

Best Practices in Boater Safety Education

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Abstract – This paper describes boater safety education programs in the United States. Boater safety education differs from other forms of environmental education considered in this document in its emphasis on safety as opposed to environmental stewardship. Environmental issues are often included in boater education programs, but receive much less emphasis than other topics related to safe boat operation. Recreational boating education in the United States is offered through a system of government agencies and non-government organizations, including the boating industry. The “best practices” in boater safety education include means of ensuring the *availability* of educational programs, ensuring the *content* and *quality* of the educational programs, getting more people to *obtain* the education, and finally, getting people to *act on what they learn*. The best practices include development of educational programs that are age- appropriate and suitable for boaters of all skill levels (including instructors), compliance with official boating education standards, and provision of boating courses through a variety of means (including traditional classes, self study and on-line courses). Commonly used specific practices include videos, practice examinations, provision of materials and equipment (such as loaner lifejackets for kids), mascots, incentives, and special events. There is a trend towards mandatory boater education, as more states are enacting laws requiring education for certain groups of boaters. At present, the best practices in boater education are defined primarily in terms of consensus of professional judgment or frequency of use. More research is needed to document the relationships between education/knowledge, boater attitudes and behavior, and the effectiveness of various educational approaches.

Introduction

Alabama recorded 11 boating fatalities during the first six months of 1999, despite a comprehensive boating safety law and ongoing efforts to teach boating and water safety. Consistent with national accident statistics, most of the fatalities involved capsizing, falls overboard, and people not wearing their personal flotation devices. The situation was described by *Small Craft Advisory* magazine (volume 14 (5): p. 17) as a “text-book example of lawmakers being unable to legislate against foolishness.”

Many boating accidents could have been avoided if boaters “had only followed the rules of the road” (Louisiana officer Robert Duthu, quoted in *Small Craft Advisory* 14 (5): 21). Boating safely requires knowing the rules and abiding by them. There are two basic approaches to reducing fatalities, injuries, and property damage related to water-based recreation: education and enforcement. The two are inter-related and usually under the jurisdiction of the same agencies. Education is fundamental and lays the foundation for safe boating behavior. Enforcement can serve two roles, first as a deterrent to unsafe and illegal boating behaviors and secondly as an opportunity for education through interaction between agency officers and the boating public.

This paper focuses on “Best Practices” in boater safety education. The best practices must address many issues, including (from easiest to most difficult): ensur-

ing the *availability* of educational programs, ensuring the *content* of educational programs (through educational standards, etc.), ensuring the *quality* of education programs (through recruitment and training of instructors), getting more people to *obtain* the education (both forcibly through legislation and voluntarily through promotions, incentives, etc.), and finally, getting people to *act on what they learn* (e.g. getting them to actually wear their life jackets, which could prevent up to 80% of drownings). This latter objective requires understanding the relationships between education/knowledge, attitudes, and ultimately, boater behavior.

The Boating Education System

Recreational boating education in the United States is offered through a longstanding “partnership” between the federal government, state and local government agencies, and a vast collection of non-government organizations. At the federal level, the U.S. Coast Guard administers applicable federal law and a grants program enabling other agencies and organizations to pursue boating-related initiatives.

The Federal Boat Safety Act of 1971 was intended to promote greater uniformity, reciprocity and comity among the states and the federal government. The act defined the roles of the federal and state government relative to boater safety education. In 1982, the Coast Guard Roles and Missions Study conducted by the

Table 1. Goals of Pennsylvania's Recreational Boating Safety Program

1. Reduce complaints about, and improper operation by, personal watercraft operators by increasing the number of operators receiving boating safety information in courses.
 2. Certify 30,000 students to partially implement the requirements of the new personal watercraft regulation.
 3. Certify 100 new boating safety instructors to teach boating courses and administer the new Boating Safety Education Certificate Examination Program (PWC Equivalency Exam).
 4. Monitor the mandatory education issue for other powerboats while promoting the voluntary Pennsylvania Basic Boating Course.
 5. Maintain the Volunteer Incentive Program (VIP) to prevent instructor burnout and encourage volunteer instructors to continue to teach. This program provides small gifts such as personal PFDs, ball caps, instructor shirts and "Trout Stamp" prints as an incentive to continue to participate in the program.
 6. Continue to promote the Boating and Water Safety Awareness Program to schools. Incorporate the program into existing school curriculums by providing schools with the lesson plan in a modular format. Certify 2,000 students.
 7. Develop a home study guide so interested boaters can better understand the importance of boating safety concepts. Give them the opportunity to test their boating knowledge.
 8. Continue to offer the Water Rescue Training Program to train water rescue volunteers and professionals in proper rescue techniques.
 9. Continue to foster a close working relationship with the U.S. Coast Guard Auxiliary and the U.S. Power Squadron's education programs for boater safety certification. Make certain that all Auxiliary Flotillas and U.S. Power Squadrons in Pennsylvania receive an update with certification instructions.
 10. Continue to teach the Commission's Professional Boating and Water Safety Program to agency employees and other Pennsylvania state employees who work on, near, or in the water.
 11. Promote safe boating habits and increase the knowledge of boaters through the production and distribution of boating safety literature through the mail, boat and sports shows, and other outlets. Continue to update the safety brochures, information sheets, and the Boating Handbook to ensure that boaters have up-to-date information on current boating laws and safety information. Provide a copy of the Boating Handbook to all first time boat owners, participants in Commission boating courses, and all owners of personal watercraft.
 12. Maintain a video library available to boating safety instructors, various organizations, clubs, and individuals from across the Commonwealth.
 13. Promote boating safety through news releases, radio advertisements, public service announcements, and radio and TV interviews.
 14. Provide all liveries with instructions for implementing the new Commission regulation concerning mandatory boating safety education briefings to their customers.
 15. Provide all personal watercraft dealers with instructions for implementing the new Commission regulation concerning issuance of temporary Boating Safety Education Certificates to their customers for completing the Commission's new Dealer Boating Education Program.
 16. Continue the U.S. Coast Guard Auxiliary Grant Program to further promote boating safety through the support programs administered by the Auxiliary. The Commission has traditionally distributed up to \$25,000 to the Auxiliary to support the expansion of their programs.
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Source: http://sites.state.pa.us/PA_Exec/Fish_Boat/uscg99rp.htm

Office of Management and Budget concluded that the states should assume primary responsibility for recreational boating enforcement and education.

