

NATIONAL BOATING TRENDS¹

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Abstract.--This paper examines the characteristics of recreational boats and boaters in the United States and the nature and extent of boating activities. The primary sources of the information presented are the United States Coast Guard's Nationwide Boating Surveys conducted in 1973 and 1976. The evidence indicates that boating is a major form of outdoor recreation with a broad base of participation which has experienced continuous growth.

INTRODUCTION

We do not know when the first boat was built. We do know that primitive men made dugout boats and canoes from large logs. The North American Indians built birchbark canoes, and the Eskimos built kayaks using seal skins. In other parts of the world, wicker and reed boats were common. While these early boats were built for work, they served as models for the "pleasure" or "recreational" craft that began to appear hundreds of years later.

Nobody really knows when recreational boating began. Little was recorded about it until the mid-1600's, when Charles II introduced yachting into England, according to the World Book Encyclopedia. The first English yacht club was founded in 1775. In the United States, recreational boating began in the early 1800's. The first yacht club was organized in New York City in 1844. In the early 1900's it is estimated that there were not more than 100,000 recreational boats in the entire United States.

The growth in boating hit its peak stride immediately after World War II.

Boating industry estimates reveal that there were approximately 2.4 million recreational boats in use in the United States in 1947. This number had doubled little more than five years later. There were various reasons for the rapid growth. As in other areas after World War II, technological advances in materials and building/assembly techniques permitted mass production of lightweight boats, and therefore brought down the cost of owning a boat. Improvement of the outboard motor, and new inventions such as electric starters made boat operation easier for many people, including women. Boat trailers were introduced for use with the fast growing automobile fleet. Boat financing and insurance were facilitated. Additionally, a wider variety of boats became available to meet buyer demands, and a market opened up for used boats, contributing to the perpetuation of this dynamic process. The population of the nation continued to increase, as did its mobility. Personal income was rising and lifestyles becoming more active. With longer vacations and more holidays, about one-third of the year became available to the average worker for leisure. Boating retail expenditures were estimated to be 1.23 billion dollars in 1955 for boats and equipment, fuel, insurance, maintenance and repairs, storage, docking, launching and club membership. These expenditures increased to \$2.68 billion in 1965, \$4.8 billion in 1975, and \$7.5 billion in 1979 (MAREX 1979). There are currently over 2,600 boat manufacturers in the United States producing a myriad of boats, and about 6,000 marinas, boat yards and yacht clubs providing essential waterfront services.

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THE COAST GUARD'S RECREATIONAL BOATING SAFETY ROLE

Recreational Boating Safety Program

The United States Coast Guard's early involvement with recreational boating was primarily search and rescue after a mishap occurred. There was some involvement, however, in the preventive aspects of boating safety. Two Federal laws, passed in 1910 and 1918, dealt with motorboat regulation. The Coast Guard's role grew as boating grew. The Motorboat Act of 1940, which superseded the 1910 Act, expanded Coast Guard authority to regulate safety equipment such as life preservers and fire extinguishers on motorboats, also, it provided for penalties for reckless or negligent motorboat operation. The Federal Boating Act of 1958 provided for Federal and State cooperation in the interest of uniform boating laws and enforcement, making the states partners with the Federal Government in regulating recreational boating.

The Coast Guard was moved organizationally from the U. S. Treasury Department to the Department of Transportation in April 1967. There was growing recognition that boating was becoming a more diverse, complex and dynamic recreational activity. Congressional interest was running high. In his 1968 message to Congress on the American Consumer, President Johnson spoke to desired improvements in the area of recreational boating. All of this interest and review of boating safety led to passage of the Federal Boat Safety Act of 1971. This Act was intended by Congress to provide, in one statute, a comprehensive national program having three main objectives: cooperative Federal/State programs, improved boat design and construction, and, more flexible regulation of boat operators. This is the present basic authority for the Coast Guard's Recreational Boating Safety Program. The objective of the program is to reduce the risk of loss of life, personal injury and property damage associated with the use of recreational boats to provide boaters maximum safe use of the nation's waters. The program is broad-based, having direct impact on the states, manufacturers of boats and associated equipment, dealers, distributors, importers and the boating public.

