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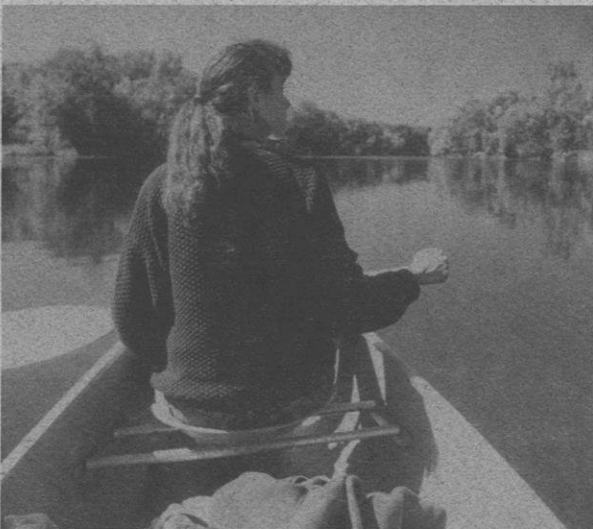
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Boater Attitudes and Experiences

Results of the 1989-1990
Wisconsin Recreational Boating Study,
Phase 2

Technical Bulletin No. 180
Department of Natural Resources
Madison, Wisconsin
1992

ABSTRACT

In 1989, the Wisconsin Department of Natural Resources (DNR) Bureau of Law Enforcement initiated an intensive study of recreational boating in Wisconsin. Objectives were to provide information on boaters' activities and experiences that could be applied to work-load analysis, boater education programs, and recreational planning.

The DNR Bureau of Research designed and implemented the study, which was conducted in 2 phases. Objectives of Phase 2 of the study were to describe Wisconsin boaters and their boats, identify their boating activities and the distribution of activities around the state and throughout the year, identify areas of concern among boaters about boating in Wisconsin, and assess the potential response of the boating public to suggested boating safety legislation. Phase 2 research was conducted in October 1990. Survey questionnaires were sent to a random sample of over 1,900 boat owners throughout the state of Wisconsin; 83% of those contacted returned the survey to us. Responses profiled Wisconsin boaters and boating for the 1989-90 boating season.

Results of the Phase 2 survey show that Wisconsin boat owners tend to be male, about 50 years old, married with children and with moderate levels of income and education. Most live in the country or in nonsuburban communities throughout the state. Many own more than one boat. The most commonly owned type of boat was a small motorized "fishing" boat.

Results show that during the study period boaters engaged in a variety of activities while boating in Wisconsin and that fishing was the most popular activity. There were conflicts between different types of water resource use and activities, primarily involving those who boated to relax and those who boated for excitement and stimulation. Boaters were in favor of some restrictions on their sport, including a greater emphasis on boating law enforcement and increased penalties for violations. Greatest support was shown for suspension of operating privileges for operating a boat while intoxicated. Opposition was shown to suggestions of requiring all boat operators to be licensed or making the possession of alcohol on a boat illegal. Problem areas identified were boater behavior, lack of knowledge of boating rules and safety regulations, and competing uses of water resources.

Recommendations based on this research include improving the quality of the boating experience near population centers, emphasizing safety issues in enforcement planning, increasing research on the impacts of specialized water-based recreation such as personal watercraft, and using the constituency profile in education and outreach efforts.

Phase 1 of this study was completed in the spring of 1990 and provided information on statewide boating pressure for each DNR district and each county in the state. The results of that study phase are reported in an earlier Technical Bulletin and in a series of 10 brochures on the most popular water bodies in the state.

Key Words: Recreational boating, recreational interference, crowding, quality of experience, survey, recall bias, personal watercraft, boating safety, violations, law enforcement.

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by Linda J. Penaloza

Technical Bulletin No.180
Department of Natural Resources
P.O. Box 7921
Madison, Wisconsin 53707
1992

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INTRODUCTION

In 1989, the Wisconsin Department of Natural Resources (DNR) Bureau of Law Enforcement identified the need for broad-based information about recreational boating in Wisconsin. This information was needed to plan future initiatives and to improve boating legislation, boater education, awareness of safety concerns, and law enforcement work-load analysis. The Bureau of Law Enforcement contacted the DNR Bureau of Research in the spring of 1989 to help design and conduct research on recreational boating in the state. A research project was developed to address the following general questions:

- Who are the boaters in Wisconsin?
- How is boating distributed throughout the state and throughout the boating season?
- What issues or concerns do boaters have about their use of Wisconsin waters?

To address these general questions, a research team was formed, with a steering committee composed of administrators, district wardens, and conservation wardens. Together, these 2 groups developed a list of study objectives, and research was broken into 2 phases, each designed to address a different set of objectives. Phase 1, the Boating Pressure Survey, was designed around those study objectives most susceptible to recall decay (wherein

the ability to remember details of minor or routine activities decreases as the time since the event increases). The second phase, the Boater Issues Survey, concerned study objectives about general attitudes and opinions of the boating population. These attitudes and opinions are less likely to be forgotten than specific details of boating events and are thus less susceptible to recall decay.

In Phase 1 of the research, we sampled over 58,000 boat owners in Wisconsin, Illinois, Iowa, and Minnesota. These boat owners were contacted with mailed questionnaires throughout a 7-month boating season (April through October) and were asked about their specific behavior and experiences while boating during the 2-week period prior to having received the questionnaire. Phase 1 provided detailed information about the number of boaters on the water in each Wisconsin county during each month of the boating season. This information was used to identify those areas in the state where boating pressure was greatest, in order to assist in the allocation of the law enforcement work force. This phase of the study also allowed us to assess the financial impact of recreational boaters on the state by providing detailed information on boating-related expenditures, and it also provided information on boaters' activities, quality of experience, and perceived crowding during the 2-week period covered by each questionnaire.

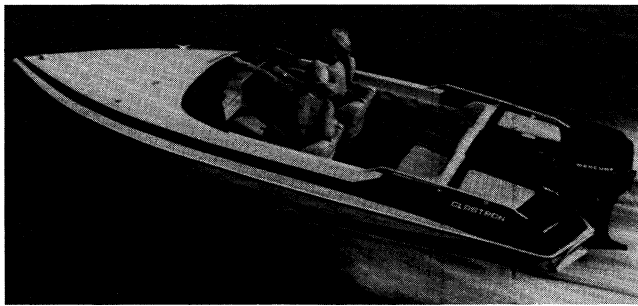


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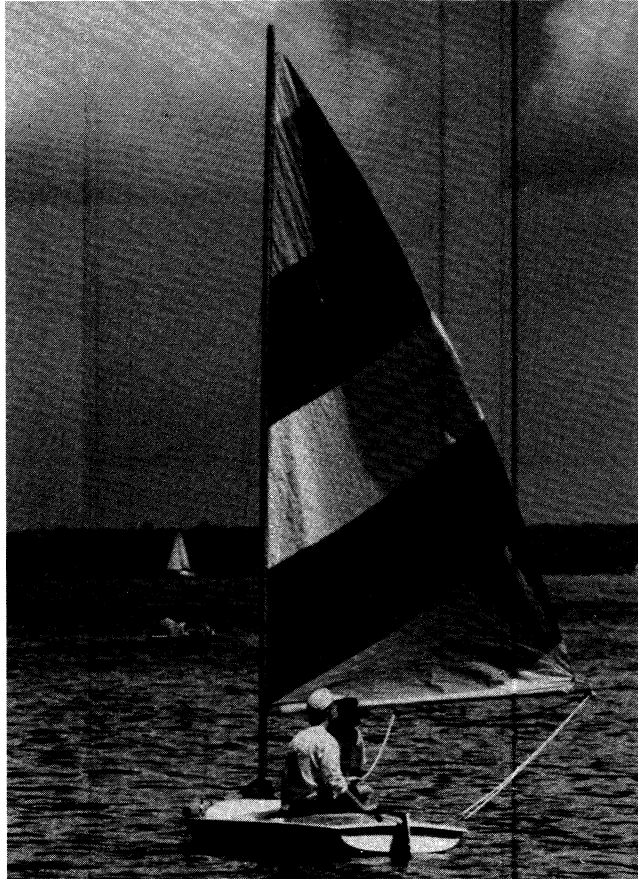


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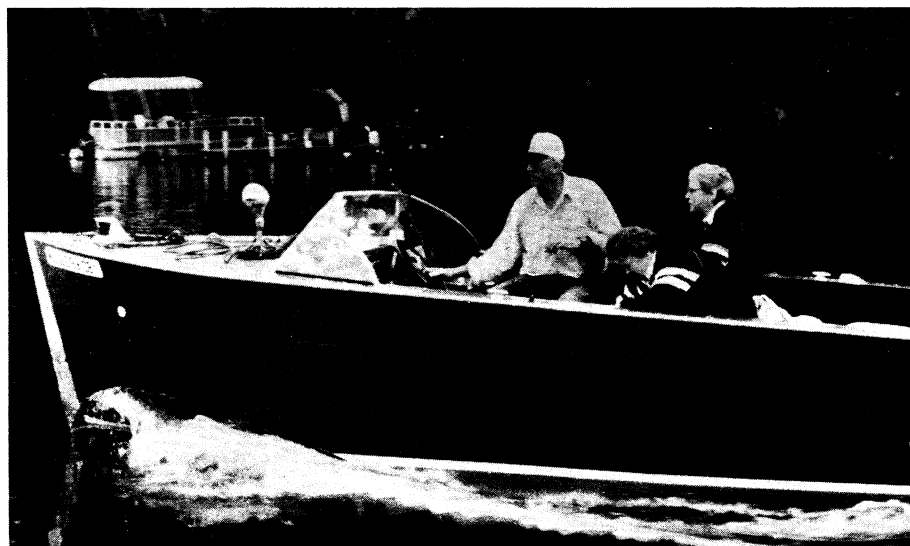


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Phase 2 of the boating study was conducted as a mailed survey to 1,920 licensed boat owners in Wisconsin. This survey, as compared with the Phase 1 survey, was designed to gather more detailed information on a wider range of attitude and behavior questions from a smaller sample of boaters. While the first phase sought detailed information on a few important questions at a county level, the second phase provided a greater depth of information on a wider range of issues concerning recreational boating. Although specific bodies of water or counties can be highlighted in this second phase, the information gathered in Phase 2 is primarily applicable to the state as a whole. Specific Phase 2 objectives were to:

1. identify and describe recreational boating participants in Wisconsin, from their demographic characteristics to their level of boating education;
2. describe the types and sizes of boats in use, including motor size (horsepower), and look for differences between boat types and boating experiences;
3. identify the activities in which recreational boaters participate;
4. identify favorite and most-used water bodies in the state and distribution of boating throughout the year;
5. identify issues of conflicting uses of water resources (recreational interference) and assess user reactions to management proposals for controlling those conflicts;
6. assess the potential responses of recreational boaters to projected legislative changes to boating regulations;
7. identify problem areas in boating safety and information gaps in boater education.

The purpose of this report is to provide the results of the Phase 2 research. The results of the first phase of the research are reported in an earlier Technical Bulletin (Penaloza 1991) and in a series of brochures on 10 of the most popular water bodies in the state (available from the DNR Bureau of Law Enforcement).

National studies of recreational boaters in the last 20 years include looks at trends in recreational boating behavior and user conflicts (Lindsay 1980, Marmo 1980, Rounds 1985). Studies conducted in the region include studies of recreational boating on the Great Lakes (Great Lakes Basin Comm. 1975, Lime et al. 1989a), the Mississippi River (McAvoy et al. 1990, Lime et al. 1989b), as well as studies of water-based recreation in Wisconsin (Wis. Dep. Nat. Resour. 1986a, 1986b). Field and Martinson (1986) reviewed the field of water-based recreation participation research, and Graefe (1986) reviewed the field

of recreational boating research for the President's Commission on Americans Outdoors. Both reports showed that outdoor recreation is dominated by recreation taking place either on or near water. Recreational boating is one of the nation's most popular outdoor recreation activities. Research on this resource use has focused on frequency and distribution of use, user characteristics, user activities, motives, values and behavior, as well as either the demand for or supply of recreational

boating facilities. Gaps in the research were identified as a lack of consistent databases by which change in recreation demand can be assessed over time, as well as a careful assessment of recreation demand and supply, clear understanding of conflicting resource use, and how to manage a resource for diverse uses. Findings from these studies are discussed in the Technical Bulletin on Phase 1 of this research project (Penaloza 1991).

RESEARCH METHODS

Overview

The study designs of Phase 1 and Phase 2 had a number of similarities. Some of the questions in Phase 2 were based upon information gathered in Phase 1, and a few of the questions were identical. There were other similarities between the 2 phases as well:

- Both were conducted as mailed surveys, with primarily fixed-option categories.
- Similar mailing procedures and follow-up procedures were used for each phase.
- The sampling schemes were identical for Wisconsin resident boaters.

But there were also important differences between the 2 phases:

- The sample size for Phase 2 was just under 2,000 registered boat owners, from Wisconsin only. For the Phase 1 survey, we contacted over 58,000 boaters in Wisconsin, Iowa, Illinois, and Minnesota.
- Phase 2 was mailed in one group at the end of the 1990 boating season, while Phase 1 was mailed in 14 separate groupings across 7 months in 1989-90.
- Phase 2 data included boating activities across the entire boating season (roughly April-September), while Phase 1 data included activities of boaters for only the 2-week period prior to their receiving the questionnaire.
- Phase 2 data had an emphasis on attitudes and opinions, while Phase 1 data included behavioral and expenditure data only.
- The Phase 2 questionnaire had 275 variables and differed in appearance from the shorter Phase 1 questionnaire (74 variables).

Sampling

We drew a random sample of 2,000 names from the Wisconsin DNR's file of active boat registrations (that is, those boats with registrations expiring in 1990, 1991, or 1992). Boaters from every county in the state were represented in the survey. Commercial or fleet boats were identified where possible and removed from the population before the sample was drawn. A total of 80 questionnaires were returned as undeliverable; thus the final sample size was 1,920.

The Questionnaire

The survey questions were developed by the research team over the course of several months. To provide comparability with other recreational boating studies, many of the questions were worded similarly to those used in other studies. The survey was pre-tested by law enforcement personnel, recreational researchers, and actual boaters. This helped us to make sure that questions were meaningful and understandable to respondents. Changes in the wording and the order of questions were made after extensive testing to ensure that the questions were reliable and valid.

The final survey document contained 59 questions (275 variables), divided into 6 sections: Boat Description, Wisconsin Boating Activities This Year, Boating Laws and Boating Safety, Experiences and Evaluations, Boating Policy, and Background (see Append. A). The survey questionnaire was typeset to make it readable and easy to follow, and it was printed on quality white paper in a 21-page booklet with a buff-colored cover showing the name of the survey and the survey logo.

Mailing

On 25 September 1990, we sent each person in the sample a personalized letter describing the study and informing them that they would be contacted in the next several days with a mailed questionnaire. This advance letter informed survey participants about the nature and purpose of the survey and invited them to start thinking about their recreational boating during the past several months.

On 1 October 1990, we sent each individual in the sample a copy of the questionnaire booklet with a personalized letter and a stamped, addressed return envelope. The letter again described the study and asked the participants to fill out the questionnaire right away and return it in the enclosed postage-paid envelope (Append. A).

By 10 October, 902 surveys had been returned completed or undeliverable. We sent all those who had not yet responded (1,098 persons) a postcard to remind them to return the questionnaire right away if they had not already done so. By 22 October, there were 660 people who had still not returned the questionnaire booklet. We sent each of these people another copy of the questionnaire and another return envelope, with a letter telling them that their responses were important to the study, even if they had not gone boating in the last year, and asking them to fill out this copy of the questionnaire right away.

The complex mailing methods employed were designed to achieve the highest possible response rate to the survey. Survey research has been an evolving science over the years, and studies of the ways surveys are conducted show that to get high response rates and quality responses, it is necessary to spend a great deal of effort on appearance and mailing procedures in addition to the wording and order of questions. For this survey, each step in the process, from the appearance and color of the cover of the booklet to the number and contents of each question, was designed to make our questionnaire look professional, credible, and important to the respondent. Each advance letter and cover letter was personalized with the name and address of the respondent, along with a personalized salutation. The mailing envelope had a first-class postage stamp affixed, instead of metered-mail or bulk-mail rates. The reply envelope had a return address and first-class postage affixed, instead of Business Reply Mail. Every effort was taken to make the survey package look like a personal appeal instead of a mass mailing, so that it would receive each person's attention instead of being taken as a solicitation or "junk mail" and thrown away unopened. While this method of conducting a mailing is more expensive, both in postage and in time, it is necessary to obtain the highest quality data.

