2007-
2009

California Boater Survey

Final Report

A statewide examination of boating habits, environmental awareness and overall outreach and education program evaluation.

Presented by:
California Department of Boating and Waterways
California Coastal Commission
Santa Monica Bay Restoration Foundation
Keep the Delta Clean Program

July 2011

2007 – 2009 California Boater Survey Report

Prepared for the

California Department of Boating and Waterways

California Coastal Commission

Santa Monica Bay Restoration Foundation

Keep the Delta Clean Program

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July 2011

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Acknowledgements

The California Department of Boating and Waterways and the California Coastal Commission's Boating Program, the Santa Monica Bay Restoration Foundation, and the Keep the Delta Clean Program would like to thank the following organizations and individuals for their generous support and assistance in collecting the information for this report:

Volunteer Dockwalkers, U.S. Coast Guard Auxiliary, US Power Squadrons, Contra Costa County, City and County of San Francisco Department of the Environment, Sacramento, San Joaquin, Solano and Yolo Counties, the City of Stockton, Lake Berryessa Watershed Partnership, Save Our Shores, Northern and Southern California Marina Association, Recreational Boaters of California, Pacific Inter Yacht Club Association, California Association of Harbor Masters and Port Captains, Marina Recreation Association, and Clean Marinas California Program.

In addition, this project would not have been possible without the support from: Alamitos Bay Marina, American Legion Yacht Club, American Sportfishing Association, Anacapa Isle Marina, Aquarium of The Bay, Aquarium of the Pacific, Balboa Yacht Club, Ballena Isle Marina, Bay Club Hotel and Marina, Benicia Yacht Club, Berkeley Marina, Bethel Harbor Marina, Cabrillo Isle Marina, California Yacht Marina, CalRecycle, City of Brisbane Marina, City of Newport Beach, Clipper Yacht Harbor, Colonial Yacht Club, Comanche Recreation Area, Coronado Cays Yacht Club, Dana West Marina and Yacht Club, Del Rey Yacht Club, Discovery Bay Yacht Harbor, Espirit Marina, Fairwind Yacht Club, Fred Hall Shows, Glenn Marine Services, Harbor Island West Marina, Humboldt Yacht Club, King Harbor Marina, Lauritzen Yacht Harbor, Loch Lomond Yacht Club, Long Beach Marina, Los Angeles County Department of Beaches and Harbors, Marina del Rey Marina, Marina Harbor Anchorage, Marin Yacht Club, Napa Valley Yacht Club, Oakland Marinas, Owl Harbor Marina, Peninsula Marina (Oxnard), Peninsula Yacht Club, Pier 44, Port of Los Angeles, Project Greenworks, Sacramento Marina, San Francisco Marina, Santa Barbara Waterfront Department, Santa Monica Windjammers Yacht Club, Sequoia Yacht Club, See's Candies, Shelter Island Marina, Ships Store, Shoreline Yacht Club, Sierra Marina, South Beach Harbor, South Coast Corinthian Yacht Club, Stockton Yacht Club, Sugar Barge Marina, Sun Harbor Marina, Tower Park Marina, Trader Joe's, Treasure Island Marina, Vallejo Yacht Club, Ventura Isla Marina, Villa del Mar Marina, West Marine, Wilmington Boat Owner's Association, Women Sailing Association, and the Dockwalker Technical Advisory Committee members (Bill Becker, Dick Daybell, James Fitzgerald, James Goff, Lorie Haney, Maggie Herbelin, Jim Minkel, Jim Sinasek, Carole Walsh and Mel Widawski).

The Statewide Boater Survey would not have been possible without your generous support and assistance.

Funding for this report was provided by the State Water Resources Control Board, the California Department of Boating and Waterways, and a grant from the Clean Vessel Act Program.

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2007 – 2009 California Boater Survey Report

Introduction

Background
BCGP is a statewide boater education and technical assistance program that promotes environmentally sound boating practices to marine businesses and boaters in California, by designing and implementing educational campaigns throughout the state in partnership with public and private agencies. The program was established in 1997 and receives funding from federal, state and local agencies. BCGP's main objectives include:

1) Educate boaters about environmentally safe and sound boating practices
2) Provide technical assistance to support local boater education efforts.
3) Assist marinas and local governments to identify the need for and install pollution control and prevention services for boaters.

In 1996, the Santa Monica Bay Restoration Foundation (SMBRF) established the Boater Education Program to reduce pollution from recreational boating activities in local small craft harbors and coastal areas in Southern California. The Boater Education Program centers around four strategies: 1) develop pollution prevention services 2) create networking opportunities 3) provide technical assistance, and (4) perform direct outreach. Funded mainly by Clean Vessel Act grants from DBW and used oil grants from the California Integrated Waste Management Board (currently CalRecycle), the Boater Education Program brings to local boating communities the tools and resources needed to improve water quality in their favorite boating destinations.

The Keep the Delta Clean Program (KDC) is a multi-stakeholder program whose mission is to improve access to convenient, free and publicly accessible marina-based pollution prevention services and to provide valuable resources for the recreational boating community that inspire environmentally sound and safety-conscious decision-making while boating in the Sacramento-San Joaquin Delta. In 2003, Contra Costa County Public Works Department (CCPW) was awarded a Proposition 13 Grant from the State Water Resources Control Board (SWRCB) and the California Bay-Delta Authority to implement a pollution prevention pilot program (KDC – Phase I) in Eastern Contra Costa County (County) serving marinas and recreational boaters to protect the Sacramento-San Joaquin Delta water resources. The County implemented KDC Phase I (2004- 2007) in partnership with five local marina operators, and the BCGP. With the proven success of KDC Phase I, in 2006, CCPW was awarded a Proposition 40 SWRCB grant to implement KDC – Phase II in partnership with Sacramento, San Joaquin, Solano and Yolo Counties, the City of Stockton, the BCGP, marine businesses, and concerned boaters and volunteers.

Purpose
Due to the shared technical and environmental goals of the BCGP, SMBRF, and KDC, these programs created a partnership in order to conduct a statewide recreational boater survey from 2007 to 2009. The purpose of this study was to collect information about recreational boater characteristics and practices that would better inform efforts to develop education and outreach strategies, identify gaps in boater knowledge and awareness, and identify the best ways to fill these gaps. By providing a snapshot of recreational boaters and boating behaviors in the State of California, the study's findings allow the

project partners to develop more effective and accurate boater outreach and education. These survey findings will assist the programs in the development of new public education materials and target strategies to reduce potential sources of boat pollution. In addition, this study is intended to share and provide valuable information about all boater education and boat-related pollution programs in California.

Primary Research Questions

The survey instruments used to collect information from recreational boaters between 2007 and 2009 (see Appendix A) and the survey results presented in the following report evolve from a set of primary research questions developed by the project partners. These include:

1. What are the characteristics of California boaters
2. How do California boaters vary by region of residence?
3. How do boaters who are aware of and/or practice water pollution prevention measures differ from those who are unaware or do not practice such measures?
4. In what areas do boaters lack information/awareness of environmental laws and clean boating best practices?
5. Which boaters can water pollution prevention programs target in the future?
6. What types of educational outreach should such programs use?

Methodology

Starting in October 2007 and ending in October 2009, project partners conducted a survey of 5,735 boaters about their attitudes, opinions, and knowledge of various issues related to boating. The survey was administered to boaters throughout the State. The purpose of the California Boater Survey was to assess current outreach and education efforts and inform future efforts throughout the State.

The 2007-2008 and 2009 instruments were developed in conjunction with the Public Research Institute at San Francisco State University (PRI), KDC and the BCGP Program's Technical Advisory Committee (TAC), which is comprised of members in marine industry, boating associations (Recreational Boaters of California and Pacific Inter Yacht Club Association), and five KDC pilot marina harbormasters (Sugar Barge Marina, Discovery Bay Yacht Harbor, Lauritzen Yacht Harbor, Lazy M Marina, and Bethel Harbor). The surveys included questions about types of boats, boating activities (e.g. fishing, skiing, leisure cruising, etc.), frequency of boat use, sewage disposal habits, oil changing and disposal habits, boating experience, sources of clean boating information, and a number of other topics.

Based on feedback received from survey respondents and through a re-evaluation of the survey instrument, in early 2009 the survey was revised to reflect lessons learned from 2007-2008 (see Attachment A for the 2007-2008 and 2009 survey instruments).

During the 2008 and 2009 boating seasons (typically boating season occurs between May and September), program staff attended boating events to distribute boater kits and administer surveys in person. Volunteer Dockwalkers[1] also played an integral role in distributing boater kits and collecting Boater Surveys. The goal was not only to survey boaters, but to educate them about clean boating and pollution prevention. Staff used these face-to-face opportunities to demonstrate the proper use of boater kit contents, as well as to answer any questions posed by boaters. This procedure ensured a high cooperation rate for the study, because in order to receive a boater kit, boaters were required to first complete a survey. Due to the popularity of the boater kit, the vast majority of boaters recruited were happy to participate in the study, and most boaters were excited to learn more about safe and environmentally-friendly boating. Examples of boating events where surveys were collected by program staff and volunteer Dockwalkers[2] are:

- Pleasanton Boat Show
- Southern California Marine Association Boat Show in Los Angeles
- Southern California Marine Association Boat Show in Long Beach
- Fred Hall Fish and Tackle Show in Del Mar
- Newport Beach Boat Show
- Discovery Bay Boat Show
- Sacramento Boat Show

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[1] Dockwalkers are volunteers who inspire and educate boaters and other recreators to be safe and environmentally sound while boating in California. They distribute boater kits with educational materials while visiting marinas, boat launch ramps, boat shows and events. The intercept survey method used provided a way to interact with boaters directly.

During the 2008 and 2009 boating seasons, the project partners offered an incentive prize to volunteer Dockwalkers who collected the most surveys. The top three Dockwalkers, during each boating season, received a jacket donated by West Marine. Other prizes included three gift baskets from Trader Joe's and, in 2009, four travel blankets donated by the California Coastal Commission Public Education Unit. In keeping with the theme of sustainable program objectives, travel blankets were made of 87 percent recycled plastic bottles and 13 percent polyester.

- Stockton Boat Shows
- Sacramento International Sportsmen's Exposition
- Opening Day on the Delta at San Joaquin Yacht Club
- Delta Marina Safety Day
- National Marina Day at Pier 39 in San Francisco
- Keep The Delta Clean Day
- Tower Park Marina Safety Day
- Brentwood Corn Fest
- Taste of the Delta event
- San Francisco Sailing Event
- Rio Vista Fishing Derby
- City of Bellflower's Earth Day Celebration
- Adopt-A-Fuel Dock, Marina del Rey
- North OC Community Day
- Sunset Beach Aquatic Marina & Public Ramp "Pancake Breakfast"
- Sausalito, Earth Day
- Honey Pot Day in Marina Del Rey (6 events)
- Alamitos Bay Marine Fuel Dock-Oil Absorbent Exchange Center Opening Day
- National Marina Day – Adopt-a-Fuel Dock, Marina del Rey
- Buckley Cove event
- Household Hazardous Waste Collection Day at the San Francisco Marina
- Eureka Marina Day
- Delta Marina Yacht Club Safety Day
- Yorba Linda Coast Guard Flotilla event at the Fullerton Airport
- Vallejo Yacht Club Membership Meeting and Club Opening Day
- Lake Berryessa Boating Summer events conducted by Lake Berryessa Watershed Partnership

The information gathered from these surveys was entered and analyzed by a professional statistician and the Public Research Institute (PRI) at San Francisco State University. It should be noted that most of the analysis presented in the following report relies on statistical tests, primarily the chi-square statistic, which measure whether apparent differences between sub-groups are large enough to consider them "statistically significant" rather than variations likely to occur naturally by chance. However, because these tests assume among other things, the presence of a random or probability sample, which was not used to collect the boater survey data, their use to evaluate sub-group differences here presents some challenges and should not be considered the only or final authority on whether variance signals meaningful difference. Likewise, the lack of evidence for any sub-group differences in the analyses may be a result of non-probability sampling error. In general, when a non-probability sample method has been used, it is difficult to assess whether, or in what ways, those who participate in the study differ from those who do not. Thus, all findings are best viewed as particular to the given sample (i.e. those boaters who participated) rather than representative of the entire population of interest (i.e. all California boaters). In consideration of these methodological challenges, the interpretive approach taken throughout the preparation of this report was to focus on large scale differences, avoid analyses and interpretations based on fewer than 30 cases, and look across sub-groups and sub-samples for consistent findings that may lend support to their validity.

2007 – 2008 California Boater Surveys

Overview

Between the 2007 and 2008 survey period, project partners and volunteer Dockwalkers administered 2,662 California boater surveys. Surveys were administered through face-to-face interaction with boaters at boating events. Respondents received boater kits in exchange. Refer to the Methodology section on page 18 for more detailed information. Appendix A includes the instrument used for the 2007 – 2008 California Boater Survey, and Appendix B includes data frequency tables for all items on the instrument. The following summaries provide a descriptive snapshot of boaters surveyed and may not reflect the population of California boaters as a whole. Due to the purpose of this study and the sampling methodology used, the analysis to follow focuses primarily on motorized boaters. The subsequent section presents the results of the data collected from 2007 – 2008.

Characteristics of Boaters

Age of Boaters

Over half of the survey respondents (56 percent) were 50 years of age or older and about three quarters (77 percent) were 42 or older. Only 10 percent of boaters in the sample were age 33 or younger. See Table 1.

Table 1. Respondent Age

Age	Count	Percent
16 – 25	63	2.6
26 – 33	172	7.0
34 – 41	332	13.6
42 – 49	519	21.2
50 – 65	1,051	43.0
Over 65	309	12.6
Total	**2,446**	**100.0**

Boating Experience

Nearly three quarters (72 percent) of the respondents surveyed said they had more than 5 years of boating experience, 21 percent had between 1 and 5 years, and 7 percent had less than one year (see Table 2).

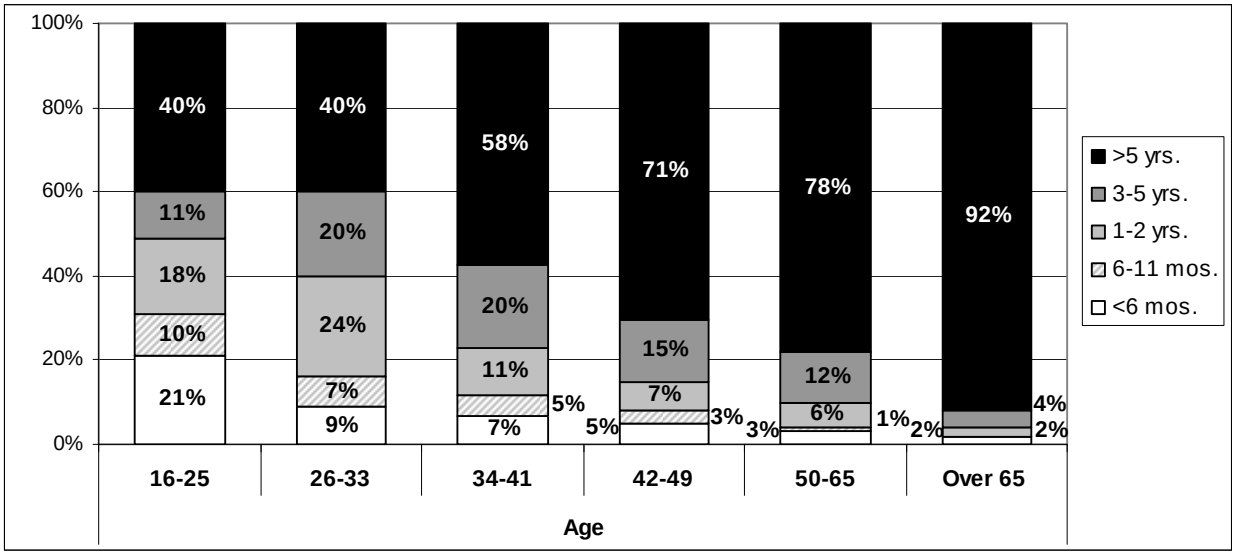
Table 2. Length of Boating Experience

Boating Experience	Count	Percent
Less than 6 months	126	4.8
6 – 11 months	68	2.6
1 – 2 years	203	7.7
3 – 5 years	338	12.8
More than 5 years	1,917	72.3
Total	**2,652**	**100.0**

Age and Boating Experience

About one-fifth of boaters age 16 – 25 (21 percent) had less than 6 months of experience compared to only 2 percent of those over 65. Forty percent of the youngest boaters reported they had more than 5 years of experience, compared to 71 percent of 42 – 49 year olds, 78 percent of 50 – 65 year olds, and 92 percent of those over 65. About 31 percent of the youngest boaters had less than 1 year of experience, compared to 16 percent of 26 – 33 year olds, 12 percent of 34 – 41 year olds, 8 percent of 42 – 49 year olds, and 4 percent of those age 50 or older. See Figure 1.

Figure 1. Years of Boating Experience by Age Group



Length of Boat

About 30 percent of boaters surveyed had boats 20 – 39 feet. Another 26 percent owned boats less than 20 feet long, and 12 percent owned boats 40 feet in length or longer. 58% percent of surveyed boaters owned trailerable boats. See Table 3.

Table 3. Boat Length

Length of Boat	Count	Percent
Less than 16 feet	228	8.7
16 to 19 feet	450	17.1
20 to 25 feet	846	32.2
26 to 39 feet	792	30.1
40 to 65 feet	295	11.2
More than 65 feet	17	0.7
Total	**2,628**	**100.0**

Type of Boat

The largest proportion of boaters **surveyed owned ski boats (28 percent**), followed by fishing boats (26 percent), sailboats with auxiliary motors (22 percent), cuddy cabin/cruisers (13 percent), and motor yachts (11 percent). Fewer than 5 percent surveyed said they owned a personal watercraft, sailboat

without an auxiliary motor, a houseboat, or an off-shore racer. Responses to the "other type" category included canoes, kayaks, row boats, inflatable boats, and pontoons. See Table 4.

Table 4. Type of Boat(s) Owned

Type of Boat	Count	Percent*
Ski Boat/Run-about	746	28.0
Fishing boat	698	26.2
Sailboat with auxiliary motor	596	22.4
Cuddy cabin/cruiser	335	12.6
Motor yacht	287	10.8
Personal watercraft	106	4.0
Sailboat without auxiliary motor	94	3.5
Houseboat	46	1.7
Off-shore racer	28	1.1
Other	92	3.5

*Questionnaire item was "check all that apply," therefore percentages do not add up to 100.

About 87 percent of the 2,662 boaters surveyed said they owned one boat, 9 percent owned two and 2 percent owned three. Boaters surveyed owned between 1 and 7 boats. Only 1 percent of those surveyed did not respond to the boat type question.

Not surprisingly, boat type and length are strongly correlated. Among these boaters, 83 percent of ski boats and 60 percent of fishing boats ranged from 16 to 25 feet in length, while 92 percent of cuddy cabin/cruisers, 92 percent of off-shore racers, and 63 percent of sailboats without auxiliary motors ranged from 20 – 39 feet in length. A majority of motor yachts (91 percent), sailboats with auxiliary motors (82 percent), and houseboats (63 percent) measured 26 – 65 feet long, and personal watercrafts were most likely to be less than 16 feet long (71 percent).

Boat Storage/Berthing

Almost half of boaters surveyed (48 percent) stored their boats at home on a trailer, while another 39 percent berthed their boats at a marina in the water. Only 5 percent used a marina dry storage, 4 percent berthed at home, and 5 percent indicated some "other" storage location. See Table 5. Other locations often included responses such as "storage," "boat storage," or specific geographic locations.

Table 5. Location Where Boats are Usually Stored/Berthed

Place Where Boat Stored/Berthed	Count	Percent
Home on trailer	1,256	48.1
Marina-in-water berth	1,006	38.5
Marina-Dry storage	125	4.8
Berth at home	105	4.0
Other	121	4.6
Total	**2,613**	**100.0**

Location Where Boat Usually Launched

Of those who launched their boats, almost half (46 percent) usually launched from a public launch facility and 45 percent launched from a marina. Only about 3 percent used a yacht club (see Table 6). Responses in the "other" category included specific bodies of water and comments such as "private launch," "everywhere," or "many locations."

Table 6. Where Boat is Usually Launched

Place Where Boat Usually Launched	Count	Percent of All Surveyed	Percent of Applicable
Not applicable	774	30.4	-
Marina	804	31.6	45.4
Public launch ramp	818	32.1	46.2
Yacht Club	61	2.4	3.4
Other	88	3.5	5.0
Total	**2,545**	**100.0**	**100.0**

Reasons for Choosing Launch Location

Boaters in this sample selected their preferred launch location most often based on its good access (32 percent), its close proximity to their storage location (30 percent), or its convenient trailer parking (19 percent). Boaters said they preferred a launch location because of its restrooms about 11 percent of the time and because of its fuel docks, restaurants, or sewage pumpout services less than 6 percent of the time. See Table 7.

Table 7. Reasons for Choosing Where to Launch Boat

Reasons for Choosing Launch Location	Count	Percent*
Launch ramp with good access (wide lanes, etc.)	847	31.8
Close proximity to where I store my boat	800	30.1
Convenient trailer parking	495	18.6
Restrooms	296	11.1
Fuel dock	157	5.9
Restaurant	133	5.0
Sewage pumpout service	99	3.7
Other	227	8.5

*Questionnaire item was "check all that apply," therefore percentages do not add up to 100.

California Region of Residence[2]

Over two-fifths of the boaters surveyed lived in the South Coast region (43 percent), while 22 percent lived in the Sacramento Basin region, and 18 percent in the San Francisco Bay Area (see Table 8). Less than 6 percent of those who participated in the 2007 – 2008 survey lived in the Central Valley, Southern Interior, or North or Central Coast regions.

[2] California regions, as defined by DBW, Boating Facilities Needs Assessment Report (2001), and their associated counties include San Francisco Bay Area (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara and Solano); Central Valley (Amador, Calaveras, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Benito, San Joaquin, Stanislaus, Tulare, and Tuolumne); Sacramento Basin (Butte, Colusa, El Dorado, Glenn, Lake, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Sutter, Tehama, Trinity, Yolo, and Yuba); North Coast (Del Norte, Humboldt, Mendocino, and Sonoma); Central Coast (Monterey, San Luis Obispo, and Santa Cruz); South Coast (Los Angeles, Orange, Santa Barbara, Ventura, and San Diego); and Southern Interior (Imperial, Riverside, and San Bernardino).

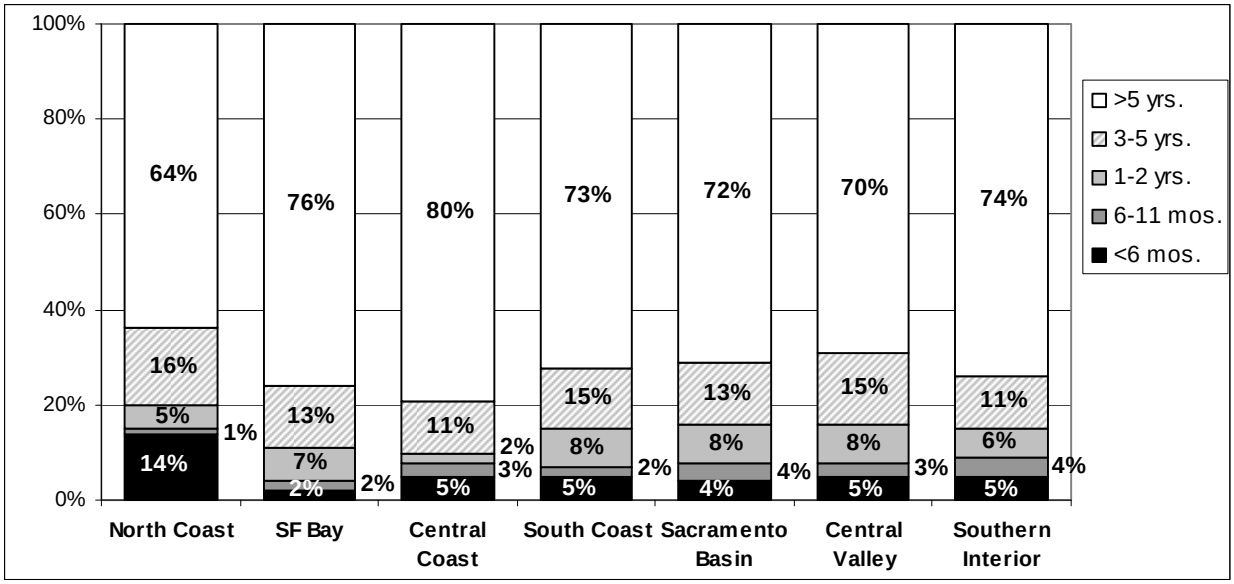
Table 8. Region of Residence

Region	Count	Percent
South Coast	917	43.0
Sacramento Basin	463	21.7
San Francisco Bay Area	376	17.6
Central Valley	119	5.6
Southern Interior	119	5.6
North Coast	75	3.5
Central Coast	65	3.0
Total	**2,134**	**100.0**

Boating Experience by Region of Residence

Boating experience did not vary significantly by region of residence among this sample, perhaps due to the low number of respondents who reported both region and age from the North (n=74) and Central (n=65) Coastal regions. Across all regions, between 64 percent (North Coast) and 80 percent (Central Coast) of boaters reported more than 5 years of experience. About 20 percent of North Coast and 10 percent of Central Coast residents reported less than 3 years experience. See Figure 2.

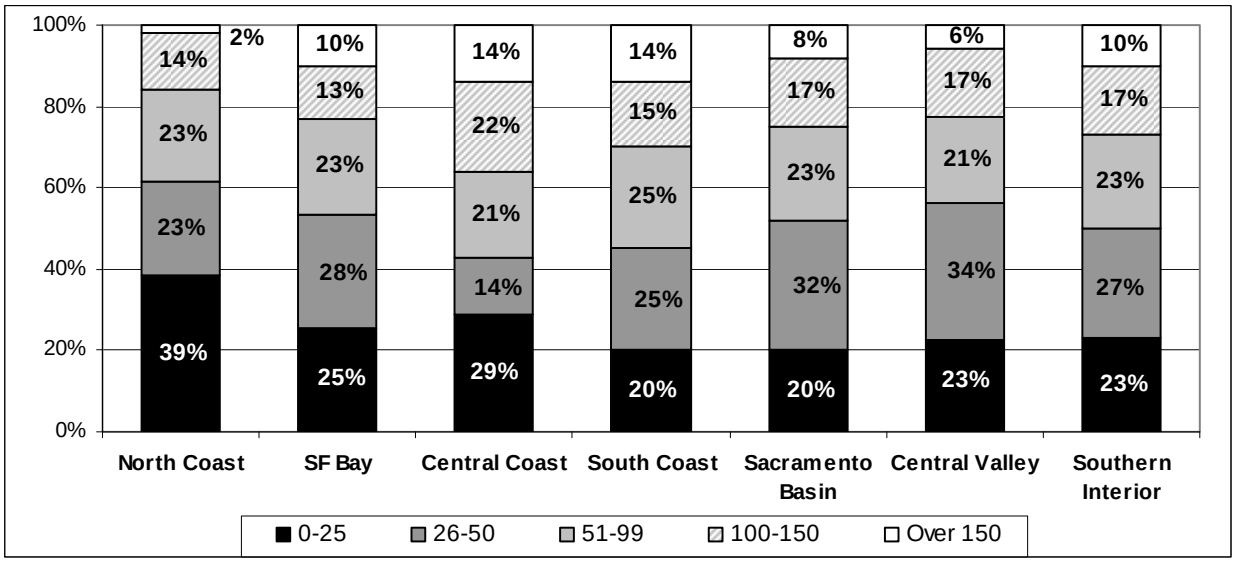
Figure 2. Boating Experience and Region of Residence



Annual Engine Hours by Region of Residence

Boaters from the Central or South Coast regions put 50 or more engine hours on their boats in greater proportions than those from other regions, and Central and South Coast residents more often log over 150 hours per year. However, boaters from the Central and North Coast regions also put less than 26 hours on their engines in greater proportions than boaters from other areas. A large majority of boaters from the North Coast (62 percent) or the Central Valley (57 percent) put 50 hours or less on their engines each year. See Figure 3.

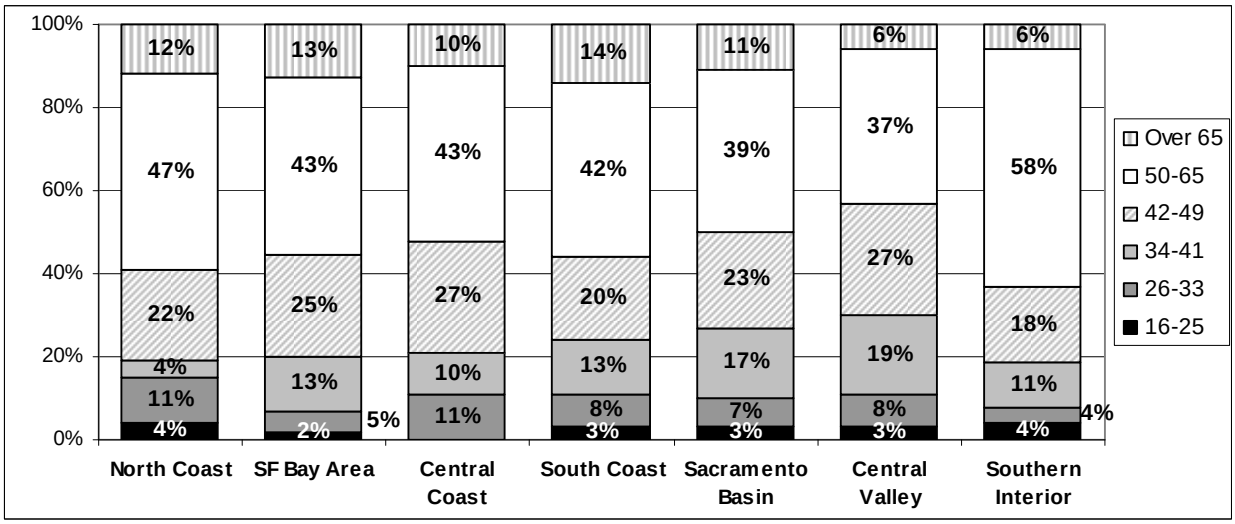
Figure 3. Annual Engine Hours and Region of Residence



Boater Age by Region of Residence

Among boaters surveyed, age varied by region of residence, as over half of boaters from the Southern Interior region (58 percent) were 50 – 65 years of age, 15 percent of North Coast residents were less than 34 years of age, and 57 percent of Central Valley residents were less than 50 years of age. The Southern Interior had the largest proportion of boaters age 50 and older, the North Coast had the largest proportion of boaters under age 34, and the Central Valley had the largest proportion of boaters under age 50 (See Figure 4).

Figure 4. Age Group by Region of Residence

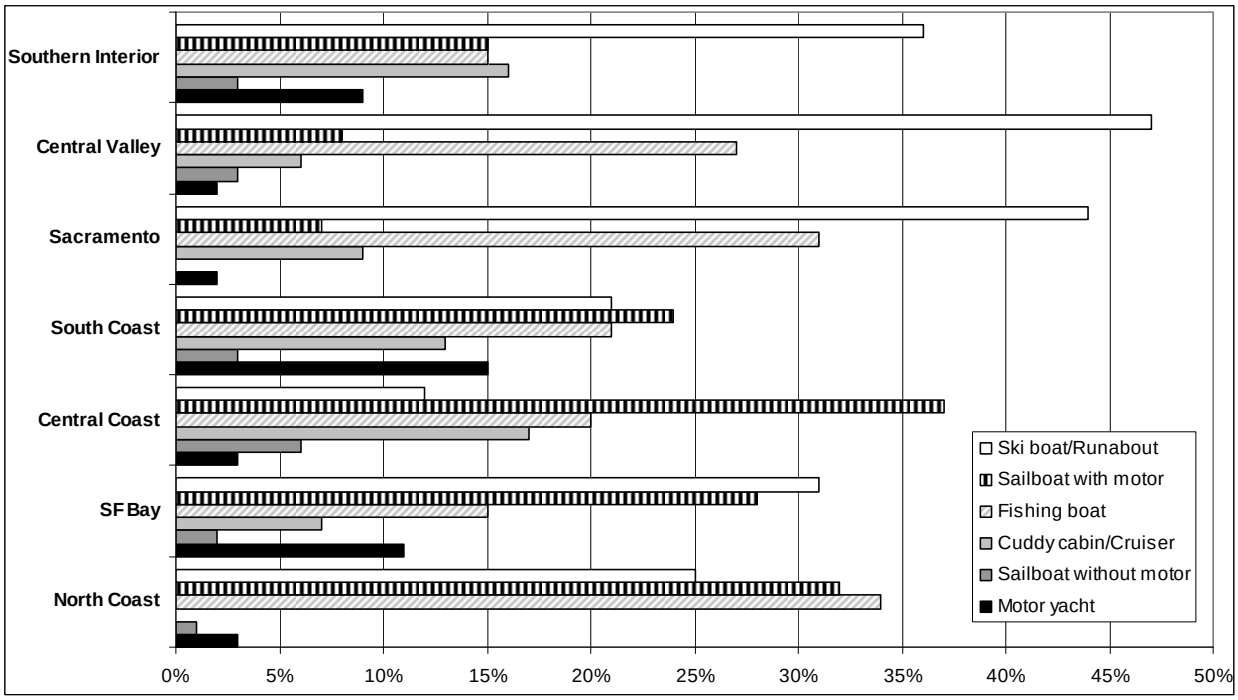


Boat Type by Region of Residence

Boaters from the Sacramento Basin and Central Valley regions were more likely to own ski boats and less likely to own sailboats with auxiliary motors than boaters from other areas. Boaters from the San Francisco Bay Area or the Southern Interior owned a smaller share of fishing boats than others, and

boaters from the San Francisco Bay Area or the South Coast owned more motor yachts than those from other areas. Boaters from the Central Coast were twice as likely as others to own sailboats without auxiliary motors and those from the Central Coast, South Coast or Southern Interior owned proportionately more cuddy cabins/cruisers. See Figure 5.

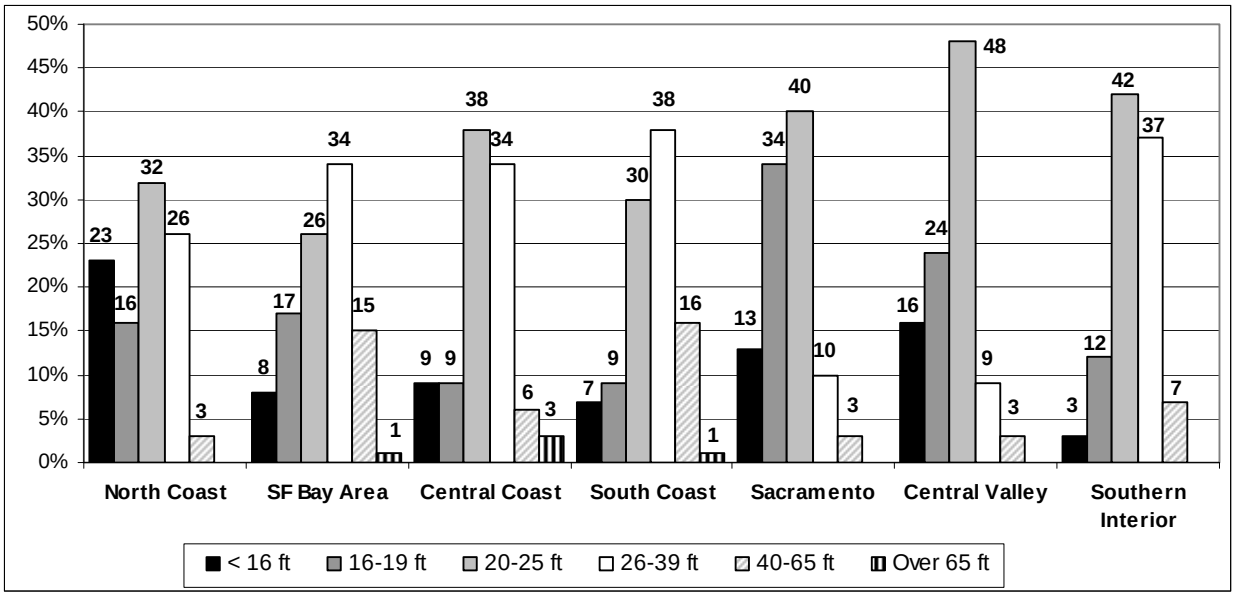
Figure 5. Boat Type by Region of Residence



Boat Length by Region of Residence

Boaters from the North Coast (23 percent) or Central Valley (16 percent) regions were more likely than others to own boats less than 16 feet in length. Boaters from the Sacramento Basin (34 percent) or Central Valley (24 percent) regions were more likely than others to own boats 16 – 19 feet in length. Boaters from the Sacramento Basin (10 percent) or Central Valley (9 percent) were much less likely than others to own boats 26 – 39 feet in length. Larger proportions of residents from the South Coast (16 percent) or the San Francisco Bay Area (15 percent) regions owned boats 40 – 65 feet in length compared to boaters from other regions (3 – 7 percent). See Figure 6.

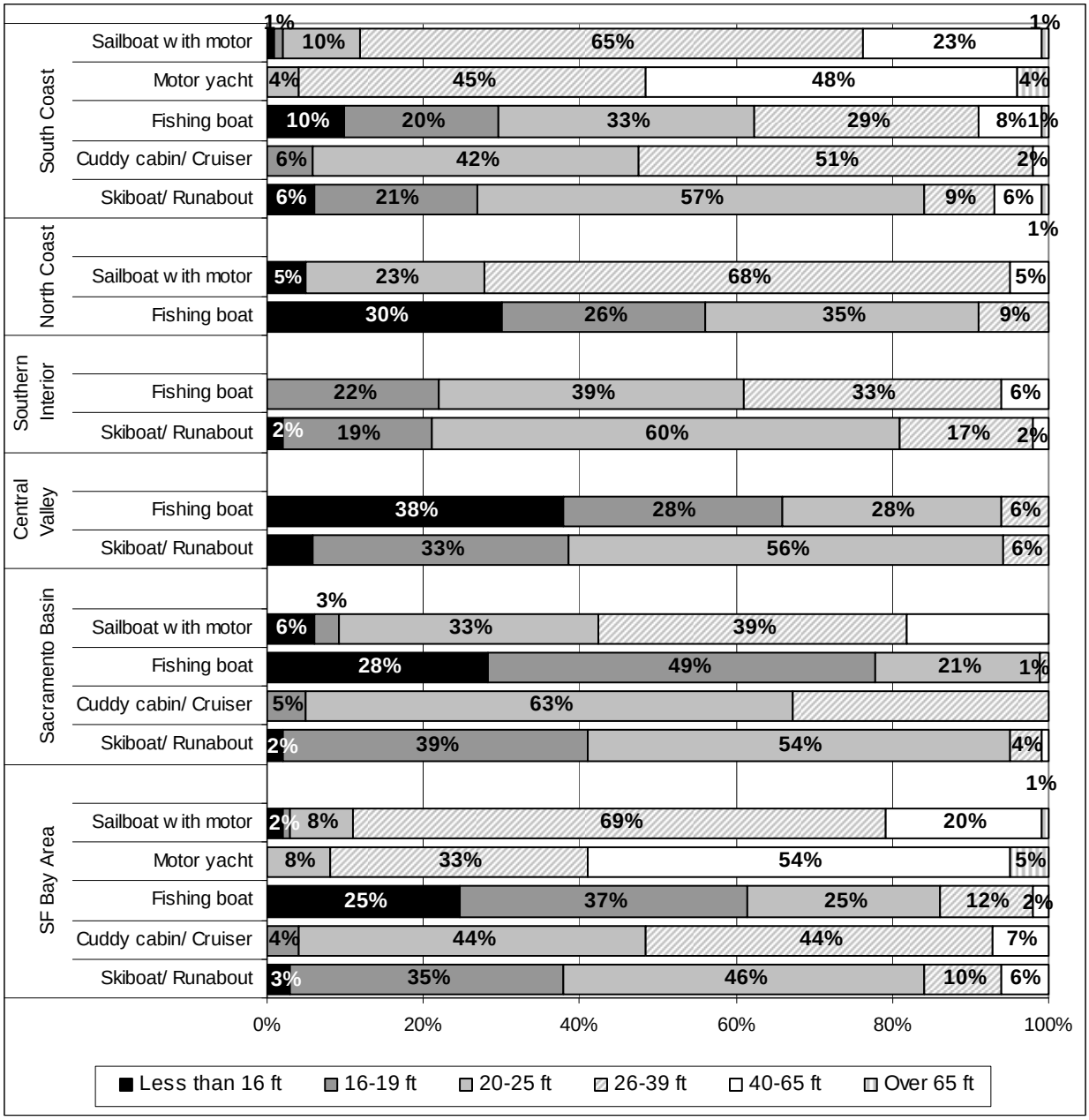
Figure 6. Boat Length by Region of Residence



Boat Type and Length by Region of Residence

Because boat type and length are strongly correlated, when considering variations in type and length together across all regions, sample sizes diminish rapidly, precluding many regional comparisons. Therefore, the distributions on boat type and length by region presented in Figure 7 include only those sub-groups with sufficient sample sizes and are best used to describe large-scale overall differences.

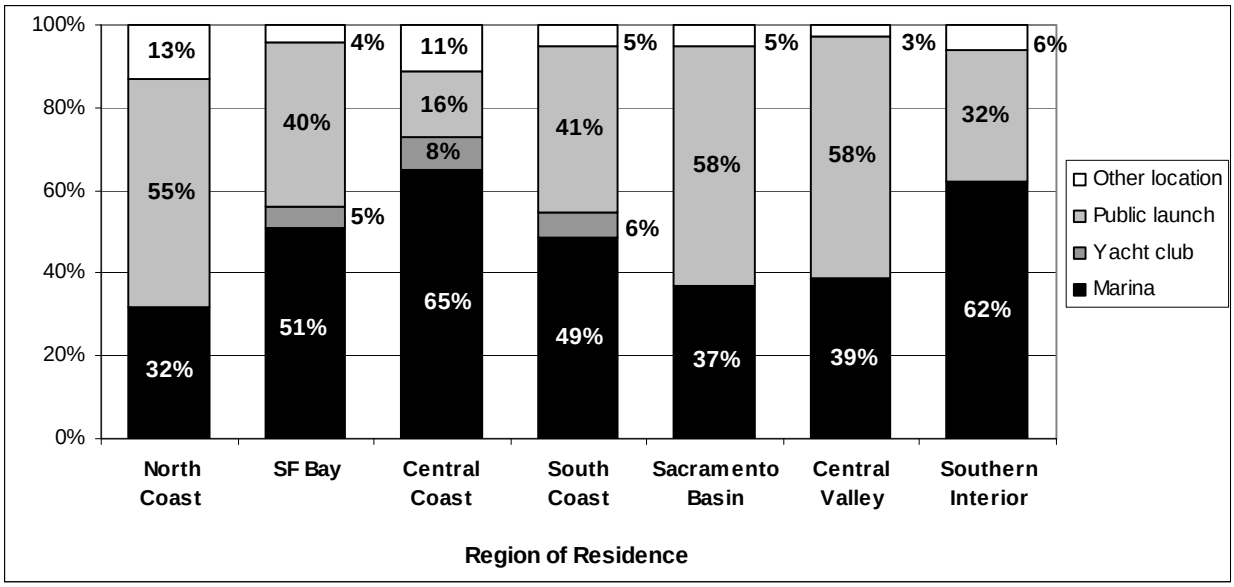
Figure 7. Boat Type and Length by Region of Residence



Boat Storage and Usual Launch Location by Region of Residence

Greater proportions of Central Coast (65 percent) and Southern Interior (62 percent) residents usually launched their boats at marinas compared to 32 – 51 percent of boaters from other regions. More Central Valley (58 percent), Sacramento Basin (58 percent), and North Coast (55 percent) residents used public launch facilities than other boaters (16 – 41 percent). Although boaters reported low usage of yacht clubs overall, Central, South Coast, and San Francisco Bay Area residents appeared to be more likely than others to use them, and North Coast residents reported using "other" launch arrangements, such as specific bodies of water, "private launch," "everywhere," or "many locations" at more than twice the rate of the overall average (13 percent to 5 percent). See Figure 8.

Figure 8. Usual Launch Location by Region of Residence



Sacramento Basin or Central Valley residents in the 2007 – 2008 samples were much more likely than boaters from other areas to trailer their boats at home (74 - 82 percent versus 34 – 50 percent). San Francisco Bay Area residents were almost twice as likely as others to berth their boats at home (8 percent versus 2 – 5 percent). South Coast and Southern Interior residents tended to use marina dry storage in greater proportions than boaters from all other areas except the San Francisco Bay (7 – 8 percent versus 2 – 3 percent). South Coast residents tended to store their boats in water at the marina more often than inland residents (52 percent versus 12 – 33 percent) and more often than all other coastal residents (38 – 42 percent).

Boating Activities and Habits of Boaters

Days of Annual Boat Use at Various Locations

Half (50 percent) of all boaters surveyed in 2007 – 2008 reported they used their boats on the ocean at least once a year, followed by 41 percent who used them on Inland lakes, 18 percent who used them on the Delta, and 14 percent who boated on the San Francisco Bay. Although the lowest proportion of those surveyed said they boated on the San Francisco Bay, those who did boat there at least once a year also used their boats an average of 38 days per year, second only to those who boated at least once a year on the ocean who average 47 days per year. Across all locations, boaters reported an average of 48 days of boat use per year. See Table 9.

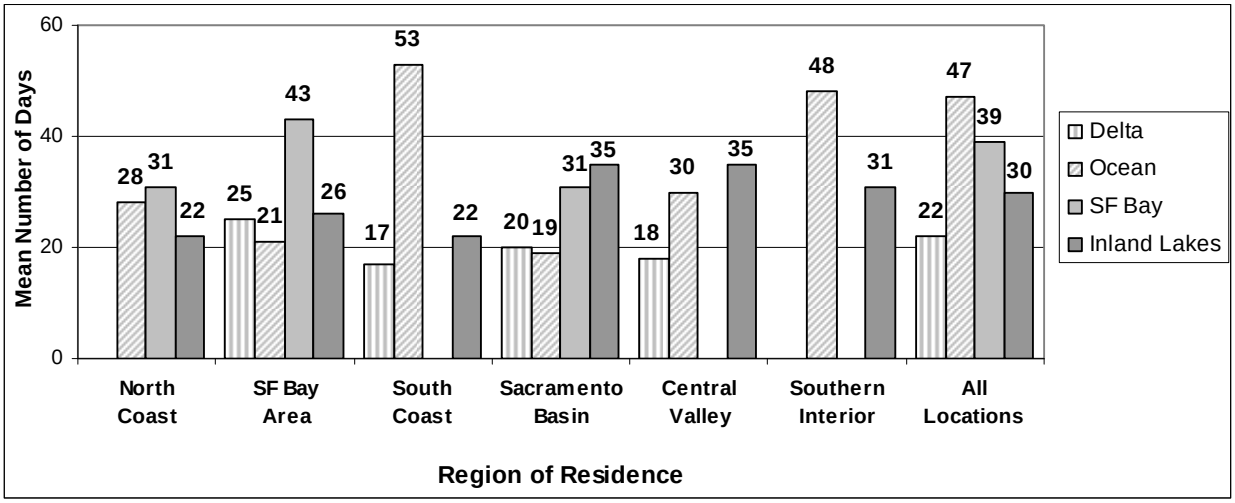
Table 9. Percent Who Boat by Boat Use Location and Annual Mean Number of Days of Boat Use

	Those who boated in location at least once a year		Of those who boated in location at least once a year:	
Location	**Count**	**Percent**	**Mean**	**Range**
Ocean	1,330	50.0	46.0	1-365
Inland lakes	1,083	40.7	30.8	1-365
Sacramento-San Joaquin Delta	473	17.8	20.9	1-330
San Francisco Bay	363	13.6	37.8	1-365

Days of Annual Boat Use by Region of Residence and Boating Location

Mean number of days of boat use on the Delta did not vary based on where a boater lives, nor did mean days on the San Francisco Bay vary by region of residence. Number of days on the ocean varied somewhat as those who lived in the South Coast region reported more days on the ocean than those from the San Francisco Bay Area or the Sacramento Basin region. Mean number of days of boat use on Inland Lakes was higher for Sacramento Basin, Central Valley, or Southern Interior residents than for North or South Coast residents. See Figure 9. Mean days of use among sub-groups with small sample sizes have been omitted from this analysis.

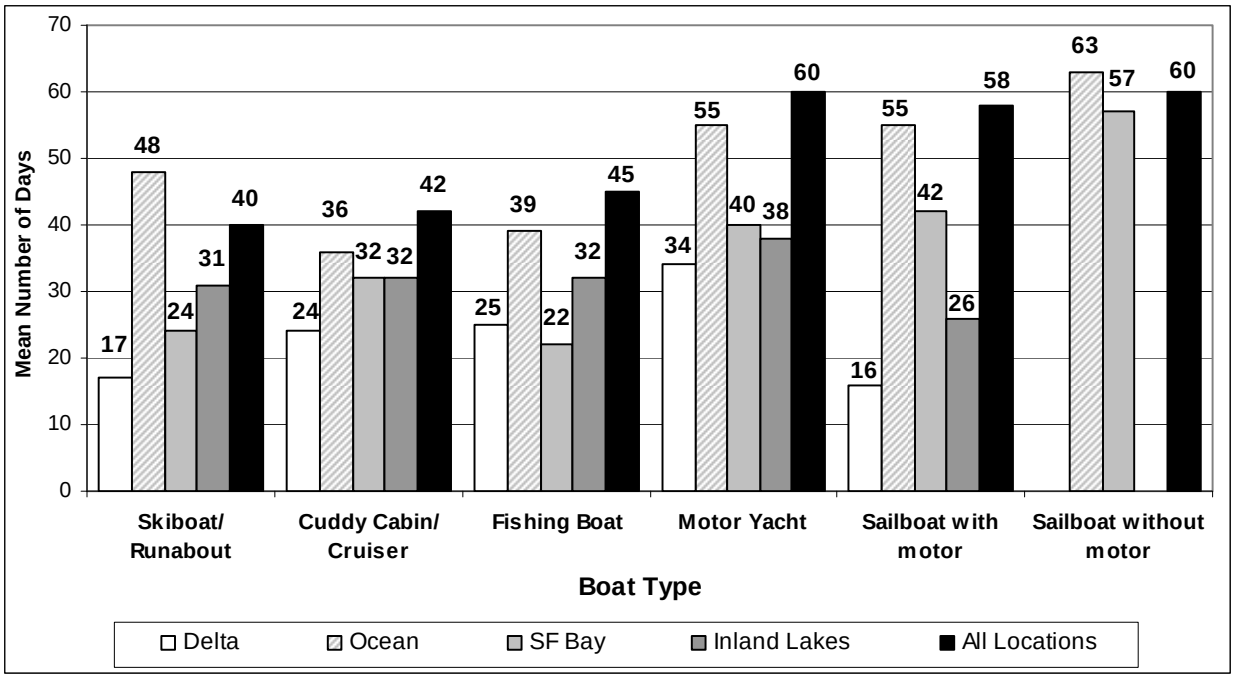
Figure 9. Mean Number of Days Annually by Boating Location and Region of Residence



Days of Annual Boat Use and Boat Type

Considering only sub-groups with sample sizes large enough for interpretation, cuddy cabin/cruiser and fishing boat owners used their boats fewer days on the ocean (36 and 39 days, respectively) than owners of sailboats with auxiliary motors (55 days). Owners of sailboats, both with and without auxiliary motors, reported more annual days on the San Francisco Bay (42 and 57 days, respectively) than those who own fishing boats (22 days). Across all locations, motor yacht and sailboat owners reported more days of use (58 - 60 days) on average than owners of ski boats (40 days), cuddy cabin/cruisers (42 days) or fishing boats (45 days). See Figure 10.

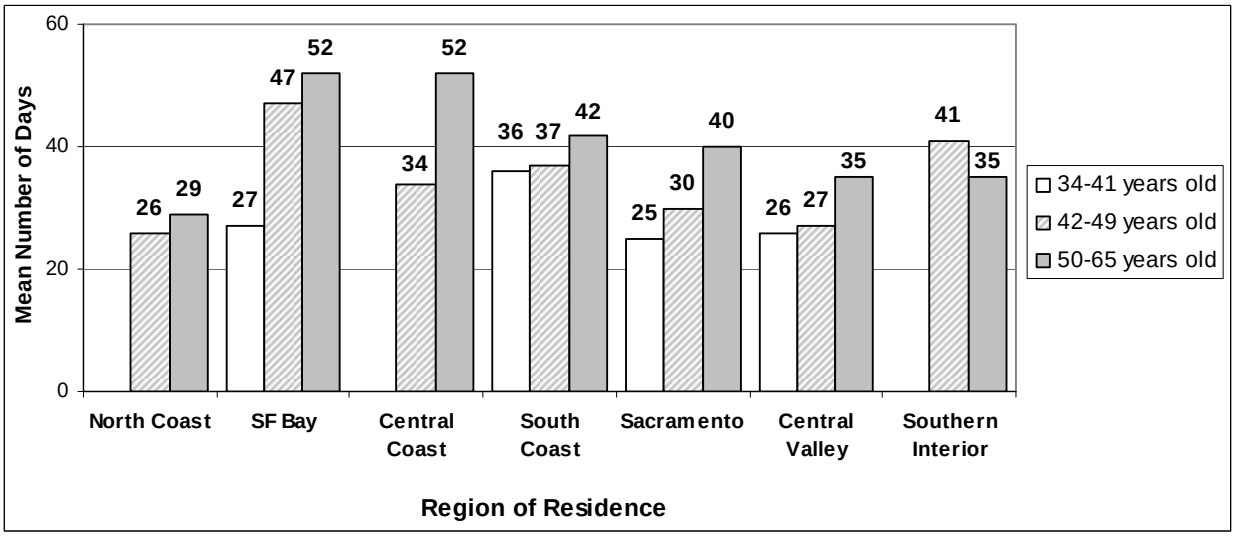
Figure 10. Mean Number of Days Boating at Various Locations by Boat Type



Days of Boat Use by Boater Age and Region of Residence

Figure 11 presents the mean number of days of annual boat use reported by boater age and region of residence. Only boaters age 34 to 65 years of age have been included in the figure because of small sample sizes among other age and region sub-groups. Although only large sub-groups have been charted here, these data may be reasonably used to estimate overall age differences by region of residence. For instance, North Coast residents age 50 – 65 years old estimated they boat fewer days per year than 50 – 65 year olds from other areas. In this sample, Sacramento and Central Valley boaters age 34 – 41 years old also appeared to use their boats somewhat less than South Coast residents in the same age group.

Figure 11. Mean Number of Days Boating by Age and Region of Residence



Hours Put on Boat Engines Each Year

The largest number of surveyed boaters (27 percent) put an average of between 26 and 50 hours on their boat engines each year, another 24 percent put between 51 and 99 hours, and about 22 percent put less than 26 hours on their engines each year. Only 16 percent of boaters said they logged 100 to 150 engine hours and 11 percent said they logged over 150 engine hours per year. See Table 10.

Table 10. Annual Hours Put on Boat Engine

Hours	Count	Percent
0 to 25	566	22.1
26 to 50	698	27.2
51 to 99	608	23.7
100 to 150	402	15.7
Over 150	291	11.4
Total	**2,565**	**100.0**

Boating Activities

Two-thirds of boaters surveyed (65 percent) used their boats for leisure cruising, followed by over half who fish (53 percent), 28 percent who swim, and 25 percent who ski. About one-fifth of boaters mentioned boat camping (21 percent) or wakeboarding (18 percent) with their boats. See Table 11. Boaters who included "other" boating activities mentioned tubing, racing, SCUBA/diving, working/researching, and various other recreational, leisure, personal or educational activities.

Table 11. Boating Activities

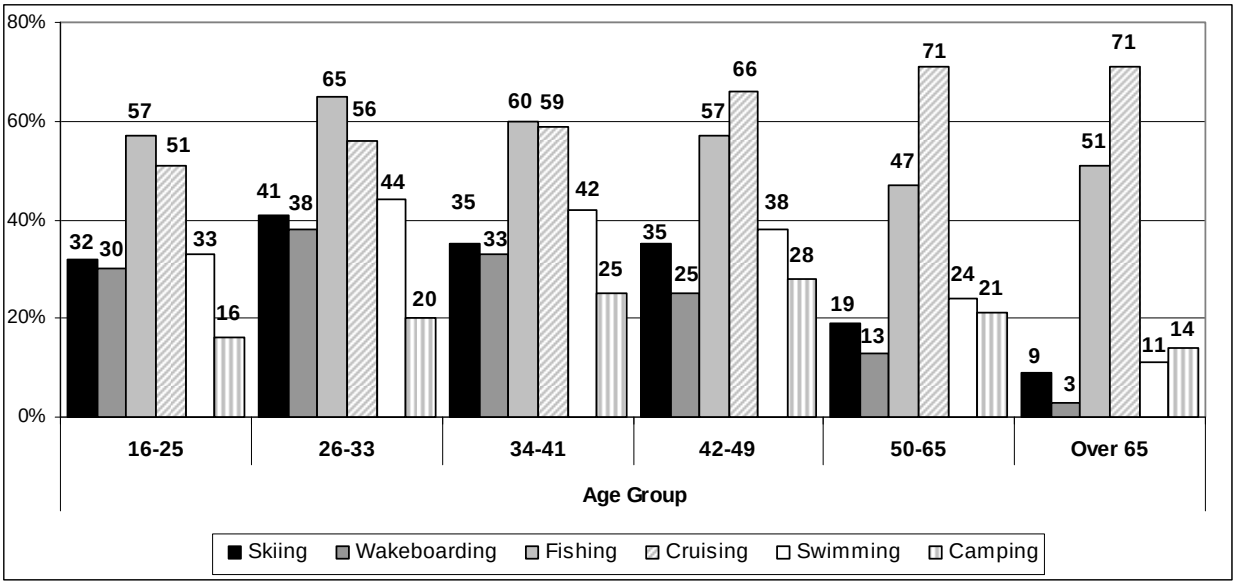
Boating Activities	Count	Percent*
Leisure cruising	1,737	65.3
Fishing	1,412	53.0
Swimming	755	28.4
Skiing	660	24.8
Boat camping	568	21.3
Wakeboarding	486	18.3
Other activities	219	8.2

*Questionnaire item was "check all that apply," therefore percentages do not add up to 100.

Boating Activities and Boater Age

Activities varied widely by boater age, with those in older age groups generally less likely than younger boaters to ski, wakeboard or swim. Boaters age 26 – 41 were among those most likely to fish, although fishing as an activity remained high among boaters of all ages. Boaters 50 and over reported more leisure cruising than those less than 50 years old. Boaters age 34 – 49 were more likely than others to camp. See Figure 12.

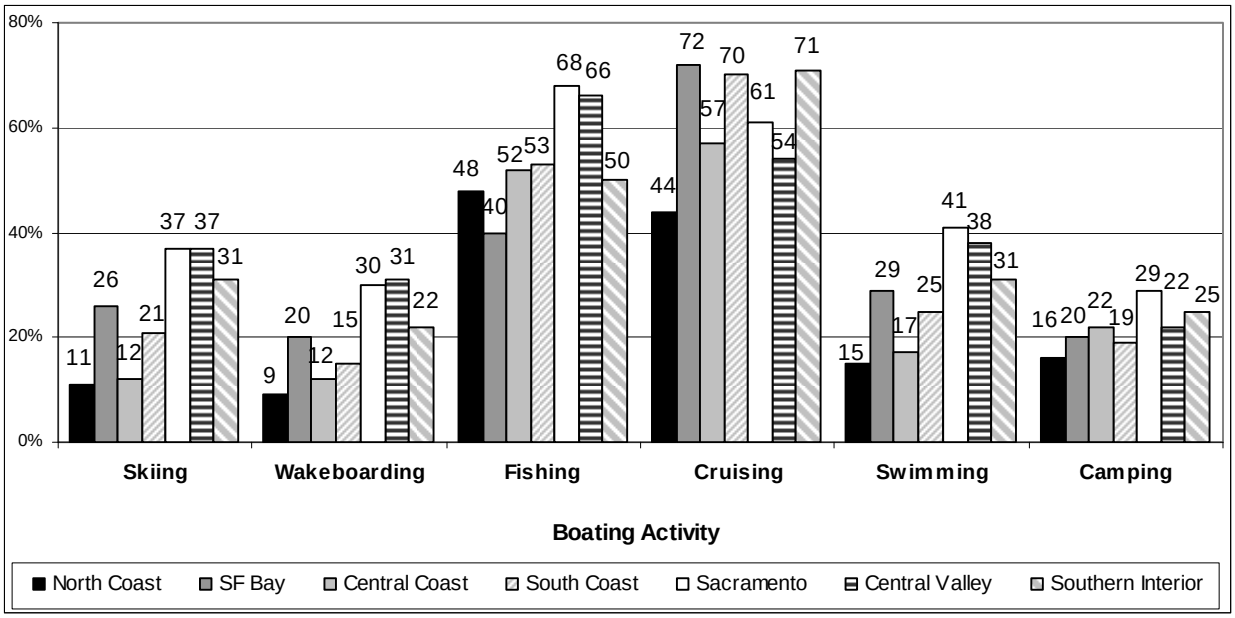
Figure 12. Boating Activities by Age Group



Boating Activities and Region of Residence

Residents from the Sacramento Basin, Central Valley, and Southern Interior were more likely than others to use their boats to ski. Residents from Sacramento Basin or Central Valley also wakeboarded in higher proportions than others. Boaters from San Francisco Bay Area were among those least likely to use their boats to fish, while those from Sacramento Basin or Central Valley were most likely to fish. Boaters from the San Francisco Bay Area, South Coast, or Southern Interior regions were more likely to leisure cruise than boaters from other areas, although the proportion of boaters who leisured cruise was relatively high among residents of all regions with the exception of those from the North Coast. Boaters from the Sacramento Basin or Central Valley were much more likely than those from the North or Central Coast to say they used their boats to swim, and Sacramento Basin residents were among those most likely to boat camp. See Figure 13.

Figure 13. Boating Activities by Region of Residence



Sewage Disposal Practices of Boaters

Type of Toilet and Marine Sanitation Device on Boat

Of all boaters surveyed, about two-fifths (42 percent) did not have a toilet on board their boat and another two-fifths (40 percent) had an installed toilet. Only about one-fifth of boaters surveyed (18 percent) had a port-a-potty on board. Of 970 boaters with an installed toilet who answered the follow-up question regarding type of Marine Sanitation Device (MSD), a little over two-thirds (69 percent) had a Type III MSD, while 22 percent had a Type I, and 9 percent had a Type II. See Table 12.