State Boating Education Programs

Boater safety education is offered in every state, although the agencies responsible for this function and methods of delivering the education vary considerably from state to state. Some states offer their own courses through their designated boating education agency, others accept courses offered by various organizations or cooperate with these organizations to deliver state-specific versions of a basic boating course, and others utilize a combination of approaches. Boating classes are but one part of the typical state boating education program. Table 1 demonstrates the breadth of activities within one state's (Pennsylvania) recreational boating safety program. It is notable that the goals of this program address many of the "best practice" issues mentioned earlier and include some quantitative targets or standards.

Boating Organizations

There are many organizations that focus on boating safety. Some of the key organizations and the boating education courses that they offer are described below:

National Water Safety Congress

The National Water Safety Congress is a non-profit organization dedicated to promoting recreation water safety in the United States. The Congress was organized in 1951 in response to a growing number of recreation related drownings. The membership of the Congress includes water safety specialists from federal, state, and local governments, water/flood control authorities, water oriented utility companies, public safety agencies, water safety councils, and private individuals. The purpose of the National Water Safety Congress is:

- To eliminate or reduce the number of water-related recreational accidents, injuries, and fatalities in the United States.
- To instill water safety awareness in recreational users of our nation's waters.
- To develop a network of water safety professionals throughout the country.
- To establish or improve working relationships between federal, state, local agencies, organizations and individuals interested in water safety.
- To educate members and the public on current water safety initiatives and problems.

Annually, the National Water Safety Congress and the National Safe Boating Council host an International

Summit. The goal of the International Boating and Water Safety Summit is twofold:

- To impact the safer use of on-the-water activities through public education and a more effective means of transferring information among boating specialists, education coordinators, waterway managers and user groups and individuals.
- To offer professional-level training workshops for federal, state, and local boating and water safety education and management personnel.

National Safe Boating Council

The National Safe Boating Council, Inc. (NSBC) was organized in September 1958 under the name, National Safe Boating Committee. The NSBC presently has a membership of over 290 U.S. and Canadian organizations with an interest in boating safety and education. Approximately 65% of NSBC membership is non-profit organizations and 35% is for-profit organizations. The mission of the NSBC is to reduce accidents and enhance the boating experience. The National Safe Boating Council accomplishes this mission by:

- Conducting a series of on-going National Campaigns to promote Safe Boating.
- Providing opportunities to work directly with national and international leaders in boating education.
- Improving the professional development of boating safety educators.
- Distributing safe boating information.
- Developing and recognizing outstanding boating safety programs.
- Supporting research initiatives that strengthen boating education and safety awareness.

National Association of State Boating Law Administrators

The goal of the National Association of State Boating Law Administrators (NASBLA) is to ensure safe and enjoyable boating for all who use the nation's waters. NASBLA's mission is to protect, promote and enhance safe and enjoyable boating and to foster partnerships and cooperation among recreational boating safety interests. NASBLA accomplishes this mission through a variety of initiatives, including advocating fair and equitable laws that provide uniformity and reciprocity among states in water safety and management, working for fair and wise use of federal funds for recreation boating safety programs, and establishing standards for boater safety education. NASBLA's Education Committee oversees the Minimum Standards for Boating Safety Education program. This includes reviewing and

Table 2. Summary of NASBLA Approved Non-State Boating Safety Courses		
Organization	Name of Course	Valid Through
Alabama Traffic Safety Center University of Montevallo	Alabama Boating Basics -- A Guide to Responsible Boating	2003
American Marine Training Stratford, CT	Basic Boating & Safety	2000
American Power Boating Association	Boating Fundamentals	2002
American Sailing Association	Basic Keelboat Sailing	2003
Bayshore Books	Toward Safer Boating -- 48	2001
BOATCLASS.COM	Boater & PWC Safety Course	2003
BoatEd	Boat America: A Course on Responsible Boating	2003
BoatEd Inc. Dallas, Texas	Boat Georgia	2001
	Boat South Carolina	2002
Boating Ed & Charter Service, Beacon Falls, CT	Basic Boating Safety Certification	2000
Boating Safety Educators of America	Basic Boating Safety	2001
Boating Safety School of Florida	Boating Safety Course	2000
Boating Safety Institute of America	Boating Basics	2001
BoatUS	On-line Boating Safety Course	2002
Boatwise	Boating Basics and Safety	2001
Canadian Power & Sail Squadrons	Boating Course	2003
	The Boat Pro Course	2001
CEERI (Florida)	BoaterEd	2002
Chapman School of Seamanship, Stuart, FL	Evening Mini-Course (Florida)	2001
	Florida Boating Basics Course	2002
	PWC Basic Boating Course	2002
Chelsea Sailing, Inc.	Seamanship/Boating Basics	2000
City of Bridgeport Harbor Master's Office	Boating Basics: A Guide to Responsible Boating	2002
Coast Boating School	Safe Boating Course	2002
Coastal Yachting Academy	Practical Boating Safety, Seamanship & Navigation	2002

Organization	Name of Course	Valid Through
Connecticut Boating Education	Safe Boating Course/PWC	2003
Connecticut Safe Boating, LLC	Basic Boating Safety	2002
	Basic Boating Safety & PWC Operation	2002
Corcoran, Raymond	Corky's Boating Basic Course/Connecticut	2001
Don Fleming Yacht Services	Don Fleming Yacht Services Basic Safe Boating Course - CT	2001
Empire Safety Council	Boating Safety Course	2002
Garden State Safety Council	Boating Safety Course	2001
Green Marine Services	Basic Safe Boating	2002
International Sail & Power Academy	Safe Boating CD-Rom	2003
Lighthouse Marine Service	Boat America: A Course on Responsible Boating for North Carolina	2003
	Boating Course for South Carolina	2003
Longshore Sailing School, Westport, Connecticut	Connecticut Boaters Guide	2001
Lytekeeper Marine Services	Basic Safe Boating/PWC Certification	2003
Mystic Safe Boating	Safe Boating Basics Course	2002
NASISS, Middletown, NJ	Recreational Boating Safety	2001
Nautical Know How Training Services	Nautical Know How Basic Boating	2002
New England Maritime	Maritime Boating Safety Course	2001
New England School of Boating	Connecticut Safe Boating	2002
Northeast Marine Services, Pawcatuck, CT	Safe Boating Course	2002
Rhode Island Maritime School	Toward Safer Boating	2002
Safe Boating Institute, Inc.	Safe Boating	2002
Safety Resources	Connecticut Basic Boating	2002
Safe-Sea Marine Services	Basic Seamanship & Boat Handling	2002
Sound Environment Associates	Learn from the Dolphins	2002
Toledo Community Boating Education Center	Basic Power Boating	2001
US Coast Guard Auxiliary	Boating Skills/Seamanship (11th)	2001
	Boating Safely (Mosby)	2000
	Skipper's Safe Boating Course (Mosby)	2000

Organization	Name of Course	Valid Through
US Sailing Association, Newport RI	Small Boat Sailing Instructor	2000
	Basic Keelboat Student Course	2000
University of North Carolina/Wilmington	Motorboat Handling	2000
US Power Squadrons	Squadrons Boating Course	2003
	For Sail & Power (video)	2002
	Boat Smart	2003
Vineyard Maritime	Safe Boating Course	2003
Watercraft Training Center (Canada)	Smart Rider/Operator Proficiency Course	2002
Westrec Yachting Center	Yacht Pro	2000

Source: http://www.nasbla.org/state_courses.htm

approving recreational boating safety courses. The Education Committee also participates in joint efforts with the National Safe Boating Council (NSBC) on National Safe Boating Week and the International Boating and Water Safety Summit. The committee is currently developing a Reference Guide to State Boating Education Laws and Regulations.