Those procedures conform to conventional wisdom concerning survey research, which indicates that the survey should present the least imposing image possible, and the mailing procedures should include a heavy dose of personalization applied in a variety of ways, including

first-class postage, which conveys the importance and individuality of the contact. Dillman (1978:164) states "The use of the 'bulk' mailing rate privilege automatically signifies a mass mailing. In fact, it is not legal to use this postage rate for personal correspondence, something known by many people, thus making it an unfailing indicator that, regardless of appearances to the contrary, the letter is not actually a personal appeal." Armstrong and Lusk (1987) also looked at how postage affects response rates. They found that the use of first-class postage provided greater final response rates over metered postage. Their basic conclusion was that business reply postage is seldom cost effective, because first-class postage yields an additional 9% return.

Fox et al. (1988) studied mailed survey response rates in relation to a variety of techniques for inducing response. Results indicated that prenotification and follow-ups increased response rates, as did the type of out-going postage used. Prenotification by letter was found to increase response rates in mailed surveys by an average of 7.7%, postcard follow-ups increased response rates by an average of 3.5%, and first-class postage increased response rates by an average of 6.2%. All of these response-rate effects of personalization in the mailing procedures were found to be statistically significant ($P < 0.01$).

For our Phase 2 research, the surveying process netted 1,592 returned questionnaires a response rate of 82.9%. This rate of response is considered exceptional, rendering the results highly accurate. Figure 1 shows the number of respondents by their county of residence.

Because the sample was drawn as a scientifically random sample and a high percentage of those contacted returned the questionnaires, it is possible to generalize the responses of this survey back to the general population with a high level of accuracy. The respondents' opinions, reported below, can be interpreted as representative of the opinions of all Wisconsin recreational boaters.

Data Analysis

Responses from returned questionnaires were coded and keyed into a computer database. We used the SAS software package for data analysis (SAS Inst. Inc. 1987). The entire sample was analyzed as a whole, although in several cases we divided the respondents into groups based on the water bodies they indicated they boated on most frequently. We conducted other analyses by grouping responses according to boat types (motor, sail, canoe, etc.) across a variety of variables, to determine the differences in experiences and attitudes of the different groups of boaters. For reporting results, average values are given most frequently. Where computed results include very high or very low values, median values are also reported to indicate the true mid-point of the data, where 50% of the respondents reported less than and 50% reported greater than that point.

RESULTS

Boat Owners and Their Boats

Who Were Our Recreational Boaters?

The survey results provided us with a demographic “picture” of the licensed boat owners in Wisconsin, including the following characteristics:

- The average age of respondents was 50.5 years (Table 1).
- 90% were male.

- 84% were married (Table 2).
- 84% had children, with average ages between 10 and 14 years old. Most respondents had 1 or 2 children (Table 3).
- 9 out of 10 respondents had high school educations or more, with 31% having a college diploma or post-graduate/professional degree (Table 4).
- The median household income was \$30,000-\$44,999 (Table 5).
- One half of all the boaters sampled lived in small towns or villages or in rural non-farm areas. Few lived on farms or in very large cities (Table 6).
- Nearly one third of the respondents indicated that they owned vacation property or a second home in Wisconsin. The most popular counties in which to own a vacation home were Oneida County and Vilas County (Fig. 2).

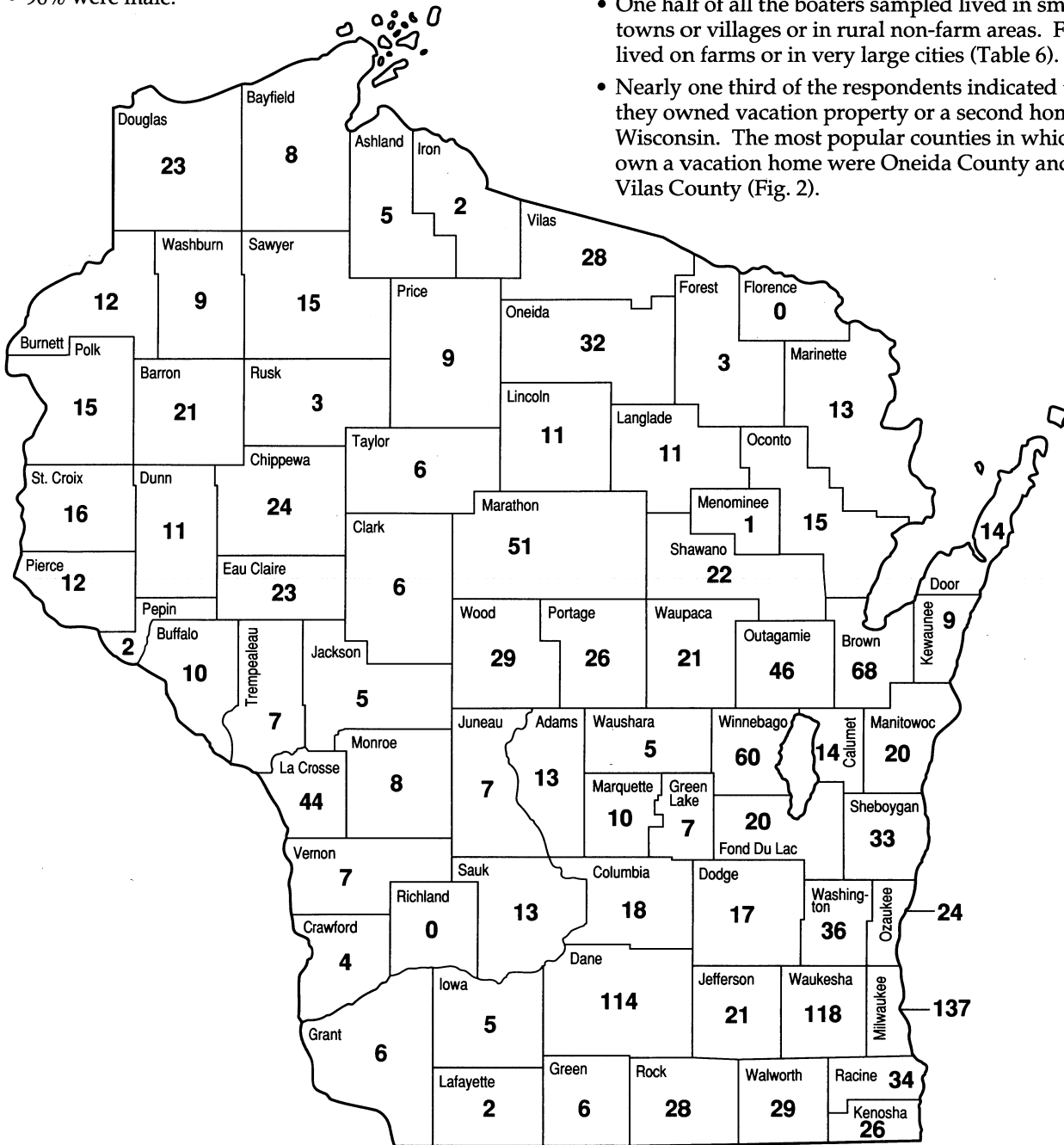


Figure 1. Number of respondents from each county (62 respondents did not identify their county of residence).

What Kinds of Boats Did They Own?

- Most respondents owned more than one boat: the average number was 2.3 boats, and the median number of boats owned was 2. Less than one half (43%) of the respondents owned one boat only.
- 51% of the respondents owned an open motorboat under 16 ft long (Table 7); 33% owned larger open motorboats, while 29% and 27%, respectively, owned rowboats and canoes.
- Open motorboats were most frequently listed as the primary boat, used most often.

- Nearly 9 out of 10 of the primary boats owned were motorized, and 84% of these had outboard motors (Table 8).
- The average horsepower of the boats in the study was 60.3 hp, and the median horsepower was only 35 hp. Distribution of horsepower among boats represented in the sample is shown in Table 9.
- Boats averaged 16.3 ft in length, with a median length of 15.5 ft.
- Over one half of the boats had metal hulls (aluminum, steel, or steel alloy), 42% had fiberglass or plastic hulls, and very few had wooden hulls (Table 10).
- The average age of the boats was 12.9 years, and they had been owned by the current owner an average of 8.7 years.

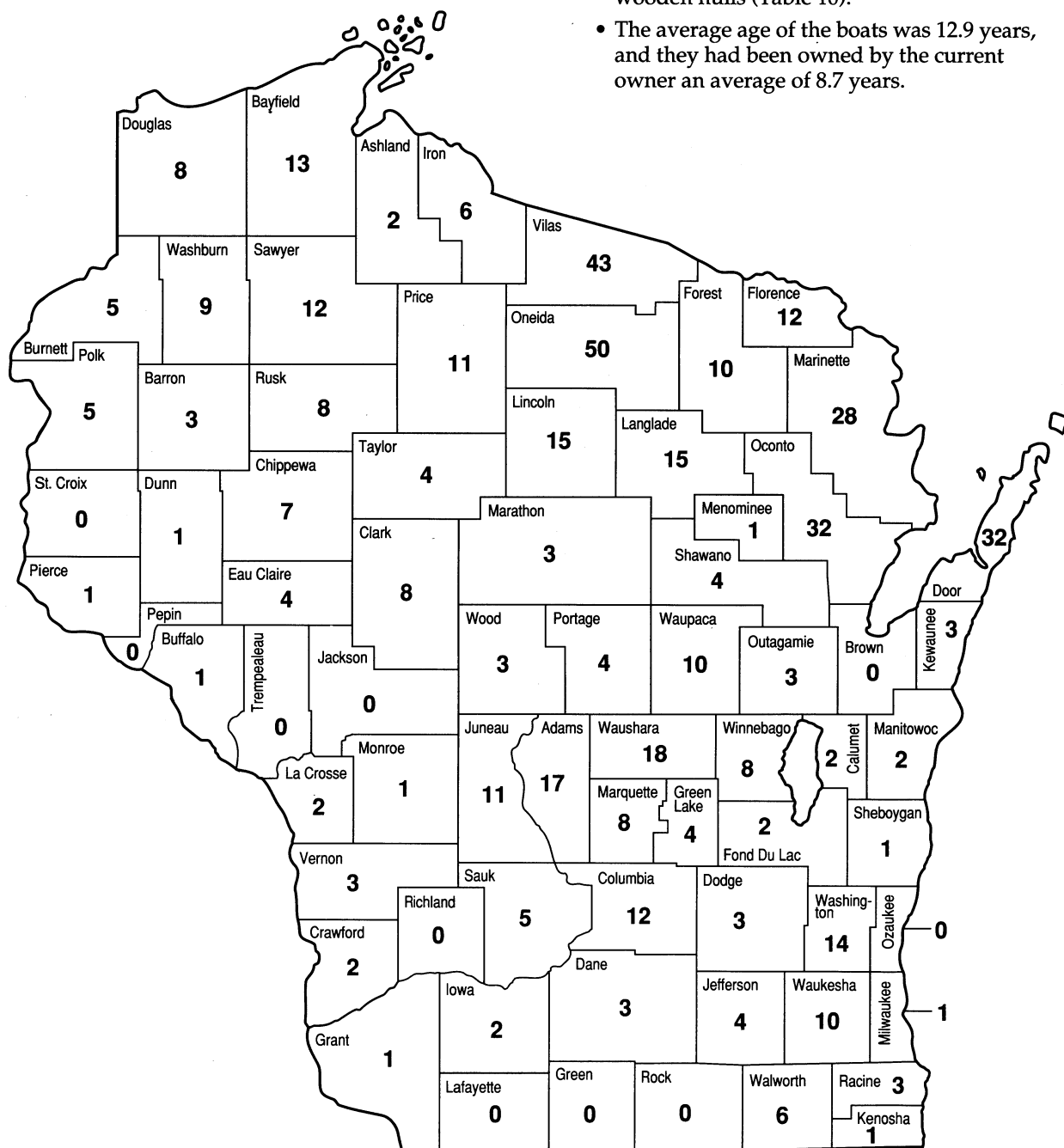


Figure 2. Number of respondents owning vacation property or second homes in each county.

Table 1. Age of respondents.

Age Group (years)	Percent (%) of Total
< 20	0.6
20-29	5.4
30-39	16.7
40-49	26.1
50-59	22.7
60-69	19.0
≥ 70	9.5
Average age: 50.5 years	

Table 2. Respondents' marital status.

Marital Status	Percent (%) of Total
Married	84.4
Never married	7.2
Divorced	4.9
Widowed	3.0
Separated	0.5

Table 3. Number of children for those respondents with children.

No. Children	Percent (%) of Total
1	34.9
2	42.4
3	15.9
≥ 4	6.8

Table 4. Respondents' level of education.

Education	Percent (%) of Total
Eighth grade or less	3.8
Some high school	5.7
High school graduate or equivalent	25.9
Some college/technical school	24.1
Technical school graduate	9.0
College graduate	17.3
Post-graduate/professional degree	14.2

Table 5. Total household income of respondents.

Income	Percent (%) of Total
< \$10,000	4.3
\$10,000-19,999	10.6
\$20,000-29,999	16.9
\$30,000-44,999	27.3
\$45,000-59,999	16.7
\$60,000-74,999	8.9
\$75,000-99,999	6.2
\$100,000-149,999	4.7
≥ \$150,000	4.4

Table 6. Where respondents lived.

Residence Category	Population Size	Percent (%) of Total
Farm	—	5.6
Rural non-farm	—	22.0
Small town or village	< 10,000	28.1
Large nonsuburban town	10,000-49,999	15.1
Suburban area of a large city	—	11.0
Large city	50,000-500,000	13.9
Very large city	> 500,000	4.3

Table 7. Types of boats owned and used most often.

Boat Type	Percent (%) of Total	
	Owned	Used Most Often
Open motorboat < 16 ft	51	37
Open motorboat ≥ 16 ft	33	28
Rowboat	29	10
Canoe	27	4
Sailboat	22	10
Pontoon boat	10	7
Inflatable boat/raft	6	<1
Sailboard	4	1
Cabin cruiser	3	2
Kayak	2	<1
Personal watercraft	2	<1
Houseboat	<1	<1
Other	6	1

Table 8. Types of motors on primary boats.

Motor Type	Percent (%) of Total
Outboard	84
Inboard/outboard	9
Inboard	6
Jet Drive	<1
Other	1

Table 9. Horsepower of primary motors.

Horsepower (hp)	Percent (%) of Total
1-15	31
16-30	18
31-45	12
46-60	8
61-75	7
76-100	5
101-150	10
≥ 151	8

Table 10. Hull materials of primary boats.

Hull Material	Percent (%) of Total
Metal	55
Fiberglass, plastic	42
Wood	2
Rubber, vinyl, canvas	<1
Other	<1

Where Did They Boat?

Boaters were asked which body of water they used most often for recreational boating in Wisconsin during the previous 12 months. Respondents listed 388 water bodies in 70 counties; the 14 water bodies named most frequently are shown in Table 11 and Figure 3. After identifying the water body they most frequently used, respondents were asked to tell us more about their experiences while boating there, particularly with regard to issues such as recreational interference, crowding, and the need for protected harbors and waterway markers. Results from that portion of the survey are presented later in this report.

In addition to the water body most frequently used, respondents were asked what water body was their favorite for boating, and why. Favorite water bodies included Lake Michigan, the Mississippi River, Green Bay, Lake Winnebago, the Wisconsin River, Lake Mendota, the Wolf River, Lake Geneva, Green Lake, and Shawano Lake.

Most respondents gave the following reasons for favoring particular water bodies:

- A vacation home or cabin on or near the water body was owned or rented, or the respondent lived there year round.
- The water body provided good fishing and variety of fish.
- It was close to home and convenient to get to.
- It offered a large area for boating and/or fishing, with little interference from other boaters.
- It had beautiful scenery and secluded shoreline.
- It had clean, clear water.
- It was a quiet area with little traffic.
- It had easy access with good launch facilities.
- It had a campground nearby or on the shore.
- It had boat storage or mooring facilities on the water.
- It had opportunities for many different activities.
- The respondent grew up there.

The reasons for boaters considering a lake or river their favorite spot for boating varied from water body to water body (Table 12). Most Lake Michigan and Wolf River boaters indicated that good fishing was what attracted them, while for the Mississippi River, Green Bay, Lake Mendota, the Wisconsin River, Pewaukee Lake, and Green Lake, respondents liked to boat there because it was close to home. Lake Winnebago was popular because it provided a large area to boat or fish in. Boaters preferred Lake Geneva and Shawano Lake because they owned or rented property in the area.