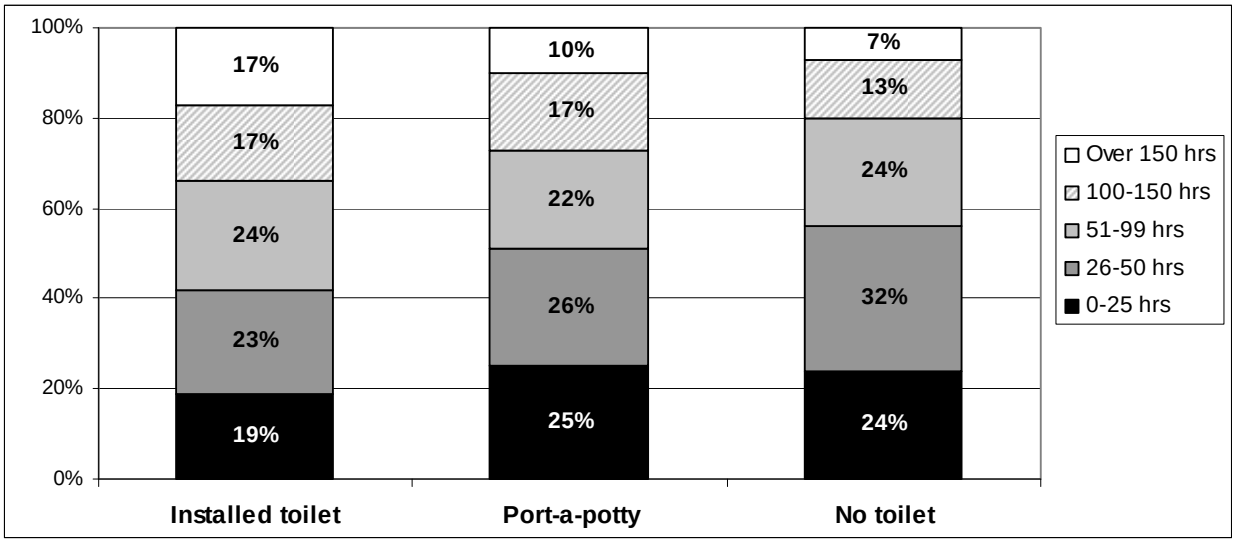
Table 12. Type of Toilet and Marine Sanitation Device On Board Boat

	Of all boaters surveyed:		Of those with a toilet on board:		
Type of toilet	**Count**	**Percent**	**Type of marine sanitation device**	**Count**	**Percent**
Installed toilet	1,035	40.4	Type I	211	21.8
Port-a-potty	461	18.0	Type II	89	9.2
No toilet on board	1,065	41.6	Type III	670	69.1
Total	2,561	100.0	**Total**	970	100.0

Type of Toilet and Annual Engine Hours

Boaters who owned boats with installed toilets on board also put the most engine hours on their boats each year; 58 percent put over 50 hours on their boat engines annually, 34 percent logged 100 or more, and 17 percent logged more than 150 hours annually. Forty-nine percent of those with port-a-potties on board put over 50 hours per year on their engines, and 27 percent put 100 hours or more annually. Among those with no toilets on their boats, 44 percent logged over 50 engine hours annually, and 20 percent logged 100 hours or more. See Figure 14.

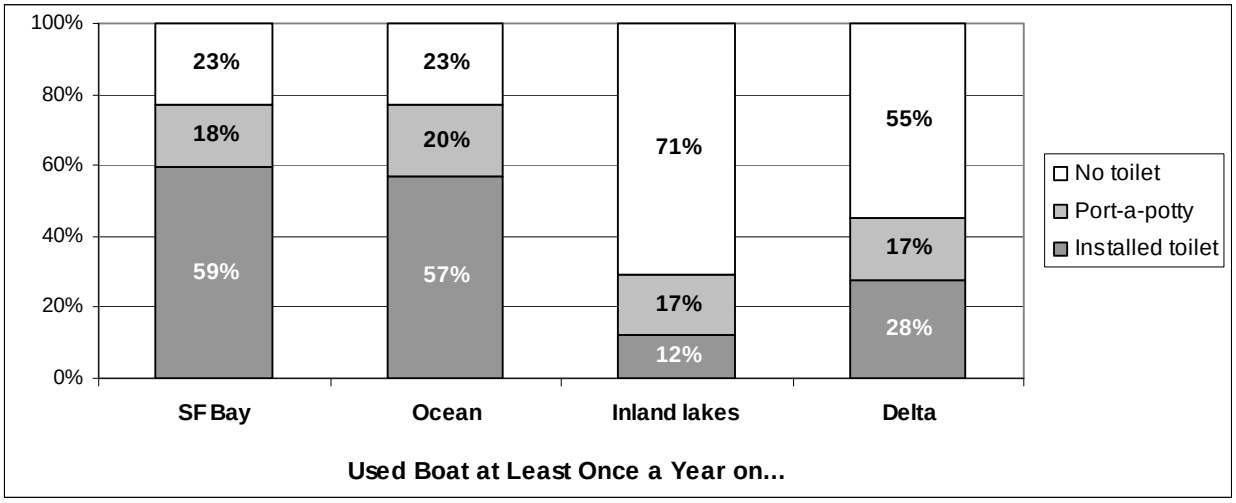
Figure 14. Type of Toilet by Annual Boat Engine Hours



Type of Toilet and Use of Boat at Various Locations

Those who used their boats on the San Francisco Bay or the ocean at least once a year were among those most likely to have an installed toilet on their boats (57 – 59 percent), while those who used their boats on inland lakes were least likely to have an installed toilet (12 percent). Nearly three quarters (71 percent) of those who boated on inland lakes had no onboard toilet, while about half (55 percent) of those who boated on the Delta and one quarter (23 percent) of those who boated on the San Francisco Bay or the ocean had no toilet. Regardless of boating location, approximately equal proportions of boaters had port-a-potties on board (17 – 20 percent). See Figure 15.

Figure 15. Type of Toilet by Use of Boat at Various Locations



Type of Toilet and Identification of Environmental Logos

Boaters with installed toilets were much more likely than those without toilets to recognize and correctly identify the sewage logo. See Figures 16 and 17.

Figure 16. Type of Toilet and Oil Recycling Environmental Logo Recognition

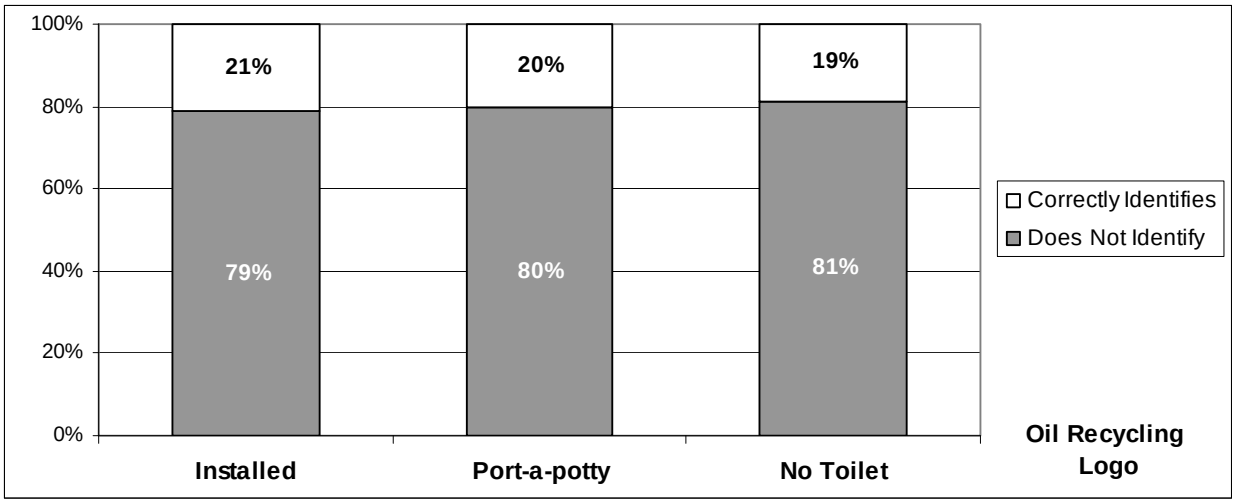
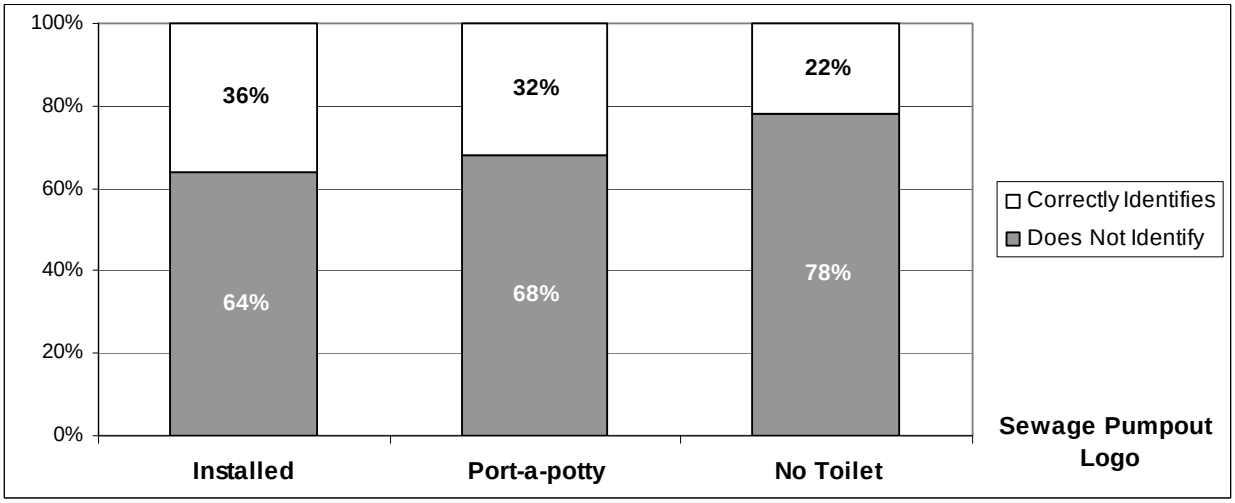


Figure 17. Type of Toilet and Sewage Pumpout Environmental Logo Recognition



Type of Toilet and Marine Sanitation Device by Region of Residence

Toilet and MSD type varied somewhat by region of residence. About two thirds of all boaters surveyed who lived in the Sacramento (65 percent) or Central Valley (66 percent) regions had no toilets versus only about one quarter (28 percent) of those from the South Coast region. Over half (52 percent) of boaters from the South Coast had installed toilets, whereas only 13 – 15 percent of those from the Sacramento and Central Valley area had installed toilets. Presence of onboard port-a-potties did not vary by region of residence. Southern Interior boaters (9.5 percent) had Type I MSDs in greater proportions than those from the San Francisco Bay Area or the Sacramento Basin regions, and compared to boaters from other regions, Sacramento Basin residents were less likely to have Type II MSDs and more likely to have Type III MSDs. Percentages of each type of toilet by region are presented in Figure 18, and Table 13 presents the percent of MSD type by region.

Figure 18. Type of Toilet by Region of Residence

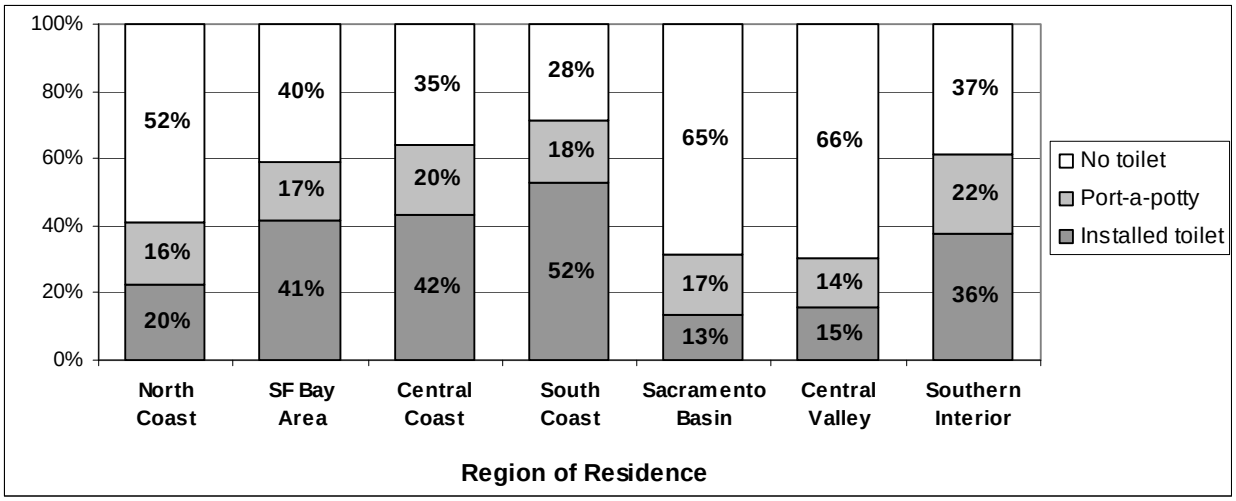


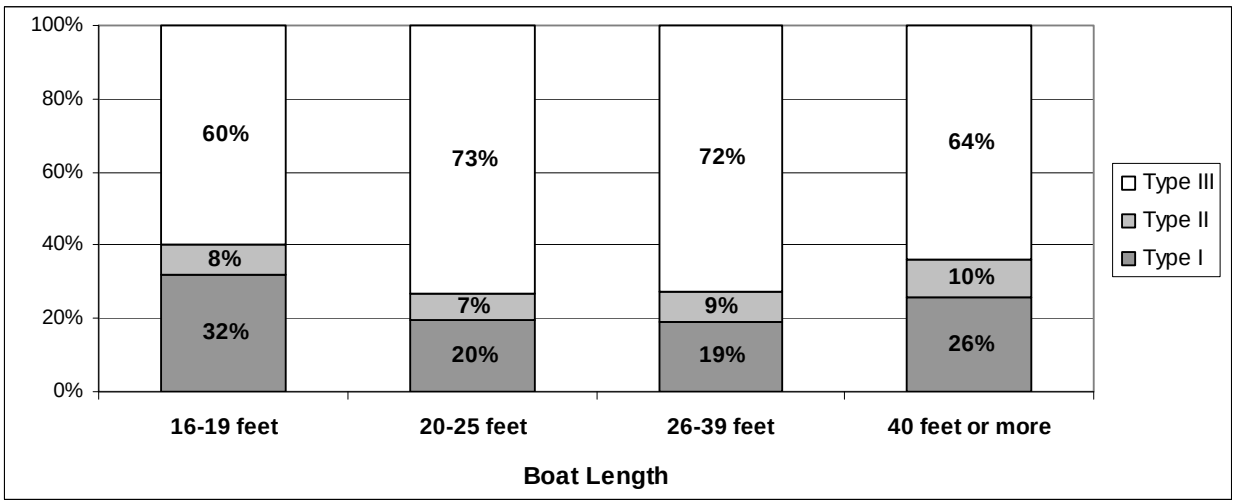
Table 13. Percent of Boats by MSD Type and Region of Residence

	SF Bay	South Coast	Sacramento Basin	Southern Interior
Type I	15.9	23.5	17.7	28.6
Type II	6.7	10.9	0.0	9.5
Type III	77.4	65.6	82.3	61.9
	(n=164)	*(n=485)*	*(n=79)*	*(n=42)*

Type of MSD, Boat Type, and Boat Length

Type of MSD varied significantly by boat length but not by boat type. Almost three quarters of boats 20 – 39 feet in length had Type III MSD toilets (72 – 73 percent), whereas only 60 percent of boats less than 20 feet long and 64 percent of boats more than 39 feet long had Type III MSD toilets. Boats 16 – 19 feet long or more than 39 feet long were more likely than 20 – 39 footers to have Type I MSDs. Having a Type II MSD was equally uncommon on boats of all lengths. See Figure 19.

Figure 19. Type of MSD by Boat Length



Frequency of Annual Sewage Pumpout Use

When asked how often boaters use sewage pumpout stations annually, the largest proportion of boaters (32 percent) said they used a pumpout 1 to 5 times annually, while almost one-fifth used a pumpout every time they go out (18 percent), more than 10 times a year (20 percent) or 6 to 10 times a year (19 percent). About 11 percent of boaters surveyed said they had no need to use a pumpout. See Table 14.

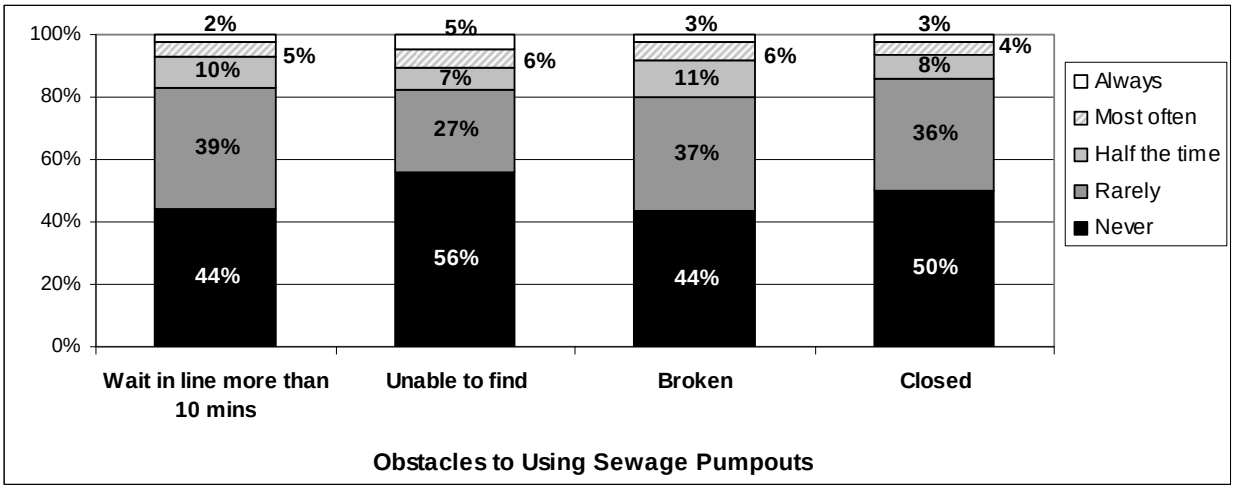
Table 14. Number of Times Use a Sewage Pumpout Annually

	Count	Percent
Every time I go out on the boat	206	18.1
More than 10 times	224	19.7
6 to 10 times	211	18.5
1 to 5 times	365	32.1
Don't use a mobile or stationary pumpout	132	11.6
Total	1,138	100.0

Obstacles to Using Sewage Pumpouts

Boaters reported the most common obstacles they encountered when trying to use a pumpout is having to wait in line more than 10 minutes (56 percent) and finding the pumpout broken (56 percent). Half (50 percent) of all boaters also said they had encountered a closed pumpout at least once. Although most (56 percent) reported they never had trouble finding a sewage pumpout, 17 percent said this happened at least half the time, in contrast to only 14 percent who said they found the pumpout closed at least half the time. About one-fifth of those who used pumpouts (20 percent) said they found it broken half the time, most often or always. See Figure 20.

Figure 20. Frequency of Experiencing Various Obstacles to Using Sewage Pumpouts



Obstacles to Using Sewage Pumpouts and Location of Boat Use

Figures 21 to 24 present the results for obstacles encountered when using pumpouts by boat use location. Boaters who used inland lakes reported they "most often or always" waited in line more than 10 minutes to use a sewage pumpout about twice as often as boaters who did not use their boats on inland lakes. On inland lakes, 88 percent of boaters said they "rarely or never" encountered a broken pumpout in contrast to 79 percent of boaters who did not boat on inland lakes. Among San Francisco

Bay users, 46 percent said they are "never" unable to find a pumpout compared to 58 percent of boaters who boated in other locations. Among those who boated on the ocean, 22 percent said they encountered broken pumpouts half the time or more, while only 13 percent of those who did not boat on the ocean had this experience. Delta boaters also reported more trouble locating pumpouts (56 percent) and encountering closed pumpouts (59 percent) than non-Delta boaters.

Figure 21. Obstacles to Using Sewage Pumpouts on Inland Lakes

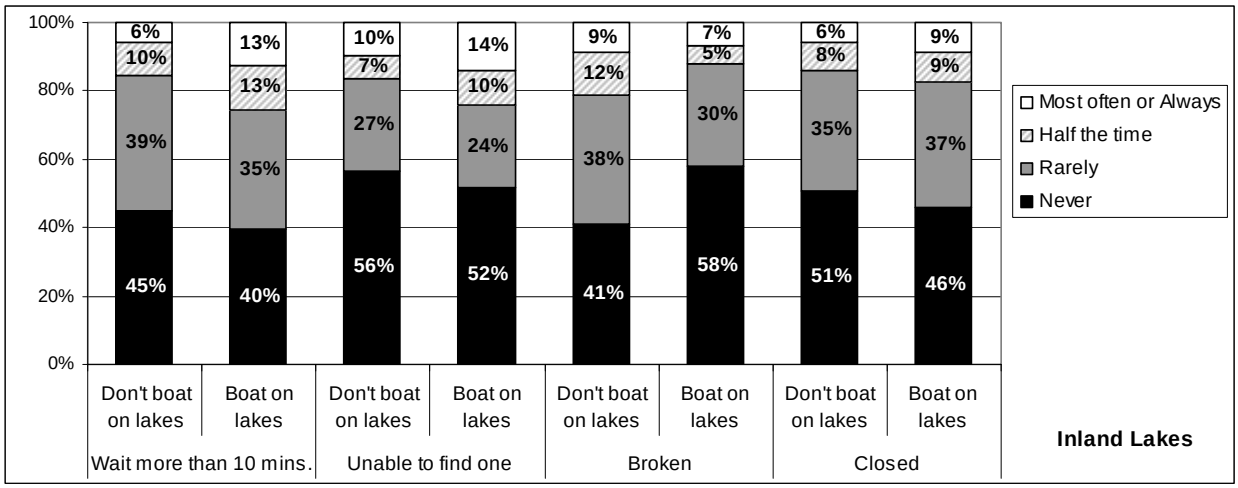


Figure 22. Obstacles to Using Sewage Pumpouts on Ocean

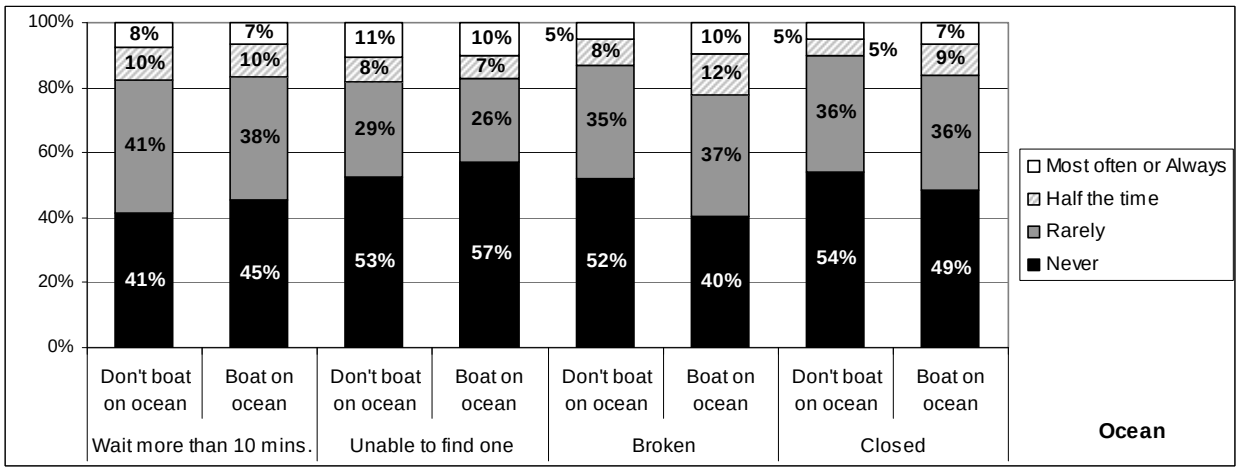


Figure 23. Obstacles to Using Sewage Pumpouts on San Francisco Bay

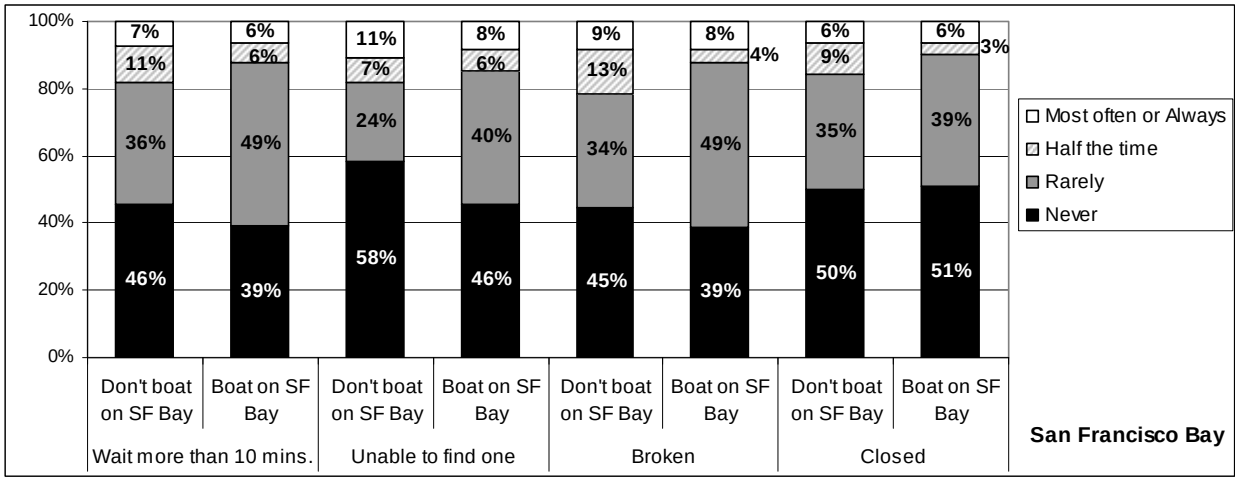
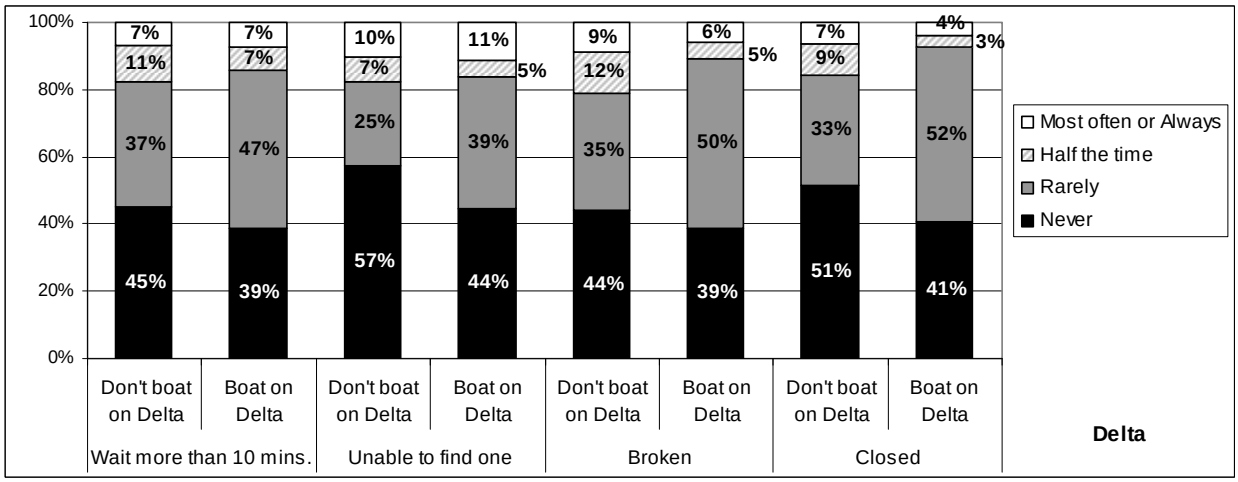


Figure 24. Obstacles to Using Sewage Pumpouts on the Delta



Obstacles to Using Sewage Pumpouts and Place Where Pumpout Most Often Used

Boaters reported some differences in how often they encountered pumpout use obstacles depending on where they typically used them. Those who usually used pumpouts where they launched were more likely to say they "never" encountered broken pumpouts (51 percent) than those who used pumpouts elsewhere (29 – 46 percent). About 84 percent of those who used pumpouts where they stored or berthed their boats "rarely or never" encountered broken pumpouts compared to 66 – 72 percent who used mobile or "other" pumpouts. Closed pumpouts were most often or always a problem for 12 percent of those who used them where they launched, compared to only 5 percent who used them where they stored or berthed their boats. Those who primarily used mobile pumpouts reported higher rates of waiting more than 10 minutes (19 percent) than those who used them elsewhere; while those who used pumpouts where their boats are stored or berthed were among those most likely to say they "rarely or never" waited in line more than 10 minutes. Boaters who used pumpouts where they launched were much more likely to say they "most often or always" had trouble finding one (26 percent), compared to only 9 percent of those who used them where they stored or berthed their boats, 12 percent of those who used mobile pumpouts, and 11 percent of those who used pumpouts in other locations.

Obstacles to Using Sewage Pumpouts by Boat Use Location and Region of Residence
Limited sample sizes in most sub-groups preclude performing analysis on each obstacle by use location and region of residence as the percentage of boaters reported would be based on such a small number of cases, they would not be reliable. However, for the obstacle "closed" and for those who used their boats at least once a year on the ocean, about one quarter (23 percent) of Southern Interior residents encountered this problem compared to only 15 – 17 percent of residents from the South Coast or San Francisco Bay Area region. No other differences are statistically significant, possibly due to insufficient sample sizes.

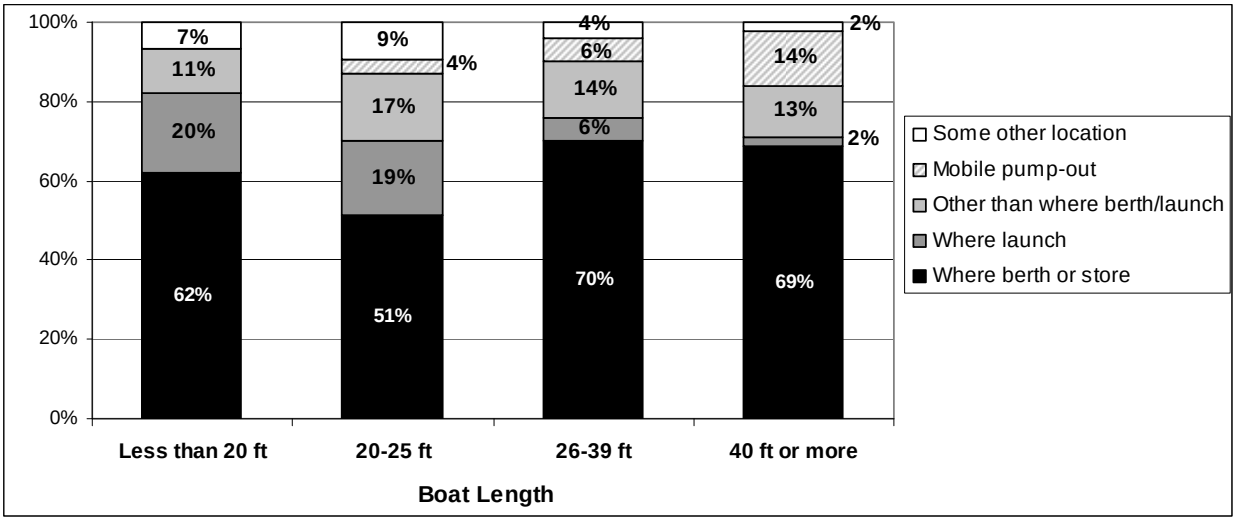
Location of Pumpout Use
About two-thirds (67 percent) of those who used sewage pumpouts used them at the marina where they stored or berthed their boats, and another 14 percent used them somewhere other than where they launched or bertedh their boats. Less than 8 percent used pumpout facilities where they launched and only about 7 percent used mobile pumpout services. See Table 15. About 5 percent specified other locations. Among these responses, the most common were "open sea/off-shore," "several places" and "fuel dock."

Table 15. Place Where Boaters Most Often Use Sewage Pumpout

	Count	Percent
At the facility or marina where I berth/store the boat	671	66.8
At the place or marina where I launch the boat	76	7.6
Somewhere other than the place I launch/berth	141	14.0
I use a mobile boat-to-boat pumpout service	72	7.2
Other	45	4.5
Total	1,005	100.0

Usual Pumpout Location and Boat Length
Usual location of sewage pumpout use varied by boat length. About 70 percent of those with boats 26 feet or longer most often used pumpouts where they stored or berthed their boats, while only about half (51 percent) of those with boats 20 – 25 feet in length primarily used these pumpouts. Boaters who owned boats 25 feet in length or less said they used pumpouts where they launched more than those with longer boats. Those who owned boats 40 feet or longer were much more likely than others to use mobile pumpout services. See Figure 25.

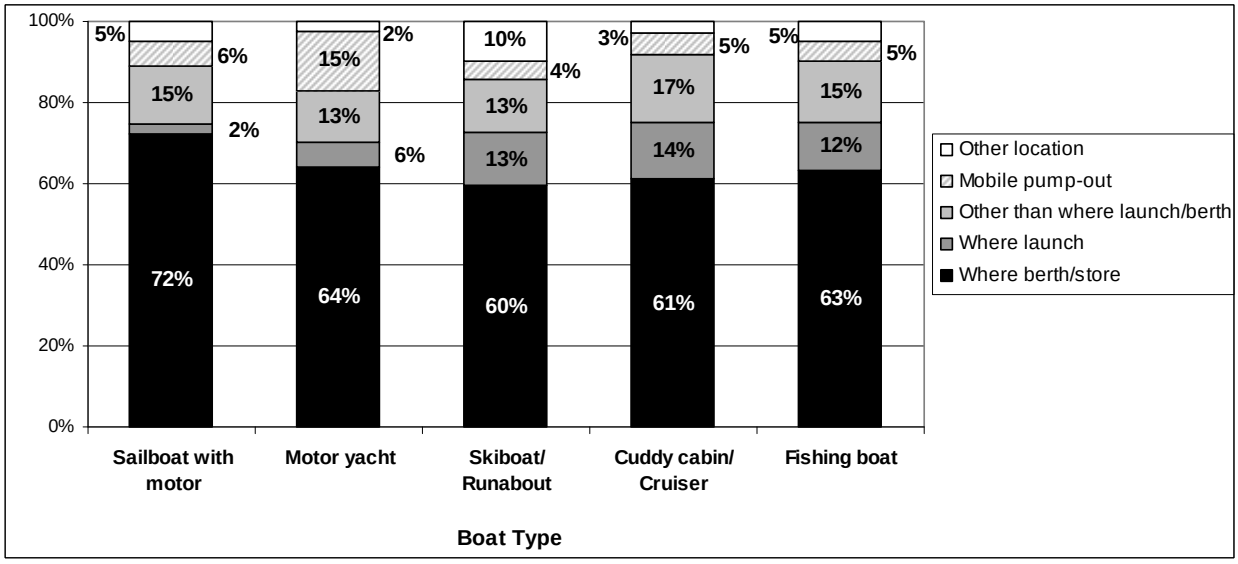
Figure 25. Location Most Often Use Sewage Pumpout by Boat Length



Usual Pumpout Location and Boat Type

Almost three quarters (72 percent) of those who owned sailboats with auxiliary motors said they used pumpouts where they berthed or stored their boats in contrast to 60 percent of ski boat owners and 61 percent of cruiser owners. Ski boat, cruiser, and fishing boat owners were more likely to use pumpouts where they launched than owners of other boat types, and motor yacht owners used mobile services much more often than others. See Figure 26.

Figure 26. Location of Sewage Pumpout Most Often Used by Boat Type

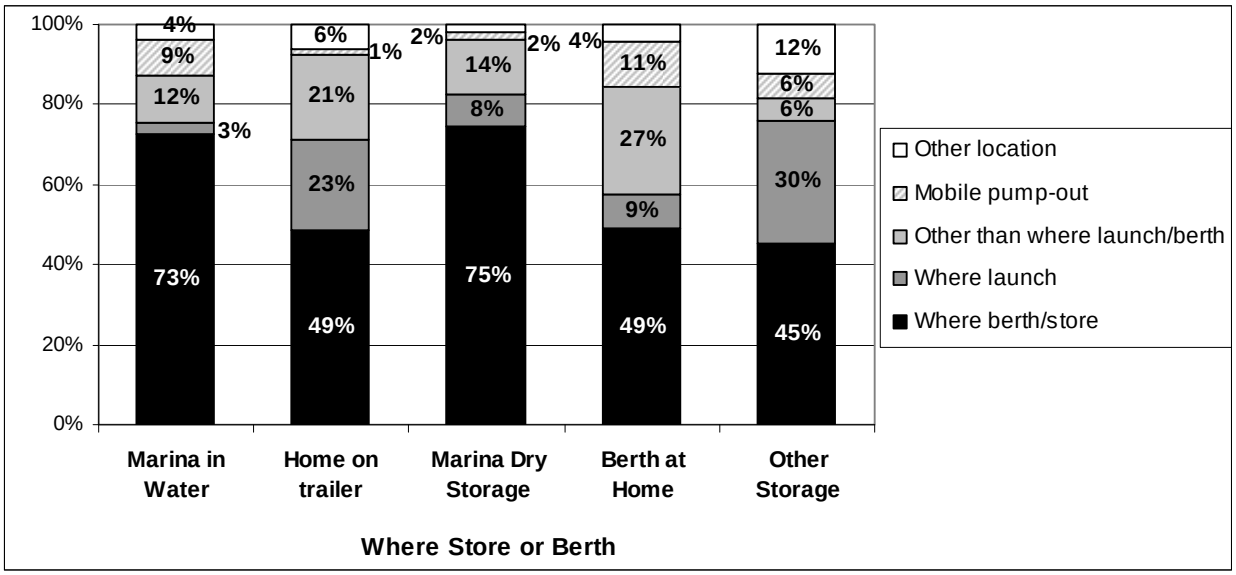


Usual Pumpout Location and Boat Storage Location

A large majority of boaters who stored or berthed their boats at a marina in water most often used the sewage pumpout at the marina (73 percent), as did the majority of those who used a marina dry storage (75 percent). Compared to these groups, those who stored their boats at home on trailers or used some other storage arrangement used pumpouts where they usually launched in much greater proportions.

Mobile pumpout service use was highest among those who berthed at home (11 percent) or at a marina in water (9 percent). See Figure 27.

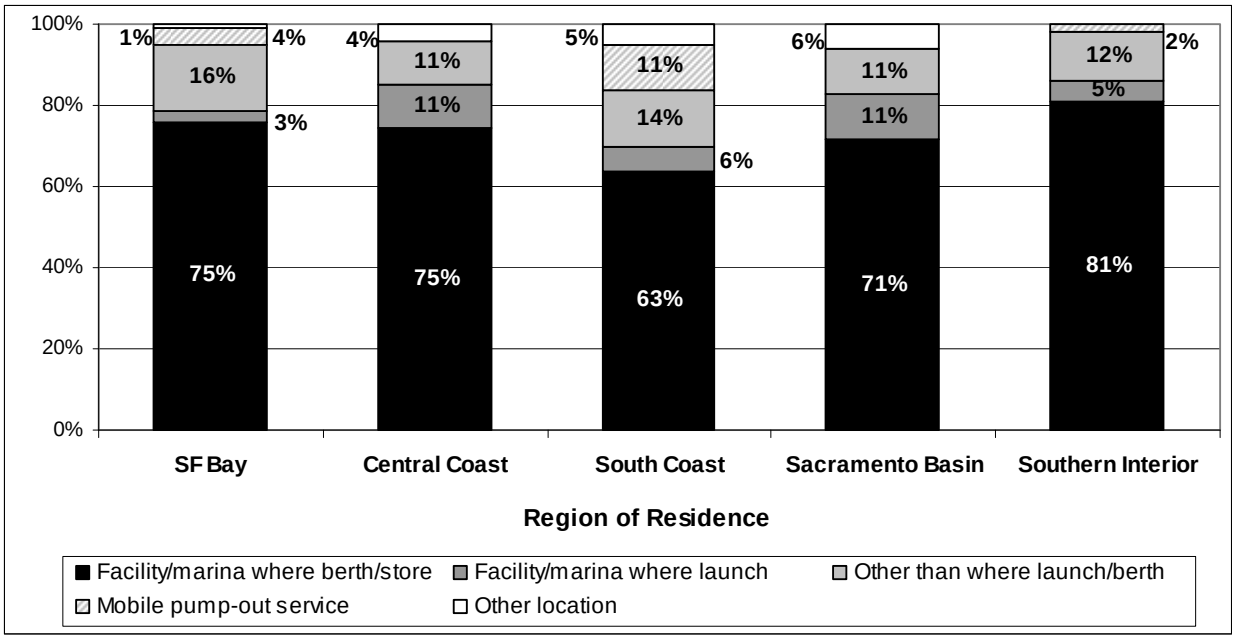
Figure 27. Location of Sewage Pumpout Most Often Used by Location Stored or Berthed



Usual Pumpout Location and Region of Residence

About three quarters of boaters surveyed who lived in the San Francisco Bay (75 percent) or Central Coast (75 percent) areas typically used pumpouts where they berthed or stored their boats, while 81 percent of those from the Southern Interior and only 63 percent of those from the South Coast used these pumpouts most of the time. More South Coast residents appeared to use mobile pumpouts than others, and more Central Coast and Sacramento Basin residents used pumpouts where they launched than boaters from other regions. Figure 28 presents the percentage of residents by region who preferred each pumpout location. Note that sub-groups with insufficient sample sizes have been omitted from this analysis.

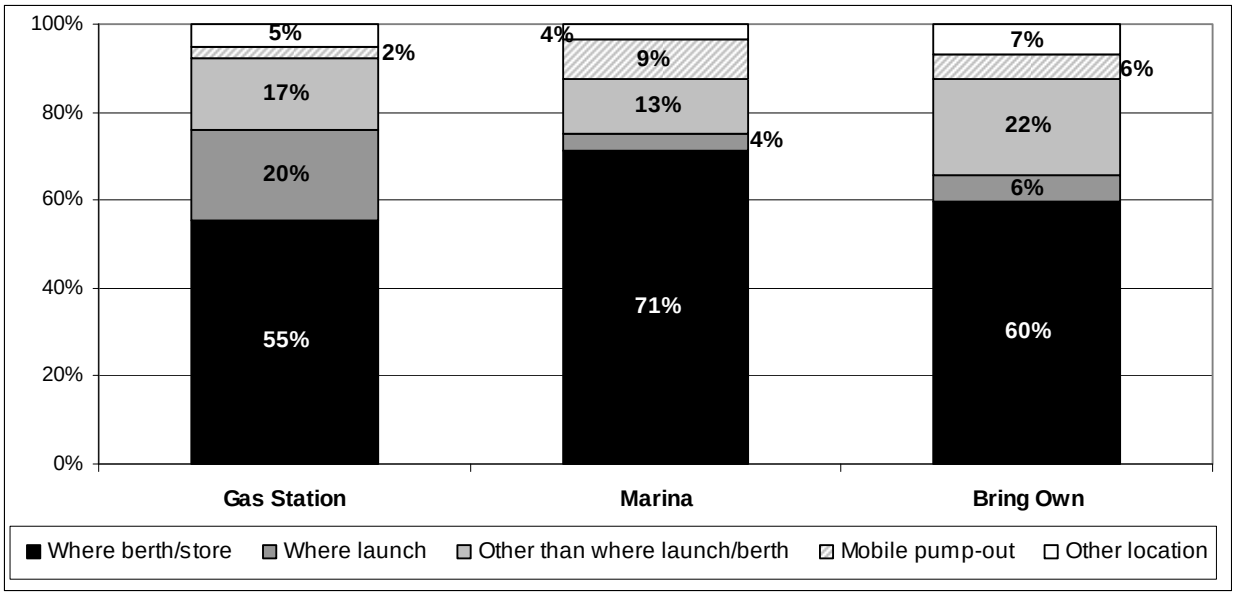
Figure 28. Location of Pumpout Most Often Used by Region of Residence



Pumpout Location by Fuel Location

Most boaters who typically fueled their boats at a marina with a fuel dock or brought their own gas cans also most often used the sewage pumpout at the marina (71 and 60 percent, respectively), compared to 55 percent of those who used a gas station prior to launch. Those who typically used a gas station prior to launch were much more likely to use a pumpout where they launched (20 percent) compared to those who most often used a marina fuel dock (4 percent) or bring their own gas cans (6 percent). About 9 percent of those who typically used marina fuel docks also said they most often used a mobile pumpout service, versus only 6 percent of those who brought their own gas cans and 2 percent of those who used a gas station prior to launch. See Figure 29.

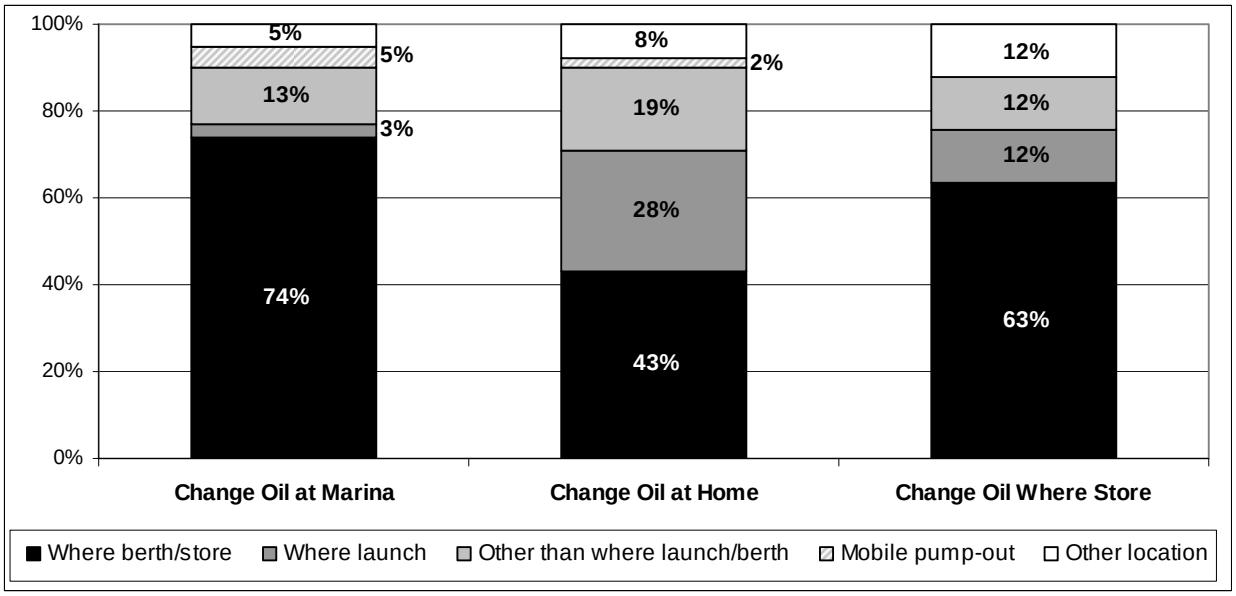
Figure 29. Location of Sewage Pumpout Most Often Used by Location Most Often Fueled



Pumpout Location and Place Where Boat Oil is Changed

About three quarters (74 percent) of those who changed their oil at the marina where they stored their boat also typically used sewage pumpouts at the marina. Less than half of those who changed their oil at home (43 percent) typically used sewage pumpouts where they berthed or stored their boats. A little over a quarter (28 percent) of those who changed their oil at home used pumpouts where they launched, while only 3 percent of those who changed their oil at the marina and only 12 percent of those who changed it at their storage facility used pumpouts at their usual launch location. About 5 percent of those who changed their oil at the marina and 2 percent of those who changed it at home used a mobile pumpout service. See Figure 30.

Figure 30. Location of Pumpout Most Often Used by Location Where Oil is Changed



Perceptions of Illegal Sewage Discharge

When asked how often they think boaters discharge untreated vessel sewage into the water, nearly 44 percent answered "frequently," and 25 percent said "once in a while." Nearly a third of all respondents (32 percent) said they did not know how often this occurs. Considering only those who provided an estimate of how often it occurs, nearly two-thirds (64 percent) believed boaters discharge untreated vessel sewage into the water frequently. See Table 16.

Table 16. How Often Do Boaters in California Discharge Untreated Sewage into the Water?

Of All Surveyed	Count	Percent	Of Those Who Gave Estimate	Count	Percent
Frequently	1,101	43.9	Frequently	1,101	64.2
Once in a while	613	24.5	Once in a while	613	35.8
Don't know	793	31.6			
Total	**2,507**	**100.0**	**Total**	**1,714**	**100.0**

Perceived Penalty for Untreated Sewage Discharge

The survey also asked boaters to indicate what they thought might happen to those who discharge untreated sewage into the water. Nearly half (45 percent) chose "a fine of up to $1,100," 35 percent chose "a fine of up to $2,200 (correct response)," 12 percent chose "up to 6 months in jail," and 8 percent chose "nothing—it is discouraged but not against the law." A little over one half of those surveyed (n=1402, 53 percent) either left the item blank or said they do not know the penalty. See Table 17.

Table 17. What May Happen to Those Who Discharge Untreated Sewage Overboard in California?

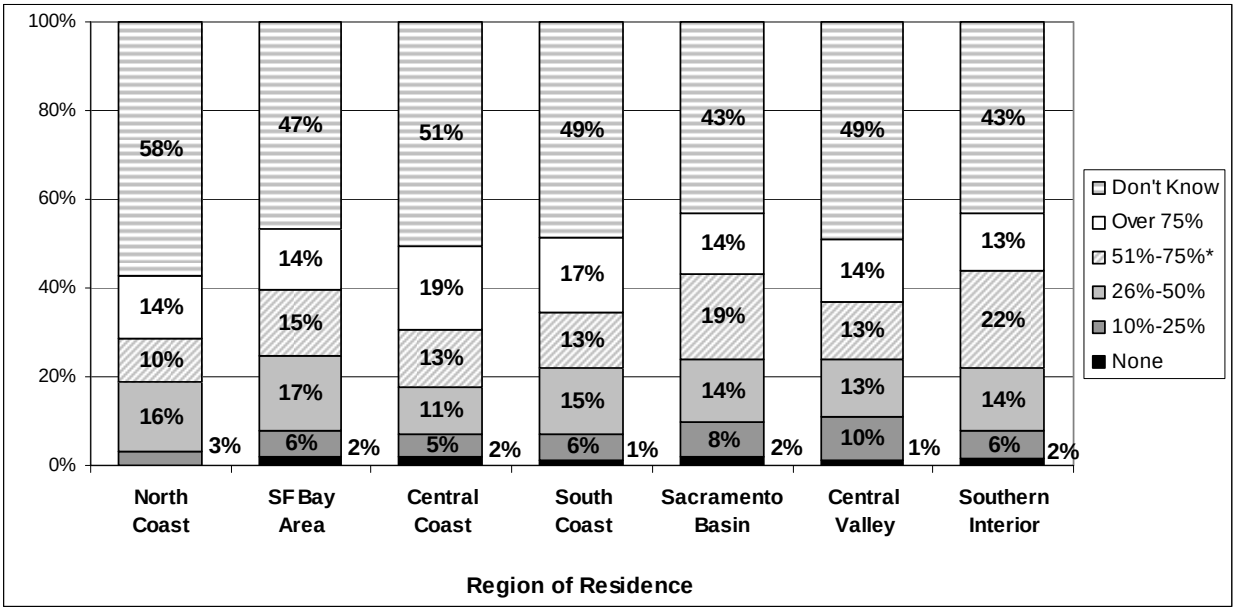
	Count	Percent
Nothing	105	8.3
Fine of up to $1,100	562	44.6
Fine of up to $2,200*	437	34.7
Up to 6 months in jail	156	12.4
Total	**1,260**	**100.0**

*Correct response

Knowledge of What Percentage of Drinking Water Comes from the Delta by Region of Residence

Knowledge of what percentage of California drinking water comes from the Delta did not vary significantly by region of residence. See Figure 31 (The correct answer for this survey question is 51-75%).

Figure 31. What Percentage of Drinking Water Comes from the Delta by Region of Residence



*Correct response

Fueling Practices of Boaters

Usual Fuel Location

Half of all boaters surveyed (50 percent) said they fueled their boats at a gas station before they launched, another 38 percent said they usually fueled at a marina with a fuel dock, and only 12 percent usually brought their own gas cans. See Table 18.

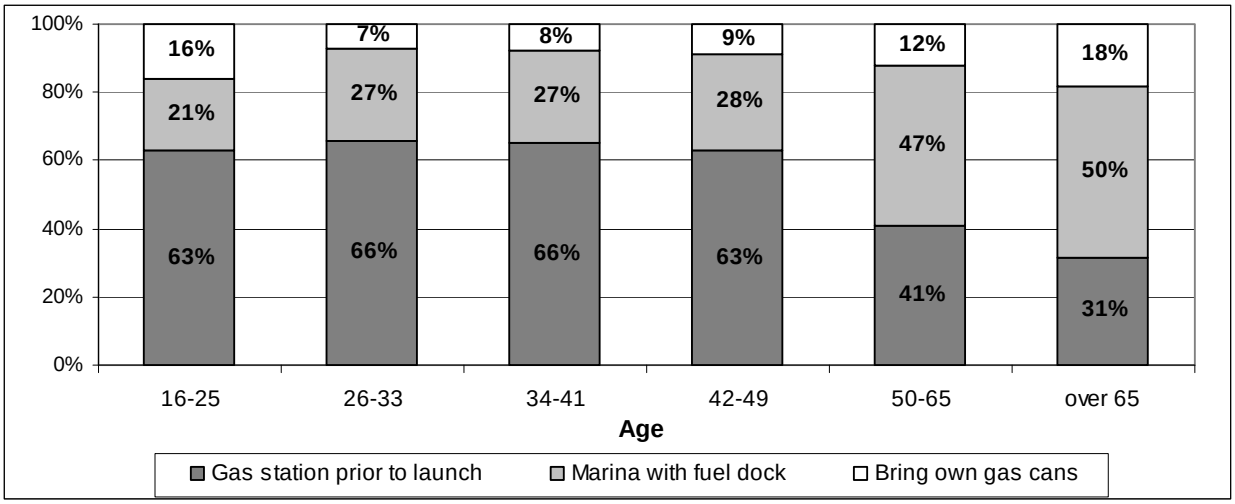
Table 18. Usual Fuel Location

	Count	Percent
Gas Station Prior to Launch	1,285	50.0
Marina with Fuel Dock	985	38.4
Bring Own Gas Cans	298	11.6
Total	**2,568**	**100.0**

Usual Fuel Location and Boater Age

Usual fuel location varied by age, with boaters age 50 and older much more likely than younger boaters to fuel at a marina with a fuel dock. Only 31 percent of boaters age 65 and older said they fueled at a gas station prior to launch compared to 63 - 66 percent of boaters less than 50 years of age and 41 percent of boaters age 50 – 65. Boaters age 16 – 25 or over 65 were about equally as likely to bring their own gas cans and more likely to bring gas cans than those age 26 – 49 years old. Overall, the likelihood a boater used a gas station prior to launch decreased as boater age increases. Conversely, the likelihood a boater used a marina fuel dock increased with age. See Figure 32.

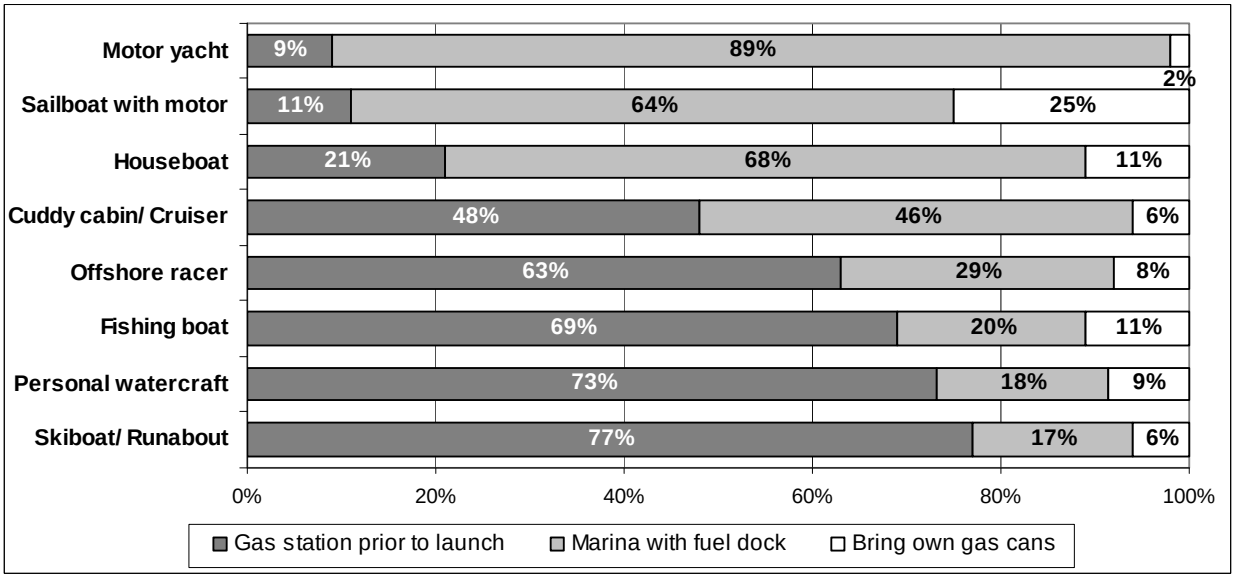
Figure 32. Usual Fuel Location by Respondent Age



Usual Fuel Location and Boat Type

About three quarters of all ski boat (77 percent) and personal watercraft (73 percent) owners and about two-thirds of all fishing boat (69 percent) and off-shore racer (63 percent) owners said they usually fueled at a gas station prior to launch. In contrast, only about half (48 percent) of those who owned cuddy cabin/cruisers, 21 percent who owned houseboats, 11 percent who owned sailboats with motors, and 9 percent who owned motor yachts typically used a gas station. Motor yacht owners were far more likely than owners of all other boat types to use a marina with a fuel dock, although 68 percent of houseboat owners and 64 percent of sailboat owners said they usually fuel at marina fuel docks. Owners of sailboats with auxiliary motors were more than twice as likely as owners of other boat types to bring their own gas cans. See Figure 33.

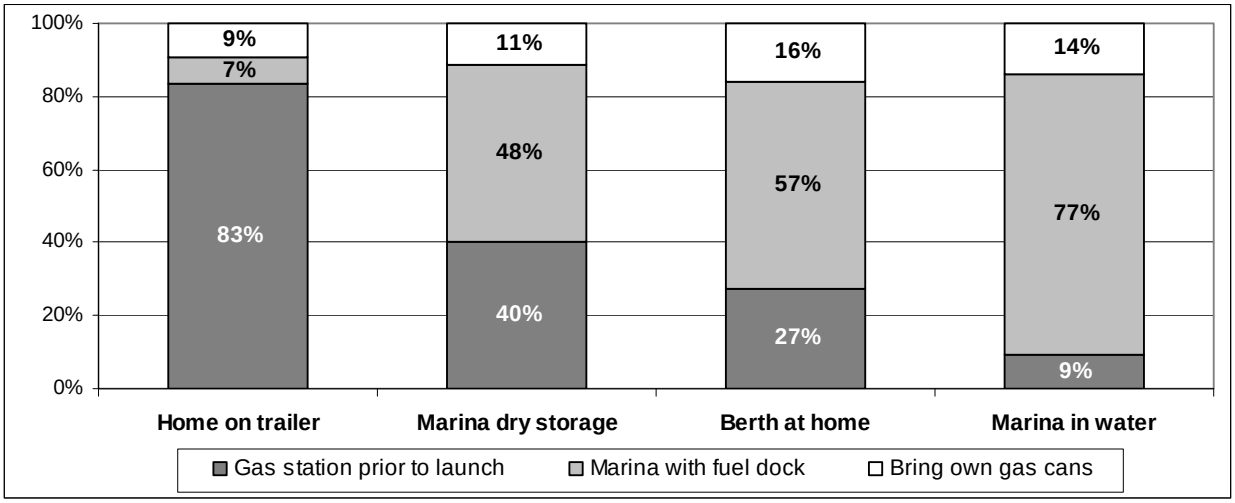
Figure 33. Usual Fuel Location by Boat Type



Usual Fuel Location and Boat Storage Location

A large majority of those who trailered their boats at home (83 percent) usually fueled at gas stations prior to launch, compared to only 40 percent of those who used a marina dry storage or 27 percent who berthed their boats at home. A large majority of those whose boats were stored at a marina in water (77 percent) fueled their boats at marina fuel docks, compared to 57 percent of those who berthed at home, 48 percent who used a marina dry storage, and just 7 percent who trailered their boats at home. Those who trailered their boats at home were somewhat less likely than others to bring their own gas cans (9 percent versus 11 – 16 percent). See Figure 34.

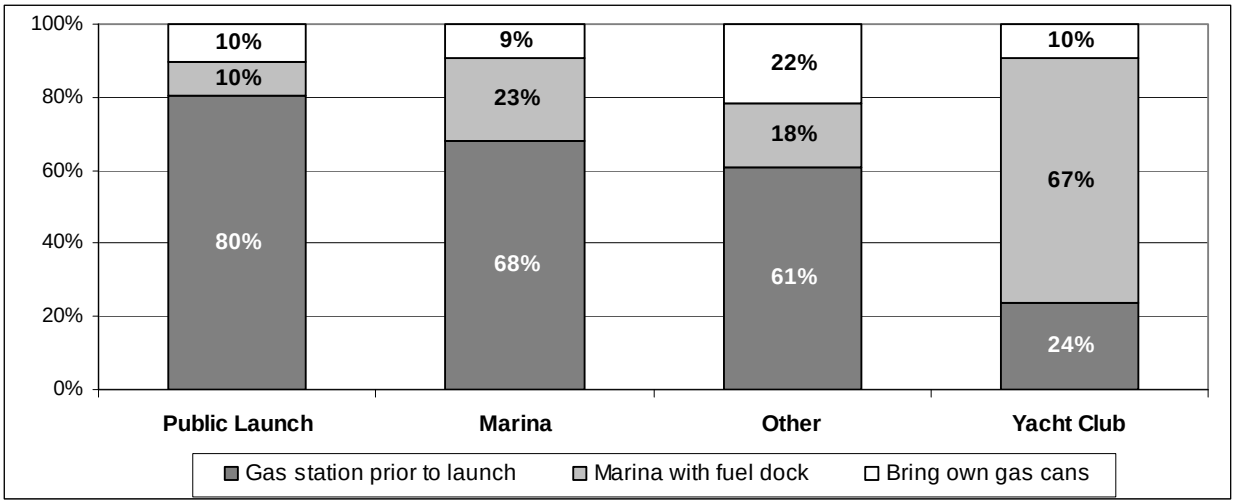
Figure 34. Usual Fuel Location by Boat Storage Location



Usual Fuel Location and Usual Launch Location

The vast majority of boaters who used public launch ramps usually fueled their boats at a gas station prior to launch (80 percent), compared to 68 percent of those who launched at the marina, 61 percent of those who launched at "other" locations, and only 24 percent of those who launched at a yacht club. Those who launched at a yacht club were much more likely than all others to use a marina fuel dock. Those who launched at public launch facilities bring their own gas cans about as often as those who launched at a marina or a yacht club, but about twice as many boaters who launched from "other" locations said they bring their own gas. See Figure 35.