The Need for Data

As the Recreational Boating Safety Program responsibilities grew and became more complex, the need for data for the

Coast Guard to manage the program grew. The Coast Guard had been assigned the responsibility for promulgating regulations dealing with manufacturer requirements for safe boat construction. In order to determine where safety problems existed, more had to be known about the boat population. The Coast Guard had been collecting and publishing boating accident statistics since passage of the Federal Boating Act of 1958. Rates, not raw accident data, however, are needed to identify the relative magnitude of safety problems and to determine effectiveness of safety programs. The Coast Guard reports annually on the number of boats registered by the states. The registration or numbering data has limitations. Initially, only boats over ten horsepower had to be registered. Presently, all motorboats are registered. Although some states go beyond this, the large nonpowered fleet is essentially not covered in this system.

Education and enforcement are two other major elements of boating safety programs. Knowledge about the number, characteristics and activities of boaters is necessary to most effectively carry out these program responsibilities. The boat operator is the primary target of safety efforts.

Boating Surveys

A Coast Guard sponsored survey was conducted in the Fifth Coast Guard District (Maryland, North Carolina, Virginia and the District of Columbia) in 1969 to determine the feasibility of collecting boating information from the general public. The regional survey proved successful, and the telephone methodology utilized was later expanded to nationwide scope. Based on cost and time considerations and the capability for immediate interaction between interviewer and respondent, the telephone survey was chosen over personal interviews and mail survey mediums. The Coast Guard has sponsored two comprehensive surveys of the boating public. They were conducted during the months of April and May 1974 and covered 1973 boating activities, and April, May and June 1977 and covered 1976 boating activities. A stratified sampling plan was employed in the surveys. The Continental United States was partitioned into 400 geographical strata consisting of one or more counties. Two telephone central offices were selected at random for each stratum, resulting in 800 Primary Sampling Units. Within each central office, the final four digits of each telephone number to be dialed were then randomly selected by computer. For the 1976 survey, 28,261 households were contacted by a contractor. Of these, 6,018 were boating households,

that is, one in which someone owned and/or operated one or more boats in 1976. There were 5,507 completed interviews of boating households.

The survey reports are compilations of answers by individuals, weighted at the completion of the interviewing period to give national estimates. These surveys were relatively modest attempts to gain some of the data required to carry out program responsibilities. We learn from each iteration and build upon this knowledge. The surveys have provided many valuable indications of the actual situation. While the Coast Guard surveys represent the most comprehensive national boating surveys known, there are other boating data developed principally by the boating industry, States and other Federal agencies. All provide valuable insights in the areas they were intended to address. This paper highlights much of the varied data on boats, boaters, and boating activities contained in the Coast Guard surveys. Unless otherwise noted, reference to "the survey" or "surveys" throughout the paper will mean the Coast Guard Nationwide Boating Surveys.

BOATING HOUSEHOLDS

Boat Operators per Household

The Coast Guard surveys looked at boating households. A boating household is defined as one in which at least one member actually operated a boat in the survey year. The surveys identified 10.6 million boating households in 1973 and 14.9 million in 1976. One out of every five households in the United States in 1976 had at least one boat operator. Table 1 shows numbers of operators per household. The share of households with only one operator decreased by about 10%. Households with two operators increased about 5%, and those with three or more operators increased by lesser amounts. This attests to a greater active family involvement in boating.

Boat Ownership

There were 7.3 million households in 1973 and 9.6 million in 1976 in which one or more recreational boats were owned. The latter survey indicated that the average number of boats per boat-owning household was 1.31, and 21.1% of boat owning households owned more than one boat. Table 2 shows the number of boats owned per household.

Table 1.--Boat operators per household (USCG 1978)

Operators per household	Year	Number of boating households	Percent of operator households
1	1973	5,529,000	52.1
	1976	6,373,000	42.8
2	1973	2,985,000	28.1
	1976	4,965,000	33.3
3	1973	1,119,000	10.6
	1976	1,800,000	12.1
4	1973	563,000	5.3
	1976	1,010,000	6.8
5	1973	258,000	2.4
	1976	409,000	2.7
6	1973	116,000	1.1
	1976	233,000	1.6
7 or more	1973	43,000	0.4
	1976	105,000	0.7
Total	1973	10,613,000	100.0
	1976	14,895,000	100.0

Table 2.--Household boat ownership (USCG 1978)

Number of boats owned	Year	Number of households	Percent of boat owning households	Percent change
1	1973	5,893,000	80.6	
	1976	7,559,000	78.9	28.2
2	1973	991,000	13.6	
	1976	1,377,000	14.4	38.9
3	1973	260,000	3.6	
	1976	390,000	4.1	50.0
4 or more	1973	165,000	2.2	
	1976	258,000	2.7	56.4

There is almost an even division in the way owners obtained their boats in 1976. According to the survey, approximately 48% bought their boats new, and a nearly equal number bought used boats. The remaining 4% built their own boats, some from kits.