In addition to identifying the lakes and rivers that boaters favored and those they boated frequently, it was important to recreational managers to find out what water bodies boaters in Wisconsin might have avoided and why. We asked boaters to tell us of any water bodies they avoided for boating and to explain their reasons for

avoidance. Respondents named 109 water bodies in 61 counties that were dissatisfactory in some way and thus avoided. It is interesting to note that many of the water bodies named as dissatisfactory are the same as those mentioned by other boaters as favorites or most-visited. The reasons given for avoidance indicate differing expectations and activities. The unique recreational opportunities provided by a specific lake or river that were attractive to some boaters were the very reasons that other boaters chose not to boat there. The primary reasons respondents gave for avoiding specific lakes and rivers included too much power boat traffic or crowded conditions, pollution, too many weeds or algae, too much shallow water, and too large size (Table 12).

Wisconsin has a number of lakes and rivers that form the dividing lines between Wisconsin and other states. These lakes and rivers often provide special opportunities and challenges for providing uniform safety or regulatory standards. Thus, it was important to get an idea of how much Wisconsin boaters were making use of such border waters. Nearly one half of the respondents indicated that they boated on the border waters between Wisconsin and Michigan, Minnesota, and Iowa during the 1990 boating season (Table 13).

What Did They Do While Boating?

During the 1989-90 boating season, 84% of the respondents had operated a boat in Wisconsin (N = 1,336). The majority of this boating was during the regular boating season (April-September), although there were some boats on the water during the off-season (October-December 1989 and January-March 1990) (Figs. 4, 5).

As in the first phase of this research project, we found that the activity most frequently engaged in by recreational boaters was fishing from the boat. Three fourths (78%) of all boaters in the Phase 2 survey indicated that they participated in fishing at least once during the past 12 months (Table 14). Pleasure cruising was the next most popular activity, engaged in by 40% of the respondents. Water skiing, canoeing, sailing, towing water toys, and swimming were also engaged in by a sizeable proportion of the boaters.

Participation in each of these activities varied considerably depending on the type of boat owned. Those with small motorboats, rowboats, or large motorboats were the most likely to fish, while those with sailboats were least likely to fish. Those with cabin cruisers were primarily interested in pleasure cruising. Water skiing and towing water toys were activities dominated by those with large motorboats. Those with cabin cruisers were the most likely to swim and scuba dive as well as to spend the night on board at an overnight anchorage. Those with sailboats were the most interested in sailing and racing.

The average party size was 2.8 people (Table 15). Those with pontoon boats had the highest average party size, and those with rowboats had the lowest.

The median distance traveled to go boating in Wisconsin was only 10 miles one way. Many persons

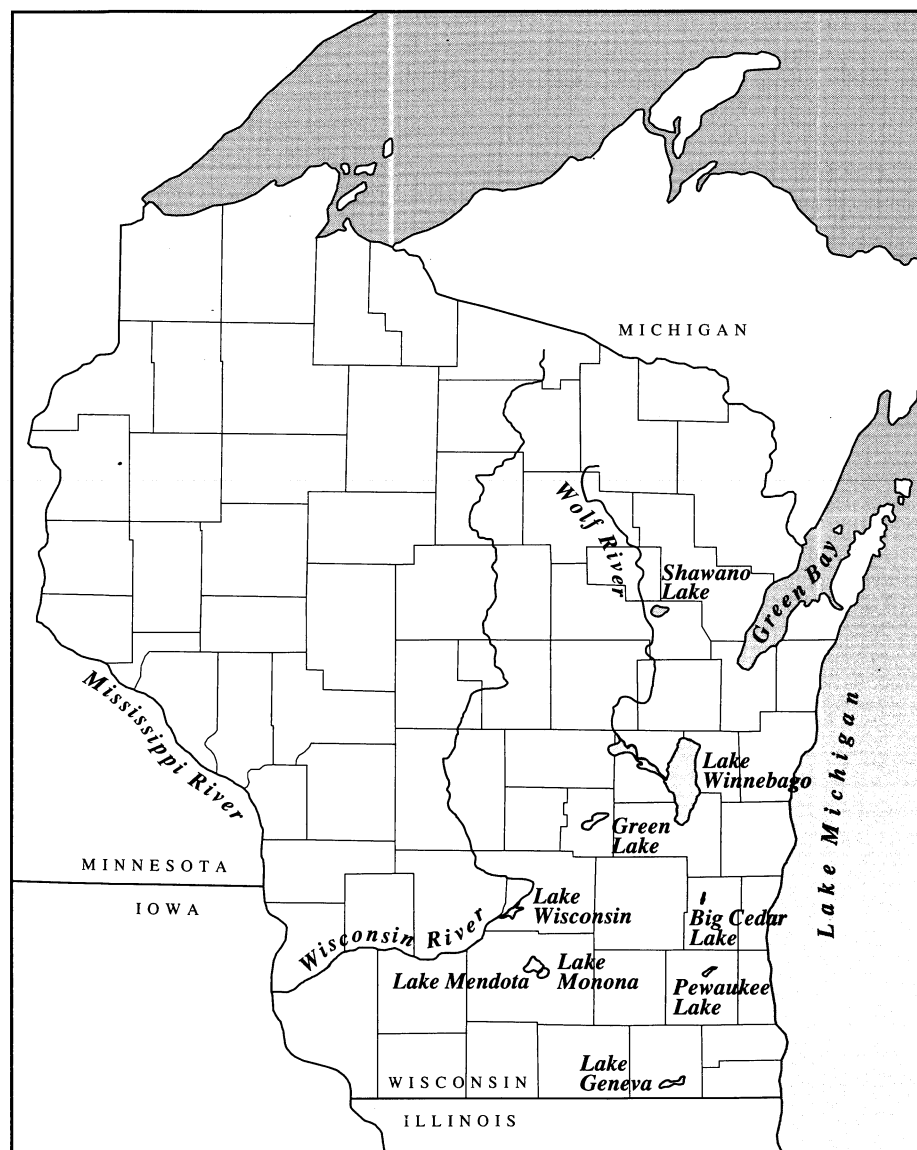
Water Body	No. Respondents	Percent (%) of Total
Lake Michigan	97	5.0
Mississippi River	66	3.4
Lake Winnebago	61	3.2
Green Bay	49	2.6
Lake Mendota	45	2.3
Wisconsin River	33	1.7
Shawano Lake	27	1.4
Lake Monona	26	1.4
Wolf River	25	1.3
Pewaukee Lake	22	1.2
Lake Geneva	20	1.0
Lake Wisconsin	18	0.9
Big Cedar Lake	16	0.8
Green Lake	14	0.7

County of residence had an impact on the distance boaters were willing to travel to go boating. The median distance traveled to go boating was over 40 miles for respondents living in Iowa, Green, Pepin, Marathon, Eau Claire, and Rock counties, while a median distance of less than 5 miles of travel for boating was reported by respondents from 16 other counties (Fig. 6).

Why Did Respondents Boat?

What Kinds of Difficulties Did They Encounter?

Recreational Interference and Other Problems. In Phase 1 of this study, we noted that conflicts in recreation are generally centered around conflicting uses of resources (Penaloza 1991). In the Phase 1 questionnaire, we asked respondents to tell us in their own words what, if anything, interfered with their enjoyment of their boating experience. For Phase 2 of the study, we used the answers given in the Phase 1 questionnaire to develop a list of 12 types of



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Table 12. *Reasons given for favoring or avoiding selected water bodies.*

Water Body	Reasons for Favoring*	Reason for Avoiding*
Lake Michigan	Good fishing, variety of fish Close to home, convenient Large area to boat or fish Own or rent property, live there Scenery is beautiful, secluded Easy access, good launch facilities Has everything needed - perfect Clean, clear water Many opportunities for activities	Too large Water is rough and unpredictable at times Boat is too small for such a large lake Pollution Private boat landings make launching too expensive Fish are contaminated Too much power boat traffic, crowded Unsafe, dangerous waters
Mississippi River	Close to home, convenient Good fishing, variety of fish Scenery is beautiful, secluded Quiet, not much traffic Easy access, good launch facilities Has a campground nearby Grew up on it Good hunting	Too much power boat traffic, crowded Pollution
Lake Winnebago	Large area to boat or fish Own or rent property, live there Close to home, convenient Good fishing, variety of fish Easy access, good launch facilities	Water is rough and unpredictable at times Too many weeds, algae Too shallow Boat is too small for such a large lake
Green Bay	Close to home, convenient Good fishing, variety of fish Own or rent property, live there Large area to boat or fish Clean, clear water Easy access, good launch facilities Scenery is beautiful, secluded Opportunities are varied Favorable sailing and racing conditions	Too much power boat traffic, crowded Too many weeds, algae Boat is too small for such a large lake Poor harbors Water is rough and unpredictable at times.
Lake Mendota	Close to home, convenient Good fishing, variety of fish Large area to boat/fish Own or rent property, live there Easy access, good launch facilities Scenery is beautiful	Too much power boat traffic, crowded
Wisconsin River	Close to home, convenient Good fishing, variety of fish Quiet, not much traffic Own or rent property, live there Scenery is beautiful, secluded Large area to boat or fish Good hunting Great area to canoe	Too much power boat traffic, crowded Pollution Shallow Submerged stumps and rocks Contaminated fish
Shawano Lake	Own or rent property, live there Close to home, convenient Large area to boat or fish Good fishing Quiet, not too much traffic Close to family Grew up there Easy access, good launch facilities	Too much power boat traffic, crowded Too many weeds, algae
Wolf River	Good fishing, variety of fish Close to home, convenient Own or rent property, live there Large area to boat or fish Scenery is beautiful, secluded Good jet skiing	Too much power boat traffic, crowded Unsafe, dangerous

Table 12. (continued)

Water Body	Reasons for Favoring*	Reason for Avoiding*
Pewaukee Lake	Close to home, convenient Large area to boat or fish Good fishing, variety of fish Own or rent property, live there	Too much power boat traffic, crowded Pollution
Lake Geneva	Own or rent property, live there Large area to boat or fish Clean, clear water Easy access, good launch facilities Close to home, convenient	Too much power boat traffic, crowded Private boat landings make launching too expensive
Green Lake	Close to home, convenient Large area to boat or fish Good fishing Clean, clear water Quiet, not much traffic Own or rent property, live there Deep Boat is stored there	Poor access

*Reasons listed in order of frequency.

Table 13. Boating participation on lakes and rivers bordering Wisconsin.

Wisconsin Border Water Used	Percent (%) of Total Participating
None	53
Lake Michigan	19
Mississippi River	11
Inland lakes on the Michigan/Wisconsin border	7
Lake Superior	4
Menominee and Brule rivers	3
St. Croix River	2
St. Louis River	1

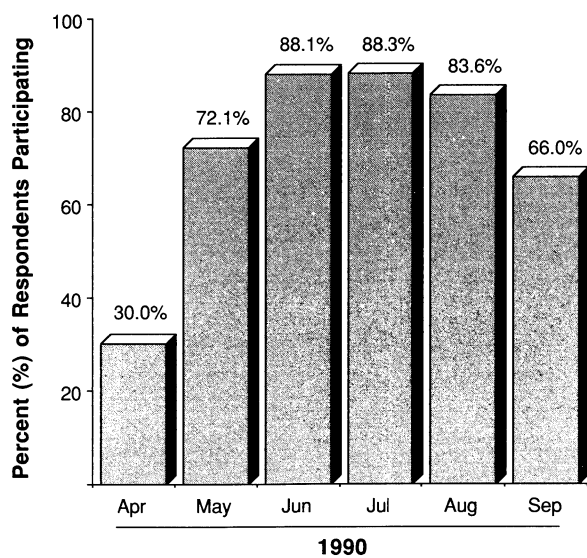


Figure 4. Boating participation, 1990, regular season.

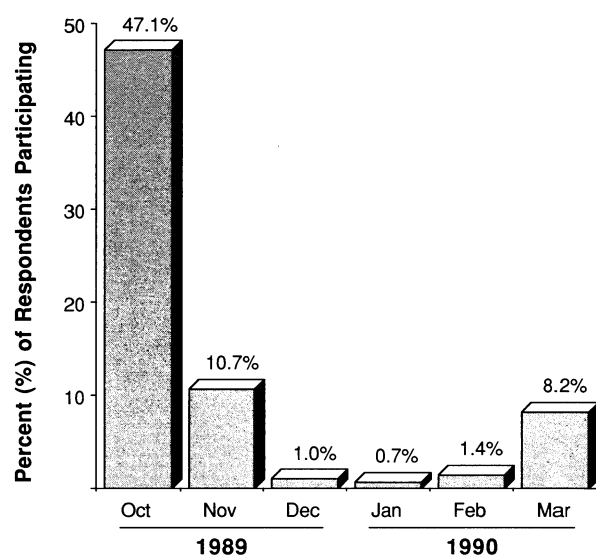


Figure 5. Off-season boating participation, 1989-90.

Table 14. Activities by boat type.

Activity	Percent (%) Participation, by Boat Type							Average
	Rowboat	Canoe	Sailboat	Small Motorboat*	Large Motorboat*	Cabin Cruiser	Pontoon	
Recreational fishing	87	71	31	88	80	62	77	78
Pleasure cruising	23	12	37	28	53	88	67	40
Water skiing	13	10	23	25	57	34	26	34
Canoeing	17	88	32	20	22	12	31	24
Sailing	8	24	97	9	18	16	24	22
Towing water toys	6	7	12	15	34	25	27	21
Swimming, scuba-diving	12	10	20	9	26	41	34	18
Hunting, trapping	9	5	2	12	9	12	4	9
Overnight anchoring	4	2	21	2	3	66	1	6
Riding personal watercraft	1	0	7	4	8	6	7	6
Racing	1	2	23	2	3	6	4	4
Commercial use	3	2	2	4	4	9	5	4
Rafting	3	15	2	3	3	0	1	3
Kayaking	0	7	2	1	1	3	1	2
Something Else	2	6	2	2	6	1	2	-

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

Table 15. Boating party size, by boat type.

Boat Type	Average No. People in Party
Rowboat	2.09
Canoe	2.29
Sailboat	2.47
Small (≤ 16 ft) motorboat	2.58
Large (> 16 ft) motorboat	3.10
Cabin cruiser	3.56
Pontoon boat	4.32
Overall average: 2.83 people	

Table 16. Distance traveled for boating.

Average Miles Traveled	Percent (%) of Total Represented
≤ 2 miles	30
3-5 miles	13
6-10 miles	11
11-20 miles	11
21-40 miles	11
41-80 miles	8
81-150 miles	8
≥ 151 miles	8

Table 17. Reasons for boating, by boat type.

Reason	Percent (%) of Total Participating, by Boat Type							Average
	Rowboat	Canoe	Sailboat	Small Motorboat*	Large Motorboat*	Cabin Cruiser	Pontoon	
To fish	60	30	0	60	43	16	20	43
To relax	23	25	58	20	29	53	45	30
To be with friends and family	3	6	15	8	16	19	19	12
To enjoy nature	13	40	8	11	9	0	17	11
For the excitement	1	0	6	1	1	0	0	2
For competition and challenge	0	0	9	<1	<1	3	0	2
To see different places	0	0	0	<1	1	9	0	1
To develop skills	0	2	0	<1	0	0	<1	<1
For transportation	0	0	1	<1	<1	0	0	<1

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

recreational interference. This list was included in the Phase 2 questionnaire, and we asked respondents to check which types of interference applied to their boating experience on the water body they had earlier indicated they used most frequently, with results as shown in Table 18.

The degree to which each type of recreational interference was a problem varied by water body (Table 19). For instance, while lack of courtesy by other boaters and large wakes from other boats were concerns related to

almost all of the most frequently used water bodies, other boaters going too fast was of concern particularly to boaters on the Wolf River, other boaters not knowing the rules of the road and sailing too close were particular concerns on Lake Geneva, and crowded conditions were of concern especially on Big Cedar Lake.

