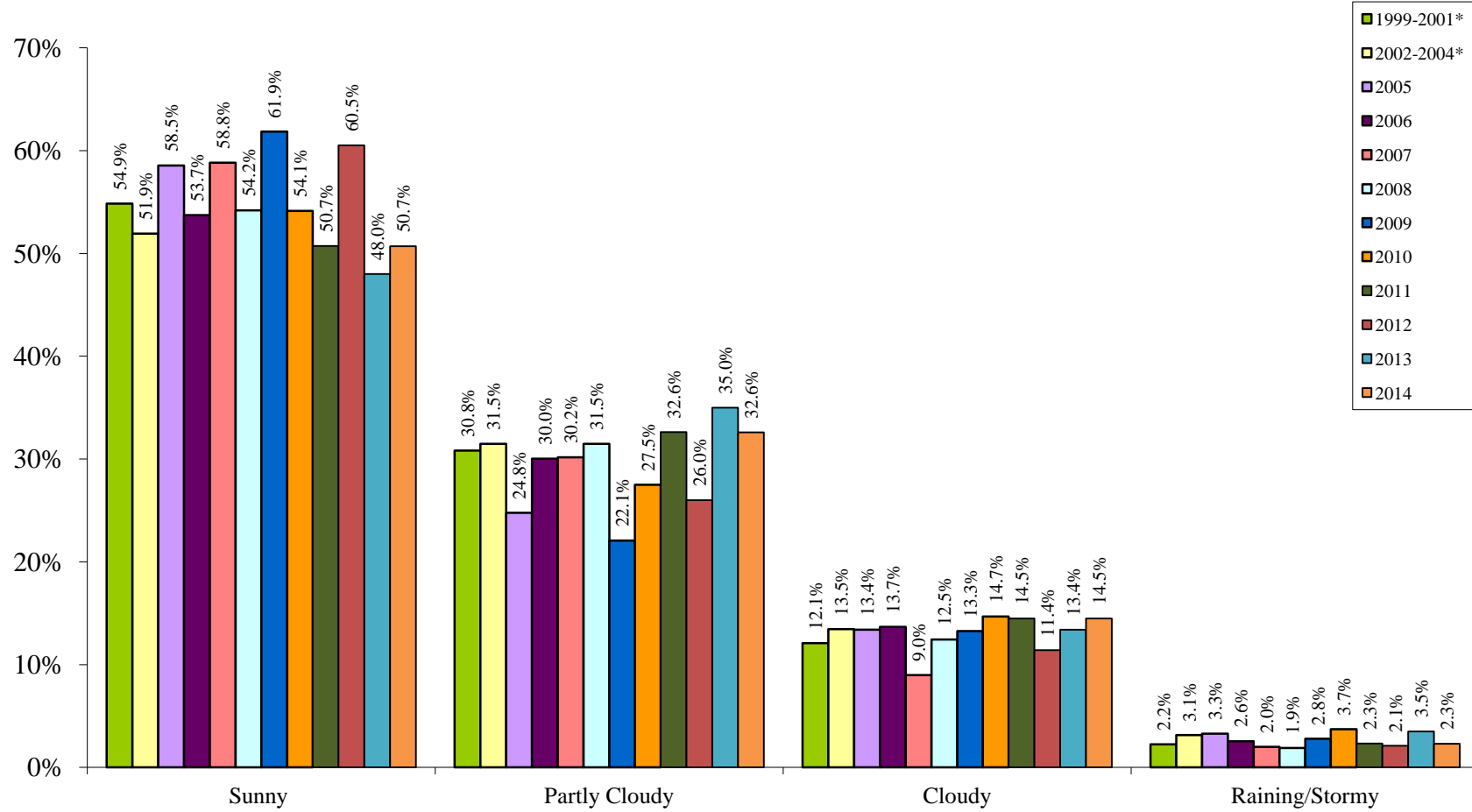
\*Three-year average

Figure V – Visibility in which ALL Boaters were Observed



