

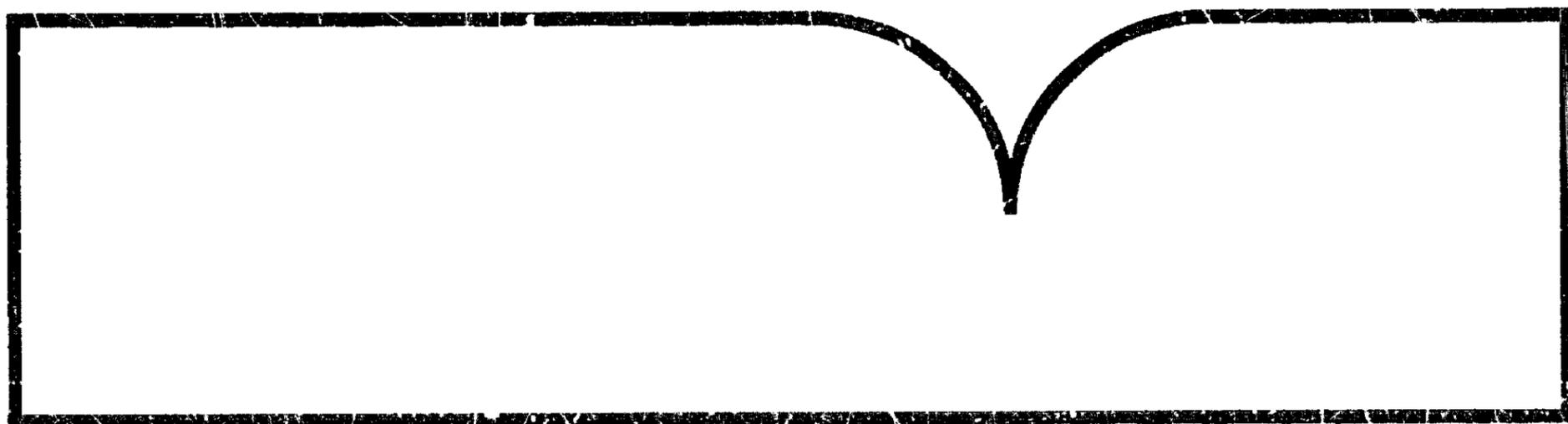


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National Transportation Safety Board Safety Study
Recreational Boating Safety

(U.S.) National Transportation Safety Board, Washington, DC

Apr 93



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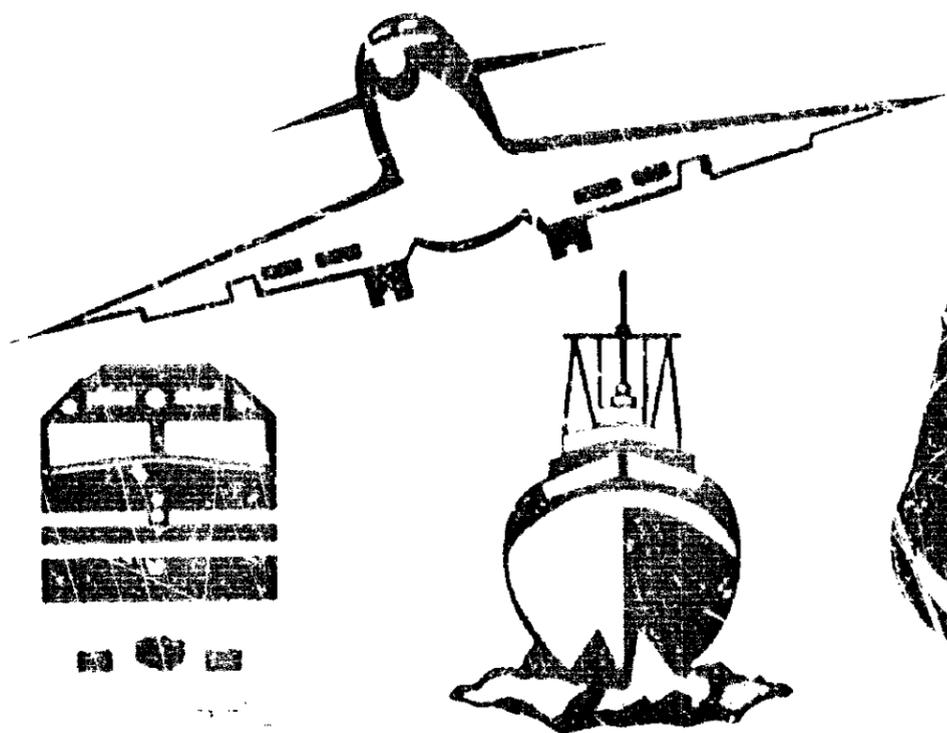


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NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

SAFETY STUDY RECREATIONAL BOATING SAFETY



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National Transportation Safety Board. 1993. Recreational boating safety. Safety Study NTSB/SS-93/01. Washington, DC.

Recreational boating accidents currently result in the greatest number of transportation fatalities annually after highway accidents. U.S. Coast Guard data indicate at least 924 recreational boating fatalities in 1991. About 355,000 persons are injured from recreational boating accidents annually, with more than 40 percent of these injuries requiring medical treatment beyond first aid, according to estimates by the American Red Cross. Because of the number of fatalities and injuries and because recreational boating activities can be expected to increase, the Safety Board believes that efforts to improve safety are needed in recreational boating. The safety issues discussed in this study are: alcohol involvement in recreational boating accidents; minimal use of personal flotation devices by recreational boaters; lack of a requirement for boat operators to demonstrate an understanding of the rules of the road and an ability to operate the vessel; and inconsistent and inadequate information reported on recreational boating accidents. Recommendations concerning these issues were made to the States; the U.S. Coast Guard; the National Association of State Boating Law Administrators; the U.S. Department of the Army, Corps of Engineers; and the American Academy of Pediatrics.

The National Transportation Safety Board is an independent Federal agency dedicated to promoting aviation, railroad, highway, marine, pipeline, and hazardous materials safety. Established in 1967, the agency is mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The Safety Board makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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RECREATIONAL BOATING SAFETY

Safety Study

Safety Study NTSB/SS-93/01
Notation 6035

National Transportation
Safety Board



Washington, D.C.
April 1993

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Executive Summary

Recreational boating accidents currently result in the greatest number of transportation fatalities annually after highway accidents. Although the number of fatal recreational boating accidents and fatalities decreased each year from 1985 to 1990, the U.S. Coast Guard indicates that in 1991, the number of fatalities from recreational boating accidents increased to 924 from the 865 fatalities reported in 1990. According to the Coast Guard, the fatality rate—the number of fatalities per 100,000 estimated boats—also increased slightly during the same period. Information from the American Red Cross indicates that about 355,000 persons are injured from recreational boating accidents annually and that more than 40 percent of those injuries require medical treatment beyond first aid. The U.S. Coast Guard estimates that in 1991 there were about 20 million recreational boats on the Nation's waterways, with the number increasing steadily each year. Not only has the number of recreational boats increased, but the speed at which many of these recreational boats operate has also increased. Because of the number of fatalities and injuries and because recreational boating activities can be expected to increase, the Safety Board believes that efforts to improve safety are needed in recreational boating. The Safety Board, therefore, initiated a safety study of recreational boating accidents to determine the

circumstances of these accidents and the countermeasures needed to prevent or reduce their number and severity.

The safety issues discussed in this study are:

- alcohol involvement in recreational boating accidents;
- minimal use of personal flotation devices by recreational boaters;
- lack of a requirement for boat operators to demonstrate an understanding of the rules of the road and an ability to operate the vessel; and
- the lack of quality information reported on recreational boating accidents.

As a result of this study, recommendations were issued to the Governors of the 50 States, the territories of the Virgin Islands and Puerto Rico, and the Mayor of the District of Columbia; the U.S. Coast Guard; the National Association of State Boating Law Administrators; the U.S. Department of the Army, Corps of Engineers; and the American Academy of Pediatrics.

Introduction

Recreational boating accidents currently result in the greatest number of transportation fatalities annually after highway accidents. In 1991, there were 41,150 highway fatalities, 924 recreational boating fatalities, 746 general aviation fatalities, and 602 railroad fatalities (fig. 1). Although the number of fatal recreational boating accidents and fatalities decreased each year from 1985 to 1990, the U.S. Coast Guard indicates that in 1991, the number of fatalities from recreational boating accidents increased to 924 from the 865 fatalities reported in 1990.¹ According to the Coast Guard, the fatality rate—the number of fatalities per 100,000 estimated boats—also increased slightly from 4.4 in 1990 to 4.6 in 1991. With respect to injuries, information from the American Red Cross indicates that about 355,000 persons are injured from recreational boating accidents annually and that more than 40 percent of these injuries require medical treatment beyond first aid.²

The U.S. Coast Guard estimates that in 1991 there were about 20 million recreational boats on the Nation's waterways, with the number increasing steadily each year. Not only has the number of recreational boats increased, but the speed at which many of these recreational boats operate has also increased. For example, the State of Florida recently estimated that 10 years ago there were about 100,000 power boats in Florida's waters capable of operating at maximum speeds of 50 miles per hour; today, there are an estimated 500,000 power boats in Florida's waters easily capable of operating at 50 mph and some capable

of operating at speeds in excess of 100 mph. With this growth, boating industry representatives from associations such as the National Association of State Boating Law Administrators (NASBLA), the Boat Owners Association of the United States, and the National Marine Manufacturers Association (NMMA) continue to voice concern about the number of recreational boating accidents and fatalities and the need for improvements in safety. Because the number of fatalities and injuries has remained substantial and because recreational boating activities (given the steadily increasing number of boats on the Nation's waterways) can be expected to continue to increase, the Safety Board believes that efforts to improve safety are needed in recreational boating. The Safety Board, therefore, initiated a safety study of recreational boating accidents to determine the circumstances of these accidents and the countermeasures needed to prevent or reduce their number and severity.

For the study, the Safety Board reviewed U.S. Coast Guard data on recreational boating accidents that occurred between 1986 and 1991. Initial review of the Coast Guard data did not yield adequate information on accident variables, such as use of personal flotation devices and alcohol involvement, to thoroughly analyze the role of these variables in the accident environment. Consequently, the Safety Board asked 18 States to provide copies of their 1991 fatal accident investigation reports, including witness statements, local investigation reports, and written narratives

¹ U.S. Department of Transportation, U.S. Coast Guard. 1992. Boating statistics 1991. CGMDTPUB P18754 5. Washington, DC.

² American Red Cross. 1991. National boating survey: a study of recreational boats, boaters, and accidents in the United States. Washington, DC. (The Red Cross survey was based on telephone interviews of 5,031 households conducted in the fall of 1989. The survey collected information that included boats owned or used, boating exposure and practice, and accident experience. The survey authors used a sampling plan that allowed them to extrapolate their findings to all boat-owning households and all households in which at least one person had been in a recreational boat during the previous year.)

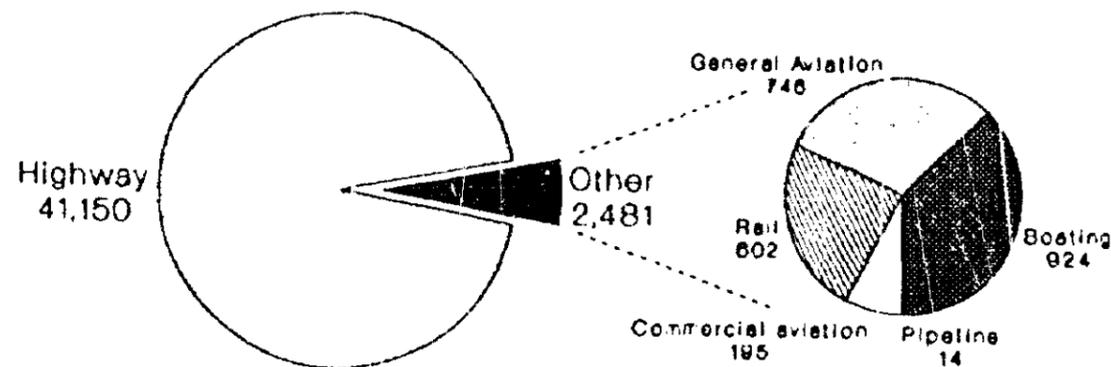


Figure 1—Preliminary estimates for 1991 transportation fatalities. Estimates for commercial marine fatalities were not available. (Source: National Transportation Safety Board and U.S. Department of Transportation.)

of the accidents. The 18 States were Alabama, Arizona, California, Colorado, Florida,³ Illinois, Indiana, Louisiana, Maryland, Minnesota, Missouri, North Carolina, Ohio, Pennsylvania, Texas, Utah, Washington, and Wisconsin. The States were selected based on several factors, including geographic location, types of waterways within the State, types of boating operations, and number of boating accidents.

The Safety Board received 407 fatal accident reports, about 52 percent of the 779 fatal boating accidents that occurred nationally in 1991; 478 persons died in these accidents, about 5.2 percent of the 924 persons who died in boating accidents nationally in 1991. Only information common to all State forms was extracted for Safety Board analysis (see appendix A). A supplemental form was also developed and sent to the States requesting additional information on children in the accidents, trailering of vessels, and convictions of the boat operators for driving (motor vehicles) while

intoxicated. The section on accident data in the study discusses the representativeness of the data collected.

The Board also reviewed its past accident investigation reports and safety studies on recreational boating and studies performed by other organizations, including a survey of recreational boating activities conducted by the American Red Cross. Educational and training materials provided by State boating agencies, the U.S. Power Squadrons, and the U.S. Coast Guard Auxiliary were examined. Pertinent Federal and State regulations regarding recreational boating safety were also reviewed. Staff also met with representatives from the Coast Guard, the NASBLA, and other experts in the field of boating safety.

Further, the Safety Board conducted a detailed investigation of three recreational boating accidents in 1992 in which a total of 13 persons died, including 4 children and 2 teenagers.⁴ The follow-

³ Florida provided an estimated 75 percent of its 1991 fatal boating accident reports; several 1991 fatal boating accidents from local sheriff and police departments had not been received by the Florida Marine Police at the time Safety Board staff began to analyze the data.

⁴ The Safety Board investigates "major marine casualties," defined in Title 49 Code of Federal Regulations (CFR) Part 850 as (1) the loss of six or more lives; (2) the loss of a mechanically propelled vessel of 100 or more gross tons; (3) property damage initially estimated as \$500,000 or more; or (4) serious threat as determined by the Commandant (Coast Guard) and concurred in by the Chairman (Safety Board), to life, property, or the environment by hazardous materials. Because recreational boating accidents generally do not meet this criteria, the Safety Board has investigated only a few of these accidents.

ing accounts of two of these 1992 accidents highlight several of the safety issues identified during the preliminary review of the 1991 data collected from the States. The third accident is discussed later in this report.

Uniontown, Kentucky.—Shortly after noon on Saturday, January 25, 1992, eight persons left the Uniontown boat ramp in Uniontown, Kentucky, in a 16-foot-long open boat powered by a 40-hp outboard motor for a fishing trip on the Ohio River. The boating party consisted of eight persons; six in their early to mid-thirties, one 16-year-old, and one 14-year-old. The boat operator was a commercial fisherman and had extensive experience on the river. According to relatives, the boating party had made numerous similar trips in the past, taking along food and drinks and stopping at one of the islands in the river to cook and spend the night when the weather was favorable.

After motoring for about 5 miles upstream, the boat operator decided that the river was too rough to continue and that the party should return to the Uniontown boat ramp.⁵ As the operator turned the boat to return to the dock area, a large wave struck the vessel. The boat flooded and quickly sank, leaving everyone in the water. A 34-year-old woman, the sole survivor of the accident, stated that she and the boat operator clutched a life jacket and held onto a gasoline can immediately after the boat sank. She stated that she believed there were sufficient lifejackets or buoyant cushions for all on board; however, she was uncertain if any of the persons were wearing lifejackets at the time of the accident. After a few minutes in the water, a young girl (the 16-year-old) in the party began to panic, and the boat operator took the lifejacket and swam to help her. The survivor never saw them again. Holding onto the gasoline can, the survivor drifted with the river current until she stranded on an island about 1/2 mile from the accident location. She believed that the

other members of the party tried to swim upstream toward another island or possibly the river bank.

The following morning the county sheriff was notified that the party had not returned.⁶ At 9:25 a.m., the local Kentucky Water Patrol and the local Kentucky Department of Fish and Wildlife Resources commenced a search of the river. Two lifejackets were found floating in the river with some other debris, including empty beer cans. Shortly after the search began, the 34-year-old woman was found on an island waving her hands. The survivor was subsequently taken to a local hospital. The rescuers, acting on the survivor's account of the accident, continued the search for the missing boaters but none was found.

After 10 days, the search for the boat was suspended; however, the search for the missing persons continued. On March 11, two bodies were recovered from the river and were identified as members of the boating party that was lost on January 25. By May 26, bodies of three additional members of the boating party were recovered. Two persons remain missing and are presumed drowned.

The aluminum V-bottomed boat had been purchased in November 1991 jointly by the registered owner and his close friend, the operator of the boat on the day of the accident—both victims of the accident. The boat had been modified for fishing by removing much of the interior, including the flotation material, and replacing it with treated plywood. The forward deck had been remodeled, and an aluminum and wood seat had been removed and replaced by a larger seat that contained a storage locker. According to the Motor Boat Certificate issued by the Kentucky Transportation Cabinet, the capacity of the boat was 6 persons. Interviews with family members following the accident indicate that the boat and the pickup

⁵ According to the National Weather Service for January 25, in this area winds were northwest at 20 to 30 knots with gusts to 40 knots. The water temperature was about 41 °F.

⁶ Because the boating party had made this trip on numerous occasions in the past and had often stayed overnight on one of the islands, there was no immediate concern by any of the boaters' families when the party did not return by nightfall.

truck that was used to trailer the boat belonged to the individual who operated the boat on the day of the accident. However, because of this individual's driving-while-intoxicated (DWI)⁷ record, the boat and the pickup truck had been registered in his friend's name.

The Safety Board determined that the probable cause of the sinking of the 16-foot aluminum boat that resulted in the loss of seven persons was the overloading of the boat, the decision by both the owner and the operator of the boat to venture out on the river during adverse weather conditions, and the failure of the operator to ensure that all persons in the boat wore lifejackets. Contributing to the loss of the boat was the removal of the flotation material during its modification.⁸

San Pablo Bay, California.—About 2 p.m. on Friday, June 12, 1992, eight persons (two adult males, one adult female, and five children ages 18 months, 2, 7, 7, and 9 years) left the Port Sonoma Marina for a trip on San Pablo Bay in a 15-foot-long open boat powered by a 70-hp outboard motor. The marina operator observed the boating party departing the marina and recalled that the party purchased gas, food, and drinks, including a six-pack of beer. He also recalled that all five children were lightly dressed and wearing lifejackets but that the adults were not wearing lifejackets.

The trip across San Pablo Bay to Red Rock Island, the party's destination—a distance of about 10 miles—was uneventful, with the boat traveling comfortably with the prevailing wind and seas.

The boating party departed the island about 5:30 p.m. On the return trip, the boat was heading into the wind and waves, and the trip was rougher than the earlier crossing.⁹

As the boat neared the entrance channel to the Petaluma River, the primary fuel tank ran dry and the outboard motor stopped. Although the fuel line was disconnected from the primary tank and reconnected to one of the two reserve gas tanks, efforts to restart the motor were unsuccessful. With the motor stopped, the boat drifted parallel to the waves and started to roll. As one of the adult males, who was in the driver's seat, stepped aft to help restart the motor, the boat sank by the stern. The adults managed to retrieve their lifejackets from a forward locker before the bow slipped under the water. Once in the water, the boaters had difficulty staying together because of the wind and waves. The adult female, the only adult to survive the accident, remembered seeing the two adult males and two of the children grouped together immediately after the boat sank. The adult female, who was able to don her lifejacket, recalled that neither of the adult males had donned the lifejackets retrieved from the locker and that one of the adults was having trouble staying afloat. Shortly thereafter, the four disappeared and the adult female did not see them again.

For several hours that evening, the adult female and three of the children drifted in San Pablo Bay. The three children were eventually overcome by the elements and expired. For the next 10 hours, the adult female continued to drift in San Pablo

⁷ State laws use various terms to describe alcohol-impaired motor vehicle operations: driving while intoxicated, driving under the influence, or operating under the influence. Similar variations in terminology are found in State laws describing alcohol-impaired boating. As used in this report, driving while intoxicated (DWI) and boating while intoxicated (BWI) refer to any of these terms.

⁸ In conversations with Kentucky State representatives following the Board's review of this accident, Safety Board staff was informed that the State considered this accident to be "alcohol involved." The Safety Board examined the toxicological test report of the operator. Because of the possibility of post-mortem generation of alcohol due to microbial action, the Safety Board has not included alcohol in the probable cause.

⁹ According to the marina operator, typically, during late afternoon on the bay, the wind picks up and the water turns rough. For June 12, the National Weather Service had forecast westerly winds at 15 to 25 knots and issued small craft advisory warnings for the San Francisco area. The water temperature was about 60 °F, and by late afternoon the air temperature was expected to drop into the low 60s.

Bay as the tides shifted. Disorientation and fatigue prevented her from swimming to shore. About 6 a.m. on June 13, a local fisherman spotted the survivor near the entrance channel to Petaluma River, about 1 mile from where the boat sank. The fisherman rescued the woman and then motored back to the marina and called the Coast Guard.

At dark on the night of the accident, the wife of the boat's owner called the Petaluma Police Department to report that her husband and children were overdue. An initial search by the Coast Guard for the boat and occupants was unsuccessful.

When the fisherman called the Coast Guard early in the morning on June 13 and relayed the adult female survivor's account of the accident, the Coast Guard launched a full scale search. By mid-morning, an additional survivor, a 9-year-old child, and five deceased bodies, one adult male and four children wearing lifejackets, were recovered near the southern end of San Pablo Bay, about 5 miles from where the boat sank.¹⁰ The surviving child was flown to a local hospital and treated for hypothermia, the abnormal lowering of the internal body temperature as a result of exposure to cold water or to cold temperatures. The deceased adult male was the boat's owner/operator and, as a routine procedure, blood and urine samples were taken for alcohol and drug analysis. Toxicological testing indicated a BAC of about 0.11 percent.

The Coast Guard search operations continued through June 15. The other adult male was never found and is presumed dead.

The accident boat, a Tristar Marine ALLSPORT, CF 8253 KF, was found early in the morning on June 13 by local county sheriff department personnel. The sport/utility fiberglass boat was built in 1979 and purchased by the owner/operator in

May 1992. According to relatives of the owner, the only change made to the boat by the current owner was the installation of a new propeller.

According to interviews with family members, the owner/operator had little experience operating boats in conditions such as those encountered on San Pablo Bay in the afternoon on June 12. Although he had owned and operated other motorboats in the past, usage was limited to fresh water lakes and rivers. There is no record that the owner had taken any training courses related to boating safety.

The Safety Board determined that the probable cause of the swamping of the 15-foot-long Tristar Marine ALLSPORT, CF 8253 KF, and loss of six lives was excessive passenger weight in the stern of the boat critically reducing the vessel's stern freeboard, intoxication of the owner/operator which reduced his abilities, and the decision of the owner/operator to venture out onto San Pablo Bay without checking for possible adverse weather conditions. Contributing to the accident was the lack of boating safety training of the owner/operator. Contributing to the loss of life was the failure of the boat to float after filling with water and failure of the owner/operator to file a float plan.¹¹

As early as 1969, through its investigations of boating accidents, the Safety Board identified several areas in which recreational safety improvements were warranted, including the requirement for all watercraft to carry approved lifesaving devices (personal flotation devices), increased emphasis on recreational boating education, the need for speed and traffic controls in congested waterways, stronger law enforcement programs, incentives for operators to take training such as reductions in insurance for boat operators who completed accredited boating safety courses,

¹⁰ Although the coroner's report listed the cause of death for each of the five victims as drowning, extensive exposure to cold water and temperatures may have been factors. (This issue is discussed in more detail later in the study.)

¹¹ Although not required by regulation, the Coast Guard urges recreational boaters to "file a float plan." In short, this means that a recreational boater should inform a reliable person of the destination of the boating excursion and the estimated time of return so that the Coast Guard or other rescue organization can be notified if the boating party does not return as scheduled. The "plan" is not filed with the Coast Guard.

and improved boating accident report forms to address human factors.¹²

In 1983, the Board examined the effect of alcohol use in recreational boating accidents. In that study, the Board found, based on data compiled from four States, that as many as 400 to 800 recreational boating fatalities annually may involve alcohol and that as many as 35 to 38 percent of the fatalities may involve boaters "legally drunk" at a BAC of 0.10 percent, the level established by most States as an illegal BAC for motor vehicle drivers.¹³ (In 1982, there were 1,178 recreational boating fatalities.) As a result of this study, the Board issued several recommendations to the U.S. Coast Guard and the States to address the hazards of alcohol use in recreational boating.¹⁴ The issue of alcohol use in recreational boating was included in the Safety Board's "Most Wanted" list of safety improvements issued in October 1990.¹⁵

In 1988, the Board issued a progress report on the States' efforts to enact laws to prevent alcohol use in recreational boating.¹⁶ In that report, the Board acknowledged that some success had been achieved since 1983 by government and private organizations to reduce the losses from recreational boating accidents in which alcohol and/or drugs were involved. The 1991 data on recrea-

tional boating accidents received from the 18 States and the circumstances of the accidents on the Ohio River and in San Pablo Bay investigated in 1992 suggest that additional efforts are needed by the States and the Coast Guard to reduce further the fatalities, injuries, and property damage caused by recreational boat operators under the influence of alcohol. A section of this study, therefore, addresses this issue.

In the 23 years since the Safety Board first addressed the issue of recreational boating safety, several Coast Guard regulations have been enacted that are aimed at reducing the number and severity of accidents attributable to the vessel and its equipment. For example, the Coast Guard now requires that personal flotation devices (PFDs) be carried on board recreational boats.¹⁷ As this study will show, however, the use of PFDs by operators and passengers involved in fatal accidents is still very low. A section of the study, therefore, focuses on the effectiveness of requiring boaters to carry PFDs without the concomitant effort to encourage or require them to use these devices.

In general, a person is permitted to operate any type of recreational boat, including personal watercraft and high-powered boats, without having to demonstrate proficiency in operating and boat

¹² National Transportation Safety Board. 1969. A study of recreational boat accidents, boating safety programs, and preventive recommendations. Washington, DC. February 13.

¹³ National Transportation Safety Board. 1983. Recreational boating safety and alcohol. Safety Study. NTSB/SS-83/02. Washington, DC.

¹⁴ These recommendations are discussed in more detail later in the study.

¹⁵ The purpose of the "Most Wanted" list, which is drawn up from safety recommendations previously issued, is to bring special emphasis to the safety issues the Board deems most critical.

¹⁶ National Transportation Safety Board. 1988. Progress of State laws on alcohol use in recreational boating. Safety Report NTSB/SR-88/01. Washington, DC.

¹⁷ The public may be more familiar with the term lifejacket or life preserver than personal flotation device. However, because this term implies a false level of protection, the boating industry now uses the term "personal flotation device" to refer to lifejackets, life preservers, and throwable devices such as boat cushions and rings.

handling characteristics or knowledge of safe operating practices.¹⁸ Generally, there are no requirements that boat operators understand safety procedures or equipment, including use of weather and hazardous water information, and the dangers of overloading or improperly loading a boat. Although States highlight the progress made to educate operators and passengers about the hazards of recreational boating activities, the accident data from the 18 States and the accidents discussed in this study suggest that additional efforts are needed in this area. The data also suggest that operator experience does not always translate into an adequate understanding of the safety procedures and rules to follow in operating recreational boats or the skills to properly and safely operate a boat. One section of the study, therefore, discusses demonstration of boat operator knowledge and skills.

Reporting of recreational boating accidents, in particular fatal accidents, has improved over the years. The Safety Board remains concerned, however, about the quality of fatal accident data.

There is also concern in the boating industry about the lack of data on accidents that involve injuries. A section of the study addresses existing reporting requirements, the reasons for the concern about the quality of data received, and additional efforts that are needed to improve the quality of data on recreational boating accidents.

The first section of this study provides an overview of recreational boating and boating safety programs. The second section is a profile of recreational boating accidents based on the accident data forms and accompanying documents provided by the 18 States—not all of which would have been available through a review of the Coast Guard data alone. This section also addresses the adequacy of State-supplied accident data and shortcomings in the national data base on recreational boating accidents. The remaining sections discuss efforts to address alcohol involvement in recreational boating, carriage and usage requirements for personal flotation devices, and the need for boat operators to demonstrate knowledge and skills in operating recreational vessels.

¹⁸ As defined by the Coast Guard, a personal watercraft is a Class A inboard vessel (less than 16 feet in length), which uses an internal combustion engine powering a water jet pump as its primary source of motive propulsion, and is designed to be operated by a person or persons sitting, standing, or kneeling on the vessel rather than in the conventional manner of boat operation. Generally, these vessels are compact, fast, and very maneuverable. Windsurfers are not included in the category of personal watercraft.

Overview of Recreational Boating and Boating Safety Organizations

Recreational boating is a major segment of the United States marine industry. About 46 million people in the continental United States participate in recreational boating activities, according to a survey conducted by the American Red Cross.¹⁹ The survey indicated that in the 1988-89 boating season, more than 4.9 billion passenger hours were spent in recreational boating activities; recreational boaters aged 16 and older accounted for most of these hours (4.175 billion passenger hours). The survey also indicated that about 4.2 million people operated a recreational boat for the first time during the 1988-89 boating season. The U.S. Coast Guard estimates that there are about 20 million recreational boats in the United States, including motorboats, sailboats, canoes, fishing craft, personal watercraft (for example, jet skis), and high-performance boats with inboard motors.²⁰

Coast Guard and State Funding

From 1985 through 1991, State and federal monies expended on all recreational boating safety activities amounted to about \$4.80 per boat operator per year.²¹ The Federal government spent an average of about \$25 million on boating safety

annually (\$.90 per boat operator), and States spent an average of about \$109 million per year (\$3.90 per boat operator). In 1991, the total outlay for recreational boating safety activities was increased to about \$164 million: \$135 million by the States, and \$29 million by the Federal government.

Since passage of the Federal Boating Safety Act of 1971—the first act to authorize general revenue funds for States' recreational boating safety programs—the States and the U.S. Coast Guard have worked jointly to implement the Federal Recreational Boating Safety Program. Each State signs a memorandum of understanding with the Coast Guard every 2 years that outlines the respective role of each in the areas of enforcement and education. Annually, the States submit a narrative that describes how they have met their statutory responsibilities with respect to the Federal Recreational Boating Safety Program.

General revenue funding for the States' recreational boating safety programs continued until 1984. In 1984, the Aquatic Resources Trust Fund (better known as "Wallop-Breaux" for the sponsors of this legislation) was created to address conservation and recreational needs of the country. The Boat Safety Account of this trust fund is derived solely from taxes paid on the marine fuel used in recreational boats. The U.S. Coast Guard administers these funds based on guidelines established by Title 46 U.S. Code Chapter 131, Rec-

¹⁹ American Red Cross 1991.

²⁰ U.S. Coast Guard 1992.

²¹ National Association of State Boating Law Administrators. 1992. Boating safety dollars at work: the State-Federal partnership. Seattle, WA.

reational Boating Safety. Funds are allocated to the States in the following manner: one-third is divided equally among all States; one-third is prorated based on the number of registered boats in the States; and one-third is prorated based on the States' expenditures for boating safety. The Coast Guard uses the annual narratives submitted by the States to determine Federal funding levels. Funds allocated to the States are spent in the following general areas: (1) the acquisition, development, and maintenance of public access facilities; (2) navigational aids, including buoys, signs, and waterway markers; (3) the registration and titling of boats; (4) education; (5) enforcement; and (6) administration.