Owners of 64.5% of new boats indicated that they had no intention of selling their boats, 5.5% had already sold the boat they used in 1976; the remaining boats were going to be kept anywhere from one month to more than five years. About 18% of the households that operated a boat in 1973, and 25% in 1976, rented a boat one or more times. In 1976, 9.2% of these households rented only one time, 5.3% twice, 5.6% three to five times, and 5.0% more than five times.

A national study of consumer attitudes toward recreational boating sponsored by the boating industry indicated that the

median family size of boat owning household was 3.7 members (MAREX 1979).

BOATS

Participation in Boating Activities

A major finding of the Outdoor Recreation Resources Review Commission's report to the President was that, "Water is a focal point of outdoor recreation - most people seeking outdoor recreation want water - to sit by, to swim and to fish in, to ski across, to dive under, and to run their boats over" (ORRRC 1962). Boating provides a platform for these and other water activities.

Members of boating households participated in one or more of a variety of boating activities. The basic proportions were similar between 1973 and 1976. The percent of households participating in water skiing showed the biggest increase, about 8%. Canoeing and whitewater activities were not separately broken out in the 1973 survey. Table 3 shows the households participating and the percent of time spent in the various boating activities in 1976.

Table 3.--Household participation in boating activities in 1976 (USCG 1978)

Activity	Households participating	Percent of households ^a	Percent of time spent
Pleasure cruising or sailing	9,312,000	62.5	31.5
Water skiing	5,617,000	37.7	13.7
Recreational fishing	11,422,000	76.7	44.7
Hunting	1,023,000	6.9	1.6
Racing	712,000	4.8	1.3
Commercial use - incl. fishing	391,000	2.6	.8
Whitewater canoeing	1,044,000	7.0	1.2
Other canoeing	2,359,000	15.8	4.6
Whitewater rafting	401,000	2.7	.3
Whitewater kayaking	161,000	1.1	.1
Other kayaking	289,000	1.9	.2
			100.0

^aMore than one response is possible for each of the 14,895,000 boating households.

It is clear from the survey that boating households are also active in recreational activities other than boating, including camping, fishing, hunting, athletic sports, and other outdoor recreation. Ninety-eight and one-half percent of boating operator households participated in one or more of these activities; 24% were active in all five. Recreational fishing had the highest percentage of participants, 88.4%.

Number of Boats

The Coast Guard has been collecting data on numbered or registered boats since the passage of the Federal Boating Act of 1958. Only motorboats of 10 or more horsepower had to be numbered. Some states expanded boat numbering requirements in the intervening years. The Federal Boat Safety Act of 1971 required all motorboats to be registered. Some states have gone beyond this and register all watercraft. While the numbering data has limitations for trend analysis due to some variances in state numbering requirements, it does provide long term data regarding the basic composition of the motorboat fleet. A major thrust of the Nationwide Boating Survey was to provide data on the non-powered boats as well as powerboats. Over 8.1 million boats were numbered in 1978. The total number of all boats according to the 1976 survey was 12.75 million. The number of boats in the United States more than doubled in twenty years.

Characteristics of the Boat Population

Boats are generally characterized by a variety of factors, including type, length, hull material, engine type and horsepower.

Boat types. There are many terms used to identify boat type. Broad categories include open motorboats, cabin motorboats, rowboats, sailboats, inboard boats and outboard boats, for example. More specific classes include runabouts, cruisers, johnboats, and many others. A long list of specific boat types was used in the 1976 survey. Some people had problems placing their boats within the types. Many people simply refer to their small boat as a "fishing boat". Six major groupings of boat types are used in this paper. It is felt that these are most representative of the many boat types, and will be easily identifiable in the mind of the reader. There is no question that the small open boats, powered and nonpowered, comprise the lion's share of the boating fleet, about three-fourths.

The relative percentage share of each major grouping of boat types is as follows:

Rowboat, Johnboat, Skiff and other open, undecked lightweight boats	42%
Open Runabouts (decked and powered)	31%

Sailboats (powered and nonpowered)	9%
Canoes and Kayaks	9%
Cabin Cruisers and Houseboats	5%
Inflatables, Rafts and Thrill Craft	4%

Boat length. The simplest and most direct measure of boat size is length. Classification of motorboats by length is established by Coast Guard regulations. These classes, set by the Motorboat Act of 1940, are:

Class A	Less than 16'
Class 1	16 to less than 26'
Class 2	26 to less than 40'
Class 3	40 to not more than 65'

Pleasure boats over 65' are documented by the Coast Guard. Numbered boat data provides a wealth of trend information regarding motorboat length. According to the 1978 data, 62% of the numbered motorboats are less than 16', 97% are less than 26' (USCG 1979). Table 4 shows the percent of boats by length class for the past ten years.