Non-State Courses

Boating organizations offer various types of courses and instruction in different formats, including classroom and field-based seminars, multi-lesson courses, self study, and on-line courses. As an inducement to participation, boating safety courses are usually free of charge (some may charge a small fee for materials, room rental, or postage and handling). A comprehensive listing of non-state courses approved by the National Association of State Boating Law Administrators (NASBLA) is provided in Table 2. Some of the courses offered by selected major boating-related organizations are described below to illustrate the educational opportunities.

The U.S. Coast Guard Auxiliary

The Coast Guard Auxiliary is one of the major providers of boating safety courses nationwide. In 1999, the Auxiliary reaffirmed the priority of its historic mission of providing boating safety programs to the public (McAdams, 1999). Seminar courses offered by the Auxiliary include:

- Boating Fun – Adventure on the Water – introducing basic safety concepts to children in grades K-3.
- Waypoints – A Guide to Boating Safely– for older children and youths in grades 4-6.
- Personal Watercraft – for those who want a brief, very basic introduction to the safety issues involved when operating a PWC.
- Navigating with GPS – for those who want a brief, very basic introduction to navigating with GPS.
- Boating Safely is a multi-lesson (eight-hour) course designed to appeal to hunters, anglers, personal watercraft operators and other boaters who cannot find time for a full, comprehensive course. Boating Safely was developed by the U. S. Coast Guard Auxiliary in cooperation with the US. Power Squadrons and Mosby Lifeline, and is approved by the National Association of State Boating Law Administrators (NASBLA). It is also approved by most of the states that require formal instruction in order to operate a boat. Course topics include: introduction to boating, boating laws, personal safety equipment, safe boat handling, navigation, boating problems, trailering, storing, and protecting your boat, hunting/fishing, water skiing, and river boating.
- Other multi-lesson courses offered by the Coast Guard Auxiliary include Boating Skills and Seamanship (for both beginning and experienced

power boaters), Sailing Fundamentals (also known as Sailing and Seamanship), Basic Coastal Navigation (an introduction to coastal piloting), and Advanced Coastal Navigation (for serious boaters who want to learn piloting techniques). The C.G. Auxiliary also offers the Skipper's Safe Boating Course, a self-paced, home-study course that provides a basic introduction to boating. United States Power Squadrons

The United States Power Squadrons (USPS) is a non profit, educational organization dedicated to making boating safer and more enjoyable by teaching classes in seamanship, navigation and related subjects. USPS has about 60,000 members organized into 450 squadrons across the country and in some US territories. This organization's name dates back to its founding in 1914 by the power boat division of the Boston Yacht Club. Currently, USPS lists itself as *America's Boating Club* for sail and power boating, and more than 40% of its members are sailors.

USPS makes a number of educational courses, both instructor led and self learning, available to the public as well as its members. The Squadron Boating Course and Boat Smart are instructor led courses given locally by individual squadrons. The USPS boating course is also available for home study on a video. Members can enroll in advanced courses on Seamanship, Piloting, Celestial Navigation, Weather, Sailing, Engine Maintenance, Marine Electronics and Cruise Planning. In addition, USPS offers more than two dozen self study courses on such subjects as Water Sports, Boat Insurance, Oceanography, Introduction to Sailing, and Preparation for Coast Guard Licensing.

An innovative feature on the USPS internet site is the link to a national safe boating test, designed to allow boaters to test their boating knowledge using a self-marking quiz. Made possible through a grant from the Aquatic Resources Trust Fund administered by the U.S. Coast Guard, this site includes a series of pictures illustrating various aspects of boating safety. The site also introduces the new interactive electronic America's Boating Course, co-produced by USPS and the U.S. Coast Guard Auxiliary. In addition to the website, the national safe boating test will be broadcast on prime time television three times during National Safe Boating week (May 19-26, 2001). Following the broadcast, USPS will distribute 10,000 videos to various boating-related organizations. USPS expects this program to have a major impact on boating safety by demonstrating to millions of boaters across America the need for all boaters to complete a boating safety education program.

Boat Education: <http://www.boat-ed.com/>

- Boat Ed is a private organization dedicated to providing boater safety courses and certification and publishing boater education materials. Boat Ed offers home study courses in cooperation with state government agencies responsible for boater safety education and certification. Boat Ed's state-specific courses are approved by the state government agency responsible for boating as well as NASBLA and are recognized by the U.S. Coast Guard. The Boat Ed website offers: Online boating safety courses with online boater certification tests for selected states (Alabama, Georgia, Indiana, Mississippi, Missouri, North Carolina, Ohio, Oregon, South Carolina, Texas).
- Home-study video boating education courses for these states.
- Information on classroom boat safety courses in these states.

BoatUS: <http://www.boatus.com/>

BoatUS, the Boat Owners Association of the United States, also provides online courses that are NASBLA approved and Coast Guard recognized. Topics covered in their courses include boating basics, communications, safe survival, safety equipment, the environment, navigation and navigation aids, small craft issues, rules of navigation (rules of the road), charting and piloting, regulations, boat handling, personal watercraft, and inland boating.

BoatClass.Com: <http://www.boatclass.com/>

BoatClass.com provides boating safety courses meeting NASBLA standards and boater certification requirements in various states. States that are currently served include New York, Connecticut, and Delaware. Certification is in progress for New Jersey, New Hampshire, Massachusetts, Rhode Island, and Pennsylvania. BoatClass.com offers the following courses:

- Boater & PWC Safety Courses. A one-day NASBLA approved, USCG recognized, eight-hour class to meet most state requirements for a boater/PWC safety certificate.
- Inland & Coastal Navigation. The course consists of 8 hours (3 sessions) of instruction aimed at sharpening navigation and piloting skills and building the confidence needed to venture to new places offshore. Includes charting, plotting, dead reckoning, GPS, fuel calculations, position fixes, cruise planning skills and more.