Boating Safety Organizations

There are several organizations at the local, State, and national level involved in efforts to improve safety in recreational boating activities. The Coast Guard Auxiliary was established by Congress in 1939 as a civilian volunteer organization to promote safety in recreational boating in the United States. It comprises about 35,000 members who are experienced boaters, amateur radio operators, or licensed aircraft pilots. To accomplish its mission, the Auxiliary carries out three basic programs: courtesy marine examinations that are a

check of the boat's safety-related equipment required by Federal and State laws; an array of boating safety courses for various segments of the boating population, and operations, which include search and rescue missions, patrols of regattas and marine events, and general safety patrols of the Nation's waterways.

The U.S. Power Squadrons (USPS) was organized in 1914 and is the world's largest private nonprofit boating organization with 70,000-plus members. The USPS comprises pleasure boat owners and others interested in studying navigation and acquiring boating skills. The USPS offers instruction in safe boating to the public; and conducts courses for members in seamanship, advanced piloting, celestial navigation, marine electronics, engine maintenance, sailing, and weather.

Other organizations that are currently involved in boating safety, either through classroom instruction or on-the-water training, include the National Safe Boating Council, the National Water Safety Congress, and the Boat Owners Association of the United States.

The National Association of State Boating Law Administrators (NASBLA) comprises State officials having responsibility for administering and/or enforcing State boating laws. The Education Committee of the NASBLA takes an active role in reviewing and approving the content and accuracy of boating safety courses at the State and national level.

Recreational Boating Accident Reporting

Federal Reporting Requirements

Federal regulations (33 CFR Parts 173 and 174) require the operator of any vessel that is numbered²² or used for recreational purposes to file a report if the vessel is involved in an accident resulting in:

- loss of life; or
- personal injury which requires medical treatment beyond first aid; or
- damage to the vessel and other property exceeding \$500; or
- complete loss of the vessel.

Boat operators are required to report their accidents to authorities of the State in which the accident occurred, or directly to the Coast Guard if it occurred in Alaska.²³ The States furnish the Coast Guard with copies of boating accident reports; the Coast Guard maintains the national accident data base. Most fatal accidents²⁴ and

some injury-producing accidents are investigated by State or local officials, and reports of these investigations are also submitted. Further, the Coast Guard conducts investigations of fatal boating accidents that occur on waters under Federal jurisdiction, and reports of these investigations are forwarded to Coast Guard headquarters for entry into the national data base on recreational boating accidents.

Profile of Accident Sample Provided by the 18 States

For 1991, the 18 States reported 407 fatal boating accidents in which 478 persons were killed and 129 were injured (table 1). Approximately 1,073 persons were involved in these accidents, but the States submitted detailed records on only 812. The 261 people for whom no records were available were not included in any of the data analyses in this report.

²² Title 46 U.S. Code Chapter 123 requires each undocumented vessel equipped with propulsion machinery to be numbered in the State in which it is principally owned. The States and other jurisdictions may create their own numbering system as long as they meet or exceed Federal requirements.

²³ The agency or organization that maintains the vessel numbering system, which is required by Coast Guard regulations, is the designated agency for receiving reports of accidents. In some States it may be the Department of Natural Resources; the Department of Game, Fish, and Parks; the Department of Public Safety; or the Department of Conservation. The Coast Guard maintains the vessel numbering system for the State of Alaska, which does not have an approved numbering system.

²⁴ States are required, through the memorandum of understanding with the Coast Guard (mentioned earlier) to investigate all fatal accidents. Some States contend, however, that insufficient resources prevent them from investigating all fatal accidents.

Table 1—Number of fatal boating accidents, fatalities, and injuries, 1991, reported by the 18 States in the National Transportation Safety Board study on recreational boating

State	Number of fatal accidents	Number of fatalities (A)	Number injured (B)	Number uninjured (C)	Total persons, injury status known (A+B+C=D)	No data ^a (E)	Total persons involved in fatal accidents (D+E)
Alabama	20	20	6	13	39	11	50
Arizona	4	5	0	2	7	3	10
California	46	58	7	25	94	27	121
Colorado	8	10	0	7	17	4	21
Florida ^b	56	72	28	21	121	24	145
Illinois	27	31	13	17	64	16	80
Indiana	11	13	4	5	22	8	30
Louisiana	26	28	11	12	51	5	56
Maryland	28	31	1	20	52	17	69
Minnesota	16	17	5	5	27	5	32
Missouri	14	18	9	10	37	11	48
North Carolina	22	26	5	7	38	12	50
Ohio	17	19	13	5	40	10	50
Pennsylvania	14	16	2	8	26	10	36
Texas	54	60	5	23	88	74	162
Utah	2	2	0	2	4	3	7
Washington	24	29	14	9	52	18	70
Wisconsin	18	23	3	7	33	3	36
Total	407	478	129	205	812	261	1,073

^a Information provided by the States indicated that these persons were involved in the fatal boating accidents; however, no data were provided regarding injuries, age, or other information.

^b Florida provided to the Safety Board an estimated 75 percent of its 1991 fatal boating accident reports.

Recreational boating activities are conducted on 50 million acres of lakes, 633,000 miles of rivers, and along the 88,633 miles of coastline in the United States.²⁶ Figure 2 shows information for the 407 accidents by the type of body of water in which they occurred.

There were 451 recreational vessels involved in the 407 reported fatal accidents (47 accidents involved two vessels).²⁵ In figure 3, the types of watercraft involved in the 407 fatal accidents are compared with data from the American Red Cross survey of recreational boating. Among the boat types, motorboats account for the largest percentage in both data sets, followed by canoes, rowboats, and kayaks.

In figure 4, accident and American Red Cross survey data are compared with respect to vessel length. About 46 percent of the vessels contained in the American Red Cross survey and about 50 percent of the vessels involved in the accidents reported by the States were less than 16 feet in length.

Of the 447 vessels involved in the accidents reported by the States, 321 vessels were powered, 105 were unpowered, and 21 were personal watercraft.²⁷ Of the 478 fatalities, 340 deaths (71 percent) occurred on powered vessels, 117 (25 percent) on unpowered vessels, and 16 (3 percent) on personal watercraft (fig. 5).²⁸

Horsepower data were provided for 81 percent of the powered vessels (261 of 321) in the sample. Figure 6 shows horsepower data for these 261 vessels.

The most common type of accident involving powered vessels was falls overboard²⁹ (38 percent); for unpowered vessels, it was capsizing (69 percent) (fig. 7). Of all powered and unpowered-vessel capsizings, two-thirds (94 of 138) involved vessels that were 16 feet in length or less. More than half of all collisions (67 of 124) involved vessels with engines of more than 50 hp. Collisions accounted for the majority of accidents (18 of 21) involving personal watercraft.

The data were examined for the type of accidents that occurred during the day and at night. The time of the accident in terms of daytime and nighttime was known for 344 accidents; 73 percent of these accidents (251) occurred during the day.³⁰ For unpowered vessels, the nighttime distribution of accidents by type of accident was similar to that during daylight. For powered vessels, the most common type of accident during daylight was falls; the most common type of accident at night was collisions. There were 26 collisions with fixed objects, such as docks. Powered vessels were involved in 24 of the 26 collisions. About 35 percent of these collisions (9 of 26) occurred at night.

²⁵ NASBLA 1992.

²⁶ In three of these two-vessel collisions, a recreational vessel collided with a commercial vessel. The commercial vessels are not included in the sample of 451 vessels.

²⁷ "Powered" and "unpowered" refer to a vessel's primary means of propulsion. Some sailboats were classified as "unpowered" even though they had maneuvering motors. The means of propulsion was not provided for 4 vessels. The 105 unpowered vessels included 21 sailboats, 34 rowboats, 35 canoes, 10 rafts, 2 kayaks, and 3 paddleboats.

²⁸ The type of vessel was not known for four fatalities (1 percent). Also, one swimmer was not on any vessel and was killed when struck by a personal watercraft.

²⁹ Hereinafter referred to as falls. Two of the cases included in this percentage involved falls within the vessel.

³⁰ Because there was no useable code in the data base to determine lighting conditions, day was defined as 7 a.m. to 7:30 p.m. in the summer months (May through September) and as 8 a.m. to 4 p.m. in the winter months (October through April). Night was defined as 9:30 p.m. to 5 a.m. in the summer months and 6 a.m. to 6 p.m. in the winter months.

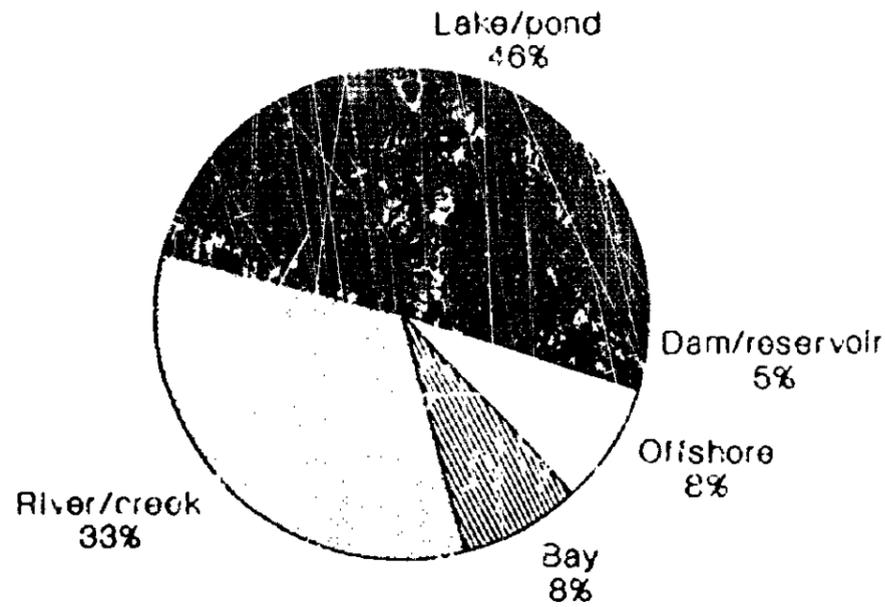
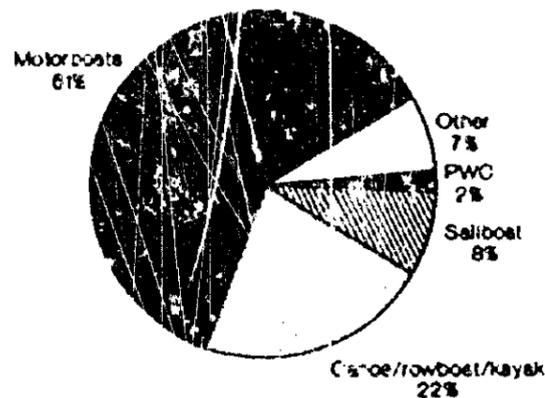


Figure 2—Percentage of fatal boating accidents, 1991, reported by the 18 States by the type of body of water in which they occurred.

American Red Cross Survey



18-State Sample

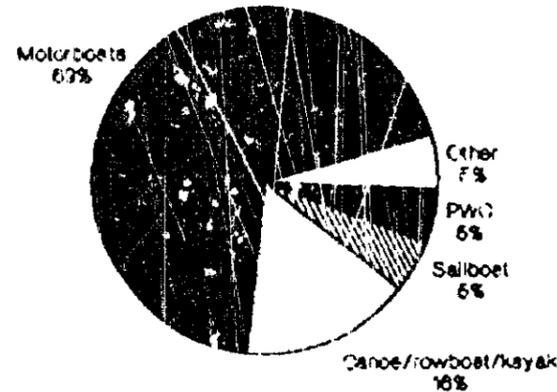
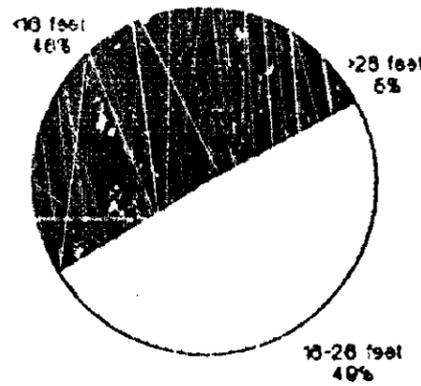


Figure 3—Comparison of the percentage of vessels reported in the American Red Cross survey and involved in the 407 fatal boating accidents reported by the 18 States in 1991 by type of vessel. (PWC = personal watercraft; other includes airboats, paddle boats, commercial vessels, and pontoon boats.)

American Red Cross Survey



18-State Sample

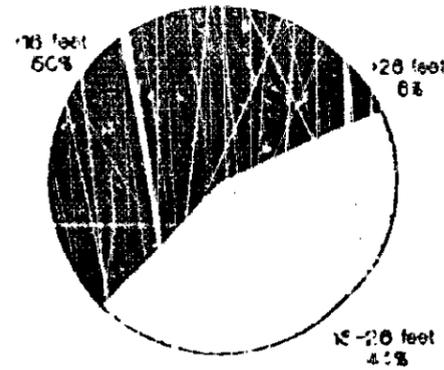
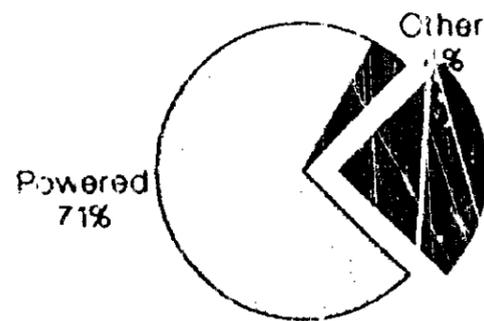


Figure 4—Comparison of the percentage of vessels reported in the American Red Cross survey and involved in the 407 fatal accidents reported by the 18 States in 1991 by length of vessel.

Percent of all fatalities



Percent of fatalities by type of unpowered vessel

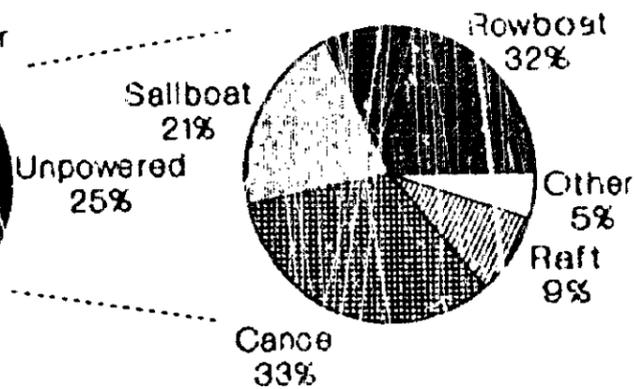


Figure 5—Percentage of fatalities that occurred on powered versus unpowered vessels, and percent of fatalities on unpowered vessels by type of vessel. (For the percentage of fatalities, other includes personal watercraft and unknown; for percentage of fatalities by type of unpowered vessel, other includes kayaks and paddleboats.)

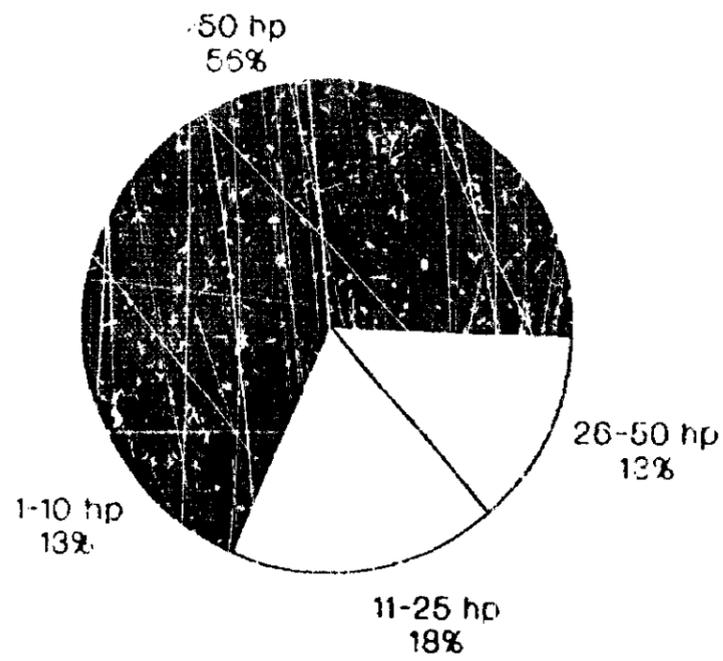


Figure 6—Percentage of vessels by horsepower for the 281 vessels for which horsepower data were known.

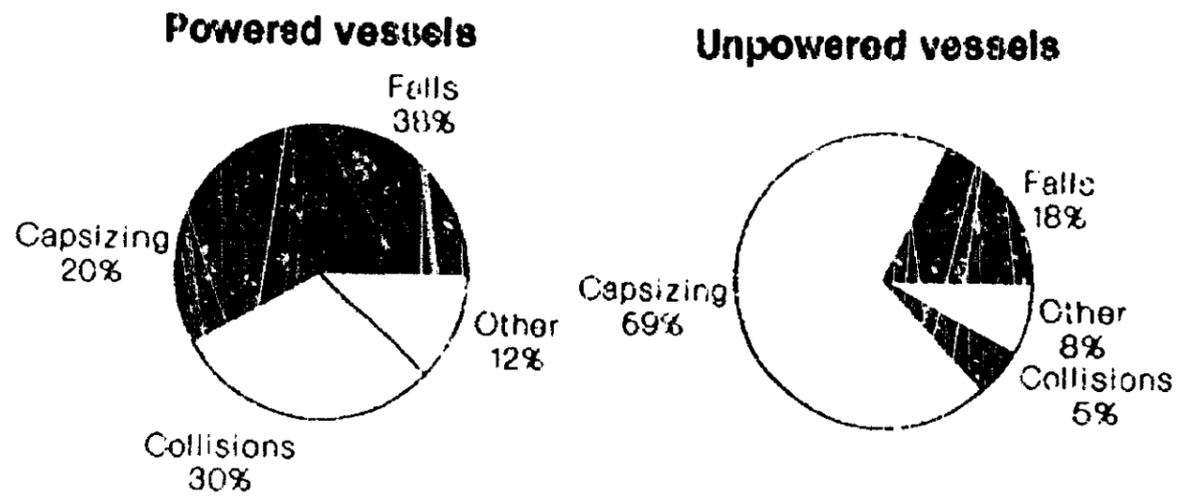


Figure 7—Percentage of fatal boating accidents by vessel type (powered versus unpowered). Data were available for 321 powered and 105 unpowered vessels.

Figure 8 illustrates the percent of the fatal boating accidents by type of operation. More than half (55 percent) of the vessels were cruising at the time of the accident.

Of the 384 accidents for which weather conditions were reported by the States, 116 (30 percent) occurred during cloudy, foggy, rainy, hazy, or snowy weather. In about 20 percent of the accidents for which wind conditions were available (73 of 375), there were strong or storm winds reported.

Water temperatures were recorded for 309 of the 407 accidents reported. Water temperatures for the 309 accidents are shown in figure 9.³¹

Representativeness of Accident Sample

The Safety Board assessed the degree to which the 18-State data were representative of all fatal recreational boating accidents reported to the Coast Guard during the same period. For this purpose, the Safety Board defined two additional samples, extracted from the Coast Guard's recreational boating accident report data base for 1991.³² Sample 1 included all fatal recreational boating accidents that occurred in 1991 in the same 18 States from which the Safety Board received fatal accident investigation reports. Sample 2 was a sample

of 410 fatal recreational boating accidents and 456 vessels involved in fatal accidents in 1991 that were randomly selected from all States, Territories, and the District of Columbia.

All accidents reported to the Safety Board during 1991 by the 18 States were also reportable to the U.S. Coast Guard and thus should have been included in Sample 1. A comparison of the number of accidents and the number of vessels in the 18-State data and in Sample 1 revealed, as was expected, a high degree of correspondence. The two samples were not statistically different (table 2).

Sample 1 (accidents from the 18 States in the Coast Guard data base) was then compared to Sample 2 (random sample of fatal accidents from the entire Coast Guard data base) with respect to a set of key variables including month, time of day, operator age, and vessel type (see appendix C). If Sample 1 were representative of Sample 2, one would expect the observed distribution for each of the key variables to be similar. Chi-squared goodness-of-fit tests were performed for each of the key variables, and the two samples did not differ significantly on any of these variables. (See appendix C for distributions of these variables.) Based on the analysis of these key variables, it can be concluded that the 407 fatal recreational boating accidents provided by the States to the Safety Board are representative of all the fatal recreational boating accidents reported to the Coast Guard in 1991.

³¹ Appendix B contains additional tables on the accident data, including operator age, vessel occupancy, month, and day of the week of the accidents.

³² This data set was used by the Coast Guard to produce its annual statistical review of recreational boating safety (U.S. Coast Guard 1992).

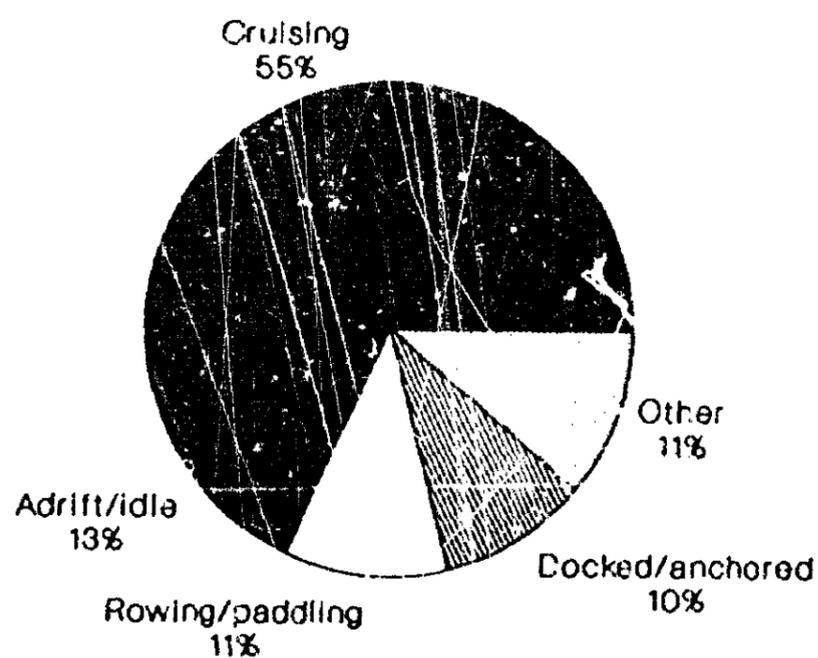


Figure 8—Percentage of fatal boating accidents, 1991, reported by the 18 States, by operation. (Other includes water skiing, maneuvering, and sailing.)

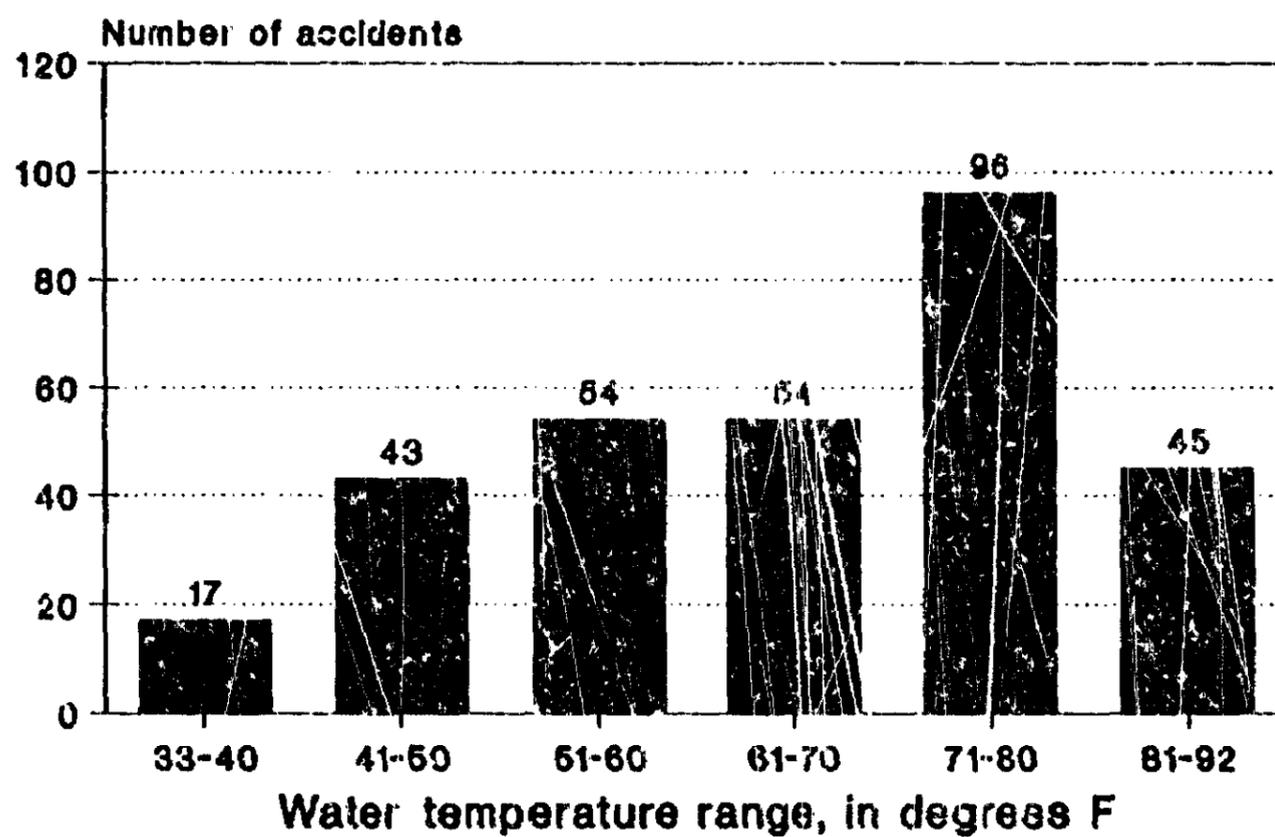


Figure 9—Number of fatal boating accidents, 1991, by water temperature.

Table 2—Number of fatal recreational boating accidents and vessels in the sample collected by the National Transportation Safety Board from 18 States and the number reported to the U.S. Coast Guard from the 18 States, 1991

State	Number of accidents			Number of vessels		
	NTSB sample	Reported to USCG	Difference	NTSB sample	Reported to USCG	Difference
Alabama	20	19	+1	23	20	+3
Arizona	4	4	0	5	4	+1
California	46	44	+2	53	49	+4
Colorado	8	7	+1	9	7	+2
Florida	*56	76	-20	*62	83	-21
Illinois	27	27	0	32	30	+2
Indiana	11	10	+1	12	11	+1
Louisiana	23	31	-5	29	34	-5
Maryland	28	24	+4	29	25	+4
Minnesota	16	16	0	17	17	0
Missouri	14	13	+1	17	15	+2
North Carolina	22	22	0	23	22	+1
Ohio	17	17	0	17	17	0
Pennsylvania	14	14	0	14	14	0
Texas	54	55	-1	62	58	+4
Utah	2	2	0	2	2	0
Washington	24	23	+1	26	23	+3
Wisconsin	18	18	0	19	19	0
Total	407	422	-15	451	450	+1

* Florida provided to the Safety Board an estimated 75 percent of its 1991 fatal boating accident reports.

Limitations to the Existing Reporting System

Although the Coast Guard probably receives some information on most fatal accidents, critical information about these accidents is not often recorded or documented. Further, the quality of the information that is recorded is often deficient. As a result, many of the data are categorized as "unknown" in the reporting system. Shortcomings in the data set restrict its usefulness for safety analyses and evaluations.

In many of the accident reports provided by the 18 States, pertinent information on the operators and occupants was not documented, including date of birth and the nature and extent of personal injuries that may have occurred. Further, the information documented is often limited to the operator of the vessel and the fatally injured occupants. Information on all occupants is often not reported. The effectiveness of safety programs targeted for specific age groups, such as PFD usage for children, cannot be adequately evaluated if data on all occupants are not recorded. For example, because the Safety Board requested that the States provide additional information on a supplemental data form, the Board identified 51 children involved in the 407 accidents. The State accident reports, however, included information only on 32 children. Thus, information on 37 percent of the children involved in these accidents was missing from the State reports. Other information on the vessel occupants may be pivotal to understanding how the accident occurred or if operator error was a factor. In 47 percent of the cases, information regarding the operator's expe-

rience in the type of vessel involved was not provided. In almost half of the cases, it was not indicated if the operator had taken a safety course.

Other information regarding the accident and the vessel and its associated equipment may be critical in understanding the nature of the accident and specifically the survivability of the accident. For example, accidents that occur at night may involve different factors, such as alcohol or speed, than accidents that occur in daylight. States, however, do not explicitly report the lighting condition to the Coast Guard. Further, the water temperature is needed to determine, in the event of a drowning, if cold water exposure contributed to the cause of death. However, in 24 percent of the accidents, information on the water temperature was missing. In addition to water temperature, other variables affect a comprehensive assessment of survivability. In 14 percent of the accidents, information was missing regarding PFD usage. In 23 percent of the cases, information regarding the accessibility of PFDs was missing. In 58 percent of the accidents, information on the proper use of PFDs was not reported. Further, for the documented occupants on board the vessels, information on whether the person could swim was missing for 47 percent of the occupants who died.

Only 24 percent of the operators involved in the fatal accidents were tested for alcohol.³³ Although States are required to report alcohol involvement in boating accidents, such information is not consistently reported. As this study indicates, some States with laws that define an illegal blood alcohol concentration and allow for a chemical test in the event the operator is suspected of being intoxicated do not always obtain BAC information. In an effort to address this problem and the general quality of data being reported, the Coast Guard, with the guidance of the NASBLA's Boating Accident Investigation Reporting Advisory Committee, has funded a boating accident investigation

³³ Alcohol involvement in recreational boating is discussed in more detail in the next chapter.

training seminar for law enforcement/marine police officers.³⁴ To date, 1,073 law enforcement/marine police officers have completed the training seminar since its inception in 1988.³⁵ In 1993, a series of eight accident investigation training seminars is scheduled. The Safety Board commends the Coast Guard and the NASBLA for their efforts to improve State accident investigations and believes that more comprehensive investigations could result in the reporting of more reliable data by the States.

The Safety Board believes, however, that additional measures, beyond better State accident investigations, may be needed to improve the quality and usefulness of the Coast Guard data base. The extent of unreported data and the lack of comprehensive data may be due, in part, to the variety of accident report forms used by the States and to the various local law enforcement officials who fill out the forms and submit them, but who may not be familiar with the forms or may not have been trained on filling out the forms. Further, the State accident reports include a "cause" determination that the States use to identify the types of errors that recreational boaters make. Although the Safety Board made no conclusion regarding the accuracy of the State-determined causes, the Safety Board is concerned that because they are not well defined and mutually exclusive, States may interpret and use the cause categories differently.

The existing problems associated with the submission of fatal accident data suggest that the Coast Guard should revamp and standardize the accident reporting system. A standardized system, similar to the National Highway Traffic Safety Administration's (NHTSA) Fatal Accident Reporting System (FARS), would improve the quality of data that are reported. As the NHTSA has done in the FARS system, the Coast Guard should

develop a three-level report form and corresponding data files that address the accident, the vessel(s), and the occupants. All three levels are just as important in understanding fatal recreational boat accidents as they are in fatal motor vehicle accidents. In addition to developing a new standardized accident investigation report form, the Coast Guard should provide guidelines for the submission of data and standardization of cause codes. The Coast Guard, as the NHTSA does, should develop a program to establish uniform data entry at the State level. This can be accomplished by training individuals in each State on the proper completion of the data forms. Comprehensive information in a three-level reporting system will enable statistical analyses of important safety issues that currently cannot be conducted.