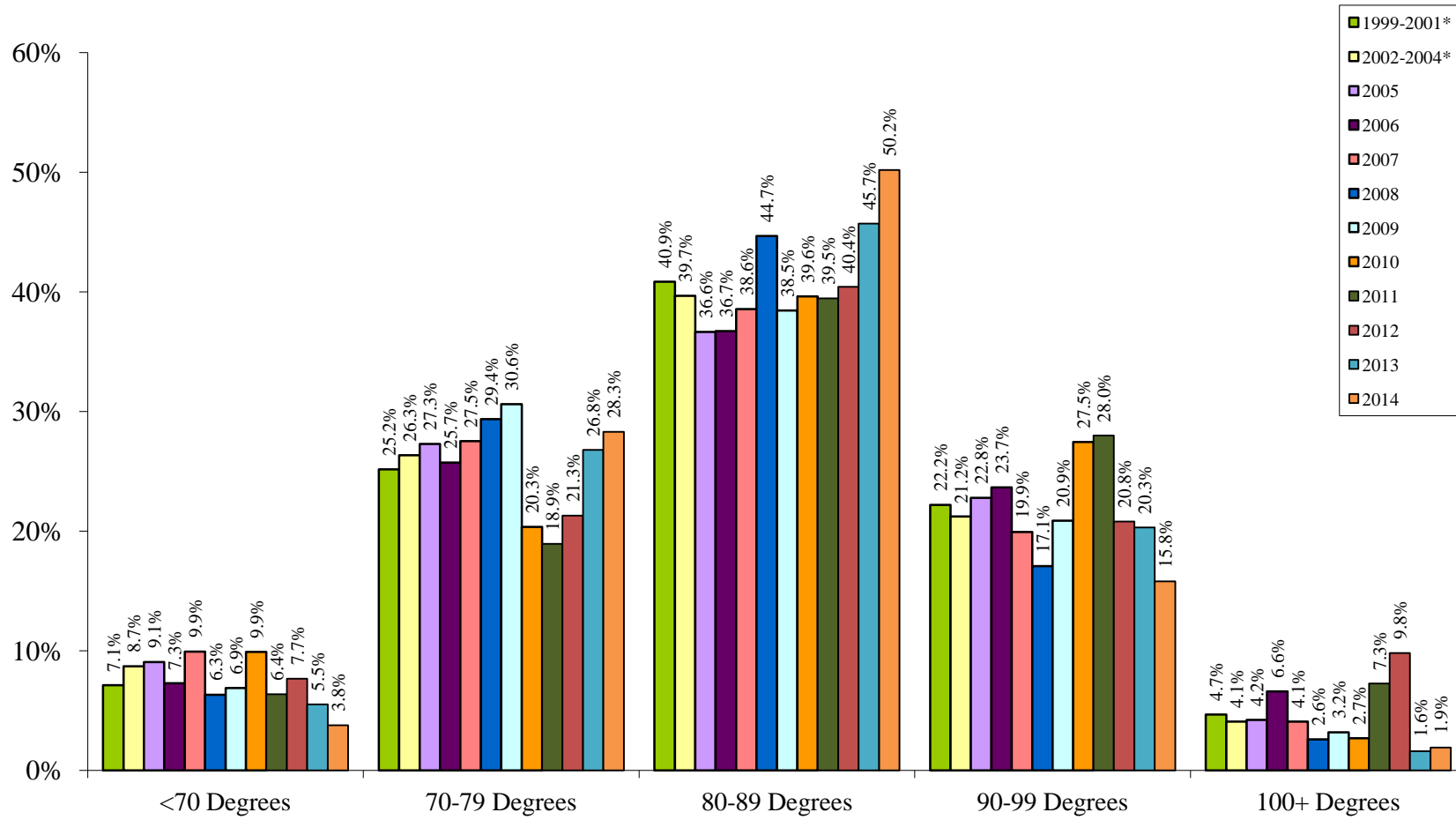
\*Three-year average

Figure W – Weather in which ALL Boaters were Observed