The activities of others that interfered with boaters' enjoyment of their own recreation varied significantly across boat types (Table 20). For all boat types, lack of courtesy by other boaters and large wakes were frequently mentioned as having interfered with respondents' boating activities. These 2 types of interference were complaints especially among those with cabin cruisers; over one half of those boaters mentioned each one as a difficulty. Those with cabin cruisers were also more likely than owners of other boat types to indicate that other boaters

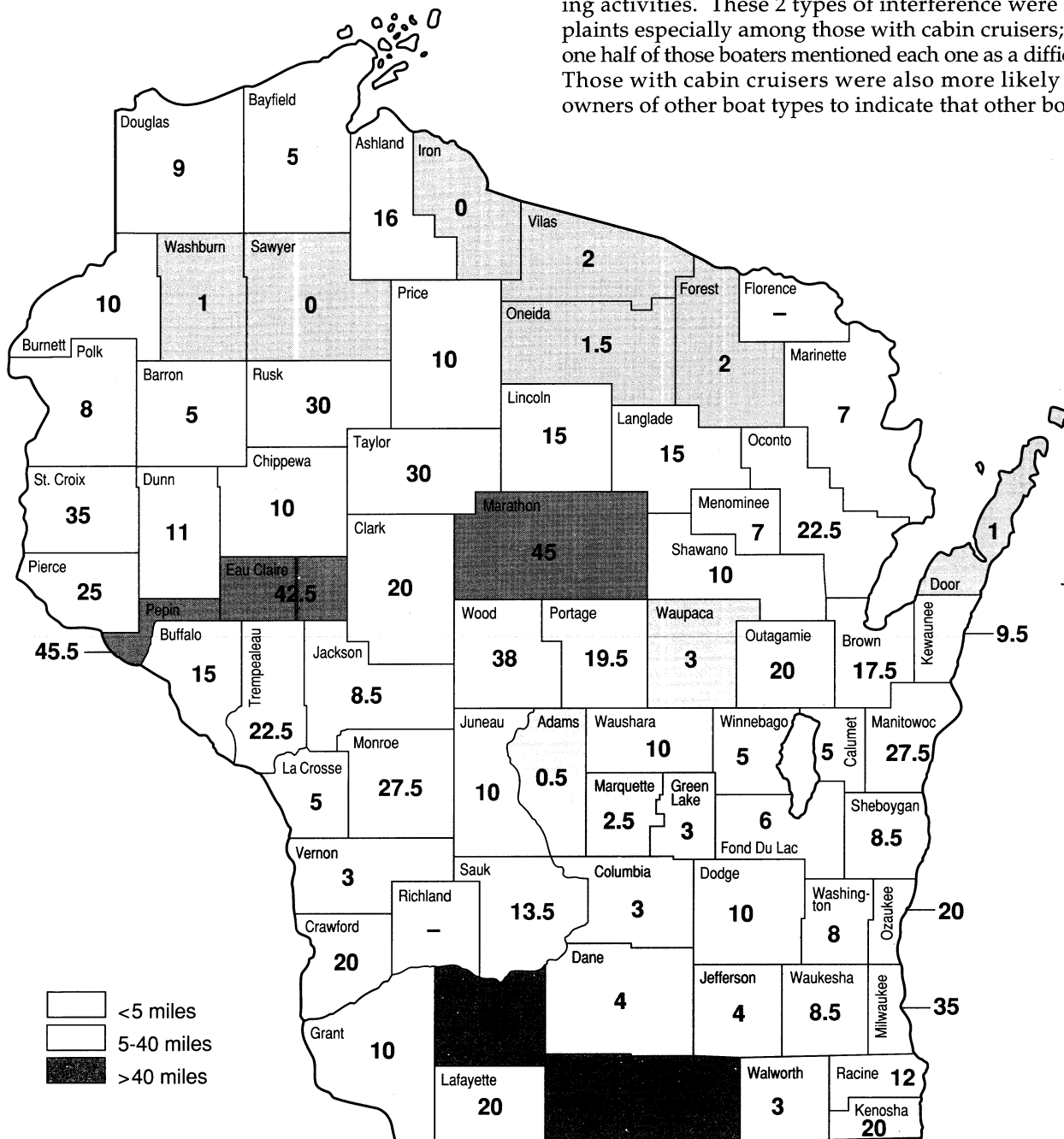


Figure 6. Median distance (miles) traveled to go boating, by county of residence.

were too close to them and that other boaters did not know the rules of the road. They also felt more strongly than other boaters that there was not enough law enforcement, access sites were too crowded, there was not enough access to Wisconsin waters, and that alcohol use by other boaters made boating unsafe. Those with pontoon boats were the most likely to indicate that other boaters traveled too fast. Those with large motorboats were the group most likely to indicate that the water body was too crowded. Sailboaters were the ones most likely to indicate that there was too much noise on the water.

In addition to asking respondents to identify which types of recreational interference had negatively affected their boating experience, we also asked respondents to tell us *how much* of a problem a variety of negative experiences were to their enjoyment of the body of water on which they boated most frequently. We compiled a list of common problems identified by respondents to the Phase 1 questionnaire, including some of the recreational interference situations, and asked respondents to rate each one on a scale of 1-4, from "not a problem" to "a serious problem." Table 21 shows the percentages of boaters for whom each experience was a moderate or serious problem on the water body they boated most frequently. Some of these problem areas were more prominent on certain water bodies than others. Table 22 shows the rankings for 10 of the most frequently boated water bodies.

Table 18. *Percentage of respondents who experienced recreational interference.*

Type of Recreational Interference	Percent (%) of Total Citing Interference Type
Lack of courtesy by other boaters	42
Large wakes from other boats	42
Other boaters came too close to my boat	36
Other boaters going too fast	32
Other boaters did not know rules of the road	27
Too many other boaters on the water	22
Not enough law enforcement emphasis	22
Crowding at access points	22
Too much noise from other boats	19
Not enough access points to water	15
Alcohol use by other boaters made boating unsafe	13
Too much law enforcement emphasis on the water	3

Table 19. *Incidence of interference on the most frequently boated water bodies.*

	Percent (%) Respondents Citing Interference Type											
	Large wakes	Lack of courtesy	Rules of the road not followed	Others came too close	Others going too fast	Too much noise	Too many other boaters	Too much law enforcement	Not enough law enforcement	Not enough access	Crowding at access	Other boaters' alcohol use
Lake Michigan	46	48	42	39	22	19	9	6	15	25	33	16
Mississippi R.	64	68	30	45	39	11	27	5	29	12	24	18
Lake Winnebago	49	51	41	38	28	25	10	0	21	15	21	23
Green Bay	51	45	29	47	35	22	14	4	24	35	33	8
Lake Mendota	67	51	31	58	42	38	40	4	20	11	33	24
Wisconsin River	52	48	33	58	42	27	39	6	36	18	30	12
Shawano Lake	44	52	30	37	44	26	26	0	33	7	26	22
Lake Monona	46	46	31	31	46	23	46	4	15	15	42	23
Wolf River	80	76	44	56	64	16	40	0	40	28	32	12
Pewaukee Lake	50	41	41	27	36	14	41	9	18	18	45	23
Lake Geneva	65	65	70	65	50	50	55	5	50	10	20	30
Lake Wisconsin	39	50	44	50	50	56	33	6	39	33	33	28
Big Cedar Lake	47	33	33	27	33	33	60	13	13	20	53	13
Green Lake	43	14	7	36	14	29	14	7	7	7	29	0

Table 20. *Recreational interference experienced, by boat type.*

Interference Type	Percent (%) of Total Citing Interference, by Boat Type							Average
	Rowboat	Canoe	Sailboat	Small Motorboat*	Large Motorboat*	Cabin Cruiser	Pontoon	
Lack courtesy	29	22	40	42	48	79	39	42
Large wakes	32	20	44	45	44	52	42	42
Other boaters too close	26	17	32	37	42	48	42	37
Others going too fast	26	9	32	32	33	30	44	32
Others not knowing rules of the road	13	9	38	19	35	67	30	27
Too crowded	11	9	16	22	28	24	23	22
Not enough law enforcement	17	7	19	22	26	27	24	22
Crowded access	7	13	15	25	29	39	6	22
Too much noise	14	19	34	14	22	18	23	19
Not enough access	10	9	11	16	19	33	7	15
Alcohol use	9	2	16	10	19	21	10	13
Too much law enforcement	1	0	3	2	4	12	3	3

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

Table 21. *Problems rated as moderate or serious.*

Problem	Percent (%) Respondents Rating Problem as Moderate or Serious
Excessive speed of power boats	37
Excessive horsepower of power boats	35
Conflicts with personal watercraft	33
Inconsiderate behavior of others	31
Poor water quality, habitat destruction	30
Garbage (cans, bottles, etc.) in the water	27
Lack of parking lots at access sites	26
Poor design and condition of boat launch ramps at public water access sites	25
Lack of public water access sites	23
Shore erosion	22
Lack of handicap access sites	20
Lack of enforcement of boating rules and regulations	20
Not enough pamphlets, brochures, or maps describing public water access sites	19
Too much alcohol use by boat operators	19
Boat noise	18
Condition of parking lots at public water access sites	16
Pollution caused by outboard motors	15
Maintenance of boating facilities at public water access sites	15
Conflicts with water skiers	12
Conflicts with anglers	8
Too many public water access sites	6

Table 22. *Highest ranking problems for some of the most frequently boated water bodies.*

Water Body	Excessive speed	Conflicts with PWCs	Excessive horsepower	Lack of access parking	Poor water quality	Poor access ramps	Others inconsiderate
Lake Michigan				1*	2		
Mississippi River			2		1		
Lake Winnebago			2		1		
Green Bay				1		2	
Lake Mendota	1				2		2**
Wisconsin River		1	2				
Lake Monona		1			2		
Wolf River	1		2				
Lake Geneva	1	2	2**				2**
Lake Wisconsin	1	1**			2	1**	

*1 = highest ranked problem; 2 = second highest ranked problem.

**Duplicate ratings indicate a "tie score".

Perceived Crowding. The Phase 2 questionnaire asked respondents to rate how crowded they felt on the water body they used most frequently. Rating was on a scale from 1 to 9, corresponding to feelings of "not at all crowded" to "extremely crowded." Boaters overall expressed fairly low levels of crowding on the water. Thirty-seven percent of all boaters in the study indicated that they felt not at all crowded while boating on their most frequently used water body, and 32% felt only somewhat crowded. For the state's most popular water bodies, the percentage of boaters who felt somewhat to extremely crowded on the water body they used the most ranged from 49% to 95% (Fig. 7). Boaters expressed the highest levels of perceived crowding on Lake Geneva, Lake Wisconsin, Big Cedar Lake, Pewaukee Lake, the Wolf River, Lake Mendota, and Lake Monona.

For some of these water bodies, the level of perceived crowding reported on the Phase 2 questionnaire far exceeded the levels found in Phase 1 (Penaloza 1991). We attribute these differences to the different types of recall bias elicited by the different methods used in each phase of the survey. The Phase 2 questionnaire asked respondents to evaluate crowding on their most frequently used water body for the entire boating season, while the Phase 1 questionnaire asked respondents to evaluate crowding for boating during the most recent 2-week period only. We assume that perceptions of crowding for Phase 2 respondents were biased by memories of their worst crowding experiences of the whole year, which would stand out in their memories more than less-crowded experiences on the same water body, while Phase 1 reports were less affected by this type of recall bias. Therefore, we believe that Phase 1 of the survey provided the most accurate results regarding perceived crowding.

The Need for Protected Harbors and Waterway Markers. Forty percent of the respondents indicated that they would like to see more protected harbors, including breakwaters, launching facilities, and tie-up spots on the lakes and rivers in Wisconsin. Of these, 40% wanted to see these improvements on Lake Michigan, 19% on Lake

Winnebago, 15% on the Wisconsin River, 10% on Lake Superior, and 7% on Green Bay.

Some water bodies used most by respondents did not have adequate waterway markers. The most commonly cited needs for additional markers were for shallow water or sand bars (25%), rocks (17%), and channels (15%). About 10% of the respondents suggested that their most-used water body needed "slow, no wake" signs or speed limits.

How Did They Feel About Personal Watercraft?

Ten percent of the respondents owned a personal watercraft (PWC)—often known by such brand names as Jet Skis, Sea-Doos, Wet-jets, WaveRunners, and Wet-bikes¹—but only 0.2% listed a PWC as their primary boat. Nearly one quarter (22%) of the respondents had rented a personal watercraft at some time. Of these, 40% reported having received some safety information about the operation of that watercraft, while 60% had not.

Most people seemed to experience some dissatisfaction with the way PWCs were currently being operated on Wisconsin waters. Interestingly, there were few differences in attitudes between those who owned PWCs and those who did not. Two thirds (65%) of the respondents disagreed or strongly disagreed with the statement that PWCs do not need to be regulated any differently than other motorboats (they currently are not) (Fig. 8), while only one quarter (24%) agreed or strongly agreed with that statement. Similarly, 72% disagreed or strongly disagreed with the statement that the use of PWCs does not conflict with other water recreation and does not require any special restrictions; only 15% agreed or strongly agreed with that statement (Fig. 9).

Other perceptions about PWCs were that they make too much noise (48% agreement) (Fig. 10) and that they are dangerous to other boaters on the water (58% agreement) (Fig. 11). Those who owned PWCs were more likely to agree that PWCs are too noisy—57% agreed, compared with 47% of those who did not own a PWC. Suggestions for regulating or controlling PWC use were generally favorably received. Nearly three quarters (73%) agreed

¹Reference to trade names does not imply government endorsement of commercial products.

or strongly agreed that operators of PWCs should be required to take a course in Wisconsin boating laws and boating safety practices (Fig. 12), and 63% agreed that the use of PWCs should be restricted to certain parts of lakes and/or to certain times of day in order to reduce the conflicts with other water recreationists (Fig. 13). Those who owned PWCs were slightly more likely to agree that operators of the craft should take a safety course—76% of the PWC owners agreed with this idea, 73% of those who did not own PWCs agreed.

Written comments from respondents concerning PWCs were common throughout the completed questionnaires, primarily in response to questions concerning restrictions or potential conflicts between other types of recreational boating and PWCs. About one third of these comments concerned the perception of unsafe operation of PWCs or simply the inconsiderate or rude behavior of operators. Many respondents indicated a general dislike for PWCs, but provided no specifics about what it was they objected to, while many others focused on the noise produced by the craft as the reason for their objections. About one in 10 of the comments stated that there should be no special regulations for PWCs, but most of these comments stressed that existing regulations (the same as for any motorboat) should be strictly enforced. A minority of the respondents commented that PWCs should be banned or outlawed or suggested special licensing or age restrictions. A few suggested that the primary difficulties with PWCs involved rentals, especially to persons with no prior training or understanding of safe boating practices. These respondents suggested providing restrictions and regulations on the use of PWCs and strict enforcement of those regulations; banning or outlawing the use of PWCs, particularly on small, quiet lakes; banning rentals of PWCs; and providing better boating safety education for PWC operators.

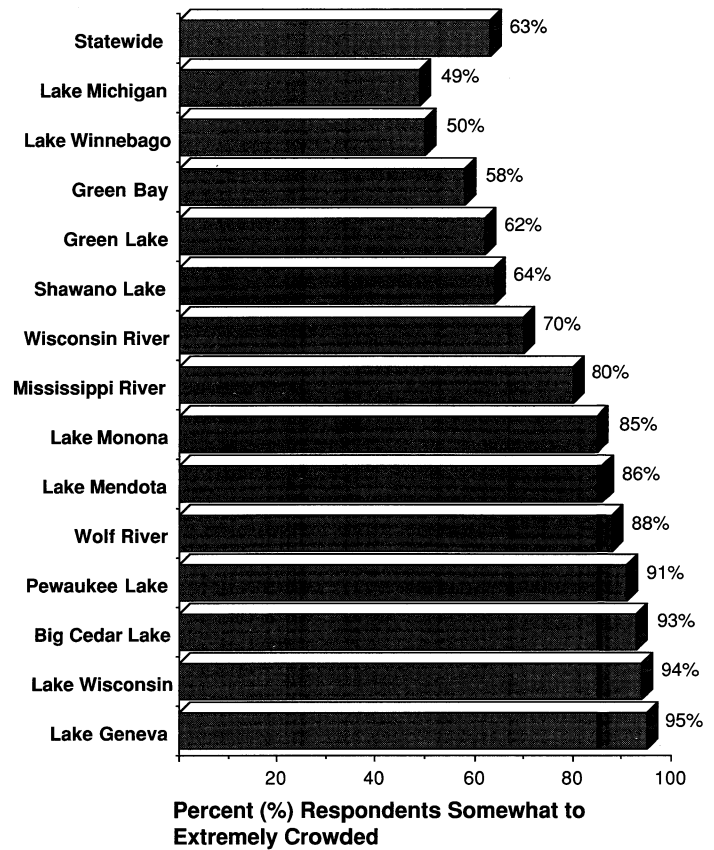


Figure 7. Perceived crowding levels on frequently used water bodies.