Table 4.--Motorboat length (USCG 1969-1978)

Length class	Percent by year						
	1978	1977	1976	1975	1973	1971	1969
Class A	62.22	63.68	64.31	65.58	65.20	64.53	66.28
Class 1	34.66	33.33	32.67	31.46	31.44	31.91	29.99
Class 2	2.76	2.66	2.69	2.65	3.03	3.19	3.37
Class 3	.36	.33	.33	.31	.33	.37	.36

The 1976 survey showed that 55% of all boats, powered and nonpowered, were under 16', and 96% under 26'. The 1973 survey contained similar findings. The following percentage share of boat type by length were computed by excluding the other or unspecified types reported in the 1976 survey. The rowboats, johnboats, skiffs, dinghys and other open lightweight boats accounted for 61.4% of boats under 16', sailboats 8.3%, canoes and kayaks 7.5% and open runabouts 19.9%. The open runabouts also accounted for 49% of boats between 16 and 25', open lightweight boats 18%, canoes and kayaks 12.7%, cabin cruisers and houseboats 8% and sailboats 7.2%. There were 418,000 boats between 26 and 39', consisting primarily of cabin cruisers, sailboats and houseboats. These types also account for most of the 78,000 boats over 40' in length.

Hull material. That material which constitutes the majority of the shell of the vessel is its hull construction. One of the clearest trends available is hull material preference. From the ten-year boat numbering data reflected in Table 5 it can readily be seen that fiberglass has become the predominant hull material, replacing wood. Aluminum has pretty much held its own.

Table 5.--Hull material (USCG 1969-1978)

Year	Hull material				
	Wood	Fiberglass	Aluminum	Steel	Other
1978	10.91%	47.28%	36.80%	1.43%	3.58%
1977	12.10%	45.66%	37.90%	1.47%	2.87%
1976	13.48%	44.54%	36.90%	1.47%	3.61%
1975	14.24%	43.07%	37.05%	1.68%	3.96%
1974	16.62%	41.48%	35.70%	2.32%	3.88%
1973	18.66%	40.75%	34.58%	2.10%	3.91%
1972	23.08%	38.37%	33.03%	2.26%	3.26%
1971	25.67%	37.06%	31.64%	2.20%	3.43%
1970	29.04%	35.29%	30.27%	2.39%	3.01%
1969	31.38%	33.41%	29.30%	2.45%	3.46%

Fiberglass overtook wood as the most used hull material in 1969. New, more exotic and efficient hull shapes made fiberglass' advantage of molding-ease attractive. Fiberglass is also lighter, and offers ease of maintenance. Aluminum is now the second most used hull material. It has more strength in relation to weight than fiberglass, but it is more difficult to form. The two nationwide surveys bore out this trend in hull material for all boats. Fiberglass accounted for 44% of the hulls in 1976, 40% in 1973, aluminum 33% and 34%; and wood 10% and 15% in the two survey years. Most of the open lightweight boats, 61%, in 1976 were aluminum; 20% fiberglass. Fifty-three percent of the canoes were aluminum, 32% fiberglass. Sixty-six percent of the sailboats were fiberglass, 14% wood. Seventy percent of the open runabouts were fiberglass, 12% aluminum and 9% wood. Forty-seven percent of the cabin cruisers and houseboats were fiberglass, and 31% wood.

Looking at hull material by boat length, the 1976 survey showed that aluminum is the predominant material for the smallest boats, such as johnboats, canoes and skiffs, accounting for 47% of the boats under 16'. Fiberglass is second at 32%. Fiberglass accounted for 60% of the boats 16 to 25',

aluminum 18%. Wood accounted for 47% of the boats 26 to 39', fiberglass 37%. Fiberglass accounted for 49% of the boats over 40', wood 42%.

Engine type. Marine engines are basically either inboard or outboard, jet, or inboard/outboard (outdrive). As the name implies, outboards are mounted outside the boat, on the transom. These are generally two-stroke engines designed specifically for boating. The inboards are built into the boat hull. These are usually four-stroke engines adapted from automotive engines. Inboard/outboards have the power unit inside the boat and the drive outside.

Most of the early recreational boats in the country were inboards or auxiliary-powered sailboats. The outboard was something of a novelty. The motors were bulky, heavy, hard to start, generally unreliable, and lacking in horsepower. The phenomenal growth in boating went along with the refinement of the outboard motor.