The Coast Guard acknowledges that there are many limitations to the accident reporting system because the system relies largely on self-reported data. Some of the problems include deliberate nonreporting, ignorance by the boating public of the reporting requirements, reluctance by boaters to provide all pertinent information, and the lack of an effective mechanism to enforce the reporting requirements.

For example, in 1990, the operator of a recreational boat submitted a report of an accident to the appropriate authorities in the State of Illinois. The report indicated that the operator of a ski boat with a 90-hp engine struck a floating object; six other persons were on board. The operator indicated on the report that he had 500 hours of boating experience. The cause of the accident was listed as "other," and no damage estimate was provided. The State authorities, consequently, considered the accident a nonreportable accident and did not forward the information to the Coast Guard. Additional information received by the State through the news media resulted in a re-

³⁴ The training seminar was developed by Underwriters Laboratories, Inc., and is a week-long session addressing investigative techniques on various subjects, including overloading and stability, electrical components, lighting and navigation, fire and explosion, and collisions.

³⁵ A survey of State boating law administrators by Outdoor Publishing, Inc., in 1993 indicated that there are about 6,800 State marine police/officers nationwide. This number does not include county and local officials who also investigate recreational boating accidents.

quest for the operator to fill out a more accurate report. The subsequent report from the operator indicated an injury described as a "hurt arm," but provided no information regarding property damage or the cause of the accident. Information received from local officials subsequent to the second report revealed that the boat operator had struck and destroyed a life guard tower in a restricted area and dismembered the arm of a 9-year-old boy swimming in the area. The information also revealed that the boat operator's BAC at the time of the accident was 0.20 percent.³⁶ Although in this case corrected information eventually was reported to the Coast Guard's national accident database, the Safety Board is concerned that inadequate or incorrect reporting is a pervasive problem.

Although the Coast Guard believes that it receives some information on most fatal recreational boat accidents, it estimates, based on the American Red Cross survey, that it receives only about 3 percent of all nonfatal reportable accidents. For example, the American Red Cross survey esti-

mated that for the 1988-89 boating season, about 355,000 boaters were injured and that about 152,000 of these boaters (more than 40 percent) received medical treatment beyond first aid. The Coast Guard, on the other hand, received reports on only 3,563 injuries during this same interval.

Because of its concern about the lack of nonfatal boating accident data, in 1992 the Coast Guard contracted with the Marine Index Bureau Foundation, Inc., and implemented a nationwide data collection program involving 15 insurance companies.³⁷ The Coast Guard believes that a more representative sample of nonfatal boating accident data can be collected through this program that involves reviewing insurance claims for damage incurred during recreational boating accidents. The Safety Board has reviewed the data elements being collected in this program and encourages the Coast Guard to require the collection of complete information on alcohol use, PFD use, and operator education, in addition to the data elements currently being collected by the Marine Index Bureau.

³⁶ A local police investigation report of the accident was made but did not accompany the boat operator's report filed with the State. Further, information contained in the local police report, including a 0.20-percent BAC, was not initially forwarded to the State officials.

³⁷ The Marine Index Bureau Foundation, the education and research arm of the Marine Index Bureau, is a nonprofit foundation formed in 1992 to address injury/accident information needs from an ongoing review of marine insurance data.

Alcohol Involvement in Recreational Boating

Accidents

Clermont, Florida.—About 7:30 p.m. on March 22, 1993, two men were fatally injured on Little Lake Nellie, Clermont, Florida, when their 18-foot Skeeter Bass Boat, powered by a 150-hp engine, struck a fixed dock protruding 126 feet into the lake. A third person on the vessel was seriously injured. The vessel struck the dock about 7 feet from the end of the dock.

The operator had recently purchased his home on the lake and was reported to be familiar with the lake and the dock, which was built in 1990. However, the accident occurred at night, there were no lights on the dock, nor were lights required. According to the operator's wife, the operator had owned the vessel since 1989. It was not known if the operator had taken any boating safety courses or training.

According to the Florida Game and Fresh Water Fish Commission, the investigating agency, the factors that contributed to the accident included: the operator's failure to operate his vessel at a safe speed to avoid a collision; an unlit structure measuring about 171 feet with about 126 feet protruding into the lake; and the vessel operator's legally intoxicated condition (0.14 percent BAC) at the time of the accident.³⁸

Although PFDs were not a factor in the accident, the investigating agency reported that an inadequate number of PFDs were on board the vessel.

Chesapeake Bay, Maryland.—At 6:55 p.m. on August 5, 1992, the chartered fishing/pleasure yacht *Zona Downs* left a marina in Back Creek near Annapolis, Maryland, bound for the Magothy River north of the Chesapeake Bay Bridge.³⁹ The 50-year-old operator, an experienced boater, had chartered the 60-foot yacht. The yacht headed out the Annapolis Channel and turned toward the Bay Bridge around buoy No. 4 at a speed of about 6 knots. Shortly after passing the bridge, the operator noticed a power boat approaching from the east side of the bay at a high speed. Realizing the boat was headed for his vessel, the operator of the *Zona Downs* first stopped his propeller and then engaged it again, pushing the throttle to full ahead in an attempt to avoid the oncoming craft. The 22-foot inboard/outboard sport fishing boat, the *Linda Kay*, struck the larger vessel, *Zona Downs*, head on about 3 feet forward of the transom on the starboard side. The operator of the *Zona Downs* then circled around and approached the *Linda Kay* to ask if there were any injuries. After determining that there were injuries, he called the Coast Guard and reported the accident. His wife, who was also on board, called 911 on a mobile phone and relayed the same information. The operator of the *Linda Kay*, age 24, asked the operator of the *Zona Downs* to follow him into Sandy Point Marina. When both boats were halfway into the entrance channel, the Maryland De-

³⁸ This accident was investigated in support of the Safety Board's study on recreational boating safety. At the time the report was published, the Safety Board had not completed its investigation of this accident and had not determined a probable cause.

³⁹ Detailed information is given in the Safety Board accident brief. This accident was investigated in support of the Safety Board's study on recreational boating safety. (National Transportation Safety Board. 1992. Marine accident brief No. DCA92MM033. In: Marine accident reports, brief format issue number 9--reports issued December 3, 1992. NTSB/MAB-92/01. Washington, DC.)

partment of Natural Resources police launch intercepted the *Linda Kay* and determined that the operator was affected by alcohol. The marine police officer administered a breathalyzer test and arrested the *Linda Kay*'s operator for boating under the influence.⁴⁰ A 32-year-old female passenger on board the *Linda Kay* was seriously injured and transported to a shock trauma center in Baltimore where she was treated for a broken leg and internal injuries. A 7-year-old boy on board the same vessel was not injured. Weather conditions at the time of the accident were clear with good visibility and light winds.

Essington, Pennsylvania.—On May 19, 1991, two men drowned in the Delaware River near Little Tincum Island, Essington, Pennsylvania, when they fell overboard from their 19-foot Mako open motorboat during a high speed turn. According to the operator, who survived by swimming to shore after the accident, as their boat was crossing a wake, one of the victims pushed the throttle down and grabbed the wheel, causing the boat to turn abruptly. As a result of this action, all three boaters on board, who were standing at the time, were thrown overboard. One of the victims and the operator could swim; the other victim could not.

Toxicological tests of the victims indicated blood alcohol concentrations of 0.13 and 0.26 percent. According to the State investigation report, the survivor had very little operating experience and had no formal boating safety education. Personal flotation devices were on board but were not worn. The water temperature was 60 °F.

Accident Data

A review of the accident data provided by the 18 States indicated that 107 boat operators (76 of whom were fatally injured) were tested for alcohol; that is, 24 percent of the 451 boat operators were tested. Test results were negative for 21 operators, not available for 19 operators, and positive for 67 of the operators (fig. 10). Thus, 15 percent of the 451 operators were positive for alcohol. Further, 76 percent of those tested and for whom test results were available (88 operators) had positive test results. Figure 11 shows the blood alcohol concentrations for the 67 operators who tested positive, 50 of whom were fatally injured. Of the operators for whom test results were available, 42 percent had a BAC greater than 0.10 percent, the same level considered by most States to be illegal for driving.

In addition to the operators who tested positive for alcohol (15 percent), another 101 operators (22 percent) were suspected by law enforcement officers of having been drinking while operating a boat.⁴¹ Consequently, at least 168 of the 451 operators (37 percent) probably had some level of alcohol in their system at the time of the accident (fig. 12).⁴² However, it is likely that some of the 252 operators in the "unknown" category—those for whom there was no indication on the accident report of having been drinking—also had some alcohol in their system. Thus, 37 percent is probably a conservative estimate of the number of operators who had alcohol in their system at the time of the accident.

⁴⁰ A blood test taken about 1 hour after the accident indicated that the operator's blood alcohol concentration was about 0.10 percent at the time of the accident.

⁴¹ In some recreational boating cases, the on-site law enforcement officer may not have the necessary authority or equipment to require a boat operator to undergo a chemical test for alcohol and/or drug use. Several States, therefore, place a box on the accident forms to check if the responding officer observes or suspects from observation, witness statements, or evidence at the scene that an operator has been drinking. Consequently, 101 operators were suspected of having been drinking, but no BAC information was available.

⁴² For purposes of this report, if either (1) the person had a BAC of 0.02 or greater, or (2) the responding marine or law enforcement officer stated that the operator had been drinking, the operator was considered to have alcohol in his or her system. It could not be concluded, however, that in all cases the operator was under the influence of alcohol.

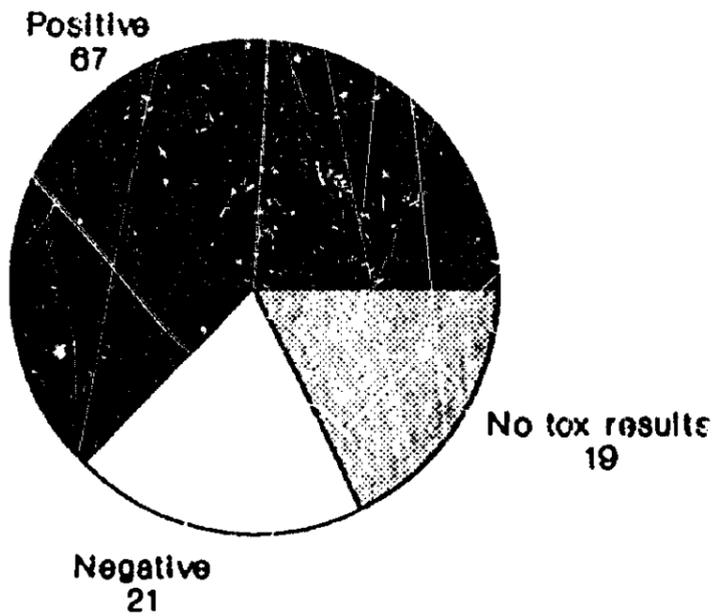


Figure 10—Results of tests for 107 boat operators who were chemically tested for alcohol.

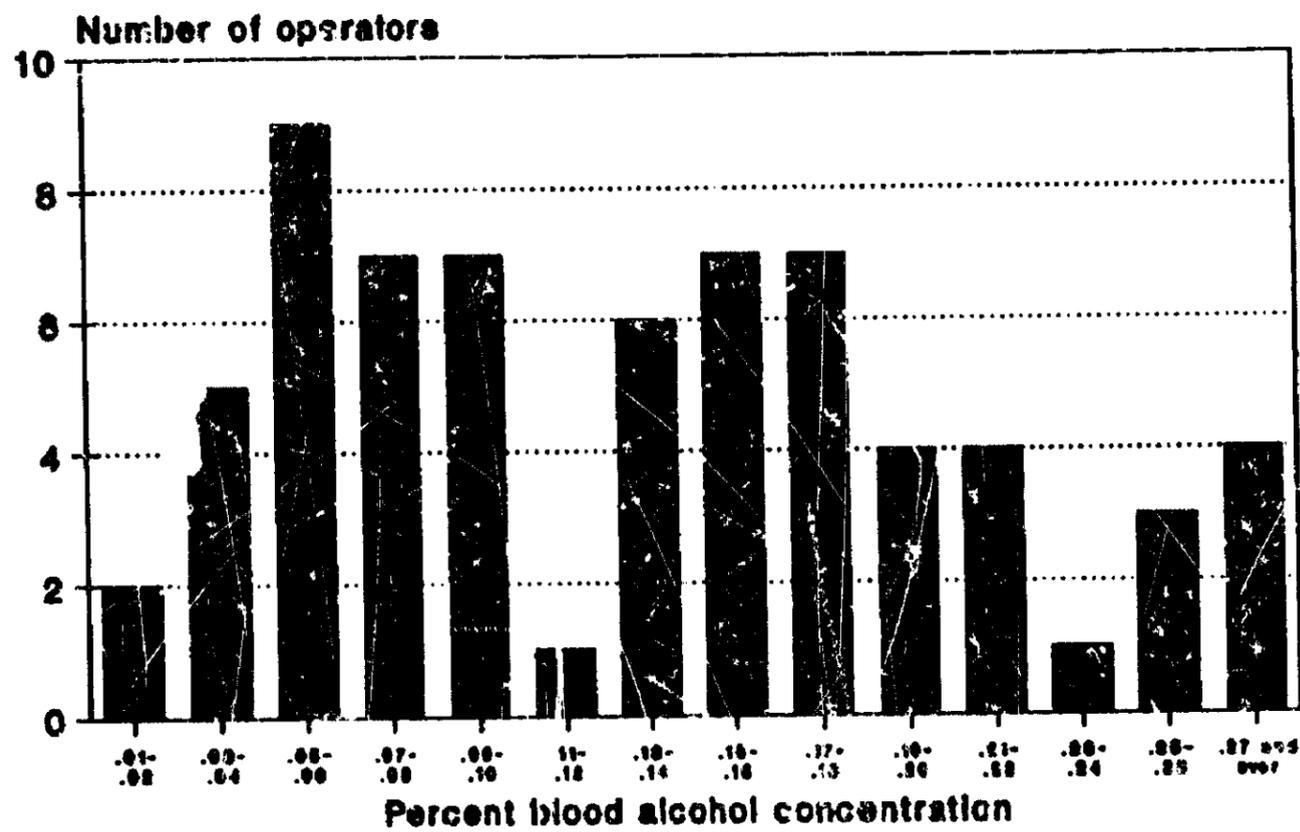


Figure 11—Blood alcohol concentration (BAC) of the 67 operators who tested positive for alcohol; 21 operators who were tested had a 0.00 percent BAC.

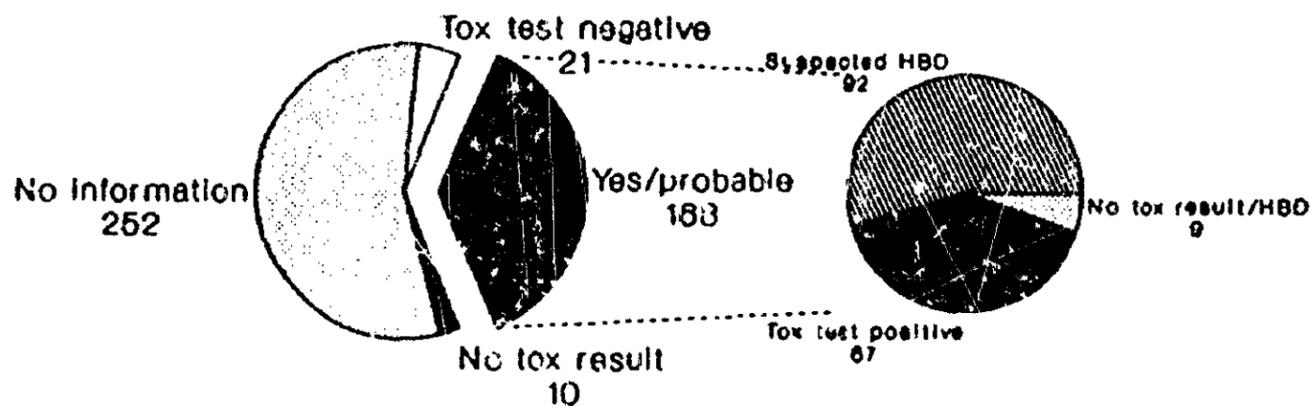


Figure 12—Status of alcohol involvement for the 451 boat operators. HBD is defined as "had been drinking."

Because nonoperator activity within a boat can potentially affect the operator's handling of the boat, and because nonoperators can also be fatally injured, alcohol involvement for nonoperators was examined. Of the 622 nonoperators involved in the accidents, 58 (34 of whom were fatally injured)⁴³ were tested for alcohol. Of the tests conducted, 39 were positive, 10 were negative, and the results of 9 tests were not available. Thus, 80 percent of those tested and for whom test results were available had positive test results. About 51 percent of the nonoperators for whom results were available had a BAC above 0.10 percent.

The available data indicated that 38 of the operators who were tested for alcohol were also tested for drugs, and 9 tested positive. Two operators tested positive for marijuana use, 4 for cocaine, 2 had a mixture of drugs (in one case phenobarbital, valium, nordiazepam, and marijuana and in the

other case marijuana and cocaine), and 1 had used drugs, but the trace amounts were not identified in the investigating officer's report. Twenty nonoperators were tested for drugs; all tests were negative for drug use.

The alcohol data were examined for alcohol involvement by operator age. There were 50 of the 451 operators under 21 years of age. This age group comprised 11 percent of the operators for whom age was known (see appendix B for a table on operator age). About 36 percent of the operators under age 21 for whom alcohol involvement was known (18 persons) had alcohol in their system. About half (10 of 18) of the operators under age 21 who had alcohol in their system were operating power boats, 7 were operating unpowered boats, and 1 was operating a personal watercraft. Five of the 18 operators under age 21 (28 percent) who had alcohol in their system were fatally injured.

⁴³ In most instances, alcohol or drug use by nonoperators was determined as a result of autopsy reports. In a few cases, nonoperators were requested to undergo tests because their behavior created suspicion that they were under the influence.

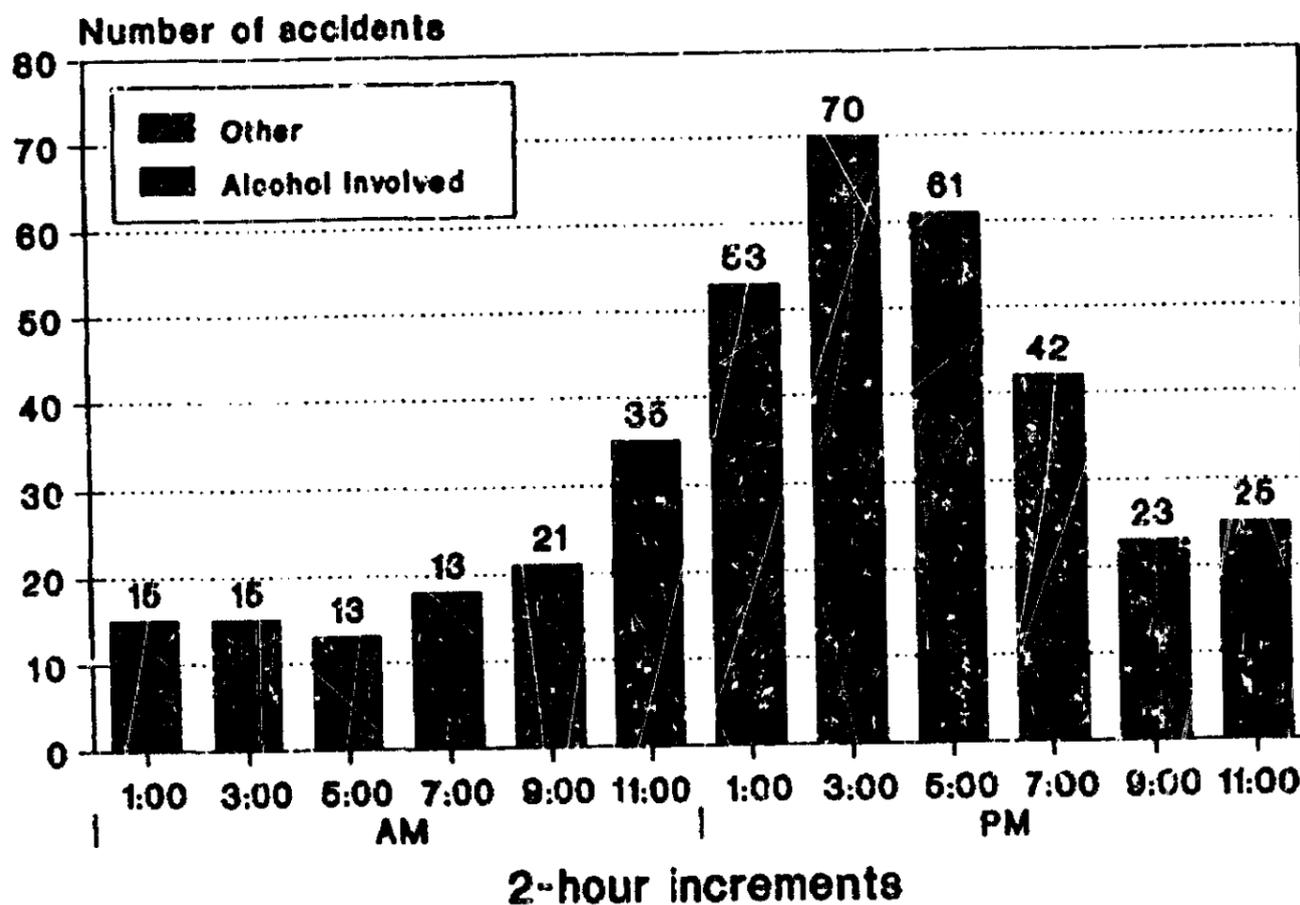


Figure 13—Time of day of 391 fatal boating accidents reported by the 18 States, 1991. (Time of day was not known for the remaining 16 accidents.)

The alcohol data were reviewed in terms of the operators of powered versus unpowered vessels. Of the 321 operators of powered vessels, 122 (38 percent) had alcohol in their system at the time of the accident. Of the 105 operators of unpowered vessels, 42 (40 percent) had alcohol in their system, about 80 percent of whom (34 persons) were operating rowboats or canoes. Four of the 21 operators of personal watercraft (19 percent) had alcohol in their system.

The 122 operators of powered boats who had alcohol in their system were involved in 53 percent of the collisions, 38 percent of the falls, and 20 percent of the capsizings. The 42 operators of unpowered boats who had alcohol in their system were involved in 47 percent of the falls and 42 percent of the capsizings. Four of the 21 operators of personal watercraft had alcohol in their system—all were involved in collisions.

The alcohol data were also reviewed to determine whether alcohol was a factor in accidents occurring at night. (Nighttime is defined in the section "Profile of Accident Sample Provided by the 18 States.") Although 27 percent of all accidents for which the time of day was known occurred during nighttime, 46 percent of alcohol-related accidents occurred at night. Moreover, at least 66 percent of the accidents that occurred at night were alcohol-involved (fig. 13). Further, 75 percent of the collisions that occurred at night were considered to be alcohol-involved.⁴⁴ Thus, alcohol is overrepresented in accidents that occur at night.

Of the 43 operators known to have taken a boating education course, about 30 percent (12 of the 43) had alcohol in their system; of the 187 operators who were known not to have taken a boating education course, about 45 percent (84) had alcohol in their system.

⁴⁴ Seven of the nine collisions with fixed objects that occurred during conditions of darkness involved alcohol.

Because of the possible relationship of boating while intoxicated to driving while intoxicated, the data were examined in terms of alcohol involvement for those operators who had trailered their vessels to the body of water in which the accident occurred. For the 451 vessels involved in these accidents, it was known that 209 were trailered to the body of water in which the accident occurred and that 112 vessels were not.⁴⁵ Alcohol involvement was a factor for 33 percent (68 of 209) of the vessel operators who had trailered a vessel to a boating facility.⁴⁶

State Legislative Initiatives on Alcohol Involvement in Recreational Boating

In its 1983 study on the role of alcohol/drugs in recreational boating accidents, the Safety Board concluded that as many as 35 to 38 percent of the fatalities in the recreational boating accidents studied were "legally drunk" at the generally accepted BAC of 0.10 percent. Prior to that time, boating while intoxicated (BWI) had not gained national attention as a serious safety issue, and only three States (Arizona, Louisiana, and Maryland) had statutes that specifically addressed

BWI. As a result of its 1983 study, the Board recommended that the various States and the District of Columbia undertake legislative initiatives to complete a solid framework to address BWI.⁴⁷ In short, the three elements of the Board's safety recommendations called on the various States to:

- Establish a defined level of intoxication to strengthen and improve State marine safety programs to handle alcohol-involved incidents and accidents. (M-83-76)
- Provide for a chemical test of blood, breath, or urine if a recreational boating operator is suspected of being intoxicated. (M-83-77)
- Require toxicological tests of recreational boating fatalities. (M-83-78)

The Safety Board also issued a safety recommendation (M-83-73) to the NASBLA to work with the States to develop a model enforcement program that would include a defined level of intoxication and toxicological and chemical testing requirements. Although it is illegal in all States to operate a vessel under the influence, since 1983, 37 States and 2 Territories have passed and/or strengthened BWI laws. Three States had some type of law prior to 1983. Although these laws vary from State to State, the majority of States define an illegal blood alcohol concentration standard. Some States define behavioral standards in addition to an illegal blood alcohol concentration; some States specify field test methods; and several States have instituted implied consent provisions.⁴⁸ (Appendix E provides an updated summary of State BWI provisions, as prepared by the National Council of State Legislatures and the NASBLA.)

⁴⁵ Data were not available for 130 vessels.

⁴⁶ Alcohol involvement was not known for 141 of the 209 operators.

⁴⁷ The specific contents of the Board's safety recommendations (M-83-76 through -78 issued on November 7, 1983) are contained in appendix D.

⁴⁸ "Specified field test methods" means that the general method of determining a blood alcohol concentration, or other standard of intoxication, is prescribed in the law or regulation. "Implied consent" means that the refusal of the boater to submit to a test for intoxication (for example, breathalyzer, blood test, or other) may be introduced in court as evidence of intoxication. In some States, it may be considered a separate offense.

State BWI Enforcement Initiatives

Attendant to the enactment of comprehensive boating-while-intoxicated laws is the implementation of aggressive State enforcement programs to deter the use of alcohol in recreational boating. Maryland's program, "Safer Waterways through Alcohol Monitoring Patrols (SWAMP)," targets specific areas for increased law enforcement patrols—areas where an excessive number of accidents have occurred or areas where previous alcohol-involved accidents have occurred. In 1988, the State of Maryland reported that since the initiation of the SWAMP program in 1983, the number of fatalities in 1988 (16) was 44.5 percent less than it was in 1983 (29).⁴⁹ Other States, including Indiana, Michigan, and California, have reported positive results with a similar enforcement approach. The Indiana Department of Natural Resources reported that its 1990 program reduced the number of fatalities from the 1989 boating season to the 1990 season by half.⁵⁰ In 1990, Michigan reported that its high visibility patrols that targeted Lake St. Clair, lower Lake Huron, Lake Erie, and the Detroit and St. Clair Rivers resulted in "very low" boating accident fatalities in 1988 and 1989.⁵¹ Some States have initiated programs to reduce the number of alcohol-related accidents and fatalities, even though there are no State laws to back up these enforce-

ment programs. Missouri, for example, has instituted a program called "Boat Block" that includes sobriety checkpoints on some of the State's larger lakes. A representative of the Missouri State Water Patrol has indicated that although the program has had positive results, it is, in essence, a "bluff" because of the lack of boating-while-intoxicated laws in that State.

In two States, Alaska and New Hampshire, a conviction for boating while intoxicated will be listed on a person's motor vehicle drivers record. In these States, a drivers license cannot be revoked solely on the grounds of a BWI conviction; however, the conviction counts as an offense and may be considered during proceedings for drivers license revocation. In New Hampshire, the BWI conviction remains on the driver's record for 7 years; in Alaska, the information is part of the driver's record for 10 years.

Discussion

Defining the level of intoxication, conducting chemical tests if a recreational boater is suspected of being intoxicated, and requiring toxicological testing in the event of a fatality have enabled States to document more accurately the extent of alcohol use in recreational boating than they were able to do a decade ago. The Safety Board continues to believe that documenting the extent of the problem is a necessary first step before States can

⁴⁹ The SWAMP program is still in existence in Maryland. From 1983, when Maryland initiated the SWAMP program, through 1991, there were 29, 24, 18, 13, 16, 16, 25, 18, and 26 recreational boating fatalities, respectively, in Maryland, according to Coast Guard data. (Maryland and other States' citing of decreases in the number of fatalities as evidence that alcohol enforcement programs are effective is addressed in the discussion section.)

⁵⁰ (a) National Association of State Boating Law Administrators. 1990-91. High visibility patrols curb alcohol-related fatalities in Indiana. Small Craft Advisory 6(2). December/January. (b) According to Coast Guard data, there were 16 and 9 fatalities in Indiana in 1989 and 1990, respectively.

⁵¹ (a) National Association of State Boating Law Administrators. 1990. High visibility patrols reduce accident potential. Small Craft Advisory 6(6). August/September. (b) Coast Guard data indicate that for the 5 years from 1987 to 1991, there were 55, 30, 34, 32, and 16 fatalities, respectively, in Michigan. Information from the State of Michigan Department of Natural Resources indicated that one severe accident in 1991 accounted for the high number of fatalities for that year. Preliminary information from Michigan indicates that the number of fatalities for 1992 will be in the low 20s.

determine the appropriate countermeasures. The Safety Board further believes that all three of the legislative provisions outlined above are necessary to achieve an overall effective program. However, some States have defined the level of intoxication in terms of an illegal blood alcohol concentration but have not adopted a legislative provision allowing a chemical test of blood or urine if a recreational boat operator is suspected of being intoxicated. If enforcement officials are unable to conduct a chemical test, the extent of the alcohol involvement in recreational boating cannot be accurately determined nor can an upward or downward trend be determined. Other States have attempted to curb alcohol use in recreational boating through various programs but have yet to adopt legislative provisions to define the level of intoxication or to allow for a chemical test. Actions taken by enforcement officials through programs that lack legislative backing are less likely to be effective. Therefore, the Safety Board believes that the remaining States that have not yet enacted the legislative provisions outlined above should do so immediately. Safety Recommendations M-83-76 through -78 are being classified "Closed—Acceptable Action/Superseded" as a result of the new recommendations being issued to the States in this report.

The accident data provided by the States suggest that additional BWI legislation may be warranted. Of the 451 operators who were involved in fatal accidents, BAC tests were not conducted on 344 (76 percent). The Safety Board is concerned with the high number of recreational boat operators involved in fatal accidents that are not tested chemically for alcohol and believes that to understand more accurately the effect of alcohol on recreational boating activities, all recreational boat operators involved in fatal accidents should be chemically tested for alcohol. Although 12 States have enacted legislation to require a chemical test of blood and/or urine if a recreational boater is the operator of a boat involved in a fatal accident, the Safety Board believes that all States

should enact such legislation. The Safety Board also believes that NASBLA should urge its association members to seek such legislative action in their respective States. Although the model enforcement program called for in Safety Recommendation M-83-73 was never developed, the Safety Board is aware that the NASBLA has worked closely with the States in the last 10 years to enact legislation outlined in Safety Recommendations M-83-76 through -78. Consequently, Safety Recommendation M-83-73 is being classified "Closed—Acceptable Action/Superseded" as a result of the new recommendation being issued to the NASBLA in this report.