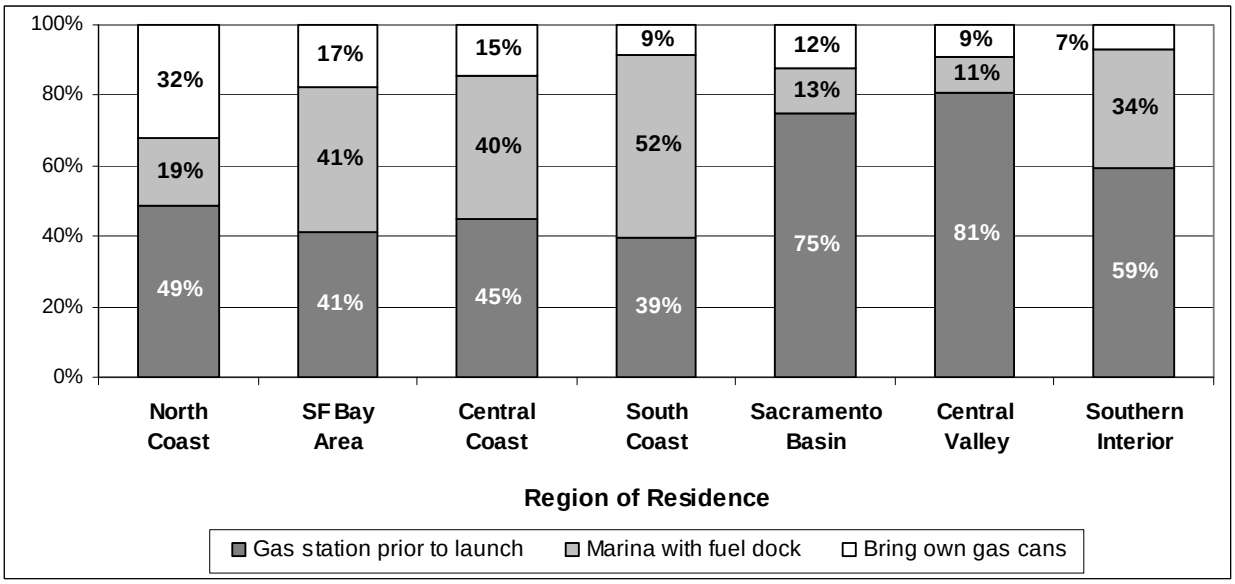
Figure 35. Usual Fuel Location by Usual Launch Location



Usual Fuel Location and Region of Residence

A large majority of boaters from the Central Valley (81 percent) and Sacramento Basin (75 percent) regions usually fueled their boats at gas stations prior to launch, while considerably smaller proportions of those from the North Coast (49 percent), Central Coast (45 percent), San Francisco Bay Area (41 percent), or South Coast (39 percent) usually fueled their boats at gas stations prior to launch. South Coast, San Francisco Bay, Central Coast, and Southern Interior region residents were more likely than boaters from other areas to use a marina's fuel docks. Almost one-third of those from the North Coast region (32 percent) said they usually brought their own gas cans, which was about twice the proportion of boaters from the San Francisco Bay Area (17 percent) or the Central Coast (15 percent), and over three times as many as boaters from the South Coast (9 percent), Central Valley (9 percent) or the Southern Interior region (7 percent). See Figure 36.

Figure 36. Usual Fuel Location by Region



Daily Fuel Use

Of the 2,575 respondents who estimated their typical daily fuel use, just under half (48 percent) used less than 12 gallons in a typical day, 36 percent used from 12 – 30 gallons, and 16 percent used over 30 gallons in a typical day. See Table 19.

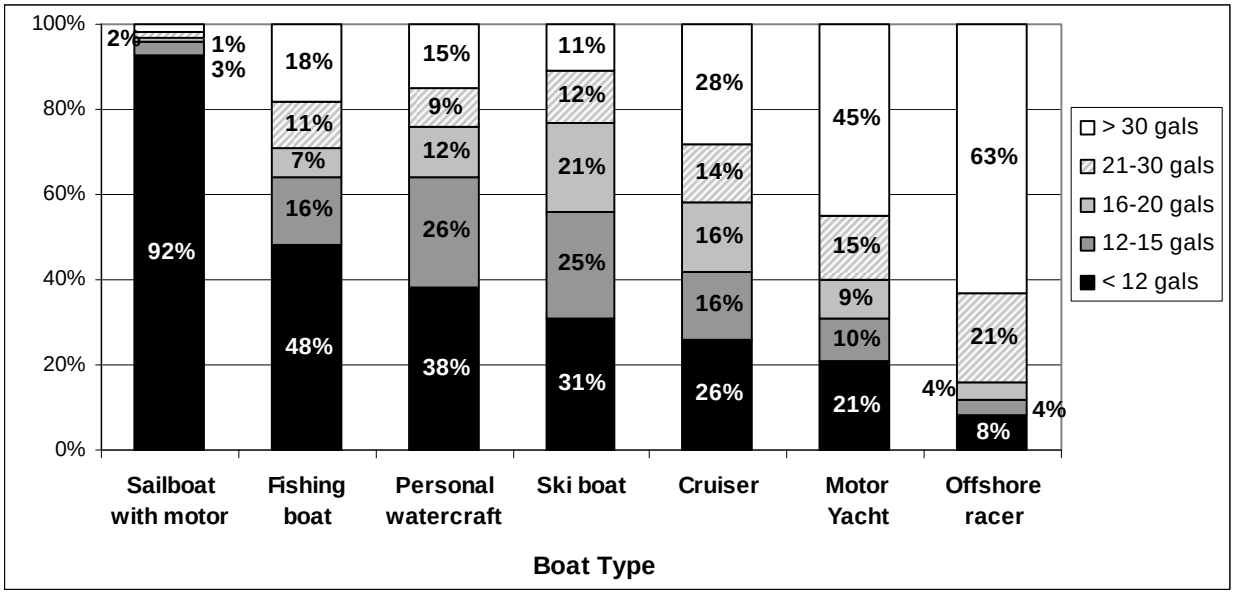
Table 19. Average Daily Fuel Use in Gallons

	Count	Percent
Less than 12 gallons	1,222	47.5
12 – 15 gallons	386	15.0
16 – 20 gallons	285	11.1
21 – 30 gallons	250	9.7
Over 30 gallons	421	16.4
Other amount	11	.4
Total	**2,575**	**100.0**

Daily Fuel Use and Boat Type

Proportionately more boaters who owned sailboats with auxiliary motors (92 percent) or fishing boats (48 percent) reported they used less than 12 gallons of fuel in a typical day than owners of all other boat types. However, about another fifth of fishing boat owners (18 percent) said they used more than 30 gallons of fuel in a typical day, perhaps indicating two very different boat use patterns among fishing boat owners. Only about 12 percent of off-racer owners said they used less than 16 gallons daily compared to 31 percent of motor yacht owners, 42 percent of cabin cruisers, 56 percent of ski boat owners, and 64 percent of fishing boat owners. About 60 percent of motor yacht owners and over 80 percent of off-shore racer owners used more than 20 gallons in a typical day, while only 23 – 29 percent of personal watercraft, ski boat or fishing boat owners used that much fuel each day they were on the water. See Figure 37.

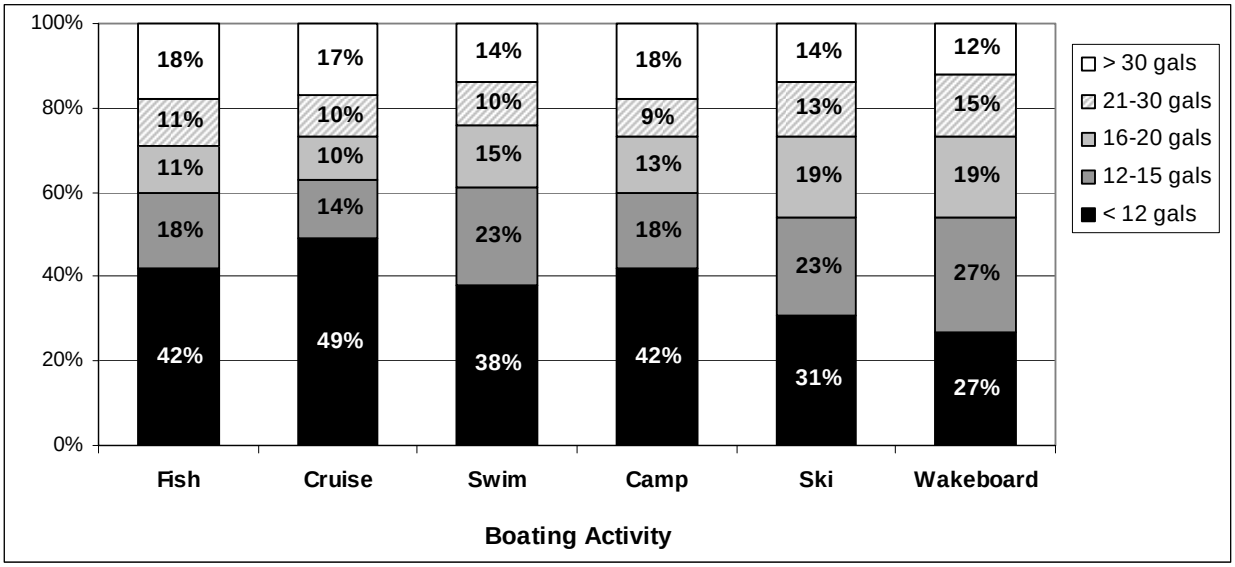
Figure 37. Daily Fuel Use in Gallons by Boat Type



Daily Fuel Use and Boating Activities

Not surprisingly, boaters' daily fuel use varied by the types of activities they tend to engage in on the water. Fewer boaters who used their boats to ski or wakeboard said they consumed less than 15 gallons in a typical day compared to boaters who did not engage in these activities. Boaters who fish, leisure cruise, swim or camp were also more likely to use less than 12 gallons a day compared to those who ski or wakeboard. However, those who fish, cruise or camp were also among those most likely to consume more than 30 gallons in a typical day on the water. See Figure 38.

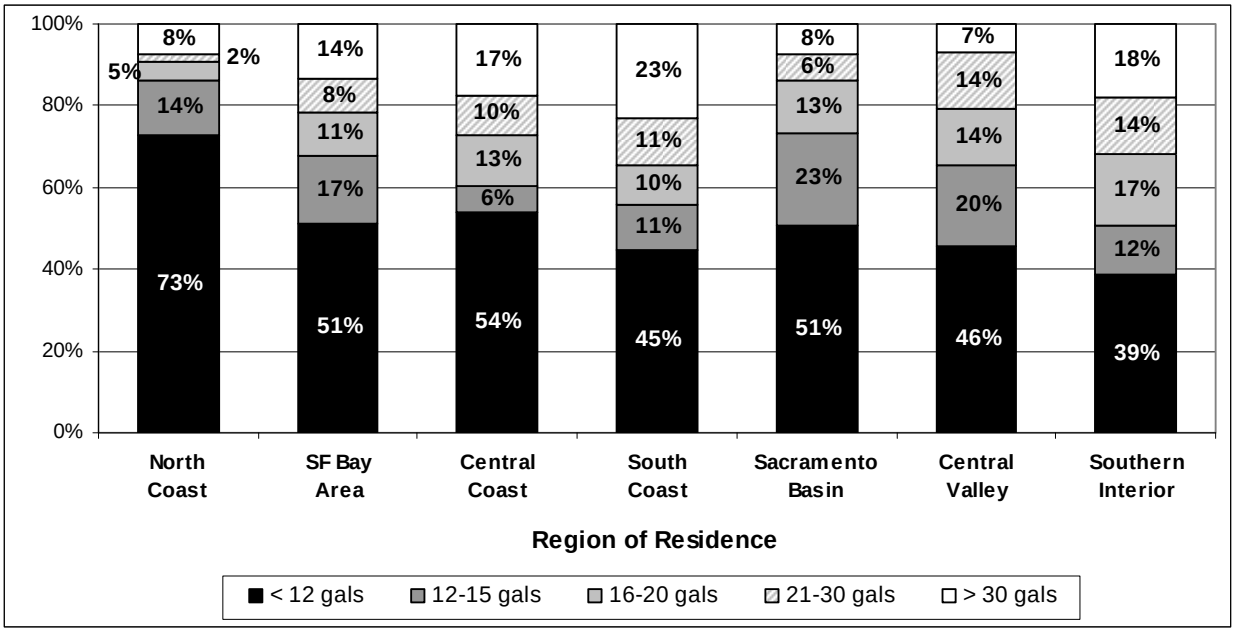
Figure 38. Daily Fuel Use in Gallons by Boating Activities



Daily Fuel Use and Region of Residence

Residents from the North Coast region reported using the least fuel and were much more likely than others to say they consumed less than 12 gallons of fuel in a typical day (73 percent versus 39 – 54 percent). About one-third of boaters from the South Coast (34 percent) or Southern Interior (32 percent) region said they used more than 20 gallons in a typical day, while 27 percent from the Central Coast, 22 percent from the San Francisco Bay Area, 21 percent from the Central Valley, and less than 15 percent from the other regions used this much fuel daily. South Coast region residents were also more likely than boaters from other areas to say they consumed more than 30 gallons in a typical day (23 percent versus 7 – 18 percent). See Figure 39.

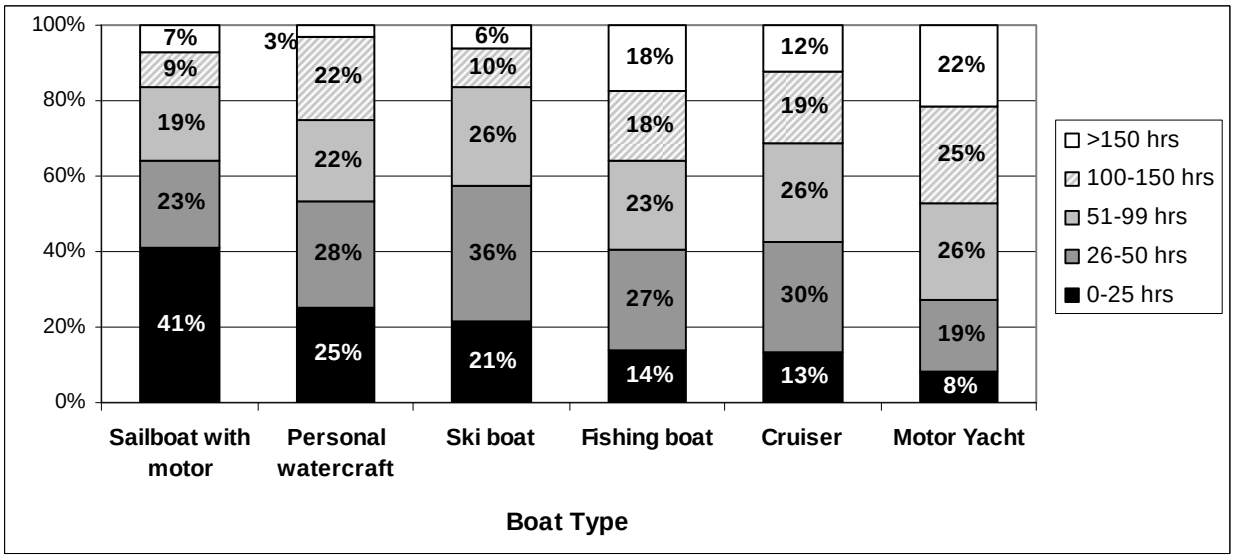
Figure 39. Daily Fuel Use in Gallons by Region



Annual Engine Hours and Boat Type

Boaters' estimates of their total annual engine hours varied by boat type, with sailboat owners more likely to say they put less than 26 hours on their engines than owners of all other boat types. Owners of fishing boats, cuddy cabin/cruisers, or motor yachts logged more than 150 hours per year in greater proportions than other boat owners, and nearly one quarter of motor yacht owners (22 percent) put more than 150 hours on their engine annually. A little over one-third of ski boat owners (36 percent) say they put between 26 – 50 hours on their engines per year, while only one-fifth of motor yacht owners (19 percent) made this estimate. About one-quarter of those who own personal watercrafts (22 percent), ski boats (26 percent), fishing boats (23 percent), cruisers (26 percent), or motor yachts (26 percent) estimated they logged between 51 – 99 hours on their engines each year. See Figure 40.

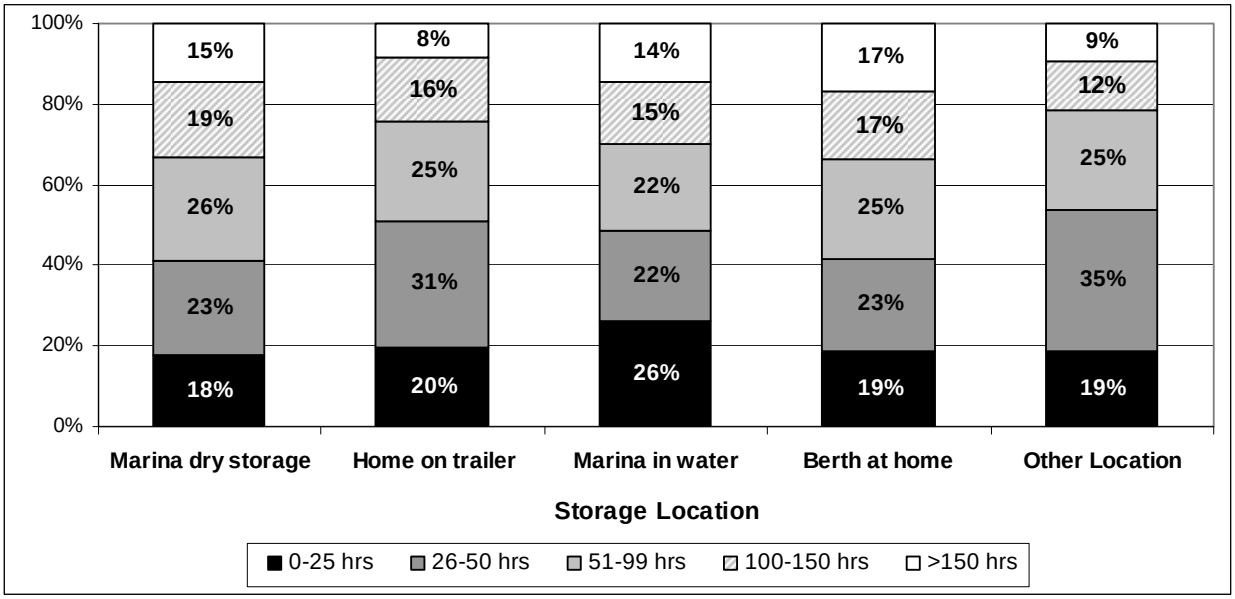
Figure 40. Annual Engine Hours and Boat Type



Annual Engine Hours and Boat Storage

Boaters who stored their boats at home on a trailer or in an "other" location were less likely than those who used a marina dry storage (15 percent), stored their boats at the marina in water (14 percent) or berthed them at home (17 percent) to put more than 150 hours on their engine per year. These boaters were also more likely than others to put between 26 – 50 hours on their boat engines in a year. However, those who stored their boats at a marina in water were also those most likely to put the fewest number of engine hours on their boats in a typical year. See Figure 41.

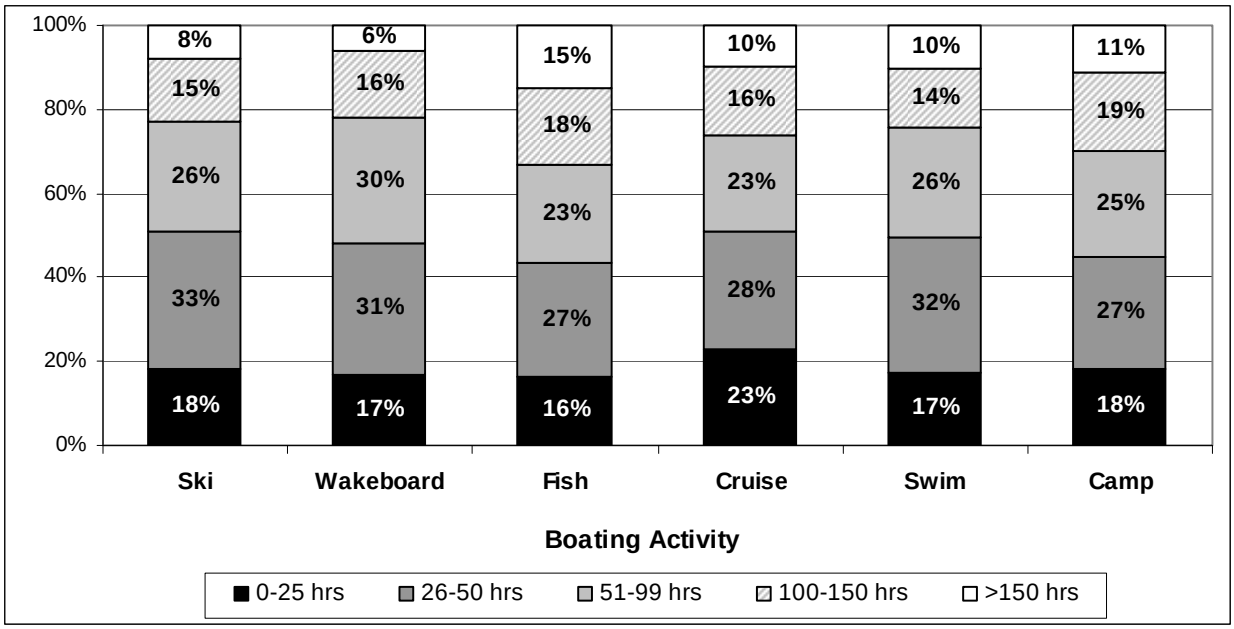
Figure 41. Annual Engine Hours and Boat Storage Location



Annual Engine Hours and Boating Activities

Number of engine hours boaters put on their boats varied by boating activities, with those who fish or camp more likely than others to say they put 100 or more hours on their engine in a year. A higher proportion of those who used their boats for leisure cruising (23 percent) said they put less than 26 hours on their engine annually compared to others activity groups (16 – 18 percent). About one-third of those who ski (33 percent), wakeboard (31 percent), or swim (32 percent) said they put between 26 – 50 hours on their boats. See Figure 42.

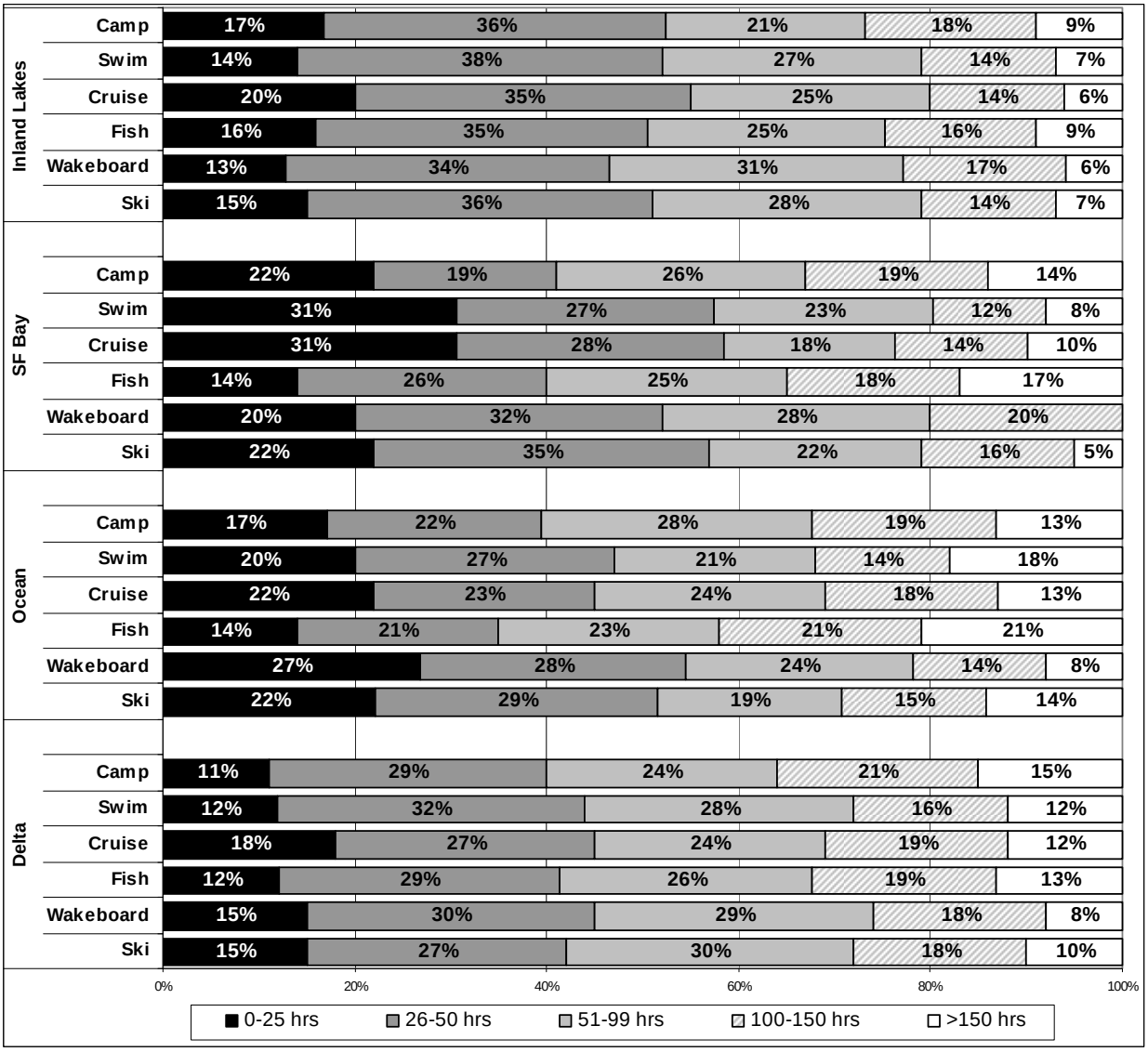
Figure 42. Annual Engine Hours and Boating Activities



Annual Engine Hours and Activities by Boat Use Location

Figure 43 presents the percentage of those who said they boat at least once per year in each location, use their boats for the boating activity, and estimate they log the given range of engine hours annually. These results may be used to describe overall patterns of use, such as major differences in engine use among those who leisure cruise and boat at least once a year on the San Francisco Bay. Within this sub-group, 31 percent put less than 26 hours on their engines annually, whereas only 18 percent of those who leisure cruise and boat at least once a year on the Sacramento-San Joaquin Delta logged less than 26 engine hours.

Figure 43. Annual Engine Hours and Boating Activities by Boat Use Location



Oil Changing Practices of Boaters

Where Usually Change Engine Oil

About 47 percent of boaters surveyed said they change their own oil, and of those, just over half (53 percent) reported they changed their oil at home, while two-fifths usually changed it at a marina (40 percent). See Table 20.

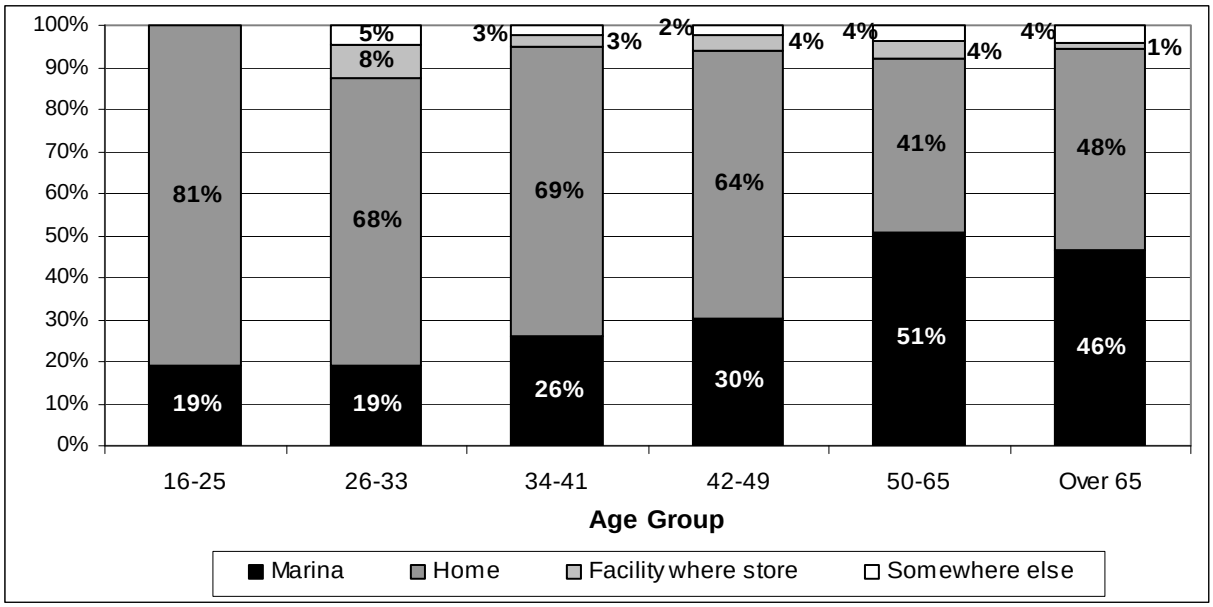
Table 20. Usual Location of Oil Change

	Count	Percent
At home	592	53.1
At marina	441	39.6
At facility where boat is stored	43	3.9
Somewhere else	39	3.5
Total	**1,115**	**100.0**

Where Usually Change Engine Oil and Boater Characteristics and Habits

The location where boaters usually changed their oil varied by age as boaters age 50 and older were less likely to change their engine oil at home and more likely to change it at a marina than boaters in other age groups. See Figure 44.

Figure 44. Where Change Engine Oil by Respondent Age



Boaters who put over 150 hours on their engines each year were more likely than others to change their engine oil at a marina, while those who put 26 – 99 hours on their engines were more likely than others to change their oil at home. See Figure 45. Boaters who owned boats 25 feet in length or shorter were far more likely than others to change their oil at home, while those who owned boats more than 25 feet in length were much more likely than others to change their oil at a marina. See Figure 46.

Figure 45. Where Change Engine Oil by Annual Engine Hours

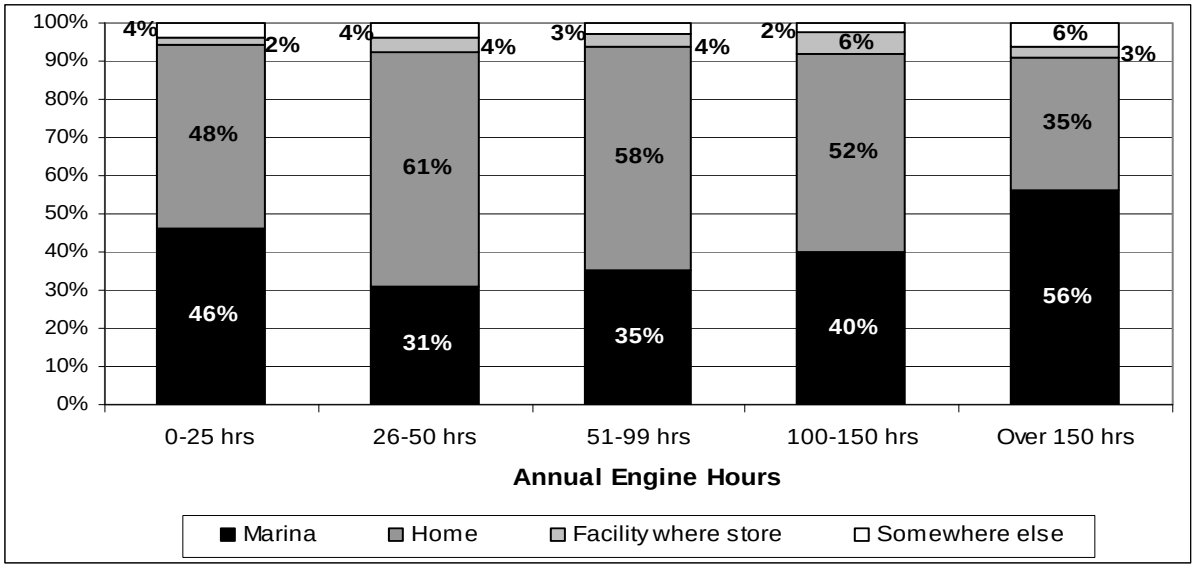
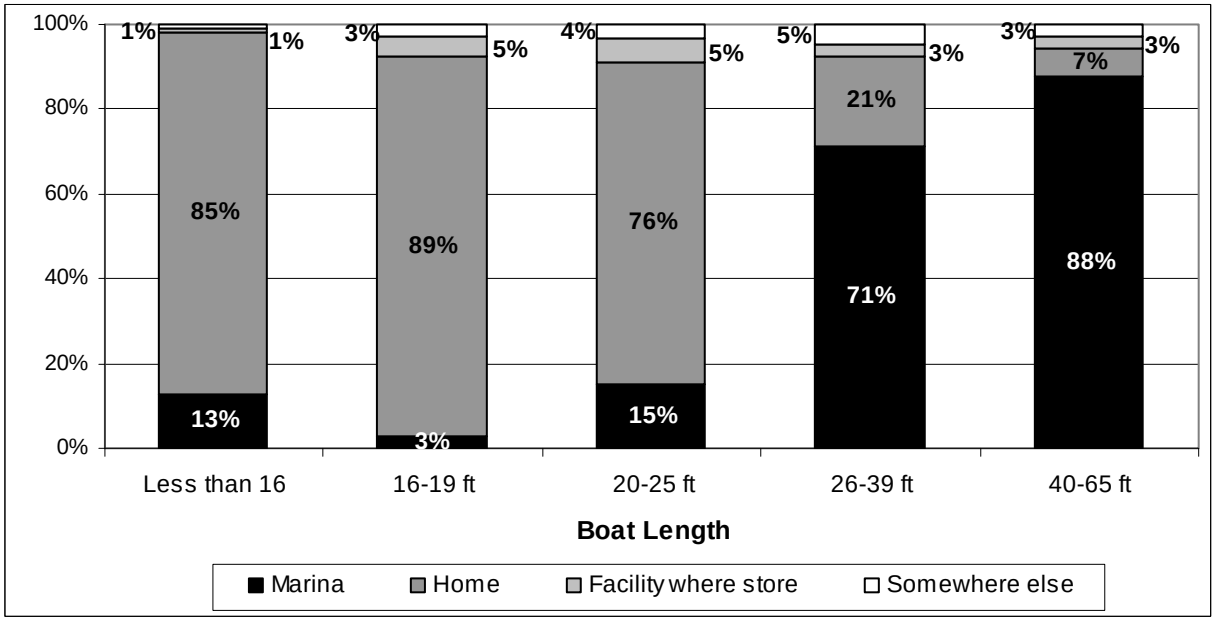


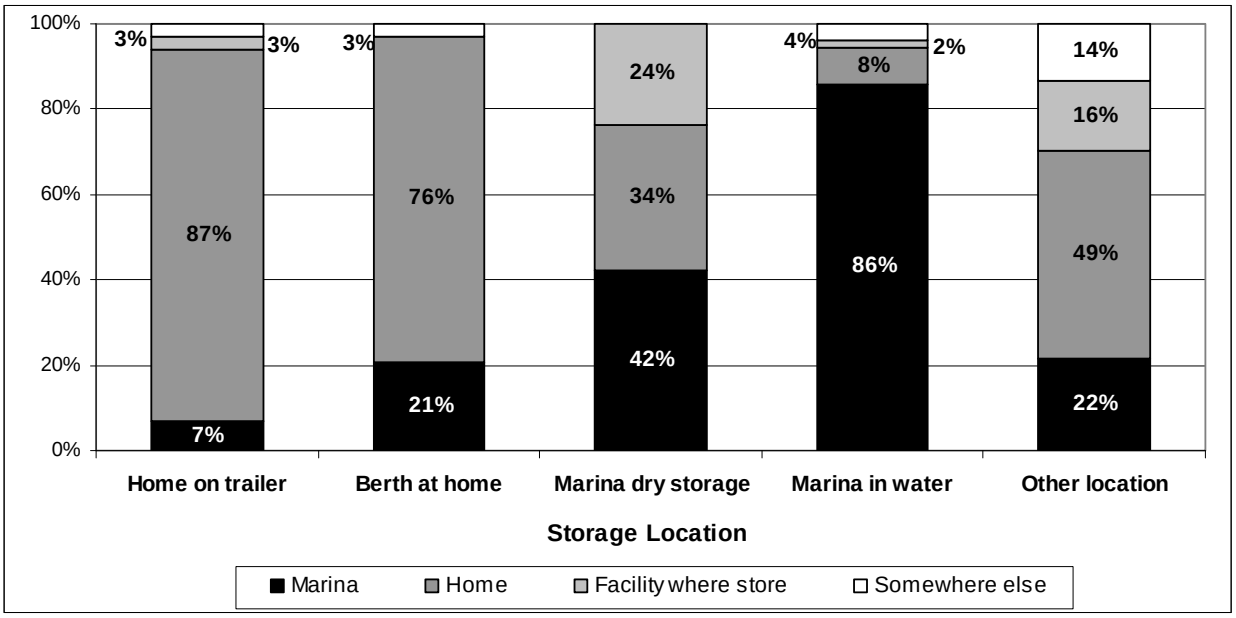
Figure 46. Where Change Engine Oil by Boat Length



Those who changed their oil at marinas were much more likely to own motor yachts or sailboats with auxiliary motors while those who changed their oil at home were more likely to be ski boat or fishing boat owners. Those who stored their boats at a marina in water were much more likely to change their oil at the marina and those who trailered their boats at home were much more likely to change it at home. However, among those who used marina dry storage and changed their own oil, 42 percent did it at the marina while 34 percent changed it at home. See Figure 47. Compared to those who changed the oil elsewhere, those who changed it at marinas were much less likely to use their boats to ski, wakeboard, or fish and much more likely to use their boats to leisure cruise. Those who changed the oil

at a non-marina facility where they stored their boats were less likely to camp than those who changed it in other locations.

Figure 47. Where Change Engine Oil by Boat Storage Location



Where boaters usually changed their own oil varied by typical launch location as well. Among those who changed their own oil and tended to use public launch facilities, nearly all (93 percent) changed their oil at home, compared to only 67 percent of those who tended to launch at marinas. Usual oil change location also varied based on region with Central Valley (94 percent) and Sacramento Basin (82 percent) residents much more likely than boaters from other areas (38 – 58 percent) to change their oil at home.

Characteristics and Habits of Boaters Who Change Their Own Engine Oil

Among this sample, tendency to change one's own oil did not vary by age; however, a higher proportion of those who changed their own oil had more than 5 years of boating experience (77 percent) compared to those who did not change their own oil (67 percent). Also among this sample, number of engine hours was unrelated to whether or not boaters change their own oil.

Boat length appeared to have no bearing on boater's tendency to change their own oil, although boat type does. Owners of sailboats with auxiliary motors changed their own oil in higher proportions than all other boat type owners (58 percent versus 37 of motor yacht owners, 46 percent of ski boat owners, or 49 percent of fishing boat owners). Those who owned fishing boats were more likely to change their own oil, and those who owned motor yachts were less likely. Boaters who changed their oil stored their boats at home on a trailer in higher proportions than those who did not change their own oil (52 percent versus 45 percent). Those who changed their oil were less likely to use their boats to ski, wakeboard, or swim and were more likely to use their boats to fish or camp.

Although boaters who changed their own oil were not more likely to say they clean oil that has leaked into the bilge, they did have somewhat different oil disposal practices than those who did not change their own oil. Those who changed their own oil were about twice as likely to use rags or paper towels,

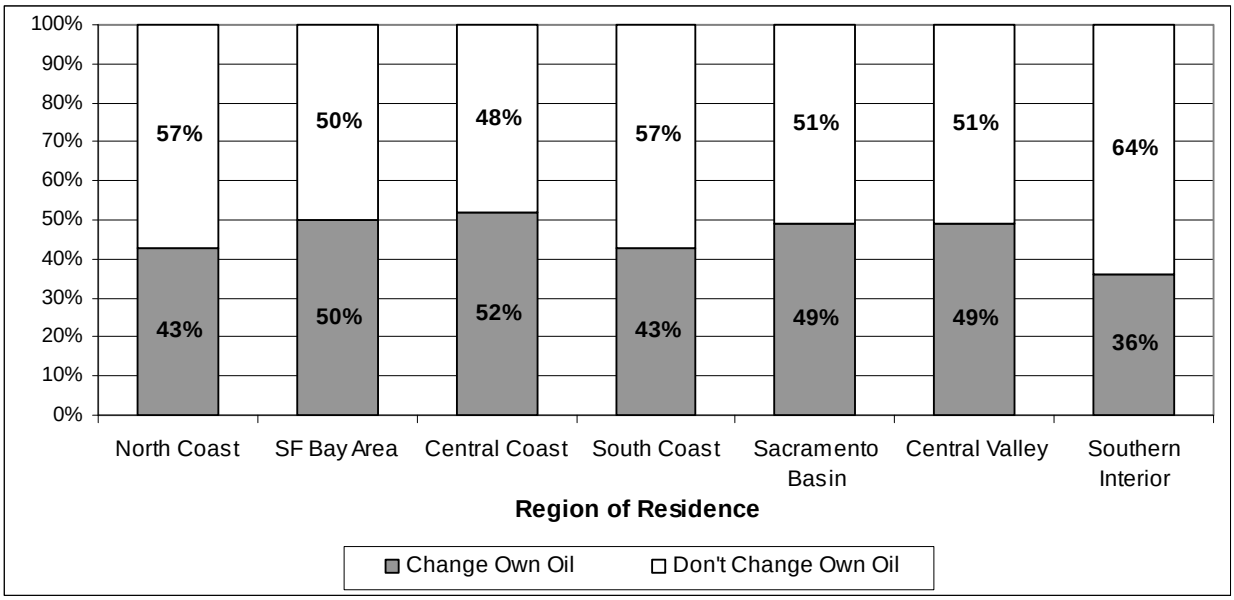
soap or detergent, and oil absorbents to clean leaked oil as those who didn't change their own oil, and they were also more likely to use bilge cleaning products. Their oil absorbent disposal practices, however, were not different than others.

Boaters who read Latitude 38 or got boating information from the California Delta Scuttlebutt website tended to change their own oil more than those who did not use these resources, but those who did and did not change their own oil showed no other major differences in their preferred boating information sources. Boaters who changed their own oil did not tend to rank their boating concerns any differently than those who did not change their own oil. Correct identification of the oil recycling service logo was significantly higher among those who changed their own oil (24 percent) versus those who did not (18 percent), and identification of the sewage pumpout service logo was higher among those who changed their own oil (33 percent) versus those who did not (26 percent).

Boaters Who Change Their Own Engine Oil and Region of Residence

Boaters from the North Coast, South Coast and Southern Interior regions were less likely than boaters from other areas to change their own oil. Boaters from other regions were just as likely to change their own oil as they were to have it done by others. See Figure 48.

Figure 48. Boaters Who Change Their Own Oil by Region of Residence



Usual Method of Used Oil Disposal

Boaters who changed their own oil most often reported taking their used oil to an auto shop, gas station or certified drop-off center (47 percent), dropping it off at a marina (30 percent), taking it to a household hazardous waste disposal center (8 percent), or taking it to a dump or landfill (5 percent). About 4 percent left it curbside for home pick-up, and the remaining 5 percent said they either stored used oil at home, put it in the trash or disposed of it some other way. See Table 21.

Table 21. Oil Disposal Method Most Often Used

	Count	Percent
Take to auto shop, gas station or certified drop-off center	528	47.4
Drop off at marina	336	30.2
Take to Household Hazardous Waste center	93	8.4
Take to dump or landfill	58	5.2
Leave it on curb for home pick-up	44	4.0
Store at home	25	2.2
Put in the garbage	15	1.4
Other	15	1.4
Total	**1,114**	**100.0**

Boater Characteristics and Habits and Usual Method of Used Oil Disposal

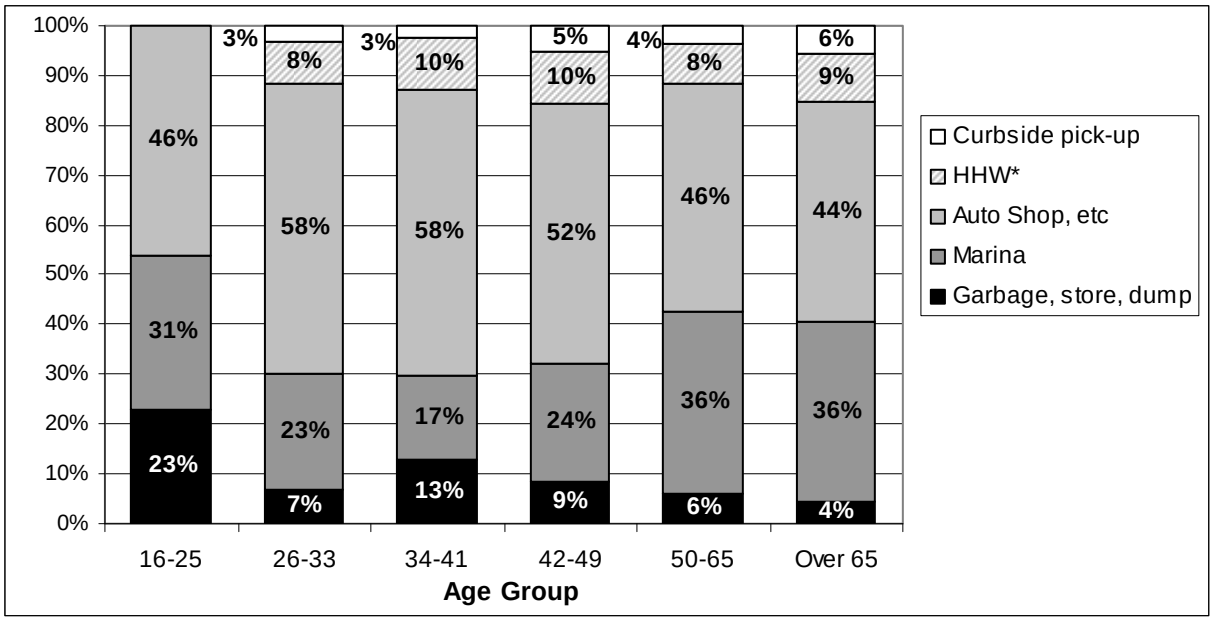
Disposal method most often used did not vary by boating experience, but those who owned boats less than 20 feet in length were more likely than owners of longer boats to take used oil to the dump, and those who owned boats 26 feet or longer were much more likely than owners of smaller boats to use a marina drop-off center. Owners of boats less than 26 feet long were the most likely to take used oil to a certified recycling center such as an auto shop.

Ski boat owners were more likely than others to take used oil to an auto shop or similar certified center, drop it at a household hazardous waste center, or leave it for curbside pick up, while fishing boat owners were more likely than others to put used oil in the trash, take it to a dump, take it to an auto shop, or leave it for curbside pick up. Motor yacht owners and those who owned sailboats with auxiliary motors were more likely than others to drop used oil at a marina and less likely to take it to an auto shop or leave it for curbside pick up. Owners of sailboats with auxiliary motors were also among those least likely to throw used oil in the trash, store it at home, or take it to a dump. Boaters who correctly identified either environmental service logo were among those least likely to dispose of their used oil improperly and most likely to drop it at a marina or a certified oil recycling center such as an auto shop.

Usual Method of Used Oil Disposal and Boater Age

Disposal habits varied by boater age with 26 – 49 year olds somewhat more likely to use certified recycling centers such as auto shops and gas stations than boaters other ages. About one-third of boaters age 50 and over (36 percent) dropped used oil at marinas as compared to only 17 – 24 percent of boaters age 26 – 49. Boaters age 16 – 25 were more likely than all others to say they tossed their used oil in the trash, stored it at home, or took it to the dump. Almost one quarter (23 percent) of these young boaters said they used one of these improper disposal methods. See Figure 49.

Figure 49. Usual Method of Used Oil Disposal by Boater Age

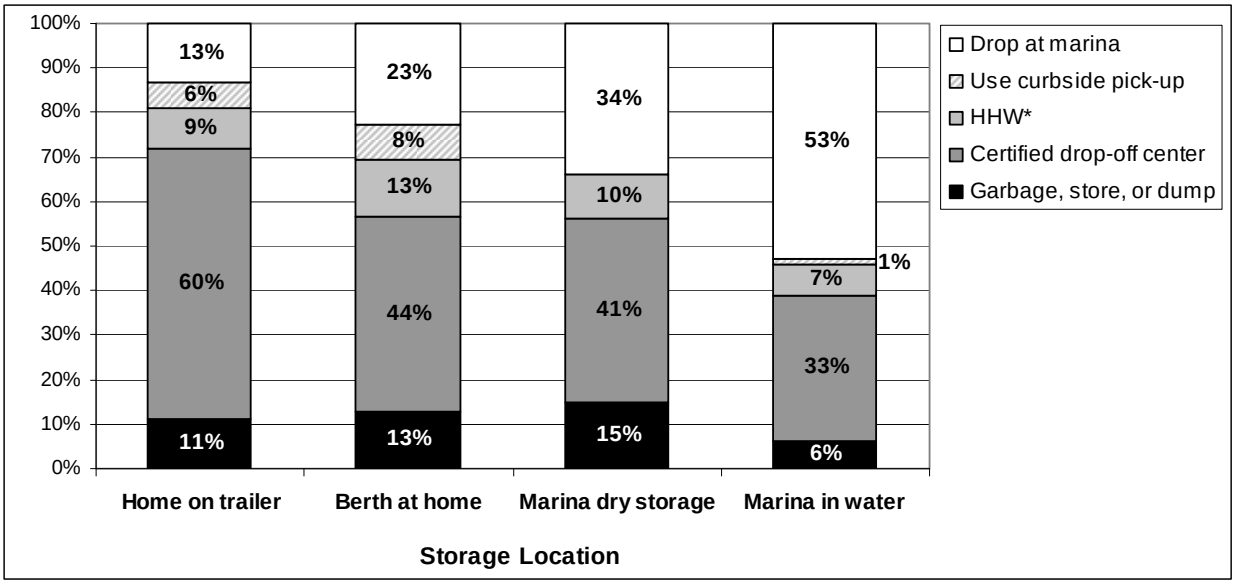


*HHW = Household Hazardous Waste Center

Usual Method of Used Oil Disposal and Boat Storage Location

About 60 percent of boaters who stored their boats at home on a trailer took their used oil to a certified recycling center such as a gas station or auto shop, in contrast to only 33 – 44 percent of those who stored their boats in other locations. Just over half (53 percent) of those who stored their boats in water at the marina dropped their used oil at the marina, versus only 13 percent of those who stored their boats at home on a trailer and 23 percent of those who berthed their boats at home. Those who used marina dry storage were more likely than others to say they disposed of used oil improperly, although 13 percent of those who berthed their boats at home and 11 percent of those who trailered their boats at home also used improper methods. See Figure 50.

Figure 50. Usual Method of Used Oil Disposal by Boat Storage Location

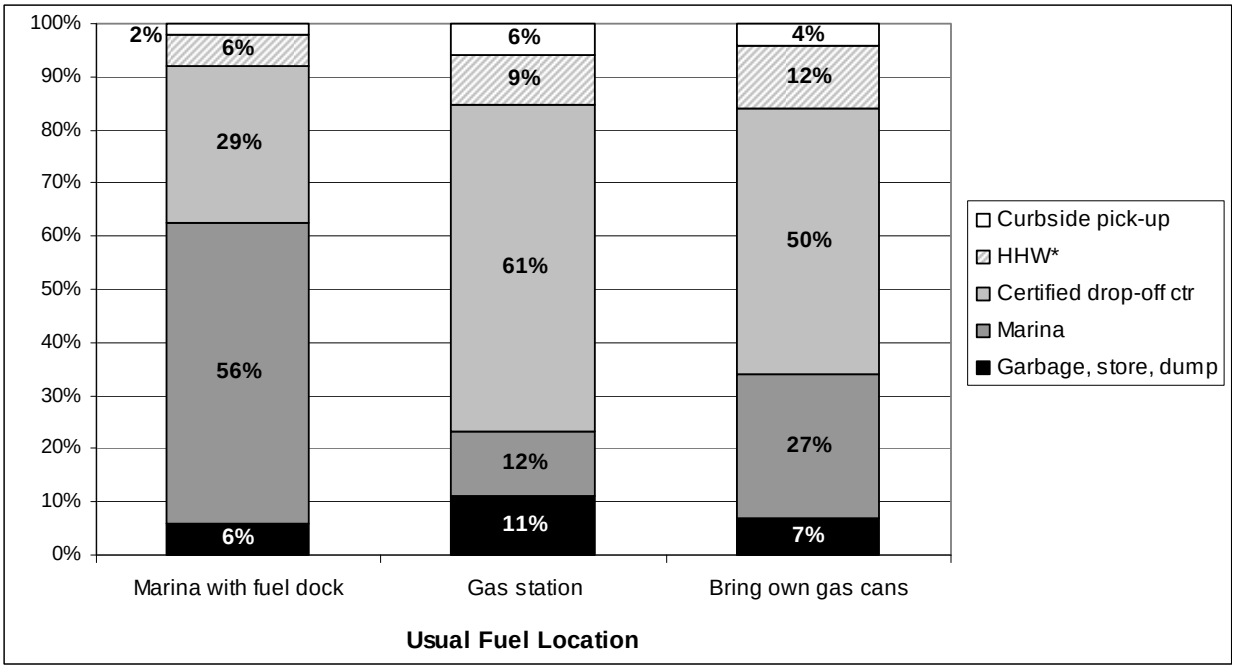


*HHW = Household Hazardous Waste Center

Usual Method of Used Oil Disposal and Usual Fuel Location

Boaters who usually fueled their boats at gas stations prior to launch were somewhat more likely than those who fueled other ways to put used oil in the trash, store it at home, or take it to a dump or landfill. However, about 60 percent of those who fueled their boats at gas stations said they took used oil to a certified drop-off center, such as a gas station. Those who fueled their boats at marina fuel docks were at least twice as likely as those who used other fueling methods to take their used oil to marina drop-off sites and less likely to go to the dump, use certified drop-off centers, use household hazardous waste facilities, or leave used oil for curbside pick up. See Figure 51.

Figure 51. Usual Method of Used Oil Disposal by Usual Fuel Location

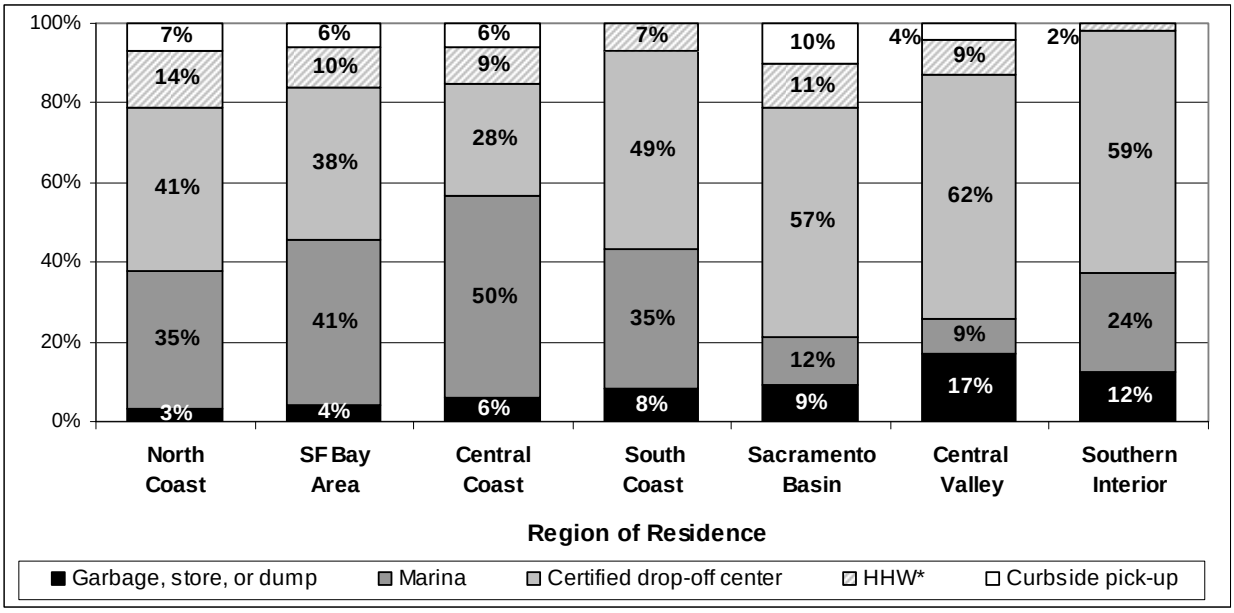


*HHW = Household Hazardous Waste Center

Usual Method of Used Oil Disposal and Region of Residence

About half (50 percent) of boaters surveyed from the Central Coast region dropped their used oil off at a marina, in contrast to only 9 percent of those from the Central Valley, 12 percent of those from the Sacramento Basin region, or 24 percent from the Southern Interior region. Large proportions of boaters from the Central Valley (62 percent), the Southern Interior region (59 percent), the Sacramento Basin (57 percent), and the South Coast region (49 percent) said they took used oil to certified drop-off centers such as auto shops. Sacramento Basin residents reported the highest usage of curbside pick-up (10 percent), while South Coast and Southern Interior residents reported no curbside pick-up. Central Valley (17 percent) and Southern Interior (12 percent) residents appeared to dispose of used oil in the trash, store it at home, or take it to the dump in greater proportions than boaters from other regions. See Figure 52.

Figure 52. Usual Method of Used Oil Disposal by Region of Residence



*HHW = Household Hazardous Waste Center

Distance to Oil Disposal Site

About 82 percent of those who changed their own engine oil must travel some distance to their usual oil disposal site. About one-quarter of boaters (25 percent) reported the distance they traveled is less than a mile. A little over a quarter (28 percent) said the distance was between 1 and 3 miles. Almost 30 percent must travel more than 3 miles to their usual oil disposal site. See Table 22.

Table 22. Distance to Oil Disposal Site

	Count	Percent
Dispose of oil where change oil	202	18.4
Less than 1 mile	272	24.8
1 – 3 miles	310	28.2
4 – 5 miles	140	12.7
More than 5 miles	175	15.9
Total	**1,099**	**100.0**

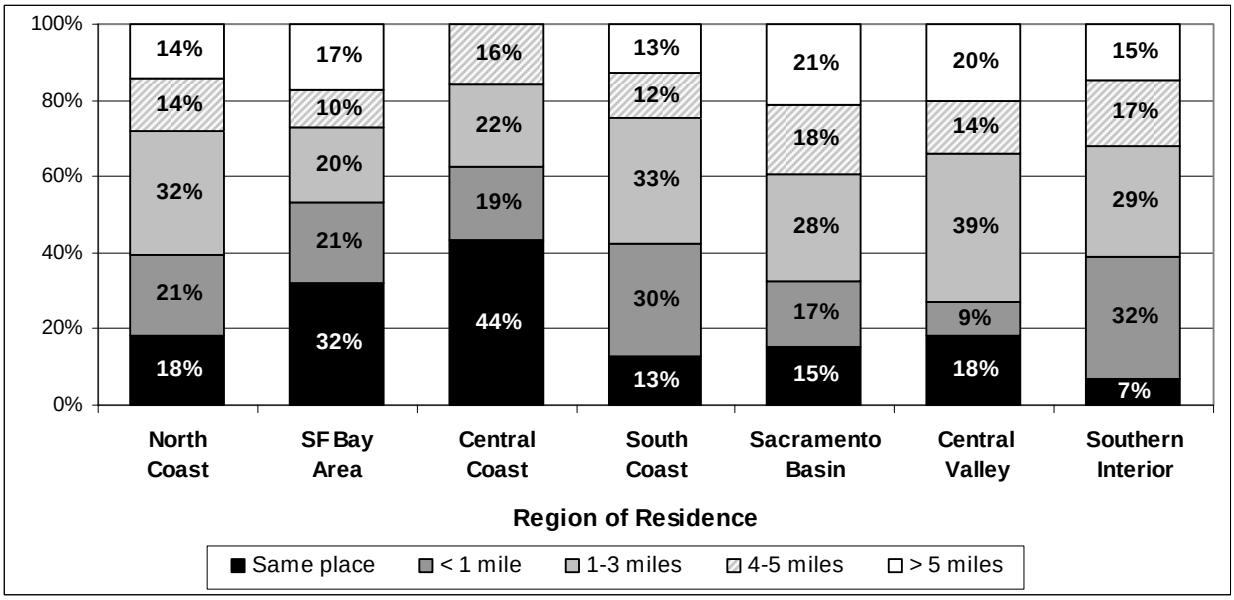
Boater Characteristics and Habits and Distance to Oil Disposal Site

Distance to usual oil disposal site was unrelated to boating experience or annual engine hours. In general, owners of shorter boats appeared to be more likely than owners of longer boats to have to travel to a disposal site, and motor boat owners were more likely than others to travel less than 1 mile. Owners of sailboats with auxiliary motors were much more likely than owners of other boat types to dispose of their used oil at the same location where they change their oil and less likely to have to travel more than 1 mile. Distance to usual oil disposal site varied by launch location with yacht club launchers most likely to change and dispose of their oil in the same place, marina launchers among those least likely to travel 4 – 5 miles, and public ramp launchers less likely to travel less than 1 mile.

Distance to usual oil disposal site varied by region of residence. About 44 percent of boaters from the Central Coast said they disposed of their used oil in the same place they changed it compared to 18

percent overall, and 30 – 32 percent of those from the South Coast or Southern Interior said they traveled less than 1 mile compared to 9 – 21 percent from other areas. Sacramento Basin residents reported traveling more than 3 miles in greater proportion than boaters from all other areas. See Figure 53.

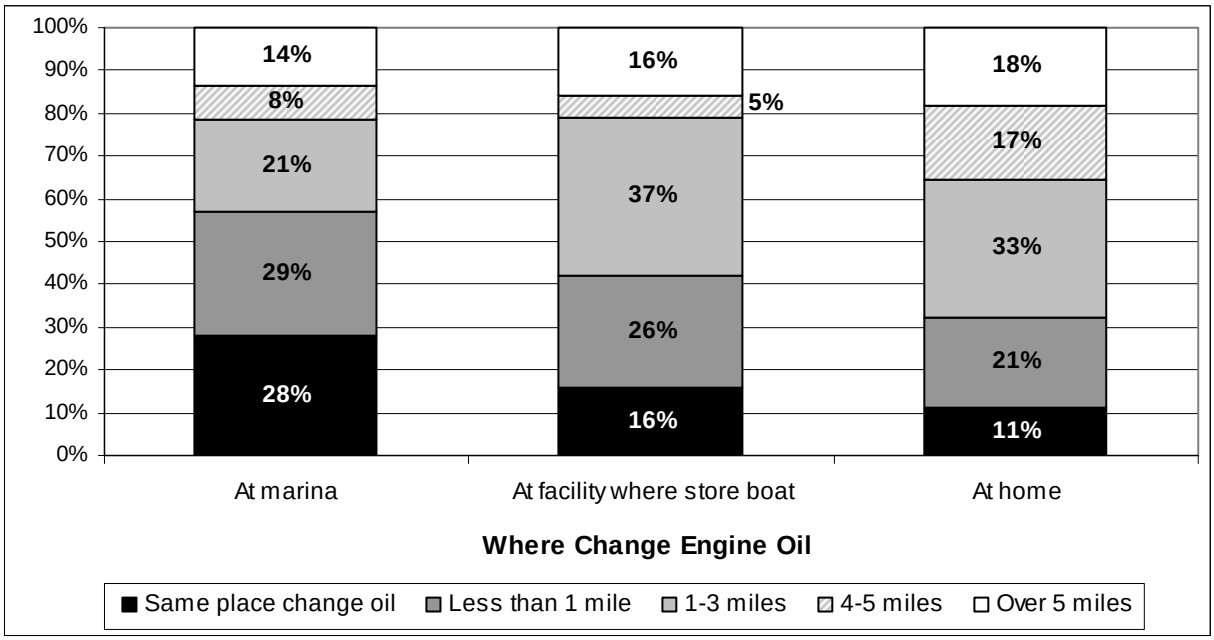
Figure 53. Distance to Used Oil Disposal Site by Region of Residence



Distance to Oil Disposal Site and Where Usually Change Engine Oil

Those who changed their oil at marinas were more likely than others to say they disposed of their used oil at the same place they changed the oil. Those who changed their oil at home were much more likely than others to travel from 4 – 5 miles to dispose of their oil. See Figure 54.