- Marine Weather. A plain-language, practical, 8-hour course for inland and ocean sailing. Emphasizes how to combine observations of wind, sea, clouds, and barometer to better interpret official forecasts obtained from radio or facsimile as well as make your own forecast if you lose the official sources. Also presents practical rules of thumb that can contribute to sound and efficient decision making underway.
- Marine Radar. A practical (8-hour) guide to safe, versatile, and efficient use of small craft radar, including radar principles and operation, definition of terms, navigation by range and bearing, use of VRM and EBL in navigation and collision avoidance, identifying radar targets and interpreting their motions, how to apply the Rules of the Road, and how to interpret land masses seen on radar. Claims to increase the safety and efficiency of your radar watch many fold and greatly reduce the anxiety of encounters with converging radar targets that cannot be seen visually.
- GPS Plus! Designed to take boating knowledge to a new level and keep boaters' investment "off the rocks" through GPS navigation. How does it work, why do I use it? Covers uses for GPS besides just where am I?, when will I get there, how fast do I need to go to be back for dinner?
- Rules of the Road. The course consists of 8 hours of instruction and is based on the *Wheelhouse Companion*, a resource designed for professionals and recreationalists alike. More than 85 million people now participate in recreational boating in North America. Many share 'navigable' waters with commercial and military vessels of all types. All must comply with the same Rules of the Road and understand these rules for proper and safe conduct on these shared waters. The course covers these rules in a multi-media environment. There is a recreational and professional option for this course.

Boatsafe: <http://www.boatsafe.com/>

Boatsafe.com offers online boating courses, tips on boating safety, and boating contests. Their Basic Boating Safety Course is approved by the National Association of State Boating Law Administrators (NASBLA) and recognized by the U.S. Coast Guard. The course can be taken on one's own schedule and pace. Help is available via email. There are three ways to take the Boating Safety Course:

- Study the material online, taking the online chapter review quizzes and final exam. The boater receives an email transcript upon completion and certificate and ID card sent via U.S. mail. Download the *digital version* of the course in a

PDF file that can be viewed with the free Adobe viewer. The boater can study offline and go online to take the chapter review quizzes and the final exam. Boater receives an email transcript upon completion and certificate and ID card sent via U.S. mail.

- Order the *printed workbook* that includes the entire course, a companion disk with tutorials, all chapter review quizzes and the final exam. The boater can mail in the final exam (or take it online). Upon successful completion, boater receives certificate and ID card via U.S. mail.
- Boatsafe.com also offers a Coastal Navigation Course. This navigation course is a combination of home study materials, sample and real-time chart work, online testing, help desk and discussion board.

Boating Education for Kids

In recognition of the fact that boating is usually a family activity, many organizations offer boating education for children of various ages. The rationale underlying safety education targeted for youth is also based on the concept that lessons learned early in life will serve throughout one's lifetime. Examples include:

The U. S. Coast Guard Auxiliary's Boats 'n Kids course is a short one-hour presentation designed to teach 5- to 12-year-olds some basic safety tips around boats. The presentation includes a slide show demonstrating the right and wrong things to do around water and boats. There is also a short video showing the safe things to do around and in boats. Boats 'n Kids ends with a demonstration of how to put on a PFD (personal flotation device or life preserver) and what to do if someone else is in trouble in the water. Each child is given a workbook to help them remember what they have learned, including proper boat loading, safe fuel handling and basic safe boating tips. The Coast Guard Auxiliary also offers the Water 'n Kids course, a similar program designed for 4- to 7-year-olds.

- Boating Safety for Kids is offered by the US Power Squadrons concurrently with adult boating safety education courses, using different rooms of the same facility on the same evenings. This program was developed by USPS and Washington State Parks over a three year period with two years of test courses. (Jensen, 1999). The course is taught by two adults teaching as a team and is very hands-on. It is designed to appeal to children from ages 4 or 5 to early teens. The course focuses on needs for and how to wear pfd's, how to keep weight low in boats, how to throw lines and flota-

tion devices, dangers of hypothermia, and other life saving subjects.

- Boatsafe.com offers Boating for Kids to help young boaters (and young-at-heart boaters) to start boating safely and smartly.
- Boating Safety Sidekicks is a program of the National Safe Boating Council (NSBC). It includes booklets and online programs · (<http://www.boatingsidekicks.com/>).
- California's AquaSMART boating program offers curriculum materials for aquatic and boating safety education to public schools at no charge. During the current biennium, all elementary school curriculum materials were revised and the AquaSMART Water & Boating Safety series was developed. The series is divided into three parts, for grades K-2, 3-5, and 6-8. High school students are served by another boating safety program for grades 9-12. This information is also available on the AquaSMART webpage.

Instructor Training

Ensuring the quality of instructors is a critical element of the boating safety education system. A prime example of "training the trainers" is the National Safe Boating Council's (NSBC) Boating Safety Instructor Certification Course. The purpose of this training is to educate instructors on both the NASBLA Minimum Standards for Boating Education and on effective boating education methods. The NSBC Boating Safety Instructor Certification is designed to recognize the instructor candidate's prior training and experience plus completion of basic boating safety course work. The course objective is to identify and clarify the knowledge and skills needed to present an effective boating safety education curriculum to entry-level students. The course involves lecture, group discussion and a review of standards, textbooks, manuals and lesson plans.

Prerequisites of the NSBC Boating Safety Instructor program include current instructor level certification in a state or nationally recognized training program (or equivalent), a minimum of 40 hours teaching experience, and a high level of comprehension of the boating course content. This is a two-day, 16-hour boating safety review with written instructor exam. All materials, including five major boating safety manuals used in courses throughout the country and an NSBC instructor manual with disk of a model NASBLA safety course outline, is given to all registered instructor candidates. Upon successful completion of the course, the instructor receives an Instructor Certificate and an individual one-year membership to the National Safe Boating Council.

The learning outcomes of the instructor training program are as follows:

- Candidate will become familiar with the national course standards in boating safety education (NASBLA Minimum Standards for Boating Education).
- Candidate will be able to develop and present a course customized to local and regional requirements following the NASBLA Minimum Standards for Boating Education.
- Candidate will receive instruction and gain practical experience in developing and presenting a classroom-based boating course using proven education methods.

There are many other information sources for boating safety instructors as well, including the Boatus.com and BoatClass.com websites. In addition, many boating organizations provide a variety of services and professional development opportunities related to boater safety education.