Notwithstanding the concern about the high number of recreational boat operators involved in fatal accidents that are not tested for alcohol, the Safety Board recognizes that there has been an increased awareness of alcohol involvement in recreational boating in the last several years by the boating public and public officials responding to recreational boating accidents. Thus, better reporting in the 10 years since the Safety Board addressed this issue may account for the steady increase in the percent of recreational boating fatalities that are reported to be alcohol-involved during the same period when the number of recreational boating fatalities had been decreasing (figs. 14 and 15). The accident data provided by the 18 States confirm that alcohol involvement in fatal accidents remains high. That is, 37 percent of the 451 operators involved in fatal accidents were known or strongly suspected to have consumed alcohol prior to their accidents.⁶² Because toxicological tests are more likely to be taken from fatally injured operators (and may not fully account for surviving operators who may also have been drinking) and because marine safety officers were unlikely to indicate that an operator had been drinking without substantial evidence of alcohol use, the Safety Board concludes that 37 percent probably underestimates the extent of alcohol use by the 451 operators. Although the incidence of alcohol use

⁶² A total of 67 of the 451 operators (14.9 percent) tested positive for alcohol and an additional 101 operators (22.4 percent), were reported to have been drinking.

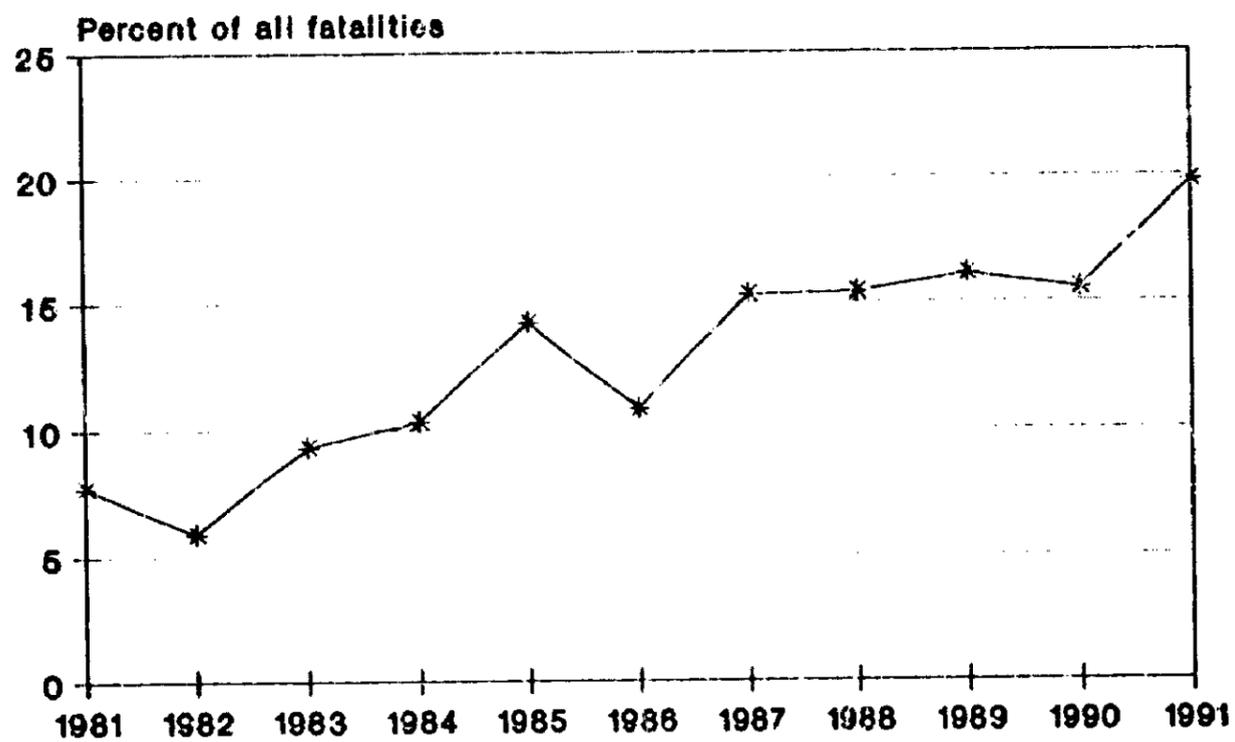


Figure 14—Percentage of boating fatalities reported to be alcohol-involved, 1981 through 1991. (Source: U.S. Coast Guard.)

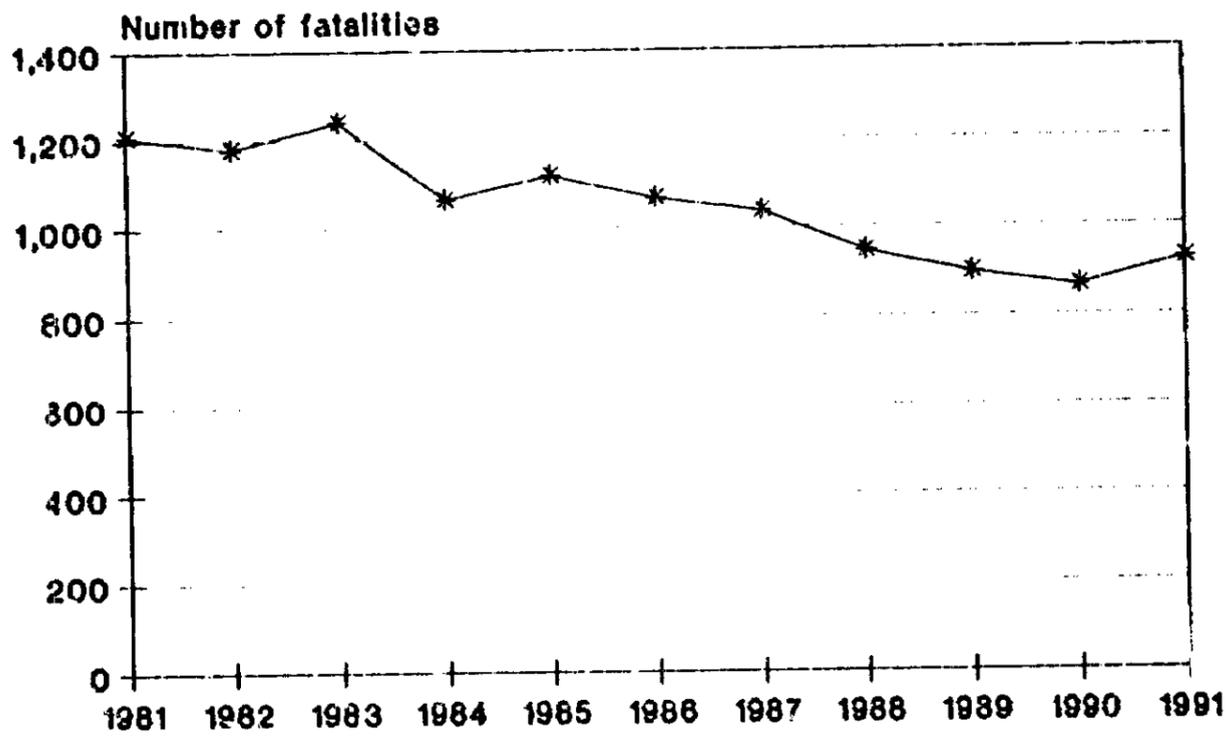


Figure 15—Recreational boating fatalities, 1981 through 1991.

could be estimated to be 76 percent (the percentage of conclusive test results that were positive), it is recognized that toxicological testing is most likely to be requested only for those operators suspected of drinking; thus 76 percent would be an inflated estimate of the incidence of alcohol use. Given that the sample of 451 operators is representative of all operators involved in U.S. fatal boating accidents during 1991, the Safety Board believes that the actual incidence of alcohol involvement is probably more than 37 percent but less than 76 percent of operators involved in fatal recreational boating accidents. Moreover, the Safety Board points out that even an estimate of 37 percent indicates that alcohol involvement is underreported to the Coast Guard, given that the highest level reported to the Coast Guard was 20 percent in 1991 (fig. 14).

A 1990 study by the Law Enforcement Committee of the NASBLA⁶³ concluded that there was a higher percentage of decline in accident fatalities in those States with "significant" BWI legislation and enforcement practices.⁶⁴ In the past, States have pointed to the decrease in the overall number of fatalities as proof that BWI legislative and enforcement initiatives have been effective. However, Maryland and Michigan, two States considered to have significant BWI legislation and enforcement activities, have experienced increases in the number of fatalities from 15 to 26 and 32 to 56, respectively, in the last 2 years. As a Michigan State representative pointed out, one nonalcohol-involved accident with multiple fatalities can skew the numbers dramatically. Therefore, an evaluation of BWI programs based on fatality counts can be misleading. The Safety

Board believes that because the number of recreational boating fatalities in most States is small, other quantitative information should be examined, including the number of newly registered boats, the number of boats stopped, the number of alcohol tests conducted, the number of intoxicated boaters identified, the time of day when the boats were stopped, locations where intoxicated boaters were stopped, and accident rates in those areas.

Moreover, the Board believes that the Coast Guard, as the Federal agency administering the boat safety account of the Aquatic Resources Trust Fund, has a responsibility to determine if programs implemented using these funds are achieving their intended results. The Safety Board, therefore, believes that the Coast Guard should undertake a study to evaluate the effectiveness of individual State programs aimed at curbing alcohol use in recreational boating. The study should include a detailed accounting of various enforcement efforts; that is, do they take into account that alcohol is overrepresented in accidents that occur at night, do they result in apprehension of intoxicated boaters, and do the programs reduce the number of persons who drink while boating. A quantitative evaluation, as described above, should be conducted. The study should also determine if the actual percentage of alcohol-involved fatalities is increasing or if the change seen is due to better reporting. The Safety Board further believes that in conjunction with this evaluation, the Coast Guard should use its funding authority to encourage States to use those programs that are most effective.

⁶³ National Association of State Boating Law Administrators, Law Enforcement Committee. 1990. The effects of OWI/OUI (operating while intoxicated/operating under the influence of alcohol) laws on boat accidents. Annapolis, MD.

⁶⁴ The study established a set of criteria for legislative provisions—including BAC standard, BAC standard less than 0.10, behavioral standards, open container law, testing for drugs, jail time, etc.—and a set of criteria for enforcement efforts. Point values were assigned to each criterion. Those States receiving the higher number of points were considered to have the more "significant" BWI laws.

Use of Personal Flotation Devices

Accidents

Swissvale, Colorado.—About 1 p.m. on May 26, 1991, three men, ages 46, 49, and 33, launched a small (6-foot) vinyl plastic inflatable raft on the Arkansas River, near the Wellsville Bridge northwest of Swissvale, Colorado. After traveling about 2 miles to a point just east of Swissvale, they started through an unnamed rapid rated as a class II.⁵⁶ Their raft entered the rapid sideways, hit a small rock, and capsized, throwing all three men into the water. Two men who were wearing personal flotation devices (PFDs) struggled and eventually reached the river bank. Although there were three PFDs on board the raft, the third man was not wearing one; he died.

A Colorado State park ranger had spotted the three men earlier in the day rafting on the same stretch of the river. Observing that one of the rafters was not wearing a PFD, the ranger contacted the men and, after determining that the correct number of PFDs were on board, recommended that the one rafter use his PFD. The rafter asked if he was required by law to wear a PFD and was told that he was not.⁵⁷ He, therefore, refused to wear it, despite the fact that he could not swim. This man was the same individual who drowned

in the accident later in the day. Additional information revealed that all three rafters had been drinking before the raft trip. Toxicological tests on the drowning victim determined a 0.125-percent BAC.

Jefferson City, Missouri.—About 1:15 a.m. on July 27, 1991, 10 recreational boaters in a 14-foot aluminum Ouachita open motorboat powered by a 20-hp engine were headed up the Missouri River when water began flowing over the boat's bow. All 10 boaters were thrown into the water. Nine of the boaters, all of whom were wearing Type II PFDs, survived the accident; seven of the occupants managed to reach shore and two stayed with the overturned boat and were subsequently rescued. The one boater who drowned was not wearing a PFD although one was on board for his use. The responding official indicated that there was no evidence of alcohol use in this accident.

Bayou Teche, Louisiana.—About 11 a.m. on September 29, 1991, a 32-year-old and a 5-year-old were traveling south on Bayou Teche, Louisiana, in a 12-foot aluminum Eldocraft powered by a 15-hp engine. The vessel struck a sunken log causing the boat to capsize and the occupants were thrown into the water. The 5-year-old, who was wearing a Type II PFD, was able to hold onto the side of the capsized boat and was subsequently

⁵⁶ A class II rapid, as defined by the Coast Guard, is a novice rapid on flat water with waves to 3 feet and obvious channels requiring some maneuvering. Rapids are classed from I, the easiest rapids, to class VI, the most difficult rapids.

⁵⁷ Colorado State law, consistent with Coast Guard regulations, requires that personal flotation devices (PFDs) be carried on recreational boats; there is no requirement that PFDs be worn.

rescued. The 32-year-old, who was not wearing a PFD even though there was one on board for his use, drowned trying to reach the bank of the bayou. There was no evidence that alcohol was a factor in this accident.

The available evidence from the States' investigation reports of the above three accidents suggest that if all the victims had been wearing PFDs, they would have survived the accidents.

Accident Data

For all operators and passengers (586) for whom use/nonuse of PFDs was documented,⁵⁷ 139 (24 percent) wore PFDs and 447 (76 percent) did not wear PFDs. Of the 451 operators, use/nonuse of PFDs was documented for 296; 55 (19 percent) of these persons wore PFDs, and 241 (81 percent) did not wear PFDs. Of the 364 passengers known to be on board the boats involved in the accidents, use/nonuse of PFDs was documented for 290; 84 (29 percent) wore PFDs, and 206 (71 percent) did not wear PFDs (fig. 16).

Of the 478 fatalities that occurred in the accidents, 351 were reported by the States to be the result of drowning and 89 were due to traumatic injuries (fig. 17).⁵⁸ Of the 351 persons who drowned, use/nonuse of PFDs was known for 331 persons; 50 (15 percent) of these persons wore PFDs; 281 (85 percent) did not wear PFDs. Of the 351 persons who drowned, 338 persons drowned in single-vessel accidents. Of these 338 drownings, 96

victims (28 percent) were alone in the vessel at the time of the accident.

A detailed review of the 50 State-reported "drownings" in which the victims were wearing a PFD suggests that cold water exposure (hypothermia) may have been a factor in the cause of death in 23 cases. The review further revealed that in 10 cases, the victims were caught under water; in 4 cases, the victims were probably unconscious; in 1 case, the PFD was ripped off the victim; in 4 cases, the PFDs were not being worn properly; and in 8 cases, the circumstances of the drowning and the role of the PFD were not known or not documented. Thus, in at least 84 percent of the drownings in which the victim was wearing a PFD, there is a reason for the victim drowning that is not attributed to the failure of the PFD.

A review of the 281 State-reported "drownings" in which the victims were not wearing a PFD suggests that in 15 percent of the drownings (43 drownings) there were factors involved that may not have been influenced by the wearing of a PFD. The cause of death in 32 of the 43 drownings was probably exposure to cold water (hypothermia) rather than drowning; in 9 of the drownings, the victims were caught under water; and in 2 of the drownings, the victims were probably unconscious. Therefore, as many as 238 persons (85 percent of the drownings) may have survived had they been wearing a PFD.

There were 51 children under the age of 12 on board the accident vessels.⁵⁹ Fifteen of these 51 children were fatally injured: 2 died from traumatic injuries, 12 drowned, and the cause of death for 1 victim was not known because the body was

⁵⁷ Information on PFD use/nonuse was documented for only 72 percent of the 812 occupants for whom data were provided by the States.

⁵⁸ Subsequent information obtained from the States indicates that for the remaining 38 fatalities, 35 bodies were never recovered and the cause of death could not be accurately determined; 1 fatality was believed to have been caused by a pre-existing medical condition; and 2 fatalities were thought to have been the result of exposure to cold water.

⁵⁹ The States' data provided information only on 32 children, including all 15 who were fatally injured. Information on the additional 19 nonfatally injured children was obtained from the Board's supplemental form to the States (see appendix A).

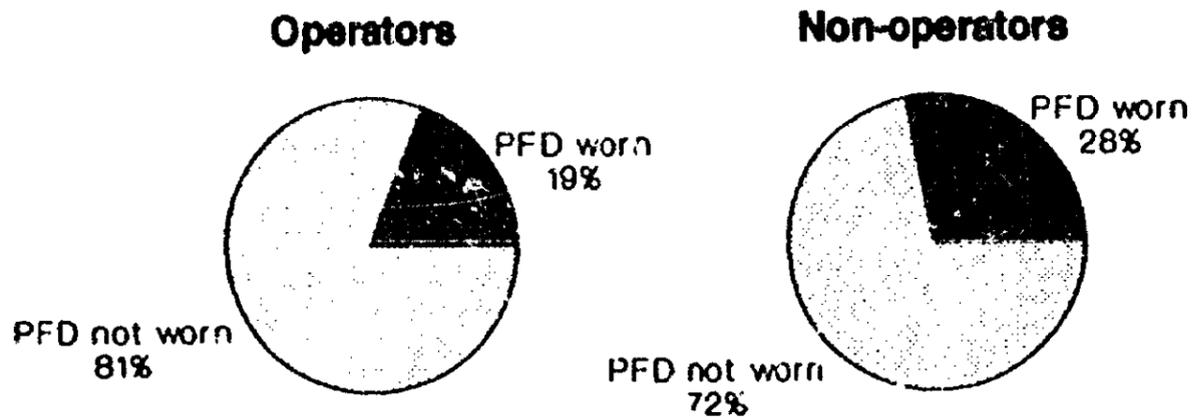


Figure 16—Percentage of personal flotation device (PFD) use by boat occupant.

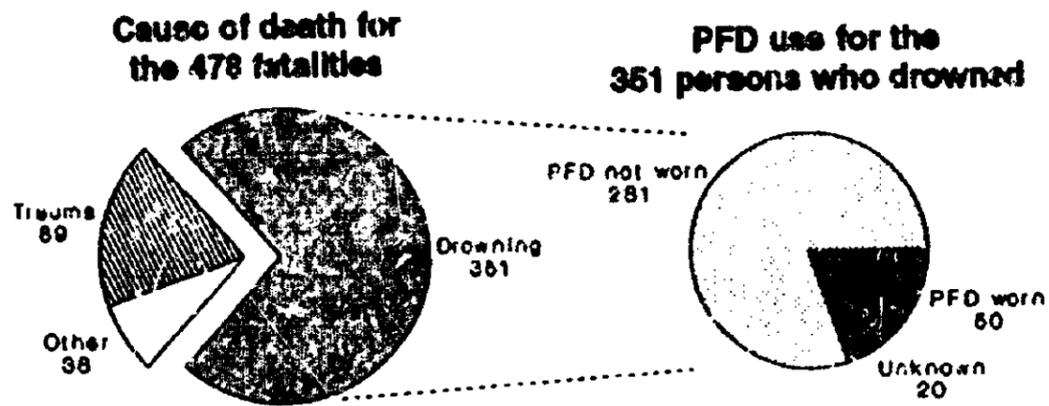


Figure 17—Cause of death for the 478 fatalities and PFD use for the persons who drowned. The deaths of the 50 persons who were wearing PFDs were attributed mostly to exposure to cold water, unconsciousness, or being caught under water.

never recovered. Of the 12 children who drowned, it was documented that 5 were wearing a PFD and 7 were not.⁶⁰ Information provided by the officers who responded to the accidents indicates that of the children who survived the accidents, 15 lives were saved because they were wearing a PFD.

The above accidents and data raise concern about the adequacy of current requirements regarding the carriage and use of personal flotation devices on recreational boats.

Coast Guard Requirements

The Coast Guard sets minimum safety standards for recreational boats and associated equipment. Personal flotation devices must carry the label of "Coast Guard Approved Equipment," which means that the equipment has been determined to be in compliance with U.S. Coast Guard specifications and regulations relating to performance, construction, and materials. Coast Guard regulations require that PFDs be in good and serviceable condition, of appropriate size for the intended user and that wearable PFDs be readily accessible (33 CFR 175.19).

Recreational boats less than 16 feet in length (including canoes and kayaks of any length) must be equipped with either a Type I, II, III, IV, or V PFD for each person on board (fig. 18). Boats 16 feet and longer must be equipped with either a

Type I, II, III, or V PFD for each person on board plus one Type IV PFD. Type V PFDs have use restrictions marked on them that must be observed. In order for a Type V PFD to be counted toward minimum carriage requirements, it must be worn. There are no Federal requirements regarding the wearing of other PFDs. Federal law does not require PFDs on racing shells, rowing skulls, and racing kayaks.

On November 9, 1992, the U.S. Coast Guard published a notice of proposed rulemaking (NPRM) in the Federal Register (57 FR 53410) on recreational boating safety equipment requirements (see appendix F). The Coast Guard proposes to change several Federal requirements and exemptions for carriage of PFDs on recreational vessels. Specifically, the rulemaking would eliminate the Type IV PFD as a primary PFD on recreational vessels less than 16 feet in length. Further, the rulemaking would eliminate Federal preemption of State boating safety laws related to PFD wearing or PFD carriage. Because current PFD carriage regulations allow use of a nonwearable Type IV PFD to meet carriage requirements for vessels under 16 feet in length, a State requirement to wear a PFD is preempted by Federal regulations because it implies a wearable PFD that is in conflict with Federal regulations. Under the rulemaking, a State would no longer be preempted from requiring that PFDs be worn. The proposed rulemaking would also remove the exemption from PFD carriage requirements for racing shells, rowing skulls, canoes and kayaks, sailboards, and personal watercraft. The Safety Board supports the NPRM. (See further discussion later in this section and appendix G for the full text of the Board's comments on this NPRM.)

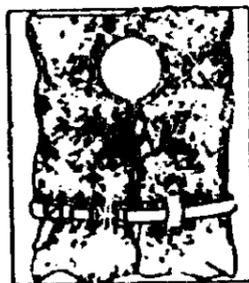
⁶⁰ Of the five children who drowned and were wearing a PFD, three died from exposure to cold water (hypothermia), one was caught under water, and one slipped out of the PFD in cold water.

A **TYPE I PFD, or OFF-SHORE LIFE JACKET** provides the most buoyancy. It is effective for all waters, especially open, rough or remote waters where rescue may be delayed. It is designed to turn most unconscious wearers in the water to a face-up position. The Type I comes in two sizes. The adult size provides at least 22 pounds buoyancy, the child size, 11 pounds, minimum.



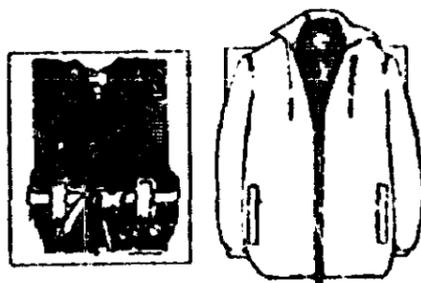
Off-shore Lifejacket

A **TYPE II PFD, or NEAR-SHORE BUOYANT VEST** is intended for calm, inland water or where there is a good chance of quick rescue. This type will turn **SOME** unconscious wearers to a face-up position in the water. The turning action is not as pronounced and it will not turn as many persons under the same conditions as a Type I. An adult size device provides at least 15 1/2 pounds buoyancy, a medium child size provides 11 pounds. Infant and small child sizes each provide at least 7 pounds buoyancy.



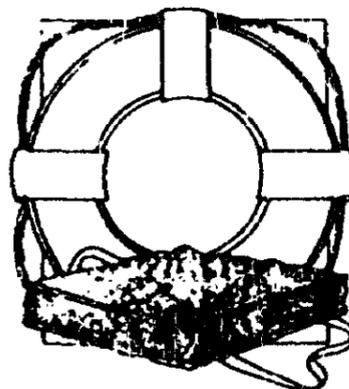
Near-Shore Buoyant Vest

A **TYPE III PFD, or FLOTATION AID** is good for calm, inland water, or where there is a good chance of quick rescue. It is designed so wearers can place themselves in a face-up position in the water. The wearer may have to tilt head back to avoid turning face-down in the water. The Type III has the same minimum buoyancy as a Type II PFD. It comes in many styles, colors and sizes and is generally the most comfortable type for continuous wear. Float coats, fishing vests and vests designed with features suitable for various sports activities are examples of this type PFD.



Flotation Aid

A **TYPE IV PFD, or THROWABLE DEVICE** is intended for calm, inland water with heavy boat traffic, where help is always present. It is designed to be thrown to a person in the water and grasped and held by the user until rescued. It is not designed to be worn. Type IV devices include buoyant cushions, ring buoys and horseshoe buoys.



Throwable Device

A **TYPE V PFD, or SPECIAL USE DEVICE** is intended for specific activities and may be carried instead of another PFD only if used according to the approval conditions on the label. Some Type V devices provide significant hypothermia protection. Varieties include deck suits, work vests, board sailing vests and Hybrid PFDs.

A **TYPE V HYBRID INFLATABLE PFD** is the least bulky of all PFD types. It contains a small amount of inherent buoyancy, and an inflatable chamber. Its performance is equal to a Type I, II, or III PFD (as noted on the PFD label) when inflated. Hybrid PFDs must be worn when underway to be acceptable.

Inflated Hybrid



Figure 18—Types of personal flotation devices. (Source: U.S. Coast Guard.)

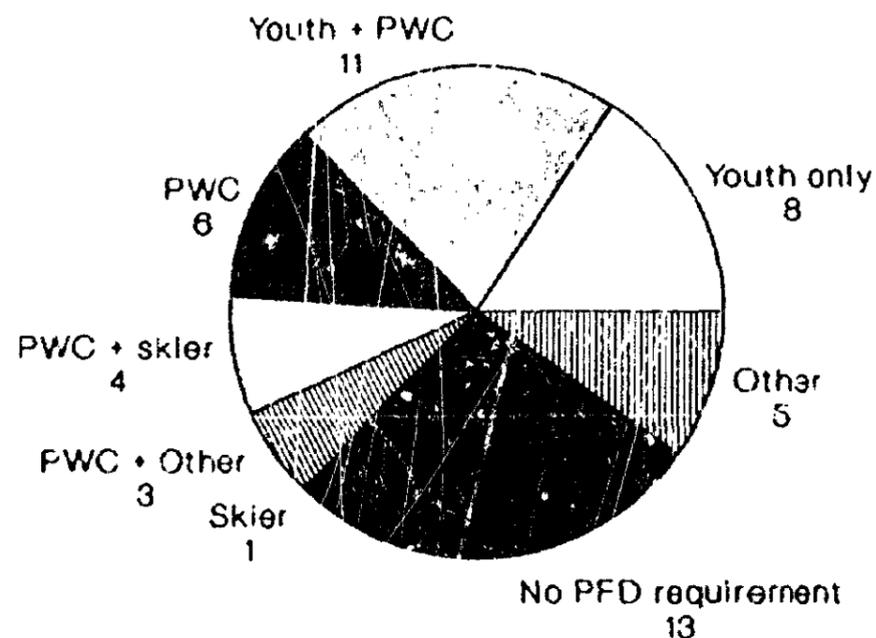


Figure 19—Number of States and District of Columbia with PFD requirements and group addressed by the requirements. (PWC = personal watercraft; other includes specified hazardous waters and seasonal requirements.)

State Requirements

Thirty-seven States and the District of Columbia have enacted laws that require PFDs to be worn: (1) by children of certain ages and on certain size vessels; (2) for specific water activities such as waterskiing and operating personal watercraft; and (3) on specified dangerous waters. (See figure 19 and appendix H.)

The typical requirements for PFD usage among the States is that children of certain ages and operators of personal watercraft wear PFDs. For

example, seven States—Arizona, Kansas, Louisiana, Mississippi, New York, Oklahoma, and Texas—require that PFDs be worn by children 12 years old and younger. In three States—Montana, Nebraska, and Vermont, the requirement is for children 11 years old and younger. In some States, the requirement that children wear PFDs is contingent on the size of the vessel. For example, in Utah, a child 11 years old and younger is required to wear a PFD if the vessel is less than 19 feet in length or if the child is outside the cabin of a vessel more than 19 feet in length. North Dakota requires children 10 years old and younger to wear a PFD if the vessel is less than 26 feet in length. Florida requires children 6 years old and younger to wear a PFD on vessels less than 26 feet in length.

Other Initiatives Regarding Use of Personal Flotation Devices

Army Corps of Engineers.—In May 1986, the Pittsburgh District of the Army Corps of Engineers established a regulation requiring children under 9 years of age in Pennsylvania and under 10 years of age in Ohio and West Virginia to wear PFDs while in a boat on Pittsburgh District project waters.⁶¹ There are 16 recreational water areas in five States (Maryland, New York, Ohio, Pennsylvania, and West Virginia) under the jurisdiction of the Pittsburgh District that were subject to this regulation. According to the Pittsburgh District, the youth PFD regulation was readily accepted by the boating public and the Corps experienced exceptional voluntary compliance with the new regulation.

In May 1990, the Pittsburgh District expanded the regulation to include all persons on board all boats less than 16 feet in length, all canoes, and all nonswimmers. According to the Pittsburgh District, 70 of the 71 drownings that occurred in the Pittsburgh District in the 10 years before expanding the regulation involved persons who were not wearing PFDs. According to District officials, three lives have been saved since the regulation was expanded, and the regulation has resulted in an increased number of boaters who wear PFDs.

Of the 38 Corps of Engineer Districts, only the Pittsburgh District has initiated any action regarding PFD usage on Corps waters. Some districts have indicated that they do not have the resources to enforce such a regulation, and others have indicated that they are waiting for the States to initiate action on the issue of PFD usage. Given the apparent success of the PFD regulation in the Pittsburgh District and the findings of this study, the Safety Board believes that the Corps of Engineers should implement similar requirements on all Corps water impoundments that are appropriate for each district with the minimum requirement that all children wear PFDs.

National Association of State Boating Law Administrators.—In 1988, the NASBLA passed a resolution calling for the mandatory wearing of PFDs by all children younger than 12 years of age. Proponents of this resolution believed that requiring children to wear PFDs would eventually result in more adults wearing PFDs. To support this contention, statistics from the Scandinavian countries of Finland, Sweden, and Denmark were cited. In the mid- and late 1970s, the Scandinavian Aquatic Council recommended that all children 12 years old and younger who were participating in Council-sponsored activities and competitions wear PFDs. This recommendation became a requirement because of liability concerns and eventually resulted in local jurisdictions, lake associations, and marinas adopting a policy that all children 12 years old and younger were required to wear a PFD. Within the last 5 years, overall boating fatalities have decreased on the Scandinavian lakes, rivers, and bays. The Finnish Bureau of Aquatic Statistics and Lake Shore Patrol attribute this downward decrease, in part, to the increase in the number of adults now wearing PFDs because of the requirement to do so when they were younger.⁶²

⁶¹ In those States that had implemented PFD usage requirements for children of certain ages on all sizes of vessels, the Pittsburgh District regulation coincided with the State requirements.

⁶² Ballestreri, S. 1992. Status of 12 and under since passage of 1988 [NASBLA] resolution. Paper presented at the 33rd annual NASBLA conference, October 4-8, 1992, Springfield, MO.

Discussion

As noted earlier, the Safety Board supports the Coast Guard's recent proposals to change several Federal requirements and exemptions for carriage of PFDs on recreational vessels. In its letter dated February 1, 1993, commenting on the notice of proposed rulemaking, the Safety Board strongly urged the elimination of Type IV (throwable) PFDs as primary personal flotation devices aboard recreational boats less than 16 feet in length. The change is needed because persons accidentally falling overboard may panic and be unable to get to this type of PFD, usually a boat cushion thrown to them by persons on the boat. Further, grasping for and holding onto a Type IV PFD in an emergency situation, particularly in rough waters, high winds, or cold water, may be difficult, and sometimes impossible. The Type IV PFD is not designed to be worn.