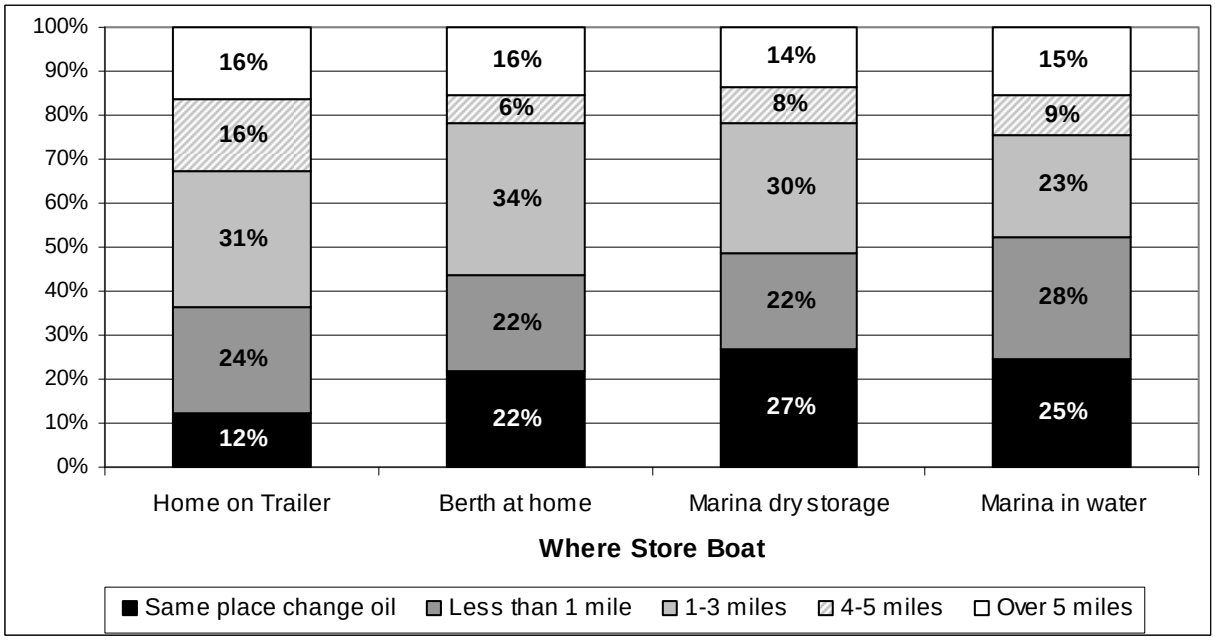
Figure 54. Distance to Oil Disposal Site by Where Change Engine Oil



Distance to Oil Disposal Site and Boat Storage Location

Those who stored their boats at a marina dry storage, at a marina in water or berthed them at home were more likely than those who trailered them at home to dispose of their used oil in the same place they change the oil. Those who trailered their boats at home were more likely than others to travel 4 – 5 miles to dispose of oil, and those who stored their boats at a marina in water were less likely than others to travel 1 – 3 miles to dispose of their used oil. See Figure 55.

Figure 55. Distance to Oil Disposal Site by Boat Storage Location



Frequency of Oil Leaks into Bilge

About 58 percent of boaters said oil leaks into the bottom of their bilge or engine compartment every time they used their boat, and another 38 percent said this happened most of the time they used their boat. Only 1 percent said this happened rarely and 1 percent said they never experienced oil leaks. See Table 23.

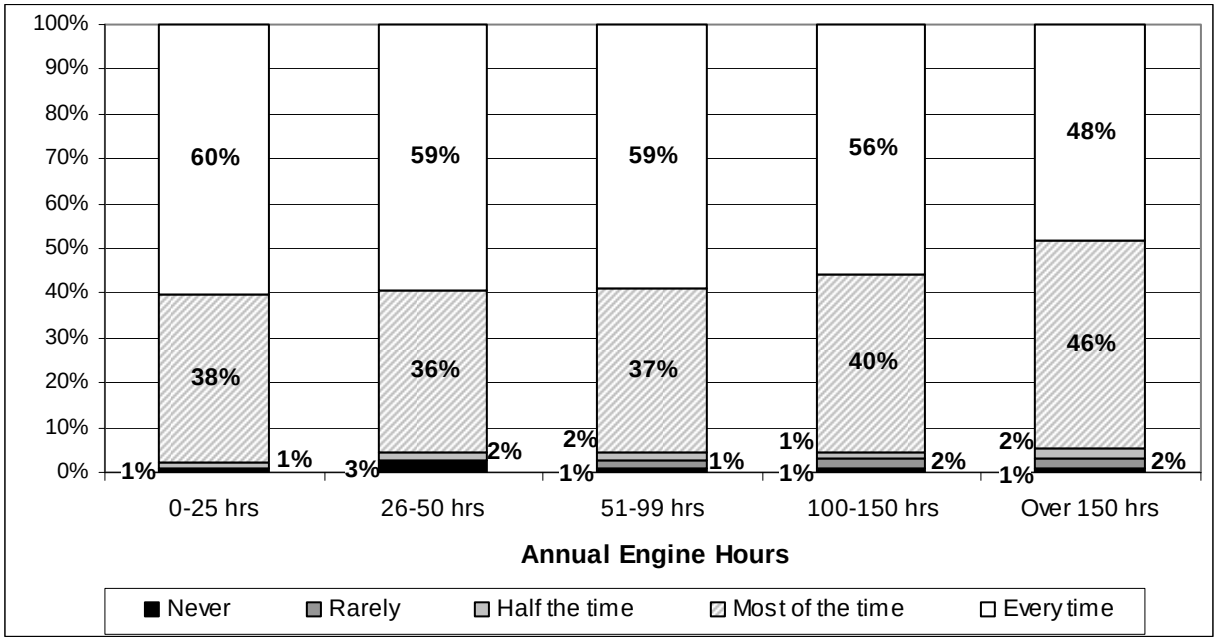
Table 23. Frequency of Oil Leaks into Bilge

	Count	Percent
Never	33	1.4
Rarely	25	1.1
Half of the time	41	1.8
Most of the time	896	38.3
Every time use the boat	1,347	57.5
Total	**2,342**	**100.0**

Frequency of Oil Leaks and Annual Engine Hours

Frequency of oil leaks varied by the number of hours boaters put on their engine. See Figure 56.

Figure 56. Frequency of Oil Leaks by Annual Engine Hours



Oil Leak Cleaning Methods

Of boaters who reported having oil leaks and how they cleaned them, 98 percent said they attempted to clean the oil, 51 percent used oil absorbents, 35 percent used rags or paper towels, 20 percent used bilge cleaning products or solvents, and 12 percent used soaps or detergents to clean leaked oil. Less than 2 percent said they pulled the bailer plug to discharge it. See Table 24. Among the "other" methods reported, "someone else does it" appeared most often.

Table 24. Oil Leak Cleaning Methods Used

	Count	Percent
Oil absorbents	442	51.2
Rags or paper towels	302	35.0
Bilge cleaning products or solvents	171	19.8
Soaps or detergents	101	11.7
Extract oil with bilge pump	31	3.6
Pull the bailer plug	10	1.2
Other	30	3.5
Do not clean leaked oil	65	2.4
Total	**864**	

Oil Leak Cleaning Methods and Boater Characteristics and Habits

Methods used to clean oil that has leaked into the bilge varied by boater age. Boaters less than 26 years of age were among those most likely to say they did not bother to clean leaked oil, and when they did clean it, they were among those most likely to use rags or paper towels. Boaters over age 65 used bilge cleaning products in higher proportions than younger boaters, and boaters age 26 – 33 used oil absorbents in higher proportions than boaters in other age groups. Methods used to clean oil also varied somewhat by boating activity as those who used their boats to ski or swim appeared to be less likely to use bilge cleaning products or oil absorbents, while those who leisure cruised appeared to be more likely to use these methods. Those who skied or fished were more likely to use rags or paper towels than others, and those who wakeboarded were less likely to use oil absorbents.

Boaters who have received boater kits in the past were more likely to use oil absorbents to clean oil leaks than those who have never received a kit (26 percent versus 16 percent). Boaters who correctly identified the oil recycling logo used oil absorbents more often than those who could not correctly identify this logo, and those who correctly identified the sewage pumpout logo were more likely than those who did not to say they clean any oil that has leaked, use bilge cleaning products, or use oil absorbents.

Oil Absorbents Disposal Methods

Of boaters who used oil absorbents, towels, pads or socks to clean oil leaks, just less than half (46 percent) said they took their used absorbents to an oil waste receptacle at a marina, but almost another third (30 percent) said they put them in the trash. About 23 percent of boaters who used absorbents took them to some other hazardous waste facility. See Table 25.

Table 25. Oil Absorbent Disposal Methods

Oil Absorbent Disposal Method	Count	Percent
Take to oil waste receptacle at marina	390	45.6
Place in trash	253	29.6
Take to other hazardous waste facility	193	22.6
Other	19	2.2
Total	**855**	**100**

Oil Absorbents Disposal Methods by Boater Characteristics and Habits

Those who said they put their used oil absorbents in the trash were among those least likely to take their used oil to a marina, while those who took them to an oil waste receptacle at a marina were much more likely to drop their used oil at a marina and less likely to take it to an auto shop or hazardous waste facility. Those who took their oil absorbents to a hazardous waste facility were more likely to take used oil to an auto shop or a household hazardous waste facility.

Skiers, wakeboarders, and swimmers said they were more likely to throw oil absorbents in the trash. Skiers were less likely, while wakeboarders and swimmers were more likely, to take them to a hazardous waste facility. Wakeboarders and swimmers also said they were less likely to use oil waste receptacles at marinas. Those who disposed of oil absorbents in special oil waste receptacles at marinas were among those most likely to dispose of their used oil in the same location where they changed their oil or to travel less than 1 mile to dispose of their used oil. Those who took used oil absorbents to hazardous waste facilities were much more likely to travel 1 or more miles to dispose of their used oil.

Method of oil absorbent disposal appeared to be unrelated to whether or not a boater had received a boater kit prior to participation nor by a boater's region of residence.

Awareness of Water Pollution Prevention among Boaters

Characteristics of Statewide Boaters Who Have Received Boater Kits
About 8 percent of respondents in 2007 – 2008 said they had received a boater kit before participating in the survey. Those with more boating experience were more likely to have received a kit prior to participation. Only 2 percent of those who had received a kit had less than 6 months of boating experience, while 86 percent had more than 5 years of experience. Older boaters were also more likely to have received a kit than younger boaters.

Boaters who berthed their boats at home were much more likely to have received a kit than boaters who stored their boats in other locations. Those who usually launched at yacht clubs were more likely to have received a kit than those who usually launched at any other location. Those who brought their own gas cans or who fueled their boats at marinas were more likely to have received a kit in the past than those who stopped at gas stations prior to launch. Boaters with installed toilets were more likely to have received a kit, but those who changed their own oil were just as likely to have received a kit as those who did not.

Those who had received kits before were more likely to be cuddy cabin/cruiser, motor yacht or off-shore racer owners and less likely to be ski boat owners. Skiers, wakeboarders, and swimmers had received kits less often than those who do not engage in these activities. Boaters who boated at least once a year on the Delta or the San Francisco Bay were more likely to have received kits before. Environmental service logo identification did not appear to be enhanced by having received a prior boater kit.

Boating Information Sources
About half of boaters surveyed said they got their boating information from marinas (55 percent) and/or boat shows (50 percent), and about 43 percent got information from marine supply stores. A little over a third of boaters got information via word-of-mouth (37 percent), 24 percent read Boat U.S. Magazine, one-fifth (20 percent) reported using safety classes, and one-fifth used boating associations (20 percent) for boating information. About 10 percent provided "other" sources including the Internet, the United States Coast Guard, a variety of publications, and yacht clubs. See Table 26.

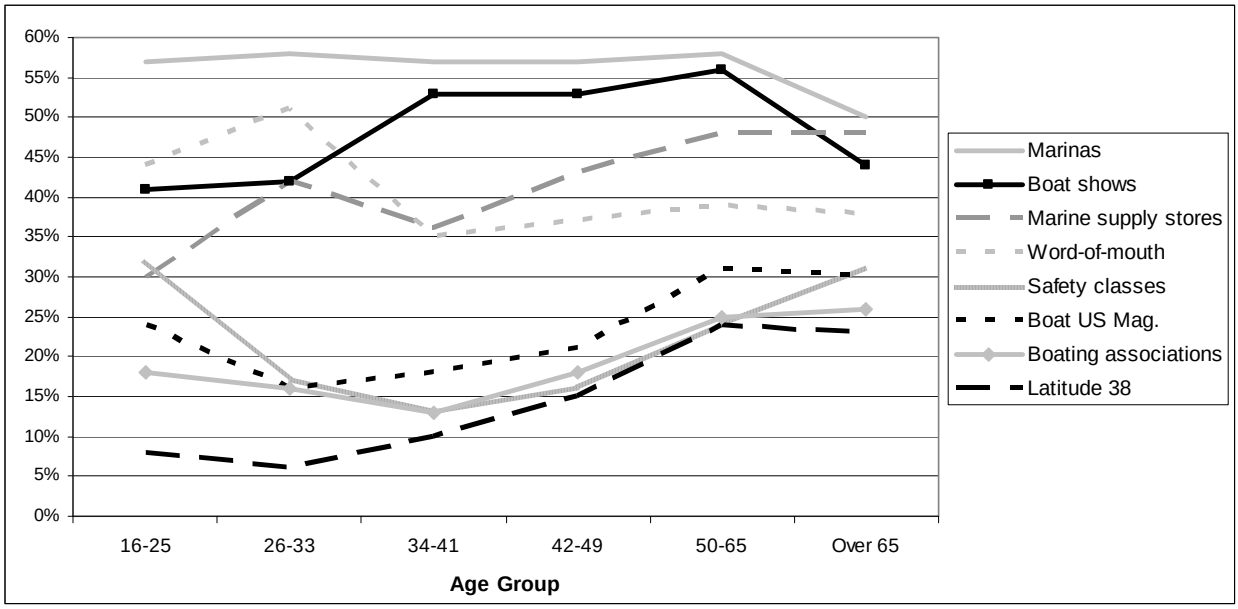
Table 26. Where Boaters Get Boating Information

Information Source	Count	Percent
Marinas	1,457	54.7
Boat shows	1,339	50.3
Marine supply stores	1,137	42.7
Word-of-mouth	981	36.9
Boat U.S. Magazine	642	24.1
Safety classes	544	20.4
Boating associations	542	20.4
Latitude 38	468	17.6
Bay and Delta Yachtsman	117	4.4
PICYA Yachting Handbook	78	2.9
All Other Sources	275	10.3

Boating Information Sources, Age and Boating Experience

The types of boating information sources used by boaters varied by age, with use of marinas and word-of-mouth declining somewhat as boaters age, while use of marine supply stores, Boat US Magazine, boating associations, and Latitude 38 increasing with age. Use of boat shows as an information source increased with age until age 65, when it declined sharply. The youngest and oldest boaters in this sample used safety classes at equal rates, but used of safety classes was comparatively low among boaters age 26 to 50. More experienced boaters were more likely to rely on information from boat shows, boating associations, Latitude 38, and Boat US Magazine. See Figure 57.

Figure 57. Where Boaters Get Boating Information by Age Group



Boating Information Sources and Region of Residence

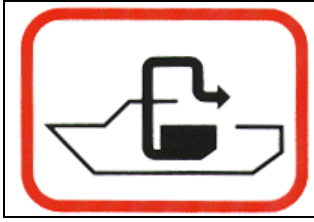
Information sources used varied by region. Boaters from coastal regions from the San Francisco Bay Area and South Coast used marinas more often than those from the North Coast or inland regions. More boaters from the inland areas of the Southern Interior (61 percent), Central Valley (60 percent), and Sacramento Basin (58 percent) used boat shows than those from the four coastal regions (30 – 52 percent). South Coast residents said they used marine supply stores (53 percent) more than boaters from all other areas (35 – 45 percent). North Coast residents said they used word-of-mouth (60 percent) more than boaters from all other areas (30 – 43 percent). Southern region boaters (27 – 29 percent) relied on boating associations more than boaters from other areas (9 – 22 percent). North Coast (35 percent) and Southern Interior (30 percent) residents used safety classes more than boaters from other areas (8 – 24 percent). San Francisco Bay residents got their information from the Bay and Delta Yachtsman and Latitude 38 magazines more often than others, while San Francisco Bay, Central Coast, South Coast, and Southern Interior residents tended to read Boat U.S. Magazine more than others.

Identification of Environmental Service Logos

Boaters were asked whether they could identify two environmental service logos – "Certified Used Oil Collection Center" and "National Sewage Pumpout." As shown below in Table 27, about one-fifth (20 percent) of all boaters knew what the oil logo means, while 29 percent could say what the sewage logo

means. Correct identification of either environmental logo did not appear to be enhanced by increased boating experience among this sample.

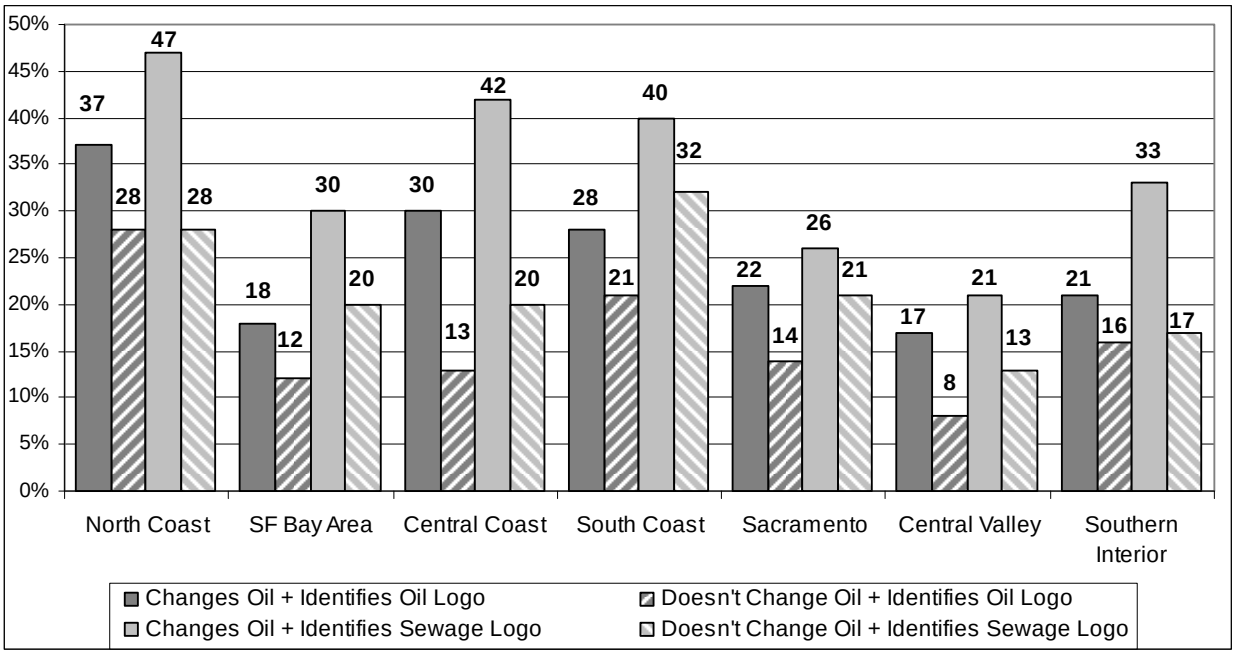
Table 27. Identification of Environmental Service Logos

Logo		Count	Percent
	Correctly Identified	536	20.1
	Did Not Recognize	2,216	79.9
	Correctly Identified	775	29.1
	Did Not Recognize	1,887	70.9

Identification of Environmental Service Logos and Region of Residence

Correct identification of both environmental logos varied significantly by region of residence with overall correct identification of both logos highest among boaters from the North, South, or Central Coast regions and lowest in the Central Valley region. When comparing those who did and did not change their own oil, regional differences in boaters' ability to correctly identify both environmental logos becomes even more pronounced. See Figure 58.

Figure 58. Identification of Environmental Service Logos by Region of Residence



Awareness of the Delta as a Source of Drinking Water
About 48 percent of all respondents said they didn't know what percentage of California residences get their drinking water from the Delta, but 29 percent said they believed more than half of California residences are served by the Delta. Only 8 percent said 25 percent of households or less get drinking water from the Delta. See Table 28. Awareness of the percentage of California households that get their drinking water from the Delta did not vary by boaters' age or by their region of residence. The correct response is 51-75%

Table 28. Percentage of California Drinking Water That Comes from the Delta

	Count	Percent
None	42	1.6
10 – 25 Percent	168	6.6
26 – 50 Percent	381	14.9
51 – 75 Percent*	379	14.8
Over 75 Percent	375	14.6
Don't Know	1,221	47.6
Total	**2,566**	**100.0**

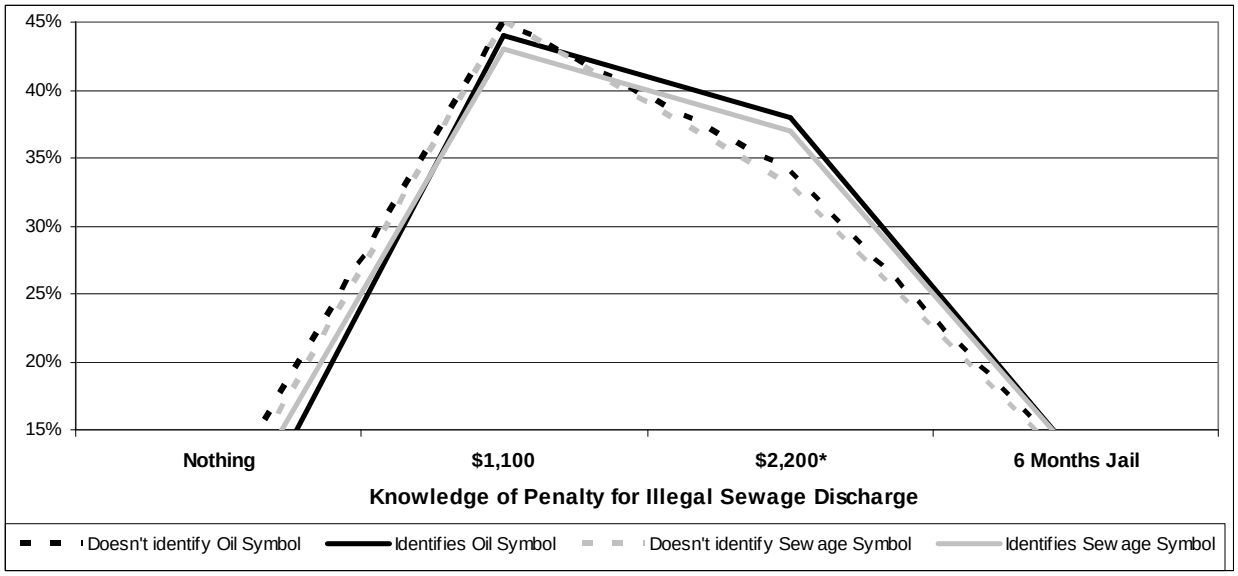
*Correct response

Perceptions of Frequency of Illegal Sewage Discharge and Boater Characteristics
Overall, about 44 percent of boaters said they believed boaters discharge untreated sewage into the water frequently and about one quarter (24 percent) believed this occurs once in awhile. Perception of the frequency of illegal sewage discharge varied by age group with boaters age 49 and younger more likely than boaters over 65 to say this happens frequently. Boaters over age 33 were more likely than 26 to 33 year olds to say this happened once in awhile. Tendency for boaters to say they did not know how often boaters dump sewage illegally increased with age.

Perception of how often boaters illegally discharge untreated sewage varied by region of residence, with residents from the Southern Interior (50 percent) and South Coast (50 percent) more likely than those from the North Coast (34 percent), San Francisco Bay Area (39 percent), or Sacramento Basin (40 percent) regions to say this happens frequently.

Knowledge of Penalty for Illegally Discharging Untreated Sewage and Boater Characteristics
Knowledge of the penalties imposed for dumping untreated sewage illegally did not vary significantly by boater age. Across all 1,260 respondents who provided a response, about 45 percent thought the penalty is $1,100 compared to 35 percent who thought it is $2,200 (correct response). Only 8 percent thought there is no penalty. Among 16 – 25 year olds, 40 percent thought the penalty is $1,100 and 37 percent thought it is $2,200. Boaters 26 – 33 years old and 65 and over appeared to be about twice as likely to think the fine is $1,100 versus $2,200, but among 42 – 49 year olds, the proportion who said the fine is $1,100 was just about equal to those who said it's $2,200. Knowledge of penalties appeared to be unrelated to number of annual engine hours and boaters did not seem to be more aware of the actual fine if they had received a prior boater kit. However, boaters who correctly identified the oil recycling service logo were more likely than those who did not to say the penalty for discharging untreated sewage is a $2,200 fine. See Figure 59.

Figure 59. Knowledge of Penalty for Illegal Sewage Discharge by Environmental Logo Recognition

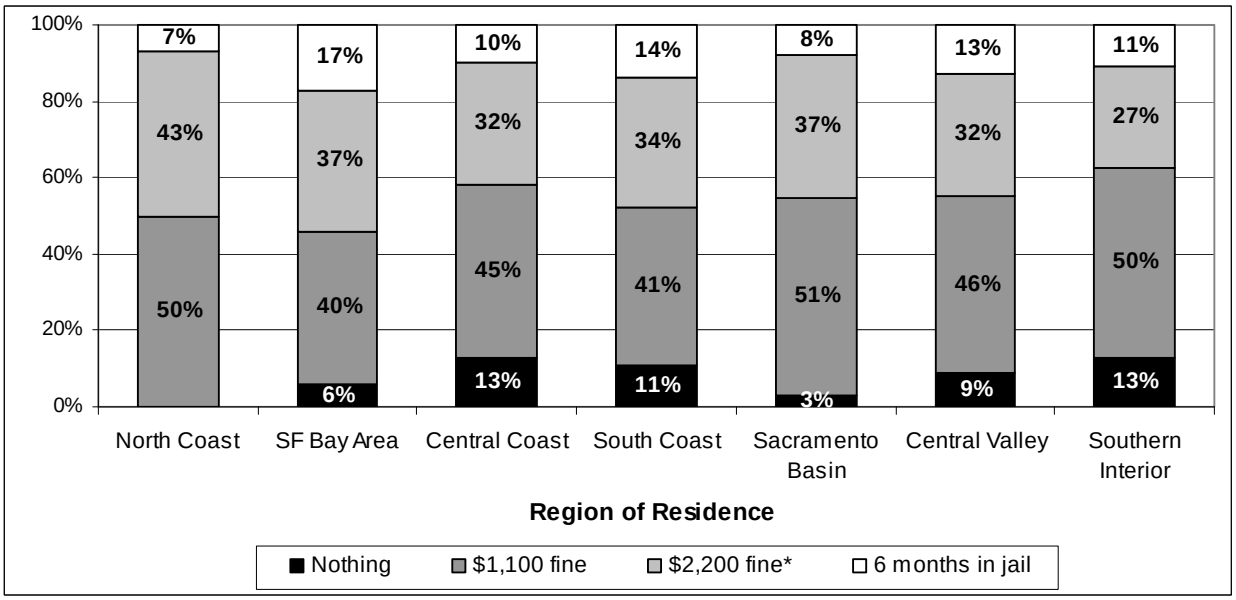


*Correct response

Knowledge of Penalty for Illegally Discharging Untreated Sewage and Region of Residence

Excluding those who said they did not know what the penalty is, knowledge of the penalty imposed for discharging sewage illegally varied by region. Although between 40 - 51 percent of boaters across all regions thought the penalty is a $1,100 fine, 43 percent of North Coast residents thought the penalty is a $2,200 fine, 17 percent of San Francisco Bay Area residents thought the penalty is 6 months in jail, and 13 percent of Central Coast and Southern Interior residents thought there is no penalty for this behavior. See Figure 60.

Figure 60. Knowledge of Penalty for Illegal Sewage Discharge by Region of Residence

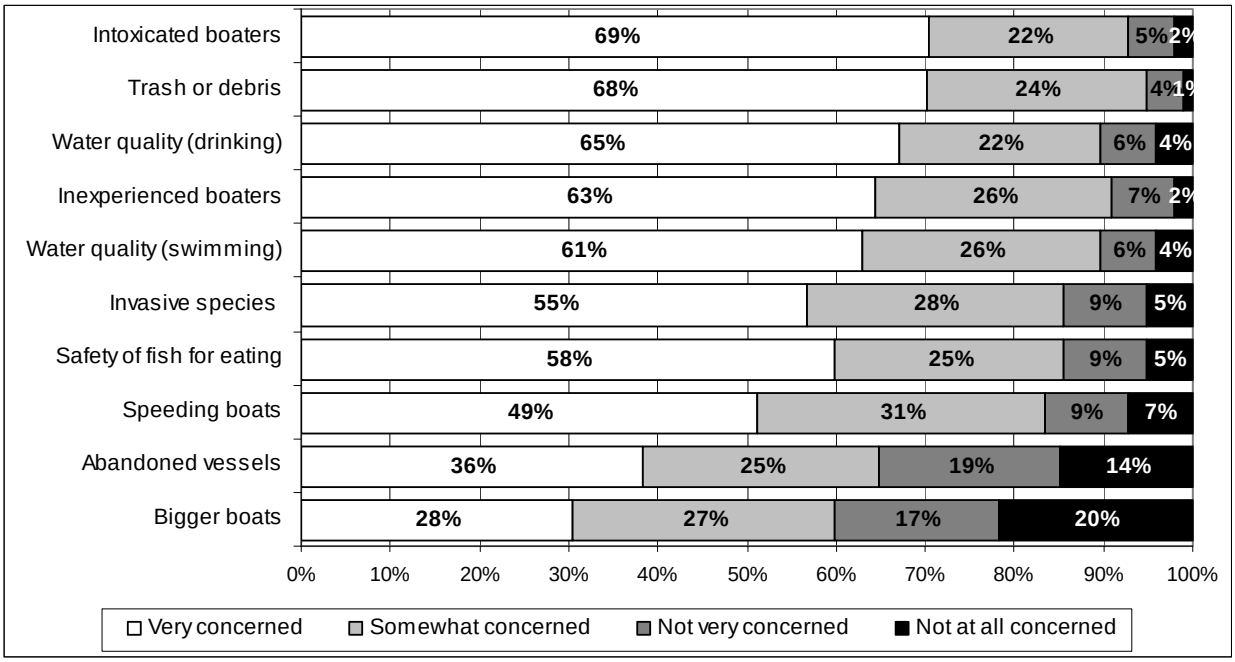


*Correct response

Concerns about Boating in California

Among 10 primary topics of concern for boaters, intoxicated boaters, trash and debris, quality of water for drinking, and inexperienced boaters ranked higher than invasive species, speeding boats, abandoned vessels or bigger boats. About two-thirds of all boaters said they were very concerned about intoxicated boaters (69 percent), trash or debris (68 percent), or the quality of the water for drinking (65 percent) compared to less than half who said they are very concerned about speeding boats (49 percent), abandoned vessels (36 percent), or bigger boats (28 percent). See Figure 61. Concerns did not appear to vary by whether or not a boater had received a boater kit prior to participation.

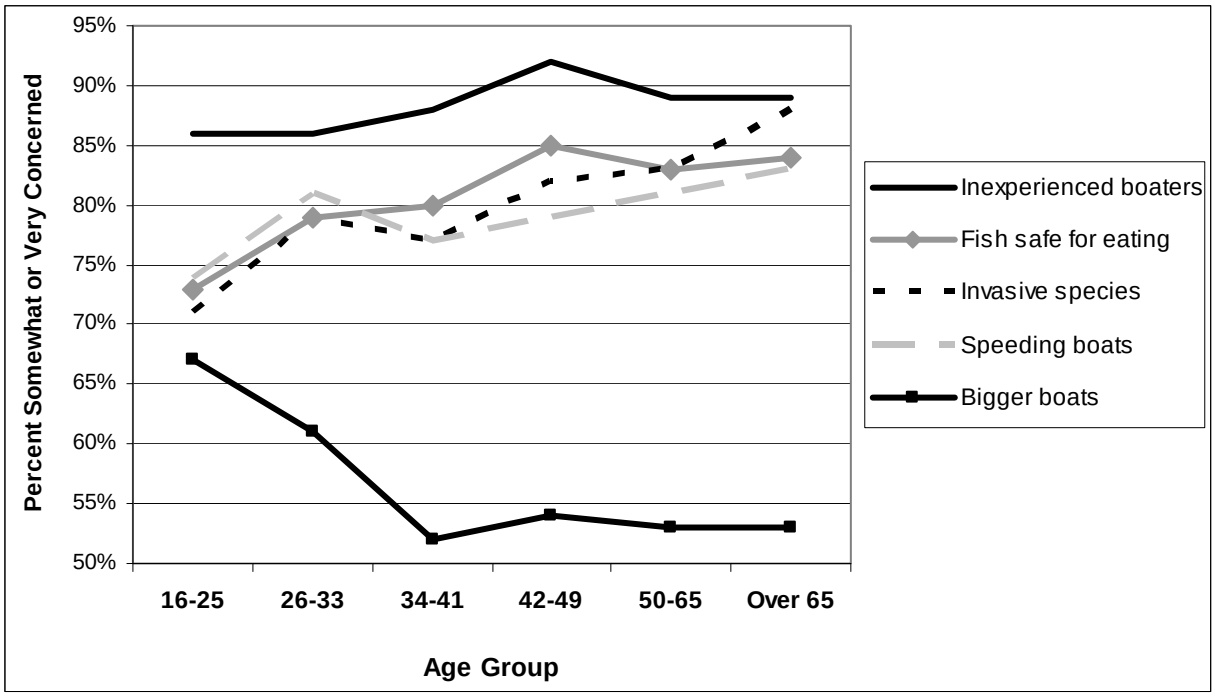
Figure 61. Concerns about Boating in California



Concerns and Boater Age

For most topics of concern, level of concern did not vary by age. Figure 62 plots the relationship between age and concern for 5 topics that varied somewhat by age when responses of "somewhat" and "very" concerned are combined. Thus, Figure 62 presents the percent of boaters within each age group who were at least somewhat concerned about the given topic. For all topics shown, concern generally increased slightly with age, except for concern about bigger boats, which declined sharply after age 25.

Figure 62. Percent of Boaters Who Say They Are Somewhat or Very Concerned by Age Group



Concerns Boaters Have About Boating in California by Region

For many topics of concern to California boaters in 2007 - 2008, the level of concern varied by boaters' region of residence. Concerns about speeding boats, water quality for swimming, intoxicated boaters, trash or debris, water quality for drinking, inexperienced boaters, safety of fish for human consumption, and abandoned vessels all varied by region, while concerns about bigger boats and invasive species did not. In particular, boaters from the inland regions of Sacramento Basin, Central Valley or Southern Interior (55 – 57 percent) were more likely than those from coastal regions (42 – 49 percent) to be very concerned about speeding boats. Similarly, boaters from the three inland regions were more likely than those from coastal regions to be very concerned about intoxicated boaters (75 – 81 percent versus 64 – 69 percent). Boaters from North Coast, Central Coast or San Francisco Bay Area regions (53 – 58 percent) were somewhat less likely than residents from inland or Southern regions (62 – 72 percent) to be very concerned about water quality for swimming, while 74 percent of Southern Interior residents versus 57 percent of San Francisco Bay Area residents were very concerned about water quality for drinking. Figures 63 – 70 present the percent of residents from each region who said they were very, somewhat, not very, or not at all concerned about each of the 8 topics that varied by region.

Figure 63. Concern about Speeding Boats by Region of Residence

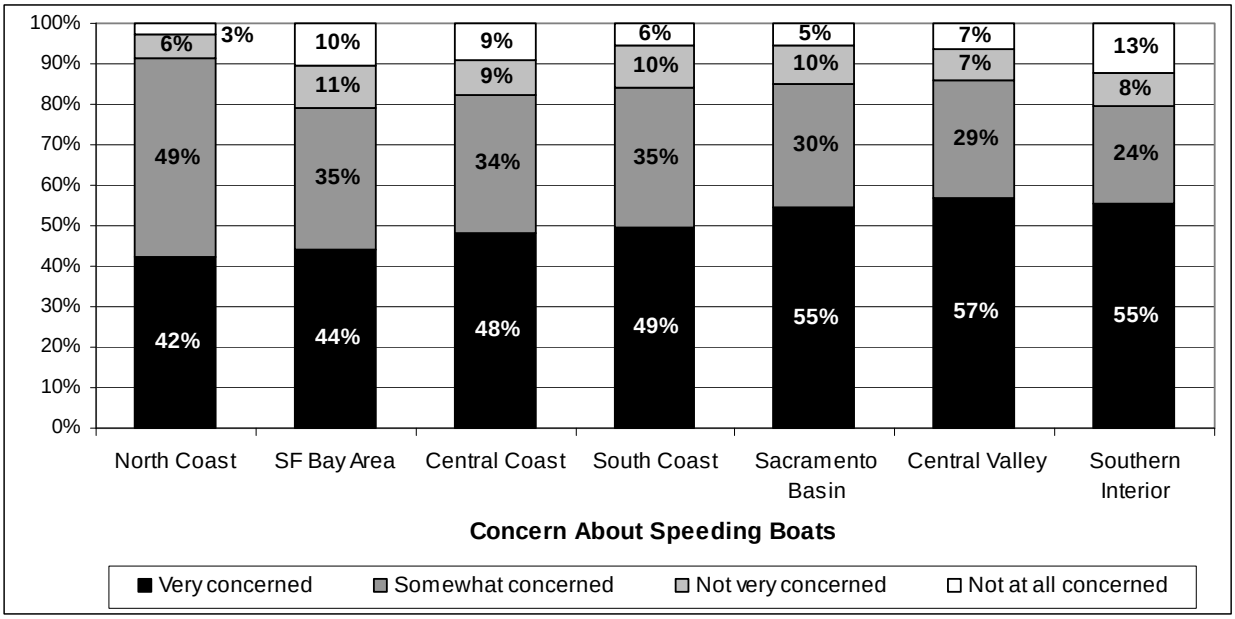


Figure 64. Concern about Water Quality for Swimming by Region of Residence

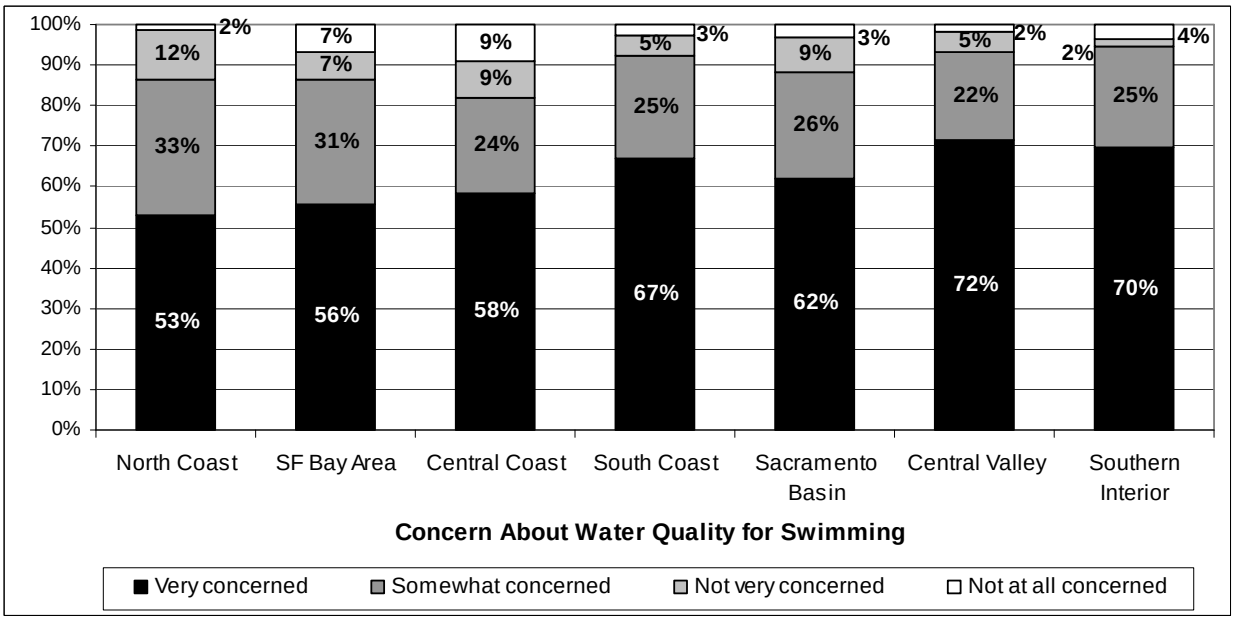


Figure 65. Concern about Intoxicated Boaters by Region of Residence

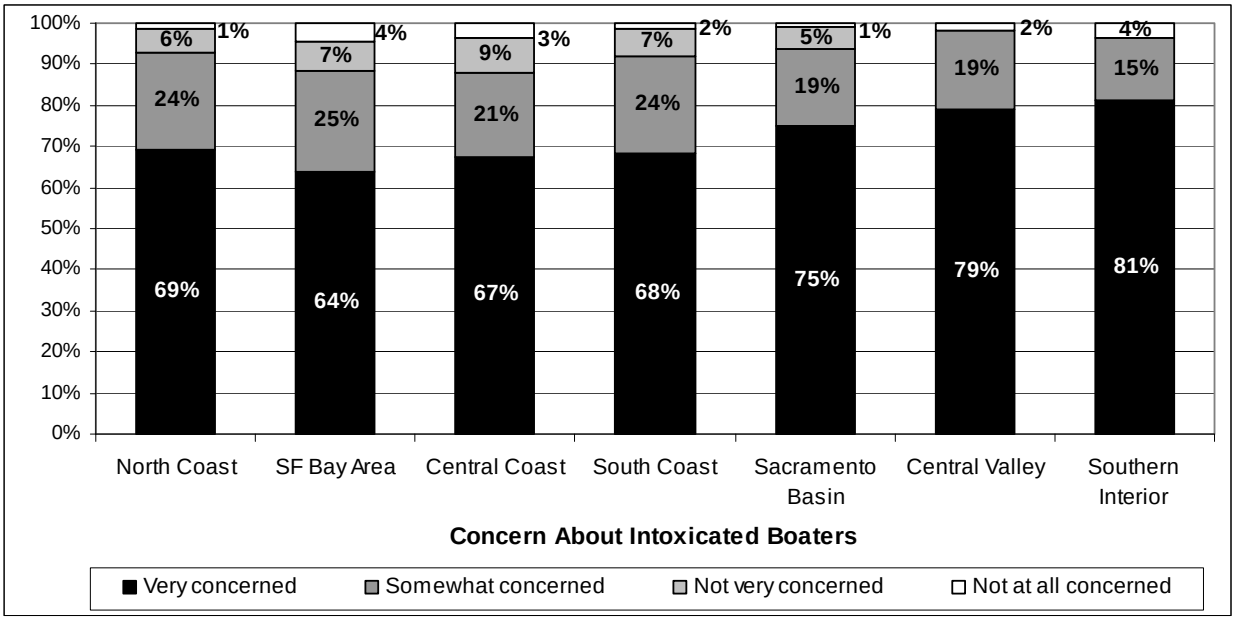


Figure 66. Concern about Trash or Debris by Region of Residence

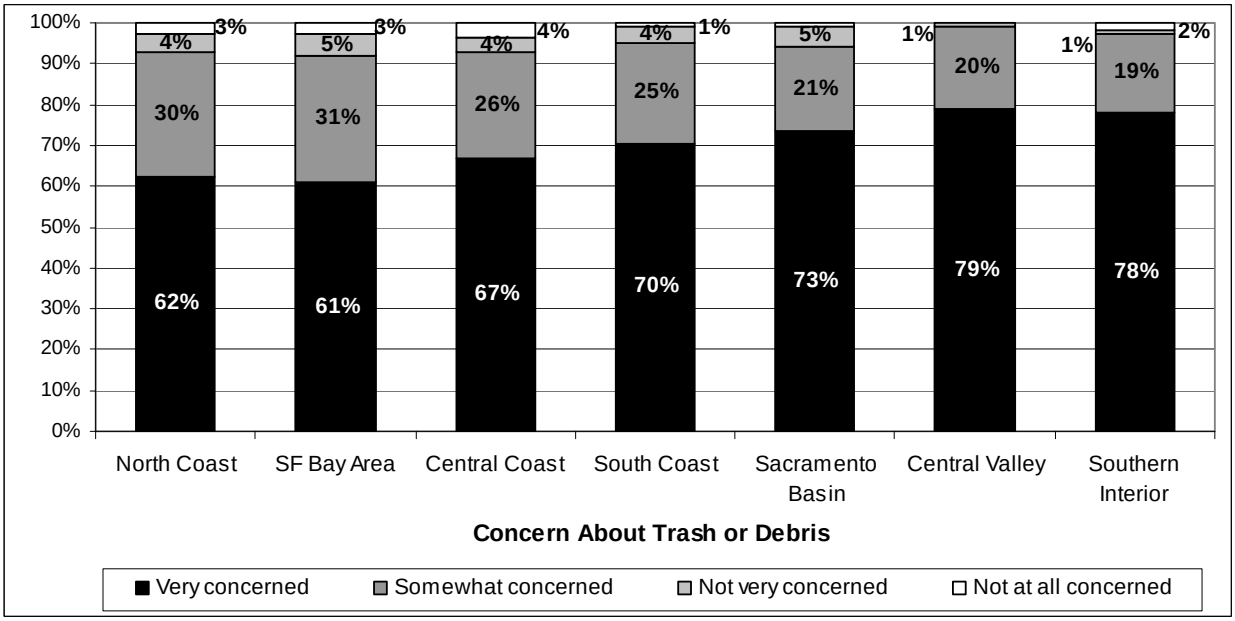


Figure 67. Concern about Water Quality for Drinking by Region of Residence

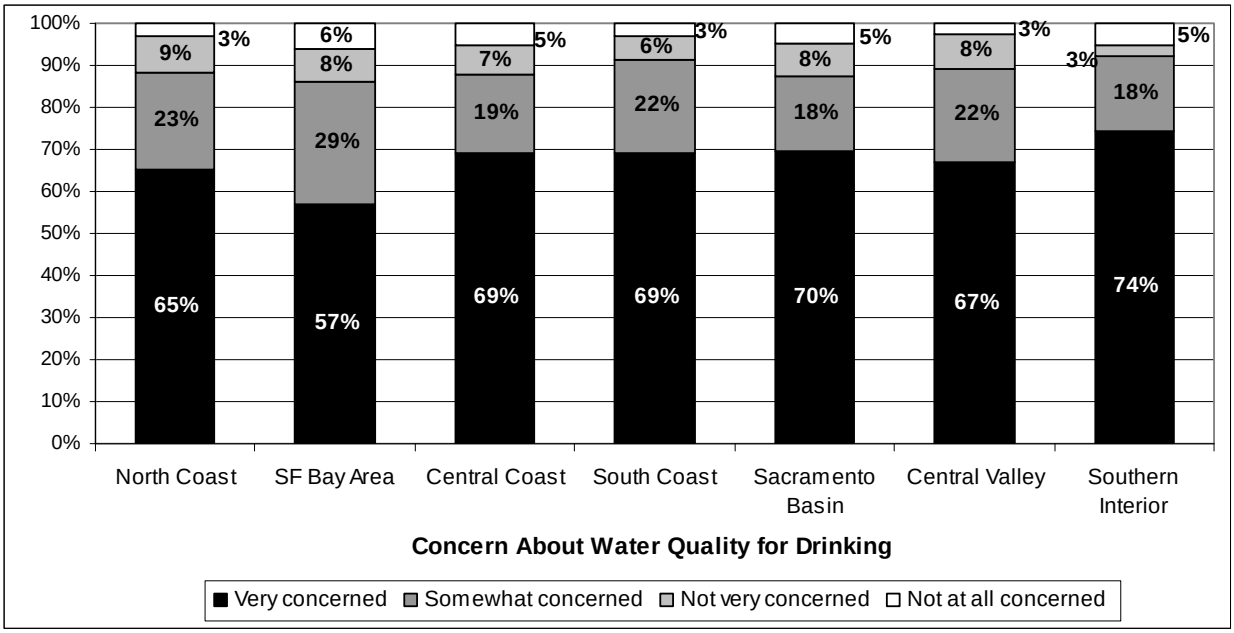


Figure 68. Concern about Inexperienced Boaters by Region of Residence

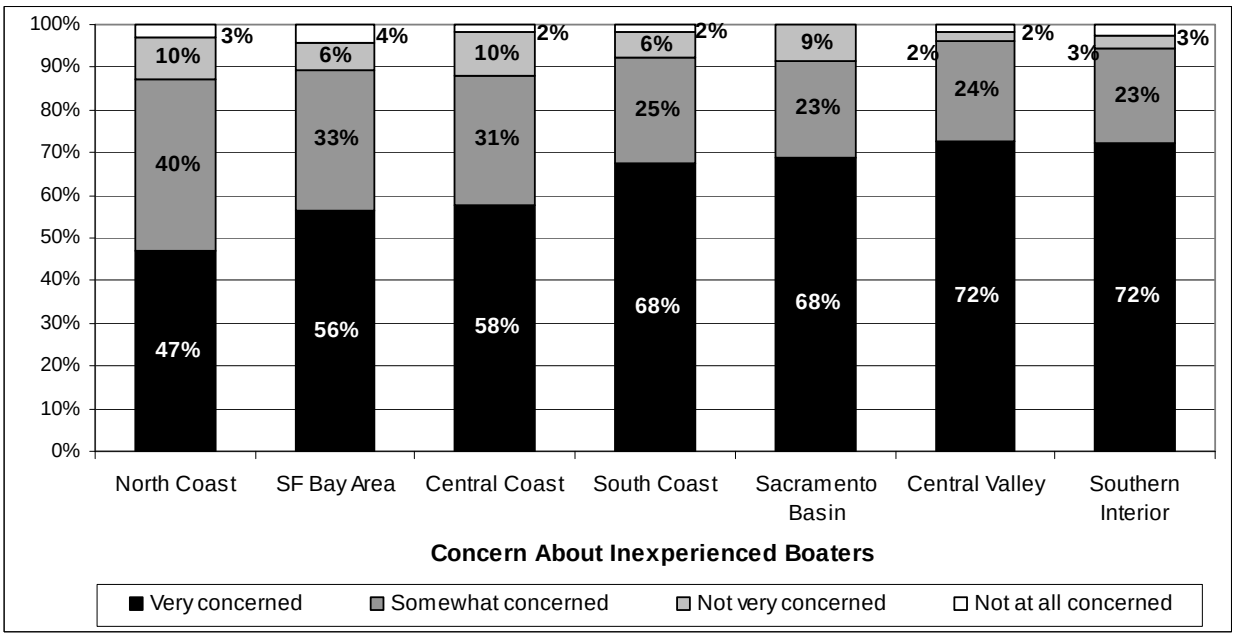


Figure 69. Concern about Safety of Fish for Human Consumption by Region of Residence

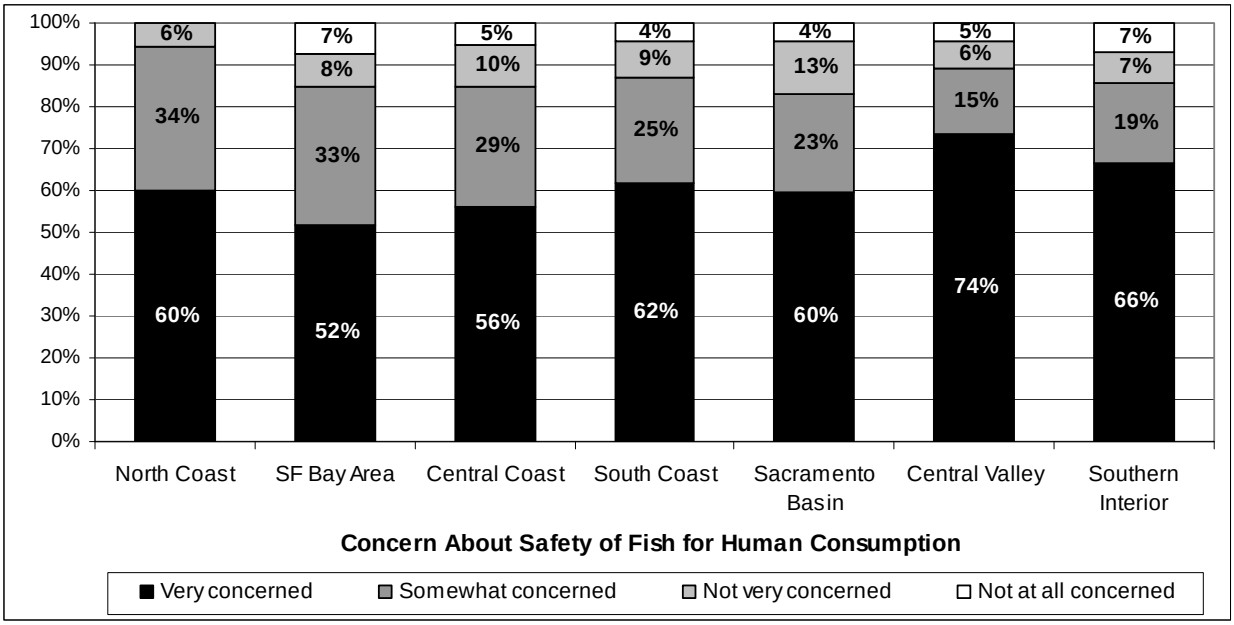
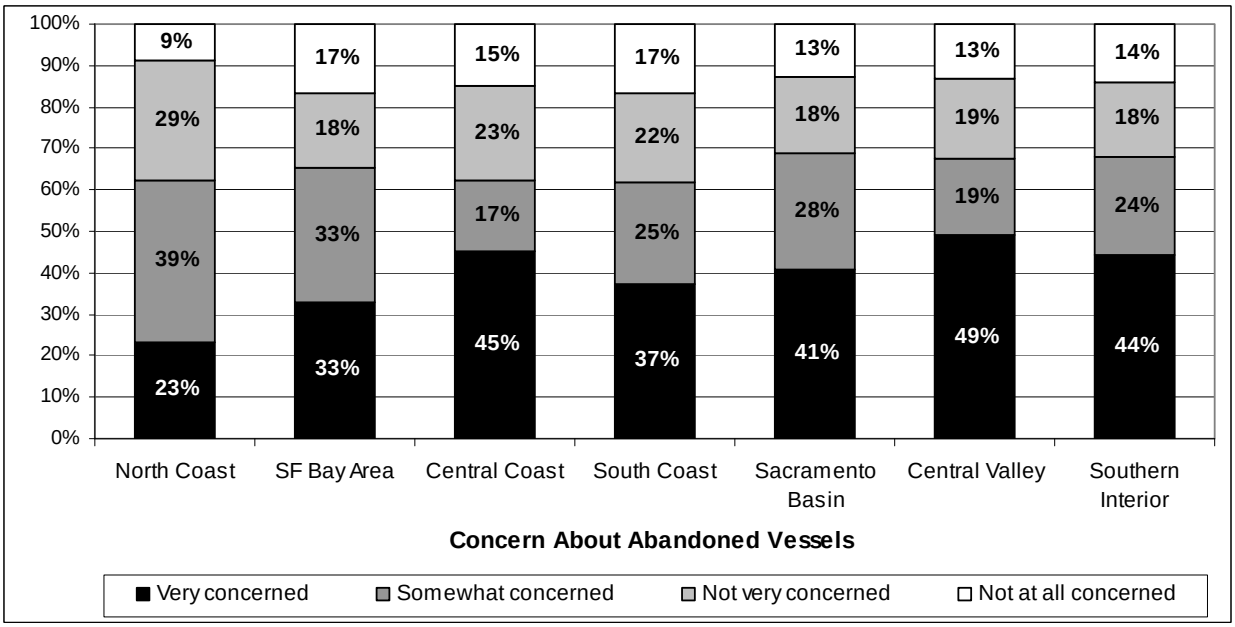


Figure 70. Concern about Abandoned Vessels by Region of Residence



2009 California Boater Surveys

Overview

During the 2009 survey period, project partners and volunteer Dockwalkers administered 3,073 surveys to California boaters. Similarly to the 2007-2008 period, surveys were administered along with face-to-face boater education and outreach efforts and distribution of boater kits. Refer to the Methodology section on page 18 for more detailed information. See Appendix A for the survey instrument used to complete these surveys, and Appendix C for the data frequency tables of all items on the survey. The following summaries provide a descriptive snapshot of boaters surveyed and may not reflect the population of California boaters as a whole. Due to the purpose of this study and the sampling methodology used, the analysis to follow focuses primarily on motorized boaters. The subsequent section presents the results of the data collected in 2009.

Characteristics of Boaters

Age of Boaters

About 60 percent of respondents to the 2009 survey were 42 to 65 years old; while only 13 percent were over 65 years of age and 13 percent were age 33 or younger. See Table 29.

Table 29. Respondent Age

Age	Count	Percent
16 – 25	149	5.2
26 – 33	228	7.9
34 – 41	399	13.9
42 – 49	640	22.2
50 – 65	1,085	37.7
Over 65	378	13.1
Total	**2,879**	**100.0**

Boating Experience

More than two-thirds of boaters surveyed (71 percent) said they had over 5 years of boating experience, while 10 percent had less than one year (see Table 30).

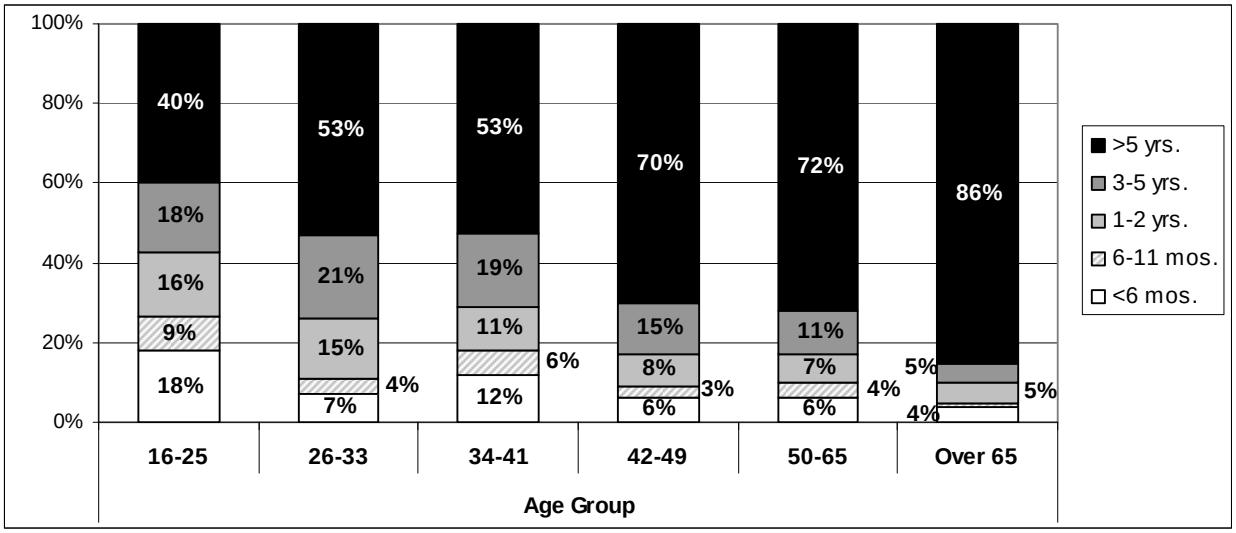
Table 30. Length of Time Boating

Boating Experience	Count	Percent
Less than 6 months	199	6.5
6 – 11 months	90	3.0
1 – 2 years	230	7.6
3 – 5 years	354	11.6
More than 5 years	2,175	71.4
Total	**3,048**	**100.0**

Age and Boating Experience

Boater age was directly related to the number of years of boating experience, with over a quarter of the 16 – 25 year olds (27 percent) reporting less than a year of experience compared to 5 percent of the over 65 age group. Forty percent of the youngest boaters reported they have more than 5 years experience, compared to 86 percent of the over 65 age group. About half (53 percent) of all respondents age 26 to 41 had more than 5 years boating experience. See Figure 71.

Figure 71. Years of Boating Experience by Age Group



Length of Boat

A majority of boaters surveyed owned boats 20 – 25 feet in length (31 percent) or 26 – 39 feet (29 percent). Another 29 percent owned boats 19 feet long or less, and 11 percent owned boats 40 feet long or more. See Table 31.

Table 31. Boat Length

Length of Boat	Count	Percent
Less than 16 feet	283	9.4
16 to 19 feet	595	19.8
20 to 25 feet	919	30.6
26 to 39 feet	870	29.0
40 to 65 feet	315	10.5
More than 65 feet	18	0.6
Total	**3,000**	**100.0**

Type of Boat

The largest proportion of boaters surveyed owned ski boats (30 percent), followed by fishing boats (21 percent), sailboats with auxiliary motors (19 percent), motor yachts (11 percent), and cuddy cabin/cruisers (11 percent). Fewer than 5 percent surveyed said they owned a sailboat without an auxiliary motor, a personal watercraft, a houseboat, or an off-shore racer. Reponses to the "other type" category include canoes, kayaks, row boats, and pontoons. See Table 32.

Table 32. Type of Boat(s) Owned

Type of Boat	Count	Percent*
Ski Boat/Run-about	928	30.2
Fishing boat	638	20.8
Sailboat with auxiliary motor	589	19.2
Motor yacht	343	11.2
Cuddy cabin/cruiser	331	10.8
Sailboat without auxiliary motor	150	4.9
Personal watercraft	135	4.4
House boat	74	2.4
Off-shore racer	36	1.2
Other	213	6.9

*Questionnaire item was "check all that apply," therefore percentages do not add up to 100.

Of the 3,073 boaters surveyed in 2009, 87 percent said they owned one boat, 9 percent had two boats, and 2 percent had three boats. Boaters gave a range from 1 to 6 boats owned and 2 percent of those surveyed did not respond to the boat type question.

As in 2007 - 2008, boat type and boat length were strongly correlated. About 80 percent of all houseboats in the sample were 26 to 65 feet in length, while 75 percent of all personal watercraft were less than 16 feet long. Sailboats without auxiliary motors were most likely to be less than 20 feet in length (72 percent), but those with motors were most likely to be over 25 feet long (80 percent). Most ski boats (84 percent) ranged from 16 to 25 feet, and nearly all cruisers (92 percent) were 20 to 39 feet in length.

Boat Storage/Berthing

Almost half of boaters surveyed (47 percent) stored their boats at home on a trailer, while another 34 percent berthed their boats at a marina in the water. Only 6 percent used dry storage, 5 percent berthed at home, and 8 percent gave "other" locations such as "boat storage," "dry storage," "rv storage," or "garage" (see Table 33).

Table 33. Location Where Boats are Usually Stored/Berthed

Place Where Boat Stored/Berthed	Count	Percent
Home on trailer	1,344	47.2
Marina-in-water berth	973	34.2
Marina-Dry storage	181	6.4
Berth at home	133	4.7
Other	217	7.6
Total	**2,848**	**100.0**

Location Where Boat Usually Launched

About two-thirds of the 2007 boaters who launched their boats launched them from a public launch ramp (66 percent), while 28 percent used a marina. See Table 34.