Boating Industry Initiatives

Boating-related industries have played an important role in boater safety education. Both the industries themselves and their trade associations have been active players. For example, the Personal Watercraft Industry Association (PWIA) was formed in 1987 as an affiliate of the National Marine Manufacturers Association. It was created to bring together companies that manufacture or distribute personal watercraft (PWC) in order to promote safe and responsible operation of personal watercraft; and to work with federal, state and local agencies with regulatory responsibilities for recreational boating. The PWIA believes boating education makes sense for all boaters, not just PWC operators (<http://www.pwia.org/>). Because safety is of paramount importance, the PWC manufacturing industry has taken the following actions to raise awareness about proper PWC operation, behavior, courtesy and safety:

- All manufacturers provide extensive printed and video materials with every boat sold, and dealers routinely review safety techniques with their customers. The PWIA also developed classroom materials now used by more than 12 states, national organizations such as the U.S. Coast Guard Auxiliary and the U.S. Power Squadrons, and local boating enforcement agencies. Some PWC manufacturers also financially support safety education courses in public schools.
- The PWIA provides free rental education packages to PWC rental businesses. This package includes a

video, safety check-off list and printed safety literature.

- Manufacturing members of the PWIA are sponsors of the Personal Watercraft Rescue Specialists National Rescue School -- a training program for water rescue specialists.
- The PWIA strongly supports the Northwest PWC Safety Project. Watercraft dealers in Washington, Oregon and Idaho have banded together to promote safe, responsible use of PWC and other boats. Some of the tools dealers are utilizing as a result of this project are: code of ethics, dealer review safety list, window placard, wallet card, laminated list of safety rules, safety checklist and safety poster.
- To educate consumers and encourage safe PWC operation, Bombardier Recreational Products initiated its "Get Caught Doing It Responsibly" Demo Days program in key markets across the country. This largest ever interactive safety campaign reached thousands of current and future PWC enthusiasts with its "Boat Smart From The Start" safety message.
- Bombardier Recreational Products, with the National Marine Manufacturers Association, is a major corporate supporter of the Watercraft Training Centre in Canada.
- Kawasaki supported California State University Sacramento as its Aquatic Center developed the first University-accredited PWC education course. Kawasaki has worked with the Aquatic Center since 1995, providing Jet Ski® watercraft for the class; in 1998 this class was granted University accreditation. The 12-week course is open to students and the general public.
- Kawasaki's National Safe Boating Week program includes the donation of Kawasaki Jet Ski® watercraft and 650 life jackets in support of state and local programs in various localities.
- Kawasaki also supports the College of Search and Rescue program, which provides state-of-the-art training for all forms of rescue including swift water and ocean PWC rescue for emergency responders and law enforcement officials.
- Polaris introduced a PWC training program that requires dealers to deliver a boating safety presentation (video and law review) to all new purchasers. The product cannot be warranty registered until the customer receives information.
- Yamaha supports K-38, a personal watercraft rescue training company, which provides hands-on training for lifeguards, rescue agencies and law enforcement personnel.
- Yamaha donated \$100,000 in personal flotation devices (PFD) and wet suits to the National Safe Boating Council for boating safety programs

across the country. This apparel will be used for day loans at local recreation areas.

- Yamaha and the United Safe Boating Institute introduced a U.S. Coast Guard Auxiliary approved safety course for PWC owners. The certification program, developed through Yamaha's Get W.E.T. (Watercraft Education and Training) initiative allows Yamaha watercraft owners to review a short videotape presentation and booklet from home. They can take the certification test by calling a toll free phone number. The course is offered at no cost to Yamaha watercraft owners and takes about an hour to complete. Those who pass the certification process are automatically enrolled in Yamaha's Club Wave Owners Club entitling them to a USBI certificate, Club Wave membership card, insurance savings and club benefits that include special discounts on selected Yamaha watercraft accessories.
- Yamaha offers a NASBLA-approved, U.S Coast Guard-recognized boating safety course on its Club Wave website, www.yamahaclubwave.com.
- Yamaha has sent over 1,637 free rental kits to rental facilities since 1995. The kit consists of a Rental Tips booklet; an Instruction Poster highlighting key points of proper watercraft operation; Instruction Video; and Riding Card providing at-a-glance instruction reference, laminated for durability.
- To reinforce safe, appropriate and courteous operation of PWC, the industry helped develop and has actively supported reasonable boating regulations. More than 26 states have based their PWC laws on the PWIA Model Safety Act. This act addresses minimum operating age (16 years old), requires mandatory education of operators, prohibits nighttime and reckless operation, and requires all operators and passengers to wear Coast Guard approved life jackets, and to use their lanyard stop switches (for vessels so equipped). The PWIA strongly encourages all its members to abide by the PWC Code of Ethics.

Boating Education Standards

Standards for boating education in the United States fall under the jurisdiction of the National Association of Boating Law Administrators (NASBLA). NASBLA developed its minimum content for boating education courses more than a decade ago. These standards have served as a guide for state, non-profit and commercial providers to follow in developing boating education materials. In 1998, NASBLA began a research program in cooperation with the Pennsylvania State University to evaluate the existing guidelines and develop a new minimum "standard of care" for boating

for boating education. Relevant documents were reviewed and interviews were conducted with nationally prominent and recognized boating educators. A working draft of the standards was written and submitted to the NASBLA Standards Advisory Committee for review and comment. Several more drafts of the standards were completed, each going through a review process. The standards were intended to describe the minimum body of knowledge that should be included in a boating safety course in order to achieve safe, legal, and enjoyable boating. In addition, the proposed standard of care was predicated on reducing risk in recreational boating based on empirical accident and boating violation statistics.

In Phase Two of the research, the Penn State team sought to pilot test and evaluate the draft National Boating Education Standards. This work was divided into three tasks. Task 1 solicited the input of almost 150 boating educators representing major national boating organizations. This survey asked boating experts whether or not each proposed standard should be included as a minimum boating education standard, as well as the relative importance of each standard. Task Two involved a review of nine boating education course/texts using the draft standards. This task used volunteers who evaluated their own course materials against the standards, along with independent reviews by the research team and NASBLA representatives. The purpose of Task 2 was to validate the NASBLA function of reviewing boating courses submitted for NASBLA approval. Task Three of the evaluation sought to understand how instructors, presented with the draft standards, dealt with the design, implementation, and teaching of a boating safety course using these standards. In this task the purpose was to gain a deep understanding of the standards through intensive observations and discussions with boating educators who were actually using the standards. Each of the three tasks was structured to gain information that would be useful in finalizing the standards.