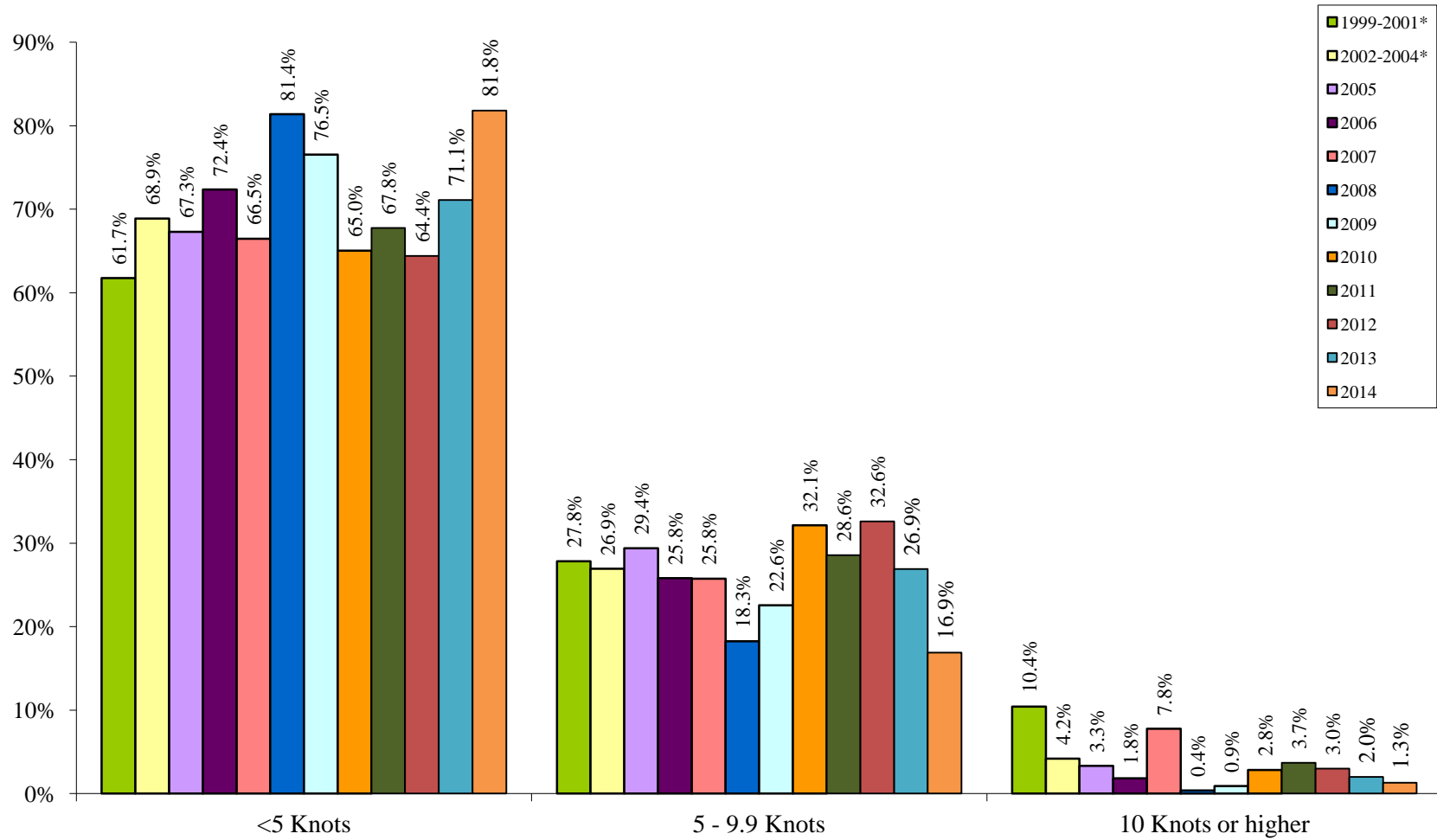
\*Three-year average

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