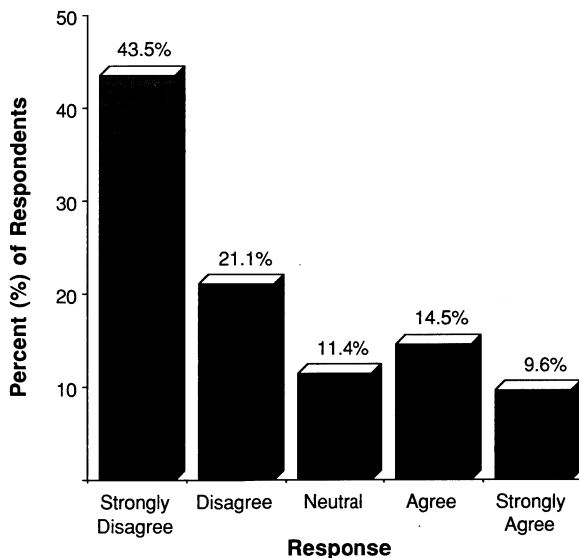


Figure 8. Responses to a statement that personal watercraft do not need to be regulated any differently than other motorboats.

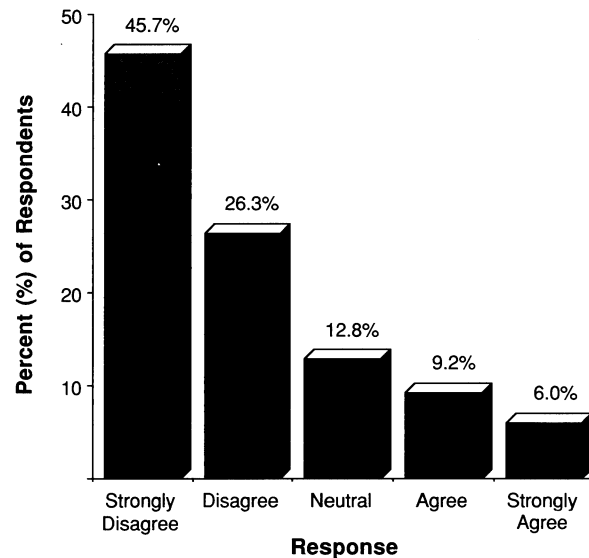


Figure 9. Responses to a statement that the use of personal watercraft does not conflict with other water recreation and does not require any special restrictions.

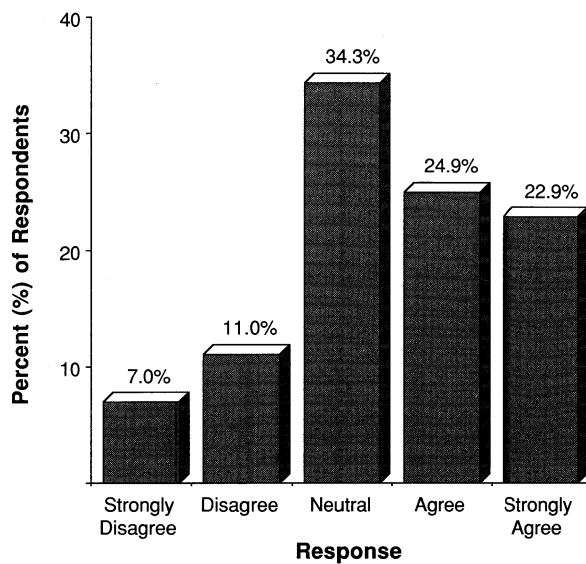


Figure 10. Responses to a statement that personal watercraft make too much noise.

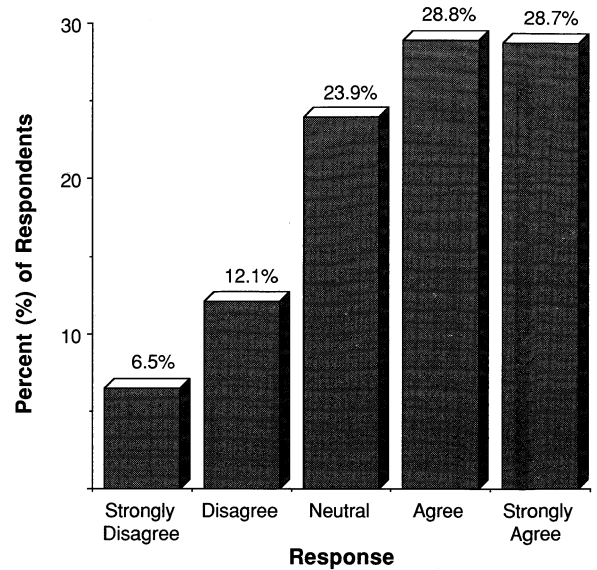


Figure 11. Responses to a statement that personal watercraft are dangerous to other boaters on the water.

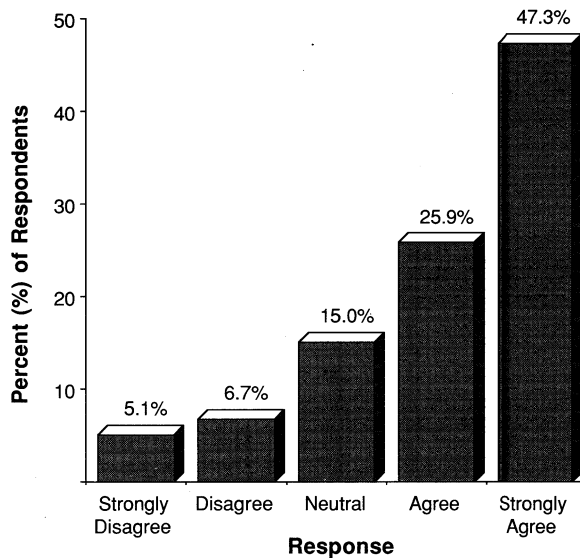


Figure 12. Responses to a statement that operators of personal watercraft should be required to take a course in Wisconsin boating laws and boating safety practices.

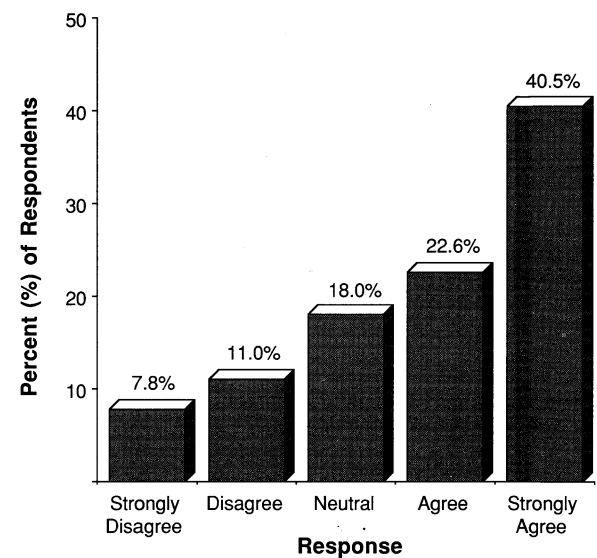


Figure 13. Responses to a statement that the use of personal watercraft should be restricted to certain parts of the lakes and/or certain times of day in order to reduce conflicts with other water recreationists.

What Improvements Did They Want To See?

We asked respondents to tell us in their own words what they saw as the most important ways the DNR could improve boating recreation in Wisconsin. Respondents gave us a wide variety of suggestions. The most frequently suggested ideas are summarized below:

- Provide better enforcement of boating regulations, more boat inspections, more law enforcement personnel (suggested by 16% of respondents).
- Increase access, provide more boat launches on all lakes (9%).
- Improve water quality, keep lakes clean, stop pollution (5%).
- Limit sizes of boats and horsepower allowed on lakes and rivers (5%).
- Reduce speeding on the water; set speed limits (5%).
- Provide better maintenance, design, and improvements for boat ramps (5%).
- Educate boaters on safety and regulations (5%).
- Don't over-regulate; stop making so many rules and laws (4%).

Boating Safety and Boating Laws

Boating safety includes the safe operation and handling of boats as well as knowing the laws concerning boating and the consequences of illegal operation. One of the important aspects of this phase of our research study was to determine the level of awareness of boating safety among recreational boaters and the need for more information and education in this area. This section describes the level of knowledge of boating safety and boating laws expressed by the respondents.

What Boating Safety Information Had Respondents Heard or Seen?

Seven out of 10 boaters saw or heard some sort of boating safety information during the 1989-90 boating season. There was a wide range of awareness of safety information across the different boat types (Table 23). Those who owned cabin cruisers were the most likely to have seen or heard some type of boating safety information during the boating season. Those who owned canoes were the least likely to have seen or heard such information. Sources from which respondents received information on boating safety are shown in Table 24, and the boating safety topics covered are shown in Table 25.

Nine out of 10 respondents reported that they had read the Wisconsin boating regulations pamphlet (Table 26). This turned out to be the primary source of information about boating laws for respondents.

Sixteen percent of the boaters reported that they had read or subscribed to at least one boating magazine or catalogue. Those persons with cabin cruisers or sailboats were the most likely to read boating-related magazines, and those with small motorboats, canoes, or rowboats

Table 23. *Percentage of respondents who saw or heard boating safety information during the 1989-90 boating season, by boat type.*

Boat Type	Percent (%) Respondents Who Got Information
Cabin Cruiser	91
Pontoon	77
Large motorboat*	75
Sailboat	75
Small motorboat*	70
Rowboat	60
Canoe	57
Overall	71

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

Table 24. *Sources of information on boating safety.*

Information Source	Percent (%) Respondents Who Got Information from Source
Television	65
Newspapers	49
Magazines	34
Brochures	26
Radio	26
Boat launch or ramp site	21
Boat show (e.g. product display)	20
A friend	14
Equipment catalogues	13
Newsletters	13
Posters	11
Park or recreational facility	9
Marina or yacht club	8
A game warden	7
Billboards	6
Boating safety course (DNR, Coast Guard, Power Squadron)	6
Boating event (such as a race, parade, fund raiser)	5
State fair	4
A Coast Guard official	4
Placemats	4
A police officer	3
Something else	10

Table 25. *Topics of boating safety information seen or heard by respondents.*

Topic	Percent (%) Respondents Who Got Information on Topic
Alcohol use and boating	84
Personal flotation device use	61
Boating safety equipment lists, checks, and inspections	38
Rules of the road	37
Boat handling tips	33
Emergency procedures and water rescue	21
Under-age operation	20
Operation of specialized craft	10

Table 26. *Sources of information about boating regulations.*

Information Source	Percent (%) Respondents Who Got Information from Source
Wisconsin boating regulations pamphlet	89
Signs and notices at landings	40
Newspapers, magazines, newsletters	34
Friends	30
Television	25
Wardens	12
Radio	12
Boating safety instructors	9

were the least likely to read them (Table 27). These magazines could be a useful tool for disseminating boating safety information, even though they do not reach the majority of boaters. The most frequently mentioned magazine or catalogue titles that respondents listed were *Sail, Sailing, Motorboat & Yachting*, *Cruising World*, *Boating*, *Yachting Magazine*, *West Marine Products*, *Wooden Boat*, *Great Lakes Sailor*, *Power & Motoryacht*, *Lakeland Boating*, and *Sailing World Magazine*.

Table 27. Percent of boaters who read or subscribed to boating-related magazines, by boat type.

Boat Type	Percent (%) Respondents Who Read or Subscribed
Cabin cruiser	55
Sailboat	44
Large motorboat*	22
Pontoon	8
Rowboat	8
Canoe	8
Small motorboat*	7
Overall	16

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

What Did They Know About Boating Safety?

The survey questionnaire included some questions designed to reveal the level of safety awareness and knowledge boaters had. We also asked them about any training in boating safety they may have had, if they could swim, what safety equipment they took with them on their boat, their familiarity with boating regulations, and if they had ever had a safety inspection on their boat.

We also asked respondents if they had ever been certified in boating safety. We defined “certified” as having passed a formal boating course and having received certification from either a state government, the U.S. Power Squadron, or the U.S. Coast Guard. Fourteen percent of respondents reported that they had been certified, primarily through the Power Squadron (33%), the Coast Guard (27%), or the Wisconsin DNR (23%), with the remaining 17% certified elsewhere, such as through another state agency. Nearly one quarter of these persons had received their certification since 1986 (Table 28).

Nearly 9 out of 10 of the respondents reported that they could swim (Table 29). Those with sailboats were most likely to know how to swim, while those with rowboats were the least likely to know how to swim.

We asked respondents to let us know what safety equipment, if any, they regularly carried on board their boat while boating in Wisconsin. Responses were used as an indicator of the general level of safety awareness among recreational boaters. Safety equipment generally carried is shown in Table 30.

One in 5 of the boaters in the survey reported having ever had a safety inspection on their boat; many of these (74%) had been conducted more than one year prior to the survey. In fact, for quite a few of the respondents

Table 28. Year of boating safety certification, for respondents who had been certified.

Year Certified	Percent (%) of Certified Respondents
Before 1950	3
1950-1970	19
1971-1980	34
1981-1985	19
1986-1990	25

Table 29. Percent of respondents, by boat type, who could swim.

Boat Type	Percent (%) Respondents Who Could Swim
Sailboat	98
Canoe	94
Cabin cruiser	94
Pontoon	92
Large motorboat*	88
Small motorboat*	87
Rowboat	79
Overall	89

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

Table 30. Safety equipment carried onboard by respondents.

Equipment	Percent (%) Respondents With Equipment Onboard
Personal flotation device or life jacket for everyone on board	98
Paddle or oar	89
Anchor and line	88
Navigation lights	65
Bailer (bucket) or bilge pump	62
Fire extinguisher	50
Flashlight	49
Equipment for reaching someone who might fall in the water	39
Extra tank of gas	36
Compass	28
Sound signals	27
First aid kit	27
Visual distress signals	19
Navigation charts	14
Two-way radio	11

(17%), the safety inspection had been conducted 5 or more years earlier. The inspections were largely done by the DNR (52%) and the U.S. Coast Guard (27%). The remaining 21% were inspections carried out by a variety of municipal, county, or state agencies.

What Did They Want To Learn?

We asked respondents to tell us what topics would be of interest to them if they were to take a boating-related course in the next year. There was a wide range of interests

reported. The most frequently cited topic of interest was waterway signs, markers, and buoys. Also of interest were boat/engine maintenance and inspection; rules of the road and boating regulations; emergency first aid and CPR; navigation; water and ice rescue; boat handling skills; safety equipment maintenance and inspection; and emergency distress signals, radio, and procedures.

Interest in boating safety courses varied across boat types (Table 31). Those with large motorboats or cabin cruisers were the most likely to be interested in learning about waterway signs, markers, and buoys. Boat or engine maintenance and inspection was of greatest interest to those with pontoon boats. Those with cabin cruisers were more interested than others in learning about rules of the road and boating regulations as well as first aid and CPR; navigation; water and ice rescue; safety equipment maintenance and inspection; and emergency distress signals, radio, and procedures. Those with sailboats were most interested in boat handling skills.

Did They Observe Unsafe Boating Practices While Boating?

Of the list of typical boating violations given in the questionnaire, three fourths of the respondents reported having observed at least one violation on the water during the previous boating season. The most frequently cited violations were hazardous wakes (observed by one half of the respondents), towing a water skier too close to anchored boats (within the safety zone of 100 ft) (41%), failure to yield the right of way (36%), and operating too close to swimming areas or docks and piers (28%). Other observed violations included operating with insufficient lights (22%), operating while intoxicated (20%), and operating outside regulated times (10%).

There seemed to be differences in the number and types of boating violations observed by different types of boaters (Table 32):

- Those with cabin cruisers reported the most hazardous wakes, failure to yield right of way, operating with insufficient lights, and operating while intoxicated.
- Those with pontoon boats spotted more violations concerning towing a water skier too close to anchored boats, operating too close to swimming areas, operating too close to docks or piers, and operating outside regulated times.
- Canoeists reported the fewest violations of all types.

Most of these violations were more common on some water bodies than on others (Table 33):

- *Hazardous wakes* were observed most frequently by boaters on Lake Michigan, Lake Geneva, the Wolf River, the Mississippi River, Lake Wisconsin, and Green Lake.
- *Failure to yield right of way* was observed most frequently by boaters on Lake Monona, Lake Geneva, and Lake Michigan.

- *Operating too close to swimming areas* was observed most frequently by boaters on Big Cedar Lake and Lake Geneva.
- *Operating with insufficient lights* was observed most frequently by boaters on Lake Monona.
- *Operating too close to docks or piers* was observed most frequently by boaters on Big Cedar Lake, Lake Monona, and Lake Wisconsin.
- *Operating while intoxicated* was observed most frequently by boaters on Lake Monona, Lake Wisconsin, and Lake Winnebago.
- *Towing a water skier too close to anchored boats* was observed most frequently by boaters on Big Cedar Lake, Lake Monona, and Lake Wisconsin.