Despite the fact that States are preempted from requiring that PFDs be worn on boats less than 16 feet in length, some States have enacted such laws. As noted earlier, one of the typical requirements is that children of certain ages wear PFDs. The age requirements, however, vary from State to State and sometimes are linked to the size of vessel. The lack of age uniformity in the requirements may be confusing to recreational boaters traveling throughout the States with children. More importantly, however, the requirements do not appear to be based on accident data or scientific research. According to the State boating law administrator in Florida, who favors a requirement for 12-year-olds and younger, the age of 6 was arbitrarily chosen by the State legislature, he believed, because it was close to 5, the age at which children are required to wear seatbelts. According

to the boating law administrator in North Dakota, the age of 10 was a compromise between those who opposed any requirement and those who favored the age of 12. The NASBLA, on the other hand, supports its resolution to require children 12 years old and younger to wear PFDs by the fact that the age of 12 has repeatedly been linked to operator maturity by the marine community. It also references work by Ballestreri Consulting, Inc., that researched the physiological, emotional, and motor skill changes that occur around the age of 12.⁶³ The American Academy of Pediatrics (AAP) recommends that "your children should wear life jackets at all times when on or near the water."⁶⁴ The AAP embarked on a water safety campaign as a result of the high incidence of drownings among children. A policy statement on drowning is due this summer. The AAP does not, however, define "children" nor does it identify the specific ages at which a child needs to wear a "life jacket."

The Safety Board obtained information from the Coast Guard on PFD use for 351 fatally injured boat operators 18-years-old and younger for the years 1985 through 1991. Similar data on surviving boat operators and on boat passengers for 18-years-old and younger were not available. Of 273 of the 351 persons (78 percent) for whom PFD use was known, 18 percent used PFDs.

The enactment of laws to require children to wear PFDs has been somewhat successful, in part, the Safety Board believes, because the boating public can readily accept that it is dangerous for children not to wear PFDs. However, the accident data provided by the States forcefully points out that boating without a PFD is dangerous for boaters of all ages. The data indicate that of the 281 people who drowned in recreational boating accidents and who were not wearing a PFD, as many as

⁶³ Letter dated January 19, 1993, from S. Ballestreri to Safety Board staff.

⁶⁴ American Academy of Pediatrics. 1992. Life jackets and life preservers [pamphlet]. TIPP HEO 133. August. (See appendix 1.)

85 percent (238 people) may have survived had they been wearing a PFD.⁶⁵ Requiring the use of PFDs for all recreational boaters, therefore, would appear to be the proper course of action for all States to take. The Centers for Disease Control, in an effort to reduce the number of drownings associated with recreational boating, has urged the States to require the wearing of PFDs. The Safety Board recognizes, however, that there would be strong opposition to an across-the-board law, that such a law would be difficult to enforce, and that PFDs may indeed not be necessary at all times, such as in certain areas of large recreational vessels.

Nevertheless, given the number of lives that could have been saved had PFDs been worn, the Safety Board believes that it is incumbent on the States to increase the level of PFD usage. Based on the NPRM issued on November 9, 1992, it is clearly the intent of the Coast Guard to allow States to enact legislation that would require boaters to wear PFDs. Thus, the Coast Guard has recognized the safety benefits that would be derived from revising current regulations that preempt States from requiring the wearing of PFDs. The Safety Board looks forward to the Coast Guard's completion of this rulemaking.⁶⁶ In the interim, the Safety Board believes that the States can begin the legislative process to increase the level of PFD usage. One approach is to mandate PFD usage for persons involved in recreational boating activities or situations that are perceived by the boating public to be dangerous, similarly to how the public has accepted that it is dangerous for children not to wear PFDs. Examples include water skiers, operators of personal watercraft, and persons operating in hazardous waters or operating a vessel alone. Of the 351 persons who drowned in the 407 fatal accidents, 338 persons drowned in single-

vessel accidents. Of the 338 drownings, 96 victims (28 percent) were alone in their vessel at the time of the accident. Some States now require that PFDs be worn by children, and some require that PFDs be worn by persons water skiing or operating a personal watercraft. Utah requires that PFDs be worn by all boaters on most of the State's active rough rivers; Utah State boating representatives contend that the PFD requirement is the reason that few deaths have occurred on Utah rivers.

Other factors that States may need to consider include the types and conditions of recreational waters within the States' respective boundaries, such as cold recreational waters (waters with a temperature of 70 °F or less). Fifty-four percent of the accidents for which water temperature was recorded occurred in water temperatures of 70 °F or less. A person entering cold water experiences a sudden cold water shock reflex. This reflex causes a person to immediately gasp for air, which can result in water entering the lungs, reduced underwater breath-holding times, and hyperventilation with subsequent confusion and increased muscle tetany.⁶⁷ The accident that occurred in San Pablo Bay, California, on June 12, 1992, described in the introduction to this report, illustrates that wearing PFDs in cold water most likely resulted in the survival of the adult female and 9-year-old child. The remaining victims, small children, who according to State officials, eventually succumbed as a result of exposure to cold water that led to drowning, probably survived as long as they did (several hours) because they were wearing PFDs.

Consideration should also be given to such factors as the types of recreational activities and the length and size of vessels. The States should study

⁶⁵ Although this estimate excludes the fatalities attributed to the possible effects of cold water exposure (hypothermia), being caught under water, or unconsciousness, it may be an overestimate of the number of lives saved by PFDs.

⁶⁶ At the time this report was published, it was anticipated that the final rule was imminent.

⁶⁷ Steinmen, Alan M.; Haywood, John S. 1989. Cold water immersion. In: Management of wilderness and environmental emergencies. St. Louis, MO: Mosbey Publishing Company.

in detail existing accident data to determine where, when, and by whom PFD usage should be required. States need to consider that on certain sizes of vessels and during certain types of recreational activities, PFD usage may not be necessary and that there is a level of risk associated with many sporting activities, including recreational boating. For example, some people jump off their boats in warm waters and swim safely without wearing a PFD.

At a minimum, however, the Safety Board believes that children should be required to wear PFDs. The Safety Board also believes that requiring children to wear PFDs will eventually result in more adults wearing PFDs, as occurred with the use of child safety seats and seatbelts for children.⁶⁸ However, given the various age limits that have been enacted by some of the States and apparently the lack of any scientific research to support the age limits chosen, the Safety Board believes that the Coast Guard and the NASBLA, in consultation with the American Academy of Pediatrics, should establish an age at or below which all children should be required by all States to wear PFDs while in recreational boats. The Safety Board further believes that the NASBLA members should then seek legislative action in their respective States that would require the wearing of PFDs, under conditions determined to be appropriate by the State, with a minimum requirement that all children wear PFDs.

The Safety Board acknowledges that enforcement of PFD usage has been and will continue to be difficult primarily because of the availability and accessibility of law enforcement officials and the number of those officials compared to the number of boaters. Programs similar to the DWI enforcement initiatives such as "Boat Block" and "SWAMP" may need to be implemented to target specific waterways. The NASBLA can play a role by working with the individual States to develop enforcement activities appropriate to the type of PFD requirements to be implemented by the States.

The Coast Guard has promoted the need for increased voluntary wearing of PFDs by recreational boaters through the development and distribution of numerous public service announcements and brochures. The Safety Board believes, however, that the Coast Guard can play a more active role by using its funding authority to increase PFD usage, as it now does with the States regarding funds expended for educational programs. For example, the Coast Guard should require that the memorandum of understanding signed by the States with the Coast Guard biennially outline specifically the State's plan to increase PFD use. The annual narratives submitted by the States and used by the Coast Guard to determine funding levels should be reviewed for compliance with the proposed activities. The Coast Guard could redistribute funds based on the level of need and/or compliance with the State's activities in this area.

⁶⁸ According to data from the National Highway Traffic Safety Administration (NHTSA) 19-city survey, seatbelt use has increased from about 16 percent for teenage drivers in 1985 to about 44 percent for teenage drivers in 1991. Also, use of seatbelts by subteens (5- to 12-year-olds) is increasing steadily. The NHTSA suggests that this is likely a function of the fact that many of these persons used child safety seats and seatbelts when they were younger and have developed the habit of buckling up. They may also have been influenced by public education efforts to promote seatbelt use. Further, the "follow the leader" effect has been evident in the child restraint area, where parents use seatbelts to serve as a role model for children who were in child safety seats.

Boat Operating Skills and Knowledge

Accidents

The two accidents investigated by the Safety Board in 1982 and discussed in the introduction to this study raise concern about operator knowledge of basic boating safety rules and ability to operate vessels properly and safely. The operators involved in these two accidents were reported to be experienced; each operator had more than 100 hours operating experience. However, the actions of both operators suggest a lack of basic knowledge of boating rules and boat handling skills. The boats involved in these accidents were either overloaded or improperly loaded and were operating in hazardous weather or cold water conditions. Both operators had been or were suspected of drinking at the time of the accident. The operator and passengers in the accident in Uniontown, Kentucky, did not use PFDs in spite of the inclement weather and the cold and hazardous water. These operators demonstrated poor judgment in operating their recreational boats in the above conditions.

Accident Data

Of the 461 operators involved in the 407 fatal accidents reported by the 18 States, information

on whether the operators had attended any boating safety courses was provided for 230 of the operators. According to the data, 43 (19 percent) of the 230 operators had taken some type of boating safety course; 187 (81 percent) of the 230 operators had not. Operators of powered vessels represented 37 of the 43 operators (86 percent) reported to have taken a boating safety course.

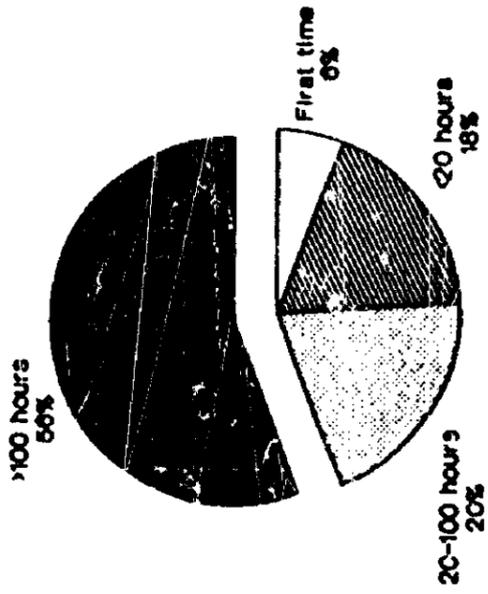
Experience level information for the accident vessel type was available for 239 operators; 126 operators (53 percent) had over 100 hours experience and 40 operators (17 percent) had less than 20 hours.⁶⁹ As indicated in figure 20, about half of the operators in each major accident category had more than 100 hours experience.

Vessel capsizings (69 percent of the unpowered vessels and 20 percent of the powered vessels) suggest that operators lacked (1) basic skills in operating a vessel; or (2) basic knowledge, or appreciation of the dangers involved in operating improperly loaded vessels, overloaded vessels, or in hazardous waters. Vessel collisions (30 percent of the powered vessels and 5 percent of the unpowered vessels) suggest that operators are not demonstrating a knowledge of basic rules of the road. Operating in strong or storm winds (18 percent of all operators) and drinking while boating (37 percent of all operators) are indicative of a lack of safe boating practices.

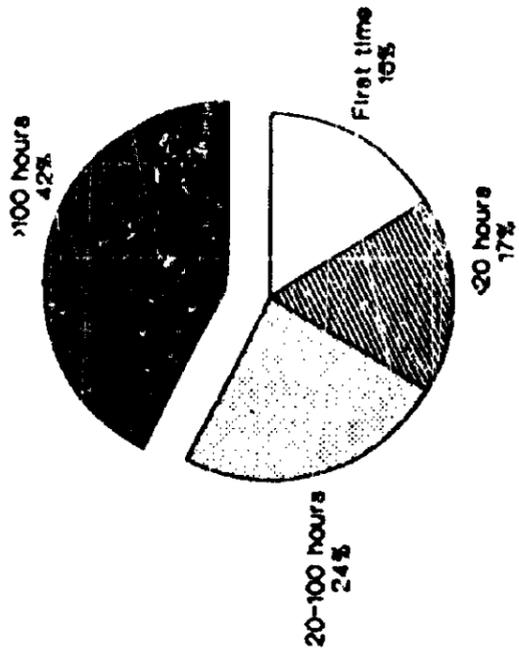
The data from the 18 States identified the types of errors made by recreational boat operators

⁶⁹ Twenty-seven persons were operating the type of vessel involved in the accident for the first time. It was unknown in 22 of the 27 cases whether the operator had any experience in other types of vessels. Of the five for whom experience level was known, one had never operated a boat; three had less than 20 hours experience operating boats; and one had more than 100 hours experience operating boats.

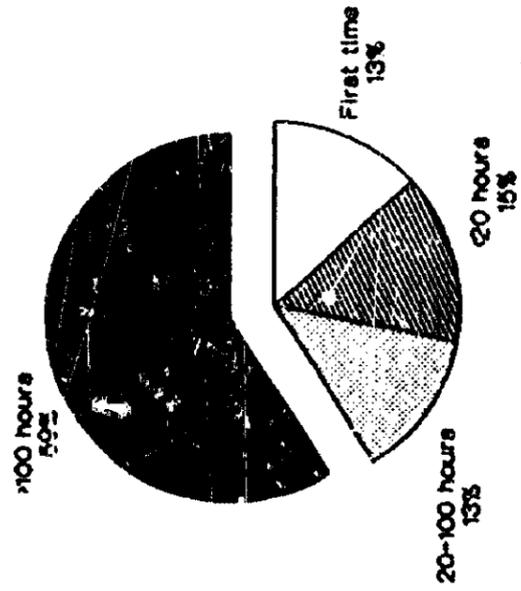
Falls



Capsizings



Collisions



Other

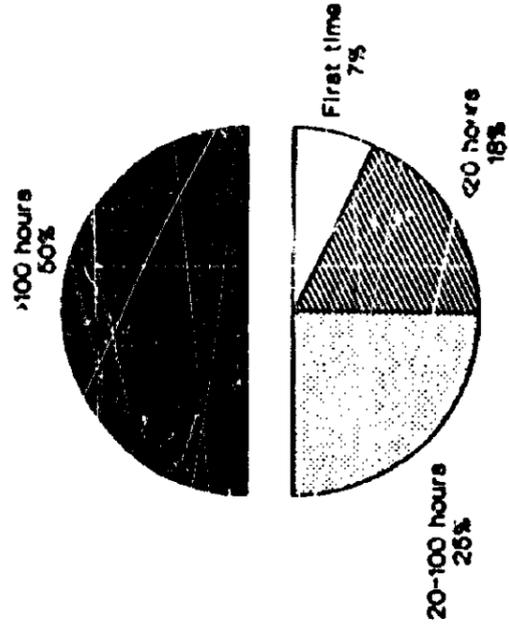


Figure 5.6—Percentage of accidents by type of accident and operator experience.

through a State determination of cause.⁷⁰ A State-determined cause was available for 329 of the 451 vessels involved in the accidents. Several categories of the State-determined causes relate to operator knowledge and skills. Operator inexperience was cited 53 times (16 percent of all causes cited), excessive speed 62 times (19 percent), and improper lookout 43 times (13 percent).

Boating Safety Courses

The boating safety courses offered by the States, the U.S. Coast Guard Auxiliary, and the U.S. Power Squadrons—the three primary sources for the NASBLA-approved boating safety courses—in general cover safety procedures and equipment, rules of the road, navigation aids, boat handling characteristics, weather and rough water hazards, alcohol and boating, and pertinent State and Federal regulations. The emphasis will vary primarily according to the length of the courses offered. Typically, a knowledge test is given at the completion of the course, and a boating safety certificate is received by those who successfully pass the test. In 1989, the Boating Accident Investigation Reporting and Analysis Committee of the NASBLA prepared a report that recommended that boating safety programs, at a minimum, address:

- safe loading and following the boat's capacity limits;

- the relative risks, degree of danger, and probable outcomes of practices such as: crossing near dams, boating on rivers during high water, high speed operation, alcohol and drug impairment, boating during high winds and rough water conditions;
- safe handling of small craft emergencies and water survival strategies; and
- wearing PFT's, especially in small craft.

According to the American Red Cross survey, only 23.7 percent of all boaters 16 years and older had taken some type of boating safety course, and only about 28 percent of all boat operators 16 years and older had taken some type of boating safety course. Although the exact number of recreational boaters who receive formal instruction on boating safety is difficult to ascertain because of the voluntary nature of most instruction, information from the States, the U.S. Coast Guard Auxiliary, and the U.S. Power Squadrons provides some insight on the number of boaters who receive information on boating safety annually.

Information provided by the States to the NASBLA indicates that about 880,000 persons received information on boating safety in 1991 through either voluntary or mandatory State boating safety programs.⁷¹ About 700,000 of these persons were school children who received information on basic boating safety concepts in a course of 1 hour or less. The U.S. Coast Guard Auxiliary reported that in 1991, 242,000 children were introduced to its abbreviated one lesson boating safety course and about 81,000 adults to one of its multi-lesson courses.⁷² The U.S. Power Squadrons reported that from July 1, 1990, to June 30, 1991, 25,665 recreational boaters completed its multi-lesson

⁷⁰ As noted earlier in this study, the Board made no conclusions regarding the State-determined causes and is concerned that States may interpret the cause categories differently.

⁷¹ Some States require formal boating safety instruction before a person is allowed to operate a boat. See further discussion in this section on mandatory boating safety programs.

⁷² The U.S. Coast Guard Auxiliary offers 4-, 6-, 7-, 13-, or 14-week courses.

boating safety course. By comparison, according to the American Red Cross survey, more than 4 million persons operated a recreational boat for the first time during this period. If it is assumed that the school children who took the abbreviated courses outlined above were not likely to have operated a boat and that all the adults who took the courses did operate a boat for the first time, it can be concluded that as few as 7 percent of the persons who operated a boat for the first time during this period took a boating safety course. On the other hand, even if it is assumed that all persons who took courses operated a boat for the first time, a maximum of only 22 percent of the persons operating a boat for the first time will have taken a boating safety course. The higher level estimate is consistent with the State-reported data (20 percent of the operators) and the American Red Cross survey (28 percent of all boat operators) on the proportion of operators who have taken boating safety courses.

Education and Licensing Requirements

Twenty States, the District of Columbia, and Puerto Rico have enacted legislation that establishes various requirements before a person is permitted to operate a recreational boat (see appendix J). For example, 11 States and the District of Columbia have requirements that are aimed at young boat operators operating the vessel without an adult present. Three additional States have

adopted mandatory education requirements for all recreational boaters phased in over a specific time period.⁷³ In each of these States, a boat operator is issued a certificate that must be available for review by a law enforcement officer.

Opponents of mandatory boater education cite studies on driver education which indicate that those with and without education have virtually the same number of violations; proponents of driver education cite a small (6 to 7 percent) decrease in the accident rates of those who have taken a driver education course. In some States, persons who successfully complete driver education can receive their license earlier than those who do not complete driver education, thus increasing their exposure. Proponents of mandatory boating education contend that boating safety education, unlike motor vehicle drivers education, is not tied to operating a vessel and, consequently, does not increase exposure.

Only one State, New Jersey, has a requirement for a recreational boat operator's license. The law has been in effect since 1954 and applies only to operators of power vessels who are engaged in sports fishing on nontidal waters. Legislation that would require a boat operator's license has been introduced in the States of Florida, Louisiana, Maryland, and New Hampshire; however, no such legislation has yet been enacted. Because these States have introduced legislation on this issue and other States have contemplated requiring a boat operator's license, the Law Enforcement Committee of the NASBLA approved in April 1992 the development of guidelines for a model operator licensing program. This issue is to be reviewed further by the Committee before being submitted to the full NASBLA membership for approval.

⁷³ In Maryland, anyone born after July 1, 1972, must obtain a "Certificate of Boating Safety Education," to operate any type of vessel. In Vermont, anyone born after July 1, 1974, must obtain a safety certificate to operate a power boat. In Connecticut, a phased-in program exists in which by October 1, 1992, operators younger than 20 years old must have a certificate, and by October 1, 1997, all operators must have a certificate. Connecticut, Illinois, and Minnesota also require mandatory education for operators of personal watercraft.

The issue of State licensing requirements was addressed in a paper presented at a 1991 conference on injury prevention sponsored by the Centers for Disease Control. The paper stated:

Few States now require standard training or licensure to operate recreational boats. Some States require a boating education course, but these requirements are usually restricted to persons who are under 16 years of age. We still do not know the effect that licensing or education has on boat-related drownings, so further research is needed. Until we know more, States should require that boat operators demonstrate competency to operate boats of the size and engine power that they actually operate.¹⁴

Information obtained through the International Council for Marine Industry Associations indicate that several countries have enacted laws that require boat operators to have a license. In Japan, a license is required for all boats with engines. In Germany, a license is required for all boats with a motor of more than 5 hp. In Italy, there are four categories of licenses based on the size of the boat, engine power, and the boat usage group. In Greece, a license is required for all habitable sailboats, for all motorboats of more than 15 hp, and for all inflatables with more than 8 hp. Information was not available regarding the effectiveness of these requirements. Several other countries, such as Canada and Finland, have license requirements under consideration.

Discussion

The accident data and case studies presented in this report strongly suggest that the individuals involved in fatal boating accidents operated their vessels in a manner that suggested a lack of basic knowledge of the rules of the road (that is, collisions, speed); a lack of understanding of safe boating practices (speed, alcohol, improper loading, inclement weather); and a lack of proficiency in operating skills (capsizings, collisions, weather).

Unlike general aviation and motor vehicle operations, an operator of a recreational boat is not required to demonstrate an understanding of the rules of the road or an ability to operate the vessel. Further, the data do not show that recreational boating is a safer form of transportation than any other mode of transportation for which a demonstration of knowledge, skills, and ability is required prior to operating the equipment. However, no comprehensive program exists to determine that a boat operator has adequate knowledge and skills to safely operate a recreational vessel. Further, perhaps as few as 7 percent, and certainly no more than 22 percent, of first time boat operators will have taken some type of voluntary boating safety course. Moreover, successful completion of these courses indicates only that the persons who have taken them have a knowledge of basic boating safety rules; it does not indicate that these persons have demonstrated an ability to operate the vessel.

¹⁴ Centers for Disease Control, Injury Control Panel on Home and Leisure Injury Prevention. 1991. Drownings. In: Setting the national agenda for injury control in the 1990s: Position papers from the 3rd national injury control conference; 1991 April 22-25; Denver, CO. Washington, DC: U.S. Department of Health & Human Services, Public Health Service and Centers for Disease Control; 275-280 (p. 279). In conjunction with: National Institute for Occupational Safety and Health; and U.S. Department of Transportation, National Highway Traffic Safety Administration.

With the one exception noted earlier in New Jersey, there is no requirement in the United States that a boat operator be licensed. A motor vehicle driver, for example, must obtain a license to operate the vehicle and to obtain the license must pass both a road test and a written test. Even motorcyclists must demonstrate, through testing, a knowledge of the rules of the road and the ability to operate the vehicle before receiving an endorsement to the motor vehicle license to operate a motorcycle. A boat operator, on the other hand, can rent or buy a vessel that can operate at speeds of 100 mph without demonstrating a knowledge of basic safety rules or skills in operating these sophisticated vessels. Although there are some boating advocates who would argue that most boaters would not attempt to operate such high-powered vessels without having received proper training and demonstrated an ability to operate these vessels, the Safety Board is concerned that this option exists. In fact, over 900 persons are killed each year in recreational boating accidents, more than are killed in any other type of marine accident or more than in rail and aviation accidents. Therefore, the Safety Board believes, as a minimum, that the States and the Territories should implement a program of minimum boating safety standards to reduce the number and severity of accidents. In addition to the PFD requirements addressed earlier in this report, such a program should consider requirements for recreational boat operators to demonstrate a knowledge of safe boating rules and an ability to operate the vessel. The requirement to possess a certificate of completion or an operator's license should also be considered as part of a comprehensive program.

The Safety Board further believes that the Coast Guard, in consultation with the NASBLA, should develop guidelines that would be used by the States to implement the minimum recreational boating safety standards. The guidelines could address, for example, the skills and knowledge necessary to demonstrate competency in operating different types of recreational boats. The Safety Board recognizes, if a State adopts such a requirement, the State may not want to require such demonstrations for some boats that fall under the category of recreational boats on some

waterways. For example, high performance boats that operate at high speeds and larger vessels should probably require demonstration of knowledge and skills. However, small unpowered boats (or boats with low horsepower) may not warrant such a demonstration. Further, the level of competency needed may vary depending on the intended use of the vessel. For example, operating a canoe or kayak in white water may require a higher level of competency than operating the same vessel on warm placid lakes. The Coast Guard and NASBLA should determine for which vessels and under what conditions it would be necessary to demonstrate an ability to operate the vessel. Because States may opt to require that boat operators demonstrate proficiency in boat handling skills and knowledge of boating rules, the Coast Guard and the NASBLA guidelines should address the methods by which this can be accomplished, such as through existing formal boating safety courses or self-teaching methods. Because testing may become an important component of the minimum boating safety standards, the Coast Guard and the NASBLA should address the issue of how and where tests could be conducted. Finally, if the States opt to require a boat operator's license, the guidelines should address how the license could be issued and the period for which the license is valid. For example, an endorsement to the motor vehicle drivers license, for those boaters who have one, could be considered; such procedure would have the advantage of using an existing administrative structure.

The Safety Board recognizes that implementation of minimum boating safety standards will be a significant change in how the recreational boating industry has operated in the past and that extensive planning, organization, and public education will be needed to successfully implement such a program. The Safety Board believes, however, that an extensive new bureaucracy may not be necessary to implement this program. Every State, with the exception of Alaska, already has a centralized boat titling and registration authority. Currently, 19 States title and register recreational boats through a department of motor vehicles or other State taxing unit. Thirty States title and register boats through a marine law enforce-

ment organization, such as a department of natural resources, a parks and recreation division, or a fish and game commission. Administration of records and fees related to certification or licensing and notification of the new requirements related to the minimum boating safety standards could be accomplished through these existing organizations. Further, the NASBLA could serve the role of administering such a program.

Perhaps more importantly, the Safety Board believes that if States implement a boat operator licensing program, such a program will provide a more effective means of enforcing boating laws, so that those who have been operating boats unsafely can be identified, and steps taken to either im-

prove their behavior or withdraw the boating privilege. Currently, marine law enforcement officials can suspend operating privileges; however, without a license, there is no mechanism to monitor boaters who have violated boating laws. The available data from the National Highway Traffic Safety Administration indicates that the suspension or revocation of a person's driving license, if found to be driving under the influence of alcohol or drugs, has proven to be a successful deterrent to this behavior. It is reasonable to believe that the suspension or revocation of a boating license would be an effective deterrent to boating while under the influence. Suspending or revoking a boating license could also prove effective in enforcing existing and future PFD laws.

Findings

1. Although the number of fatal recreational boating accidents and fatalities nationwide decreased from 1985 to 1990, the number of fatalities increased from 865 in 1990 to 924 in 1991; the fatality rate (the number of fatalities per 100,000 estimated boats) also increased slightly during the same period.
2. The extent of alcohol use in recreational boating has not been adequately documented, which precludes the ability to detect trends related to alcohol use in recreational boating.
3. Of the 451 boat operators who were involved in fatal accidents reported by the 18 States in this study, 76 percent (344) were not chemically tested to determine the presence of alcohol.
4. Available evidence suggests that the actual incidence of alcohol involvement is probably more than 37 percent but less than 76 percent of operators involved in fatal recreational boating accidents.
5. Of the 331 persons who drowned in recreational boating accidents addressed in this study and for whom personal flotation device (PFD) usage was known, 231 (85 percent) were not wearing PFDs. In 15 percent (43) of the drownings, there were factors involved that may not have been influenced by the wearing of a PFD. Therefore, as many as 85 percent of these persons (238) may have survived had they been wearing a PFD.
6. Of the 36 children who survived the accidents reported in this study, 15 lives were saved because they were wearing personal flotation devices, according to responding law enforcement officials.
7. The Pittsburgh District of the Army Corps of Engineers has implemented regulations requiring recreational boaters to wear personal flotation devices on Corps waters within its District. According to District officials, three lives have been saved since the regulations were implemented in 1990, and the regulations have resulted in an increased number of boaters who wear PFDs.
8. As few as 7 percent and no more than 22 percent of the persons operating a boat for the first time will have taken a boating safety course.
9. Unlike general aviation and motor vehicle operations, an operator of a recreational boat is not required to demonstrate an understanding of the rules of the road and an ability to operate the boat; further, the data do not show that recreational boating is a safer form of transportation than these other means of transportation.
10. The inconsistent and inadequate information reported by the States to the Coast Guard on recreational boating accidents—including information on blood alcohol concentrations, use and accessibility of personal flotation devices, nature and extent of personal injuries, all occupants of the vessel, and operator education and experience—precludes an accurate understanding of the nature and survivability of accidents.