Coast Guard data on numbered boats for 1978 indicates that 84.75% are outboards and 15.25% are inboards, including inboard/outboards. The share of inboards has increased about 3% during the past ten years. The 1976 survey indicated that there were 7.8 million boats powered by outboards, including jets, 971,000 inboards, including jets, 844,000 inboard/outboards, and 123,000 other. Five and one-half percent of all boats had two or more engines for use with them. These engines were not necessarily mounted on the boat simultaneously.

Horsepower. The surveys showed, as one would expect, that the horsepower of the majority of open lightweight boats is under 30, as are the engines on auxiliary-powered sailboats. The majority of engines on the open runabouts and cabin cruisers were over 30 horsepower. A comparison of horsepower between the two survey years is made in Table 6.

Table 6.--Number of boats by horsepower (USCG 1978)

Year	Horsepower							Total
	None	1-5	6-10	11-30	31-50	51-100	Over 100	
1973	2166	1021	1276	1069	1420	1395	1257	9604
1976	3048	1208	1562	1293	1721	1867	2051	12750

Increases in the number of nonpowered sailboats and canoes accounted for the largest shares of the higher number of boats

with no engines in 1976. The growth of boats in the higher horsepower categories is higher than in the lower categories. Boating industry data indicates that the average horsepower of motors sold has increased steadily. In 1969, it was 33.1 HP, and in 1979 it was 47.0 HP (MAREX 1979).

Boat age. The 1973 survey found that the average age of a boat was 8.0 years. The 1976 survey showed an average age of 8.3 years. Rowboats were the oldest, an average of 10 years. Cabin cruisers were next at 9.7 years, open runabouts 8.7 years and sailboats 8.5 years. The average age of wooden boats was 11.6 years in 1973, and 13.3 years in 1976; aluminum 7.6 in 1973 and 8.4 in 1976; and fiberglass 6.4 in 1973 and 7.2 in 1976. Fiberglass boats are expected to last about as long as aluminum boats, 12 to 20 years. Fiberglass is more easily repaired. Wood boats require more maintenance and their durability is highly dependent on the quality of wood used.

Insurance. Both surveys showed that about 62% of the boats were insured. In 1976, 41.3% of the boats that were insured had special boat insurance, 48.4% were covered under a homeowners policy and 10.3% had some other insurance.

BOAT OPERATOR PROFILE

The participation rate of the U. S. population in boating as determined by various recreation surveys have averaged about 25%. The 1976 Coast Guard survey identified 50.4 million boaters. It is safe to say that at least one in four Americans participate in boating. The boat operator is ultimately responsible for the safety of his craft and its passengers. He is therefore the primary target of boating safety education and enforcement programs. The surveys found that there were 1.8 operators per household in 1973 and 2.0 in 1976. The number of operators was 19.5 million in 1973 and 30.1 million in 1976. The various characteristics of these operators create a composite profile.

Age and Sex

The average age of all boat operators was 34 years in 1973 and 31.5 years in 1976. Table 7 profiles boat operators by age and sex for the two survey years. From the table it can be seen that the number of operators grew significantly. The number of female operators almost doubled, increasing by 89%. The number of male operators

increased by 43%. In the 20 to 30 age groups, the increase in female operators was about 120%. Overall females made up 30% of the boat operator population in 1976, and 25% in 1973. The number of operators 30 years and younger relative to the total operators in each survey year increased from 49.4% to 55.9%. The trend is toward younger operators, and more female involvement. The industry-sponsored study of consumer attitudes toward recreational boating found that, "Somewhat contrary to the climate that many believe existed 10 or 20 years ago, women appeared to be generally supportive of boating as a recreational activity. Whether this stems from their recognition that boating has developed into an attractive and enjoyable family-centered recreational form, or is simply one of the corollaries of female liberation so evident in other cultural spheres, boating is no longer viewed as primarily a means of male gratification" (MAREX 1979). The Department of Commerce publication, "The Growth of Selected Leisure Industries", indicates that, "Sales of almost all types of recreational goods to women are an area of both current growth and future potential. Women of all ages and all socioeconomic levels are taking up a variety of sports, many for the first time" (DOC 1979). The publication also indicated that, "The surge in the young adult population which will continue for the next few years is favorable for most segments of the recreation industry, especially for those selling equipment for active sports and outdoor activities".