Policy Issues

One of the objectives of this phase of the study was to determine the attitudes of recreational boaters in Wisconsin towards a variety of boating policy issues, ranging from requirements for boat operator licenses to penalties for operation of a boat while intoxicated. Respondents were asked to indicate whether they favored or opposed each policy option. They could also indicate if they had no opinion or were not sure.

Registration and Fees

Registration fees for all motorboats and sailboats ≥ 12 ft now pay for boating safety, boating law enforcement, and boat registration programs. Additional money to support these programs could be raised in each of the following ways: using the current boat gasoline tax for enforcement and education efforts, registering all boats (canoes, sailboats < 12 ft, etc., not just motorboats and larger sailboats), and charging access fees on certain water bodies to improve access there. Respondents were asked if they favored or opposed each of these suggestions. The suggestions that would cost boaters additional money were less favorably received than the suggestion that involved shifting of money already collected to other program areas (Fig. 14).

- The largest percentage of respondents favored the use of current boat gasoline tax for enforcement and education efforts. Those with cabin cruisers were most supportive of this measure—87% favored this proposal.
- Registration of all boats (canoes, sailboards, sailboats < 12 ft, etc., not just motorboats and sailboats) was the next most popular option, but a nearly equal percentage of respondents also opposed it. Those with canoes or sailboats were least likely to favor this proposal—65% of canoeists opposed it, and 57% of sailboaters opposed it.
- The least favored option was charging boaters access fees to improve access on the water where they launch—over one half the respondents opposed this. Those with pontoon boats or cabin cruisers

Table 31. Boating safety topics of interest, by boat type.

Topic	Percent (%) Respondents Interested							Average
	Rowboat	Canoe	Sailboat	Small Motorboat*	Large Motorboat*	Cabin Cruiser	Pontoon	
Markers	23	31	36	37	45	44	29	37
Maintenance	20	22	16	32	35	34	42	30
Rules of road	26	30	29	30	30	38	28	29
First aid, CPR	19	19	27	27	33	47	29	28
Navigation	17	31	48	23	32	59	13	27
Water and ice rescue	19	22	14	22	23	28	20	21
Boat handling	17	26	31	20	19	25	20	21
Safety-equipment maintenance	13	13	11	18	20	34	16	17
Distress signals, radio	9	13	21	14	23	28	20	17
Other	3	4	1	1	1	9	0	2

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

Table 32. Occurrence of observed boating violations, by boat type.

Violation	Percent (%) Respondents, By Boat Type, Who Observed Violation						
	Rowboat	Canoe	Sailboat	Small Motorboat*	Large Motorboat*	Cabin Cruiser	Pontoon
Hazardous wakes	36	24	57	48	51	88	54
Failure to yield right of way	20	13	50	29	43	79	40
Too close to swimming area	24	15	29	24	28	39	56
Insufficient lights	16	2	17	18	31	39	26
Outside regulated times	10	2	8	9	12	3	20
Too close to docks	24	11	31	24	31	46	46
Operator intoxicated	12	11	21	18	27	39	15
Towing skier too close to boats	32	17	32	39	47	42	61

*Small motorboat: ≤ 16 ft; large motorboat: > 16 ft.

Table 33. Occurrence of observed boating violations on the most frequently boated water bodies.

Water Body	Percent (%) Respondents Who Observed Violation on This Water Body						
	Hazardous Wakes	Failure to Yield Right of Way	Too Close to Swimming Area	Insufficient Lights	Outside Regulated Times	Too Close to Docks	Operator Intoxicated
Lake Michigan	72	54	21	30	7	24	24
Mississippi River	64	42	23	30	3	25	28
Lake Winnebago	52	39	21	23	4	21	32
Green Bay	57	45	21	15	2	27	23
Lake Mendota	51	42	28	21	7	33	26
Wisconsin River	43	34	21	27	14	23	14
Shawano Lake	56	33	33	30	0	41	26
Lake Monona	57	64	36	50	0	43	43
Wolf River	67	46	13	29	0	33	29
Pewaukee Lake	50	45	18	18	5	27	23
Lake Geneva	70	61	52	30	13	39	26
Lake Wisconsin	64	43	43	21	14	43	43
Big Cedar Lake	53	47	60	13	20	53	20
Green Lake	64	21	29	14	7	29	14

were most in favor of this suggestion—47% and 39%, respectively, favored this suggestion. Those with small motorboats, canoes or rowboats were most opposed—60% of small motorboat owners, 60% of canoeists, and 57% of rowboat owners opposed this idea.

Operator Licenses and Boating Safety Courses

Current regulations require only those boat operators under age 16 to complete a boating safety course, and Wisconsin has no requirement for any boat operator to have an operator's license. We suggested several options to respondents for ways to change the policies concerning requirements for boat operators: to require boat operator licenses or to require completion of boating safety courses or tests, either for every operator or only for some of the operators.

None of these proposed policy changes met with clear support (Fig. 15). Greatest opposition was shown for suggestions to require only motorboat operators to have an operator's license and to require all boat operators to have a license. Over one half of the respondents opposed these suggestions. The least opposition was found for a suggestion to require all boat operators (of both motorized and nonmotorized boats) to complete a boating safety course or to pass a boating safety test, but there was not much support for this idea, either. The highest favorable response to any of these proposals was for a suggestion to require all boat operators born after 1 January 1978 to have a boat operator's license. While there were no significant differences in answers based on the age of respondents, it is important to note that not one of the survey respondents was young enough to be affected by this suggested requirement.

Life Jackets

Current Wisconsin law requires boats to carry at least one personal flotation device (such as a life jacket) for each person on board. There is no requirement, however, that these devices be worn. Respondents were asked if they favored or opposed possible changes in this regulation to require either all boaters to wear life jackets or only those under 12 years of age to wear life jackets. A great deal of opposition was expressed to the suggestion of requiring all boaters, regardless of age, to wear a life jacket (Fig. 16). Greater support was expressed for the requirement of boaters aged 12 or younger to wear life jackets.



PHOTO: WISCONSIN DIVISION OF TOURISM

Improved Safety Standards

We listed a number of suggestions for improving safety standards on Wisconsin's waterways and asked respondents to tell us how they felt about each one (Figs. 17a, 17b).

- The greatest support was indicated first for suspending boat-operating privileges for 3 months for operating a boat while intoxicated and next for limiting the speed of boats on smaller lakes or rivers (lakes < 200 acres and rivers < 150 ft wide).
- About one half the respondents favored increased penalties for violating boating rules and regulations, and only slightly fewer favored increased enforcement of current safety regulations and restricting boating activities to specific times of the day on smaller lakes or rivers.
- More than one half the respondents opposed making it illegal to possess alcoholic beverages on motorboats and nearly one half opposed zoning areas of water bodies by activity (e.g., water skiing restricted to a specific part of a lake, fishing restricted to another part of the lake).
- There was also more opposition than support for limiting the number of people using smaller lakes or rivers at any one time and for limiting the number of rental boats that could be on the water at one time.

Level of Law Enforcement

Respondents were asked to choose one of several options regarding future levels of law enforcement. There was strong support for either maintaining current levels of law enforcement or increasing the level of law enforcement on the water (Fig. 18). Respondents were more than 10 times more likely to indicate that more law enforcement was needed than they were to prefer less law enforcement on the water. While about 16% of the respondents were unsure on this issue, the vast majority felt that the appropriate level of law enforcement in the future would be either the same as the current level or an increased level of enforcement.



PHOTO: DNR BUREAU OF LAW ENFORCEMENT

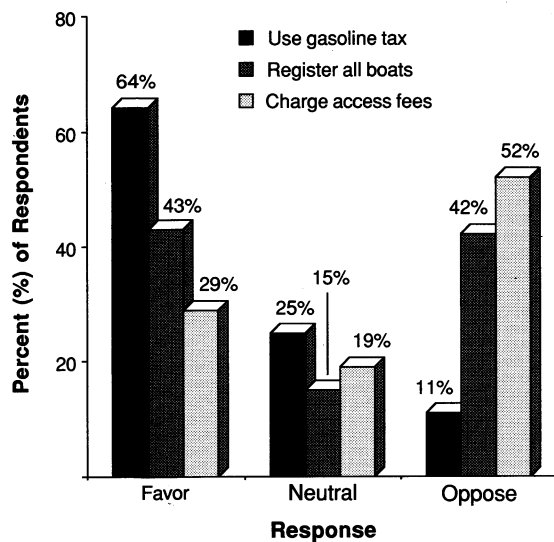


Figure 14. Responses to proposed ways to raise money to support boating safety, law enforcement, and boat registration programs.

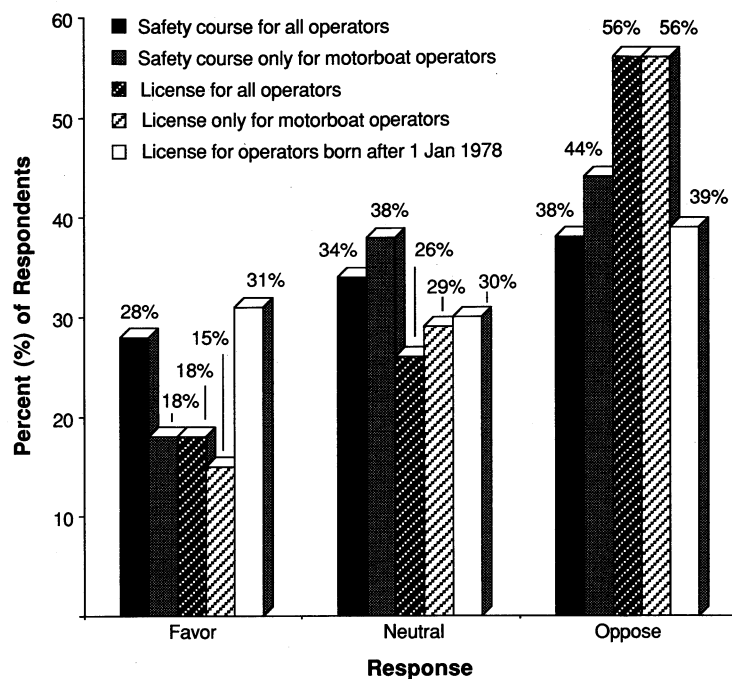


Figure 15. Responses to proposed options for operator licenses and boating safety requirements.

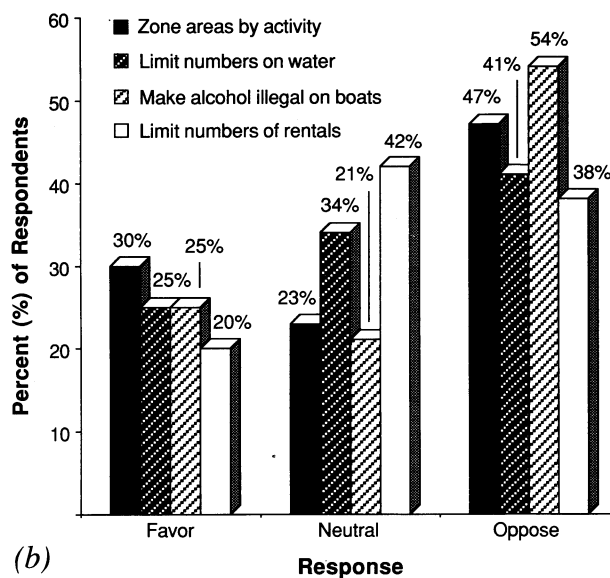
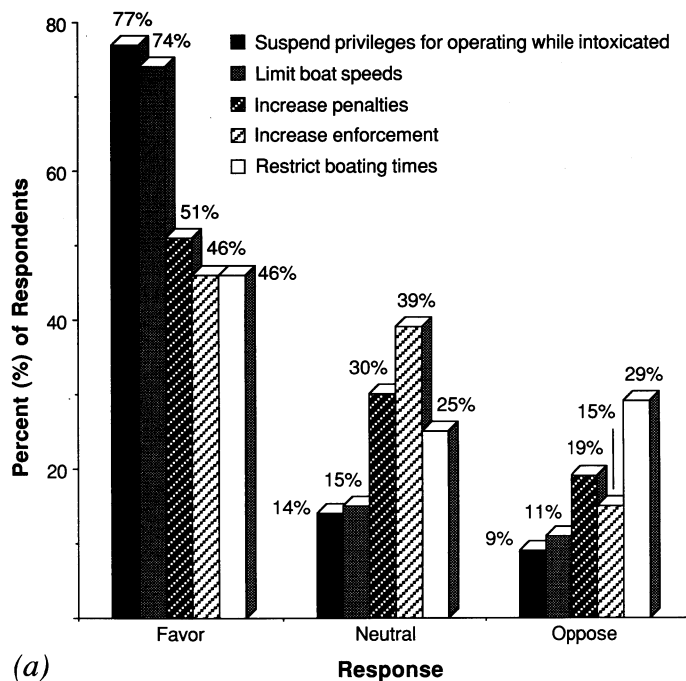


Figure 17. Responses to options for improving safety standards on the water: (a) options that received the most support and (b) options that received the least support.

SUMMARY

The average boat owner in this study was about 50 years old, married with children, had a median household income of \$30,000-\$45,000, and lived in a small town, village, or rural community. About one third of the respondents owned vacation property in Wisconsin.

Six in 10 survey respondents owned more than one boat; most owned 2. Boats were most likely to be open motorboats about 16 ft in length, although there were also sizeable numbers of larger motorboats, rowboats, canoes, and sailboats represented. Fewer of the respondents owned pontoon boats, inflatable boats, sailboards, cabin cruisers, kayaks, personal watercraft, houseboats, or other types of boats. Nine out of 10 of the primary boats had motors, with an average motor size of about 60 hp. Most of the boats were constructed of metal (steel or aluminum), fiberglass, or plastic.

The most frequently boated water bodies were Lake Michigan, the Mississippi River, Lake Winnebago, Green Bay, Lake Mendota, the Wisconsin River, Shawano Lake, Lake Monona, the Wolf River, Pewaukee Lake, Lake Geneva, Lake Wisconsin, Big Cedar Lake, and Green Lake. Favorite water bodies among the respondents were Lake Michigan, the Mississippi River, Green Bay, Lake Winnebago, the Wisconsin River, Lake Mendota, the Wolf River, Lake Geneva, Green Lake, and Shawano Lake. These water bodies were favored because respondents owned or rented property there, because of high-quality fishing, because it was close to home and convenient to get to, or because it offered a large area for boating or fishing with little interference from other boaters.

Ironically, the water bodies most often avoided were basically the same ones listed as the favorite or most-visited water bodies. The primary reason given for avoidance was that the water had too many power boats and was simply too crowded. Apparently boaters have varying expectations of their experience. What was seen as a quality boating experience for one boater was unpleasant or substandard for another. The reasons for a particular lake or river being favored by one person and avoided by another reflect different perceptions of crowding and different levels of tolerance for competing uses of the same resource.

Nine out of 10 Wisconsin boat owners operated their boats in Wisconsin during the 1989-90 boating season, primarily between April and September. Three fourths of these people fished from their boats. Fishing was most often listed as the most important reason for boating, followed by relaxation. The only group of boaters who did not fish to a large extent were sailboaters. Those with small motorboats and those with rowboats were the most likely groups to fish.

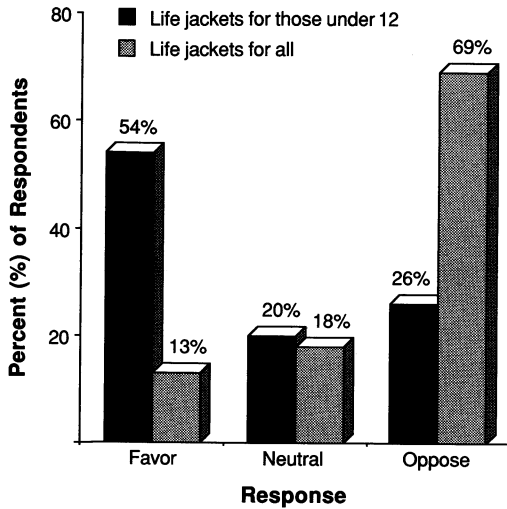


Figure 16. Responses to proposed options for life jacket requirements.