Recommendations

As a result of this safety study, the National Transportation Safety Board made the following recommendations:

—to the Governors and Legislative Leaders of the 50 States, U.S. Virgin Islands, and Puerto Rico; and the Mayor, District of Columbia:

Implement minimum recreational boating safety standards to reduce the number and severity of accidents; consider requirements such as mandatory use of personal flotation devices for children, demonstration of operator knowledge of safe boating rules and skills, and operator licensing. (Class II, Priority Action) (M-93-1)

—to the Governors and Legislative Leaders of Alabama, Alaska, Arizona, Arkansas, California, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Tennessee, Virginia, Washington, West Virginia, Wisconsin, Wyoming; the Mayor of the District of Columbia; and the Governors of the U.S. Virgin Islands and Puerto Rico:

Enact legislation that would require a chemical test to determine the alcohol concentration of all recreational boat operators involved in a fatal boating accident. (Class II, Priority Action) (M-93-2)

—to the Governors and Legislative Leaders of Alabama, Hawaii, Kentucky, Mississippi, Missouri, New Mexico, Oklahoma, South Dakota, West Virginia; and the Mayor of the District of Columbia:

Enact comprehensive legislation to address the problem of alcohol and/or drug use by recreational boat operators, including, but not limited to, a clear definition of legal impairment in terms of alcohol concentration and a provision requiring a chemical test to determine alcohol concentration if a recreational boat operator is suspected of being impaired. (Class II, Priority Action) (M-93-3) (Supersedes M-83-76 and -77)

—to the Governor and Legislative Leaders of Iowa:

Enact legislation to address the problem of alcohol use by recreational boat operators by establishing a clear definition of legal impairment in terms of alcohol concentration. (Class II, Priority Action) (M-93-4) (Supersedes M-83-76)

—to the Governors and Legislative Leaders of Connecticut, Washington, and Wyoming:

Enact legislation that would require a chemical test if a recreational boat operator is suspected of being impaired. (Class II, Priority Action) (M-93-5) (Supersedes M-83-77)

—to the Governors and Legislative Leaders of Arizona, Arkansas, Iowa, Kentucky, Massachusetts, Missouri, New Hampshire, New York, North Dakota, Oklahoma, Pennsylvania, and Virginia:

Enact legislation that would require toxicological testing of all recreational boating fatalities. (Class II, Priority Action) (M-93-6) (Supersedes M-83-78)

—to the National Association of State Boating Law Administrators:

Urge association members to seek legislative action that would require a chemical test to determine the alcohol concentration of a recreational boat operator involved in a fatal boating accident. (Class II, Priority Action) (M-93-7) (Supersedes M-83-73)

Cooperate with the U.S. Coast Guard and the American Academy of Pediatrics in developing a uniform component of standards that establishes an age at or below which all children should be required by all States to wear personal flotation devices while in recreational boats. (Class II, Priority Action) (M-93-8)

Cooperate with the U.S. Coast Guard in developing guidelines that would be used by the States to implement minimum recreational boating safety standards to reduce the number and severity of accidents; consider requirements such as mandatory use of personal flotation devices for children, demonstration of operator knowledge of safe boating rules and skills, and operator licensing. (Class II, Priority Action) (M-93-9)

—to the U.S. Coast Guard:

Implement a fatal accident reporting system, comparable to the National Highway Traffic Safety Administration's Fatal Accident Reporting System, and develop a three-level report form and corresponding data files that address the accident, the vessel(s), and the occupants. Develop guidelines for submission of the data and standardization of cause codes and develop uniform data entry at the State level. (Class II, Priority Action) (M-93-10)

Evaluate the effectiveness of State programs aimed at curbing alcohol use in recreational boating, and use funding to encourage States to use those programs that are most effective. (Class II, Priority Action) (M-93-11)

Develop, in consultation with the National Association of State Boating Law Administrators and the American Academy of Pediatrics, a uniform component of standards that establishes an age at or below which all children should be required by all States to wear personal flotation devices while on recreational boats. (Class II, Priority Action) (M-93-12)

Use Coast Guard funding authority to increase personal flotation device (PFD) usage by requiring that the memorandum of understanding signed biennially by the States with the Coast Guard outline specifically the States' plans to increase PFD usage. Review annual narratives submitted by the States to determine compliance with proposed plans and activities. (Class II, Priority Action) (M-93-13)

Develop, in cooperation with the National Association of State Boating Law Administrators, guidelines that would be used by the States to implement minimum recreational boating safety standards to reduce the number and severity of accidents; consider requirements such as mandatory use of personal flotation devices for children, demonstration of operator knowledge of safe boating rules and skills, and operator licensing. (Class II, Priority Action) (M-93-14)

—*to the U.S. Department of the Army, Corps of Engineers:*

Implement requirements for the wearing of personal flotation devices for recreational boaters on Corps' water impoundments; at a minimum, require all children to wear personal flotation devices. (Class II, Priority Action) (M-93-15)

—*to the American Academy of Pediatrics:*

Cooperate with the U.S. Coast Guard and the National Association of State Boating Law Administrators in developing a uniform component of standards that establishes an age at or below which all children should be required by all States to wear personal flotation devices while in recreational boats. (Class II, Priority Action) (M-93-16)

By the National Transportation Safety Board

Carl W. Vogt
Chairman

John K. Lauber
Member

Susan M. Coughlin
Vice Chairman

Christopher A. Hart
Member

John A. Hammerschmidt
Member

Adopted: April 13, 1993

Appendix A
Safety Board Data Entry Form

RECREATIONAL BOATING ACCIDENT STUDY FORM

General Information

A.1. NTSB Study Identifier -- State ID -- AA and Number-- NNN, for example,
UT 001 Enter: ___

A.2. NTSB Accident Identifier (accidents taken by NTSB) Enter Code:

A.3. State Accident Identifier -- 7 place alpha or numeric identifier
from State form Enter: _____

A.4. Date of Accident -- MM/DD/YY Enter ___/___/___

A.5. Time of Accident (military time) --numeric, four places Enter: _____

A.6. Type of Body of Water -- Numeric, one place Enter Code: _

- | | |
|-----------------------|---|
| 1.- Lake/pond | 5.- Dam |
| 2.- River/canal/bayou | 6.- Offshore (inlet, gulf, ocean, port) |
| 3.- Bay | 7.- Reservoir |
| 4.- Creek | 8.- Other (explain) _____ |

A.7. Type of Operation -- Numeric, two places Enter Code: ___

- 0.- Other (explain): _____
- | | |
|--------------------------------|---------------------------------|
| 1.- Commercial activity | 10.- Fueling |
| 2.- Cruising | 11.- Water Skiing/tubing |
| 3.- Maneuvering | 12.- Racing |
| 4.- Approach Dock | 13.- Towing/being towed |
| 5.- Leave Dock | |
| 6.- Tied to Dock | 14.- Sailing |
| 7.- Beached | 15.- Rowing/paddling |
| 8.- Anchored/moored | 16.- White water rafting |
| 9.- Adrift/idle speed drifting | 17.- Swimming/snorkeling/diving |

A.8. Type of Accident --Numeric. two places Enter code:___

- | | |
|--|-------------------------------------|
| 1.- Grounding | 11.- Collision with fixed object |
| 2.- Capsizing | 12.- Collision with floating object |
| 3.- Flooding | 13.- Collision with person |
| 4.- Sinking | 14.- Collision with other (explain) |
| 5.- Fire/explosion/fuel | 15.- Hit by propeller |
| 6.- Fire/explosion/other (explain) _____ | |
| 7.- Falling/fallen skier | |
| 8.- Fall overboard | 16.- Other (explain): _____ |
| 9.- Fall in vessel | |
| 10.- Collision with vessel | |

NTSB Study Identifier: _ _

A.9. Weather -- numeric, one place Enter Code: _

- 1.- Clear
- 2.- Cloudy
- 3.- Fog
- 4.- Rain
- 5.- Snow
- 6.- Hazy
- 7.- Other (explain) _____

A.10. Water Conditions -- numeric, one place Enter Code: _

- 1.- Calm waves (less than six")
- 2.- Choppy waters (6" to 2')
- 3.- Rough Waters (2' to 6')
- 4.- Very rough waves (greater than 6')
- 5.- Strong Current
- 6.- Other (explain) _____

A.11. Air Temperature (estimate): numeric, three places Enter: _ degrees F

A.12. Water Temperature (estimate): numeric, two places Enter: _ degrees F

A.13. Visibility -- numeric, one place Enter Code: _

1. Good
2. Fair
3. Poor
4. Dark/night

A.14. Wind -- numeric, one place Enter Code: _

- 1.- None
- 2.- Light (0 to 6 mph)
- 3.- Moderate (7 to 14 mph)
- 4.- Strong (15 to 25 mph)
- 5.- Storm (over 25 mph)

A.15. Number of Vessels Involved in Accident -- numeric, one place Enter: _

A.16. Number of Total Persons Involved in Accident --numeric, two places
Enter: _

A.17. Number on Primary Vessel #1 -- numeric, two places Enter: _

A.18. Number on Secondary Vessel #2 -- numeric, two places Enter: _

A.19. Number of Others -- numeric, two places Enter: _

NTSB Study Identifier: __ ____

A.20. Number of Total Fatalities -- numeric, two places Enter: __

A.21. Primary Vessel #1 -- numeric, two places Enter: __

A.22. Secondary Vessel #2 -- numeric, two places Enter: __

A.23. Number of Total Injuries -- numeric, two places Enter: __

A.24. Primary Vessel #1 -- numeric, two places Enter: __

A.25. Secondary Vessel #2 -- numeric, two places Enter: __

VESSEL INFORMATION

NTSB Study Identifier: _ _ _

V.1. Vessel Number -- numeric, one place Enter Number: _

V.2. Type of Vessel -- numeric, two places Enter Code: _

- | | |
|---------------------|----------------------------|
| 1.- Open motorboat | 8.- Personal watercraft |
| 2.- Cabin motorboat | 9.- Kayak |
| 3.- Auxiliary Sail | 10.- Houseboat/pontoon |
| 4.- Sail (only) | 11.- Other (explain) _____ |
| 5.- Rowboat | 12.- Paddleboat |
| 6.- Canoe | 13.- Commercial |
| 7.- Raft | 14.- Airboat |

V.3. Hull Material -- numeric, one place Enter Code: _

- 1.- Wood
- 2.- Aluminum
- 3.- Steel
- 4.- Fiberglass/plastic
- 5.- Rubber, vinyl or canvas
- 6.- Other (explain) _____

V.4. Length -- numeric, two places Enter length to nearest foot: _

V.5. Number of engines, numeric, one place Enter: _

V.6. Horsepower (total), numeric, four places Enter: _

V.7. Vessel Status -- numeric, one place Enter Code: _

- 1.- Rented
- 2.- Owned
- 3.- Borrowed from owner with permission
- 4.- Borrowed from owner without permission

V.8. Empty -- no value

V.9. Was the boat equipped with PFDs -- numeric, one place Enter Code: _

- 1.- Yes
- 2.- No

V.10. PFD accessible -- Numeric. one place Enter Code: _

- 1.- Yes
- 2.- No
- 3.- Unknown

V.11. PFD servicable -- Numeric, one place Enter Code: _

- 1.- Yes
- 2.- No

V.12. PFD Used by Victim-- Numeric, one place Enter code: _

- 1.- Yes
- 2._ No

V.13. PFD Properly Used -- Numeric, one place Enter code: _

- 1.- Yes
- 2.- No

V.14. PFD Properly adjusted -- Numeric, one place Enter Code: _

- 1.- Yes
- 2.- No

V.15. PFD Properly sized -- Numeric, one place Enter Code: _

- 1.- Yes
- 2.- No

V.16. Type of PFD onboard -- numeric, one place Enter Code: _

- 1.- Yes 2.- No

- 1. Number of Type I Onboard -- numeric, two places Enter: ___
- 2. Number of Type II Onboard -- numeric, two places Enter: ___
- 3. Number of Type III Onboard -- numeric, two places Enter: ___
- 4. Number of Type IV Onboard -- numeric, two places Enter: ___
- 5. Number of Type V Onboard -- numeric, two places Enter: ___
- 6. Other (explain) _____

V.17. Fire Extinguishers Onboard -- numeric, one place Enter Code: ___
(Complete only if fire involved in accident)

- 1.- Yes
- 2.- No

V.18. Number of Fire Extinguishers Onboard -- numeric, two places
Enter Number: ___ Type of Extinguishers (explain)

(Complete only if fire involved in accident)

State's opinion/contributing to the cause of the accident (less than one response is acceptable, also check all that the State indicates apply)
Numeric, one place

V.19. Weather: Enter Code: ___

- 1. Yes 2. No

NTSB Study Identifier: ___

V.20. Hazardous Waters: Enter Code: ___

1. Yes 2. No

V.21. Excessive Speed : Enter Code: ___

1. Yes 2. No

V.22. No Proper Lookout: Enter Code: ___

1. Yes 2. No

V.23. Inattention: Enter Code: ___

1. Yes 2. No

V.24. Operator Inexperience: Enter Code: ___

1. Yes 2. No

V.25. Restricted Vision: Enter Code: ___

1. Yes 2. No

V.26. Overloaded: Enter Code: ___

1. Yes 2. No

V.27. Improper loading: Enter Code: ___

1. Yes 2. No

V.28. Alcohol: Enter Code: ___

1. Yes 2. No

V.29. Drugs: Enter Code: ___

1. Yes 2. No

V.30. Fault of Vessel/Equipment (includes hull, machinery, and Equipment)
Enter Code: ___

1. Yes 2. No

V.31. Other (explain): Enter Code: ___

Operator Information

NTSB Study Identifier --

V.32. Operator of Vessel Number

V.33. Date of Birth of Operator -- MM/DD/YY Enter: / /

V.34. Operator's Experience This Type of Boat-- numeric, one place Enter Code:

- 1.- Under 20 hours
- 2.- 20 to less than 100 hours
- 3.- Over 100 hours
- 4.- None (first time)
- 5.- Unknown

V.35. Other Boat Operating Experience -- numeric, one place Enter Code:

- 1.- Under 20 hours
- 2.- 20 to less than 100 hours
- 3.- Over 100 hours
- 4.- None
- 5.- Unknown

V.36. Boating Safety Course taken -- numeric, one place Enter Code:

- 1.- Yes
- 2.- No

V.37. Formal Instruction in Boating Safety -- numeric, one place Enter Code:

- 1.- None
- 2.- USCG Auxiliary
- 3.- U.S. Power Squadrons
- 4.- American Red Cross
- 5.- State
- 6.- Other
- 7. Unknown

Operator Substance Use

V.38. Evidence of Use, such as alcoholic beverage containers in vessel or near vessel casualty -- numeric, one place Enter Code:

- 1. Yes 2. No

NTSB Study Identifier: _____

V.39. A Marine enforcement officer/witness indicates has been drinking (HBD), report may or may not indicate BAC test taken -- numeric, one place Enter Code: ____

- 1.- Yes
- 2.- No

V.40. Operator Tested for Alcohol -- numeric, one place Enter Code: ____

- 1. Yes 2. No

V.41. Blood Alcohol Concentration if Tested-- numeric Enter BAC: 0.____%

V.42. Type of Test if tested-- numeric, one place Enter Code: ____

- 1.- urine
- 2.- blood
- 3.- breath
- 4.- other (explain) _____

V.43. Operator Tested for Drugs -- numeric, one place Enter Code: ____

- 1.- Yes
- 2.- No

V.44. Type of Drug if Tested -- numeric, one place Enter Code: ____

- 1.- Marijuana
- 2.- Cocaine
- 3.- Mixture (explain) _____
- 4.- Other (explain) _____

Operator Is Victim

V.45. Operator was: -- numeric, one place Enter Code: ____

- 1.- Uninjured
- 2.- Injured
- 3.- Killed

(Note: Only answer V.46.- V.52 if operator was killed)

V.46. Able to Swim --numeric, one place Enter Code: ____

- 1.- Yes
- 2.- No

V.47. Using/Wearing PFD -- numeric, one place Enter Code: ____

- 1.- Yes
- 2.- No

V.48. Type of PFD worn -- numeric, one place Enter Code: --

- 1.- Type I
- 2.- Type II
- 3.- Type III
- 4.- Type IV
- 5.- Type V
- 6.- Other (explain) _____

V.49. Death by Drowning -- numeric, one place Enter Code: __

- 1.- Yes
- 2.- No

V.50. Death by Trauma -- numeric, one place Enter Code: __
(Go to V.53 to code more specific trauma data)

- 1.- Yes
- 2.- No

V.51. Death Most Likely Involved Hypothermia -- numeric, one place
Enter Code: __

- 1.- Yes
- 2.- No

V.52. Disappeared, Presumed drowned -- numeric, one place Enter Code:
__

- 1.- Yes
- 2.- No

V.53. Trauma Mode -- numeric, one place Enter Code: __

- 1.- Trauma induced by vessel propeller
- 2.- Trauma induced by striking or being struck by Vessel
- 3.- Trauma induced by probable medical condition
- 4.- Trauma induced by lightning
- 5.- Trauma induced by fire
- 6.- Trauma induced by striking or being struck by a fixed or floating object

OTHER PASSENGER/VICTIM INFORMATION

Complete a form for each passenger/victim involved in the accident beginning with Passenger/Victim 1

P.1. NTSB Study Identifier: __ __

P.2. Passenger or Victim of Vessel Number: __

P.2.a. Passenger/Victim Number: Enter number: __

P.3. Date of Birth of Passenger/Victim -- MM/DD/YY Enter: __/__/__

P.4. Passenger/Victim Was: numeric, one place Enter Code: __

- 1.- Uninjured
- 2.- Injured
- 3.- Killed

(Note: Only answer P.5. - P.11. if passenger/victim was killed)

Passenger/Victim:

P.5. Able to Swim -- numeric, one place Enter Code: __

- 1.- Yes
- 2.- No

P.6. Using/Wearing PFD -- numeric, one place Enter Code: __

- 1.- Yes
- 2.- No

P.7. Type of PFD worn -- numeric, one place Enter Code: __

- 1.- Type I
- 2.- Type II
- 3.- Type III
- 4.- Type IV
- 5.- Type V
- 6.- Other (explain) _____

P.8.. Death by Drowning -- numeric, one place Enter Code: __

- 1.- Yes
- 2.- No

NTSB Study Identifier:

P.9. Death by Trauma -- numeric, one place Enter Code:
(Go to trauma codes P.18 to enter more specific trauma data)

- 1.- Yes
- 2.- No

P.10. Death Most Likely Involved Hypothermia -- numeric, one place
Enter Code:

- 1.- Yes
- 2.- No

P.11. Disappeared, Presumed drowned -- numeric, one place
Enter Code:

- 1.- Yes
- 2.- No

P.12. Alcohol Involved -- numeric, one place Enter Code:

- 1.- Yes
- 2.- No

P.13. Passenger Tested for Alcohol -- numeric, one place Enter Code:

- 1.- Yes
- 2.- No

P.14. Blood Alcohol Concentration -- numeric Enter BAC 0. %

P.15. Passenger Tested for Drugs -- numeric, one place
Enter Code:

- 1.- Yes
- 2.- No

P.16. Passenger Positive for Drugs -- numeric, one place
Enter Code:

- 1.- Yes
- 2.- No

P.17. Type of Drug If Tested -- numeric, one place
Enter Code:

- 1.- Marijuana
- 2.- Cocaine
- 3.- Mixture (explain): _____
- 4.- Other (explain): _____

NTSB Identifier: _____

P.18. Trauma Mode: -- numeric, one place Enter Code: _____

- 1.- Trauma induced by vessel propeller
- 2.- Trauma induced by striking or being struck by a vessel
- 3.- Trauma induced by probable medical concerns
- 4.- Trauma induced by lightning
- 5.- Trauma induced by fire
- 6.- Trauma induced by striking or being struck by a fixed/ floating object

SUPPLEMENTAL INFORMATION ON CHILDREN AND PFD USE

NTSB Study Identifier -- State ID -- AA and Number -- NNN, for example
UT 001 Enter Code: _____

Vessel Number: _____

S.1. Were any children (under age 12) on board the vessel: _____

- 1.- Yes
- 2.- No

S.2. How many children were on board: Enter Number: _____

S.3. How many children were wearing PFDs at the time of the accident:
Enter Number: _____

S.4. Did the use of PFDs make a difference in the outcome of the accident
for the child: _____

- 1.- Yes
- 2.- No

S.5. Has Operator Previously Been Cited BWI? -- numeric, one place Enter
Code: _____

- 1. Yes
- 2. No

S.6. Number of BWI Within Last Three Years -- numeric, two places Enter
Number: _____

S.7. Operator Previously Cited for Serious Boating Violations? numeric, one
place Enter Code: _____

- 1.- Yes
- 2.- No

S.8. Number of Previous Boating Violations Within Last Three Years--
numeric, two places Enter Code: _____

S.9. Operator Previously Been Cited DWI?-- numeric, one place Enter Code: _____

- 1.- Yes
- 2.- No

S.10. Number of DWI Within Last Three Years-- numeric, two places Enter
Number _____

S.11. Vessel Trailered -- numeric, one place Enter Code: _____

- 1.- Yes
- 2.- No

Appendix B
Study Data and Tables

Table 3—Number and percent of vessel operators involved in the 409 fatal boating accidents, 1991, reported by the 18 States, by age of operator

Age of operator (years)	Number of operators	Percent of operators
Younger than 21	50	11.4
21-30	102	23.2
31-40	104	23.7
41-50	76	17.3
51-60	54	12.3
61-70	38	8.7
71 and older	15	3.4
Total	439	100.0
Unknown, not coded ^a	12	NA
All operators	451	100.1

NA = not applicable.

^a Not coded denotes that the age of vessel operators was not provided by the States. Those accidents were not included to calculate the percentages.

Table 4—Number and percent of vessels involved in the 409 fatal boating accidents, 1991, reported by the 18 States, by number of persons on board

Number of persons on board	Number of vessels	Percent of vessels
1	143	31.7
2	157	34.8
3	69	15.3
4	50	11.0
5	10	2.2
6	13	2.9
7	4	.9
8	2	.4
9	1	.2
10	1	.2
11	1	.2
Total	451	100.0

Table 5—Number and percent of fatal boating accidents, 1991, reported by the 18 States, by month of the accident

Month of the accident	Number of accidents	Percent of accidents
January	12	2.9
February	13	3.2
March	27	6.6
April	41	10.0
May	62	15.2
June	54	13.3
July	69	17.0
August	46	11.3
September	34	8.4
October	19	4.7
November	17	4.2
December	13	3.2
Total	407	100.0

Table 6—Number and percent of fatal boating accidents, 1991, reported by the 18 States, by day of the week on which the accidents occurred

Day of the week	Number of accidents	Percent of accidents
Sunday	82	20.1
Monday	46	11.3
Tuesday	46	11.3
Wednesday	33	8.1
Thursday	42	10.3
Friday	50	12.3
Saturday	108	26.5
Total	407	100.0

Table 7—Number and percent of vessels involved in the 400 fatal boating accidents, 1991, reported by the 18 States, by vessel ownership

Vessel ownership	Number of vessels	Percent of vessels
Owned by operator	307	70.6
Rented	30	6.9
Borrowed, with permission	89	20.5
Borrowed, without permission	9	2.1
Total	435	100.0
Unknown, not coded ^a	17	NA
All vessels	451	100.0

NA = not applicable.

^a Not coded denotes that vessel ownership was not provided by the States. Those accidents were not included to calculate the percentages.

Appendix C

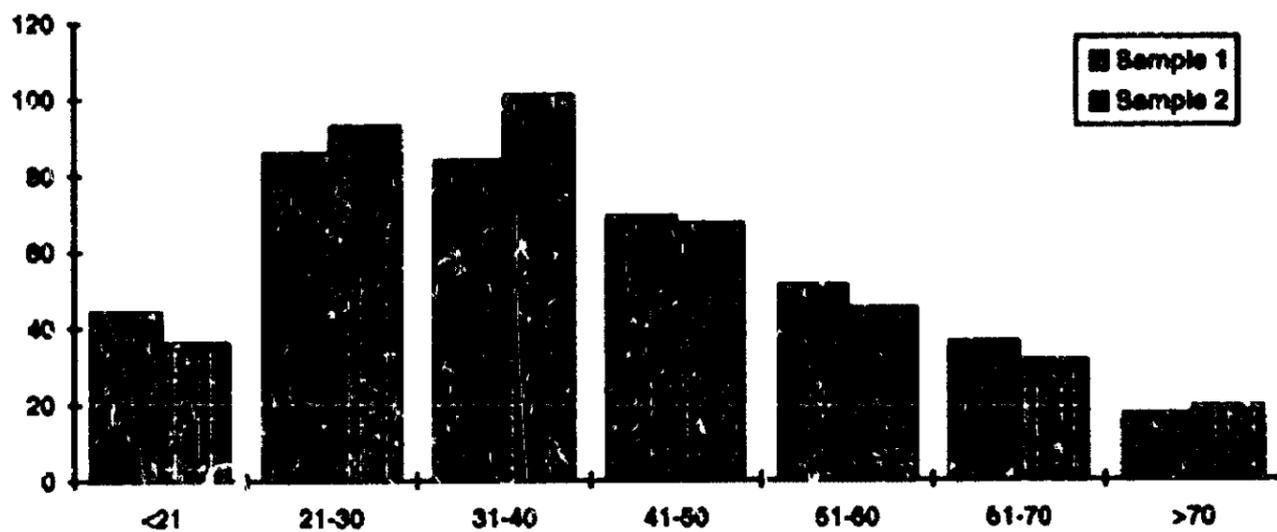
Distribution of Sample Variables in Samples Used To Assess the Representativeness of the Accident Data Provided by the 18 States

To determine if its 18-State sample of 1991 fatal recreational boating accidents could be considered a representative sample of all such accidents reported to the Coast Guard during the same period, the Safety Board defined two additional samples. Both of these samples were extracted from the Coast Guard's recreational boating accident data base for 1991. Sample 1 included all fatal recreational boating accidents that occurred in the 18

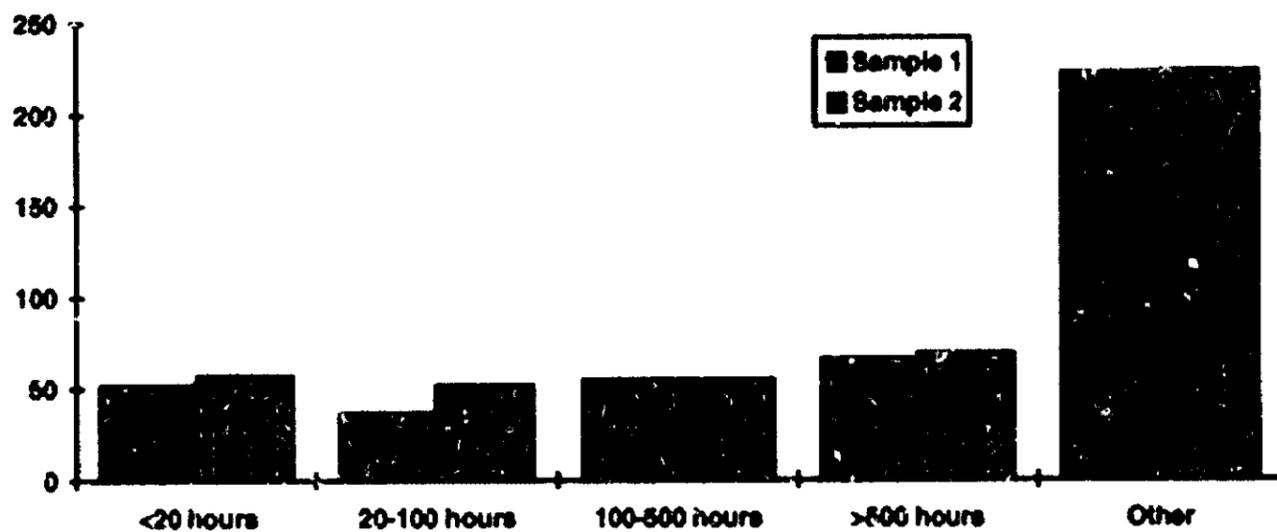
States from which the Safety Board received fatal accident investigation reports. Sample 2 was a sample of a like number of fatal accidents selected at random from all States, Territories, and the District of Columbia. A set of key variables, listed below, was selected to assess how representative Sample 1 was of Sample 2. This appendix presents comparisons of the distributions of each of the key variables for both samples.

<u>Accident</u>	<u>Vessel</u>	<u>Operator</u>
Month of the year	Horsepower	Age
Time of day	Hull material	Boating experience
Type of operation	Length	Formal instruction
Visibility	Type of vessel	Water conditions
Water temperature		
Weather		
Wind		