This work resulted in another revision of the National Boating Education Standards, which was adopted by NASBLA in September of 1999 (Hug et al., 1999). Through the national review and validation process, the National Boating Education Standards gained a high degree of national agreement. Table 3 shows a listing of the topics included in the NASBLA standards. These standards are intended to convey to organizations and individuals the **minimum body of knowledge that must be included in a short, 6-8 hour boating education course**. Boating instructors,

text authors, boating professionals, and organizations are encouraged to go beyond the standards when, in their judgment and experience, it assists the boat operator to boat more safely. In addition, the standards are intended to show just the minimum content of the course materials, not the sequence or organization of the material. Although the standards are organized in a particular way, course/text developers are welcome to organize their information as they prefer.

It is noteworthy that environmental issues are included in the minimum knowledge that all boaters are expected to have (standards 5.1-5.3). But the boating education standards emphasize information related to boating safety and boat operation. Messages related to environmental stewardship may receive only cursory treatment in many boating courses due to the logistical difficulty of covering a large amount of required material within a limited amount of time and textbook pages.

Mandatory Education

More and more states are enacting laws requiring education for boaters. Some of these laws pertain to particular segments of boaters, such as youth or operators of personal watercraft. More than half of the states currently have some form of mandatory boating education, and other states have such legislation pending or proposed.

Nationally, a general consensus exists among boating safety educators and organizations that a reduction of recreational boating fatalities, injuries, and property damage might best be accomplished by mandating boat operators to participate in a boating safety course (Hug et al. 2000). The National Association of State Boating Law Administrators has endorsed the concept and prepared a model act for mandatory boating safety education. The Personal Watercraft Industry Association (PWIA) has also noted the trend towards mandatory education and has supported state initiatives to require education for operators of personal watercraft. Based on positive results from several states that already had some form of mandatory boater education, the PWIA introduced its own model act in 1998. Although evidence regarding the effects of mandatory education is sketchy, the PIAA cited the following examples in support of its position regarding mandatory education:

- **Connecticut** implemented mandatory education for most boaters and all personal watercraft operators

Table 3. : Summary of Topics Included in NASBLA National Boating Education Standards

Section 1: The Boat

- Standard 1.1 - Boat Capacities
- Standard 1.2 - Boat Registration Requirements

Section 2: Boating Equipment

- Standard 2.1 - Personal Flotation Device Types and Carriage
- Standard 2.2 – Personal Flotation Device Sizing and Availability
- Standard 2.3 – Wearing Personal Flotation Devices
- Standard 2.4 - Personal Flotation Device Serviceability
- Standard 2.5 - Fire Extinguishers
- Standard 2.6 - Back-Fire Flame Control Device
- Standard 2.7 – Ventilation Systems
- Standard 2.8 – Navigation Light Equipment
- Standard 2.9 - Sound Signaling Equipment

Section 3: Trip Planning and Preparation

- Standard 3.1 - Checking Local Weather And Water Conditions
- Standard 3.2 - Checking Local Hazards
- Standard 3.3 - Filing a Float Plan
- Standard 3.4 - Boat Preventative Maintenance
- Standard 3.5 – Transporting and Trailering
- Standard 3.6 - Fueling Procedures
- Standard 3.7 - Pre-Departure Checklist & Passenger Communication

Section 4: Marine Environment

- Standard 4.1 – Environmental Laws and Regulations
- Standard 4.2 - Human Waste Disposal
- Standard 4.3 – Disposal of Toxic Substances

Section 5: Safe Boat Operation

- Standard 5.1 - Operator Responsibilities
- Standard 5.2 - Influence of Drugs and Alcohol on Boat Operation
- Standard 5.3 - Navigation Rules of the Road
- Standard 5.4 - Aids to Navigation
- Standard 5.5 - Docking and Mooring
- Standard 5.6 - Anchoring

Section 6: Emergency Preparedness

- Standard 6.1 - Rendering Assistance
- Standard 6.2 - Communication Procedures
- Standard 6.3 - Capsizing Emergencies
- Standard 6.4 - Falls Overboard Emergencies
- Standard 6.5 - Hypothermia Prevention
- Standard 6.6 - Fire Emergency Preparedness
- Standard 6.7 - Running Aground Prevention and Response
- Standard 6.8 - Accident Reports
- Standard 6.9 - Boating Accident Report Form

Section 7: Other Water Activities

- Standard 7.1 – Personal Watercraft and other Jet Propelled Watercraft
- Standard 7.2 - Water Skiing
- Standard 7.3 - Diving and Snorkeling
- Standard 7.4 - Hunting & Fishing

Section 8: Boating Education Practices

- Standard 8.1 - Continuing Education
 - Standard 8.2 - State Specific Boating Information
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Source: http://www.nasbla.org/education_standards.htm

in 1993. Since 1995, the number of reported accidents involving PWC has remained fairly constant (six accidents in 1995, eight accidents in 1998), however the amount of PWC registered in the state has grown by approximately 30 percent. Frank Disbrow, supervisor of Connecticut's boating division, reports that an additional benefit of mandatory education has been fewer complaints regarding PWC. He states that while complaints used to come in to his office daily, he only received three complaints in 1998 and hadn't received any complaints as of May 1999.