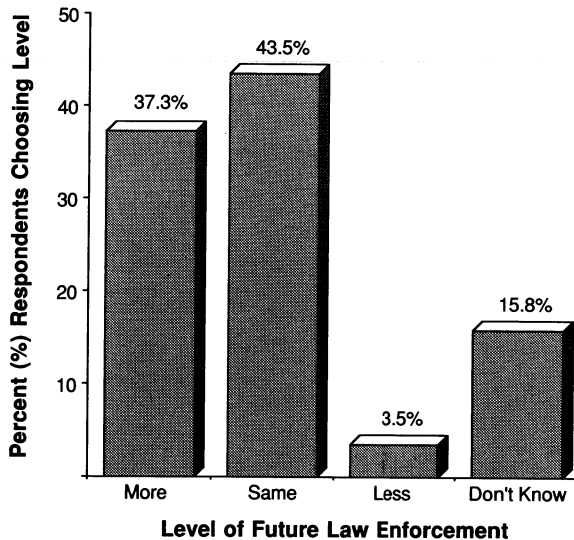


Figure 18. Future level of law enforcement desired by respondents.

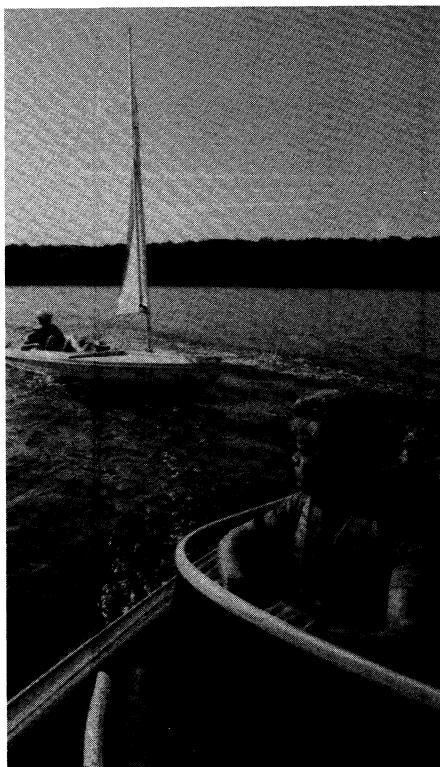


PHOTO: DNR BUREAU OF LAW ENFORCEMENT

Boaters traveled surprising little to go boating. Boaters tended to stay close to home; the median distance traveled was only 10 miles.

There were times when the behavior of others on the water negatively impacted boaters' enjoyment. Many respondents indicated that the presence and behavior of others had interfered with their own recreational enjoyment. Lack of courtesy by other boaters and large wakes from other boats were frequently cited as problems. Excessive speed and horsepower of power boats, conflicts with personal watercraft, and generally inconsiderate behavior of other boaters were considered problems by over one third of the respondents. These types of human interactions involving competing uses for water resources and values about them appeared to be frequently at the core of boater conflicts.

Despite some problems, however, boaters expressed generally low levels of crowding while boating on Wisconsin's waters; 37% of all respondents indicated that they felt not at all crowded on the water. However, the reported levels of crowding for the state's most frequently boated water bodies were quite high, with the highest levels reported for Lake Geneva, Lake Wisconsin, Big Cedar Lake, Pewaukee Lake, the Wolf River, Lake Mendota, Lake Monona, and the Mississippi River. We assume that these perceived high levels of crowding were reported with a bias toward respondents' memories of their worst crowding experiences of the entire boating season. Results of the Phase 1 survey showed significantly lower levels of perceived crowding for the same water bodies. We assume that the Phase 1 findings represent the most accurate results, less biased by recall decay than Phase 2, since responses to Phase 1 were based on memories of a discrete period in the recent past rather than general impressions from a full year.



PHOTO: BOB QUEEN

Most of the respondents expressed some dissatisfaction with the use of personal watercraft (PWCs) on the water. They tended to feel that PWCs needed to be regulated differently from other motorized boats, and felt that the use of PWCs conflicted with other water recreation. About one half of the respondents felt the PWCs made too much noise. Six in 10 felt these craft were dangerous to other boaters on the water. The majority also indicated support for the suggestion that PWC operators be required to take a course in Wisconsin boating laws and safety practices, and they also supported the suggestion that PWC use be restricted in some way.



PHOTO: WISCONSIN DIVISION OF TOURISM

Boaters told us that boating in Wisconsin could be improved in a number of ways: better enforcement of boating regulations was suggested most frequently, followed by increased access to lakes. Improved water quality; imposition of limits for boat size, horsepower, and speed; improved boat ramps; and increased boater education were each suggested by about 5% of respondents. A slightly smaller number of respondents also suggested that less regulation would be an improvement.

Boaters showed a reasonably high level of awareness of boating safety. Sources of boating safety information were most likely to be television and newspapers. Magazines, brochures, and radio reached smaller numbers of boaters. The boating safety messages most clearly received by the boating public concerned alcohol use and boating. Nearly all

boaters had read the Wisconsin boating regulations pamphlet; in fact, this was the primary source of information about boating laws for respondents.

A relatively strong awareness of boating safety was demonstrated by the fact that nearly every respondent carried at least some safety equipment on their boat—primarily life jackets, paddles or oars, and anchor and line—although fewer than one third carried such items as a compass, sound signals, first aid kits, visual distress signals, navigation charts, or 2-way radios. Boating safety awareness was also demonstrated by the fact that 14% of the respondents had been certified in boating safety, as well as by the types of courses boaters indicated they would be interested in if they were to take a course related to boating within the next year. They said they would like to take courses on waterway signs, markers, and buoys; boat/engine maintenance and inspection; rules of the road and boating regulations; emergency first aid and CPR; and navigation.

Three fourths of the respondents reported that they had observed a boating violation during the previous boating season. Hazardous wakes, towing a water skier too close to anchored boats, and failure to yield right of way were observed most often.

When asked to respond to a variety of policy change suggestions, boaters told us they were most in favor of suspending boat-operating privileges for 3 months for operating a boat while intoxicated, followed by limiting the speed of boats on smaller lakes or rivers, using the current boat gasoline tax for enforcement and education efforts, and requiring boaters 12 years old or younger to wear a life jacket. Greatest opposition was expressed for requiring all boaters (regardless of age) to wear a life jacket, requiring every boat operator (powered and unpowered boats) to have a boat operator's license, requiring only motorboat operators to have licenses, making it illegal to possess alcoholic beverages on motorboats, and zoning areas of water bodies by activity.

Many of the comments concerning improving Wisconsin boating involved stricter enforcement of current regulations as a means of reducing conflicting uses or unsafe boating practices. Boaters strongly supported either keeping levels of law enforcement the same or increasing them. Only a handful of persons indicated that the waterways of Wisconsin were either over-regulated or that regulations were over-enforced.

CONCLUSIONS AND MANAGEMENT IMPLICATIONS

▲ Constituents

This study showed that the boat owners of Wisconsin tend to be males about 50 years old, married with children, who live in small communities throughout the state and have at least moderate educations and incomes. This profile of Wisconsin's recreational boater fits the profile of the middle class. Sailing appealed more to respondents with higher incomes and higher educations, while motorboating appealed to a broader segment of the population.

This profile of Wisconsin boaters can be used to tailor educational efforts to appropriate audiences. This information can also be used if the Department wishes to expand recreational boating opportunities to members of the public who are presently not involved in boating in a large way, such as women, unmarried people, people of lower education or income levels, and people living in mid-sized to large urban areas.

▲ Boater Perceptions and Attitudes

This study showed that fishing and relaxation were the most important reasons for boating in Wisconsin. Boater satisfaction with the boating experience is based in large part on the reasons for boating and boaters' expectations of the environment in which they boat. Those interested in a quiet, relaxing floating trip or uninterrupted fishing

are more likely to feel crowded and dissatisfied when approached by boaters who are out for exciting and challenging activities such as water skiing, speed boat cruising, or riding personal watercraft. While conflicting uses may not directly compete for available surface water, they impact each user's satisfaction. Indeed, those who desire quiet, undisturbed lakes or rivers find themselves pushed away from the more popular, activity-filled water bodies. These boaters were most likely to express disappointment and feelings of crowdedness.

All other things being equal, the water bodies that were close to home (or second home) were most likely to be boater favorites. Quality and quantity of available fish were also important, as most boaters fished as part of their recreational activities. Beyond these points, favorite water bodies were those that were large enough to accommodate boating activities without interference from others. Quality and quantity of access and launch facilities were also cited as important aspects of favorite boating sites, along with beautiful scenery, seclusion, clean water, and peaceful, quiet shores.

It is important to note that not all boaters are alike in their wants and desires, and managers should strive to provide a range of boating opportunities. If possible, the qualities of the "favorite waters" identified by this study (such as good fishing, good access, good launch facilities, and clean water) should be enhanced in other waters, especially lakes and river stretches near population centers where water bodies get heavy use and are likely to



PHOTO: BOB QUEEN

be favorite recreation sites. Water bodies further from the beaten path can then offer the seclusion and quiet sought by those willing to travel a bit further for their boating pleasure.

▲ Safety Standards

Boaters did not generally object to the existence of restrictions on recreational boating. Indeed, there was strong support for strict enforcement of existing regulations, with many boaters expressing the belief that future levels of law enforcement should be the same as or more than current levels. Boaters seem to be well aware of the safety concerns involved with reckless and dangerous boating behavior, including speeding and boating while intoxicated.

Recommendations include law enforcement emphasis on safety standards, as well as increased enforcement of existing regulations. Educational efforts (addressed below), aimed at heightening awareness of the hazards of reckless operation, could focus on the reasons for safety standards.

▲ Personal Watercraft

Personal watercraft (PWCs) made up only 1.1% of all licensed boats in Wisconsin in 1990, and operators of PWCs made up only a small portion of the survey respondents. Thus, the opinions about recreational interference from PWCs expressed by respondents in this study are heavily weighted towards other types of boat owners, and we did not specifically seek the PWC owner's opinion.

Safety records compiled by the DNR Bureau of Law Enforcement and the U.S. Coast Guard indicate that



PHOTO: DNR BUREAU OF LAW ENFORCEMENT

recreationists' perceptions about PWCs—that they are more dangerous than other types of boating—may be accurate. The number of PWC accidents is disproportionately large compared with the proportion of boats on the water that they represent. In 1990, PWCs were involved in one in every 5 Wisconsin boating accidents, while accounting for only one of 100 registered boats. PWC accidents accounted for 8% of all boating accidents in 1988, 16% in 1989, and 19% in 1990 (Wis. Dep. Nat. Resour. 1991). These percentages are slightly higher than nationwide statistics, which show PWC's involved in 7% of all 1988 boating accidents, 10% of 1989 accidents, and 13% of 1990 accidents (U.S. Coast Guard 1989, 1990, 1991). Accident rates for Wisconsin were not evenly distributed throughout the state. For example, in 1989-90, 35% of all PWC accidents occurred in Oneida and Walworth counties. Forty-five percent of the PWCs involved in Wisconsin accidents in 1989-90 were rented (Wis. Dep. Nat. Resour. Bur. Law Enforc., unpubl. data).

Noise levels of PWCs are another aspect of the controversy. Perceptions have been that PWCs are noisier than other powered boats. However, according to industry standards, PWCs meet the same decibel ratings as other boat motors (the standard is 86 decibels). Many PWCs (especially newer models) are designed to vent below water to muffle the noise of the motor—a design developed, at least in part, to address public perceptions that PWCs are too noisy. While the noise levels may not be excessive from a decibel standpoint, the conflict over the noise of PWCs still arises due to a variety of reasons that contribute to their reputation as noisy and annoying: several PWCs are frequently in use together, they often following a circular path, they are often operated close to other boats, and wave jumping (which removes the muffling effect of the water on the engine) is common.

Additionally, there is a common perception that PWCs are often operated at unsafe speeds. PWCs range from

42-60 hp, with top speeds from around 32 mph to around 40 mph, with after-market products available for most models that can speed them up to as much as 55 mph. These speeds, coupled with PWCs' high maneuverability, make them speedier than much of the other motorboat traffic on the water.

Safety and noise seem to be the key points of contention concerning use of PWCs on Wisconsin waterways. The Department should consider developing a comprehensive rules package for PWCs that would include personal use, rental operations, and mechanical specifications. Consultation with the industry and user groups, and more research, may be needed to help develop these rules.²

▲ Education

Judging by the levels of awareness of safety issues and concern over boating regulations found in this study, current education efforts appear to be succeeding. However, data show that efforts should continue to be expanded in the following areas: more hands-on boating safety courses and more specialized information on topics such as boat/engine maintenance; waterway signs, markers, and buoys; navigation; and first aid.

▲ Monitoring Trends

There are many factors that may affect boating in the future, such as economics, price and availability of fuel, demographics, and technology changes.

Research conducted in 1979-80 that was designed to look at the sensitivity of recreational boat owners to energy concerns (Fridgen 1982) showed that about 30% of recreational boaters in Michigan modified their boating behavior due to the energy uncertainties at that time. Those using inland lakes or streams demonstrated the greatest sensitivity to energy constraints. Over one quarter of the sample were sensitive to the impacts of fuel prices and availability. Respondents reported less water skiing (17%), boating at slower speeds (16%), fewer cruises (11%), and staying on their craft longer but with less running time (10%). Less than 1% indicated that they sold their craft and left the sport entirely as a result of energy constraints, but 31% said they boated less. A comparison of the 1979 and 1980 boating seasons showed that power

boat traffic at public marinas decreased and sailboat traffic increased. A trend Fridgen also noted was the shift from large cars to smaller, energy-efficient ones. This trend, the author predicted, would likely reduce the number of boaters trailering their boats to the Great Lakes.

Fridgen's conclusions were that boaters as a group were not likely to drastically change their boating behavior due to energy constraints. They demonstrated less sensitivity to fuel uncertainties than was hypothesized, engaging in only moderate activity shifts. The author predicted that a long-term trend toward launching closer to home could increase pressure on marinas and launch sites in urban areas, and that the shift to smaller cars would make trailering craft more difficult, resulting in reduced use of the Great Lakes by inland residents. In short, boating itself would not necessarily decline, but in times of energy uncertainties, people would tend to boat closer to home and for shorter time periods.

It is possible to look at national trends in demographics to see if we can forecast any impact on future boating recreation. The most significant demographic pattern across the country continues to be the group of Americans born between January 1946 and December 1964. This group, known as the baby boom generation, has had an enormous impact on the country's goods and services at each stage of their life cycle. Predicting the life patterns of these people and their recreational activities can give us an idea of the future of boating in Wisconsin.

As the forefront of the baby boom generation is now reaching age 45, we will begin to see higher incomes and fewer children at home (Waldrop 1991). With fewer children under the age of 18 at home and family income peaking between the ages of 45-54, households may have more discretionary income in the future and more time in which to spend it. In the past decade, however, parenthood has been seen as one of the most important characteristics

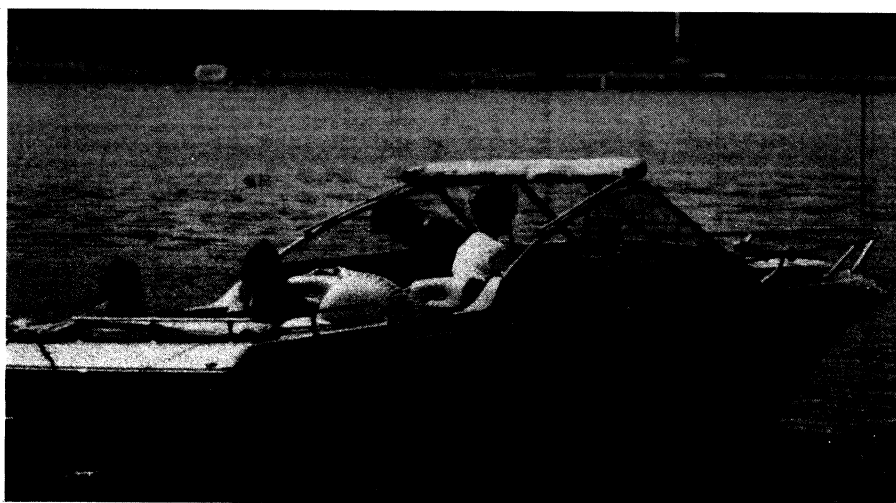


PHOTO: BOB QUEEN

²In May 1992, after this report was finalized for publication, the DNR did issue a set of rules and laws specific to personal watercraft, which addressed many of the problems with PWC operation discussed above. The new PWC law can be found in the 1992 Wisconsin boating regulations and in a pamphlet on the subject prepared by and available from the DNR Bureau of Law Enforcement.

of most baby boomers, and it will continue to be a dominant pattern throughout the 1990s (Russell 1991). Spending patterns reflect this emphasis on family. The presence of children in a household stretches the relative affluence of this generation, as income is tied up with mortgage payments, tuition costs, and saving for retirement. Thus, sales of luxury products are not likely to be high in the near future. Instead, family-oriented, inexpensive products and services are most likely to capture resources.