Table 7.--Boat operators by age and sex (USCG 1978)

Age	Year	Male	Female	Total
Under 12	1973	324,000	99,000	423,000
	1976	561,000	365,000	926,000
12-15	1973	956,000	415,000	1,371,000
	1976	1,695,000	721,000	2,416,000
16-19	1973	1,561,000	779,000	2,340,000
	1976	2,660,000	1,284,000	3,944,000
20-25	1973	2,082,000	839,000	2,921,000
	1976	3,626,000	1,857,000	5,483,000
26-30	1973	1,960,000	604,000	2,564,000
	1976	2,742,000	1,315,000	4,057,000
31-40	1973	2,553,000	933,000	3,486,000
	1976	3,702,000	1,753,000	5,455,000
41-50	1973	2,604,000	627,000	3,231,000
	1976	3,021,000	1,118,000	4,139,000
51-60	1973	1,562,000	357,000	1,919,000
	1976	1,954,000	513,000	2,467,000
Over 60	1973	1,033,000	173,000	1,206,000
	1976	1,021,000	188,000	1,209,000
Total	1973	14,635,000	4,826,000	19,461,000
	1976	20,982,000	9,114,000	30,096,000

Employment

The 1976 survey determined the labor force participation of primary boat operators over 16 years old. The primary operator is defined as that operator in a boating household who had the most operating time in the survey year. The employment status of primary operators as compared to the U. S. population is shown in Table 8. It shows that the percent of employed and full time student primary operators is much higher than the comparable segments of the U. S. population. The percent of houseworker primary operators is drastically lower. It is safe to assume that a great many are secondary operators, however.

Table 8.--Labor force participation of primary operators over 16 years old (USCG 1978)

Employment status	Primary operators		
	Number ^a	Percent of total	Percent census data ^b
Employed	11,162,000	77.6	59.0
Unemployed	270,000	1.9	4.7
Student, full time	1,599,000	11.1	5.3
Houseworker	248,000	1.7	22.3
Disabled (permanently)	92,000	0.6	3.6
Retired	1,025,000	7.1	5.1
Total asked	14,396,000	100.00	100.00

^aIncludes only those primary operators over 16 years old.

^bPercent of U.S. population over 16 years old falling in each of these categories.

Job or Occupation

The 1976 survey obtained information on the job or occupation of employed primary operators over 16 years old. Table 9 shows that the percent of primary operators in major job categories is comparable to the percent of that segment of the U. S. population, with the exception of the Service Worker occupational field. Census data indicate that 13.8% of the employed U. S. population over 16 years old in 1976 were service workers, but only 6.4% of primary boat operators were. There are some significant differences within the major occupational groupings. For example, the professional and managerial white-collar workers account for 43.5% of the employed primary operators, while their share of the U. S. population is 25.6%. On the other hand, the clerical white-collar workers accounted for only 2.5% of the primary

operators. Census data showed 17.8% falling in this category. Many of these are probably secondary boat operators in the household. The industry-sponsored survey of consumer attitudes found percentages in the major occupational groupings to be very close to those determined by the Coast Guard survey (MAREX 1979). The industry survey showed 52% of male boat owners to be white collar workers, 45% blue collar/farm workers and 9% retired/unemployed.

Table 9.--Job or occupation of primary operators (USCG 1978)

Job or occupation	Number ^a	Percent of total	Percent census data ^b
White-collar workers	5,400,000	52.8	49.8
Professional, technical Manager or administrator (except farm)	2,656,000	26.0	15.1
Sales worker	1,791,000	17.5	10.5
Clerical or kindred worker	701,000	6.8	6.4
Blue-collar workers	252,000	2.5	17.8
Craftsman or kindred worker	3,701,000	36.2	33.0
Operator (except transport)	1,708,000	16.7	12.9
Operator of transport equipment	634,000	6.2	11.4
Laborer (except farm)	528,000	5.2	3.8
	831,000	8.1	4.9
Farm workers	474,000	4.6	3.4
Farmer or farm manager	292,000	2.8	1.9
Farm laborer or foreman	182,000	1.8	1.5
Service worker	655,000	6.4	13.8
Total ^c	10,230,000	100.0	100.0

^aIncludes only those primary operators over 16 years old who are employed.

^bPercent of U. S. population over 16 years old falling in these categories.

^cDoes not include Armed Services - 197,000 and 'Other' - 735,000; this was done for comparison purposes.

Schooling

A question regarding the highest grade or year of school completed by primary operators over 25 years old was asked in the 1976 survey. Table 10 portrays the results.

Primary operators have achieved a higher educational level than the comparable U. S. population. Over 50% have some education beyond high school. Almost one-third are college graduates. The industry consumer attitude survey had similar findings.