Table 34. Place Where Boat is Usually Launched

Place Where Boat Usually Launched	Count	Percent of All Surveyed	Percent of Applicable
Marina	511	16.6	28.1
Public launch ramp	1,243	40.5	66.2
Other	125	4.1	5.7
Total	**1,821**		**100.0**

Reasons for Choosing Launch Location

The most common reasons boaters cited for their choice of launch location was easy access (29 percent), followed by close proximity to their storage location (25 percent), and convenient trailer parking (19 percent). Fuel docks, restaurants, and sewage pumpouts at the launch location were mentioned as reasons less than 5 percent of the time. See Table 35.

Table 35. Reasons for Choosing Where to Launch Boat

Reasons for Choosing Launch Location	Count	Percent*
Launch ramp with good access (wide lanes, etc.)	885	28.8
Close proximity to where I store my boat	767	25.0
Convenient trailer parking	575	18.7
Fuel dock	146	4.8
Restaurant	144	4.7
Sewage pumpout service	86	2.8
Other	308	10.0

*Questionnaire item was "check all that apply," therefore percentages do not add up to 100.

California Region of Residence[3]

About one-third of boaters surveyed lived in the South Coast region (36 percent), while 27 percent lived in the San Francisco Bay Area, and 21 percent in the Sacramento Basin area (see Table 36). Less than 5 percent of those who participated in the 2009 survey lived in the Central Valley, Central Coast, North Coast, or Southern Interior regions.

[3] California regions, as defined by DBW, Boating Facilities Needs Assessment Report (2001), and their associated counties include San Francisco Bay Area (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara and Solano); Central Valley (Amador, Calaveras, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Benito, San Joaquin, Stanislaus, Tulare, and Tuolumne); Sacramento Basin (Butte, Colusa, El Dorado, Glenn, Lake, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Sutter, Tehama, Trinity, Yolo, and Yuba); North Coast (Del Norte, Humboldt, Mendocino, and Sonoma); Central Coast (Monterey, San Luis Obispo, and Santa Cruz); South Coast (Los Angeles, Orange, Santa Barbara, Ventura, and San Diego); and Southern Interior (Imperial, Riverside, and San Bernardino).

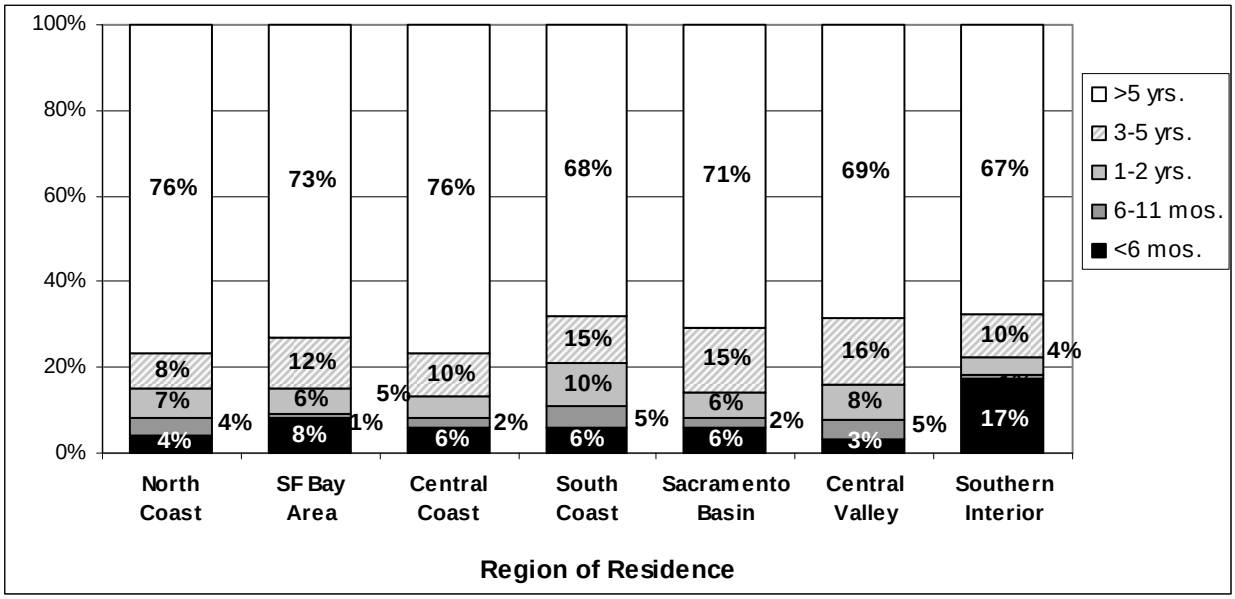
Table 36. Region of Residence

Region	Count	Percent
South Coast	862	35.8
SF Bay Area	647	26.9
Sacramento Basin	501	20.8
Central Valley	115	4.8
Central Coast	97	4.0
North Coast	96	4.0
Southern Interior	92	3.8
Total	**2,410**	**100**

Boating Experience by Region of Residence

Boaters who lived in the North or Central Coast regions were more likely to have over 5 years of boating experience than those who lived in the South Coast or Central Valley regions (76 percent verse 68 – 69 percent). Southern Interior had the largest share of the least experienced, with 18 percent reporting less than a year of boating experience compared to 8 – 11 percent in other regions. See Figure 72.

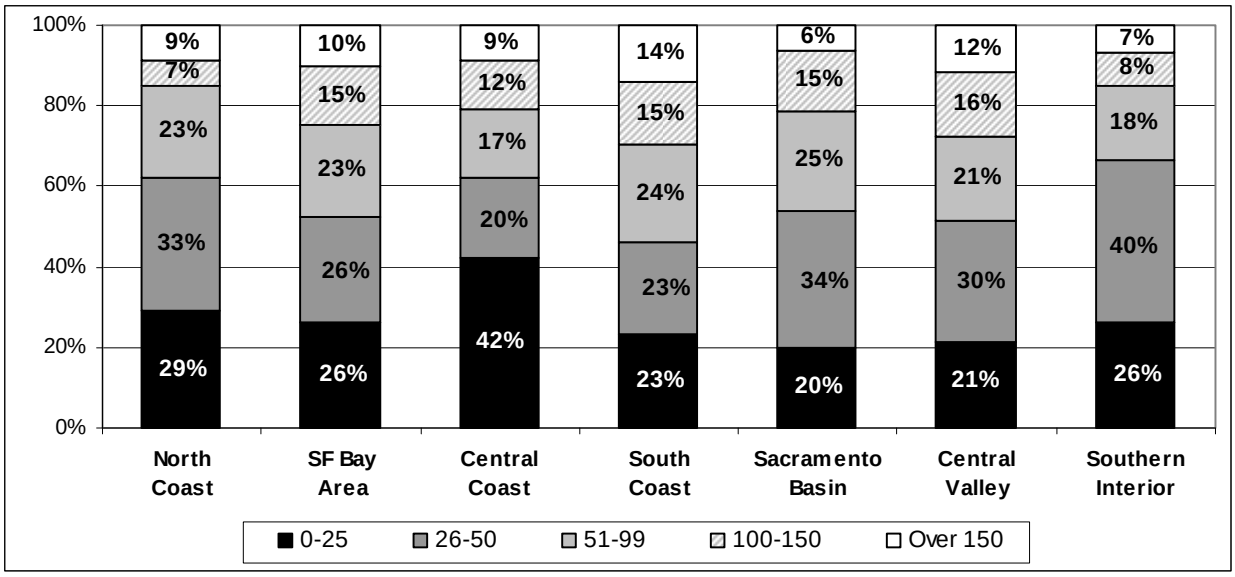
Figure 72. Boating Experience and Region of Residence



Annual Engine Hours by Region of Residence

Boaters from the Southern Interior or the North and Central Coast regions were more likely than boaters from the South Coast, Central Valley or San Francisco Bay Area to put 50 or fewer engine hours on their boats annually (62 – 67 percent versus 46 – 52 percent). Boaters who lived in the South Coast or Central Valley regions were more likely than those from the North Coast or Southern Interior to put 100 or more engine hours on their boats annually (27 – 30 percent versus 15 percent). See Figure 73.

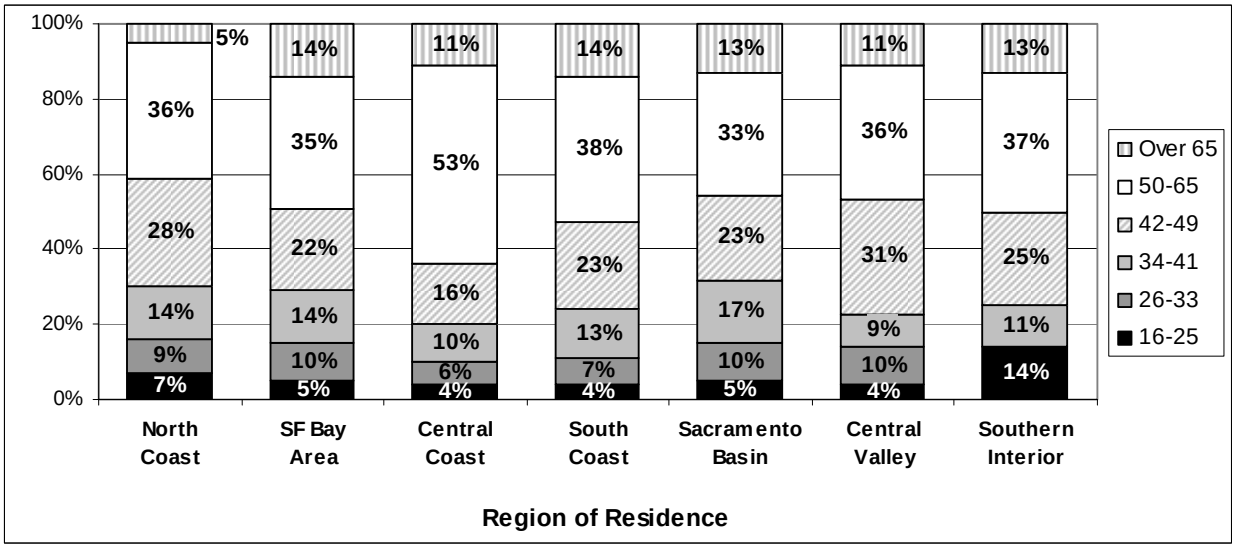
Figure 73. Annual Engine Hours and Region of Residence



Boater Age by Region of Residence

Age of boaters surveyed varied by region of residence. Over half of boaters surveyed from the Central Coast region (53 percent) were 50 – 65 years of age, while the Southern Interior region had at least double the proportion of 16 to 25 year olds than other regions (see Figure 74).

Figure 74. Age Group by Region of Residence

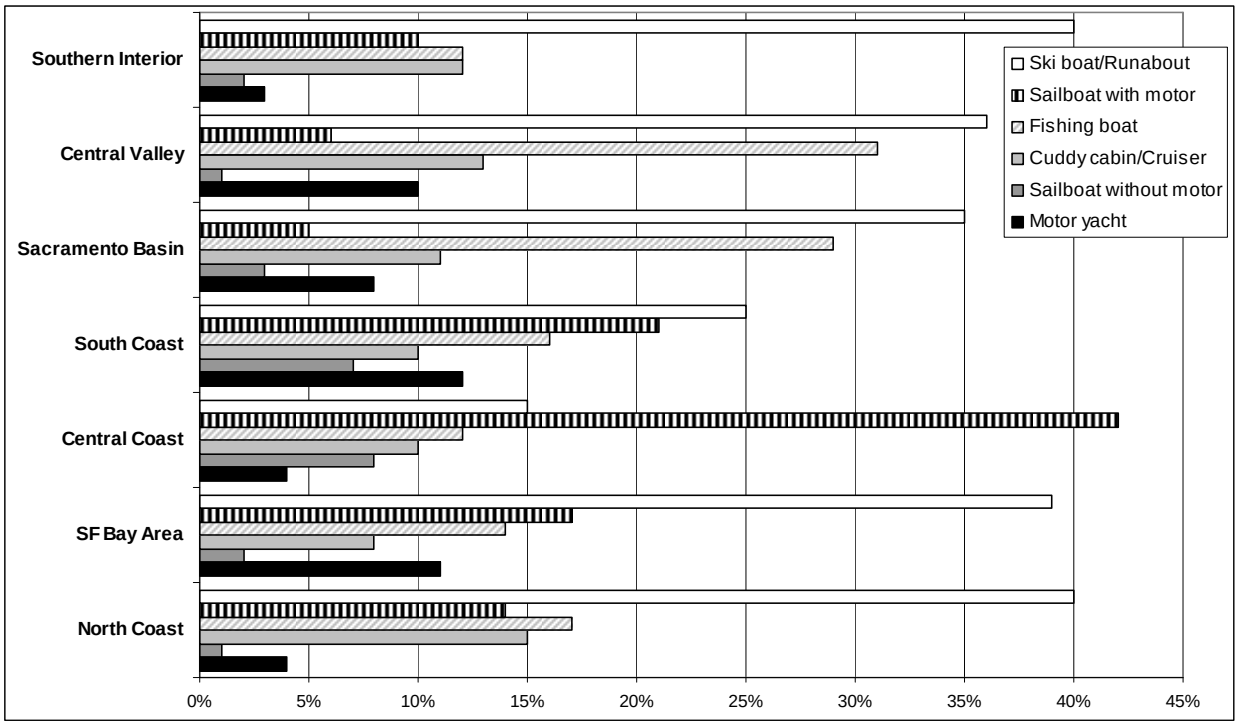


Boat Type by Region of Residence

Boaters surveyed from the North Coast, San Francisco Bay Area, or Southern Interior regions were more likely to own ski boats than boaters from the Central or South Coast. Those from the Central Coast region were at least twice as likely to own sailboats with auxiliary motors as boaters from any other region. Boaters from the Sacramento Basin or Central Valley owned a larger share of fishing boats than others, and boaters from the San Francisco Bay Area, South Coast, or Central Valley owned more motor

yachts than those from the North Coast, Central Coast, or Southern Interior. Boaters who owned sailboats without auxiliary motors were more likely to be from the Central or South Coast than from any other region. See Figure 75.

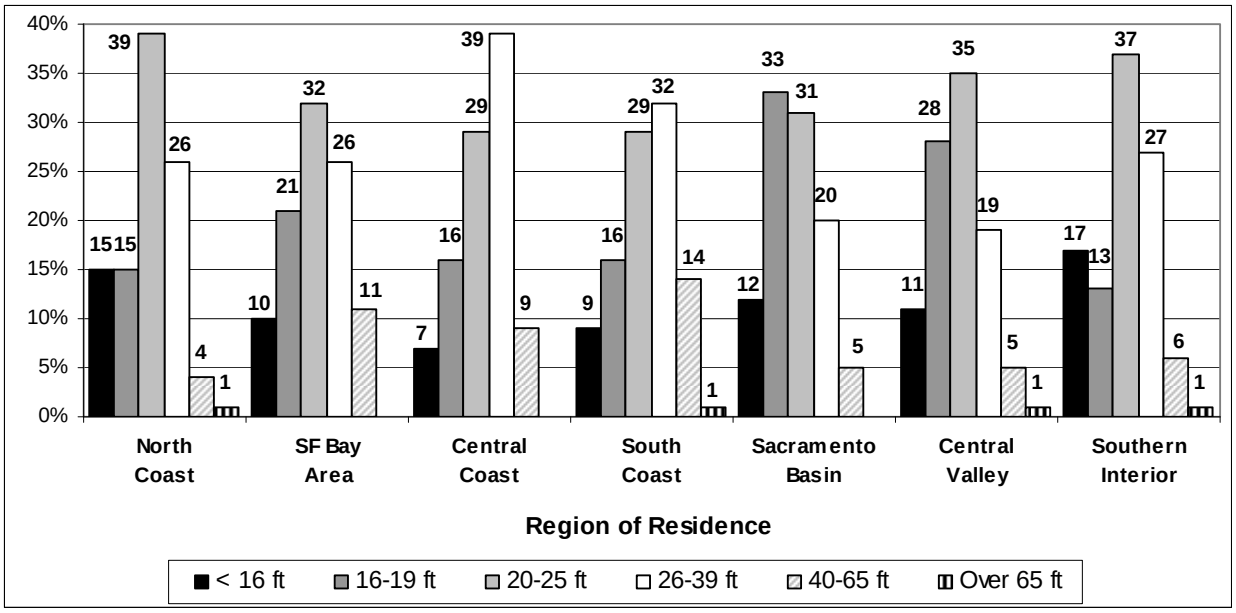
Figure 75. Boat Type by Region of Residence



Boat Length by Region of Residence

Boaters from the Southern Interior (17 percent) or North Coast (15 percent) regions were more likely than others to own boats less than 16 feet in length. Boaters from the Sacramento Basin (33 percent) or Central Valley (28 percent) regions were more likely than others to own boats 16 – 19 feet in length. Boaters from the Sacramento Basin (20 percent) or Central Valley (19 percent) were somewhat less likely than others to own boats 26 – 39 feet in length. A greater proportion of residents from the South Coast (14 percent), the San Francisco Bay Area (11 percent), or the Central Coast (9 percent) owned boats 40 – 65 feet in length compared to other regions (4 – 6 percent). See Figure 76.

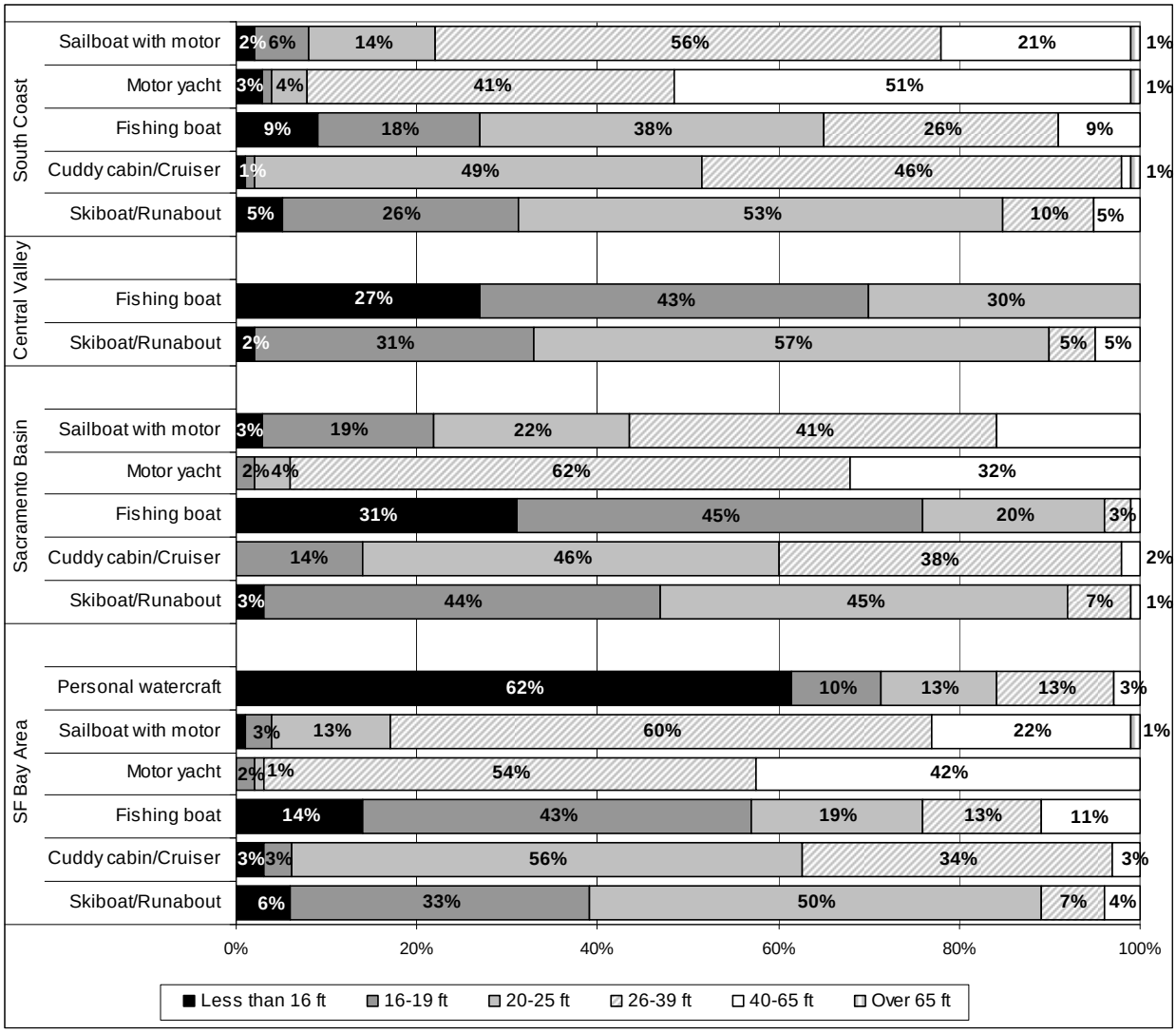
Figure 76. Boat Length by Region of Residence



Boat Type and Length by Region of Residence

Figure 77 presents the percentage of each boat type by boat length within each region of residence. Results for several boat length sub-groups with small sample sizes have been omitted from this analysis.

Figure 77. Boat Type and Length by Region of Residence



Boat Storage and Launch Location by Region of Residence

About three-quarters of boaters from the Sacramento Basin region (74 percent) usually launched from a public launch facility compared to 44 percent of those from the Central Coast or 58 percent of those from the San Francisco Bay Area. Boaters from the Central Coast region reported the highest use of marinas to launch their boats (47 percent) versus only 22 percent of those from the Sacramento Basin and 25 percent of boaters from the Central Valley or the North or South Coast regions.

Central Valley or Sacramento Basin residents were the most likely to trailer their boats at home in this sample (66 percent) and Central Coast residents the least likely (25 percent). Central Coast residents were more likely to use marina dry storage (16 percent) than residents from Central Valley (1 percent), North Coast (5 percent), Sacramento Basin (5 percent), or San Francisco Bay Area (6 percent).

Boating Activities and Habits of Boaters

Days of Annual Boat Use at Various Locations

About 45 percent of boaters surveyed reported they used their boats on inland lakes at least once a year, followed by 43 percent who used them on the ocean, 27 percent who used them on the Delta, and 17 percent who boated on the San Francisco Bay. Twenty percent, or 624 respondents, either did not answer the items or answered zero for all locations listed. Across all locations, annual mean number of days of boat use reported was 47 days. See Table 37 for mean number of annual days by each boating location.

Table 37. Percent Who Boat by Boat Use Location and Annual Mean Number of Days of Boat Use

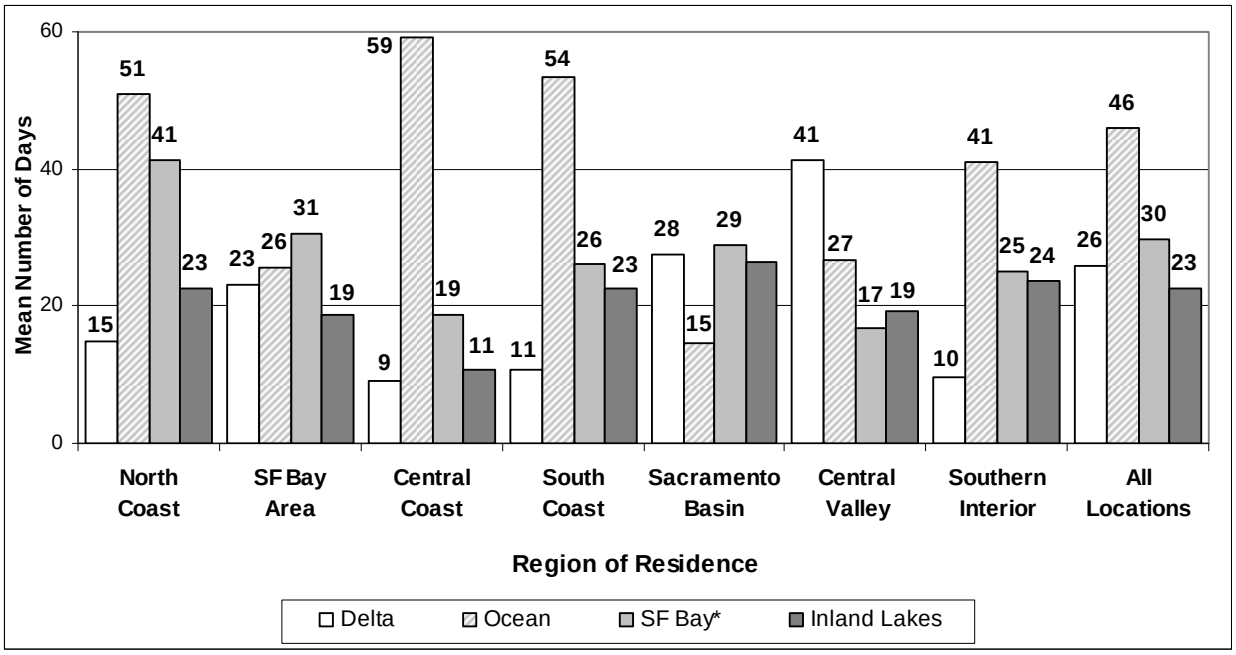
	Those who boated in location at least once a year		Of those who boated in location at least once a year:	
Location	**Count**	**Percent**	**Mean**	**Range**
Inland lakes	1,373	44.7	23.8	1-300
Ocean	1,313	42.7	49.4	1-365
Sacramento-San Joaquin Delta	822	26.8	25.4	1-365
San Francisco Bay	520	16.9	29.1	1-365

Days of Annual Boat Use by Region of Residence and Boating Location

Boaters from the North Coast said they boated about twice as many days a year on the ocean and San Francisco Bay than on the Delta or Inland Lakes. Boaters from the Sacramento Basin boated more days on per year on the Delta, San Francisco Bay or inland lakes than they do on the ocean. Residents from the Central Coast, Southern Coast, and Southern Interior spent a large majority of their annual boating days on the ocean.

According to average annual days boaters reported by location, boaters from the Central, South, or North Coast regions were those most likely to boat on the ocean and those from the Central Valley, San Francisco Bay Area or Sacramento Basin were least likely. Boaters from the Central Valley were more likely to boat on the Delta and those from the North Coast, South Coast, Southern Interior, or Central Coast were less likely to boat on the Delta. Sacramento Basin, Southern Interior, or the North or South Coast residents were most likely to use inland lakes and Central Coast residents were least likely. Although San Francisco Bay boaters appeared to be more likely to be from the North Coast, San Francisco Bay Area, or Sacramento Basin and less likely to be from the Southern Interior, Central Coast or Central Valley, these differences were not statistically significant. See Figure 78.

Figure 78. Mean Number of Days Annually by Boating Location and Region of Residence

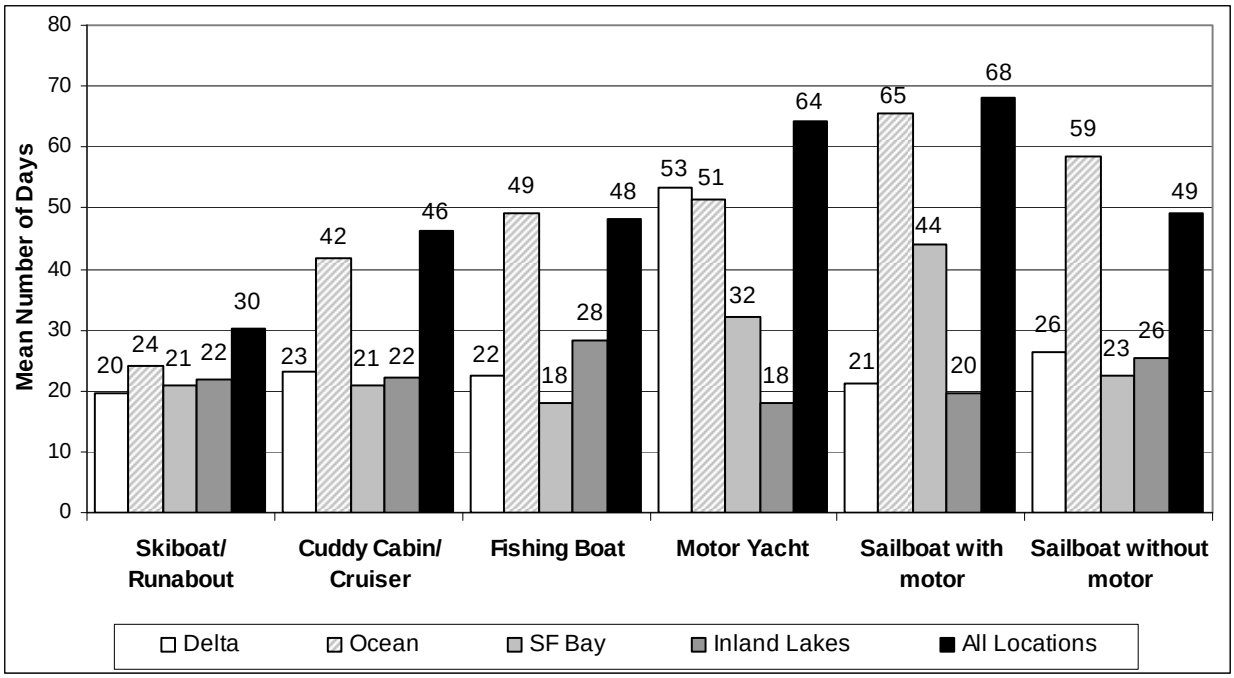


* Differences are not statistically significant.

Days of Annual Boat Use and Boat Type

Considering those subgroups with sample sizes adequate for interpretation, those who owned motor yachts reported using their boats for more annual days on the Delta (mean=53.4 days) compared to owners of other boat types (mean=23 days). Owners of sailboats, both with and without auxiliary motors, reported more annual days on the ocean (mean=65.4 and 58.5 days, respectively) than the group average of 49.4 days. Sailboats with auxiliary motors were also used in the San Francisco Bay more days than other types (44.0 days versus 28.9 days), and were used most across all locations (68.0 days) compared to all other boat types combined (mean=46.6 days). The next most frequently used boats were motor yachts which were used an average of 64.4 days across all locations. See Figure 79.

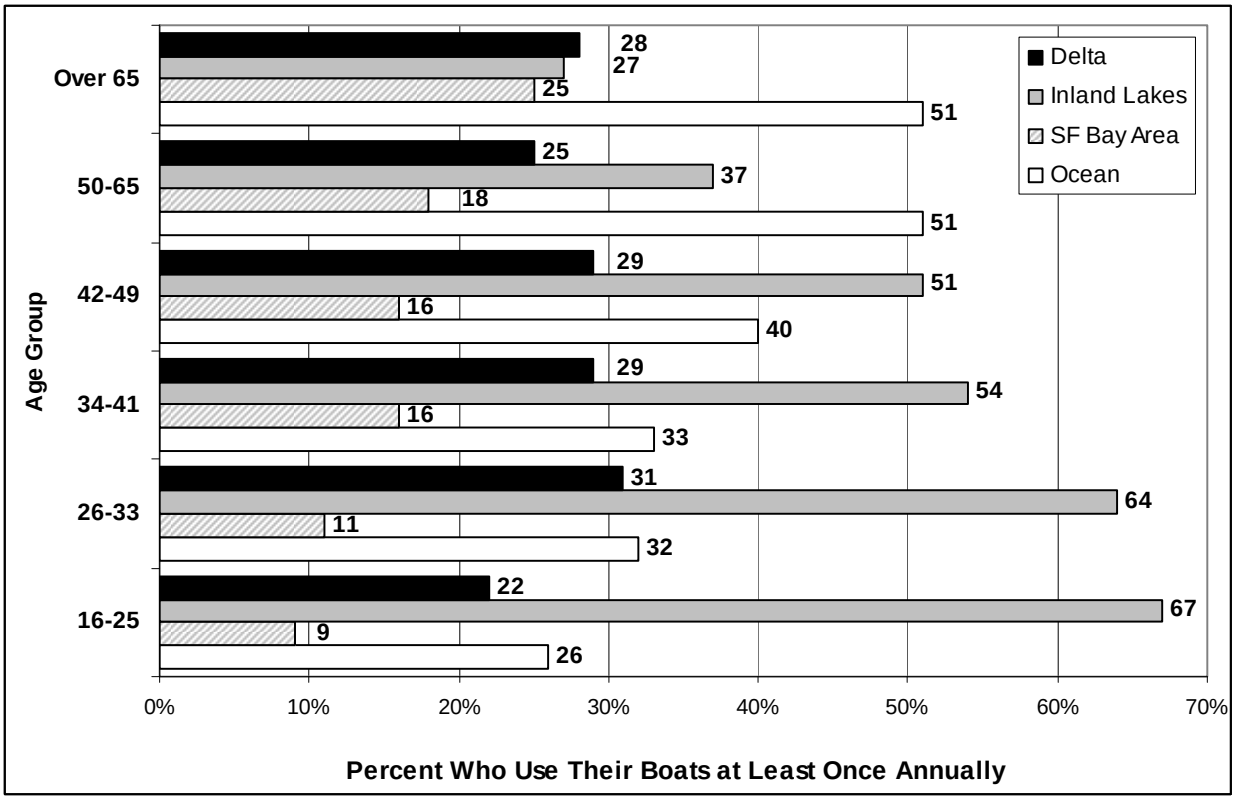
Figure 79. Mean Number of Days Boating at Various Locations by Boat Type



Boat Use and Boater Age

Boaters 50 years old or older used their boats more total annual days than those in younger age groups. Those 50 and over boated an average of 51 – 55 days annually compared to 44 days or less for those under 50. Boaters 16 – 25 years old reported they used their boats an average of 31 days a year. Older boaters also reported a higher average number of days per year boating on the Delta compared to younger boaters, but average number of days reported in other locations did not vary significantly by age. Boaters age 50 and over were more likely than those in younger age groups to boat on the ocean and on San Francisco Bay. Boaters less than 34 years of age were more likely than older boaters to use their boats on inland lakes. See Figure 80.

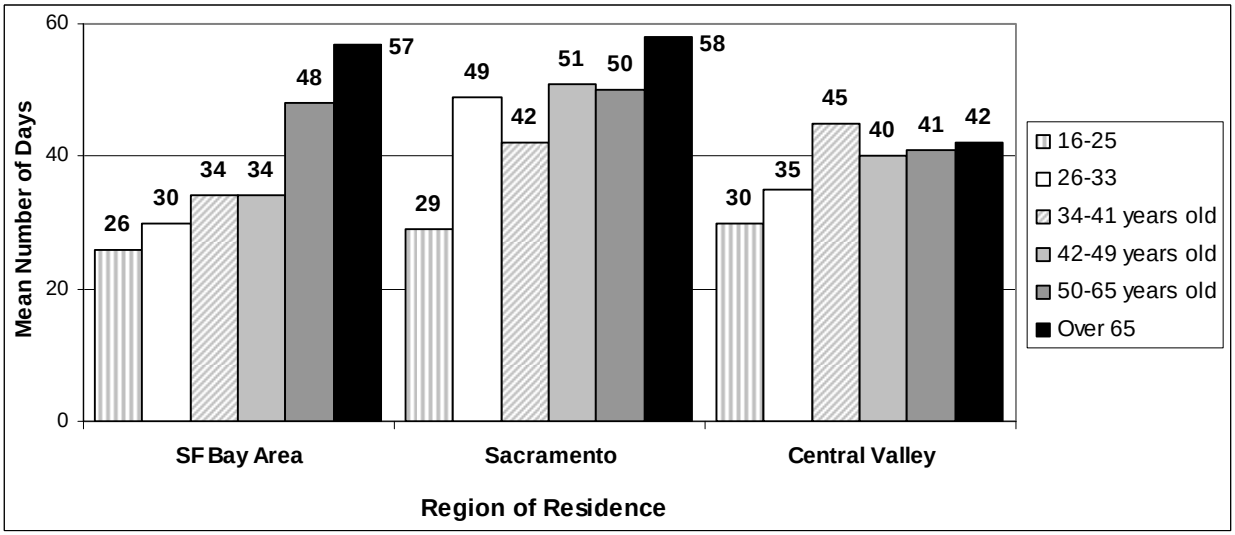
Figure 80. Percent of Boaters Who Use Their Boats at Various Locations by Age



Days of Annual Boat Use, Age and Region of Residence

Sacramento Basin residents age 26 – 33 or 42 – 49 years old reported higher annual usage than boaters the same age from the San Francisco Bay Area or Sacramento Basin regions. Central Valley residents age 34 – 41 used their boats more days per year than 34 – 41 year olds from the San Francisco Bay Area region, while Central Valley residents over 65 used their boats fewer days than San Francisco Bay Area or Sacramento Basin residents in the same age group. See Figure 81.

Figure 81. Mean Days of Annual Boat Use by Age and Region of Residence



Hours Put on Boat Engines Each Year

The largest proportion of boaters in this sample (25.5 percent) put between 26 and 50 hours on their boat engines each year, and 23.5 percent put less than 26 hours per year. Slightly fewer used their boat engines for 51 – 99 hours (21.9 percent), 100 – 150 hours (13.8 percent), or over 150 hours (10.0 percent). See Table 38.

Table 38. Annual Hours Put on Boat Engine

Hours	Count	Percent
0 to 25	722	23.5
26 to 50	782	25.5
51 to 99	673	21.9
100 to 150	422	13.8
Over 150	308	10.0
Total	**3,070**	**100.0**

Boating Activities

Almost two-thirds (65 percent) of the boaters surveyed in 2009 used their boats for leisure cruising, followed by fishing (46 percent), swimming (28 percent), skiing (24 percent), boat camping (21 percent) and wakeboarding (20 percent). See Table 39. Boaters who mentioned "other" activities included tubing (n=120), racing (n=92), scuba/diving (n=38), patrolling (n=20) and various other sport, leisure, and work or educational activities.

Table 39. Boating Activities

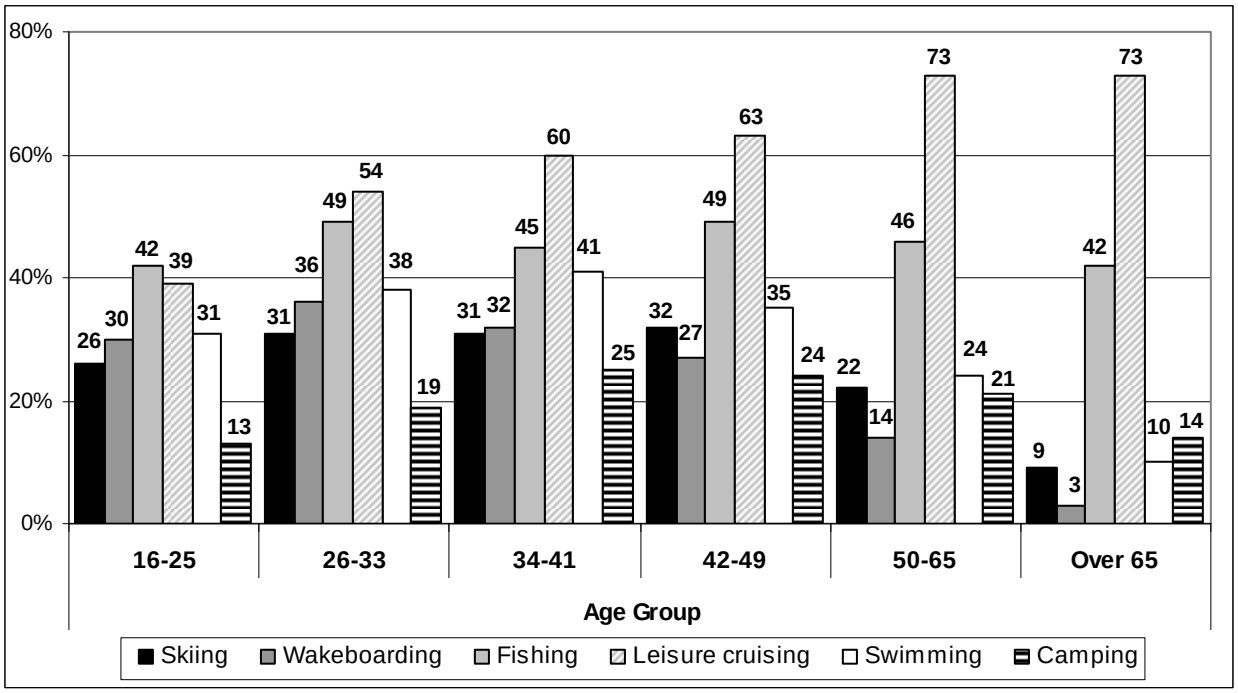
Boating Activities	Count	Percent
Leisure cruising	1,985	64.6
Fishing	1,419	46.2
Swimming	853	27.8
Skiing	745	24.3
Boat camping	648	21.1
Wakeboarding	613	20.0
Other activities	499	16.3

*Questionnaire item was "check all that apply," therefore percentages do not add up to 100.

Boating Activities and Boater Age

Boaters in older age groups were more likely than younger boaters to leisure cruise and less likely to ski, wakeboard, and swim. For example, 73 percent of boaters age 50 or older used their boats to leisure cruise, while 39 percent of 16 – 25 year olds leisure cruise, and 31 – 32 percent of boaters age 26 – 49 used their boats to ski, whereas only 9 percent of boaters over age 65 ski. See Figure 82.

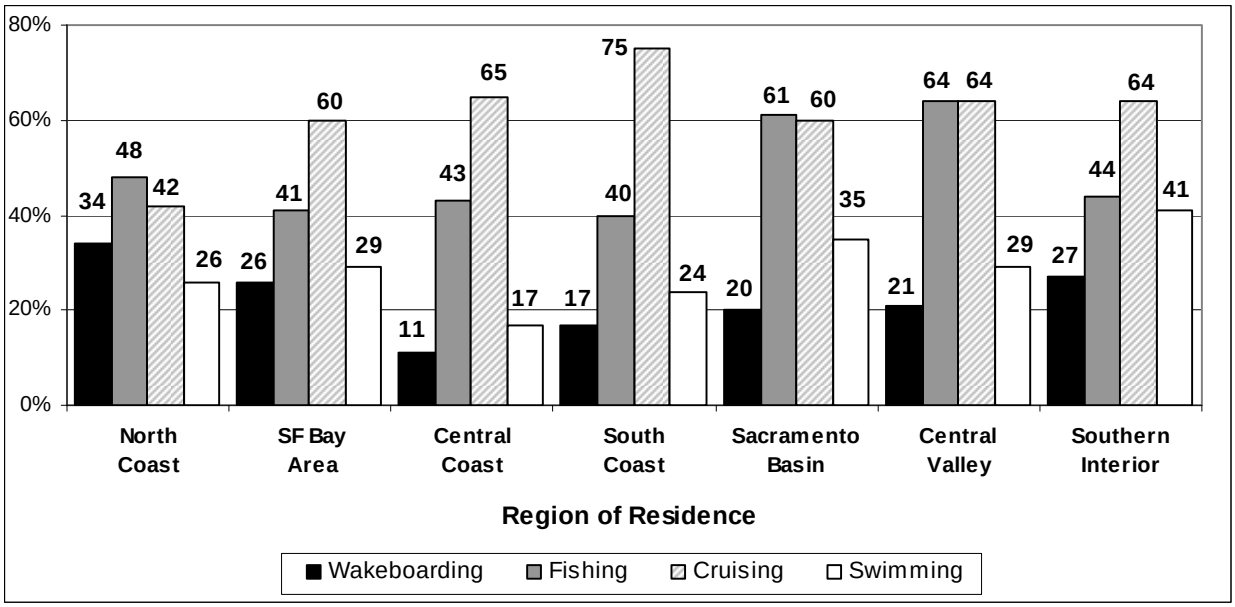
Figure 82. Boating Activities by Age Group



Boating Activities and Region of Residence

Residents from the North Coast, Southern Interior, and San Francisco Bay Area were more likely than residents from the Central or South Coast regions to use their boats to wakeboard. Boaters from the Sacramento Basin and Central Valley were more likely than those from the San Francisco Bay or Central and South Coast regions to use their boats to fish. Boaters from the South Coast, Central Coast, Central Valley or Southern Interior were more likely to use their boats for leisure cruising than boaters from the North Coast region. Boaters from the Sacramento Basin or Southern Interior were more likely than those from the North, South or Central Coasts to use their boats to swim. See Figure 83.

Figure 83. Boating Activities by Region of Residence



Sewage Disposal Practices of Boaters

Type of Toilet and Marine Sanitation Device on Boat

Of all boaters surveyed, just over half (52 percent) did not have a toilet on board their boat. Another third of all boaters (36 percent) had an installed toilet, while 13 percent said they had a port-a-potty. Of the 922 boaters with an installed toilet who answered the follow-up question regarding type of Marine Sanitation Device (MSD), nearly three quarters (75 percent) had a Type III MSD, while 18 percent had a Type I, and 7 percent have a Type II. See Table 40.

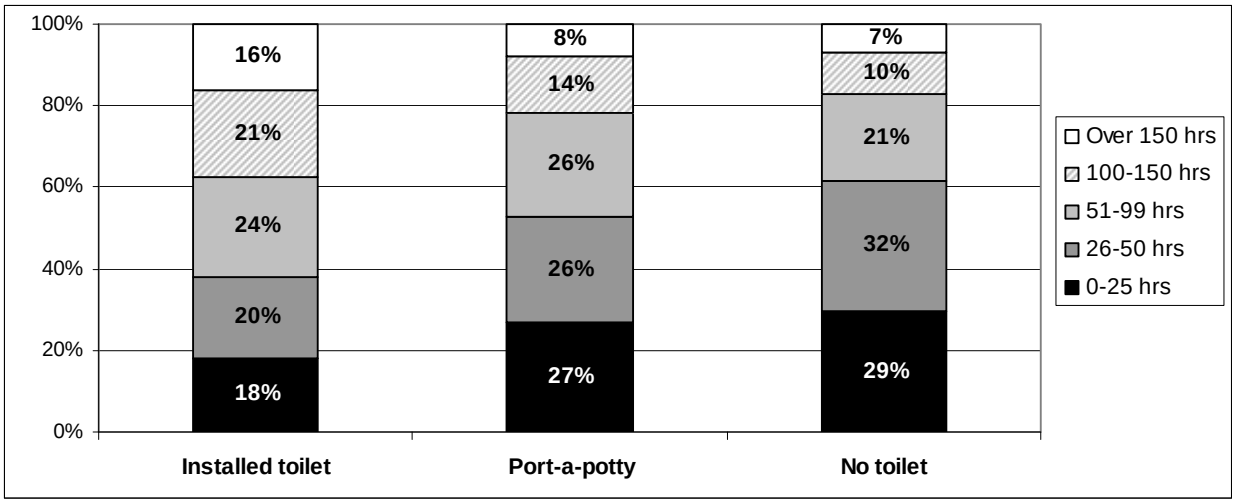
Table 40. Type of Toilet and Marine Sanitation Device On Board Boat

	Of all boaters surveyed:		Of those with a toilet on board:		
Type of toilet	**Count**	**Percent**	**Type of marine sanitation device**	**Count**	**Percent**
Installed toilet	1,025	35.5	Type I	168	18.2
Port-a-potty	378	13.1	Type II	65	7.0
No toilet on board	1,488	51.5	Type III	689	74.7
Total	2,891	100.0	**Total**	922	100.0

Type of Toilet and Annual Engine Hours

Boaters who owned boats with installed toilets on board also put the most engine hours on their boats each year; 61 percent put over 50 hours on their boat engines annually, and 37 percent logged 100 or more hours annually. Forty-eight percent of boaters with port-a-potties used their boats for over 50 engine hours a year, and 22 percent for 100 hours or more. Among those with no toilets on their boats, 38 percent logged over 50 engine hours annually, and 17 percent logged 100 hours or more. See Figure 84.

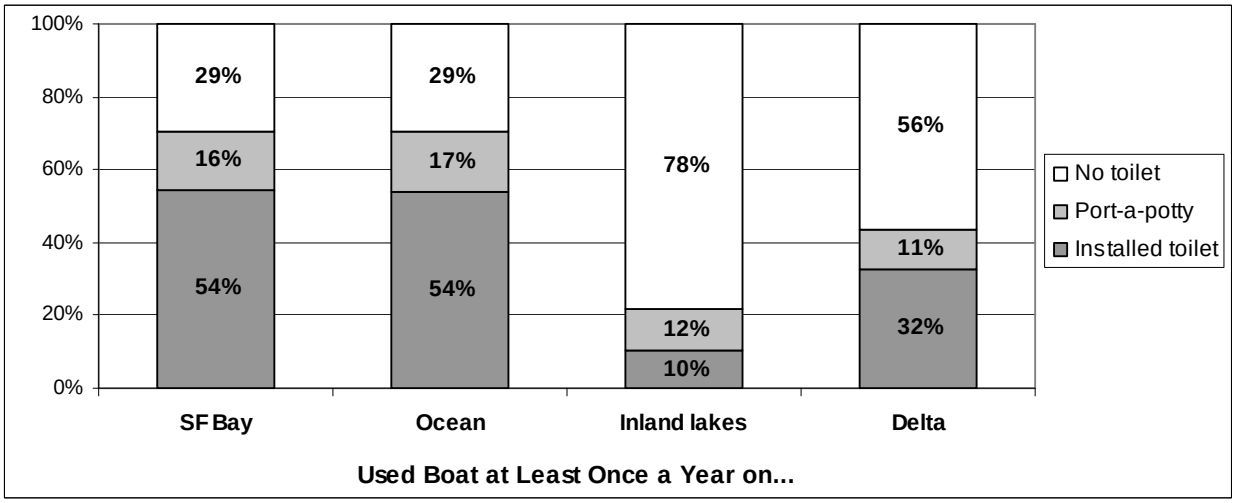
Figure 84. Type of Toilet by Annual Boat Engine Hours



Type of Toilet and Use of Boat at Various Locations

Those who used their boats on the San Francisco Bay, the ocean, or the Delta at least once a year were more likely to have an installed toilet on their boats, while those who usde their boats on inland lakes were less likely. Nearly 80 percent of those who boated on inland lakes had no onboard toilet, while at least 70 percent of those who used their boats on the San Francisco Bay or the ocean had either an installed toilet or a port-a-potty on board. Nearly half (43 percent) of those who used their boats on the Delta had either an installed toilet or a port-a-potty on board. See Figure 85.

Figure 85. Type of Toilet by Use of Boat at Various Locations



Type of Toilet and Identification of Environmental Logos

Ability to correctly identify the oil and sewage logos was greater among those with installed toilets. About 29 percent of boaters with installed toilets correctly identified the oil logo compared to 25 percent of those with no toilets. Similarly, 42 percent of boaters with installed toilets and only 28 percent of those with no toilets recognized the sewage logo. See Figures 86 and 87.

Figure 86. Type of Toilet and Oil Recycling Environmental Logo Recognition

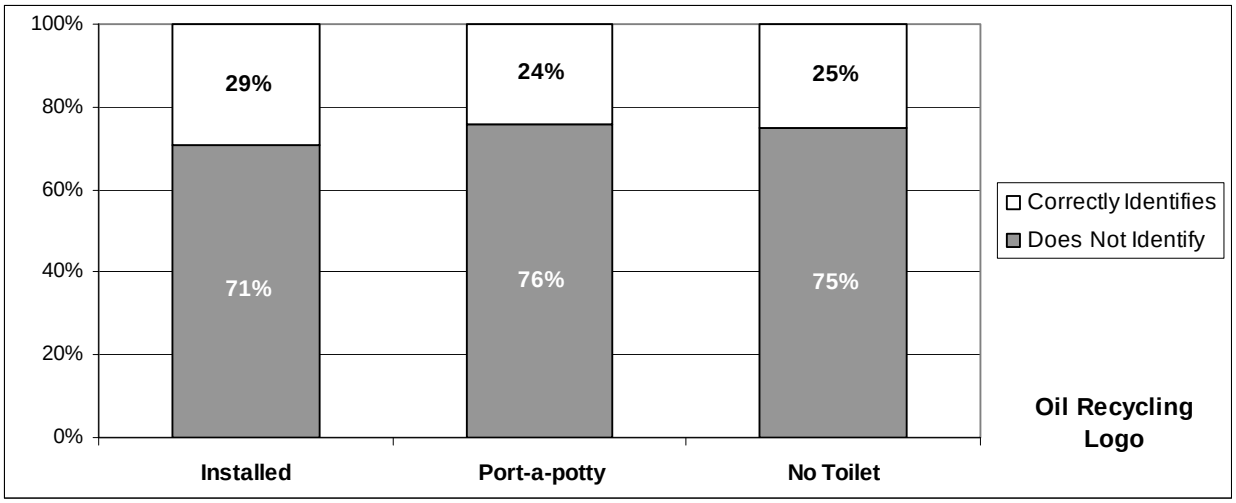
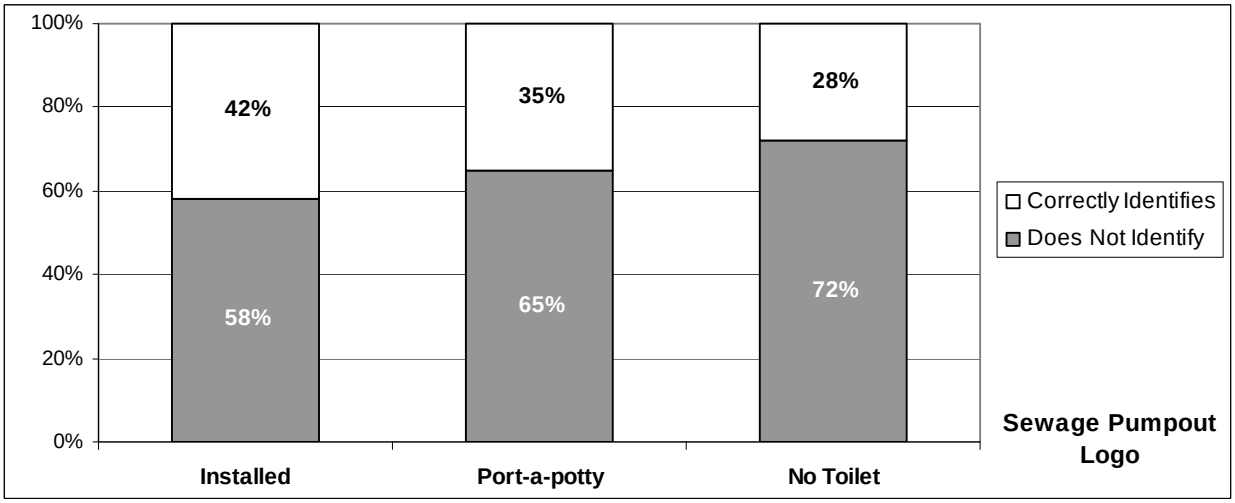


Figure 87. Type of Toilet and Sewage Pumpout Environmental Logo Recognition



Type of Toilet and MSD by Region of Residence

Although toilet type varied somewhat by region of residence, MSD type did not. Central and South Coast residents were among those most likely to have installed toilets (41 – 42 percent), while boaters from the three inland regions were the most likely to have no onboard toilet (59 – 66 percent). More Southern Interior residents had port-a-potties on board (18 percent) than boaters from the Central Coast (10 percent), Sacramento Basin (10 percent), or San Francisco Bay Area (9 percent). Table 41 presents the percentages of each type of toilet by region of residence.

Table 41. Percent of Boats by Toilet Type and Region of Residence

	North Coast	SF Bay	Central Coast	South Coast	Sacramento Basin	Central Valley	Southern Interior
Installed	27.8	33.9	41.3	42.2	24.7	25.7	22.9
Port-a-potty	14.4	8.8	9.8	15.6	9.8	12.8	18.1
No Toilet	57.8	57.3	48.9	42.2	65.5	61.5	59.0
	(n=90)	*(n=613)*	*(n=92)*	*(n=822)*	*(n=79)*	*(n=109)*	*(n=83)*

Type of MSD, Boat Type, and Boat Length

Type of MSD varied by boat length but not by boat type. Although 60 percent or more of all boaters surveyed had Type III MSDs, the likelihood of having a Type III MSD increased with length of boat. Of those who owned boats 26 feet or longer, at least three quarters (75 – 79 percent) had Type III MSDs. Type II MSDs were relatively uncommon on boats 20 feet or longer. See Figures 88 and 89.

Figure 88. Type of MSD by Boat Length

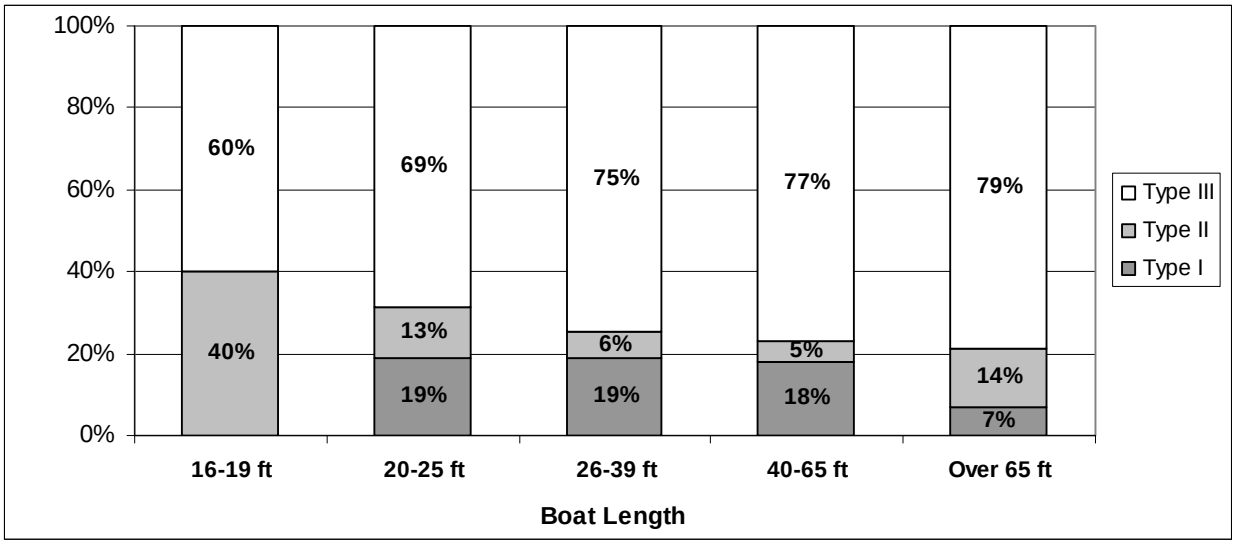
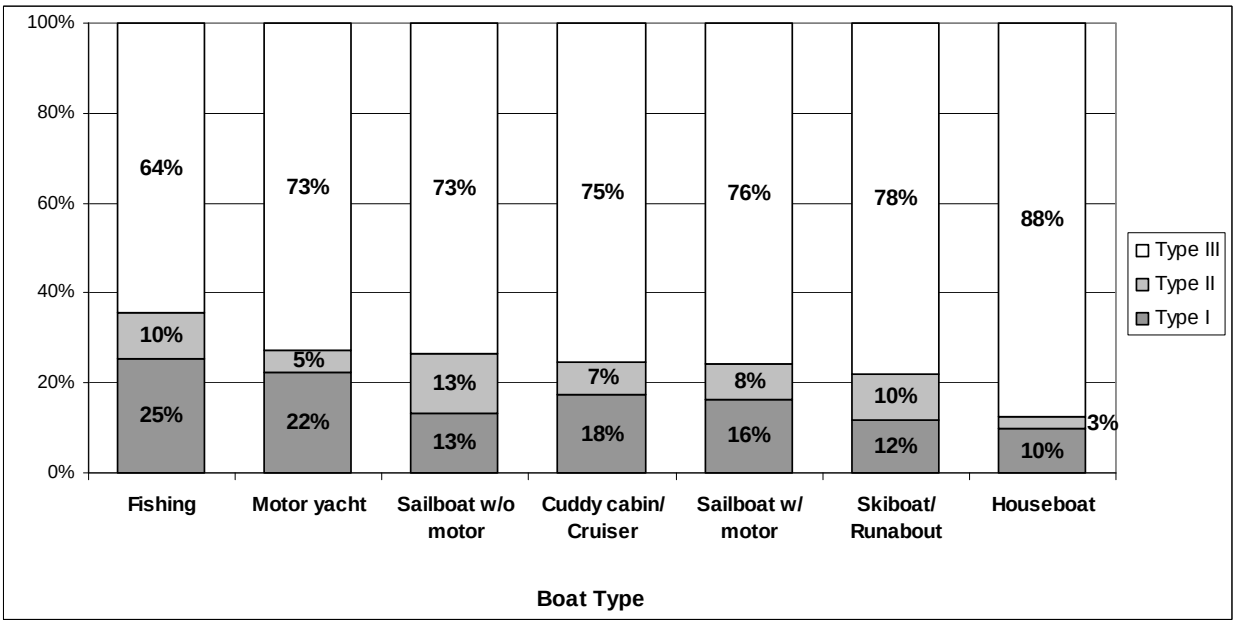


Figure 89. Type of MSD by Boat Type



Frequency of Annual Sewage Pumpout Use

When asked how often they use sewage pumpout stations annually, the largest proportion of respondents (30 percent) said they used a pumpout 1 to 5 times annually, while 25 percent said they used pumpouts more than 10 times a year, and 23 percent said they used them 6 to 10 times a year.

Nearly 14 percent of respondents said they used a pumpout every time they go out on their boat. See Table 42.

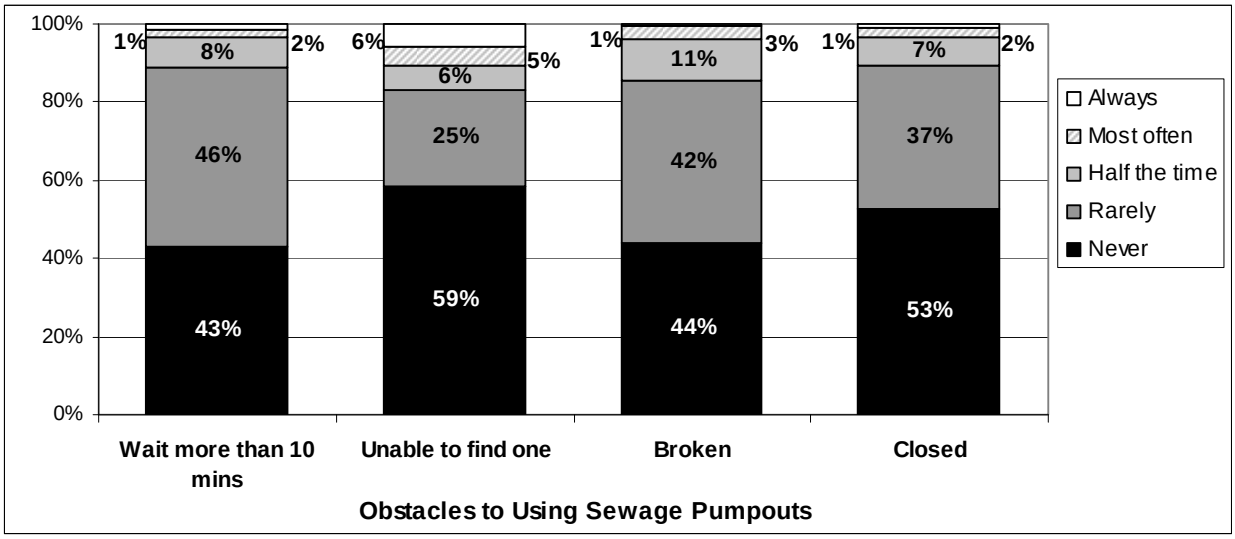
Table 42. Number of Times Use a Sewage Pumpout Annually

	Count	Percent
Every time I go out on the boat	132	13.7
More than 10 times	240	24.8
6 to 10 times	218	22.5
1 to 5 times	288	29.8
Don't use a mobile or stationary pumpout	89	9.2
Total	967	100.0

Obstacles to Using Sewage Pumpouts

Of the 878 respondents who reported using sewage pumpouts, 723 (82 percent) answered at least one follow-up question about obstacles to using pumpouts. The most common obstacle reported was having to wait in line more than 10 minutes (57 percent), followed by 56 percent who found the pumpout broken, and 47 percent who said it was closed. However, only 11 percent said they waited in line half the time or more often while 46 percent said they waited rarely. Although most (59 percent) reported they never had trouble finding a sewage pumpout, 11 percent said they were most often or always unable to find a pumpout. In contrast, less than 4 percent of respondents reported they most often or always found the pumpout broken, found it closed, or had to wait in line. See Figure 90.