- In October 1996, **Florida** established its mandatory education law. It requires all persons born after September 30, 1980 to complete a NASBLA approved boater education course or competency exam prior to operating a vessel powered by a motor of 10 horsepower or more. On October 1, 2001, all persons 21 years of age and younger will be required to comply with this law. According to boating law administrator Jim Brown, Florida has seen a downward trend in the percentage of reported accidents in the 16 and under age group since the law was established. In 1996, the 16 and under age group was responsible for 14 percent of reported accidents involving PWC. By 1998, the percentage of reported accidents from this age group had dropped to 12 percent. "It is a good sign," he says of the official statistics. "In reality, the percentage of accidents from this age group dropped to about 10 percent in 1998." He bases this on what he calls the "double-edge sword of education," meaning that as more people receive boating safety training and learn about the accident reporting requirements, more accidents get reported. Brown said another positive aspect of the law is that adults are completing the course along with their children. He feels this helps account for the fact that the number of PWC accidents has remained stable, even though more craft have been registered every year since the law took effect. In fact, PWC accidents have dropped about 15 percent since 1995, while the number of registered PWC increased over 31 percent.
 - In January 1995, **Kansas** began requiring mandatory education for PWC operators between the ages of 12 and 15. Boating Law Administrator Cheri Swayne reports that PWC accident figures involving youths under 19 dropped dramatically since then. During 1998, 12.5 percent of PWC accidents involved youths, a significant drop from the 35.3 percent involvement in 1997. Overall, PWC accidents decreased significantly during 1998. In 1997, PWC accidents comprised 56.1 percent of the total accident figure; PWC involvement dropped to 39.8 percent in 1998 - a decrease
- of over 16 percent, while PWC registration numbers during the same time increased 11.5 percent.
- In **Maryland**, which enacted mandatory education regulations in the mid-1990s, the number of PWC registered in the state increased from 9,273 in 1995 to 14,365 in 1998, an increase of almost 55 percent. During the same time, the amount of PWC-related accidents increased by approximately 7 percent, with 56 PWC accidents reported in 1995 and 60 PWC accidents in 1998. Maryland officials also note that they had no PWC-related fatalities in 1996 or 1997, and only one fatality in 1998, down 50 percent from the two fatalities recorded in 1995.
 - **New Jersey's** mandatory education program began in 1997. Under state law all PWC operators must complete a boating safety course and carry an operator's certificate. The program has been an overwhelming success. According to state officials there were 68 accidents, 53 injuries and one fatality reported to the state in 1998 in comparison to the pre-law statistics for 1996 of 89 accidents, 55 injuries and three deaths. This corresponds to approximately a 24 percent decrease in accidents, a four percent decrease in injuries and a 67 percent decrease in fatalities. These decreases are significant in light of the fact that PWC registrations in New Jersey increased during this time as compared to the number registered in 1996.
 - **Utah** continues to see reductions in the number of reported PWC accidents, despite the fact that the number of personal watercraft registered in the state has risen since the implementation of mandatory education in 1995. Utah requires mandatory education for operators between the ages of 12 and 17. The results for this targeted age group are highly significant. Accidents involving 12 to 17-year olds dropped by almost 72 percent since 1995. While education is only required for youths, the benefits are not confined to that age group. Since 1995, PWC registration increased almost 40 percent, yet accidents involving PWC decreased by about 18 percent. Fatalities involving PWC have dropped as well, with two recorded in 1998 as compared to four recorded in 1995. This amounts to a 50 percent reduction in fatalities. Ted Woolley, boating law administrator for Utah is "proud of the statistics" and a firm believer in mandatory education. "We have proof it works," he said and notes that these reductions were achieved, "even though a new insurance requirement went into effect last year that increased the reporting of accidents."

Testing Issues

The trend toward mandatory boating education has raised many difficult questions relative to the implementation of the required education. Thus, Phase Three of NASBLA's research on National Boating Education Standards addressed several questions related to testing boater knowledge, including:

- What does evidence from educational research literature tell us about learner acquisition of boating knowledge in distance learning courses versus classroom instruction?
- Is there any evidence from educational research that suggests there is a difference in boat operator knowledge demonstrated on a course exam versus an equivalency exam?
- What does evidence from educational research, mandated boating education states, and comparable fields, tell us about the differences between proctored and non-proctored exams in classroom and distance learning settings (such as the Internet).
- What research information exists about whether boating safety exams should be approved independently or in conjunction with a course of study?
- Should there be a national pool of exam questions from which approved tests are constructed?
- What information can be provided to boating educators and NASBLA course reviewers on designing and evaluating high quality tests of boat operator knowledge.
- How many exam questions should be allocated to each standard to assure that the boat operator is tested adequately on each standard?
- What kinds of questions (true/false, multiple choice, fill-in blank, etc.) are most effective at testing boat operator knowledge on exams?

To address these questions, Hug et al. (2000) examined educational research literature and explored education practices in fields comparable to boater education. They found no evidence of significant differences in knowledge acquisition between traditional classroom formats and distance learning or self-study programs. Most of the studies reviewed found no significant differences between alternative formats, and those finding differences showed no consistent pattern (Russell, 1999; Schulman & Sims, 1999; Wade, 1999). In some cases traditional classroom settings showed stronger results, and in other instances the distance education alternatives were superior.

Experts in educational testing recommend that a well-designed exam should have a variety of types of questions and cover the entire body of knowledge as outlined by the National Boating Education Standards. Certain standards, however, carry more importance and should receive more attention within the exam.

The boating community is divided in beliefs about whether boating safety exams must be proctored. Some states and organizations require proctored exams and others do not. The main reasons to proctor an exam are to make sure that the test is secure from theft and to assure that the test taker is actually the person who has attained a high degree of content knowledge. In high stakes testing situations, such as entrance into college or obtaining a professional license (doctor, lawyer, pilot, commercial boat captain, etc), the ability to successfully pass a knowledge exam provides the test taker with the right to attain a privilege. Through legislation society determines what professions necessitate a higher level of prerequisite knowledge before gaining a professional privilege, and test security is matched to that knowledge-testing purpose.

Boating test security should be appropriate for the exam purpose and context of the test. Exam security might include procedures such as: confirming the identity of the test taker, randomizing test items, using different versions of an exam, observing test takers during the exam, protecting the security of the test item answers, using distinctive, hard to duplicate certificates, maintaining test taker records, etc. There is no single exam security protocol that would fit all boating safety examinations.

Even with the highest levels of test security, ingenious test takers find ways of cheating. No matter what exam security measures are followed, as the stakes (fees, consequences for failure) increase, the possibility of losing exam integrity increases. Fortunately, in most cases, learning recreational boat safety is easier than cheating on the examination.

From their research, Hug et al. (2000) recommended adding several additional standards to the approved NASBLA boating education standards:

Standard 9.1 - Boat Operator Knowledge Course Formats. The course submitted for NASBLA review may be in any format that meets the standards as long as it can be reviewed easily by NASBLA. These may include but are not limited to classroom instruction, distance learning, or self-study programs.

Standard 9.2 - Boat Operator Knowledge Exams. In order to receive NASBLA approval, all exams,

whether administered as part of a course of study or as independent exams, must be submitted for review.

Standard 9.2.1 -The exam must be well designed and comprehensive in covering NASBLA's standards for boat operator knowledge. Well designed comprehensive exams assess boat operator knowledge equally well as an independent exam or as an exam at the end of a course.

Standard 9.2.2 - Each exam submitted for review must be accompanied with a plan that explains how the test administrator will seek to **maintain exam integrity**. The plan must address security issues commensurate with the purpose of the test and perceived opportunity to commit exam fraud.

Other Examples of Best Practices

The above discussion has identified the major components of boater safety education in terms of key boating organizations and agencies. It is also useful to consider the various types of practices that cut across the organizations and providers. The following approaches have been used frequently within boater safety education programs in the United States.