Table 10.--Highest grade or year of school completed (USCG 1978)

Grade or Year	Primary operators		Percent census data ^b
	Number ^a	Percent of total	
Less than 8th grade	251,000	2.3	11.6
Completed 8th grade	436,000	3.9	10.3
Some high school	1,165,000	10.4	15.6
High school graduate	3,492,000	31.3	36.2
Some post-high school; no college degree	2,643,000	23.7	12.4
College graduate, incl. graduate work	3,165,000	28.4	13.9
Total	11,152,000	100.0	100.0

^aIncludes only those primary operators who gave their age and were over 25 years old.

^bPercent of U. S. population over 25 years having completed these categories.

Income

The 1976 survey did not include any question regarding income. The 1973 survey provided the following household income data: 28.5% under \$10,000 per year, 32.9% ten to \$15,000, 18.4% fifteen to \$20,000, 8.6% twenty to \$25,000, and 11.6% over \$25,000 per year. Nearly 62% of the boating households had income of less than \$15,000 per year in 1973. The boating households had slightly higher percentages in the income categories over \$10,000 as compared to the Census data for total U. S. households. The 1979 industry consumer attitude survey found a median income of \$23,500 for boat owning households.

Boat Operating Experience

The 1973 survey found that 10.2% of primary boat operators had under 20 hours of operating experience. In 1976, 15% had under 20 hours, 23.3% had 21-100 hours, 26.0% had 101-500 hours, and 35.7% had over 500 hours. There was a slight downward trend in boat operating experience.

BOAT USE

Boating Exposure

Determination of the amount of time boats are used is necessary to assess whether any particular types of boats are generally less safe than others.

Therefore, a major purpose of the surveys was to develop these estimates. Each boat owner was asked the number of months the boat was used during the survey year, the average number of outings per month, and the hourly length of an average outing.

Months used. There were 1,428,000, or 11.2%, of the 12,750,000 boats estimated by the 1976 survey not used at all during 1976. Of those that were used, 35% were used up to three months of the year, 79% were used six months or less. No particular type of boat stood out as to monthly use patterns.

Of the boats that were used during 1976, 11.5% were used only one time per month and 17.3% twice. Almost 70% of the boats were used six or less times. Seventeen percent were used more than ten times.

Outing length. The average number of hours per outing of boats used in 1976 was 5.3. Forty-six percent of the boat outings were from two to four hours, 22.3% were over six hours.

Boat hours. Based upon the monthly use and length of outing data, the number of boat hours was computed. The total number of boat hours in 1976 was 2.26 billion, and 1.55 billion in 1973. The exposure per boat went from 190 hours in 1973 to 199 hours in 1976. The runabout accounted for the largest single boat type percent share of boat exposure hours, 26.7% in 1976. The various types of open lightweight boats with motors accounted for 29.9%, and without motors 3.3%. Sailboats without motors accounted for 7.1%, and with motors 3.3%. Cabin cruisers accounted for 7.7% of the 1976 boat exposure hours.

Boats with motors accounted for 84% of the 1976 boat exposure hours, and 87% of the 1973 boat exposure hours. Boats without motors accounted for the remaining 16% of the boat exposure hours in 1976, and 13% in 1973. The largest single change between 1973 and 1976 in the boat type categories that are directly comparable is a 3% increase in the sailboat without motor exposure hours.

Passenger hours. The average number of passengers on board boats was obtained through the surveys. These data were used to convert boat exposure data to passenger exposure information. There were 7.6 billion passenger hours in 1976. This is about 3 billion more than in 1973, when

approximately 3 million boats less operated. According to the 1973 survey data there were 3 passengers, on the average, for every hour of boat operation. This ratio increased to 3.4 in 1976.

The types of boats accounting for the greatest shares of passenger exposure hours in 1976 include: runabouts 27.5%, open lightweight boats 23.0%, cabin cruisers 13.8%, and sailboats 9.8%. Houseboats averaged the most passengers carried per boat, 6.6, however this type of boat only accounted for 1.7% of the total passenger exposure. Cabin cruisers averaged 6.1 passengers, and sailboats with motors 4.8.