Figure 90. Frequency of Experiencing Various Obstacles to Using Sewage Pumpouts



Obstacles to Using Sewage Pumpouts and Location of Boat Use

Figures 91 to 94 present the results for obstacles encountered when using pumpouts by boat use location. In general, relationships between boat use location and problems using sewage pumpouts were not significant. However, boaters who used their boats at least once on inland lakes were more likely than those who did not boat on inland lakes to have trouble locating a pumpout, to wait more than 10 minutes in line to use a pumpout, or to encounter a closed pumpout. Ocean boaters also reported more trouble locating pumpouts and encountering more closed pumpouts than non-ocean boaters.

Figure 91. Obstacles to Using Sewage Pumpouts on Inland Lakes

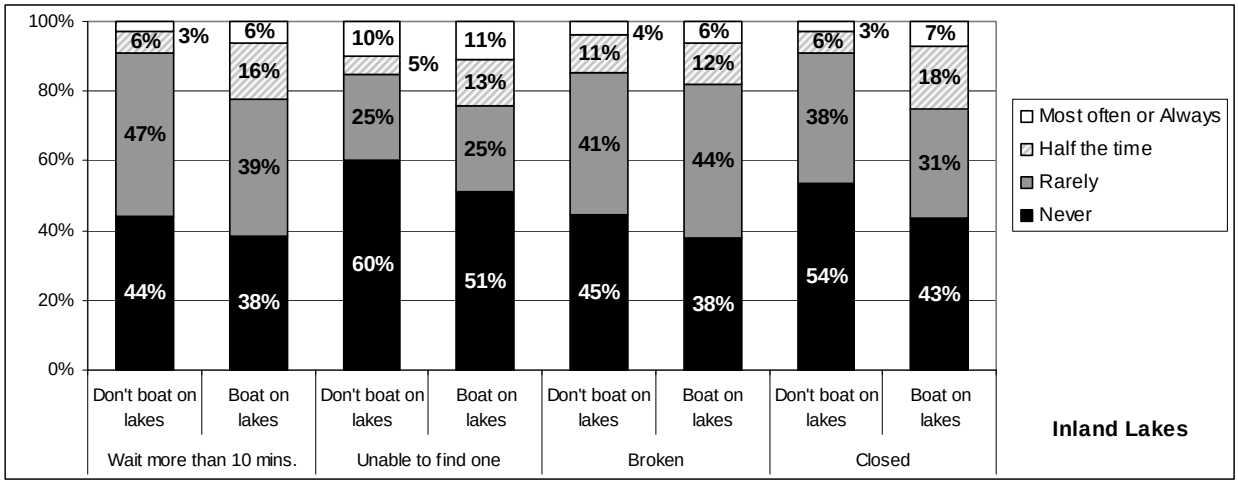


Figure 92. Obstacles to Using Sewage Pumpouts on the Ocean

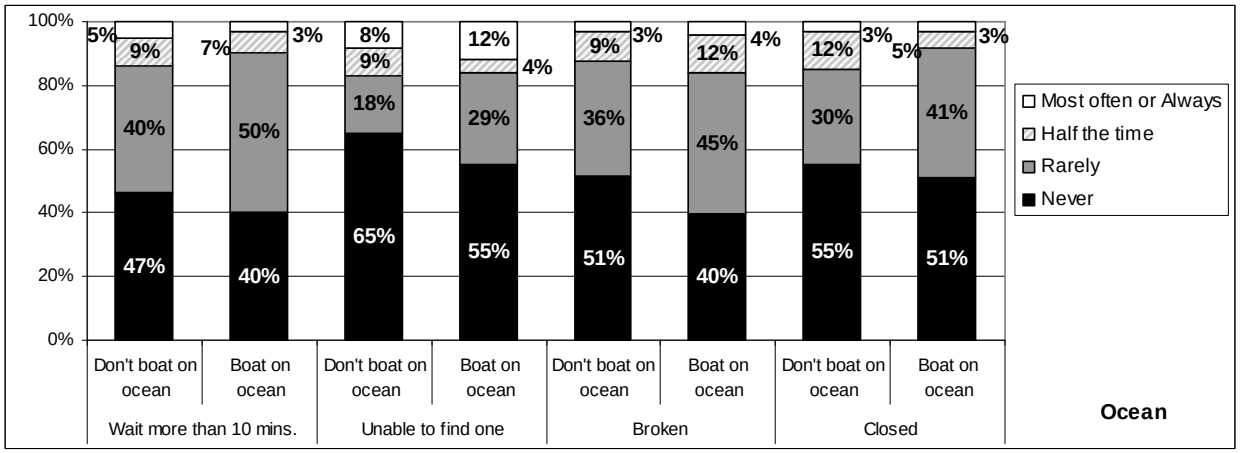


Figure 93. Obstacles to Using Sewage Pumpouts on the San Francisco Bay

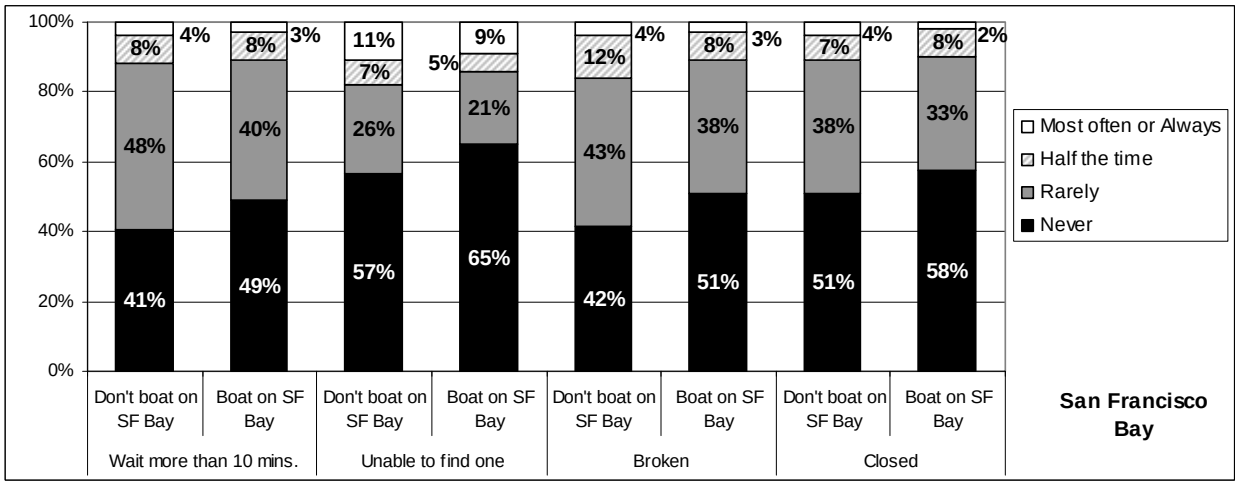
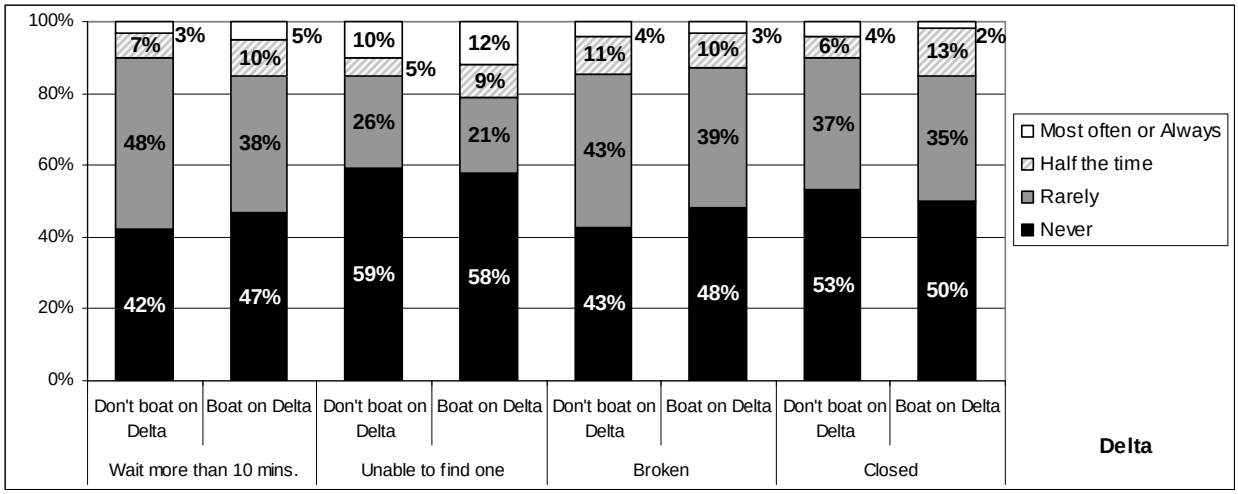


Figure 94. Obstacles to Using Sewage Pumpouts on the Delta



Obstacles to Using Sewage Pumpouts and Place Where Pumpout Most Often Used

In general, obstacles to using sewage pumpouts did not appear to be meaningfully related to where boaters most often used pumpouts. Boaters did not report encountering broken pumps or having to wait in line at different rates based upon where they usually used sewage pumpouts. Perhaps not surprisingly, those who usually used pumpouts at the facility where they berthed or stored their boats were less likely to report encountering a closed pumpout; 55 percent of these boaters said they never encountered a closed pumpout, compared to 42 percent of those who most often used pumpouts where they launched, and 42 percent of those who used mobile pumpouts. However, 60 percent of those who usually used pumpouts where they launched reported they were unable to find one at least some of the time, versus 38 – 48 percent of those who used pumpouts in any other location.

Obstacles to Using Sewage Pumpouts by Boat Use Location and Region of Residence

Among boaters who boated at least once a year on the Delta, Sacramento Basin residents reported they encountered broken pumpouts half the time or more often about twice as often as San Francisco Bay residents (20 percent versus 8 percent). Boaters who recreated on the Delta at least once a year also encountered closed pumpouts half the time or more often, about twice as often, as San Francisco Bay residents (22 percent versus 10 percent), and they waited in line more than 10 minutes more often than San Francisco Bay Area residents (26 percent versus 15 percent). Sacramento Basin residents were nearly 3 times as likely as San Francisco Bay residents to report they couldn't find a pumpout half the time or more often (28 percent versus 11 percent).

Among those who boated at least once a year on the ocean, South Coast residents reported they encountered broken pumpouts half the time or more often about three times as often as San Francisco Bay residents (19 percent versus 6 percent). They also said they never had to wait in line more than 10 minutes less often than San Francisco Bay Area residents (36 percent versus 52 percent) and never had trouble finding one less often than San Francisco Bay residents (53 percent versus 66 percent).

All other analysis of obstacles encountered by boat use location and region of residence has not been conducted due to insufficient sample sizes.

Location of Pumpout Use

Nearly three quarters (72 percent) of those who used sewage pumpout facilities used them at the marina where they stored or berthed their boats, and another 14 percent used them somewhere other than where they launched or berthed their boats. Less than 6 percent used the pumpout facilities where they launched, and only about 5 percent used a mobile pumpout service. See Table 43. Three percent specified other locations. Some of the "other" responses provided include at another marina close to home (5 responses), at sea 3 miles out (4 responses), and where they fuel (2 responses).

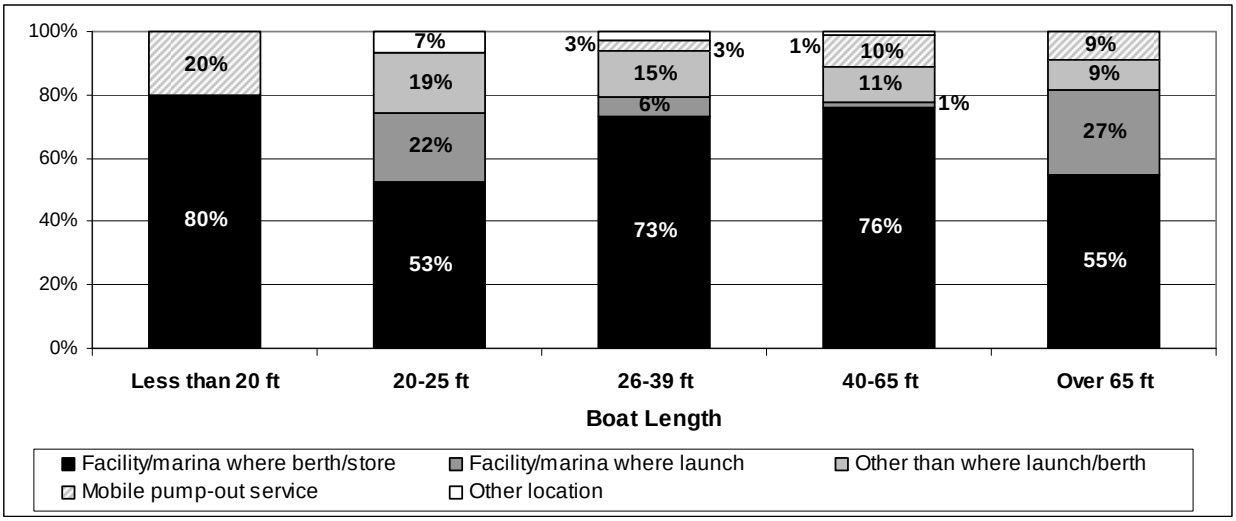
Table 43. Place Where Boaters Most Often Use Sewage Pumpout

	Count	Percent
At the facility or marina where I berth/store the boat	592	72.4
At the place or marina where I launch the boat	48	5.9
Somewhere other than the place I launch/berth	113	13.8
I use a mobile boat-to-boat pumpout service	44	5.4
Other	21	2.6
Total	818	100.0

Usual Pumpout Location and Boat Length

Usual location of sewage pumpout use varied significantly by boat length, but the pattern of responses was not linear. While about three quarters (73 – 76 percent) of those with boats 26 to 65 feet long most often used pumpouts where they stored or berthed their boats, only 55 percent of those with boats over 65 feet in length and 53 percent of those with boats 20 – 25 feet in length used these pumpouts most often. Boaters who owned boats over 65 feet or 20 – 25 feet in length were also more likely to use pumpouts where they launched more than those with other boat lengths. See Figure 95.

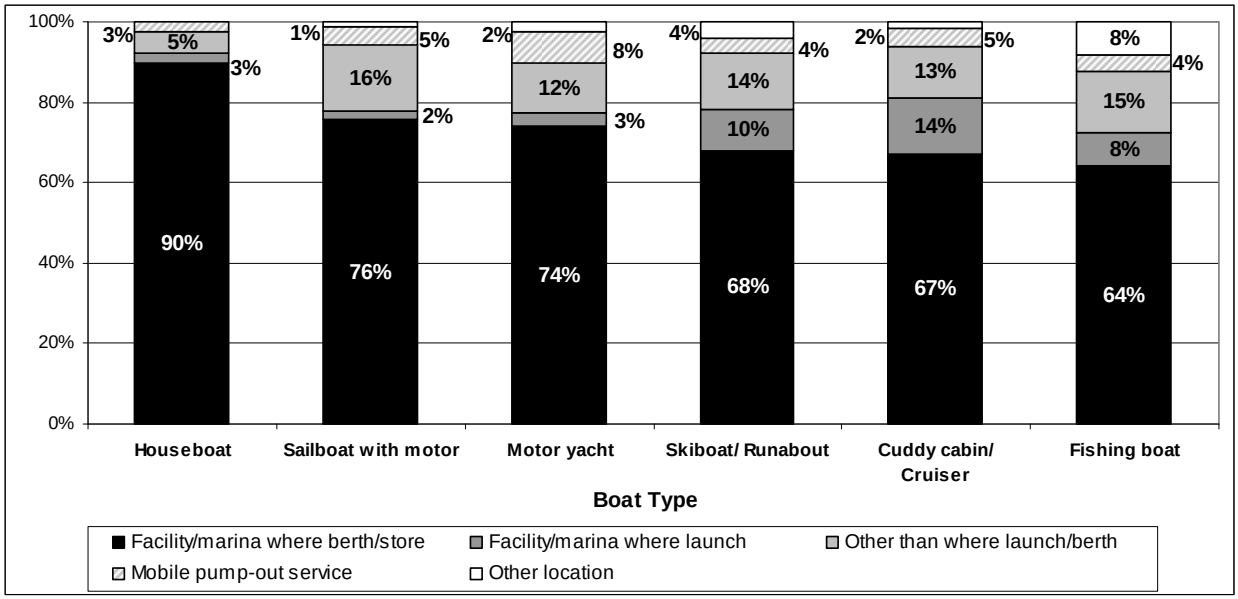
Figure 95. Location Most Often Use Sewage Pumpout by Boat Length



Usual Pumpout Location and Boat Type

Regardless of boat type, a large majority of boaters (64 to 90 percent) most often used the sewage pumpout where they stored or berthd their boat. Another 14 percent of cruiser owners, 10 percent of ski boat owners, and 8 percent of fishing boat owners most often used the sewage pumpout where they usually launched their boat. See Figure 96.

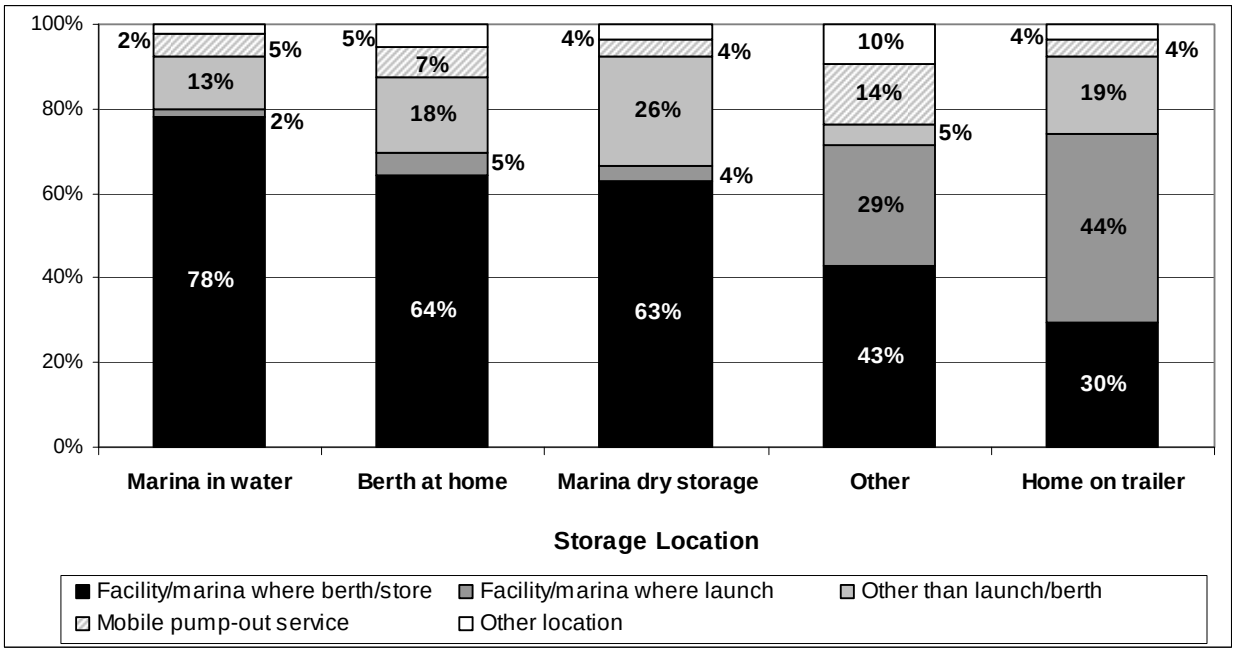
Figure 96. Location of Sewage Pumpout Most Often Used by Boat Type



Usual Pumpout Location and Boat Storage Location

A large majority of boaters who stored or berthed their boats at a marina in water most often used the sewage pumpout at the marina (78 percent), as did the majority of those who berthed at home (64 percent) or used a marina dry storage (63 percent). Compared to these three groups, those who stored their boats at home on a trailer or at some other location were much more likely to say they used pumpouts where they usually launched their boats (44 and 29 percent, respectively). Mobile pumpout service use was relatively low overall with the highest use reported by just 14 percent of those who stored their boats at some other location and 7 percent of those who berthed at home. See Figure 97.

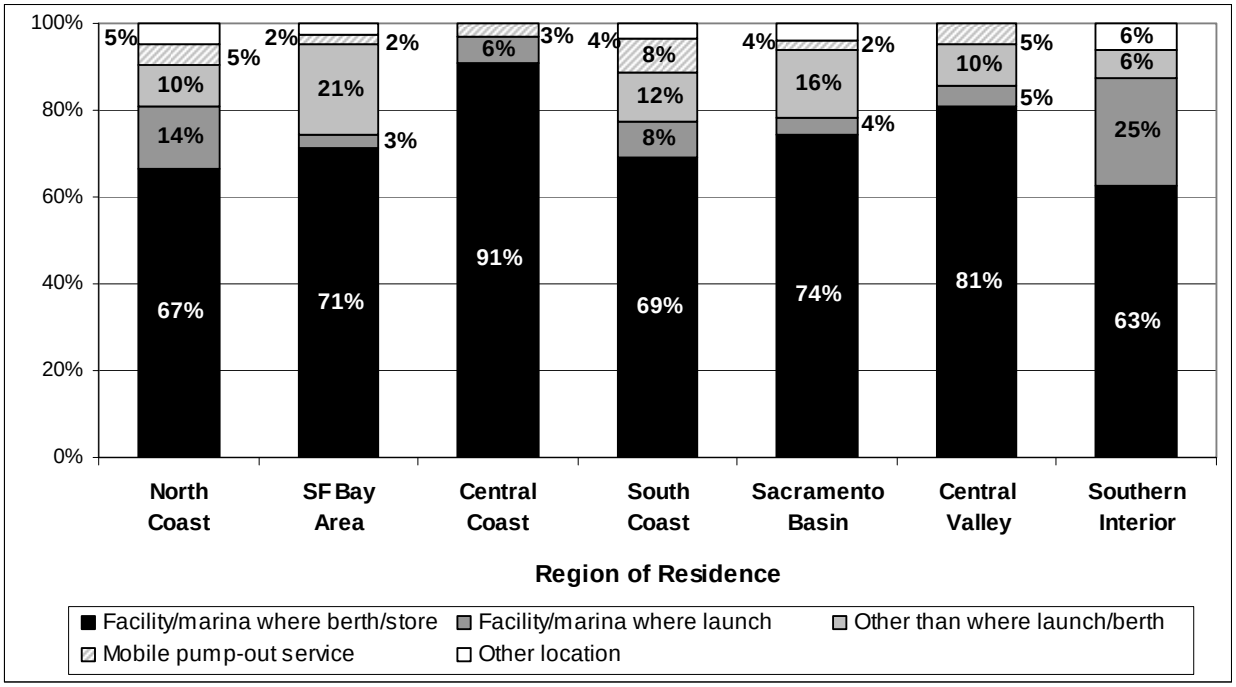
Figure 97. Location of Sewage Pumpout Most Often Used by Location Stored or Berthed



Usual Pumpout Location and Region of Residence

Most boaters (91 percent) surveyed who lived in the Central Coast region reported they most often used pumpouts at the marina where they stored their boat compared to only 63 percent of those who lived in the Southern Interior region. Those who lived in the Southern Interior region appeared to rely more on pumpouts where they launched than do residents in other regions. Residents of the San Francisco Bay Area region most often used pumpouts in locations other than where they launched or berthed their boats more than those who lived in other regions. Differences in usual pumpout location by region may be difficult to interpret given relatively low counts in some pumpout location by region categories. See Figure 98.

Figure 98. Location of Pumpout Most Often Used by Region of Residence



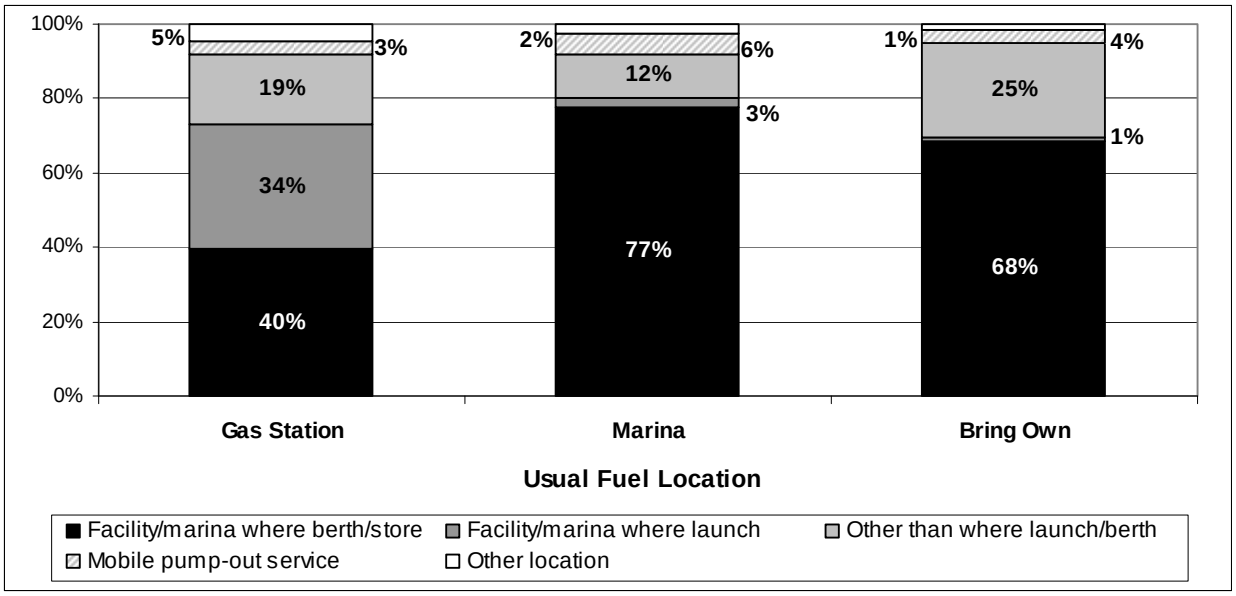
Annual Mean Number of Days of Boat Use by Usual Pumpout Location and Region of Residence

Among boaters who completed the survey in 2009, analyses of the mean number of days of total annual boat use by usual pumpout use location and region of residence cannot be done due to small sample sizes in most sub-groups.

Pumpout Location by Fuel Location

Most respondents who most often fueled their boats at a marina with a fuel dock or brought their own gas cans also most often used the sewage pumpout at the marina (77 and 68 percent, respectively), compared to 40 percent of those who used a gas station prior to launch. Those who most often used a gas station prior to launch were much more likely to use a pumpout where they launch (34 percent) compared to those who most often used a marina fuel dock (3 percent) or brought their own gas cans (1 percent). About one-fifth of those who used a gas station (19 percent) and one-quarter of those who brought their own gas cans (25 percent) reported they most often used a pumpout somewhere other than where they stored, berthed or launched. See Figure 99.

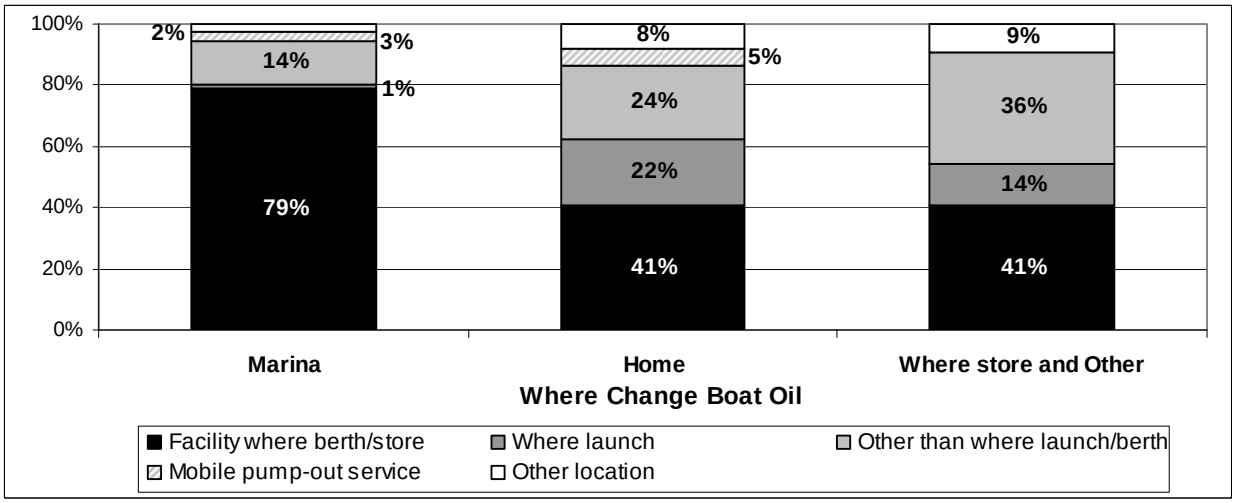
Figure 99. Location of Sewage Pumpout Most Often Used by Location Most Often Fueled



Pumpout Location and Place Where Boat Oil is Changed

Most boaters (79 percent) who changed their oil at the marina where they stored their boat also used the sewage pumpout at the marina. Forty-one percent of those who changed their oil at home or at locations other than the marina where they stored their boat used the sewage pumpout where they berthed or stored their boat. Almost a quarter (22 percent) of those who changed their oil at home used the pumpout where they launched most often, and over one-third (36 percent) of those who changed their oil somewhere other than at the marina or home most often used a pumpout somewhere other than where they usually launched or berthed their boat. About 5 percent of boaters who changed their oil at home used a mobile pumpout service. See Figure 100.

Figure 100. Location of Pumpout Most Often Used by Location Where Oil is Changed



Perceptions of Illegal Sewage Discharge

When asked how often they think boaters discharge untreated vessel sewage into the water, nearly 41 percent answered "frequently," 23 percent said "once in a while," and only 4 percent said "never." A third of all respondents (33 percent) said they did not know how often this occurs. See Table 44.

Table 44. How Often Do Boaters in California Discharge Untreated Sewage into the Water?

Of All Surveyed	Count	Percent	Of Those Who Gave Estimate	Count	Percent
Frequently	1,220	40.7	Frequently	1,220	60.8
Once in a while	683	22.8	Once in a while	683	34.0
Never	105	3.5	Never	105	5.2
Don't know	989	33.0			
Total	**2,997**	**100.0**	**Total**	**2,008**	**100.0**

Perception of how often boaters discharge untreated sewage into the water varied by the type of toilet they reportedly had on their boat. Those with installed toilets were more likely to say this happens "once in awhile" compared to those with no toilets (28 versus 20 percent). Of boaters with no toilets, 4 percent said this never happens compared to 2 percent of those with installed toilets. Perceptions of how often boaters discharge untreated sewage did not vary by the type of MSD a boater had onboard nor by where they most often used a sewage pumpout.

Perceived Penalty for Untreated Sewage Discharge

Boaters were asked to indicate what they thought might happen to those who discharge untreated sewage into the water. Nearly half (48 percent) said they did not know, while 17 percent chose "a fine of up to $1,100," 26 percent chose "a fine of up to $2,200" (correct response), 6 percent chose "up to 6 months in jail," and 3 percent chose "nothing—it is discouraged but not against the law." See Table 45.

Table 45. What May Happen to Those Who Discharge Untreated Sewage Overboard in California?

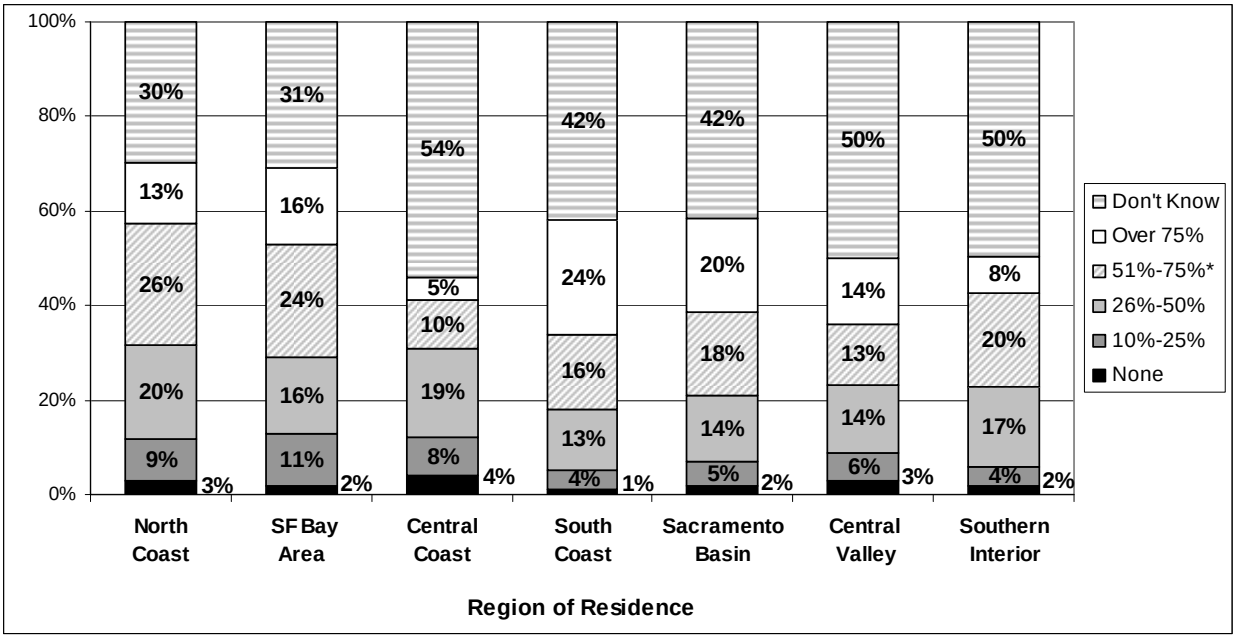
	Count	Percent
Nothing	99	3.4
Fine of up to $1,100	478	16.5
Fine of up to $2,200*	739	25.6
Up to 6 months in jail	176	6.1
Don't know	1,398	48.4
Total	**2,890**	**100.0**

*Correct response

Knowledge of What Percentage of Drinking Water Comes from the Delta by Region of Residence

Boaters' awareness of the percentage of drinking water that comes from the Delta varied by region of residence with only 10 percent of those from the Central Coast saying 51 – 75% (the correct response) as opposed to 20 percent of those from the Southern Interior region and 26% from the North Coast. See Figure 101.

Figure 101. California Boaters: What Percentage of Drinking Water Comes From the Delta by Region of Residence



*Correct response

Fueling Practices of Boaters

Usual Fuel Location

About half of the respondents in this sample (50 percent) said they fueled their boats at a gas station before they launched, but another 37 percent said they usually fueled at a marina with a fuel dock. Only 13 percent usually brought their own gas cans. See Table 46.

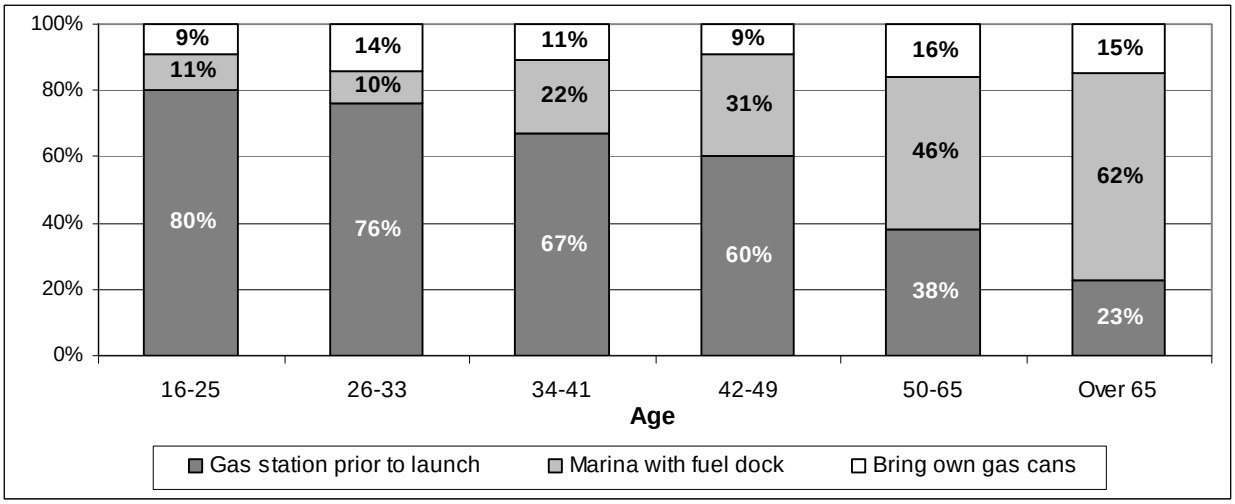
Table 46. Usual Fuel Location

	Count	Percent
Gas Station Prior to Launch	1,363	49.6
Marina with Fuel Dock	1,022	37.2
Bring Own Gas Cans	363	13.2
Total	**2,748**	**100.0**

Usual Fuel Location and Boater Age

Usual fuel location varied significantly by age, with boaters over 49 more likely than other age groups to fuel at a marina with a fuel dock. Only 23 percent of boaters 65 year old and over said they fueled at gas stations prior to launch, compared to 80 percent of 16 – 25 year olds, 76 percent of 26 – 33 year olds, and 67 percent of 34 – 41 year old who usually used a gas station. In this sample boaters who brought their own gas cans were about as likely to be 26 – 33 years old or over 50, but overall, the likelihood that a boater used a gas station prior to launch decreased as boater age increased. Conversely, the likelihood that a boater used a marina fuel dock increased with age. See Figure 102.

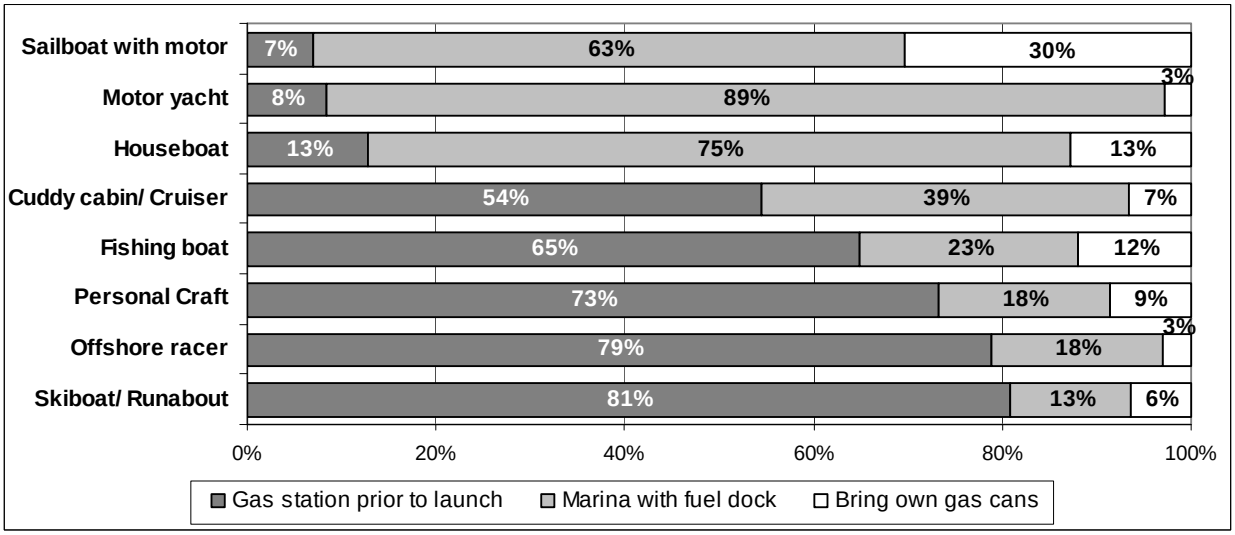
Figure 102. Usual Fuel Location by Respondent Age



Usual Fuel Location and Boat Type

A large majority of all boaters with ski boats (81 percent), off-shore racers (79 percent), personal water craft (73 percent), and fishing boats (65 percent) said they usually fueled at a gas station prior to launch. In contrast, not more than 13 percent of owners of houseboats, motor yachts or sailboats with auxiliary motors said they usually fueled at a gas station prior to launch. Motor yacht owners were more likely than owners of all other boat types to use a marina with a fuel dock, although 75 percent of houseboat owners and 63 percent of sailboat owners said they usually fueled at marina fuel docks. Owners of sailboats with auxiliary motors were more than twice as likely as others to bring their own gas cans. See Figure 103.

Figure 103. Usual Fuel Location by Boat Type

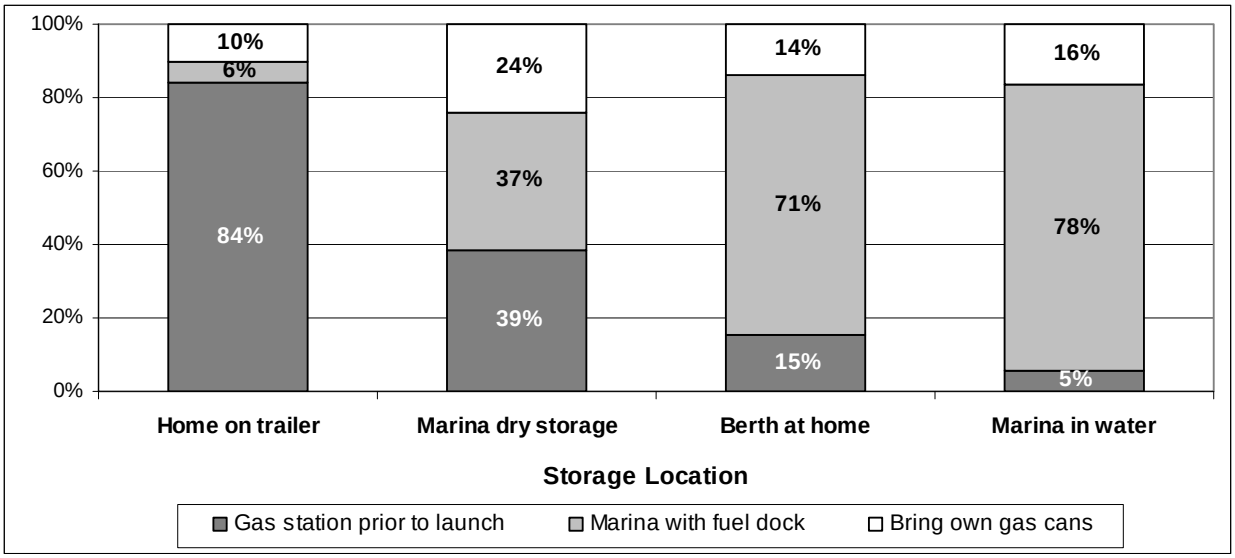


Usual Fuel Location and Boat Storage Location

A large majority of those who trailered their boats at home (84 percent) said they usually fueled at a gas station prior to launch, compared to 39 percent of those who used a marina dry storage, and only 15 percent who berthed their boats at home. A large majority of those whose boats were stored at a

marina in water (78 percent) said they fueled their boats at the marina fuel docks, compared to only 37 percent of those who used a marina dry storage or 6 percent who trailered them at home. Those who used a marina dry storage were more likely than others to bring their own gas cans (24 percent versus 10 – 16 percent). See Figure 104.

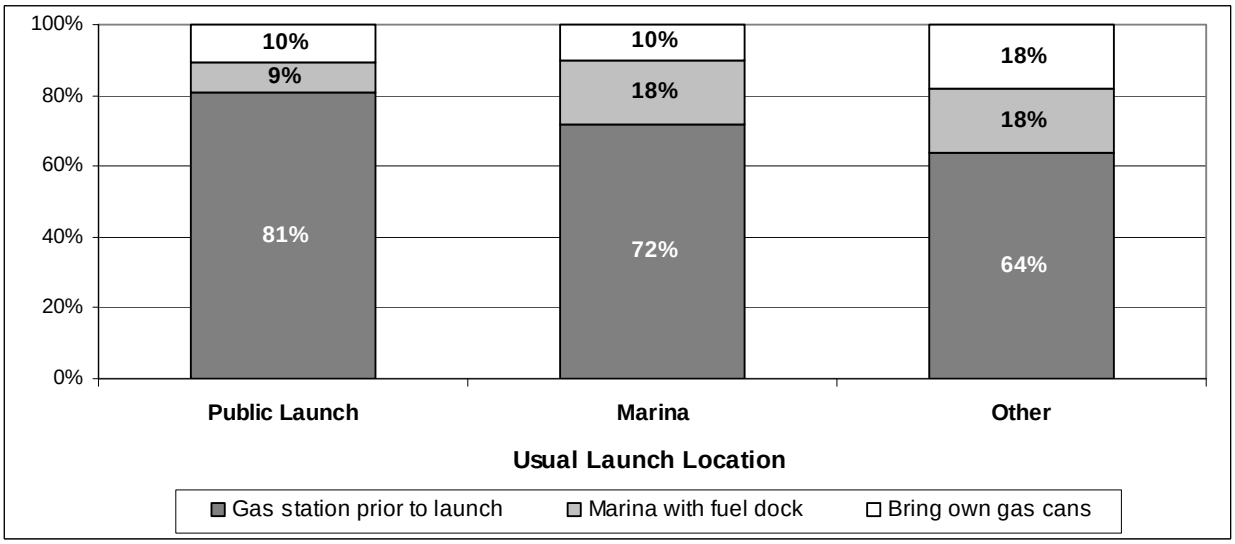
Figure 104. Usual Fuel Location by Boat Storage Location



Usual Fuel Location and Usual Launch Location

About 81 percent of boaters who usually used public launch facilities fueled their boats at a gas station prior to launch compared to 72 percent of those who launched at the marina or 64 percent of those who launched at "other" locations. Those who launched at public launch facilities brought their own gas cans about as often as those who launched at a marina, but boaters who launched from other locations appeared to bring their own gas somewhat more frequently. See Figure 105.

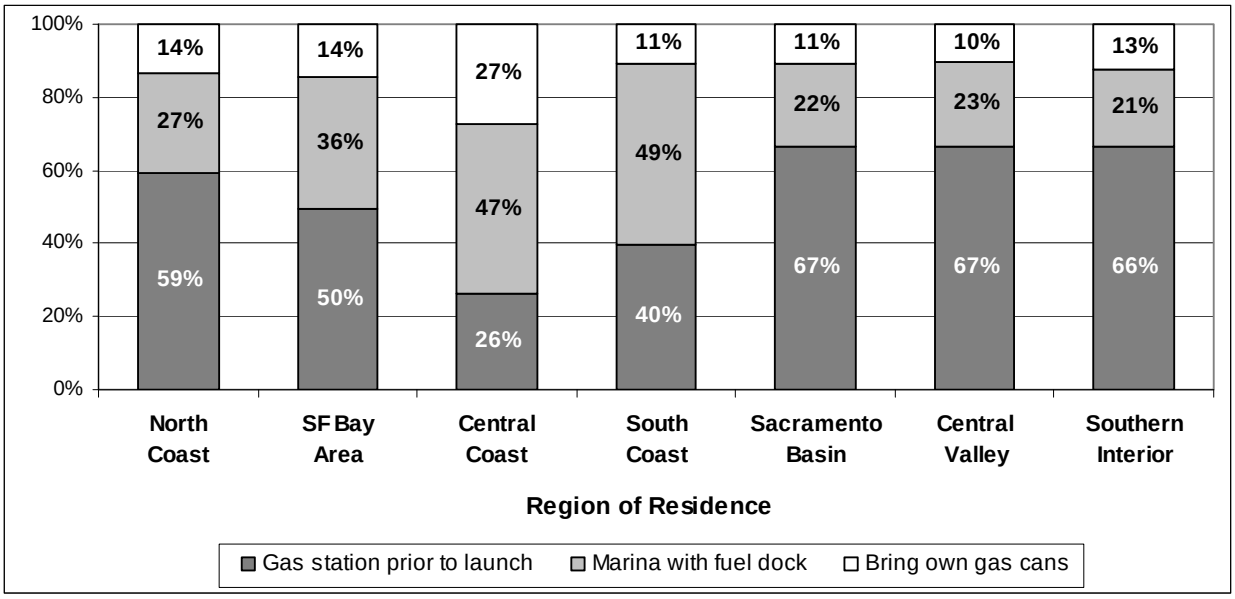
Figure 105. Usual Fuel Location by Usual Launch Location



Usual Fuel Location and Region of Residence

About two-thirds of boaters from the Sacramento Basin (67 percent), Central Valley (67 percent), or Southern Interior (66 percent) regions usually fueled their boats at a gas station prior to launch. In contrast, only 40 percent of boaters from the South Coast region and 26 percent from the Central Coast region say they used a gas station prior to launch. Central and South Coast region residents were more likely than boaters from other areas to say they used a marina's fuel docks, and 27 percent of boaters from the Central Coast region said they usually brought their own gas cans, which was a higher proportion of boaters by far than in any other region. See Figure 106.

Figure 106. Usual Fuel Location by Region



Daily Fuel Use

Of those 2,884 respondents who estimated their typical daily fuel use, just under half (45 percent) used less than 12 gallons in a typical day, 39 percent used from 12 – 30 gallons, and 12 percent used over 30 gallons in a typical day. See Table 47.

Table 47. Average Daily Fuel Use in Gallons

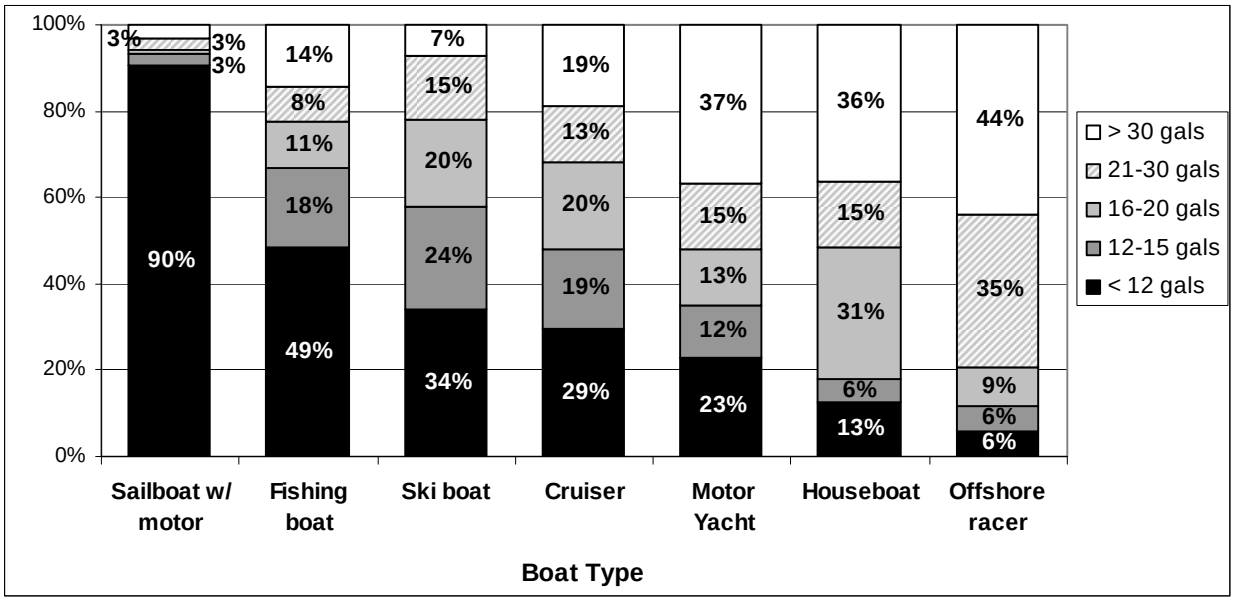
	Count	Percent
Less than 12 gallons	1,308	45.4
12 – 15 gallons	450	15.6
16 – 20 gallons	365	12.7
21 – 30 gallons	303	10.5
Over 30 gallons	357	12.4
Other amount	101	3.5
Total	**2,884**	**100.0**

Daily Fuel Use and Boat Type

Proportionately more boaters who owned sailboats with auxiliary motors or fishing boats reported they used less than 12 gallons of fuel in a typical day than owners of other boat types. Less than 10 percent of owners of sailboats with motors said they used more than 12 gallons daily, and nearly half (49

percent) of those who owned fishing boats said they used less than 12 gallons of fuel on an average day. Those who owned offshore racers, motor yachts or houseboats were more likely than other owners to say they used more than 30 gallons of fuel in a typical day, and 79 percent of offshore racer owners said they consumed 21 gallons or more each day they were on the water. See Figure 107.

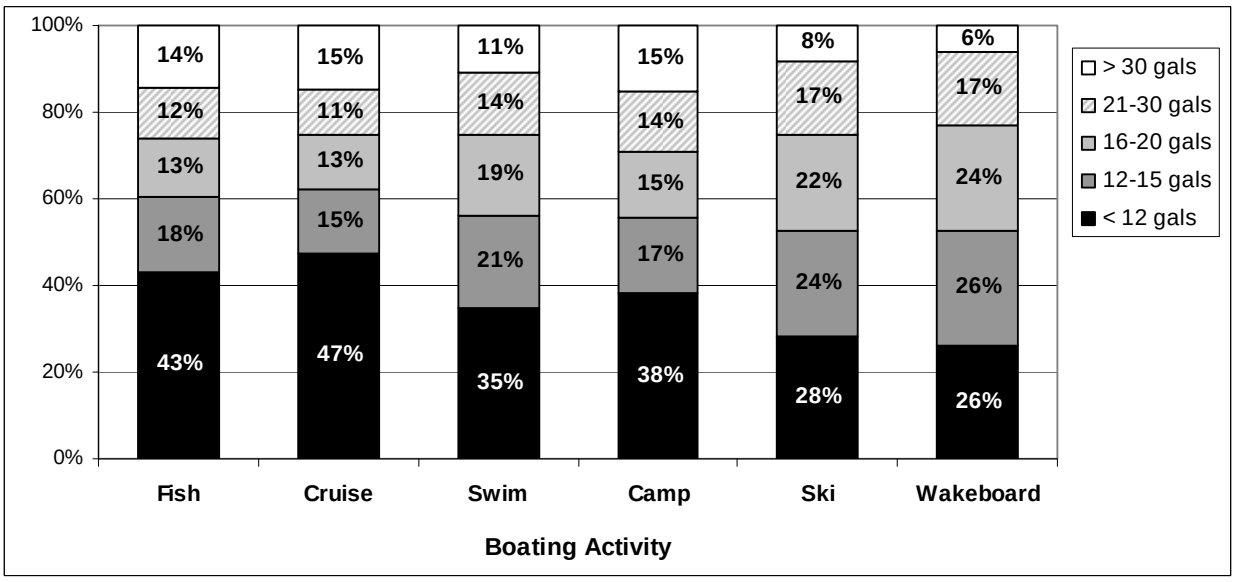
Figure 107. Daily Fuel Use in Gallons by Boat Type



Daily Fuel Use and Boating Activities

Boaters who used their boats to fish or leisure cruise more often reported that they consumed less than 12 gallons in a typical day compared to boaters who engaged in other activities. Also boaters who fished, leisure cruised, or camped with their boats more often said they used more than 30 gallons in a typical day compared to those who skied or wakeboarded. See Figure 108.

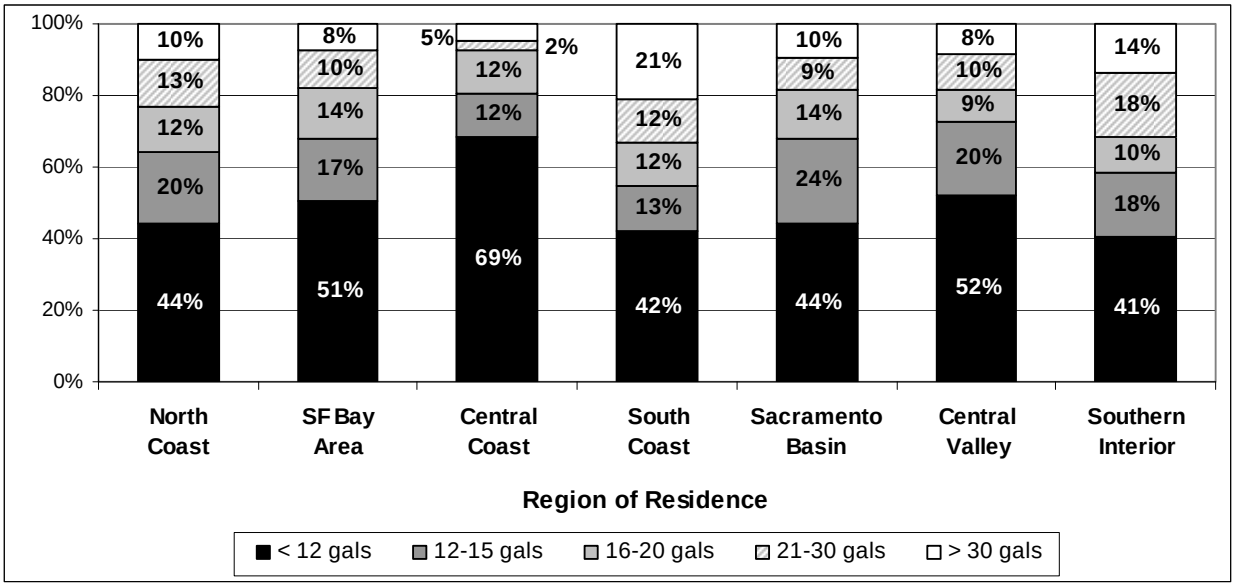
Figure 108. Daily Fuel Use in Gallons by Boating Activities



Daily Fuel Use and Region of Residence

Residents from the Central Coast region were more likely than others to use less than 12 gallons of fuel in a typical day (69 percent versus 41 – 52 percent). South Coast region residents were more likely than boaters from other areas to say they consumed more than 30 gallons in a typical day (21 percent versus 5 – 14 percent). See Figure 109.

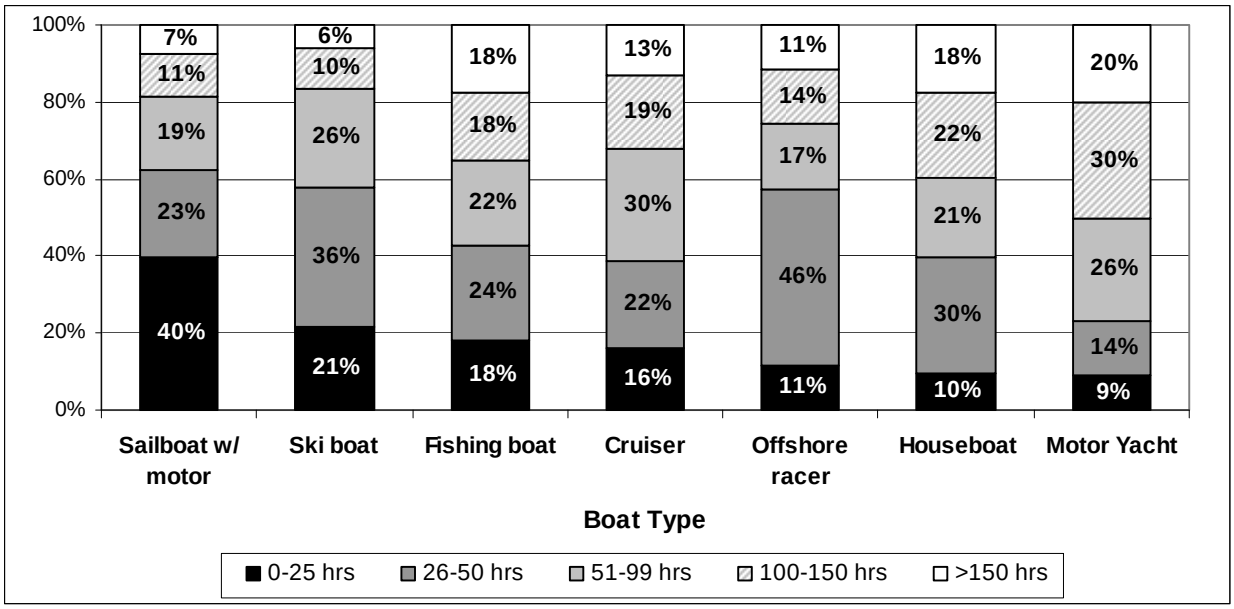
Figure 109. Daily Fuel Use in Gallons by Region



Annual Engine Hours and Boat Type

Boaters who owned motor yachts, houseboats, or fishing boats were those most likely to put 150 or more hours on their engines annually. Those who owned sailboats with auxiliary motors, offshore racers, or ski boats were those more likely to say they put 50 hours or less on their engines, and those who owned sailboats with auxiliary motors were far more likely than those with other boat types to say they put 25 hours or less on their engines annually. See Figure 110.

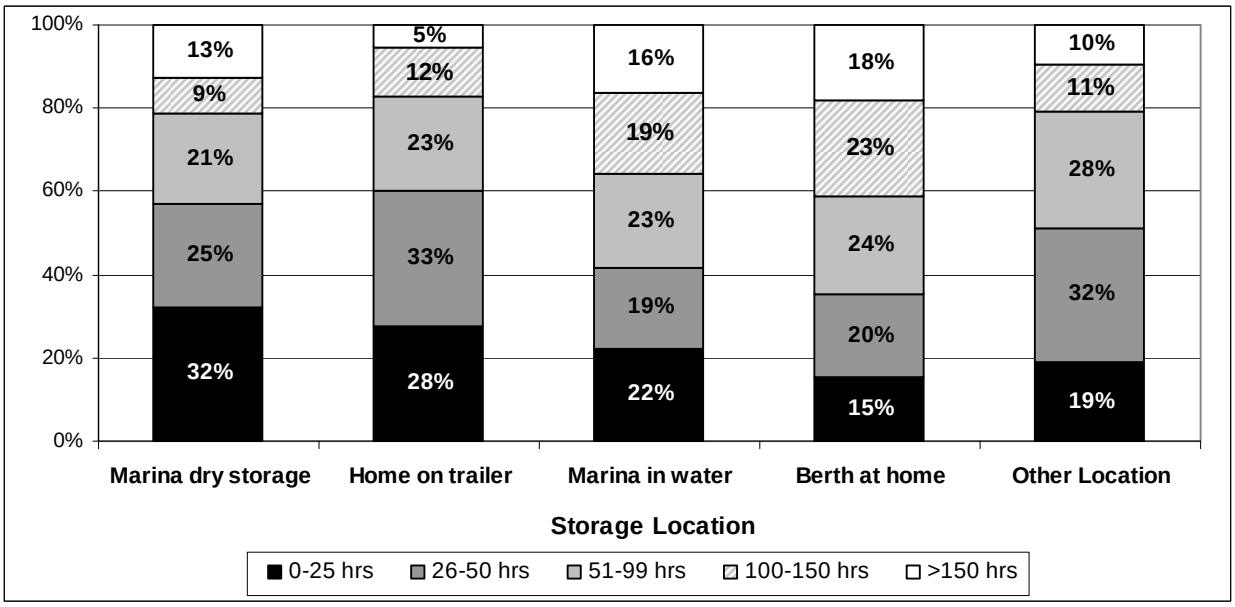
Figure 110. Annual Engine Hours and Boat Type



Annual Engine Hours and Boat Storage

Boaters who stored their boats at home on a trailer were less likely than those who stored their boats in any other locations to put more than 150 hours on their engine per year. Those who trailered their boats at home or used a marina dry storage were also more likely than other boaters to say they put less than 51 hours on their engines annually. Those who berthd at home or at the marina in water were more likely than other boaters to report they put 100 or more hours on their engines annually (35 – 41 percent versus 17 – 22 percent). See Figure 111.