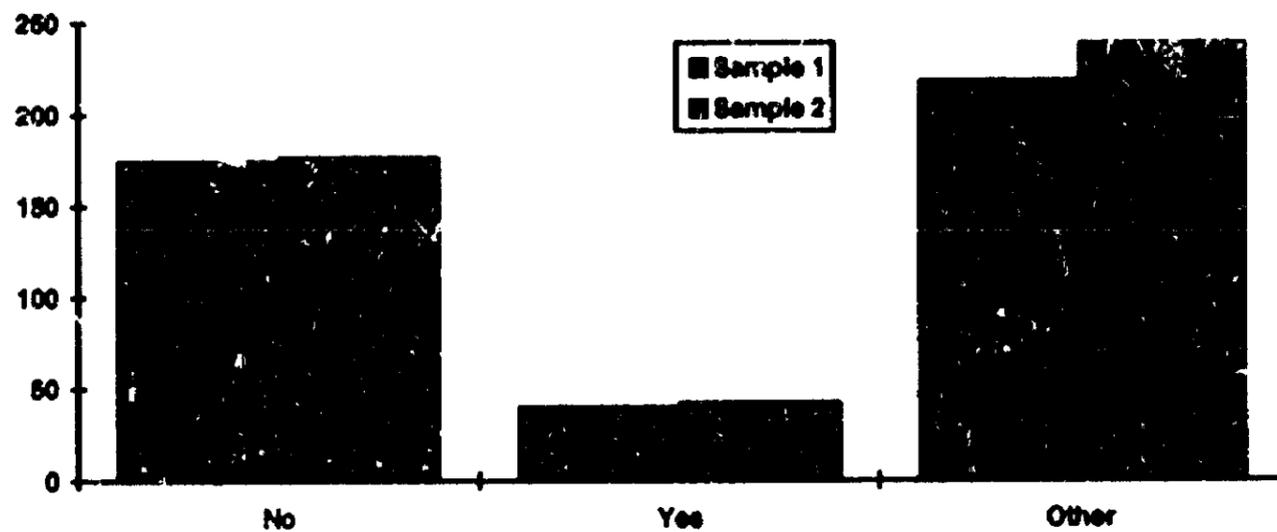
Age of operator



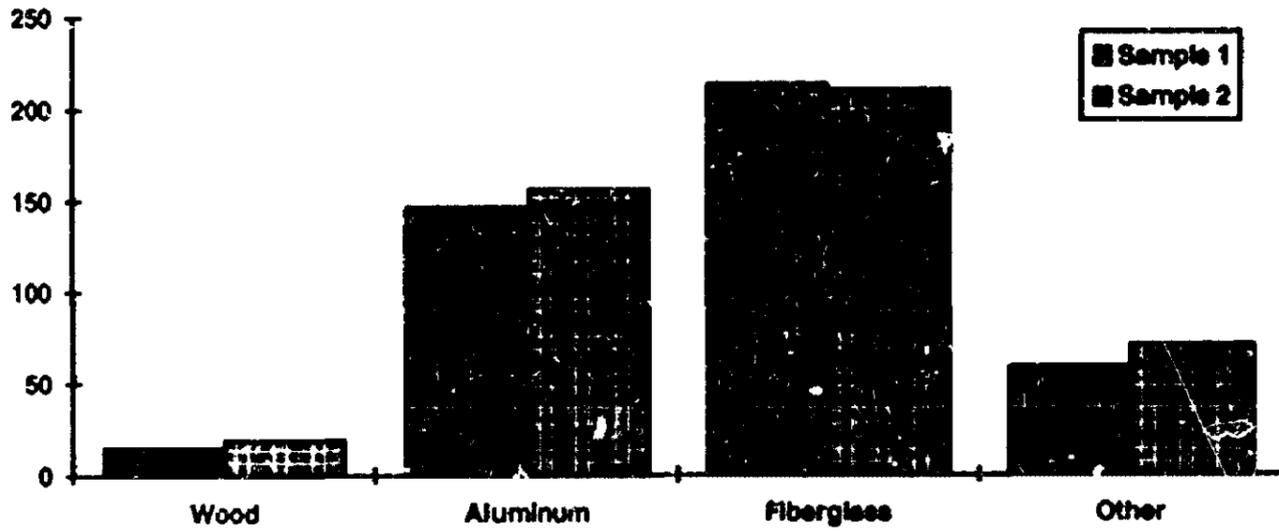
Operator experience



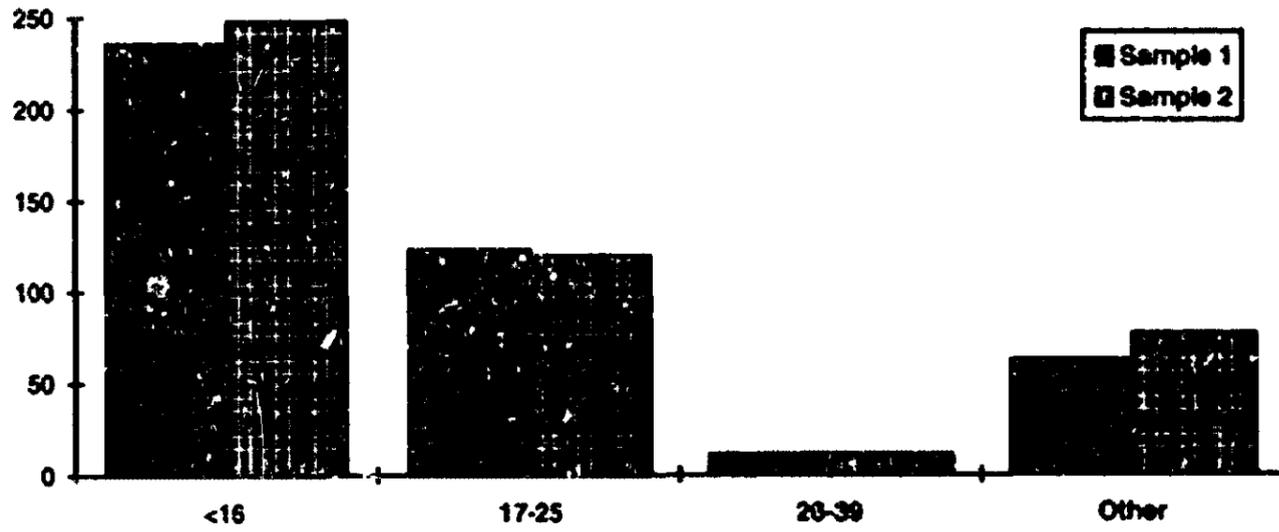
Formal instruction



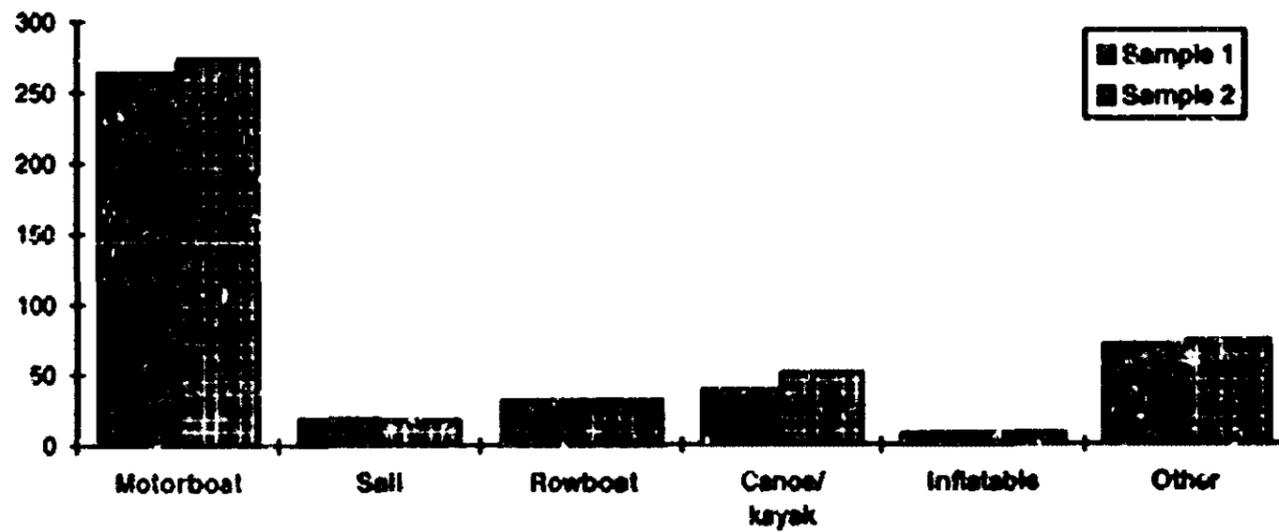
Hull material



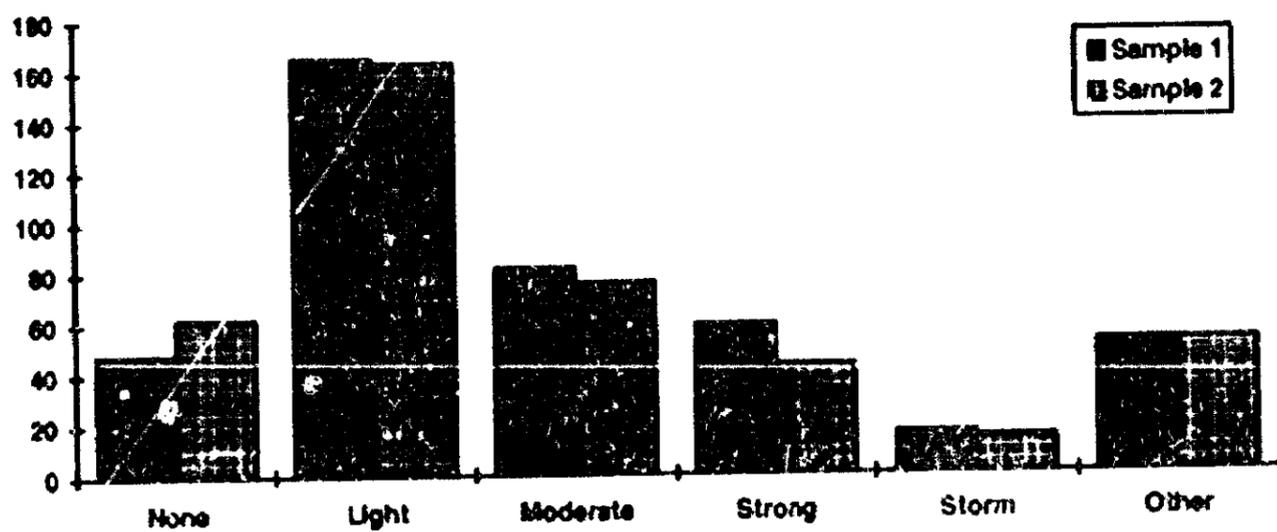
Length



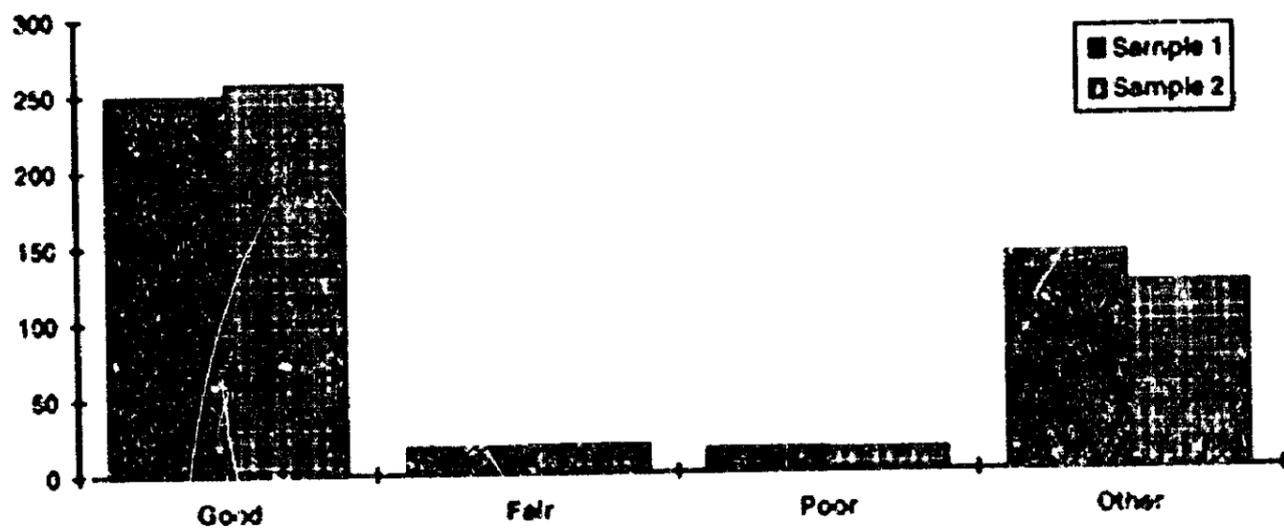
Type of vessel



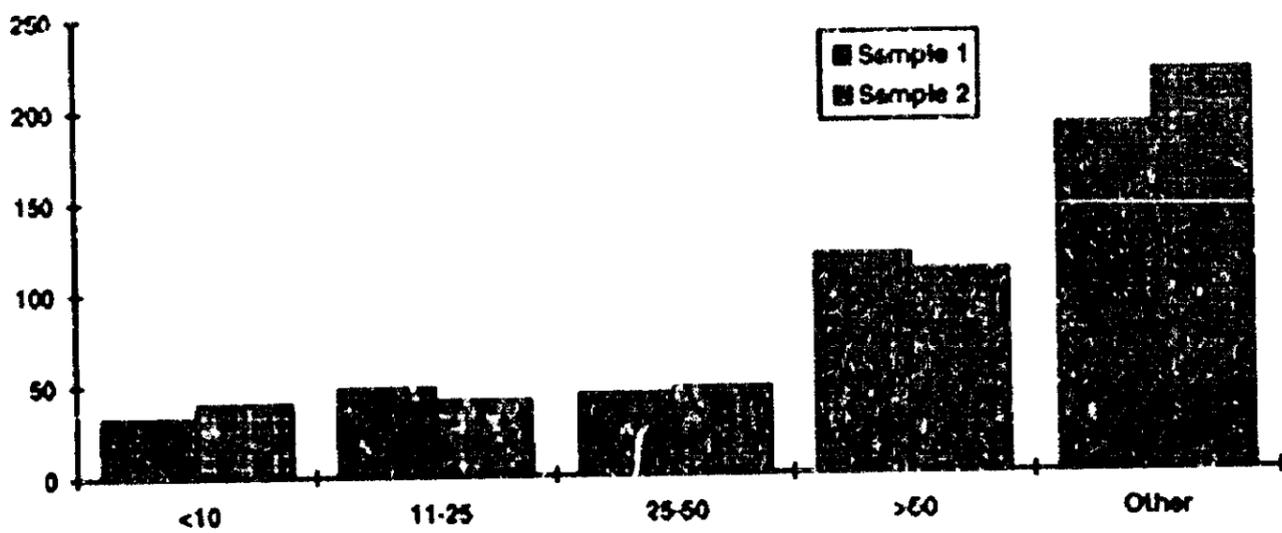
Wind



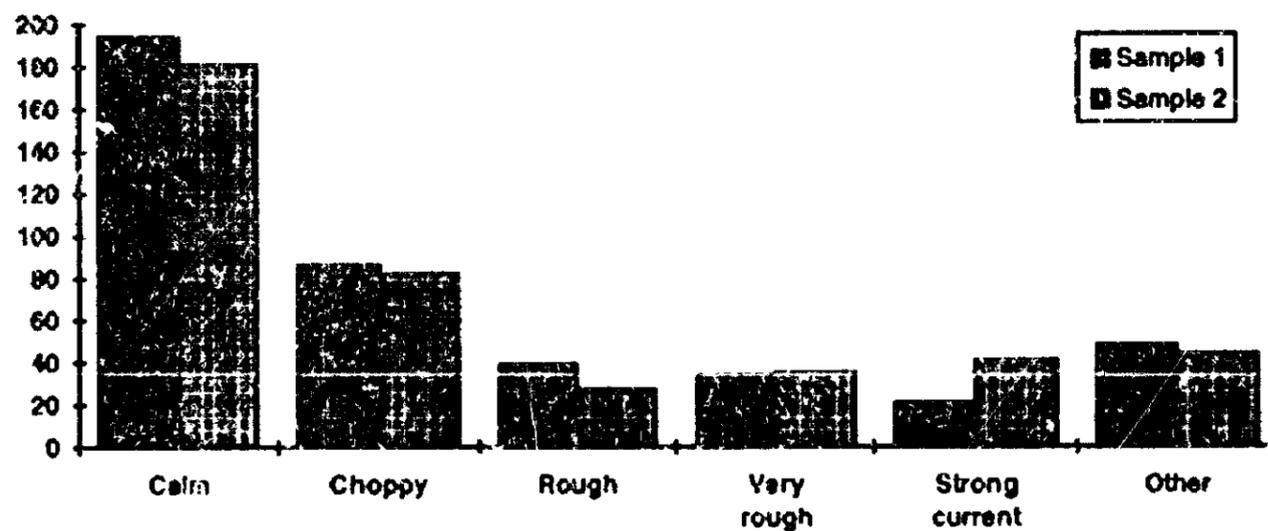
Visibility



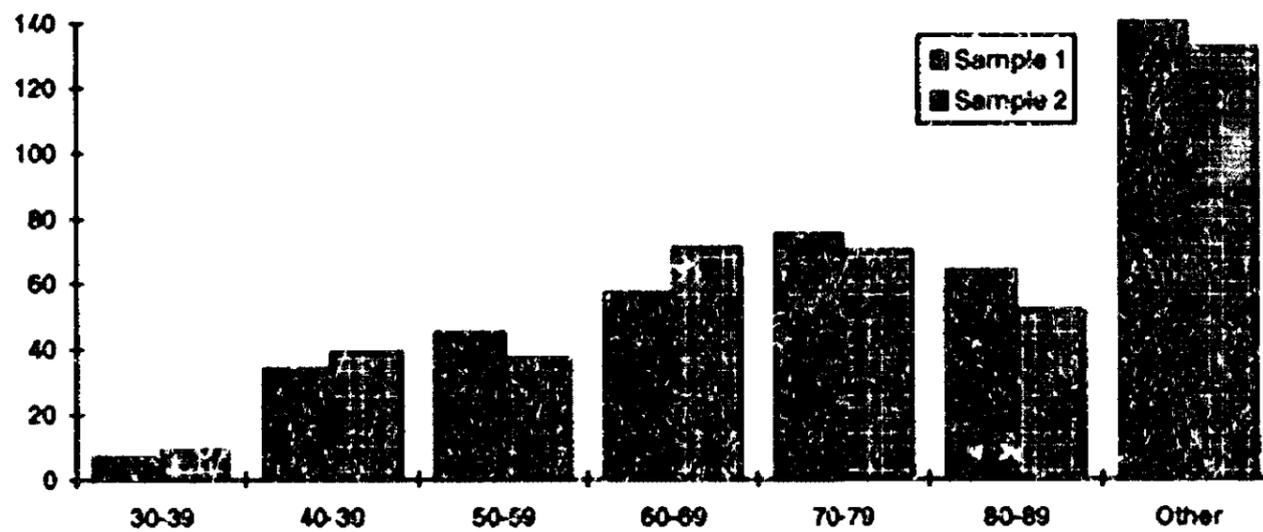
Horsepower



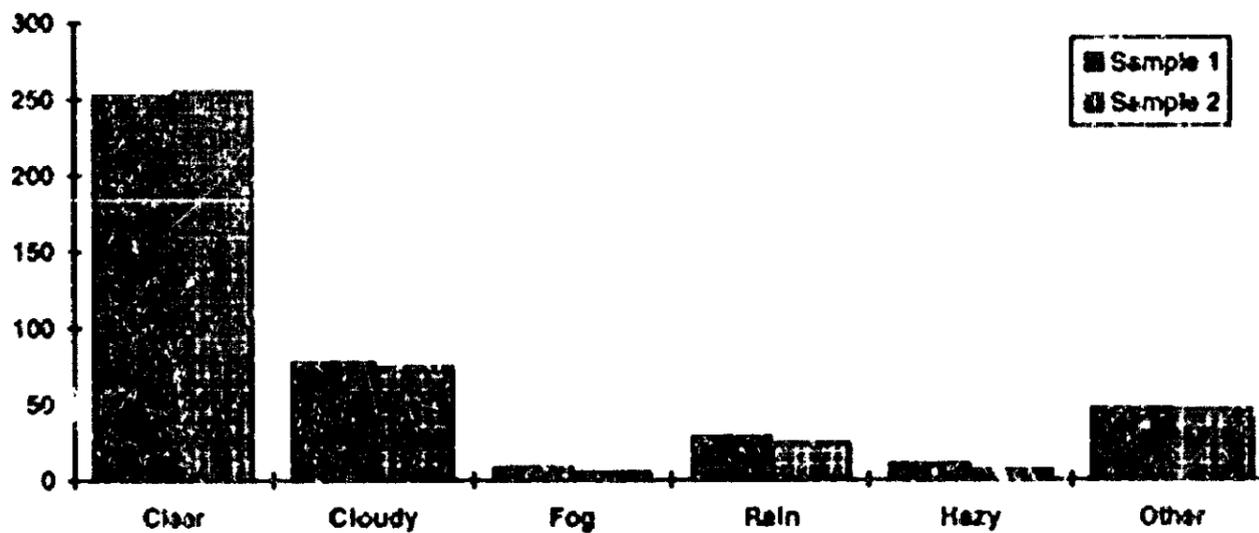
Water conditions



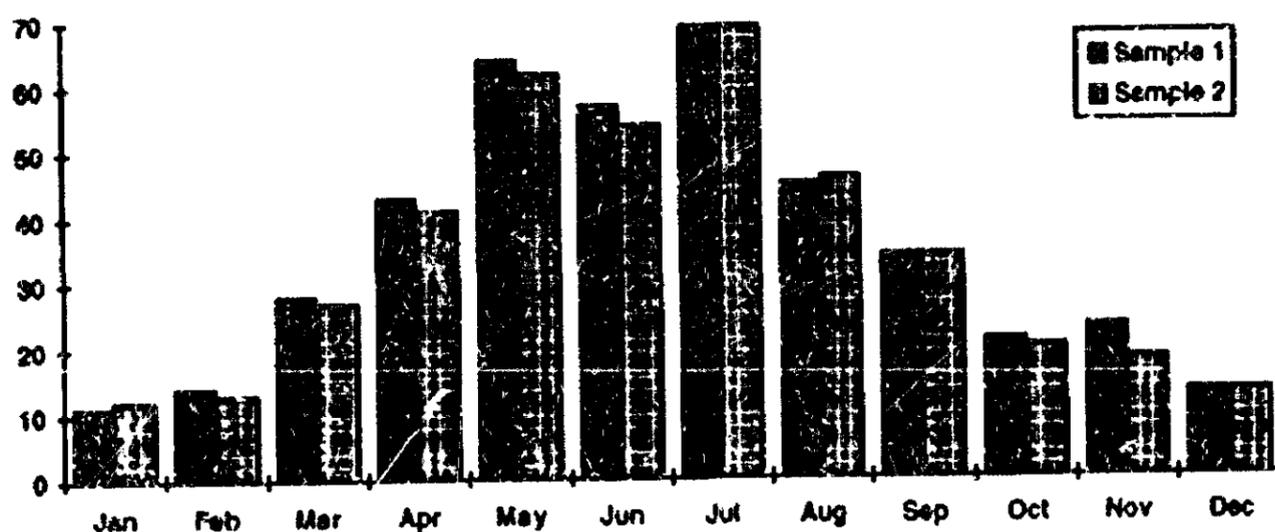
Water temperature (degrees F)



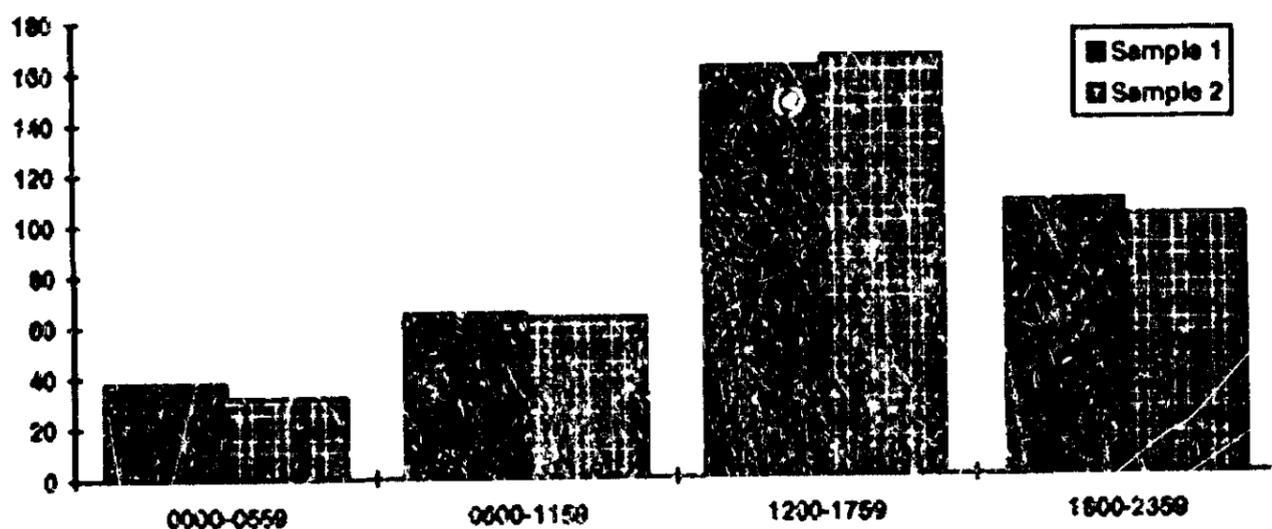
Weather



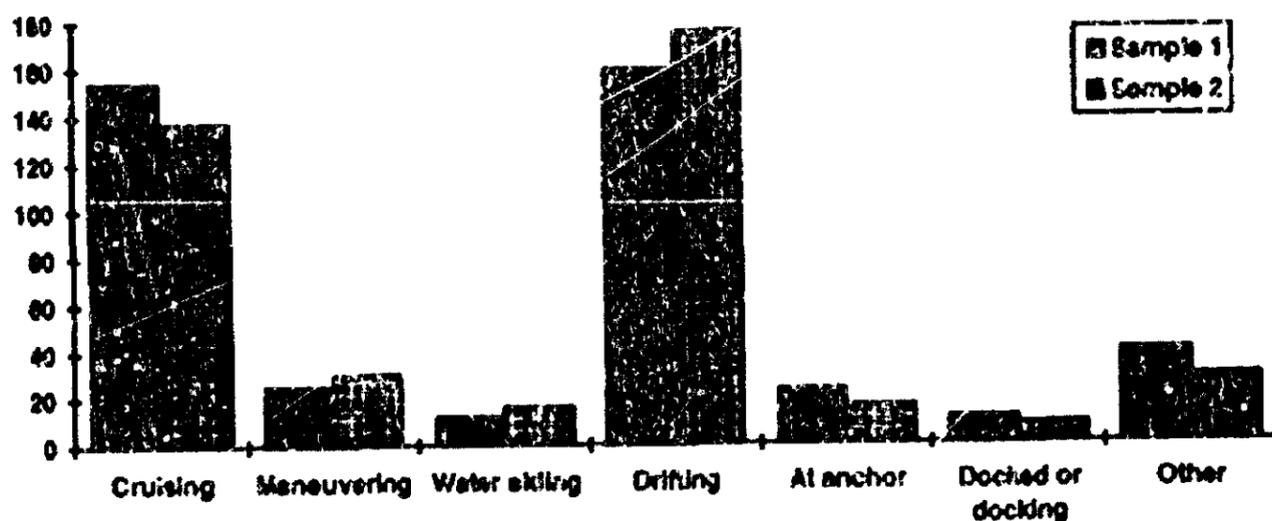
Month of the year



Time of day (24 hour clock)



Type of operation



Appendix D

Safety Board's 1983 Safety Recommendations on BWI Provisions

Safety Recommendation No.: M-83-76
Date Issued: November 7, 1983
Recipient: Governors and Legislative Leaders of Alabama, Alaska, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, Wisconsin, and the District of Columbia
Status: Open—Acceptable Action
Subject: Adopt legislation to clearly define the level of intoxication for recreational boat operators in order to strengthen your State's enforcement program for reducing accidents, fatalities, injuries, and property damage caused by the use of alcohol.

Safety Recommendation No.: M-83-77
Date Issued: November 7, 1983
Recipient: Governors and Legislative Leaders of Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Texas, Vermont, Virginia, Washington, West Virginia, Wyoming, and the District of Columbia
Status: Open—Acceptable Action
Subject: Adopt legislation to allow a chemical test of blood, breath, or urine if a recreational boating operator is suspected of being intoxicated and toxicological tests in the event of a recreational boating accident.

Safety Recommendation No.: M-83-78
Date Issued: November 7, 1983
Recipient: Governors and Legislative Leaders of Alaska, Arizona, Colorado,
Louisiana, Maine, Maryland, Nebraska, Tennessee, Utah, and
Wisconsin
Status: Open—Acceptable Action
Subject: Require procedures for toxicological tests in the event of a recreational boating fatality to document the role of alcohol in recreational boating accidents and fatalities.

Appendix E
Current State BWI Legislative Provisions

SUMMARY OF STATE OUI BOATING LAWS

STATE	Blood Alcohol Concentration Standard	Behavioral Standard	Field Test Methods Defined	Implied Consent Law	Maximum Penalties 1st Offense	Suspend Operating Privileges
Alabama					\$500/6 mos.	✓
Alaska	.10				\$500/6 mos.	
Arizona	.10	✓	✓	✓	\$1000/6 mos.	
Arkansas		✓			\$500/6 mos.	
California	.08		✓		\$1000/6 mos.	
Colorado	.10	✓	✓	✓	\$1000/1 yr.	✓
Connecticut	.10			✓	\$1000/3 mos.	✓
Delaware	.10				\$300/10 days	
D.C.					\$500/6 mos.	✓
Florida	.10	✓	✓	✓	\$1000/1 yr.	✓
Georgia	.10/.12	✓	✓	✓	\$2000/1 yr.	✓
Hawaii				✓	\$300/30 days	✓
Idaho	.10		✓	✓	\$1000/1 yr.	✓
Illinois	.10	✓	✓	✓	\$500/60 days	✓
Indiana	.10	✓	✓	✓	\$1000/1 yr.	
Iowa		✓	✓	✓	\$500/1 yr.	
Kansas	.10		✓	✓	\$100/	
Kentucky			✓	✓	\$300/6 mos.	✓
Louisiana	.10		✓	✓	\$500/6 mos.	
Maine	.08	✓	✓	✓	\$1000/1 yr.	
Maryland	.07/.10	✓	✓		\$500/6 mos.	✓
Massachusetts	.10			✓	\$500/90 days	✓
Michigan	.10	✓	✓	✓	\$700/90 days	✓
Minnesota	.10	✓	✓	✓	\$250/30 days	
Mississippi					\$500/6 mos.	
Missouri			✓	✓	\$500/6 mos.	
Montana	.10		✓	✓	\$1000/6 mos.	✓
Nebraska	.10		✓	✓	\$1000/6 mos.	
Nevada	.10		✓	✓	\$1000/1 yr.	✓
New Hampshire	.10		✓	✓	\$400/1 yr.	✓
New Jersey	.10				\$500/30 days	
New Mexico					\$500/90 days	✓
New York	.08/.10		✓	✓	\$500/6 mos.	
North Carolina	.10				\$500/30 days	✓
North Dakota	.10	✓		✓	\$500/30 days	✓
Ohio	.10	✓	✓	✓	\$1000/1 yr.	✓
Oklahoma					\$1000/6 mos.	
Oregon	.08	✓	✓	✓	\$2500/1 yr.	✓
Pennsylvania	.10		✓	✓	\$2000/90 days	✓
Puerto Rico	.10				\$500/6 mos.	
Rhode Island	.08/.10			✓	\$1000/1 yr.	✓
South Carolina	.10		✓	✓	\$200/30 days	✓
South Dakota					\$1000/1 yr.	
Tennessee	.10	✓	✓	✓	\$1000/1 yr.	✓
Texas	.10	✓	✓	✓	\$1000/6 mos.	✓
Utah	.08		✓	✓	\$750/1 yr.	✓
Vermont	.10	✓		✓	\$1000/1 yr.	
Virgin Islands	.10		✓	✓	\$2500/1 yr.	✓
Virginia	.10			✓	\$1000/90 days	
Washington	.10				\$300/90 days	
West Virginia					\$333/\$500	✓
Wisconsin	.01-.09/.10	✓	✓	✓	\$750/6 mos.	✓
Wyoming	.10				\$750/6 mos.	✓

* For operators of boats involved in reportable accidents

NOTES:

1. It is unlawful in all states to operate a vessel under the influence (OUI) of alcohol or drugs.
2. "Blood Alcohol Concentration" (BAC): Two figures in the column indicate the state has established progressively stiffer penalties for different levels of intoxication.
3. "Field Test Methods Defined" means that the general method of determining blood alcohol concentration, or other standard of intoxication, is prescribed in the law or regulation.
4. "Implied Consent Law" means that refusal of a boater to submit to a test for intoxication, (e.g., breathalyzer, blood test, etc.) may be introduced in court as evidence of intoxication; and in some states, it may be considered as a separate offense.

Adapted from: Cris Pattarozzi 1992. Operating under the influence of alcohol. In: Recreational boating safety: State policies and programs. Denver, CO: National Conference of State Legislatures: 22. Chapter 3.

Appendix F

Coast Guard NPRM Regarding Recreational Boating Safety Equipment Requirements

DEPARTMENT OF TRANSPORTATION**Coast Guard****33 CFR Part 175****(CGD 92-045)****RIN 2115-AE26****Recreational Boating Safety
Equipment Requirements****AGENCY:** Coast Guard, DOT.**ACTION:** Notice of proposed rulemaking.

SUMMARY: The Coast Guard proposes to change a number of Federal requirements and exemptions for carriage of personal flotation devices (PFDs) on recreational vessels. The designs and uses of recreational vessels and safety equipment have changed since the rules were first issued or last revised and some of the requirements and exemptions are no longer appropriate. This rulemaking project will provide the recreational boating public with clearer and more appropriate requirements for carrying personal flotation devices and promote a safer recreational boating environment.

DATES: Comments must be received on or before January 8, 1993.

ADDRESSES: Comments may be mailed to the Executive Secretary, Marine Safety Council (G-LRA/3406), (CGD 92-045), U.S. Coast Guard Headquarters, 2100 Second Street, SW., Washington, DC 20593-0001, or may be delivered to room 3406 at the above address between 8 a.m. and 3 p.m., Monday through Friday, except Federal holidays. The telephone number is (202) 267-1477.

The Executive Secretary maintains the public docket for this rulemaking. Comments will become part of this docket and will be available for inspection or copying at room 3406, U.S. Coast Guard Headquarters.

FOR FURTHER INFORMATION CONTACT: Mr. Carlton Perry, Auxiliary, Boating, and Consumer Affairs Division, (202) 267-0979.

SUPPLEMENTARY INFORMATION:**Request for Comments**

The Coast Guard encourages interested persons to participate in this rulemaking by submitting written data, views, or arguments. Persons submitting comments should include their names and addresses, identify this rulemaking (CGD 92-045) and the specific section of this proposal to which each comment applies, and give a reason for each comment. The Coast Guard requests that all comments and attachments be submitted in an unbound format suitable

for copying and electronic filing. If not practical, a second copy of any bound material is requested. Persons wanting acknowledgment of receipt of comments should enclose a stamped, self-addressed postcard or envelope.

The Coast Guard will consider all comments received during the comment period. It may change this proposal in view of the comments.

The Coast Guard plans no public hearing. Persons may request a public hearing by writing to the Marine Safety Council at the address under **ADDRESSES**. The request should include reasons why a hearing would be beneficial. If it determines that the opportunity for oral presentations will aid this rulemaking, the Coast Guard will hold a public hearing at a time and place to be announced by a later notice in the *Federal Register*.

Drafting Information

The principal persons involved in drafting this document are Mr. Carlton Perry, Project Manager, and Mr. Don Faleris, Project Counsel, Office of Chief Counsel.

Background and Purpose

The designs and uses of vessels and safety equipment have changed since the Federal regulations for carriage of personal flotation devices (PFDs) on recreational vessels were first issued or last revised and some of the requirements and exemptions may no longer be appropriate. After a comprehensive review of recreational boating safety regulations conducted at its May 1992 meeting, the National Boating Safety Advisory Council (NBSAC) recommended a number of changes to the safety equipment carriage requirements for recreational vessels (33 CFR part 175). Prior to that meeting, the Coast Guard received additional related suggestions from the National Association of State Boating Law Administrators (NASBLA) and the general public.

This rulemaking would change the existing regulations on PFD carriage requirements. These changes will provide the boating public with clearer, better consolidated, and more appropriate requirements for carrying personal flotation devices, and will promote a safer recreational boating environment.

Discussion of Proposed Amendments**1. Eliminate Type IV PFD as a Primary Device on Vessels Under 16'**

This proposal would amend 33 CFR 175.15 (PFDs required) to remove the Type IV PFD as a primary personal

flotation device on recreational vessels under 16 feet in length. The requirement for vessels 16 feet and over to carry a Type IV PFD in addition to a Type I, II, or III PFD for each person on board will be retained. This proposal would also remove the exemption language for canoes and kayaks to treat them like other recreational vessels.

The rulemaking setting PFD carriage requirements in 1973, allowing Type IV PFDs on vessels under 16 feet in length and on canoes and kayaks of any length, emphasized that these vessels were highly maneuverable and had limited storage space in which to stow a throwable device in addition to a wearable device for each person on board. However, the rulemaking also indicated that the Coast Guard would study the matter further. Statistics compiled by the Coast Guard for 1990 reveal that of 865 boating fatalities, there were 534 fatalities (62% of all recreational boating fatalities) where PFDs were not used, or where there were insufficient or no PFDs on board. These statistics also indicate that of the 865 boating fatalities, 368 fatalities involved vessels under 16 feet in length, the category of vessels directly affected by this rulemaking.