Trailerage of Boats

Trailerage or carrying his boat gives the boater the flexibility to choose a boating area suitable to his purposes. The range and variety of boating locations afforded by trailerage is appealing to a great number of boaters as evidenced by the 1976 survey data. The survey indicated that 62.7% of the boats, about 8 million, were trailerage or carried to a launching site. Boats under 16 feet accounted for 58.8% of the boats trailerage, and those 16 to 25 feet accounted for 40.6%. As to type of boat, 66.7% of the runabouts, 66% of the open lightweight boats, 46.4% of the sailboats, and 34% of the cabin cruisers are trailerage or carried. Survey respondents were asked the number of miles, round trip, they normally trailerage or carried their boat on each outing. The results were that 29.3% trailerage less than 10 miles, 35.9% between 11 and 50 miles, 17.1% between 51 and 100 miles, and 17.7% over 100 miles. The effects of fuel prices and availability on the distances boats are trailerage will be an interesting trend to observe.

BOATING ACCIDENTS

Boating is fun. Unfortunately, the fun in boating can be marred by the consequences of a boating accident. The unfamiliarity of the water environment which makes boating an enjoyable break from the daily routine, also poses a danger to those who may be unaware of the possible hazards. The Coast Guard has published annually for 20 years statistical information gleaned from boating accident reports received. This information, together with the boating survey and any other pertinent data available, is analyzed to determine safety problem areas and program effectiveness.

The reporting of fatalities is within the 95 to 100% range. Therefore, fatality data is the most complete and reliable source of boating safety trend data. The fatality rate per 100,000 boats is one overall indicator of boating safety. The rate of fatalities per 100,000 boats has been cut in half over the last ten years, going from 19.6 in 1968 to 9.4 in 1978. The actual number of boating fatalities in 1978 was 1,321. The highest rate computed was 21.4 fatalities per 100,000 boats in 1965. The major types of boating casualties are capsizings, which accounted for 35.5% of the boating fatalities in 1978; falls overboard, which accounted for 27.2% of the fatalities; collisions, accounting for 44.1% of the reported injuries and 35.6% of the reported property damage; and fires and explosions, accounting for 28.4% of the reported property damage.

Boats Involved

The prevalent characteristics of the boats involved in the largest share of the fatalities are generally not surprising having looked at the characteristics of all boats through the survey data. The percentages included in Table 11 reflect the number of fatalities in 1976 related to the particular boat characteristics listed. Factors referred to as "unknown" were eliminated. Only those characteristics accounting for at least 20% of their particular category were included in the table with the exception of the manual propulsion item which in 1976 was under 20%, but is included for comparative purposes.

Table 11.--1976 Fatalities by boat characteristics
(USCG 1977)

Primary boat characteristics	Percent of fatalities
<u>Type</u>	
Open motorboat	50.6
<u>Length</u>	
Less than 16 feet	58.2
16 to 26 feet	35.8
<u>Hull material</u>	
Aluminum	40.7
Fiberglass	38.9
<u>Propulsion</u>	
Outboard	57.7
Manual (oars, paddle)	19.0
<u>Horsepower</u>	
No engine	30.3
10 HP or less	20.7
Over 75 HP	21.6
<u>Age</u>	
Under 5 years	54.0
Over 10 years	22.5

Boat Operators

The following operator information was computed based upon those descriptors which were specified in the 1976 reports of fatalities. The age of the operator involved in 28.7% of the fatalities was 25 or under, 50.9% between 26 and 50 and 20.4% over 50 years. The 1976 survey indicated that the number of operators 25 or under was 13.7% higher than the number involved in fatalities in 1976, the 26 to 50 age category was 5.5% lower, and the over 50 years category was 8.2% lower. As for experience, 19.9% of the fatalities in 1976 involved operators with less than 20 hours of operating experience, 27.9% with 20 to 100 hours, 23.6% with 100 to 500 hours, and 28.6% with over 500 hours. These percentages are within five percentage points of the comparable categories of operator experience in the 1976 survey.

Exposure

Going a step farther in accident analysis, we can look at the fatalities in terms of boater exposure. Fatalities per million passenger hours dropped from .38 in 1973 to .17 in 1976. Based on the boater exposure by boat type data in the 1976 survey and the 1976 boating fatality statistics, fatality rates by boat type were computed. It was found that the open lightweight boats without motor topped the list with about 1.8 fatalities per million passenger hours. These are the types of boats on which most of the falls overboard and capsizings occur, and these types of casualties account for the greatest share of the fatalities.

Comment

These are but brief examples of how the data collected by the Coast Guard are used. Like virtually all data, these data have limitations. Reliance on individual reporting and availability of sufficient funds for more extensive data gathering are two constraints. We continuously strive to improve the information base using experience gained in collecting and working with the data. Other valuable sources of data are sought out and considered in the interest of developing the most representative picture of boating in the United States. The picture that has emerged is one of a continuously growing form of outdoor recreation which enjoys a broad base of participation.

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