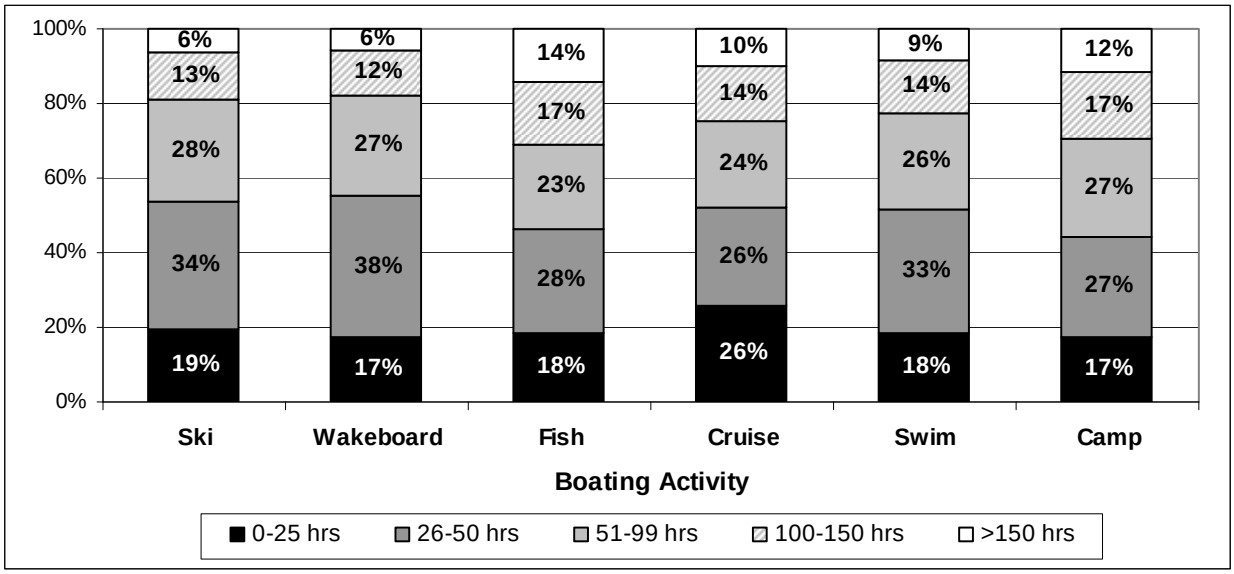
Figure 111. Annual Engine Hours and Boat Storage Location



Annual Engine Hours and Boating Activities

Number of engine hours boaters put on their boats varied by boating activities reported. Boaters who fish or camp tended to more often report that they put 100 or more hours on their engine in a year. A higher proportion of those who used their boats for leisure cruising (26 percent) said they put less than 26 hours on their engine annually as compared to others activity groups (17 – 19 percent). Patterns of response for those who ski, wakeboard or swim with their boats was highly similar. See Figure 112.

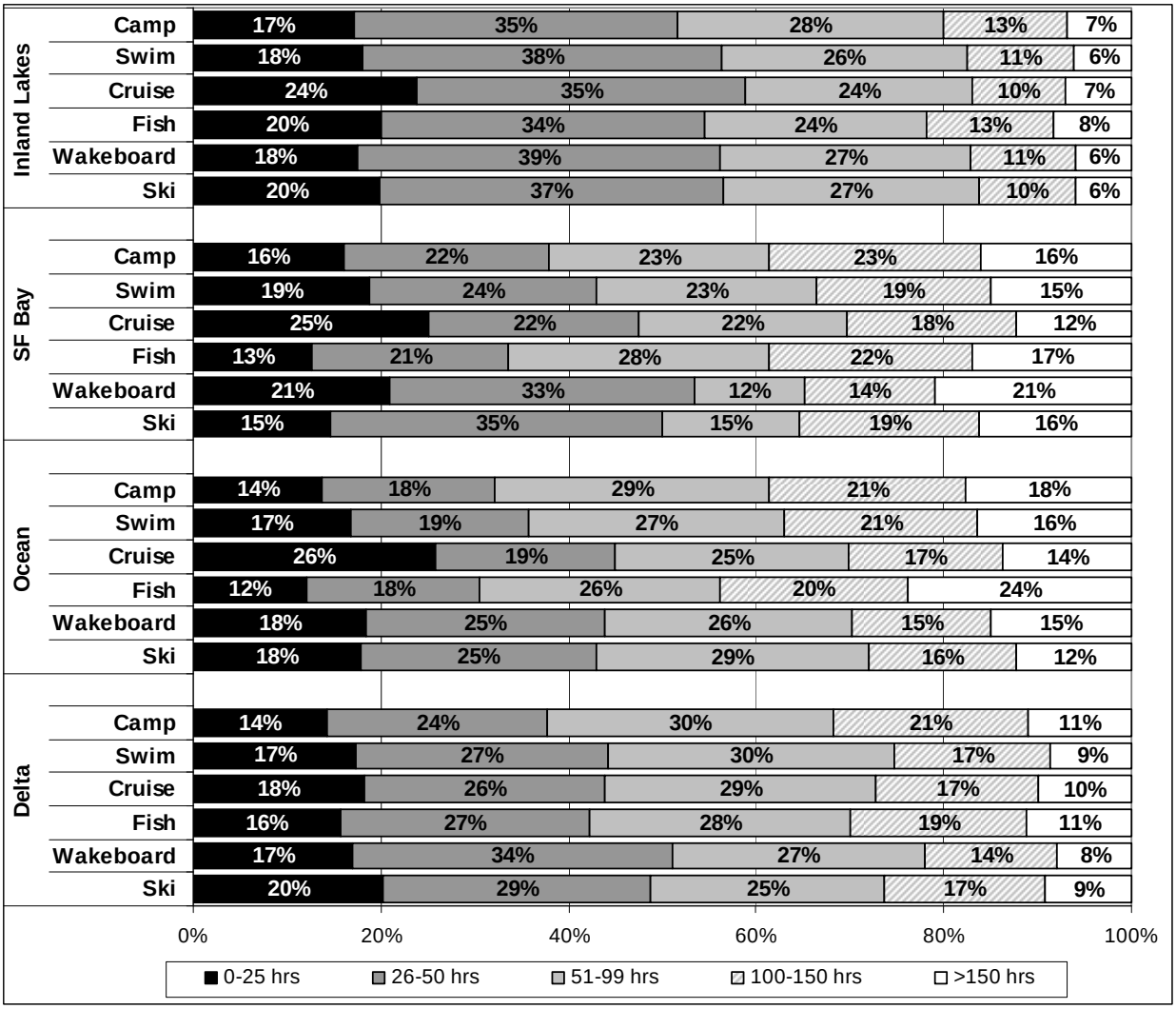
Figure 112. Annual Engine Hours and Boating Activities



Annual Engine Hours and Boating Activities by Boat Use Location

Figure 113 presents the percent of boaters who boated at least once per year in the boat use location, used their boats for the boating activity, and estimated they logged the given range of engine hours annually. The graph describes overall patterns of boat use, such as major differences in boaters' estimated annual engine hours among those who used their boats to fish and boat at least once a year on the ocean. About one quarter of boaters in this sub-group (24 percent) estimated they put over 150 hours on their engines annually, while only 8 percent of those who fished and boated at least once a year on inland lakes logged more than 150 engine hours per year.

Figure 113. Annual Engine Hours and Boating Activities by Boat Use Location



Oil Changing Practices of Boaters

Where Boaters Usually Change Engine Oil

About 40 percent of all boaters surveyed said they changed their own oil, and of those, just over half (53 percent) reported they changed their oil at home. See Table 48.

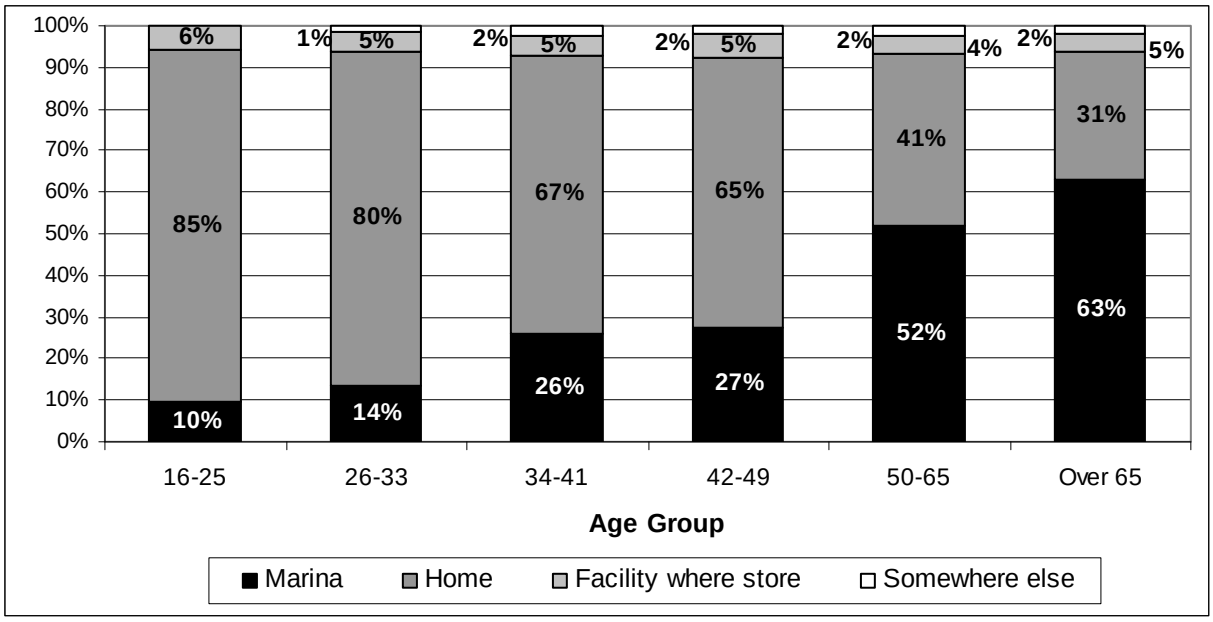
Table 48. Usual Location of Oil Change

	Count	Percent
At home	626	52.5
At marina	484	40.6
At facility where boat is stored	58	4.9
Somewhere else	25	2.1
Total	**1,223**	**100.0**

Where Usually Change Engine Oil and Boater Characteristics and Habits

Where boaters usually changed their oil did not vary by boating experience, but did vary by age as boaters age 50 and older were less likely to change their engine oil at home and more likely to change it at a marina than boaters in other age groups. See Figure 114.

Figure 114. Where Boaters Change Engine Oil by Respondent Age



Boaters who put 100 or more hours on their engines each year were more likely to change their engine oil at a marina, while those who put 26 – 50 hours on their engines were more likely to change their oil at home. See Figure 115. Boaters who owned boats 25 feet in length or shorter were far more likely to change the oil at home, while those who owned boats 26 feet in length or longer were much more likely to change their oil at a marina than at any other location. See Figure 116.

Figure 115. Where Boaters Change Engine Oil by Annual Engine Hours

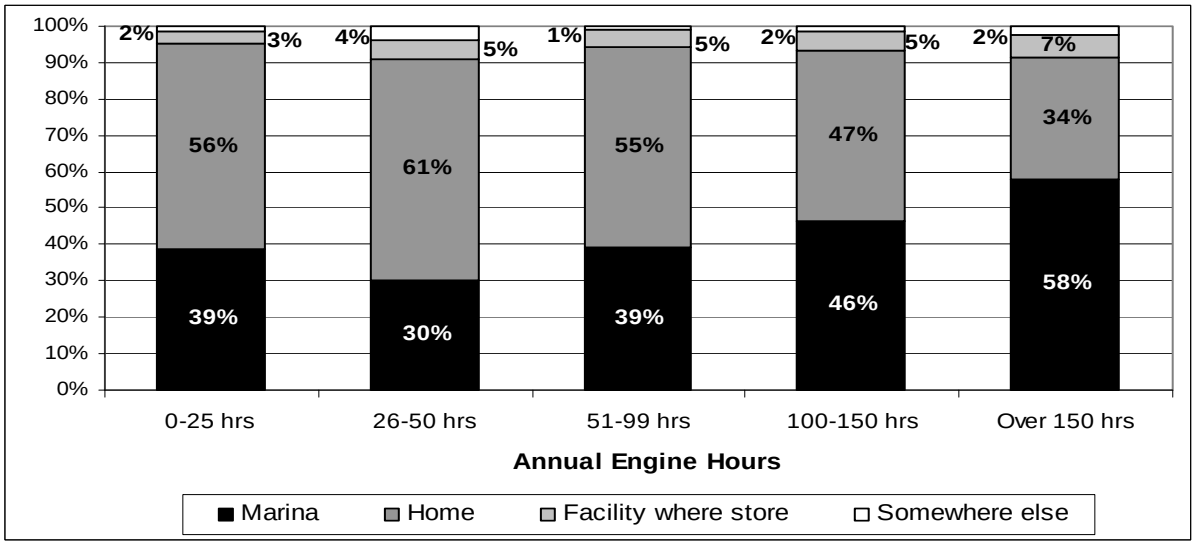
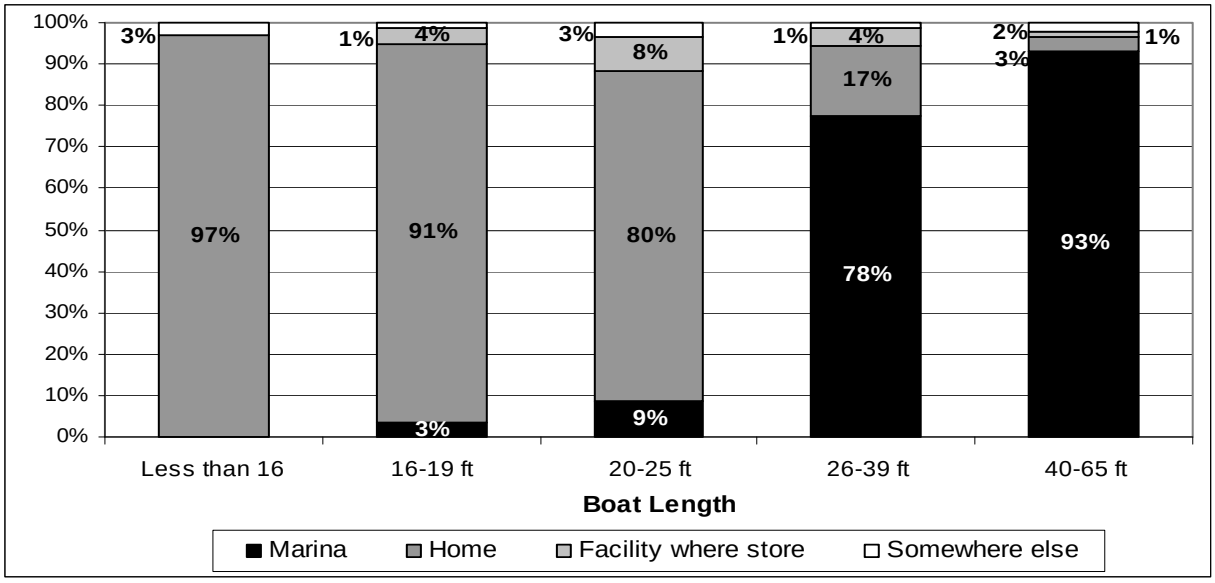
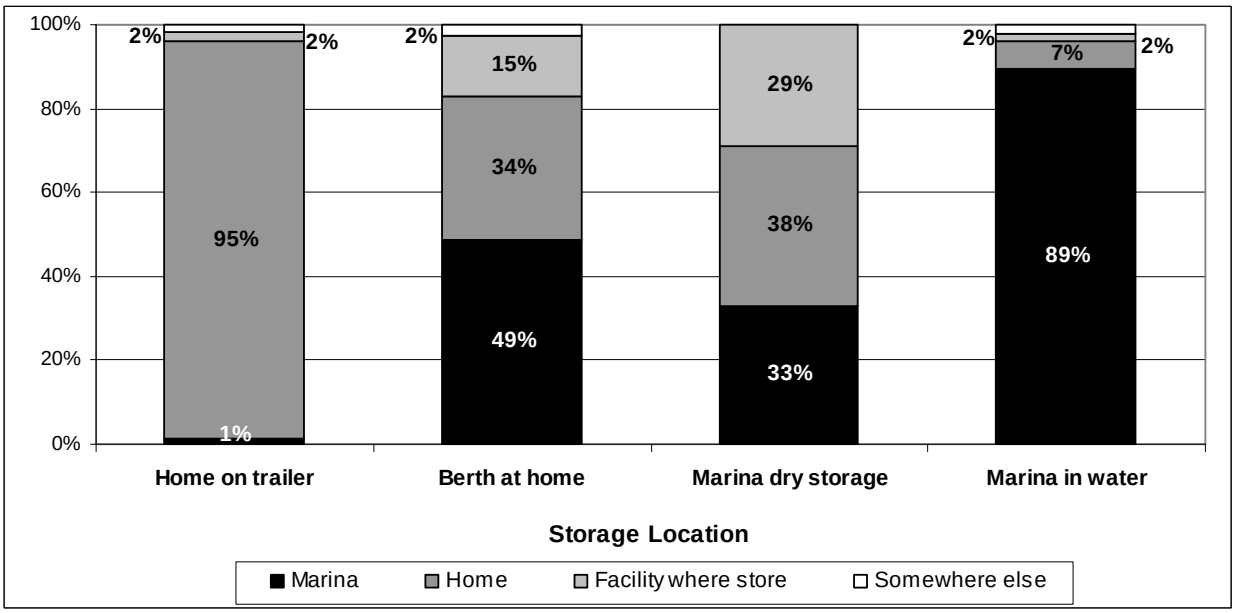


Figure 116. Where Boaters Change Engine Oil by Boat Length



Ski and fishing boat owners were among those most likely to change their oil at home, while motor yacht and sailboat owners were most likely to change their oil at the marina and cuddy cabin/cruiser, houseboat, or offshore racer owners were more likely to change their oil at the facility where the boat is stored. Those who stored their boats at the marina in water were much more likely to change their oil at the marina, and those who trailered their boats at home were more likely to change the oil at home. See Figure 117. Usual launch location was unrelated to oil change location.

Figure 117. Where Boaters Change Engine Oil by Boat Storage Location



Characteristics and Habits of Boaters Who Change Their Own Engine Oil
Male boaters, boaters age 50 and over and those with more than 5 years of boating experience were more likely to say they changed their own oil. Number of engine hours was also related to whether or not boaters change their own oil, as those who put less than 50 hours a year on their engines were less likely to change their own oil. As annual engine hours increased, so did a boater's tendency to change their own engine oil.

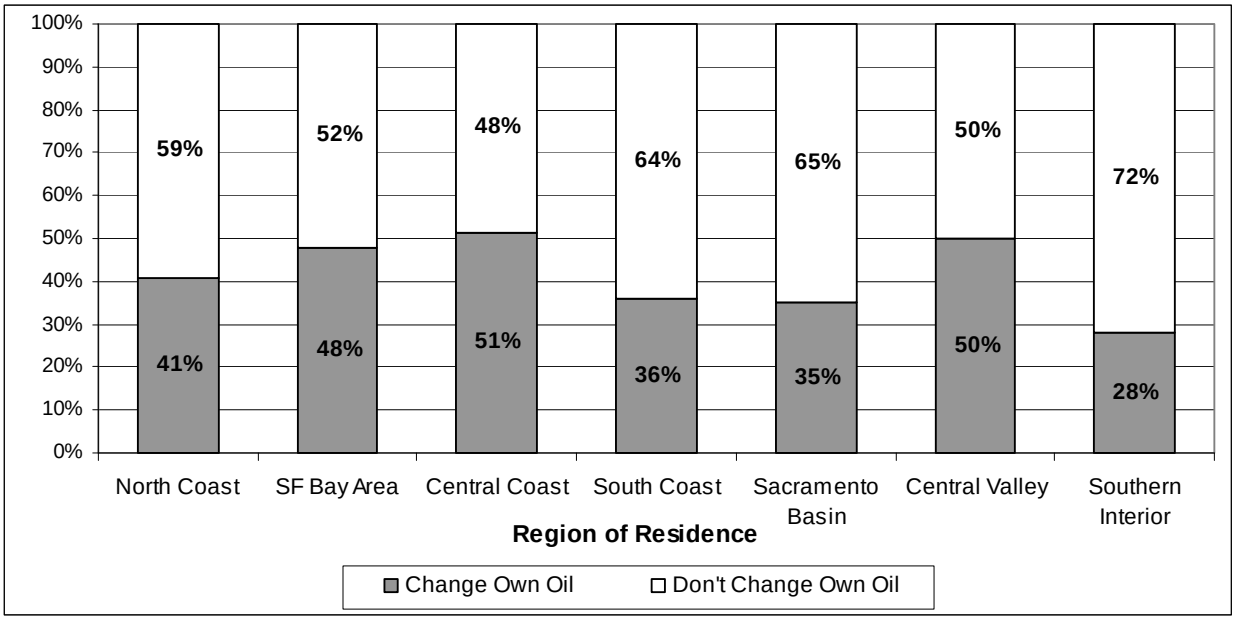
Type of boat owned had no impact on a boater's tendency to change their own oil with the exception that owners of sailboats with auxiliary motors were much more likely than those who did not own sailboats to change their own oil. Owners of boats 26 – 65 feet long and those who stored their boats at a marina in water were among those most likely to change their own oil, as well as those who used their boats to camp.

Boaters who changed their own oil had different oil disposal methods than those who did not change their own oil in that they were more likely to say they cleaned any oil that has leaked into the bilge and they were more likely to use rags or paper towels, bilge cleaning products, bilge pumps, soap or detergent, or oil absorbents to clean leaked oil. Their oil absorbent disposal practices, however, were not different than those who did not change their own oil.

Boaters who changed their own oil tended to be more likely than others to get boating information from marinas, marina supply stores, boating associations, the Bay and Delta Yachtsman, Latitude 38, Boat U.S. Magazine or the PICYA Yachting Handbook, suggesting they may simply be more likely than those who did not change their own oil to seek boating information. Those who changed their own oil tended to be less concerned than others about bigger boats, speeding boats, or intoxicated boaters. Correct identification of the oil recycling service logo was higher among those who changed their own oil, but there was no difference in identification of the sewage pumpout logo.

Boaters Who Change Their Own Engine Oil and Region of Residence
There were some regional differences between boaters who did and did not change their own oil. Those who changed their own oil were more likely to be from the Central Coast, Central Valley, or San Francisco Bay Area regions and less likely to be from the Southern Interior region than from other locations. See Figure 118.

Figure 118. Boaters Who Change Their Own Oil by Region of Residence



Usual Method of Used Oil Disposal

Boaters who changed their own oil most often report taking their used oil to an auto shop, gas station or certified drop-off center (47 percent), dropping it off at a marina (32 percent), taking it to a household hazardous waste disposal center (9 percent), or leaving it curbside for home pick-up (5 percent). About 6 percent reported they put used oil in the trash, stored it at home or took it to a dump or landfill. See Table 49.

Table 49. Oil Disposal Method Most Often Used

	Count	Percent
Take to auto shop, gas station or certified drop-off center	551	47.0
Drop off at marina	380	32.4
Take to Household Hazardous Waste center	102	8.7
Leave it on curb for home pick-up	56	4.8
Take to dump or landfill	38	3.2
Store at home	20	1.7
Put in the garbage	11	.9
Other	14	1.2
Total	**1,172**	**100.0**

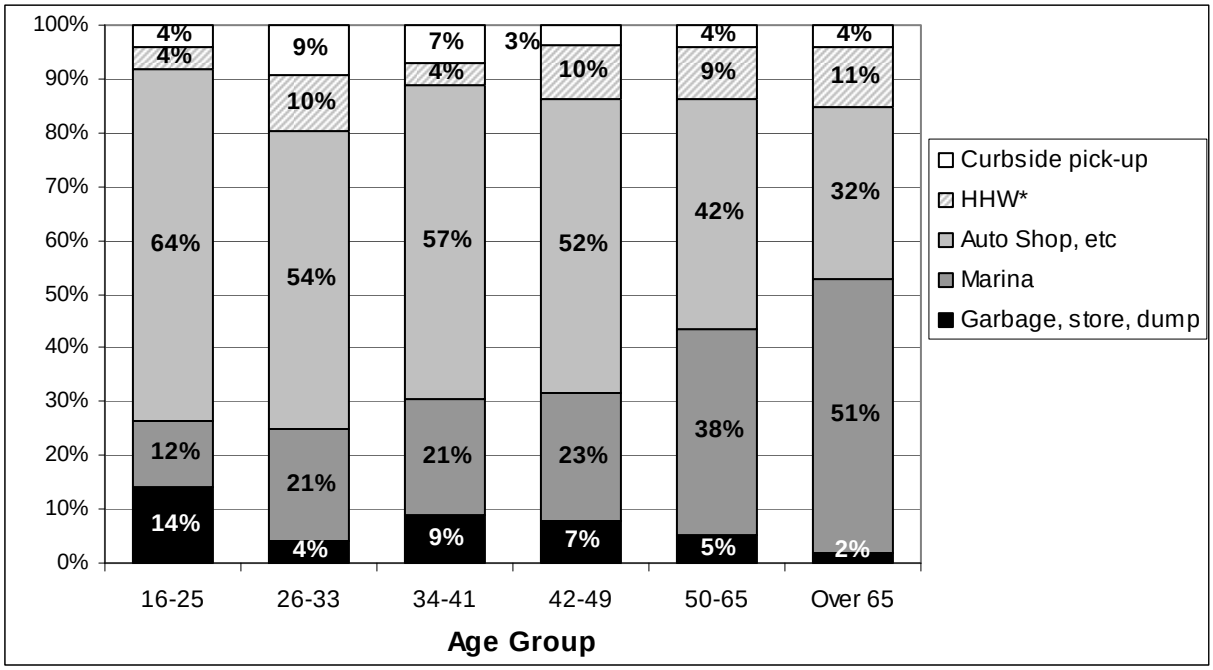
Boater Characteristics and Habits and Usual Method of Used Oil Disposal

Disposal method most often used did not vary by boating experience and was not strongly related to the type of boat owned. However, owners of ski boats were more likely than other boaters to take used oil to an auto shop or similar certified center, and owners of motor yachts or sailboats with auxiliary motors were more likely than other boaters to drop their used oil off at marinas. Usual method of oil disposal was not associated with correct identification of either environmental service logo.

Usual Method of Used Oil Disposal and Boater Age

Disposal habits varied by boater age. Overall, certified recycling centers such as auto shop and gas stations were used more often by younger boaters than older boaters. For example, certified recycling centers were used by 64 percent of 16 – 25 year olds, 57 percent of 34 – 41 year olds, 42 percent of 50 – 65 year olds, and only 32 percent of boaters over age 65. Older boaters dropped used oil at marinas more often than younger boaters, with about half (51 percent) of boaters over age 65 using this method compared to only 12 percent of 16 – 25 year olds. Boaters age 16 – 25 were more likely than others to put used oil in the trash, store it at home or take it to a dump or landfill. See Figure 119.

Figure 119. Usual Method of Used Oil Disposal by Boater Age

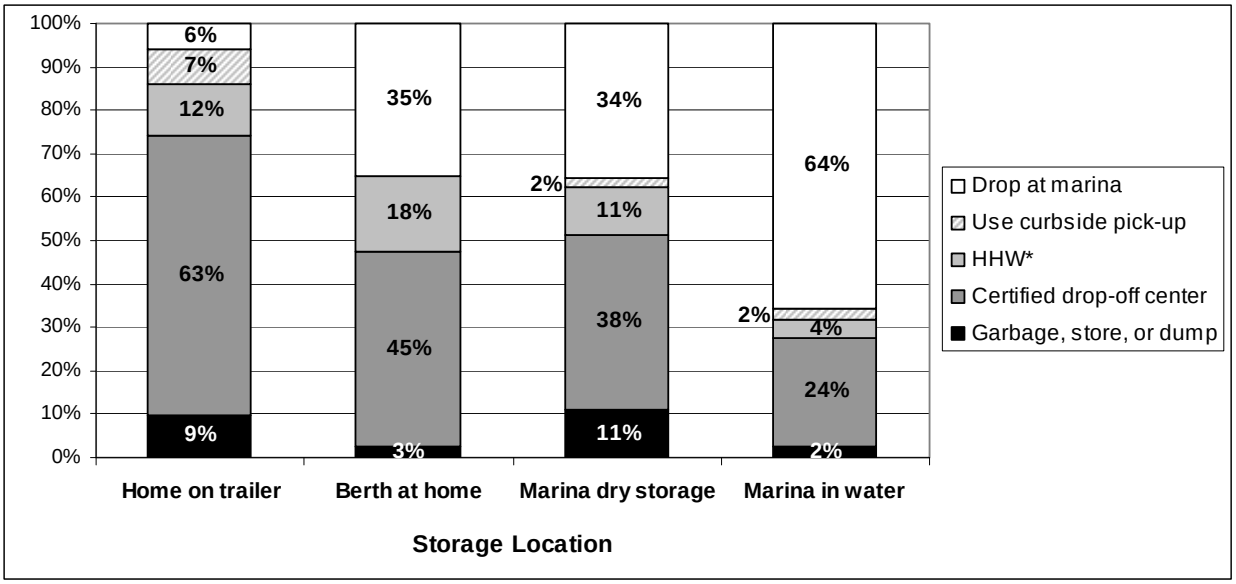


*HHW = Household Hazardous Waste Center

Usual Method of Used Oil Disposal and Boat Storage Location

About 63 percent of boaters who stored their boats at home on a trailer took their used oil to a certified recycling center such as a gas station or auto shop, in contrast to only 24 – 45 percent of those who stored their boats in other locations. Over half of those who stored their boats in water at the marina dropped their used oil at the marina (64 percent), versus only 6 percent of those who stored their boats at home on a trailer. Those who used marina dry storage or trailered their boats at home were more likely than others to have put used oil in the garbage, stored it at home or taken it to a dump or landfill. See Figure 120.

Figure 120. Usual Method of Used Oil Disposal by Boat Storage Location

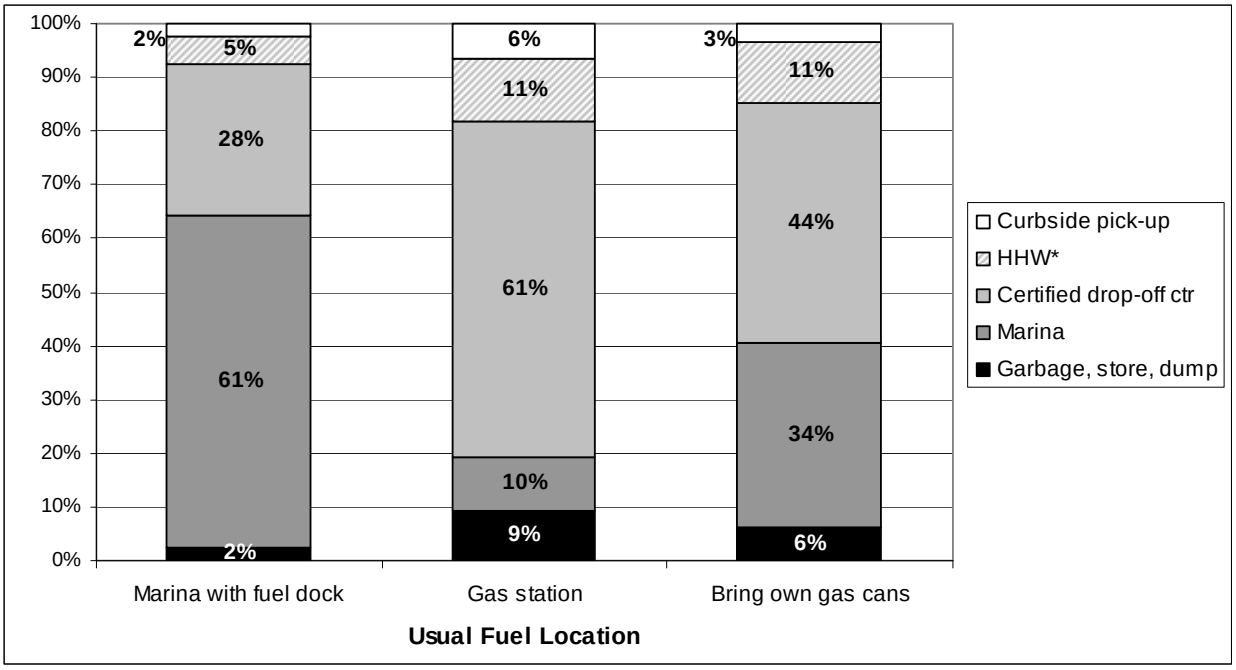


*HHW = Household Hazardous Waste Center

Usual Method of Used Oil Disposal and Usual Fuel Location

Boaters who usually fueled their boats at a gas station prior to launch were somewhat more likely than those who fueled other ways to put used oil in the trash, store it at home, or take it to a dump or landfill. However, about 61 percent of those who fueled their boats at gas stations said they took used oil to certified drop-off centers, such as gas stations. Those who fueled their boats at marina fuel docks were much more likely than those using other fueling methods to take their used oil to marina drop-off sites and were less likely to use certified drop-off centers or household hazardous waste facilities. See Figure 121. How boaters dispose of used oil was unrelated to their usual launch location.

Figure 121. Usual Method of Used Oil Disposal by Usual Fuel Location

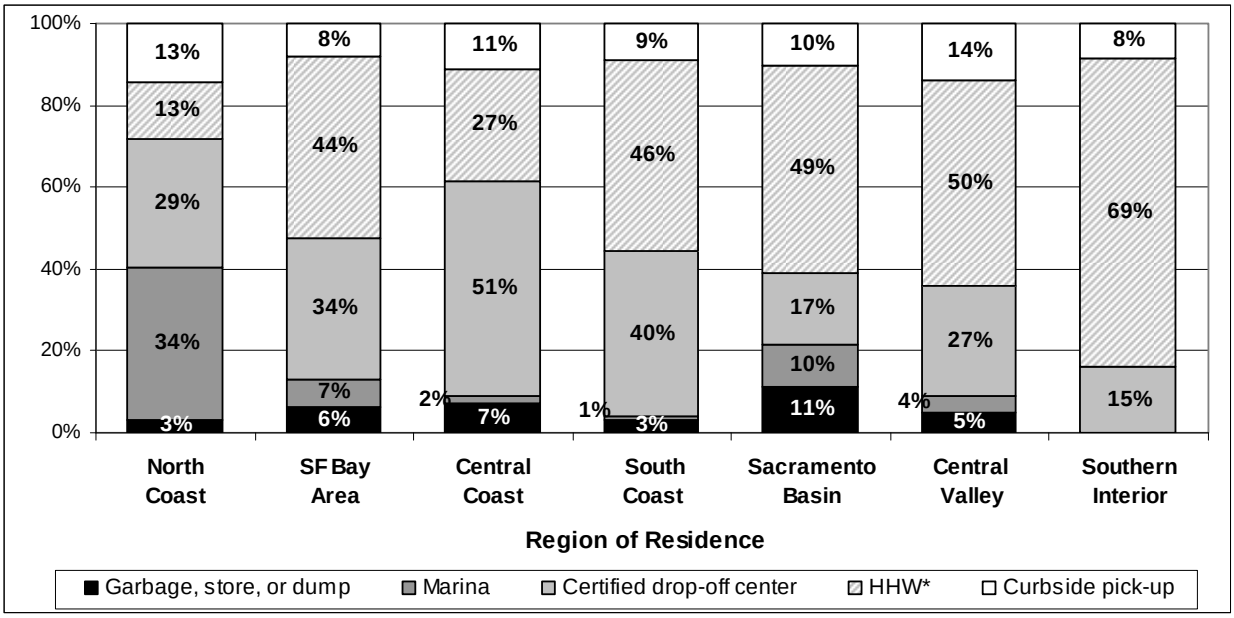


*HHW = Household Hazardous Waste Center

Usual Method of Used Oil Disposal and Region of Residence

About half of the boaters from the Central Coast region (51 percent) took their used oil to a certified recycling center such as a gas station or auto shop, in contrast to only 15 – 40 percent of those who lived in other areas. Over two-thirds of those who lived in the Southern Interior region (69 percent) used a household hazardous waste facility, and one-third of those from the North Coast region (34 percent) took their used oil to a marina. Those from the Sacramento Basin region were more likely than boaters from other areas to have put used oil in the trash, stored it at home or taken it to the dump. See Figure 122.

Figure 122. Usual Method of Used Oil Disposal by Region of Residence



*HHW = Household Hazardous Waste Center

Distance to Oil Disposal Site

About 78 percent of those who changed their own engine oil must travel some distance to their usual oil disposal site. About 31 percent of boaters in this sample reported the distance they traveled is between 1 and 3 miles, 23 percent reported the distance is less than 1 mile, and 13 percent reported they must travel more than 5 miles to their usual oil disposal site. See Table 50.

Table 50. Distance to Oil Disposal Site

	Count	Percent
Dispose of oil where change oil	264	22.6
Less than 1 mile	270	23.1
1 – 3 miles	356	30.5
4 – 5 miles	130	11.1
More than 5 miles	150	12.8
Total	**1,168**	**100.0**

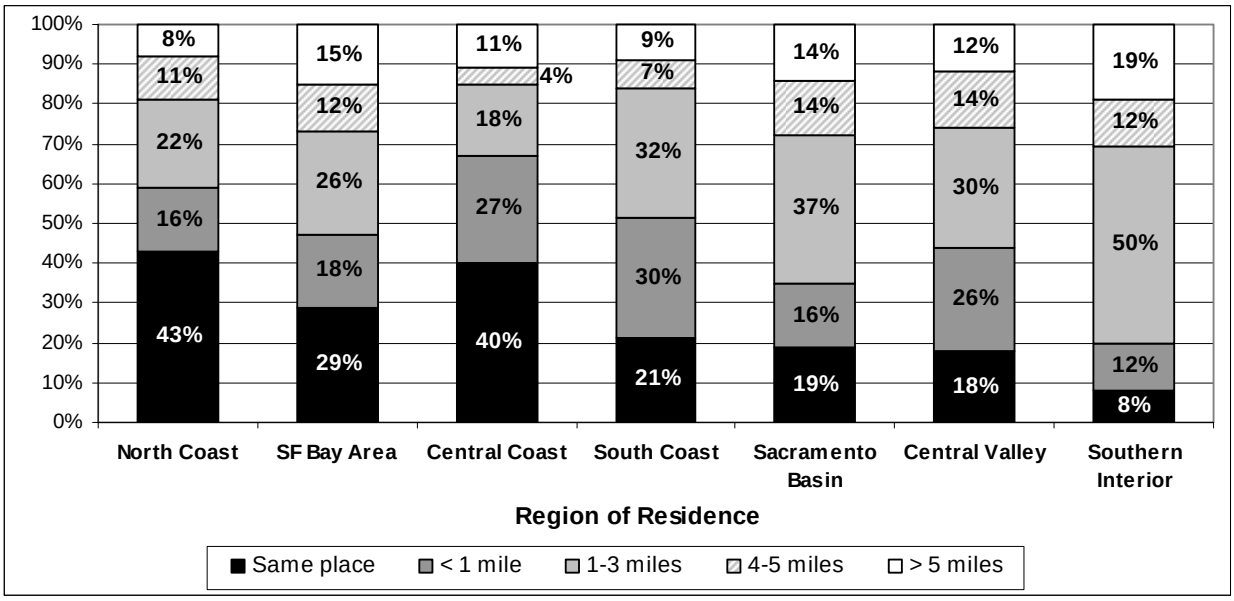
Boater Characteristics and Habits and Distance to Oil Disposal Site

Distance to usual oil disposal site was unrelated to boating experience or annual engine hours. Owners of ski boats were more likely than other boaters to travel 1 – 3 miles to dispose of oil. Owners of motor yachts and sailboats with auxiliary motors were more likely than owners of other boat types to dispose of their used oil at the same location where they changed their oil. Distance to usual oil disposal site did not vary by usual launch location. Distance to dispose of oil was, however, related to usual sewage pumpout location used in that those who used pumpout facilities at the marina were much more likely to dispose of used oil in the same place that they changed their oil.

Distance traveled to dispose of used oil varied by region of residence, with higher proportions of Central (40 percent) and North Coast (43 percent) residents reporting they disposed of their used oil where they

changed it, as opposed to only 8 percent of Southern Interior residents. Nearly a third (31 percent) of Southern Interior residents traveled more than 3 miles to dispose of used oil. See Figure 123.

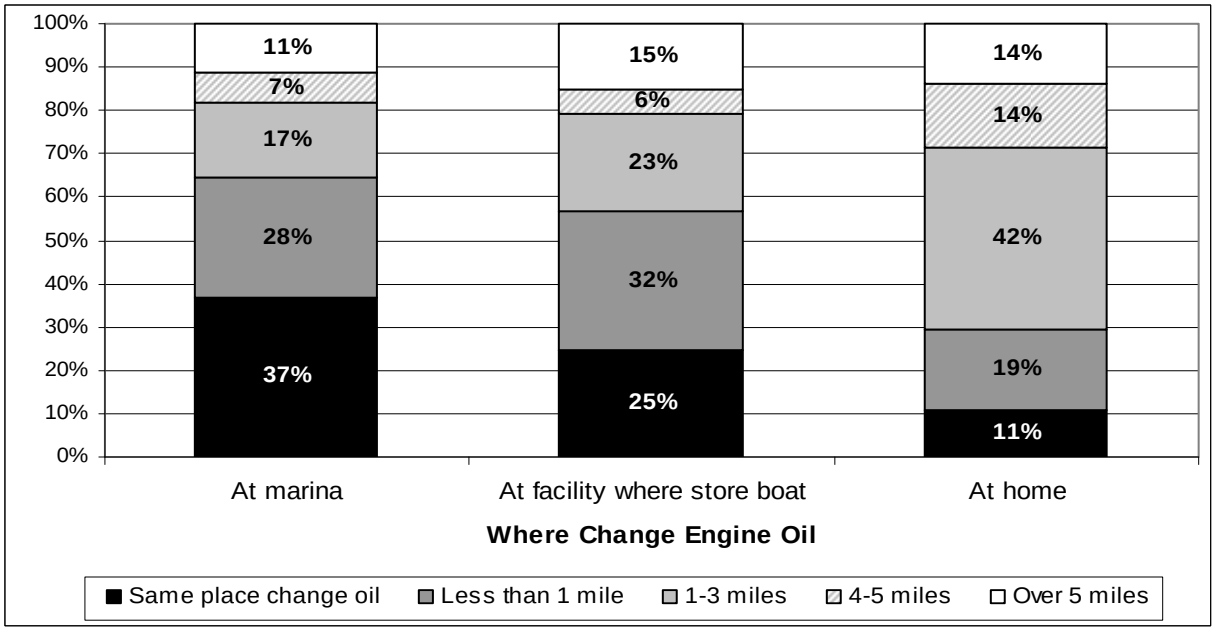
Figure 123. Distance to Oil Disposal Site by Region of Residence



Distance to Oil Disposal Site and Where Usually Change Engine Oil

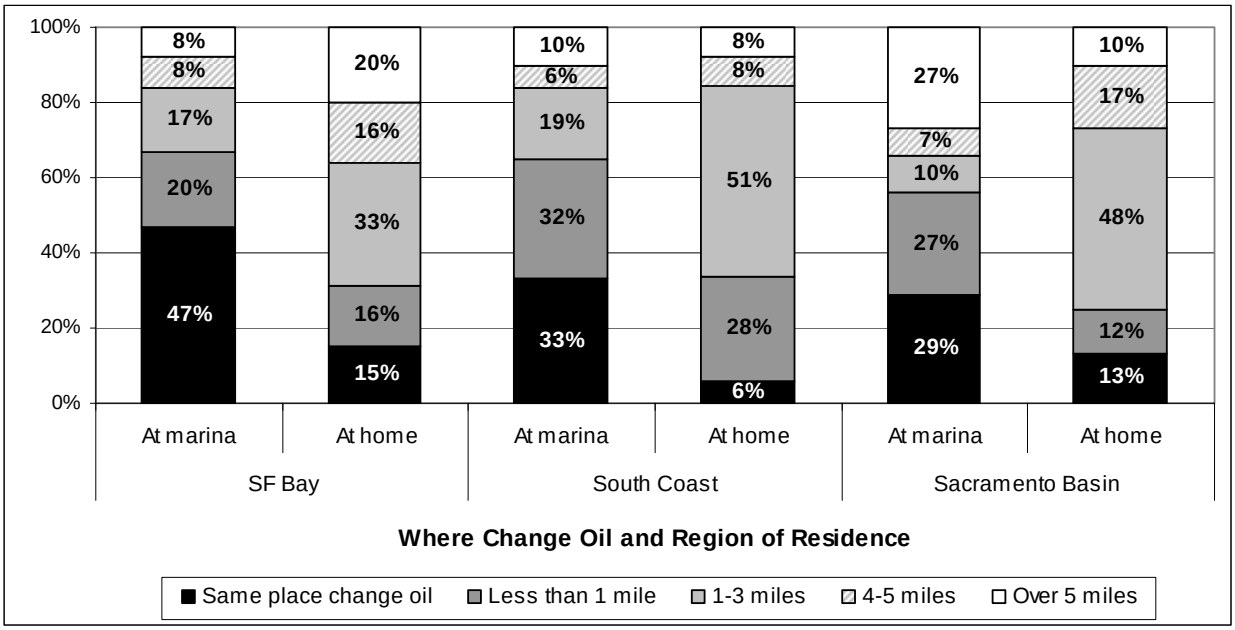
Those who changed their oil at marinas were more likely than others to say they disposed of their used oil at the same place they changed the oil. Those who changed their oil at home were much more likely than others to travel from 1 – 5 miles to dispose of their oil. See Figure 124.

Figure 124. Distance to Oil Disposal Site by Where Change Engine Oil



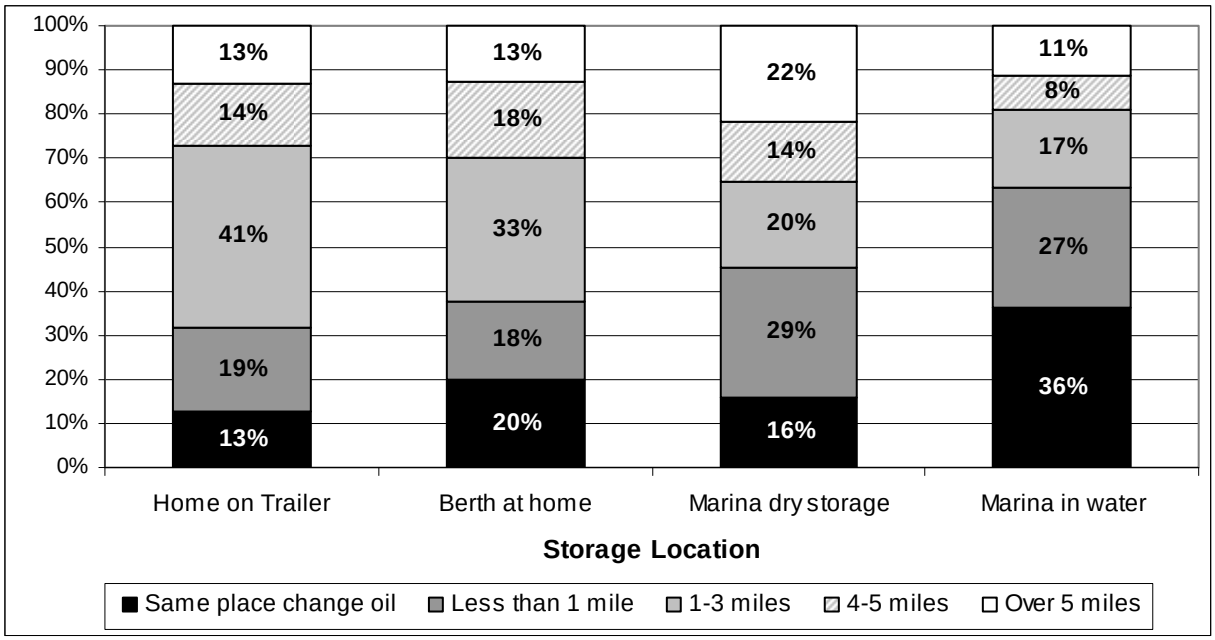
Distance to Oil Disposal Site and Where Usually Change Engine Oil by Region of Residence
Boaters from the San Francisco Bay region who changed their oil at a marina reported they disposed of their used oil at the same place they changed it in greater proportions than boaters from the South Coast or the Sacramento Basin regions who changed their oil at marinas. Those from the South Coast region who changed their oil at home reported traveling 4 or more miles to their usual disposal site less often than those from the San Francisco Bay Area or Sacramento Basin regions. Sacramento Basin residents who changed their oil at a marina traveled over 5 miles to dispose of used oil much more often than those from the other two regions presented in Figure 125.

Figure 125. Distance to Oil Disposal Site by Where Change Engine Oil and Region of Residence



Distance to Oil Disposal Site and Boat Storage Location
Those who stored their boats at the marina in water were more likely than those using other storage locations to say they disposed of their used oil in the same place they changed the oil. Those who trailered their boats at home were more likely than others to travel 1 – 3 miles to dispose of oil. Those who used marina dry storage were more likely than others to travel more than 5 miles to dispose of their used oil. See Figure 126.

Figure 126. Distance to Oil Disposal Site by Boat Storage Location



Frequency of Oil Leaks into Bilge

Nearly two-thirds of the boaters surveyed in 2009 (64 percent) said oil leaked into the bottom of their bilge or engine compartment every time they used their boat and another 33 percent said this happened most of the time they used their boat. Only 1 percent said they never experienced oil leaks. See Table 51.

Table 51. Frequency of Oil Leaks into Bilge

	Count	Percent
Never	35	1.3
Rarely	20	0.7
Half of the time	39	1.4
Most of the time	918	33.1
Every time use the boat	1,766	63.6
Total	**2,778**	**100.0**

Boater Characteristics and Habits and Frequency of Oil Leaks

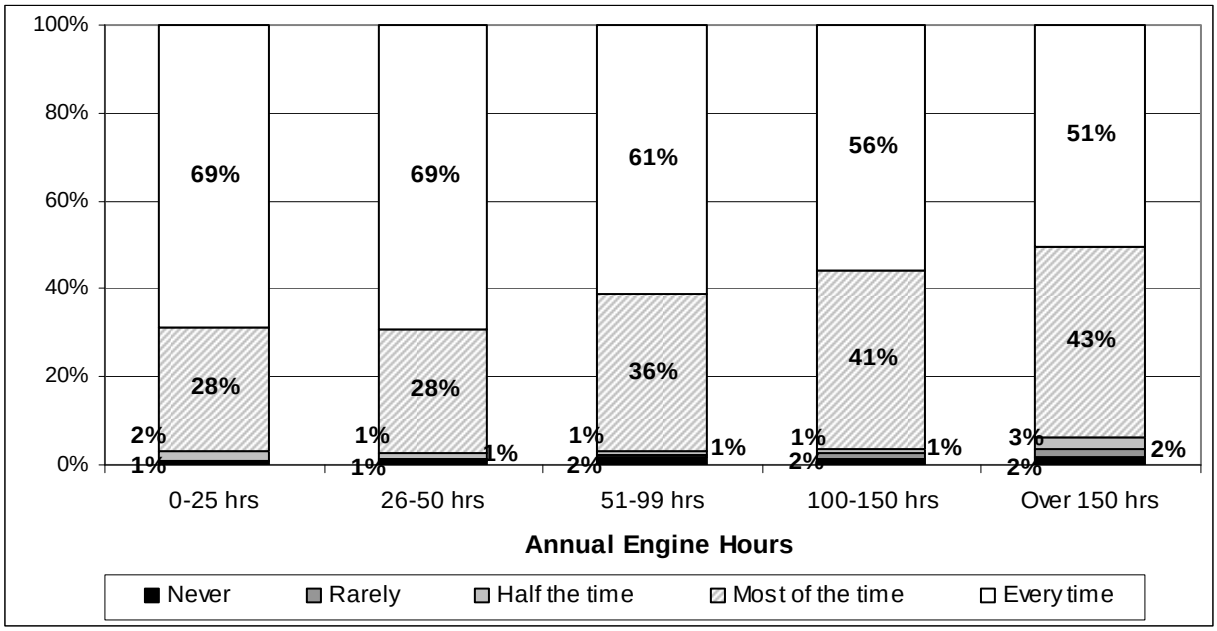
Frequency of oil leaks varied somewhat by type of boating activity. Skiers were more likely to say their oil never leaked than non-skiers, wakeboarders were more likely than non-wakeboarders to say their oil leaked every time, leisure cruisers were more likely than non-cruisers to say their oil leaked most of the time, and campers were more likely than non-campers to say their oil leaked half of the time.

Frequency of leaks reported also varied by boating experience. Boaters with the least experience (less than 6 months) and those with the most experience (more than 5 years) both said their oil leaked every time they went out somewhat less than all other age groups, and they also said their oil leaked most of the time somewhat more than other age groups. Reported frequency of oil leaks did not vary by ability to correctly identify either environmental service logo. However, reported frequency of oil leaks did vary somewhat by boaters' perception of how often boaters discharge untreated sewage into the water.

Frequency of Oil Leaks and Annual Engine Hours

Frequency of oil leaks varied by the number of hours boaters put on their engine each year. The more hours boaters put on their engines, the less likely they were to say their oil leaked every time they went out and the more likely they were to say their oil leaked most of the time they go out. See Figure 127.

Figure 127. Frequency of Oil Leaks by Annual Engine Hours



Oil Leak Cleaning Methods

Of boaters who reported oil leaks and how they clean them, 98 percent said they attempted to clean the oil, and 50 percent said they used oil absorbents, 31 percent used rags or paper towels, 18 percent used bilge cleaning products or solvents, and 10 percent said they used soaps or detergents to clean it. See Table 52.

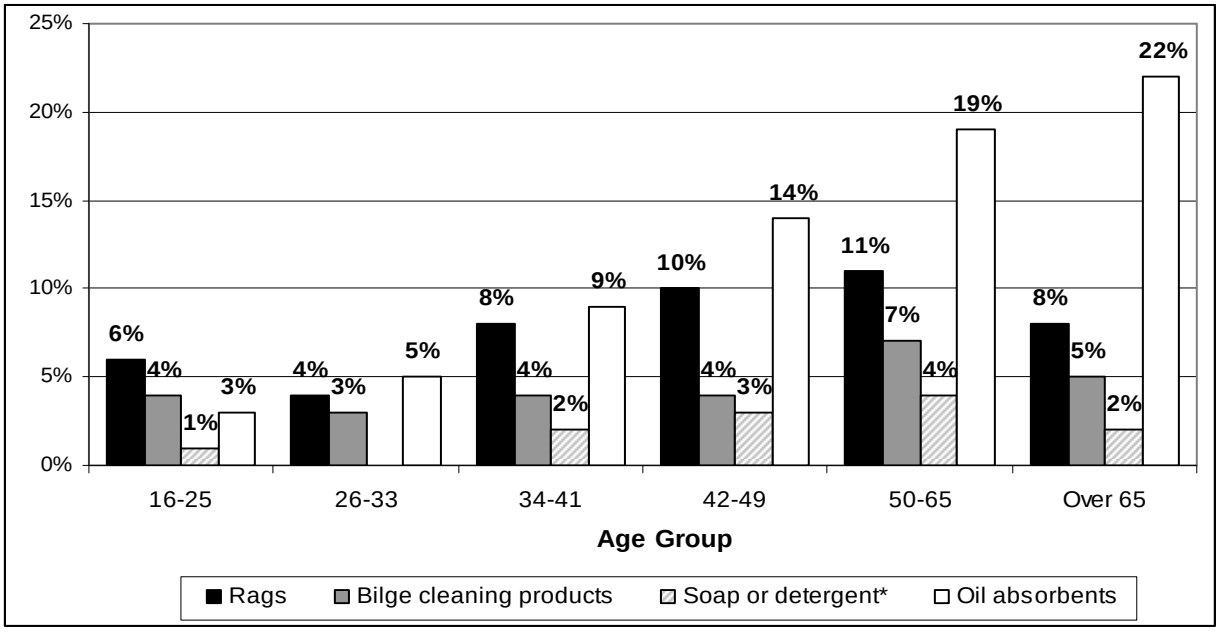
Table 52. Oil Leak Cleaning Methods Used

Oil Leak Cleaning Method	Count	Percent
Oil absorbents	449	50.3
Rags or paper towels	271	31.0
Bilge cleaning products or solvents	159	18.2
Soaps or detergents	87	10.0
Extract oil with bilge pump	37	4.2
Pull the bailer plug	12	1.4
Other	38	4.4
Do not clean leaked oil	68	2.2
Total	**808**	

Oil Leak Cleaning Methods and Boater Characteristics and Habits

Methods used to clean oil that has leaked into the bilge varied by boater age. Boaters age 50 – 64 were more likely than others to use bilge cleaning products, and those 50 and older were more likely than younger boaters to use oil absorbents. See Figure 128.

Figure 128. Methods Used to Clean Oil Leaks by Age



*Differences not statistically significant

Methods used to clean leaked oil also varied somewhat by boating activity, as those who used their boats to ski or wakeboard were less likely than those who did not engage in those activities to use bilge cleaning products or oil absorbents, and were more likely to use soap or detergents. Those who leisure cruised were more likely than those who did not cruise to use rags or paper towels, bilge cleaning products, or oil absorbents to clean leaked oil. Those who used their boats to swim were less likely than non-swimmers to say they did not clean leaks and were less likely to use oil absorbents. Campers were more likely than non-campers to use bilge cleaning products and oil absorbents.

Boaters who used oil absorbents to clean oil leaks were more likely than those who did not to say they had received a boater kit in the past (16 percent versus 13 percent). Those who said they did not clean leaked oil were also less likely to correctly identify either the oil recycling logo or the sewage pumpout logo, and those who used oil absorbents were much more likely than those who didn't use them to correctly identify both environmental service logos. Those who used bilge cleaning products were more likely to correctly identify the sewage logo than those who don't use these products.

Oil Absorbents Disposal Methods

Of boaters who used oil absorbents, towels, pads or socks to clean oil leaks, almost two-thirds (65 percent) said they took their used absorbents to an oil waste receptacle at a marina, but another 29 percent said they put them in the trash. About 21 percent of boaters who used absorbents took them to some other hazardous waste facility. See Table 53.

Table 53. Oil Absorbents Disposal Methods

Oil Absorbents Disposal Method	Count	Percent*
Take to oil waste receptacle at marina	404	64.5
Place in trash	181	28.9
Take to other hazardous waste facility	157	25.1
Other	20	3.2
Total	**626**	

* Sum is greater than 100% because respondents could provide more than one response.

Oil Absorbents Disposal Methods by Boater Characteristics and Habits

Those who said they took their used oil absorbents to hazardous waste facilities were more likely than others to also take their used oil to a dump or landfill or to use a household hazardous waste center. Those who threw their used oil absorbents in the trash were also more likely than others to say they stored their used oil at home. Those who took used oil absorbents to oil waste receptacles at the marinas were much more likely than others to take their used oil to the marina drop-off. Skiers, wakeboarders and swimmers were more likely than boaters who did not engage in these activities to throw oil absorbents in the trash or to take them to a household hazardous waste facility. Leisure cruisers were more likely than non-cruisers to use oil waste receptacles at the marina. Those who disposed of oil absorbents in special oil waste receptacles at marinas or at hazardous waste facilities elsewhere were more likely to have received a boater kit in the past than those who did not use these disposal methods.

Awareness of Water Pollution Prevention among Boaters

Characteristics of Statewide Boaters Who Have Received Boater Kits

About 13 percent of respondents said they have received a boater kit at least once prior to participating in the 2009 survey. Boaters with more boating experience were more likely to have received a kit prior to participation; only 3 percent of those with less than 6 months of experience had ever received a kit, as opposed to 16 percent of those who had more than 5 years of experience. Overall, older boaters were also more likely to have received a kit than were younger boaters. For example, among boaters over age 65, 18 percent had received a kit, versus only 9 percent of boaters age 16 – 25 and 12 percent of boaters age 26 – 33.

Boaters who boated on the Delta or San Francisco Bay were more likely than those who did not boat on the Delta or San Francisco Bay to have received a kit before, and boaters who boated on the ocean were less likely than those who did not boat on the ocean to have received a kit.

Boaters who stored their boats in water at the marina were more likely to have received a kit than boaters who stored their boats in other locations. Those who usually launched at the marina were more likely to have received a kit than those who usually launched at any other location. Boaters who changed their own oil were less likely to have received a kit than those who did not change their own oil. In general, boating activity was not strongly related to likelihood of having received a kit in the past.

Boaters who usually fueled at marina fuel docks were somewhat more likely to have received a boater kit prior to survey participation than those who fuel at gas stations prior to launch. Those with installed toilets on board were more likely to have received a kit in the past than those with no toilets and about twice as likely as those with port-a-potties.

Boating Information Sources

More than half of those surveyed in 2009 said they got their boating information from marinas (51 percent), 45 percent get information from boat shows, and about 39 percent got information from marine supply stores. About a third of boaters got information via word-of-mouth (36 percent), 23 percent use safety classes, 21 percent read Boat U.S. Magazine, and 18 percent used boating associations for boating information. About 18 percent provided "other" sources including the Internet, the United States Coast Guard, and yacht clubs. See Table 54.