Given the high incidence of non-use of nonavailability of wearable (e.g., Type I, II, or III) PFDs on these vessels, it appears that the current regulations allowing carriage of Type IV (e.g., seat cushion) PFDs may not be sufficient. Therefore, more stringent requirements to carry Type I, II, or III PFDs are warranted. We also note that new PFD designs are more comfortable to wear.

This change was recommended by NBSAC in May 1988 and 1992, NASBLA in December 1989, and the National Water Safety Congress (NWSC) in March 1989.

2. Exemption From Preemption

Under 46 U.S.C. 4306, States and their political subdivisions may not establish, continue in effect, or enforce a law or regulation pertaining to recreational vessel safety standards or associated equipment that is not identical to Federal regulation, unless permitted by exemption under 46 U.S.C. 4305. This proposal would add a new § 175.5 (Exemption from preemption) to 33 CFR part 175 to formally allow States to require certain persons or a category of persons on certain types of vessels to carry or even to wear an appropriate PFD, as determined by the States. It would allow States to establish local PFD wearing or carriage requirements concerning children; recreational use of racing shells, rowing sculls, and racing

kayaks; and canoes, kayaks, sailboards, and personal watercraft.

A. Children

Current PFD carriage regulations allow use of a nonwearable Type IV PFD to meet carriage requirements for vessels under 16 feet in length. At least 19 States now require children under a certain age (ranging from 12 to 6 years of age) to wear a PFD while on a vessel due to concern for safety of young children. Young children lack the ability to don PFDs in emergency situations, and assistance from adult passengers in emergency situations may not be sufficient. Currently, a State requirement to wear a PFD is preempted by Federal regulations because it implies a wearable PFD carriage requirement in conflict with Federal regulations. Under this proposal, then, a State will no longer be preempted from requiring children to wear a PFD.

B. Racing Shells, Rowing Sculls, and Racing Kayaks

A current Federal exemption from PFD carriage requirements for racing shells, rowing sculls, and racing kayaks as a class of vessels preempts States from requiring PFDs to be worn during recreational (noncompetitive and noncompetitive practice) use of racing vessels. The original rulemaking emphasized that all of these vessels lacked space in which to stow lifesaving devices, that racing vessels were usually accompanied by other vessels, and that PFDs unduly impaired the rowers', scullers', or paddlers' movements. Now PFD designs are more comfortable and interfere less with physical activity, such as rowing, sculling, and paddling. Further, an increasing number of individuals use racing shells, rowing sculls, and racing kayaks for recreational (noncompetitive and noncompetitive practice) use, and instead of practicing and competing only under supervised conditions, seek out isolated stretches of waterways. In one State, a recreational rowing sculler died on an isolated stretch of river. For all of these reasons, this proposal will provide that States are no longer preempted from regulating the carriage or wearing of PFDs while operating a racing shell, rowing scull, or racing kayak for recreational (noncompetitive and noncompetitive practice) use.

C. Canoes and Kayaks

Currently, Federal regulations for recreational vessels, § 175.15(a), require canoes and kayaks of any length to carry a Type I, II, III, or IV PFD for each person aboard. Further, a provision in § 175.15(b) exempts canoes and kayaks

16 feet in length and over from having to carry a throwable PFD per boat in addition to a wearable PFD per person aboard. This exemption preempts States from requiring PFDs to be worn while operating a canoe or kayak. The original rulemaking emphasized that these vessels lacked space in which to stow lifesaving devices and that PFDs unduly impaired the paddlers' movements. Now PFD designs are more comfortable and interfere less with paddling. For these reasons, this proposal will provide that States are no longer preempted from regulating the wearing of PFDs while operating a canoe or kayak.

D. Sailboards

On July 17, 1980, the Coast Guard proposed a rule which would except operators of certain sailboards from the requirement to carry PFDs (45 FR 47876). Because of comments received primarily from State boating safety officials, the Coast Guard issued a withdrawal of this proposed rule on August 20, 1981 (46 FR 42288). In effect, this withdrawal action initiated an exemption from preemption for States regarding PFD carriage requirements for sailboards. Under the authority of section 9 of the Federal Boat Safety Act of 1971 (46 U.S.C. 4305) the withdrawal notice specifically exempted the States and their political subdivisions from section 10 of the Federal Boat Safety Act of 1971 (46 U.S.C. 4306), which provides for Federal preemption of inconsistent State regulations. Rather than continue to rely on this approach, which is arguably unclear given conflicting State court interpretations pertaining to sailboards, a specific preemption exemption has been placed in proposed § 175.5.

E. Personal Watercraft

Federal regulations for recreational vessels apply to personal watercraft, and require carriage of one PFD for each person on board. The designs of personal watercraft usually do not provide a space to store PFDs and, as a practical matter, most personal watercraft operators choose to wear a PFD rather than stow it. However, an increasing number of States are now requiring that a PFD be worn when operating a personal watercraft. For these reasons, a specific preemption exemption has been placed in proposed § 175.5, to clearly allow this State regulation.

3. PFD Carriage Exemptions

This proposal would relocate an existing exemption from the equipment requirements of 33 CFR part 175 for seaplanes, removing it from § 175.3 (Definitions) and placing it into § 175.1

(Applicability); revise an existing exemption for racing shells, rowing sculls, and racing kayaks in § 175.11 (Applicability); remove an existing exemption for canoes and kayaks 16 feet in length and over in § 175.15(b) (Personal flotation devices required); and add new exemptions for recreational submersibles and foreign competitors in § 175.17 (Exceptions).

A. Seaplanes

Current § 175.3 exempts seaplanes on the water from the definition of the term "vessel" and all of part 175, including subpart B (PFDs), as well. However, in a 1983 recodification of 46 U.S.C. subtitle II, the statutory definition of the term "vessel" in 46 U.S.C. 2101(45), which exempted seaplanes on the water, was changed to refer instead to 1 U.S.C. 3, which does not. Requiring seaplanes on the water to comply with U.S. Coast Guard equipment requirements in addition to the Federal Aviation Administration equipment requirements would be an unnecessary burden on seaplane owners and operators. This proposal would add an exemption provision to § 175.1 for seaplanes on the water to clarify that the exemption is continued, while providing for the consistency of definition at the same time.

B. Racing Shells, Rowing Sculls, and Racing Kayaks

As currently written, § 175.11 (Applicability) provides that subpart B (Personal Flotation Devices) does not apply at all to racing shells, rowing sculls, or racing kayaks. This proposal would remove the broad exemption from PFD carriage requirements now contained in § 175.11 and revise § 175.17 to provide an exception from PFD carriage requirements for these vessels only while engaged in competition or engaged in competition practice and accompanied by a tender equipped with PFDs for all crew members. The original rulemaking on the PFD carriage exemption for racing shells, rowing sculls, and racing kayaks as a class of vessels emphasized that these vessels lacked space in which to stow lifesaving devices and were usually accompanied by other vessels. Now, because practice often occurs without adequate supervision or assistance in the event of capsizing, the blanket exemption is not appropriate. In addition, newer PFD designs are more comfortable and interfere less with rowing, sculling, or paddling.

C. Recreational Submersibles

This proposal would exempt recreational submersibles from PFD carriage requirements. Current PFD carriage requirements reflect surface operating recreational vessels and do not account for recreational submersible operation. Further, there are no Coast Guard approved PFDs for recreational wet or dry submersibles and Coast Guard regulations only provide for approving inflatable PFDs for commercial vessel use. For these reasons, this proposal would amend § 175.17 to specifically exempt recreational submersibles from PFD carriage requirements.

D. Foreign Competitors

Current § 175.1 exempts from all of part 175, including subpart B (PFDs), foreign boats temporarily using waters subject to U.S. jurisdiction. However, Federal PFD regulations do not provide for foreign competitors complying with their own country's PFD requirements when using U.S. vessels (such as those donated for a competition). This proposal would add an exemption provision to § 175.17 for vessels of the United States used by foreign competitors in competition and related practice. As revised, § 175.17 would allow foreign competitors to use their own country's PFDs in competition, although those PFDs may not be Coast Guard approved.

Regulatory Evaluation

This proposal is not major under Executive Order 12291 and not significant under the "Department of Transportation Regulatory Policies and Procedures" (44 FR 11040; February 26, 1979). The Coast Guard expects the economic impact of this proposal to be so minimal that a full regulatory evaluation is unnecessary.

The Coast Guard has not compiled its own statistics on the number of vessels carrying only Type IV PFDs to meet the Federal PFD carriage requirements. However, based on the results of a national boating survey conducted by the American Red Cross and published in 1991, at least 60 percent of the individuals operating vessels under 16 feet in length reported wearing a PFD all or some of the time. This indicates that perhaps 40 percent of those surveyed carry either a Type IV PFD or no PFD at all, or carry but choose not to wear a Type I, II, or III PFD.

Type IV PFDs (cushion) and Type II PFDs are available at many boating supply stores at a cost of about \$8.00 and \$6.00, respectively. If 40 percent of the owners of the estimated 10 million

vessels under 16 feet in length (51% of 19.5 million total vessels) were each required to purchase 3 wearable PFDs as a result of this rulemaking, the one-time cumulative cost to the public may be as high as \$72 million. The actual cost may be less. It may be that many owners will only need to purchase 1 or 2 PFDs, or that the Type II PFDs purchased will be less expensive than the Type IV PFDs currently allowed. Furthermore, the cost of subsequent replacement of unserviceable wearable PFDs should not exceed the current cost of replacement of Type IV PFDs. The statistics compiled by the Coast Guard for 1990 indicate that of 865 boating fatalities, there were 534 fatalities where PFDs were not used, or where there were insufficient or no PFDs on board. These statistics also indicate that of the 865 boating fatalities, 366 fatalities involved vessels under 16 feet in length, the category of vessels directly affected by this rulemaking.

Taking into account the value of a human life, if as few as 10 percent of the 366 fatalities on vessels under 16 feet in length are saved annually, the benefits of requiring the carriage of wearable Type I, II, or III PFDs on all recreational vessels will exceed the one-time cost within two years. The Coast Guard expects the annual saving of lives to continue well beyond two years.

The Coast Guard considered three alternatives in developing the proposed rulemaking.

(1) *Take no action.* This alternative would retain the existing PFD carriage requirements in 33 CFR part 175 for recreational vessels. States would continue to be restrained from requiring individuals to carry or wear PFDs under certain circumstances for increased safety of life. The Coast Guard would continue an unclear policy of relying on a 1981 notice of withdrawal of a proposed rulemaking as a basis for the States' exemption from preemption regarding PFD carriage or wearing requirements for sailboards, racing shells, rowing sculls, and racing kayaks would remain exempt from Federal PFD carriage requirements as a class of vessels, even when used by individuals for isolated recreation. The States would continue to be restrained from requiring individuals to wear PFDs under certain circumstances for increased safety of life within the jurisdictional boundaries of the States.

(2) *Initiate a rulemaking project to revise 33 CFR part 175 to reflect suggested changes regarding PFD requirements for sailboards, racing sculls, personal watercraft, vessels under 16 feet in length, and use by children.*

(3) *Initiate a rulemaking project to revise 33 CFR part 175 to reflect suggested changes regarding Federal PFD requirements for sailboards, racing sculls, personal watercraft, vessels under 16 feet in length, and use by children; and add an exemption from preemption for States, allowing States to set local PFD requirements for increased safety of life.*

The Coast Guard selected alternative (3) in proposing these regulations because it provides the most comprehensive response and clarification, and at the same time, is a cost-effective approach, economically. Alternative (1), taking no action, would simply continue existing regulations that no longer adequately address current boating safety issues. Alternative (2) would provide much-needed remedies, however, it would not go far enough to relieve States from an unclear policy regarding States' exemption from preemption to regulate PFD wearing or carriage requirements on sailboards, personal watercraft, and other vessels.

Small Entities

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), the Coast Guard must consider whether this proposal, if adopted, will have a significant impact on a substantial number of small entities. "Small entities" include independently owned and operated small businesses that are not dominant in their field and that otherwise qualify as "small business concerns" under section 3 of the Small Business Act (15 U.S.C. 632). The overall impact of this proposal will be to provide clearer, better consolidated, and more appropriate requirements for carrying personal flotation devices on recreational vessels, for a safer recreational boating environment. This will not affect a substantial number of small entities. However, it may have a one-time financial benefit as high as \$72 million to PFD manufacturers and retailers, some of which may be small entities. It will primarily impact individual recreational boaters, since the main thrust of the proposal affects recreational vessels under 16 feet in length, PFD regulation of other small watercraft, and PFD regulation by the States. Because it expects the impact of this proposal to be minimal, the Coast Guard certifies under 5 U.S.C. 605(b) that this proposal, if adopted, will not have a significant economic impact on a substantial number of small entities.

Collection of Information

This proposal contains no collection of information requirements under the

Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*).

Federalism

The Coast Guard has analyzed this proposal under the principles and criteria contained in Executive Order 12612 and has determined that this proposal does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment. In fact, portions of it are designed to provide for additional regulatory discretion by the States. The National Association of State Boating Law Administrators has been consulted regarding the proposed exemption from preemption portion of this proposal.

Environment

The Coast Guard considered the environmental impact of this proposal and concluded that, under sections 2.B.2 (c) and (1) of Commandant Instruction M16475.1B, this proposal is categorically excluded from further environmental documentation. This proposal governs regulation of PFD carriage and use, and has no environmental consequences. A Categorical Exclusion Determination is available in the rulemaking docket for inspection or copying where indicated under ADDRESSES.

List of Subjects in 33 CFR Part 175

Marine Safety.

For the reasons set out in the preamble, the Coast Guard proposes to amend 33 CFR part 175 as follows:

PART 175—EQUIPMENT REQUIREMENTS

1. The authority citation for part 175 is revised to read as follows:

Authority: 46 U.S.C. 4302, 4305, 4306, 49 CFR 1.46

2.-3. In § 175.1, paragraph (e) is added to read as follows:

§ 175.1 Applicability.

(e) Seaplanes on the water.

4. Section 175.3 is revised to read as follows:

§ 175.3 Definitions.

As used in this part:

Boat means any vessel manufactured or used primarily for noncommercial use; leased, rented, or chartered to another for the latter's noncommercial use; or engaged in the carrying of six or fewer passengers.

Passenger means every person carried on board a vessel other than:

- (1) The owner or his representative,
- (2) The operator,
- (3) Bona fide members of the crew engaged in the business of the vessel

who have contributed no consideration for their carriage and who are paid for their services; or

(4) Any guest on board a vessel which is being used exclusively for pleasure purposes who has not contributed any consideration, directly or indirectly, for his carriage.

Personal Watercraft means a vessel, less than 16 feet in length, propelled by machinery that is designed to be operated by a person sitting, standing or kneeling on the vessel, rather than being operated by a person sitting or standing inside the vessel.

Racing shell, rowing scull, and racing kayak means a manually propelled vessel that is recognized by national or international racing associations for use in competitive racing and one in which all occupants row, scull, or paddle, with the exception of a coxswain, if one is provided, and is not designed to carry and does not carry any equipment not solely for competitive racing.

Recreational vessel means any vessel being manufactured or operated primarily for pleasure; or leased, rented, or chartered to another for the latter's pleasure. It does not include a vessel engaged in the carrying of six or fewer passengers.

Sailboard means a sail propelled vessel with no freeboard and equipped with a swivel mounted mast, not secured to a hull by guys or stays.

Use means operate, navigate, or employ.

Vessel includes every description of watercraft used or capable of being used as a means of transportation on the water.

5. A new § 175.5 is added to subpart A to read as follows:

§ 175.5 Exemption from preemption.

The States are exempted from preemption regarding establishing, continuing in effect, or enforcing State laws and regulations on the wearing or carriage of personal flotation devices concerning the following subject areas within the jurisdictional boundaries of the State:

- (a) Children under a certain age.
- (b) Operating a canoe or kayak.
- (c) Operating a racing shell, rowing scull, or racing kayak for recreational (noncompetitive or noncompetitive practice) purpose.
- (d) Operating a sailboard.
- (e) Operating a personal watercraft.

6. Section 175.11 is revised to read as follows:

§ 175.11 Applicability.

This subpart applies to all recreational vessels that are propelled

or controlled by machinery, sails, oars, paddles, poles, or another vessel.

7. Section 175.15 is revised to read as follows:

§ 175.15 Personal flotation devices required.

Except as provided in § 175.17:

(a) No person may use a recreational vessel unless at least one PFD of the following types is on board for each person:

- (1) Type I PFD,
- (2) Type II PFD, or
- (3) Type III PFD.

(b) No person may use a recreational vessel 16 feet or more in length unless one Type IV PFD is on board in addition to the number of PFD's required in paragraph (a) of this section.

8. Section 175.17 is revised to read as follows:

§ 175.17 Exceptions.

(a) A Type V PFD may be carried in lieu of any PFD required under § 175.15, provided:

(1) The approval label on the Type V PFD indicates that the device is approved:

(i) For the activity in which the vessel is being used; or

(ii) As a substitute for a PFD of the Type required on the vessel in use;

(2) The PFD is used in accordance with any requirements on the approval label; and

(3) The PFD is used in accordance with requirements in its owner's manual, if the approval label makes reference to such a manual.

(b) Racing shells, rowing sculls, and racing kayaks are exempted from the carriage of any PFD required under § 175.15, provided:

(1) The vessel is engaged in competition; or

(2) The vessel is engaged in competition practice and is accompanied by a tender equipped with PFDs for all vessel crew members.

(c) Sailboards and recreational submersibles are exempted from the carriage of any PFD required under § 175.15.

(d) Vessels of the United States used by foreign competitors while practicing for or racing in competition are exempted from the carriage of any PFD required under § 175.15.

Dated: October 30, 1992

W.J. Ecker,

Rear Admiral, U.S. Coast Guard, Chief, Office of Navigation Safety and Waterway Services
(FR Doc. 92-27097 Filed 11-6-92; 8:45 am)

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Appendix G

Safety Board's Comments on Coast Guard NPRM Regarding Recreational Boating Safety Equipment Requirements



National Transportation Safety Board

Washington, D.C. 20594

Office of the Chairman

FEB 1 1993

Executive Secretary, Marine Safety Council
(G-LRA/3406) (CGD 92-045)
U.S. Coast Guard Headquarters
2100 Second Street, S.W.
Washington, D.C. 20593-0001

Dear Sir:

The National Transportation Safety Board is pleased to respond to the Notice of Proposed Rulemaking (NPRM) published in the Federal Register on November 9, 1992. This NPRM proposes to change a number of Federal requirements and exemptions for carriage of personal floatation devices (PFDs) on recreational vessels. Further, it would eliminate Federal preemption of State boating safety laws related to PFD wearing or PFD carriage.

The Safety Board believes that the implementation of the proposed rule will aid those States that wish to enact their own boating safety regulations that would surpass the Federal regulations. The Board agrees that because current Federal regulations contained in 46 U.S.C 4306 prohibit the States from establishing or enforcing recreational boating standards that differ from the Federal regulations unless permitted by exemption, State boating laws could be unclear and confusing to the public.

The statutes and regulations in the 19 States and one territory that currently require children under a certain age to wear a PFD are in conflict with the Federal regulations. The Coast Guard's proposal to add 33 CFR 175.5, Exemption from Preemption, to the current regulations would remove this conflict and would permit the States' and territories to enact boating laws that are more stringent than the Federal requirements.

In 1983, the Safety Board investigated an accident that occurred in Morro Bay, California where the use of PFDs was a safety issue. The SAN MATEO, a small passenger vessel used for whale watching expeditions, capsized in heavy swells at the harbor entrance¹. A total of 32 persons, 23 children and 9 adults, were thrown into the water without PFDs. As a result, the Safety Board issued 3 safety recommendations, one of which, M-83-80, would have required children aboard small passenger vessels to wear PFDs when departing protected waters. The Coast Guard did not concur with the Safety Board's recommendation. The proposed amendments will give the States and territories the opportunity to enact their own boating safety regulations, more suited to the risks in their waters, concerning the use of PFDs by children.

¹ See Marine Accident Report--"Capsizing of the Charter Passenger Vessel SAN MATEO, Morro Bay, California, February 16, 1983" (NTSB/MAR-83/09)

The Board also supports removal of exemptions from PFD carriage requirements for racing shells, rowing sculls, racing kayaks, canoes and kayaks, sailboards, and personal watercraft that preclude the States and territories from effectively regulating the use of PFDs aboard these vessels.

The Safety Board strongly urges the elimination of Type IV PFDs as primary personal floatation devices aboard recreational boats less than 16 feet in length. The change is needed because persons accidentally falling overboard may panic and be unable to get to a throwable PFD, usually a boat cushion, found in many of those recreational boats under 16 feet in length. Persons falling overboard in cold water rapidly lose their ability to grasp a Type IV PFD. Coast Guard boating fatality statistics for 1990 indicate that in 42 percent of the recreational boating fatalities no PFD was used. Abolishing the Type IV PFD as a primary lifesaving device aboard recreational boats less than 16 feet in length may increase the use of wearable PFDs. The Safety Board agrees with the Coast Guard's position that PFD's would more likely be worn in small boats if the Type IV cushions are no longer acceptable as primary lifesaving devices. The Safety Board is presently preparing a study on recreational boating safety that will address methods to reduce recreational boating accidents and fatalities.

The Safety Board appreciates the opportunity to present its views on this proposed rulemaking.

Sincerely,

Original Signed By
Carl W. Vogt

Carl Vogt
Chairman

Enclosure

Appendix H
Current State PFD Usage Requirements

Table 8—State and U.S. Territory requirements for wearing personal flotation devices (PFD)^a

State and U.S. Territory	Youth	Water skiers	Others
Alabama			Within 800 feet below hydroelectric dam.
Alaska	No PFD requirements		
Arizona	12 and younger		
Arkansas	No PFD requirements		
California	No PFD requirements		
Colorado			Operator, crew, and all passengers aboard vessel during commercial trip.
Connecticut		Yes	Personal watercraft.
Delaware	12 and younger		Personal watercraft.
Florida	Younger than 6 in boats less than 26 feet		Personal watercraft.
Georgia	No PFD requirements		
Hawaii	No PFD requirements		
Idaho	No PFD requirements		
Illinois	No PFD requirements		
Indiana	No PFD requirements		
Iowa	No PFD requirements		
Kansas	12 and younger		
Kentucky		Yes	
Louisiana	12 and younger		Personal watercraft.
Maine			Personal watercraft.
Maryland		Yes	Personal watercraft; sailboarder must wear flotation wetsuit in fall and winter; specific application for PFD use on some State waters.
Massachusetts			Personal watercraft; everyone in canoes and kayaks between September 5 and May 15.

(continued)

Table 8—State and U.S. Territory requirements for wearing personal flotation devices (PFD)^a (continued)

State and U.S. Territory	Youth	Water skiers	Others
Michigan			Personal watercraft.
Minnesota			Personal watercraft.
Mississippi	12 and younger		
Missouri	7 and younger		
Montana	Younger than 12		Personal watercraft.
Nebraska	Younger than 12		
Nevada		Yes	Personal watercraft.
New Hampshire	6 and younger		Personal watercraft.
New Jersey		Yes	Personal watercraft.
New Mexico			Everyone in white water rafts, ice sailboats, surfboards, kayaks, canoes, rubber crafts, or air mattress on any waters, and in boats on rivers.
New York	Younger than 12 in boats less than 26 feet		Personal watercraft.
North Carolina	No PFD requirements		
North Dakota	10 and younger in boats less than 27 feet		
Ohio	Younger than 10 in boats less than 18 feet		
Oklahoma	12 and younger in boats less than 27 feet		Personal watercraft.
Oregon			Personal watercraft.

(continued)

Table 8—State and U.S. Territory requirements for wearing personal flotation devices (PFD)^a (continued)

State and U.S. Territory	Youth	Water skiers	Others
Pennsylvania	Younger than 9 on Fish Commission and State Park lakes		Personal watercraft.
Rhode Island	10 and younger in boats less than 26 feet		Personal watercraft.
South Carolina	No PFD requirements		
South Dakota	No PFD requirements		
Tennessee			Personal watercraft; for all persons below dams or hazardous waters.
Texas	Younger than 13		Personal watercraft.
Utah	Younger than 12 in vessels less than 19 feet or if outside cabin in vessels over 19 feet		Everyone on all rivers, except where designated flat, must wear Type I or Type III. If carrying passengers for hire on these rivers, must wear Type I. Everyone on waterjets or sailboards.
Vermont	Younger than 12 while underway and on an open deck		Personal watercraft.
Virginia		If no observer in boat	Personal watercraft.
Washington			Personal watercraft; two counties require everyone on boats, inner tubes, etc., on moving water.
West Virginia			Everyone on white water.
Wisconsin			Personal watercraft.
Wyoming	No PFD requirements		

(continued)

Table 8—State and U.S. Territory requirements for wearing personal flotation devices (PFD)^a (continued)

State and U.S. Territory	Youth	Water skiers	Others
District of Columbia			Everyone younger than 18 in vessel when 18-year-old or younger is operator.
American Samoa	No PFD requirements		
Guam	No PFD requirements		
Northern Mariana Islands	No PFD requirements		
Puerto Rico	10 and younger		
Virgin Islands	No PFD requirements		

^a The requirements presented are current as of December 15, 1992.

Source: Balistreri Consulting, Zephyrillus, Florida. (Data presented by Susan Balistreri at the 33rd annual conference of the National Association of State Boating Law Administrators, Springfield, Missouri, October 7, 1992, and additional data obtained in subsequent telephone conversation with Susan Balistreri.) Data are used with permission.

Appendix I

American Academy of Pediatrics Position on Use of PFDs for Children



Life Jackets and Life Preservers

If your family enjoys boating, sailing, and canoeing on lakes, rivers, and streams, be sure your children wear the correct life jackets. If you do, they will be able to take part in these activities safely.

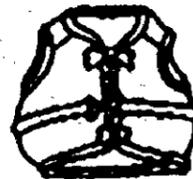
Many children and adolescents think life jackets and life preservers are hot, bulky, and ugly. This is no longer true. Newer models look better, feel better, and are safe.

Life preservers and life jackets are required by many states and must be present on all boats traveling on bodies of water supervised by the US Coast Guard.

Parents should choose from the following life jackets or life preservers approved by the US Coast Guard. They are:

LIFE JACKETS

- **TYPE 1:** This jacket floats the best. It is designed to turn most unconscious persons in the water from the face-down position to an upright and slightly backward position. This jacket will help the person to stay in that position for a long time. It is to be used in open water and oceans. It is available in only 2 sizes: one size for adults more than 90 lb, and one for children less than 90 lb.
- **TYPE 2:** This jacket turns the wearer to an upright and slightly backward position, but not as much as Type 1. It may not always cause unconscious people to float face up. It is comfortable and comes in many sizes for children. This is the best kind of life jacket to wear on bodies of water where people are boating, fishing, and doing other water activities.



continued on the reverse side



American Academy of Pediatrics



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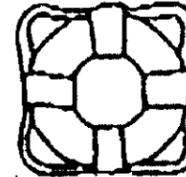
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LIFE PRESERVERS

- **TYPE 3:** This jacket is designed so the wearer can get himself/herself in an upright and slightly backward position and stay in that position. It is very comfortable and comes in many styles. This life jacket is ideal for water sports, and should be used only when it is expected that the child could be rescued quickly.



- **TYPE 4:** A life preserver is a cushion or ring, and is not worn. They are designed to be used in two ways. It can be grasped and held until the user is rescued, or it can be thrown to someone who is in trouble in the water, until he or she is rescued. It should not be used by children or by those who do not swim. Check the label on the life preserver to be sure it meets US Coast Guard or state regulations.



Use only life jackets and life preservers that are tested by Underwriters Laboratories and approved by the US Coast Guard. If they are, they will have a label that says so.

Remember, unless your children wear or use them, life jackets and life preservers will not protect them. Also, life jackets and life preservers should never be a substitute for adult supervision.

ALWAYS REMEMBER THESE TIPS:

- Your children should wear life jackets at all times when on or near the water.
- Teach your child how to put on his/her own life jacket.
- Make sure your child is comfortable wearing a life jacket and knows how to use it.
- Make sure the life jacket is the right size for your child. The jacket should not be loose. It should always be worn as instructed with all straps belted.
- Blow-up water wings, toys, rafts, and air mattresses should never be used as life jackets or life preservers. They are not safe.

The information contained in this publication should not be used as a substitute for the medical care and advice of your pediatrician. There may be variations in treatment that your pediatrician may recommend based on the individual facts and circumstances.

Appendix J

State Requirements for Boating Safety Education

Table 9—State and U.S. Territory requirements for boating safety education and certificates

State and U.S. Territory	Boating safety education certificate and/or supervision	Horse power	Boating safety education
Alabama	Certificate or supervision for 12 and younger.		
Alaska			
Arizona	Younger than 12 must be supervised to operate a motor vessel with 8 hp or more.		
Arkansas	12 and younger must be supervised to operate a motor vessel with 10 hp or more.		
California			
Colorado			
Connecticut	By October 1, 1992, certificate for operators younger than 20. By October 1, 1997, certificate for all operators.		Yes; includes operators of personal watercraft.
Delaware			
Florida			
Georgia			
Hawaii			
Idaho			
Illinois	Certificate for 11-18 years to operate boats without supervision.		Yes; includes operators of personal watercraft.
Indiana			Yes
Iowa			
Kansas	Certificate or supervision for 12 and younger.		

(continued)

Table 9—State and U.S. Territory requirements for boating safety education and certificates (continued)

State and U.S. Territory	Boating safety education certificate and/or supervision	Horse power	Boating safety education
Kentucky			
Louisiana			
Maine	Younger than 12 must be supervised to operate a motor vessel with 10 hp or more.		
Maryland	Certificate for anyone born after July 1, 1972, to operate any type of vessel.		Yes
Massachusetts	Certificate for younger than 18 to operate boats more than 25 hp without supervision.		Yes
Michigan	Certificate for 12-17 years to operate boats 6 hp or more; younger than 12 must have supervision in boat.		Yes
Minnesota	Certificate for 13-17 years to operate boats without supervision. Younger than 13 must be supervised to operate a motor vessel with 24 hp or more.		Yes; includes operators of personal watercraft.
Mississippi			
Missouri			
Montana			
Nebraska			
Nevada			
New Hampshire			
New Jersey	Certificate for 16 and younger. ^a		Yes
New Mexico			Yes
New York	Certificate for 10-17 years.		
North Carolina			

(continued)

Table 9—State and U.S. Territory requirements for boating safety education and certificates (continued)

State and U.S. Territory	Boating safety education certificate and/or supervision	Horse power	Boating safety education
North Dakota	Certificate for 12-15 years to operate boats more than 10 hp.		
Ohio			
Oklahoma			
Oregon			
Pennsylvania			
Rhode Island			Yes
South Carolina			
South Dakota			
Tennessee			
Texas	Certificate for younger than 13 to operate boats more than 15 hp if not supervised by adult.		Yes
Utah			
Vermont	Certificate for anyone born after July 1, 1974, to operate a power boat.		Yes
Virginia			
Washington			
West Virginia			
Wisconsin	Certificate for 12-16 to operate motor vessel alone.		Yes
Wyoming			
(continued)			

Table 9—State and U.S. Territory requirements for boating safety education and certificates (continued)

State and U.S. Territory	Boating safety education certificate and/or supervision	Horse power	Boating safety education
District of Columbia	Certificate for younger than 16.		
American Samoa			
Guam			
Northern Mariana Islands			
Puerto Rico			Yes
Virgin Islands			

* New Jersey requires a recreational boat operator's license for operators of power vessels who are engaged in sports fishing on nontidal waters.

Sources: (a) Chris Pattarozzi. 1992. Boater education, certification, and licensing. In: *Recreational boating safety: State policies and programs*. Denver, CO: National Conference of State Legislatures: 10. Chapter 2. (b) National Association of State Boating Law Administrators. 1991. *Small Craft Advisory* 6(2). February-March.

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