Videos

There are many excellent videos on various aspects of boating safety. Videos can be used in the classroom, at home, or even online. They can enhance an instructional program or be the means of conveying the entire program. Besides the many examples of videos mentioned earlier, some notable examples include:

- "Judgement on the Water – Sportsman Version" is an instructional video designed for all sportsmen—both fisherman and hunters – who use small boats, often on cold water and in inclement weather. It combines Small Boat Safety for the Fisherman and Small Boat Safety for the Hunter into one video that has a great deal of life-saving information for this large and at-risk segment of the small boat using public. Roughly 12-1/2 minutes long, the video is directed to a segment of the boating public that has been challenging to reach - anglers and hunters. Sportsmen and women are an important target for boating safety education and information. Unfortunately, most do not identify themselves as boaters. This video speaks directly to them by capturing their attention with graphic and gripping images and action. It is highly successful in bringing the boating safety message home to this group. The video is short enough to use during a formal meeting, banquet, or casual presentation or it can be used as a stand-alone program at an

exhibit booth (available through special arrangement between the National Safe Boating Council and Alan Madison Productions).

- The state of Utah mailed a video about personal watercraft safety to every household in the state with a registered PWC (about 7,000 copies). This is a good example of aggressively providing an educational program to a boating segment that has been identified with a high need for safety education.

Practice Exams, Quizzes, and Pretests

It has been documented that people learn material by taking tests without prior study (Hug et al. 2000). Many boating websites include practice tests that boaters can take at any time to prepare for a certification test or just learn about boating safety.

- The Boat Ed website offers a boating safety course Pre-Test. The site suggests that, even though you may have been boating for a long time, you can still learn something new about boating safely and the boating laws in your state.

Loaner lifejackets for kids

Many places have instituted programs providing life jackets for kids. These programs recognize that failure to wear personal flotation devices (PFDs) is a leading cause of boating fatalities. They attack the problem directly by making suitable PFDs available and indirectly through the educational message that PFDs must be age-appropriate and must be worn to be effective.

- Texas has a cooperative program with BOAT/U.S. to provide loaner life jackets for youngsters (*Small Craft Advisory* 14 (5): 19).
- Colorado has a similar program. "A properly sized life jacket can be the difference between survival and tragedy for a child that falls in the water," said Ron Dunlap, Boat Safety Coordinator for Colorado State Parks." The intent of the program is to make sure kids, especially young kids, have properly fitting life jackets while they are boating." (from website)
- South Dakota's Department of Game, Fish & Parks offered loaner personal flotation devices that fit infants and toddlers (*Small Craft Advisory* 14 (5): 19).

Mascots

Mascots are often used at community events or boating-related special events. This is a popular means of targeting children for boating safety messages. Some examples include:

- Lenny the Lake Lizard – this costume is available from the Boating Safety Section of New Mexico’s State Parks agency (who adapted the idea from Arizona).
- Charley the Police Boat reminds youngsters about the importance of boating safety (a cooperative effort between state of Oregon and U.S. Coast Guard Auxiliary, and FWP).
- Theodore Tugboat (National Safe Boating Council) travels to different areas and events. It includes a complete online activity center.
- Bobby the Boat (Michigan) is a remote controlled electronic robot used for teaching elementary school students boating and water safety. Bobby the Boat has working navigation lights, horns, siren, blue emergency light, an AM/FM cassette, and a remote speaker and microphone system. Bobby is capable of holding a conversation with an audience without the audience being able to see the operator. The average presentation lasts about an hour and consists of how to safely do a water rescue without the rescuer going into the water and the importance of wearing a life jacket (PFD). Students are taught to reach for a victim, throw a life preserver or go for help, but never go into the water to perform a rescue.

Incentives

Incentives are an increasingly popular method of rewarding or recognizing good examples of safe boating behavior.

- Many insurance companies offer discounts on boat insurance to individuals who successfully complete boating safety courses. This is a strong incentive for boaters to seek formal boater education.
- In Ohio, boaters wearing PFDs received floating key chains, while kids got a “junior watercraft officer” badge.
- Alabama has a cooperative program with McDonalds that offered youngsters wearing pfd coupons for free French fries.
- Louisiana’s “I got caught wearing my lifejacket” program offered boaters a free t-shirt.

- In North Carolina, t-shirts and stickers were given to youngsters wearing PFDs. In addition, glow sticks were given to boaters who did not have proper lighting equipment and needed to return to shore after dark.
- The Michigan Department of Natural Resources, in cooperation with AAA of Michigan, Stearns Manufacturing and Wellington Water Sports, held a drawing for a free pfd for young boaters. Michigan conservation officers handed out postage paid drawing cards to boaters during the boating season. A drawing was held during the boating season and the winner received a free PFD delivered by a conservation officer. For an opportunity to win a free PFD, boaters were advised to contact a Michigan conservation officer on the water during the boating season.
- Alaska’s Boating Safety Program offers free posters and bumper stickers featuring the 2001 National Safe Boating Campaign theme, “Boat Smart from the Start - Wear your Life Jackets.”

Research Needs

While boating-related agencies and organizations throughout the U.S. are currently following many “best practices for boater safety education,” more research is needed to document the effectiveness of various practices. At present, the best practices are defined primarily in terms of consensus of professional judgment or frequency of use. Relative to the current NASBLA boating education standards, further study is needed to assist the development of “boat operator knowledge exam quality criteria.” The current standards use terminology such as “well-designed comprehensive exam.” These terms need to be defined and described thoroughly to assist boating education course and test designers with the review process. This research should address questions such as:

- What is the purpose of boat operator knowledge exams?
- What are the characteristics of high quality exam questions?
- How many questions should be on a well-designed comprehensive exam of boat operator knowledge?
- How many questions should cover each section of the required NASBLA standards?
- What type (multiple choice, true/false, etc.) of questions should be used on an exam?
- How do you establish test validity?
- How do you establish test reliability?

In its most recent annual conference (September, 2000), the National Association of State Boating Law Administrators passed a formal resolution (Resolution 00-1) calling for a Comprehensive Boating Safety Needs Assessment. This resolution was intended to stimulate research providing the U.S. Congress with a complete picture of what is needed to advance boating safety in the next 10 years, and was forwarded to the U.S. Coast Guard for their consideration and appropriate action. NASBLA also passed Resolution 00-5, calling for research on Exposure Hours of Recreational

Boaters. This resolution recognized the importance of understanding the amount of time various types of watercraft spend on the water and the inconsistency in previous studies examining the role of exposure hours in explaining boating accidents and fatalities. Research is needed to document variation in exposure levels by state and whether such variances have a direct effect on the frequency of accidents. Educational efforts can then be developed to further reduce the frequency and consequences of boating accidents.

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- NASBLA: http://www.nasbla.org/state_courses.htm
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