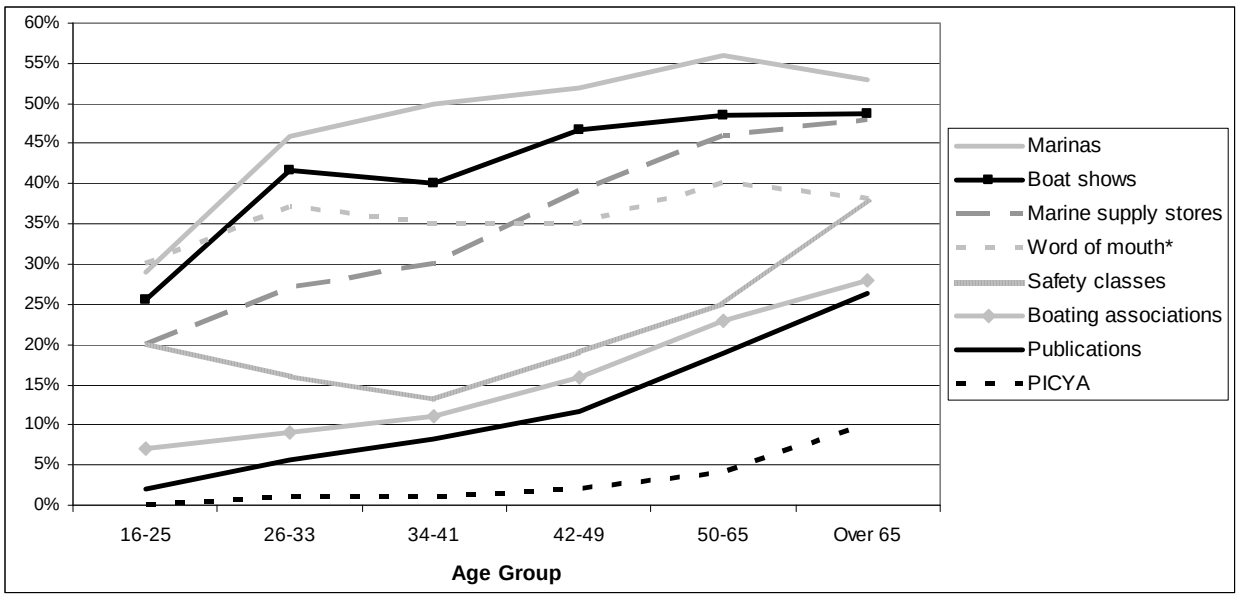
Table 54. Where Boaters Get Boating Information

	Count	Percent
Marinas	1,555	50.6
Boat shows	1,368	44.5
Marine supply stores	1,196	38.9
Word-of-mouth	1,111	36.2
Safety classes	690	22.5
Boat U.S. Magazine	658	21.4
Boating associations	559	18.2
Latitude 38	499	16.2
Bay and Delta Yachtsman	178	5.8
PICYA Yachting Handbook	112	3.6
Other Sources	573	18.7

Boating Information Sources, Age and Boating Experience

Regardless of age, boaters used marinas and marine supply stores as boating information sources more than other sources, with the exception of safety classes, which 16 – 25 year olds used as often as marine supply stores. Use of most information sources, charted below in Figure 129, increased somewhat with age, with the exceptions that after age 65, reliance on marinas for boating information declines slightly. Boaters' experience also impacted which information sources boaters used, with the most experienced boaters using marinas, marine supply stores, boating associations, the Bay and Delta Yachtsman, Latitude 38, Boat U.S. Magazine, and the PICYA Yachting Handbook for boating information more than the least experienced.

Figure 129. Where Boaters Get Boating Information by Age Group

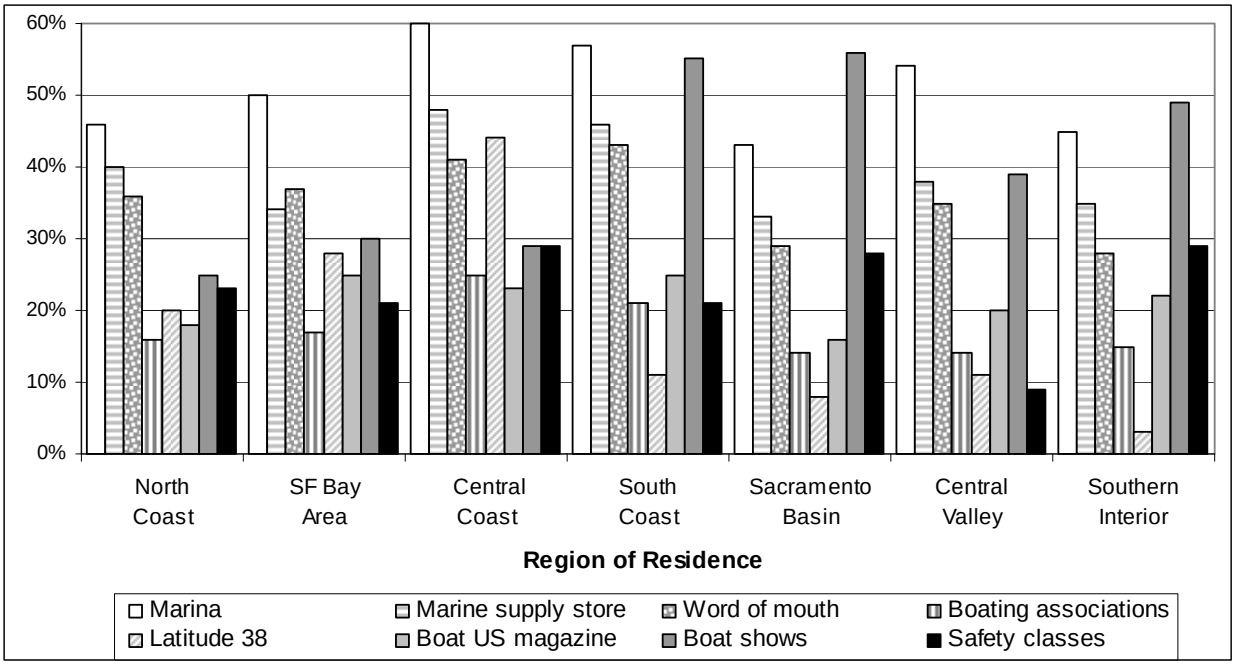


*Differences not statistically significant

Boating Information Sources and Region of Residence

Information sources used varied by region. Marinas were used most often by boaters from the Central Coast (60 percent) and South Coast (57 percent) regions. Central and South Coast residents also reported using marine supply stores (49 and 46 percent), word-of-mouth (41 and 43 percent), and boating associations (25 and 21 percent) for their boating information more often than boaters from other regions. Boaters from the Sacramento Basin (56 percent), South Coast (54 percent), and Southern Interior (49 percent) regions used boat shows more than boaters from other regions. The Bay and Delta Yachtsman was used most often by boaters from the San Francisco Bay Area region (13 percent). Latitude 38 was used most by Central Coast residents (44 percent) and San Francisco Bay Area residents (28 percent). Boat U.S. Magazine was used most by San Francisco Bay Area residents (25 percent) and South Coast residents (25 percent). The PICYA Yachting Handbook was used most by San Francisco Bay Area residents (8 percent). Safety classes were used most by Central and South Coast residents (29 percent) and Sacramento Basin residents (28 percent). Figure 130 presents the results for the eight most frequently used sources.

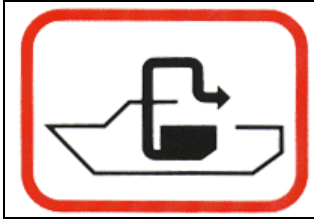
Figure 130. Boating Information Sources by Region of Residence



Identification of Environmental Service Logos

Boaters were asked whether they could identify two environmental service logos – "Certified Used Oil Collection Center" and "National Sewage Pumpout." As shown below in Table 55, about 26 percent of all respondents recognized what the oil logo means, while 33 percent recognized what the sewage logo means.

Table 55. Identification of Environmental Service Logos

Logo		Count	Percent
	Correctly Identified	786	25.6
	Did Not Recognize	2,287	74.4
	Correctly Identified	1,012	32.9
	Did Not Recognize	2,061	67.1

Identification of Environmental Service Logos and Boating Experience

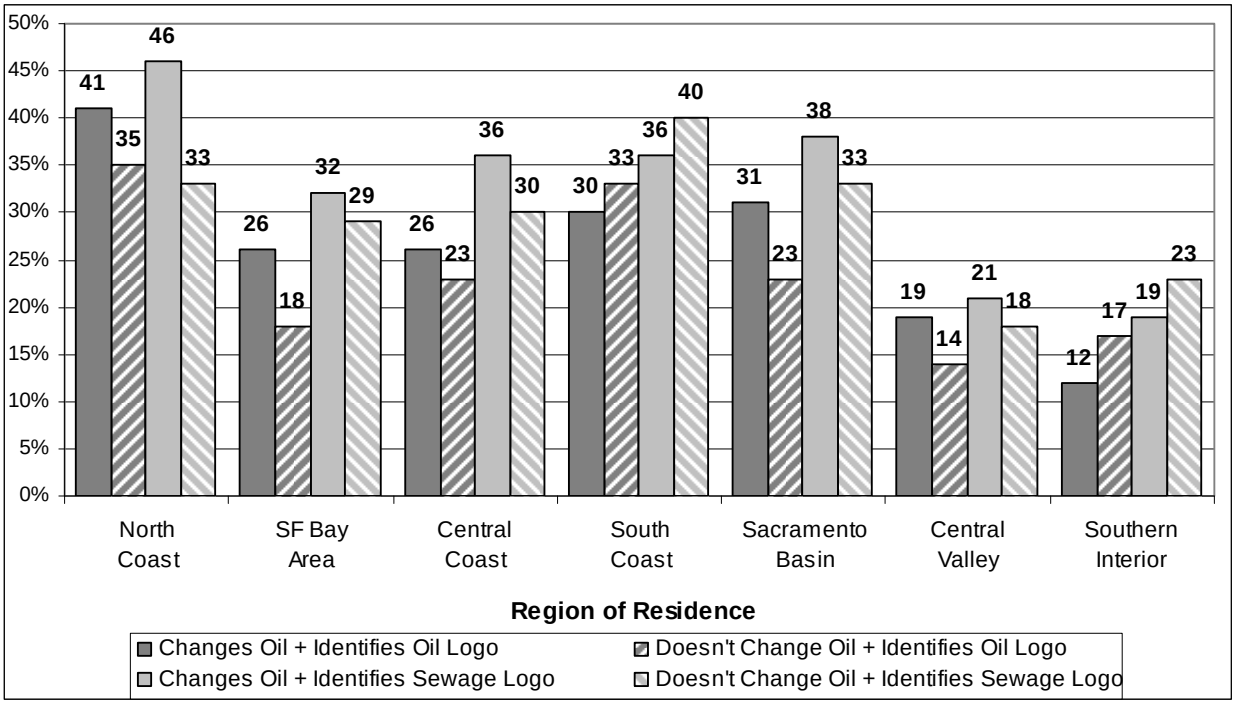
Correct identification of both environmental logos varied by boating experience, but again this relationship was not linear. About 16 percent of those boating less than 6 months, 47 percent of those boating 6 – 11 months, 34 percent of those boating 1 – 2 years, and 25 percent of those boating 3 or more years correctly identified the oil recycle logo. About 25 percent of those boating less than 6

months, 52 percent of those boating 6 – 11 months, 37 percent of those boating 1 – 2 years, and 33 percent of those boating 3 or more years correctly identified the sewage pumpout logo.

Identification of Environmental Service Logos and Region of Residence

Correct identification of the environmental service logos varied by region of residence with correct identification of both logos highest among those from the North or South Coast regions and lowest among those from the Central Valley and Southern Interior. Figure 131 presents the percent of boaters from each region that correctly identified each logo by whether or not they change their own oil.

Figure 131. Identification of Environmental Logos by Those Who Do and Do Not Change Their Own Oil and Region of Residence



Awareness of the Delta as a Source of Drinking Water

About 41 percent of all respondents said they didn't know what percentage of California residences get their drinking water from the Delta, but 37 percent said they think more than half of California residences are served by the Delta. See Table 56.

Table 56. Percentage of California Drinking Water That Comes from the Delta

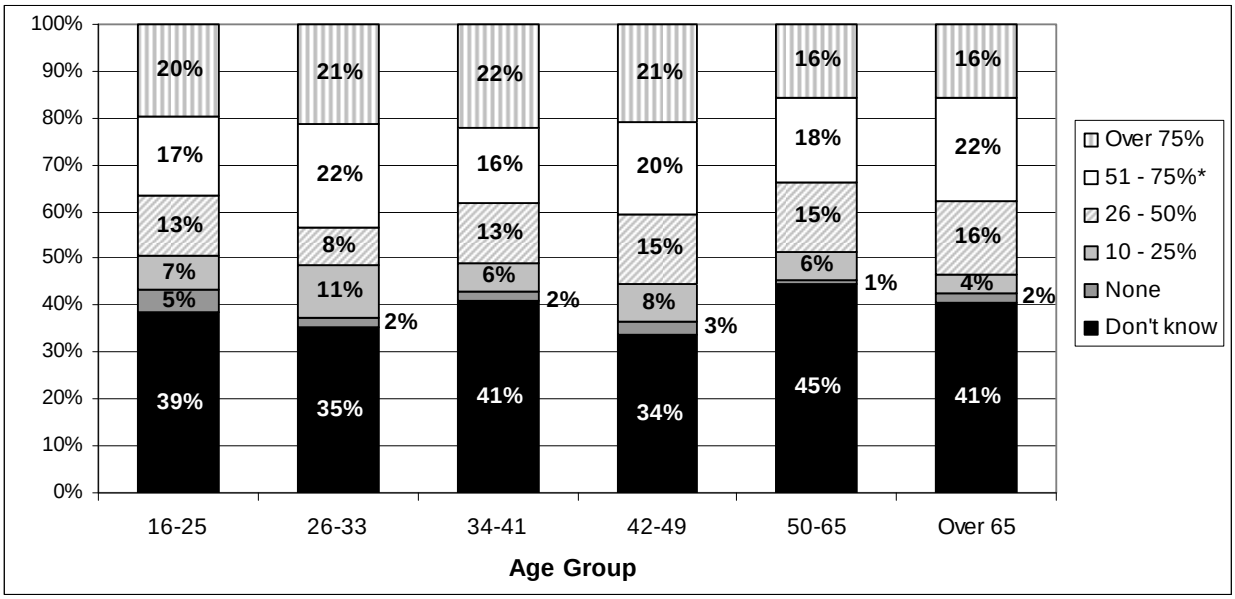
	Count	Percent
None	56	1.9
10 – 25 Percent	189	6.4
26 – 50 Percent	410	13.9
51 – 75 Percent*	555	18.8
Over 75 Percent	541	18.3
Don't Know	1,203	40.7
Total	**2,954**	**100.0**

*Correct response

Awareness of the Delta as a Source of Drinking Water and Age

Awareness of the percentage of drinking water that comes from the Delta varied by age. See Figure 132.

Figure 132. Percentage of California Drinking Water That Comes from the Delta by Age

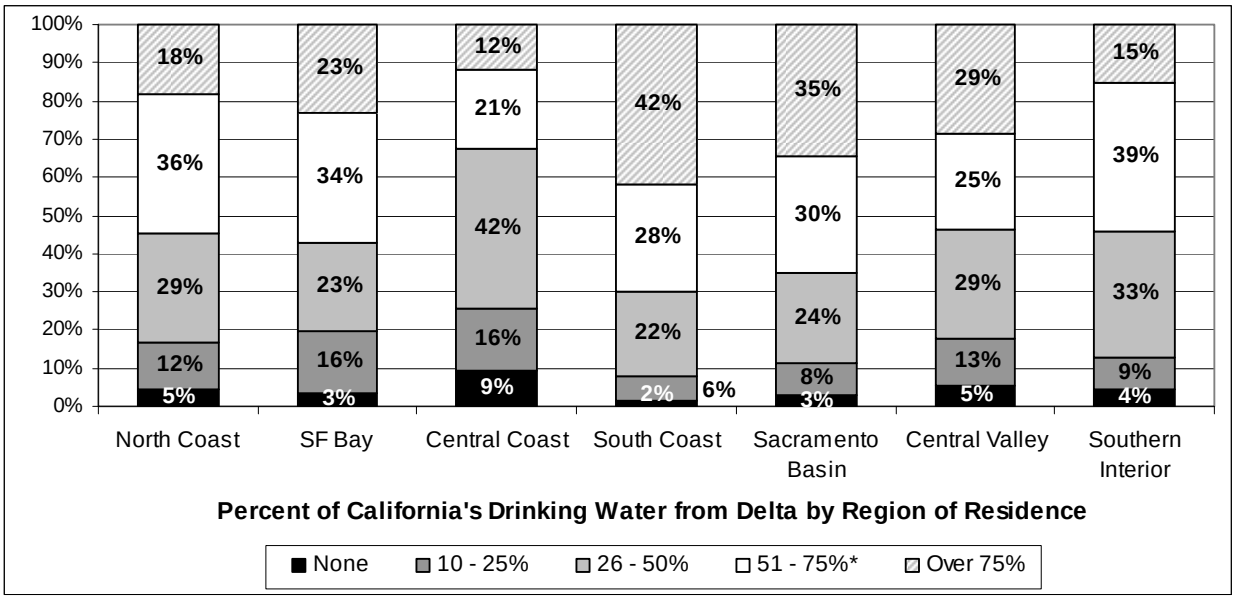


*Correct response

Awareness of the Delta as a Source of Drinking Water and Region of Residence

Awareness of the Delta as a source of California's drinking water varied by region of residence. Excluding those who said they didn't know what percentage of households get drinking water from the Delta, about 9 percent of boaters from the Central Coast region versus 2 percent of those from the South Coast region said no households are served by the Delta. About 16 percent of boaters from the San Francisco Bay Area or the Central Coast region versus only 6 percent of those from the South Coast region said 10 – 25% of households are served by the Delta. About 42 percent of Central Coast residents versus only 22 percent of South Coast residents, 23 percent of San Francisco Bay Area residents, and 24 percent of Sacramento Basin residents thought 26 – 50% of homes get drinking water from the Delta. Boaters from the Southern Interior (39 percent), North Coast (36 percent), or San Francisco Bay Area (34 percent) were among those most likely to know the correct percentage of California households that get their drinking water from the Delta is 51 – 75%. About half of all boaters from the Central Coast, Central Valley, or Southern Interior regions said they did not know what percentage of residences get drinking water from the Delta. See Figure 133.

Figure 133. Percentage of California Drinking Water That Comes from the Delta by Region of Residence



*Correct response

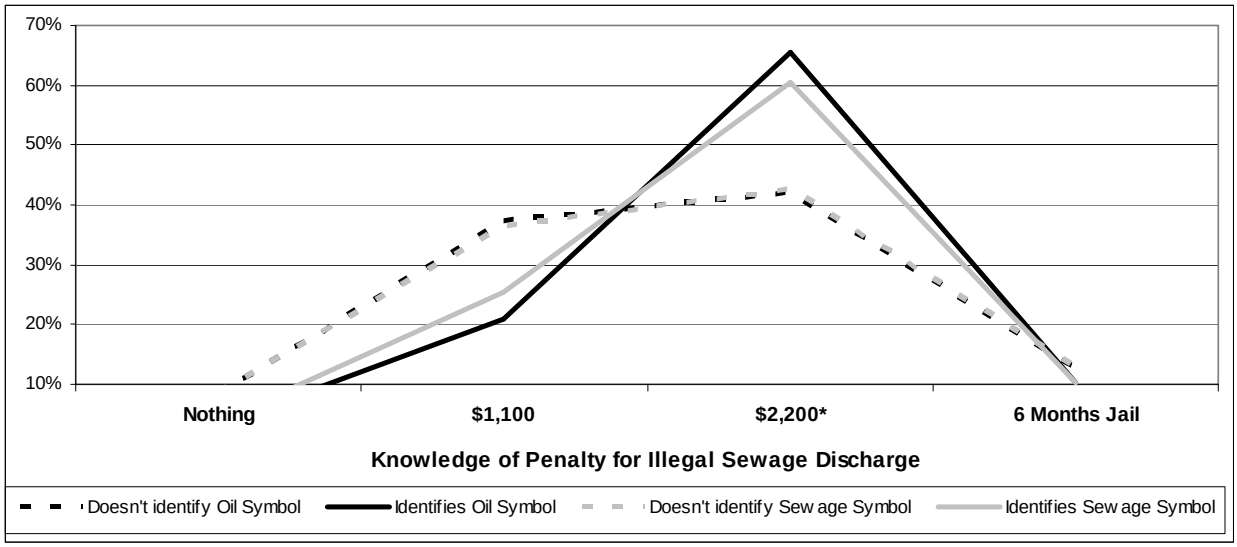
Perceptions of Frequency of Illegal Sewage Discharge and Boater Characteristics

Perception of the frequency of illegal sewage discharge varied by age group with the youngest boaters more likely than boaters over 33 to say this happened frequently. Older boaters were more likely than younger boaters to say this happened once in awhile. Perception of how often boaters illegally discharge untreated sewage appeared to be unrelated to region.

Knowledge of Penalty for Illegally Discharging Untreated Sewage and Boater Characteristics

Knowledge of the penalties imposed varied by boater age, with 16 – 25 year olds more likely than others to say there is no penalty (8 percent versus 1 – 3 percent), 16 – 25 year olds less likely than others to say the penalty is a $2,200 fine (correct response) (20 percent versus 24 – 32 percent), and 34 – 49 year olds more likely than others to say the penalty is 6 months in jail (8 percent versus 5 percent). Knowledge of penalties appeared to be unrelated to number of annual engine hours or whether or not a boater had received a prior kit. However, boaters who correctly identified either environmental service logo were much more likely than those who did not to say the penalty for discharging untreated sewage is a $2,200 fine. See Figure 134.

Figure 134. Knowledge of Penalty for Illegal Sewage Discharge by Environmental Logo Recognition

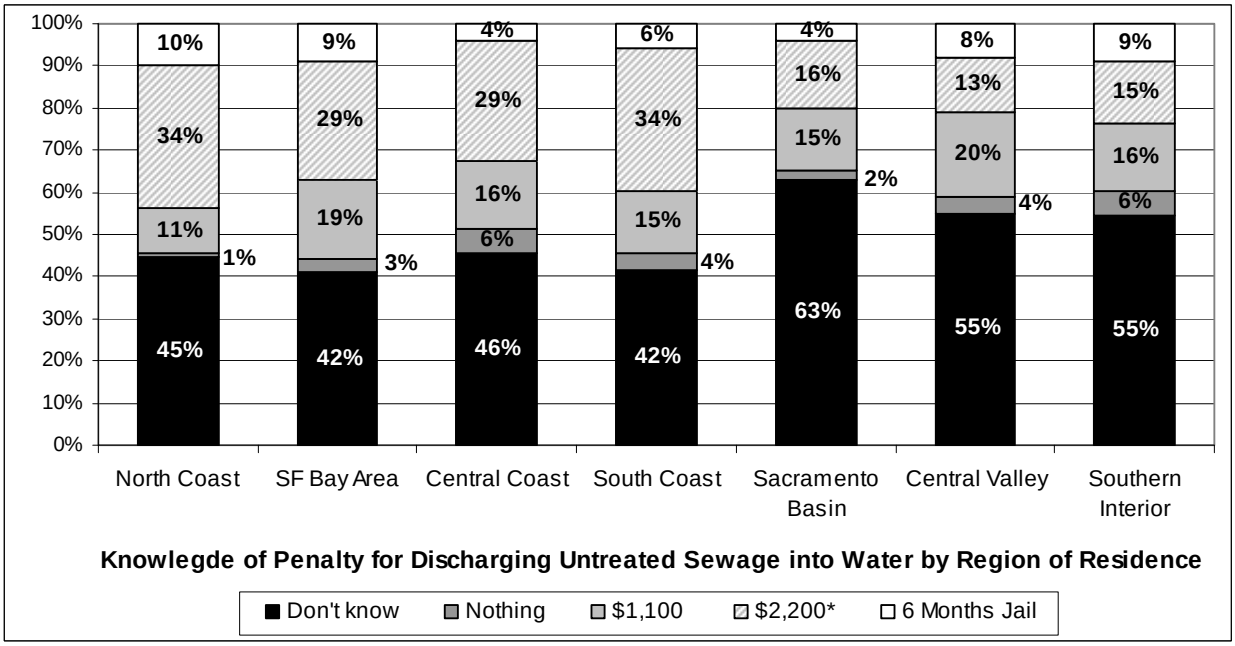


*Correct response

Knowledge of Penalty for Illegally Discharging Untreated Sewage and Region of Residence

Knowledge of the penalties imposed varied significantly by region. About a third (34 percent) of boaters from the North or South Coast regions said the penalty was a $2,200 fine. Almost two-thirds (63 percent) of boaters from the Sacramento Basin said they did not know what the penalty was. See Figure 135.

Figure 135. Knowledge of Penalty for Illegal Sewage Discharge by Region of Residence

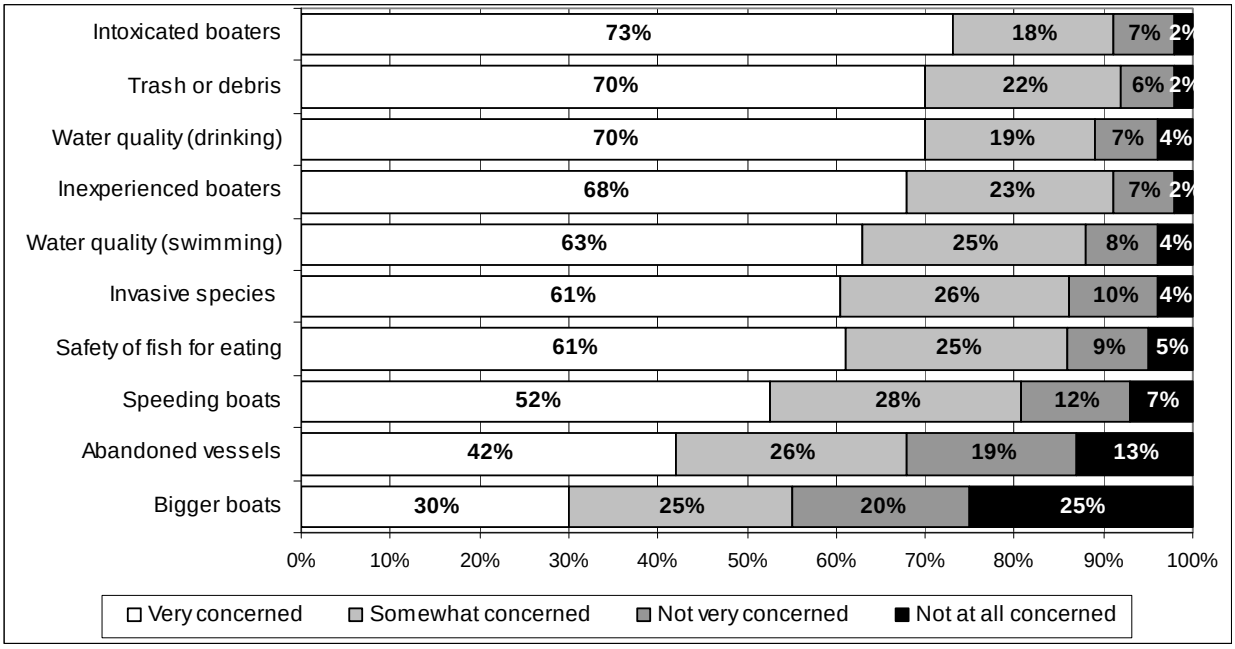


*Correct response

Concerns Boaters Have About Boating in California

Of the 10 topics of concern for boaters, intoxicated boaters, trash and debris, quality of water for drinking, and inexperienced boaters were ranked higher than invasive species, safety of fish for human consumption, speeding boats, abandoned vessels or bigger boats. About three quarters of all boaters said they were very concerned about intoxicated boaters (73 percent), compared to only 30 percent who said they were very concerned about bigger boats. See Figure 136.

Figure 136. Concerns about Boating in California

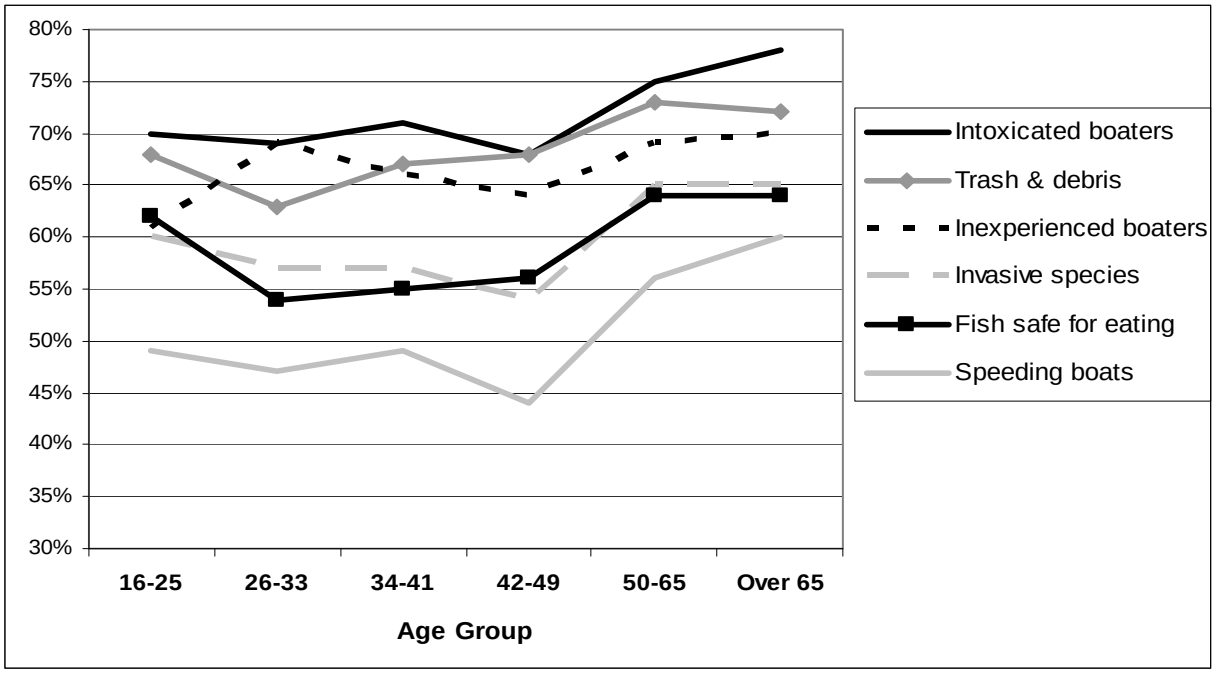


Some concerns appeared to be higher among those who had received a boater kit prior to participation than among those who had not received kits in the past. Boaters who had received prior kits tended to be more concerned about trash and debris, invasive species, inexperienced boaters, safety of fish for human consumption, and abandoned vessels than those who had never received kits before.

Concerns and Boater Age

For most topics of concern to boaters, level of concern generally increased with age. Figure 137 plots the relationship between age and concern for 6 topics where the relationship was statistically significant. The chart plots the percentage of boaters within each age group who say they are very concerned about the particular topic.

Figure 137. Percent of Boaters Who Say They Are Very Concerned by Age Group



Concerns Boaters Have About Boating in California by Region

Of the 10 topics presented to boaters in 2009, level of concern varied by region of residence for 6 of the boating topics. Regional differences emerge for concerns about bigger boats, speeding boats, water quality for swimming, intoxicated boaters, invasive species, and abandoned vessels. Residents in all regions expressed similar levels of concern for trash or debris, water quality for drinking, inexperienced boaters, and the safety of fish for human consumption. In 2009, 40 percent of those from the Southern Interior were very concerned about bigger boats, while only 21 percent of North Coast residents, 22 percent of San Francisco Bay Area residents and 24 percent of Central Coast residents were. About 60 – 64 percent of boaters from the inland regions of Sacramento Basin, Central Valley, or Southern Interior were very concerned about speeding boats, versus 41 – 56 percent of those from the coastal regions. Boaters from the San Francisco Bay Area were less likely than residents from the Sacramento Basin to be very concerned about water quality for swimming (57 percent versus 67 percent). More Central Valley residents (55 percent) were very concerned about abandoned vessels than South Coast residents (36 percent). Figures 138 – 143 present the percentage of residents in each region who said they were very, somewhat, not very, or not at all concerned about the 6 topics that vary by region.

Figure 138. Boaters' Concern about Bigger Boats by Region of Residence

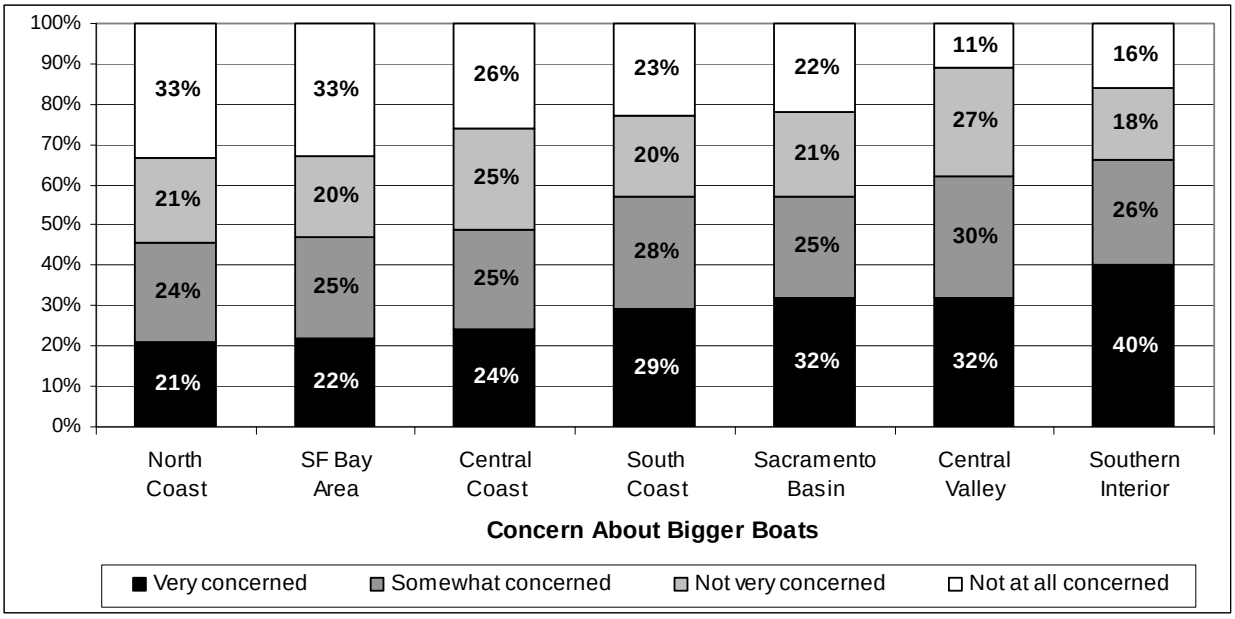


Figure 139. Boaters' Concern about Speeding Boats by Region of Residence

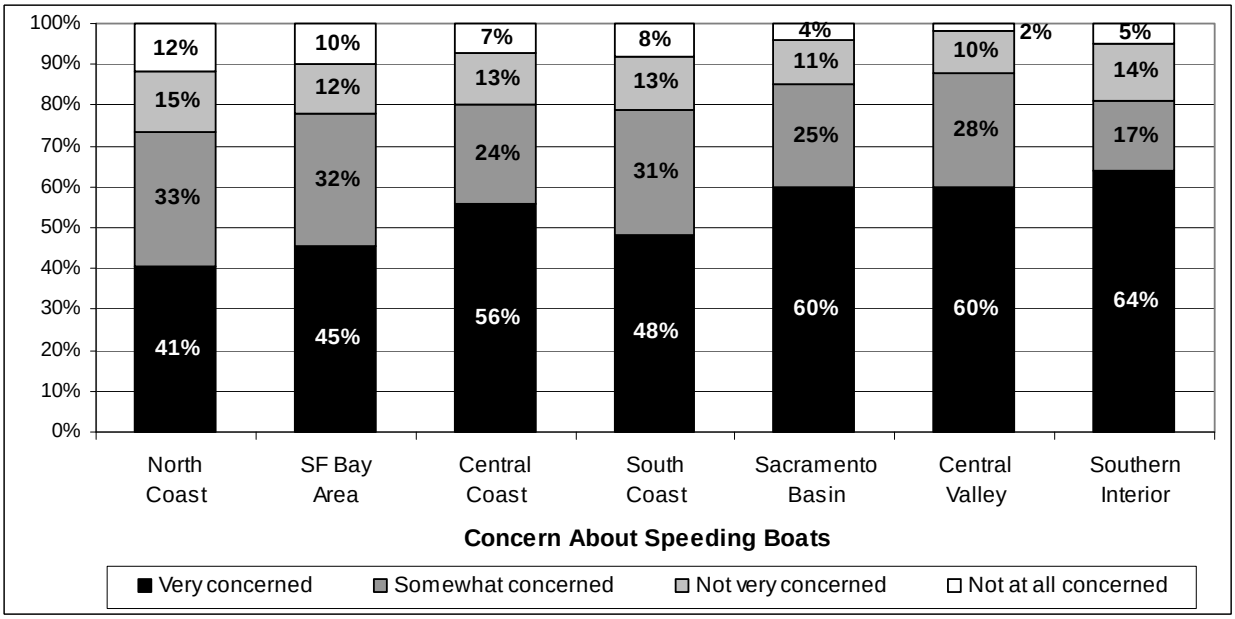


Figure 140. Concern about Water Quality for Swimming by Region of Residence

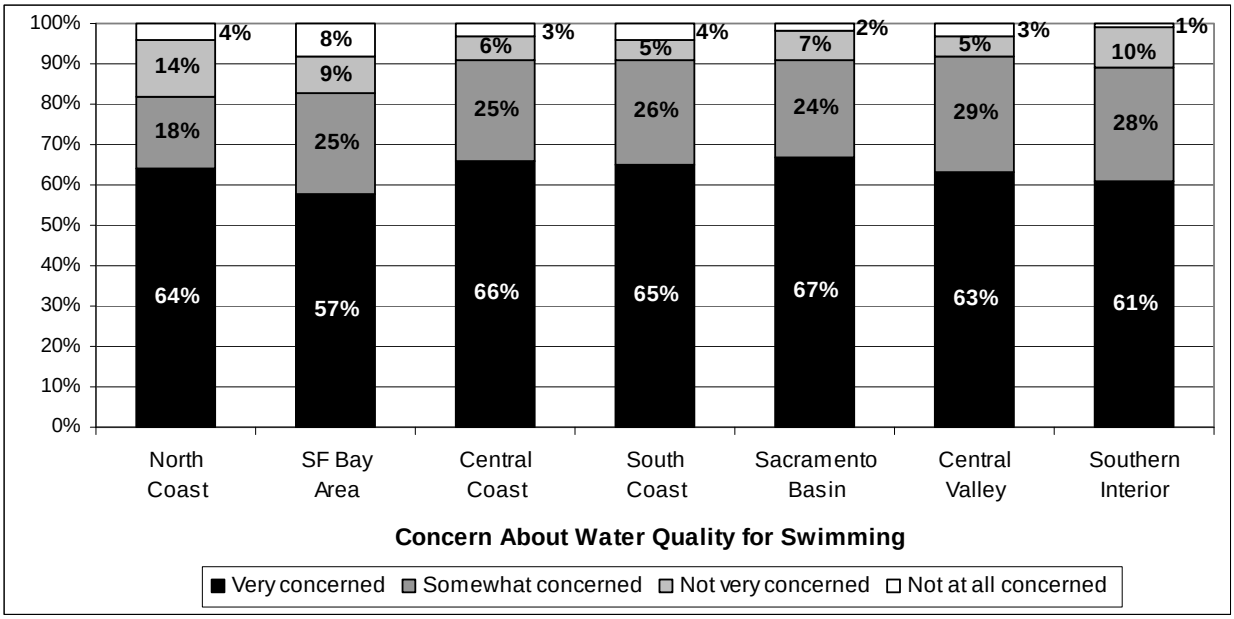


Figure 141. Concern about Intoxicated Boaters by Region of Residence

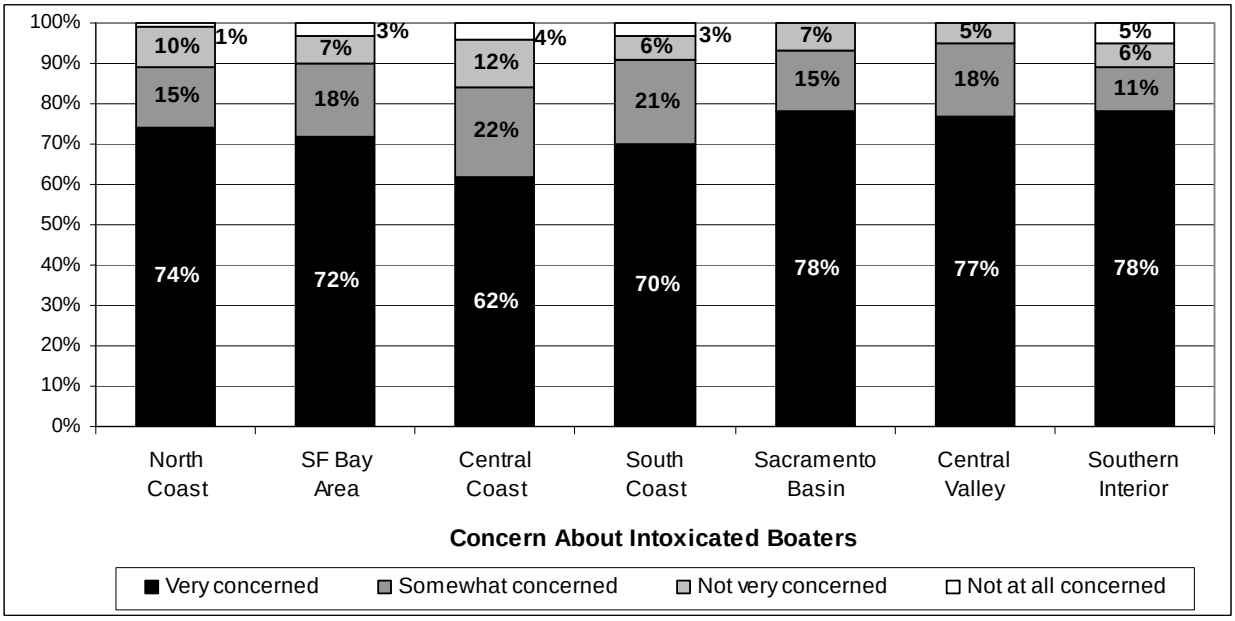


Figure 142. Concern about Invasive Species by Region of Residence

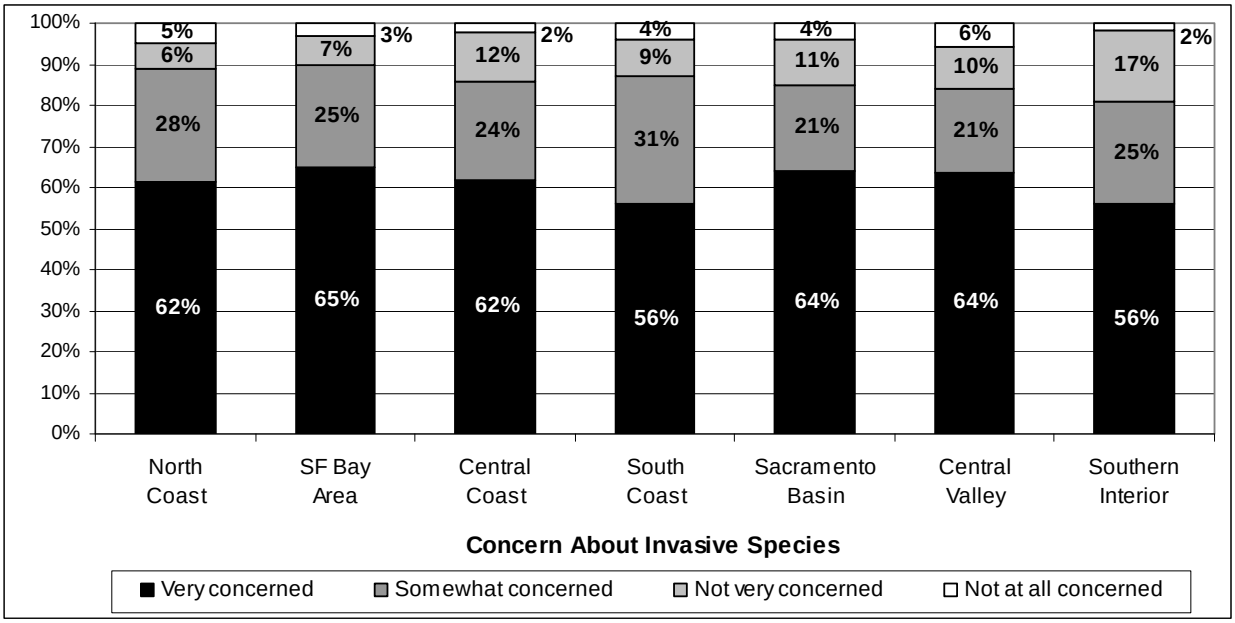
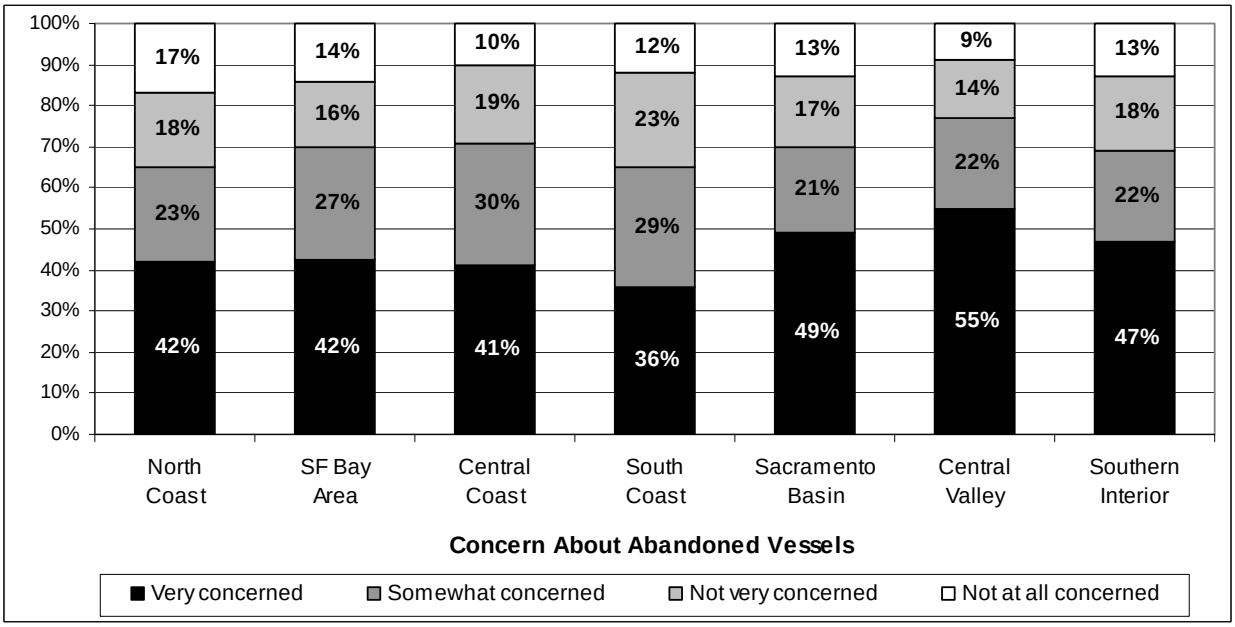


Figure 143. Concern about Abandoned Vessels by Region of Residence



Conclusions and Recommendations

The findings from 5,735 surveys collected from recreational boaters between 2007 and 2009 presented in the preceding report evolved from six primary research questions. The following conclusions and recommendations have been presented to address each of those questions.

What Are the Characteristics of Surveyed Boaters and Boats on California Waters?

- The largest group of all boaters surveyed was between 50 and 65 years of age and about three-quarters (73 – 77 percent) were 42 or older. Only 3 – 5 percent was less than 26 years old. Over 80 percent had been boating at least 3 years and more than two-thirds (71 – 72 percent) had over 5 years of experience. Only about 10 percent had been boating less than a year.
- Ski and fishing boats, the first and second most popular boats, represent at least half (51 – 54 percent) of all boat types owned by survey respondents. About one-fifth (19 – 22 percent) owned sailboats with auxiliary motors. In both survey years, residents of the Sacramento Basin or Central Valley were among those most likely to own fishing boats (27 – 32 percent), but in 2007 – 2008, a large proportion of North Coast residents (34 percent) also owned fishing boats. At least 83 percent of all boaters owned one boat, and about 10 percent owned 2. Owners of motor yachts and sailboats with auxiliary motors tended to use their boats the most, particularly those who used motor yachts on the Sacramento-San Joaquin Delta or who sailed on the ocean or San Francisco Bay.
- More than half (60 – 62 percent) of all boaters surveyed owned boats 20 – 39 feet long, 11 – 12 percent owned boats 40 feet or longer, and 26 – 29 percent owned boats less than 20 feet long. In both survey years, boaters from the North Coast, Central Valley, or Southern Interior regions were those most likely to own boats less than 16 feet long, and more boaters from the Sacramento Basin or Central Valley owned boats 16 – 19 feet long. Sacramento Basin and Central Valley residents were also less likely to own boats 26 – 39 feet in length, while larger proportions of residents from the South Coast (14 – 16 percent) or the San Francisco Bay Area (11 – 15 percent) regions owned boats 40 – 65 feet in length compared to boaters from other regions (3 – 7 percent).
- About 36 – 40 percent of boaters had installed toilets. Type III marine sanitation devices were most common, installed on 69 – 75 percent of boats with onboard toilets, while 18 – 22 percent had Type I MSDs. Boaters who boated on the San Francisco Bay, the ocean, or the Sacramento-San Joaquin Delta at least once a year were more likely to have onboard toilets, particularly those surveyed in 2009.
- About one-third of boaters with onboard toilets used sewage pumpouts more than 10 times a year or every time they go out, and about another third used them 1 – 5 times annually. Between 51 and 80 percent of boaters usually used pumpouts where they stored or berthed their boats. Those who fueled at marinas or brought their own gas cans tended to use pumpouts at marinas more often while those who fueled at gas stations used pumpouts where they launched.
- The most common obstacle to pumpout usage was waiting in line more than 10 minutes, followed by broken pumpouts. Those who boated on inland lakes had more difficulty finding pumpouts, and those who used pumpouts where they launch were much more likely to have trouble finding one than those who use them elsewhere. Among boaters who boated on the Sacramento-San Joaquin Delta, Sacramento Basin residents encountered broken or closed pumpouts, had to wait in line more than 10 minutes, or could not find a pumpout more often than San Francisco Bay residents, which

may signal a greater demand and/or a higher expectation for pumpout services among these boaters.

- Among boaters who boated at least once a year on the ocean, South Coast residents encountered broken pumpouts half the time or more often about three times as often as San Francisco Bay residents (19 percent versus 6 percent). They also reported they never had to wait in line more than 10 minutes less often than San Francisco Bay Area residents (36 percent versus 52 percent) and never had trouble finding one less often than San Francisco Bay residents (53 percent versus 66 percent).
- Boaters overall most often used their boats to leisure cruise, fish, swim, or ski. In particular, boaters from the Sacramento Basin or Central Valley more often used their boats to fish while San Francisco Bay Area, South Coast and Southern Interior residents preferred leisure cruising. On average, boaters spent 46 – 49 days per year on the ocean, 29 – 38 on the San Francisco Bay, 24 – 31 on inland lakes, and 21 – 25 days per year on the Sacramento-San Joaquin Delta. About 43 – 50 percent of all boaters surveyed boated at least once a year on the ocean, 41 – 45 percent boated at least once a year on inland lakes, 18 – 27 percent boated on the Sacramento-San Joaquin Delta, and 14 – 17 percent boated on San Francisco Bay.
- Among boaters surveyed in 2007 – 2008, South Coast and Southern Interior residents spent more days per year on the ocean than residents from the North Coast, San Francisco Bay Area, or Sacramento Basin. Among those surveyed in 2009, Central, South, or North Coast residents spent more days on the ocean than Sacramento Basin, Central Valley or San Francisco Bay Area residents. In 2009, average days of boat use on inland lakes was highest among Sacramento Basin residents and lowest among Central Coast residents, while Central Valley residents averaged more days on the Sacramento-San Joaquin Delta than all other boaters.
- Concerns common to most boaters, and particularly older boaters, included intoxicated boaters, inexperienced boaters, trash and debris, and drinking water quality. Boaters expressed the least concern about speeding boats, abandoned vessels, and bigger boats.
- In both survey periods, level of concern varied by region of residence. Boaters from the inland regions of Sacramento Basin, Central Valley or Southern Interior were more likely than those from coastal areas to be very concerned about speeding boats. In 2007 – 2008, boaters from the three inland regions were more likely than coastal residents to be very concerned about intoxicated boaters. In 2009, however, boaters from all regions, except the Central Coast, were very concerned about intoxicated boaters.
- In 2007 – 2008, boaters from the North Coast, Central Coast or San Francisco Bay Area (53 – 58 percent) were less likely than those from inland or Southern regions (62 – 72 percent) to be very concerned about water quality for swimming, while 74 percent of Southern Interior residents versus 57 percent of San Francisco Bay Area residents were very concerned about water quality for drinking. In 2009, 57 percent of the San Francisco Bay Area residents surveyed were very concerned about water quality for swimming compared to 67 percent of Sacramento Basin residents, 66 percent of Central Coast residents, and 65 percent of South Coast residents.
- Almost half (49 percent) of all boaters surveyed logged 50 or fewer engine hours annually and 10 – 11 percent logged more than 150 engine hours annually. Hours of use depended on type of boat, boating activities, and use location. Boaters who owned motor yachts, houseboats, or fishing boats, who used their boats to fish, or who boated at least once a year on the ocean were among those most likely to log over 150 engine hours.

- The largest proportion (45 – 48 percent) of those surveyed consumed less than 12 gallons of fuel in a typical day on the water, and across all boaters, those who owned offshore racers tended to be among the highest fuel consumers while those who owned sailboats with auxiliary motors tended to be among the lowest consumers.
- Between 40 – 47 percent of boaters reported they changed their own boat oil and about one half of those (53 percent) said they usually changed it at home. Boaters age 50 and older and those with more than 5 years of boating experience tended to be among those most likely to change their own oil. Boaters who owned sailboats with auxiliary motors or who used their boats to fish or camp were also more likely to change their own oil. More residents of the Central Coast, Central Valley, or San Francisco Bay Area regions changed their own oil.
- Although 43 – 46 percent of all boaters traveled less than a mile or disposed of their used oil where they changed it, on average about one quarter (24 – 29 percent) traveled more than 3 miles to dispose of used oil. Travel distance also varied by region as higher proportions of Central Coast residents traveled less than 1 mile to dispose of used oil. In 2007 – 2008, Sacramento Basin residents traveled more than 3 miles in greater proportion (39 percent) than boaters from the Central Coast, South Coast, San Francisco Bay Area or North Coast (16 – 28 percent), while in 2009, nearly a third (31 percent) of Southern Interior residents traveled more than 3 miles to dispose of used oil.

How Do Surveyed Boaters Who Are Aware of and/or Practice Water Pollution Prevention Measures Differ From Those Who Are Unaware or Do Not Practice Such Measures?

- Boaters with the least experience and those from inland regions had the most difficulty identifying either environmental service logo. Perhaps surprisingly, in 2009 boaters with 6 months to 2 years of boating experience demonstrated significantly higher recognition rates of both logos than those of all other experience levels.
- Encouragingly, across most regions, boaters who changed their own oil demonstrated higher recognition of the oil logo, and those with installed toilets demonstrated higher recognition of the sewage logo.
- Overall, the younger a boater the more likely he or she was to take used oil to a certified oil recycling center and the older a boater, the more likely he or she was to dispose of used oil at a marina. Boaters age 16 – 25, those who fueled at gas stations, and those who used marina dry storage were among those most likely to use improper disposal methods.
- In 2007 – 2008, Sacramento Basin residents were among those least likely to use oil absorbents and most likely to use rags or paper towels to clean leaked oil. In 2009, boaters from the Central Coast or Central Valley were among those most likely to use oil absorbents.
- Overall, boaters who used their boats to ski or wakeboard were less likely to use bilge cleaning products, less likely to use oil absorbents, and more likely to use improper cleaning methods and materials, such as soaps or detergents, while those who leisure cruised were among those most likely to use environmentally responsible oil cleaning options, such as bilge cleaning products or oil absorbents. Those who used oil absorbents generally disposed of them at oil waste receptacles at marinas, especially those surveyed in 2009. However, 29 percent said they tossed them in the trash.
- Boaters from the North and South Coasts tended to be the most informed about fines for illegal dumping, while those ages 16 – 25 tended to be least informed. For all boaters surveyed, but

especially among boaters surveyed in 2009, those who correctly identified the environmental service logos demonstrated more knowledge of the fines than those unfamiliar with the logos.

- Across all boaters, level of concern about ecological topics, such as the safety of fish for human consumption, invasive species, trash and debris and water quality for drinking, generally increased with age.

In What Areas Do Surveyed Boaters Lack Information/Awareness of Environmental Laws and Clean Boating Best Practices?

- Boaters overall and especially those who frequent the Sacramento-San Joaquin Delta most often were largely unaware that 51 – 75 percent of California residences receive their drinking water from the Sacramento-San Joaquin Delta.
- About 65 - 74 percent of boaters did not know the penalty in California for illegally discharging untreated sewage is a $2,200 fine. In 2008, boaters age 26 – 33 and over 65 tended to be the least informed about fines and penalties while in 2009, boaters age 16 – 25 tended to be least informed.
- In 2007 – 2008, 20 and 29 percent of boaters could correctly identify the oil recycling service logo and the sewage pumpout service logo, respectively. In 2009, about one-quarter (26 percent) recognized the oil recycling service logo and one-third (33 percent) recognized the sewage pumpout service logo. Encouragingly, across most regions, boaters who changed their own oil demonstrated higher recognition of the oil logo and those with installed toilets demonstrated higher recognition of the sewage logo.
- The incidence of oil leaks was very high, as 96 percent said their boat leaked oil most or every time they went out. Nearly all boaters (98 percent) reported that they cleaned the oil that had leaked into their bilge. Across all boaters surveyed who reported having oil leaks and how they cleaned them, one-third (31 – 35 percent) used rags or paper towels, about half (50 – 51 percent) used oil absorbents, and about 10 - 12 percent still used soap or detergent.
- While the 40 – 47 percent of boaters who changed their own boat oil were among those most likely to clean oil that had leaked into the bilge and to use oil absorbents, they also tended to use rags or paper towels and soaps or detergents to cleaned leaked oil more often than those who didn't change their own oil. About half (47 percent) of those who changed their own oil, especially those who stored their boats at home on trailers, took the used oil to certified oil recycling centers, but nearly another third (30 – 32 percent) took it to marina drop-off centers. Still, 5 – 9 percent of boaters overall disposed of used oil improperly, and in 2007 – 2008, up to 23 percent of boaters age 16 – 25 said they tossed their used oil in the trash, stored it at home, or took it to the dump.
- In 2007 – 2008, boaters from the Central Coast, San Francisco Bay Area, or North Coast were those most likely to take used oil to marina drop-off centers, while in 2009, North Coast residents were most likely. In 2007 – 2008, 17 percent of Central Valley residents and 12 percent of Southern Interior residents used improper oil disposal methods, while in 2009, improper methods were reported most often by Sacramento Basin residents (11 percent).[4]

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[4] Because social desirability factors may be present in survey research, in particular the tendency for respondents to under-report behaviors counter to existing social norms, the actual proportion of boaters who use improper methods is assumed to be somewhat higher than reported.

Which Surveyed Boaters Can Water Pollution Prevention Programs Target in the Future?

- Overall, the 8 – 13 percent of boaters who had received clean boater kits in the past tended to be much more likely to use oil absorbents to clean leaked oil and somewhat more likely in 2009 to correctly identify environmental service logos. These findings suggest continued educational efforts, such as boater kit distribution, should target harder-to-reach populations such as younger and less experienced boaters as well as those who launch at public launch ramps and/or fuel their boats at gas stations.
- Because over 80 percent of boaters did not know that 51 – 75 percent of California residences get their drinking water from the Sacramento-San Joaquin Delta and because this knowledge may provide motivation or encourage boaters to practice more environmentally sound behaviors while boating on the Sacramento-San Joaquin Delta, future education campaigns should continue to target high traffic hubs or boating locations that draw large numbers of boaters during peak boating seasons. For instance, outreach efforts should target boaters at launch sites such as those with good access and wide lanes, close proximity to boat storage, and convenient trailer parking, which are very popular among the majority of boaters who use public launch ramps. Another strategy might be to create profiles of boaters who know what percent of homes gets water from the Sacramento-San Joaquin Delta to determine, if possible, alternative access points for those who are unaware.
- Because between 6 and 9 percent of all boaters surveyed reported using improper used oil disposal methods and because social desirability effects in survey research suggest the actual figures may be higher, future water pollution prevention program efforts should target boaters who report using improper methods, such as boaters age 16 – 25, boaters who fuel at gas stations, and boaters who use marina dry storage. These boaters might be accessed via their usual fuel or launch location, or through sites associated with patterns of boat use, habits, or activities. One next step may be to use existing data to create and refine profiles of boaters whose habits, practices, and awareness are the least environmentally sound. Possible analyses might, for instance, grade boaters on their environmental consciousness by combining all available behavioral, knowledge and awareness indicators into an overall index. If such an index appears to be statistically valid and reliable and is shown to have predictive value, it might then be used to specifically identify potential environmental offenders and help inform future educational campaigns.
- Because those who changed their own boat oil represented a sizable majority of boaters (40 – 47 percent) and were among those most likely to use cleaning materials such as rags or paper towels and soaps or detergents, future pollution prevention outreach might target do-it-yourselfers through local access points such as certified oil recycling centers, marina drop-off sites, marine supply stores, or boat launch and storage facilities to discourage the use of improper materials and/or provide alternative strategies.
- Because awareness of the fine for dumping untreated sewage was relatively low (26 – 35 percent) among California boaters overall, future pollution prevention programs and educational campaigns might target the 36 – 40 percent of boaters with onboard toilets, one-third of which use sewage pumpouts services on California waters more than 10 times a year or every time they go out. These boaters also tend to log more annual engine hours and may be especially accessible through their use of pumpout services where they store, berth, or launch their boats.

What Types of Educational Outreach Should Such Programs Use?

- Due to boaters' high reliance on boat shows, marinas, marina supply stores and word-of-mouth (i. e. Dockwalker programs) for boating information, pollution prevention programs would do well to continue to include these hubs in future educational outreach campaigns. However, age differences in resource use and variations by region of residence suggest access to some boaters may be better achieved through advertisements in publications like Boat U.S. Magazine or Latitude 38, through boating safety classes, or in partnership with boating associations.
- Considering the commonalities demonstrated by boaters' shared concerns over intoxicated boaters, inexperienced boaters, trash and debris and drinking water quality, it's feasible that educational campaigns could motivate boaters towards behavioral change by tapping into common themes and capitalizing on their potential to unify boaters around issues that impact everyone's experience on California waters. Despite boaters' tendency to perhaps prioritize those concerns that directly impact their personal boat use habits and preferences, such as southern residents rating the quality of water for swimming a higher concern than those who live in northern climates, the unity demonstrated over many concerns suggests boaters' experiences do intersect in important ways that may well resonate with large numbers of recreational boaters.
- Certainly educational outreach campaigns need to be designed around the boating activities, habits, and preferences of those least aware of water pollution prevention measures or least likely to practice environmentally sound behaviors while boating. Attempts to reach these boaters must take into consideration where they store, launch, fuel and use their boats, as well as where they get boating information. However, it may be just as important to craft messages and campaigns that personally resonate with particular boaters by addressing their specific needs, especially those who have demonstrated resistance to environmentally conscientious messages and behavioral change.

Some final words about the analysis conducted and the conclusions presented here. Although several preliminary findings suggest that boaters surveyed in 2009 differ from those surveyed in 2007 – 2008 in relevant and important ways, due to time and budgetary restrictions, no trend analysis has been performed on these data at the time of this report. Additionally, apparent differences indicated by the preceding analysis may or may not be the result of (non-probability) sampling error, particularly when much of the analysis concentrates on sub-group and/or population differences, such as regional comparisons. In some instances, sub-group differences that vary from one survey year to the next or that appear to be contradictory have been omitted when the source of the variance is suspected to be the result of sampling error. Additional methods of investigation that may help validate the foregoing research or identify and confirm suspected population differences include a) combine all data from prior survey years into a single dataset in order to perform comparative or trend analyses on key variables of interest, b) consider using other statewide data, such as boater registration information, to statistically adjust (weight) the boater survey data to more closely match known statewide distributions, and c) design and implement a small-scale validation study using a probability sample to test those specific findings which are most critical to policy-makers.