This could mean an increase in expenditures for relatively inexpensive family-oriented recreational activities, such as boating.

Recreational research literature also suggests that, due to shifting demographic characteristics (such as the increase in single parent families), there will be greater calls in the future for organized activities and outings in which staff provide instruction and supervision, as well as greater demands for facilities close to home and opportunities for day-use only and short outings (Field and Martinson 1986).

As Americans age, we find patterns of activities that will tend to increase the number of persons engaging in boating activities. Older Americans, while no longer in the labor force, are still keeping busy. Older Americans have no significant decrease in outdoor sports, recreation and hobby time compared with younger people (Russell 1991). Thus, boating and fishing will be seen as increasingly attractive, as long as facilities and access do not make them burdensome. While boating activities that emphasize high energy and speed will continue to be popular with younger age groups, the majority of the population will be older, and fishing from boats or cruising for pleasure will continue to dominate.

Other trends include increased demand for neighborhood recreational facilities with swimming pools and demand for improved fishing opportunities and locations. High-risk adventure activities will emerge with advancing technology (such as personal watercraft or other "thrill craft"). There will be increased social conflicts among diverse groups over the appropriate use of a given water resource, which will require resource managers to improve their human resources management skills (Field and Martinson 1986).

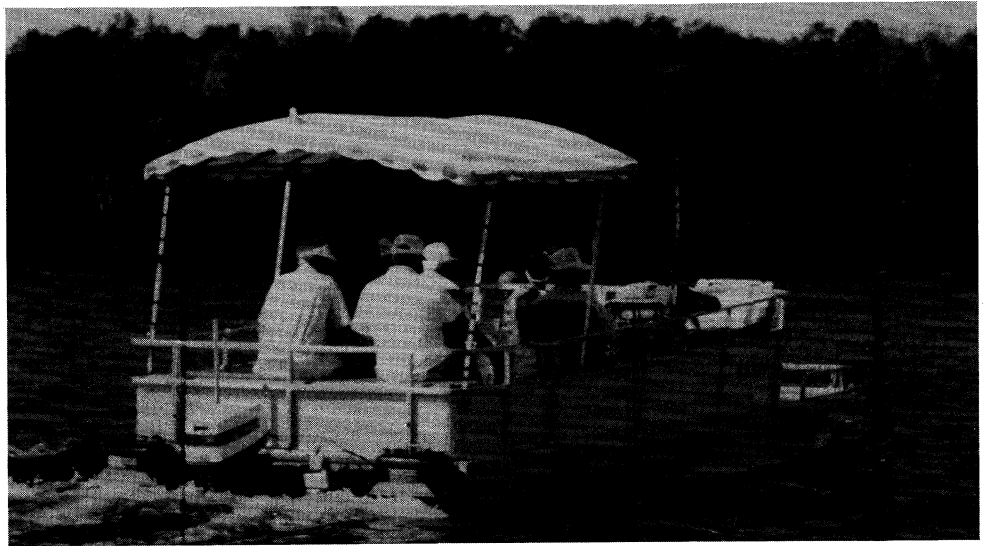


PHOTO: WISCONSIN DEPARTMENT OF TOURISM

The Department must continue to monitor the trends in boating behavior throughout the state and the country, and continue to evaluate Department policies based on these trends. It will be important to conduct further research on the needs and perceptions of boaters in the state. Using the results of the current Phase 1 and Phase 2 boating study as baseline data, future research could build on these results, refining the instrument and filling in missing pieces. For example, research aimed exclusively at users of personal watercraft would be important in analyzing present safety standards and setting policy for this type of craft. Studies of specific water bodies that have had policy changes implemented to ease crowding or other hazards could show the impact of those changes on user attitudes, with the current study showing the "before" picture. It would also be of value to replicate the current study (or parts of it) at regular intervals such as 7-10 years, to find where attitudes or expectations are changing, where problem areas are developing, and where difficulties have improved.

▲ Using Results of This Study

This report is the second of 2 Technical Bulletins that together report the results of a comprehensive research project aimed at finding out the extent of boating in Wisconsin and the attitudes, perceptions, and behaviors of the state's recreational boaters. It is important that managers and others involved with boating recreation use the results of both Phase 1 and Phase 2 of the study as their information base for understanding and managing Wisconsin's boating resources.



PHOTO: BOB QUEEN

Appendix A: The Survey Questionnaire and Sample Letters

Cover Letter



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny, Secretary
Box 7921
Madison, Wisconsin 53707
TELEFAX NO. 608-267-3579
TDD NO. 608-267-6897

October 1, 1990

Dear Friend,

Here is the questionnaire that I told you about in my last letter. Others who have filled it out say it takes about 15 minutes to complete, although you might spend more or less time, depending on how much you have to tell us.

The purpose of the questionnaire is to provide recreation planners and law makers with information about people's activities and concerns while boating in Wisconsin. To learn more about how people use our water resources, we have scientifically selected a small sample of boat owners from all over the state. You are part of this special group.

Whether you boat frequently or only now and then, your answers to this questionnaire are important because they will help us to understand **all** recreational boaters in the state.

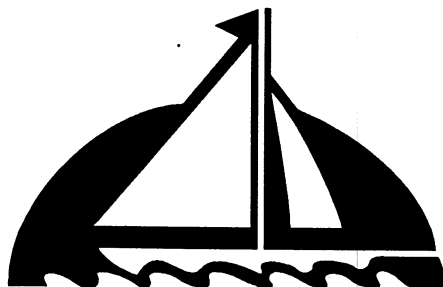
An identification number on the questionnaire helps us to get in touch with those who haven't filled out the survey and keeps us from bothering those who have already returned it. **Your answers are confidential and will not be revealed.**

We have tried to make the questionnaire interesting and easy to complete. I hope that you will fill it out and return it to us as soon as you can. I've enclosed a stamped, self-addressed envelope for your convenience.

I appreciate your help!

Sincerely,

Linda J. Penaloza
Researcher



1990 Wisconsin Recreational Boating Survey

This study is being conducted by the
Wisconsin Department of Natural Resources.

I. BOAT DESCRIPTION

1. How many boats or other watercraft do you and all members of your household currently own?

_____ number of boats

2. What type(s) of boat(s) do you and all members of your household currently own? First tell us if you own the boat, then if it is registered in Wisconsin. For example:

Canoe.....(1) → Y (N)

	<i>Circle all that apply</i>	<i>Is it registered in Wisconsin?</i>
A. Rowboat.....1	→	Y N
B. Canoe.....2	→	Y N
C. Kayak.....3	→	Y N
D. Sailboard.....4	→	Y N
E. Sailboat.....5	→	Y N
F. Inflatable boat/raft.....6	→	Y N
G. Open motor boat under 16'.....7	→	Y N
H. Open motor boat 16' and over.....8	→	Y N
I. Cabin cruiser.....9	→	Y N
J. Houseboat.....10	→	Y N
K. Pontoon boat.....11	→	Y N
L. Personal watercraft (Jet Ski, Sea-doo, Wet-jet, Waverunner, Wet-bike, etc.).....12	→	Y N
M. Other (specify.....).....13	→	Y N

3. Which of the above boats would you consider to be your primary boat, that is, the boat you use most often?

_____ letter from list above

4. Have you ever rented a personal watercraft?

No1
 Yes2

IF YES, did you receive any safety information about the operation of a personal watercraft?

Yes1
 No2

NOTE: The next questions in this section apply to your primary boat. Please answer them with that boat in mind.

5. About how old is this boat? _____ years old

6. How long have you owned this boat? _____ years

7. Is this boat motorized?

No1
 Yes2

IF YES, what type of engine does this boat have?

Circle one

Inboard1
 Outboard2
 Stern drive (inboard/outboard)3
 Jet drive4
 Other (specify _____)5

What is the total horsepower of this boat? _____ hp

Is the principle engine fueled by gas, diesel, or electric?

Gas1
 Diesel2
 Electric3
 Other (specify _____)4

8. What is the length of this boat? _____ feet long

9. What is the hull of this boat made of?

Circle one

Wood1
 Metal (aluminum, steel, or steel alloys)2
 Fiberglass, plastic3
 Rubber, vinyl, canvas4
 Other (specify _____)5

10. Is this boat federally documented? A federally documented boat is registered with the U.S. Coast Guard, in addition to being registered with the state.

Yes1
 No2

11. Have you ever had a law enforcement or Coast Guard auxiliary safety inspection on this boat?

No1
 Yes2

IF YES, when was this done?

Less than 1 year ago1
 1-2 years ago2
 3-4 years ago3
 5-10 years ago4
 More than 10 years ago5
 Don't know6

IF YES, by whom?

Wisconsin Department of Natural Resources1
 Other state governmental agency2
 U.S. Power Squadron3
 U.S. Coast Guard4
 Other (specify _____)5

II. WISCONSIN BOATING ACTIVITIES THIS YEAR _____

In this section, we are interested in what activities you did this past year in Wisconsin on ANY BOAT that you may have operated, yours or someone else's, in the last 12 months.

1. Did you operate a boat **In Wisconsin** this year (from October 1989 - September 1990)?

Yes1

No..(Please go to question 10)2

2. REGULAR SEASON BOATING: During which months did YOU operate a boat **In Wisconsin** during the spring and summer 1990? Please make your best estimate.

Circle all that apply

April1

May2

June3

July4

August5

September6

3. OFF SEASON BOATING: During which months did YOU operate a boat **In Wisconsin** during the autumn and winter 1989-1990? We know it may be hard to remember, but please make your best estimate.

Circle all that apply

October 19891

November 19892

December 19893

January 19904

February 19905

March 19906

4. Approximately how many days in the past 12 months did you operate a boat **at night** in Wisconsin, that is between dusk and dawn? We know it may be hard to remember, but please give your best estimate.

_____ days

5. **Including yourself**, how many people usually went on a typical boating trip with you this year?

_____ people

6. How far, on average, do you travel to go boating in Wisconsin?

_____ miles one way

7. Thinking of your total boating in Wisconsin in the past 12 months, which, if any, of the following activities did you participate in?

Circle all that apply

Canoeing.....1

Kayaking2

Rafting.....3

Sailing4

Racing (motorboat, canoe, kayak, sailboat).....5

Riding personal watercraft (Jet Skis, etc.)6

Water skiing or towing skiers7

Towing or riding behind a boat on towed water toys8

Recreational fishing from a boat9

Swimming or scuba diving off the boat10

On board at an overnight anchoring, mooring.....11

Other pleasure cruising12

Commercial or occupational use (including fishing).....13

Hunting or trapping14

Something else? Please tell us.

8. During boating season when it is not being used on the water, where is your boat(s) kept or stored?

Circle all that apply

Trailered1
 Moored2
 Stored at water's edge3
 Kept in a rented slip or dock4
 Other (specify _____)5

9. Which, if any, of the following Wisconsin border waters did you boat on in the last 12 months?

Circle all that apply

None1
 Lake Michigan2
 Lake Superior3
 Mississippi River4
 St Croix River5
 St Louis River6
 Inland lakes on Michigan/Wisconsin border7
 Other (specify _____)8

10. What body of water in Wisconsin did you most often use for recreational boating in the last 12 months? (NOTE: We will be asking you about your specific experiences on this body of water in the next sections.)

name of water body

county

11. What body of water in Wisconsin is your favorite for recreational boating?

name of water body

county

Why is this your favorite?

12. Is there a body of water in Wisconsin that you avoid?

name of water body

county

What are your reasons for avoiding it?

13. In which states or provinces other than Wisconsin did you or any other member of your household operate your boat this year (since January 1990)?

III. BOATING LAWS AND BOATING SAFETY _____

Boating safety is the safe operation and handling of boats, as well as knowing the laws concerning boating and consequences of illegal operation.

1. In the last 12 months, that is since October 1989, did you happen to see or hear any information about boating safety in Wisconsin?

Yes1
No. *.(Please go to question 4)*2

2. Where did you see, read, or hear this boating safety information?

Circle all that apply

Television1
Radio2
Newspapers3
Magazines4
Equipment catalogues5
Newsletters6
Brochures7
Posters8
Billboards9
Placemats10
From a game warden11
From a police officer12
From a Coast Guard official13
From a friend14
Park or recreational facility15
Boat launch or ramp site16
Marina or yacht club17
Boat show (e.g., product display)18
Boating event (social event such as a race, parade, fund raiser)19

continued on next page

State fair20

Boating safety course (DNR, Coast Guard, Power Squadron)21

Anything else? Please tell us.

3. What were the topics of the boating safety information you heard about or saw in 1990?

Circle all that apply

PFD (Personal Flotation Device) use1
Alcohol and boating2
Boating safety equipment lists, checks, and inspections3
Operation of specialized craft4
Underage operation5
Rules of the road6
Boat handling tips7
Emergency procedures and water rescue8
Other (specify _____)9

4. Have you ever been certified in boating safety? By "certified" we mean having passed a formal boating course and received certification from either a state government, the U.S. Power Squadron, or the U.S. Coast Guard.

No1
Yes2

IF YES, who gave the course?

Wisconsin Department of Natural Resources1
Other state governmental agency2
U.S. Power Squadron3
U.S. Coast Guard4
Other (specify _____)5

What year did you receive your boating safety certification?
19 _____

5. Can you swim?

Yes1
 No2

6. Which, if any, of the following pieces of equipment do you regularly carry while boating in Wisconsin?

Circle all that apply

PFDs or life jackets for everyone on board1
 Paddle or oar2
 Extra tank of gas3
 Anchor and line4
 Flashlight5
 Navigation lights6
 Navigation charts7
 Compass8
 Bailer(bucket) or bilge pump9
 Equipment for reaching someone
 who might fall in the water10
 First aid kit11
 Fire extinguisher12
 Visual distress signals13
 Sound signals14
 Two-way radio15

7. Have you read the Wisconsin boating regulations pamphlet?

Yes1
 No2

IF NO, what would encourage you to do so?

8. How do you learn about boating laws?

Circle all that apply

Wisconsin boating regulations pamphlet1
 From signs and notices at landings2
 From boating safety instructors3
 Television4
 Radio5
 Newspapers, magazines, newsletters6
 Friends7
 Wardens8
 Other (specify _____)9

9. If you were to take a boating-related course in the next year, what would you like to learn more about?

Circle all that apply

Boat handling skills1
 Boat/engine maintenance and inspection2
 Safety equipment maintenance and inspection3
 Navigation4
 Waterway signage, markers, and buoys5
 Rules of the road and boating regulations6
 Emergency distress signals, radio, and procedures7
 Water and ice rescues8
 Emergency first aid and CPR9
 Other (specify _____)10

10. Do you read or subscribe to any boating magazines or catalogues?

No1
 Yes2

IF YES, which one(s) _____

IV. EXPERIENCES AND EVALUATIONS

1. Personal watercraft (PWCs) are small boats designed for one to three persons. They are generally known by the brand names "Jet Ski," "Wave Runner," "Sea Doo," etc.

Please tell us the extent to which you agree or disagree with each of the following statements concerning the use of personal watercraft in Wisconsin waters?



- 1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Circle a number for each item

- A. PWCs do not need to be regulated any differently than other motor boats 1 2 3 4 5
- B. PWCs make too much noise 1 2 3 4 5
- C. PWCs are dangerous to the other boaters on the water 1 2 3 4 5
- D. Operators of PWCs should be required to take a course in Wisconsin boating laws and boating safety practices 1 2 3 4 5
- E. The use of PWCs should be restricted to certain parts of the lakes and/or to certain times of day in order to reduce the conflicts with other water recreationists 1 2 3 4 5
- F. The use of PWCs does not conflict with other water recreation and does not require any special restrictions 1 2 3 4 5

2. People go boating for many reasons. Indicate below your primary reasons for boating.

Circle all that apply

- A. To relax 1
- B. To enjoy nature 2
- C. To fish 3
- D. To be with friends and family 4
- E. For competition and challenge 5
- F. To develop skills 6
- G. For the excitement 7
- H. For transportation 8
- I. To see different places 9

Something else? Please tell us.

3. From the previous question, write the letter of the reason for boating that is MOST IMPORTANT to you.

_____ most important reason for boating

NOTE: For the rest of the questions in this section, please refer to the lake or river you boat on the MOST, that is, the one that you told us about in Section II (question 10).

4. About how many boats would you prefer to see in an hour while boating on this water?

_____ number of boats on a WEEKEND

_____ number of boats on a WEEKDAY

5. How crowded do you feel while boating on this water?

Circle one number

- 1 2 3 4 5 6 7 8 9
- Not at all Slightly Moderately Extremely
crowded crowded crowded crowded

6. Did you observe any of these boating violations on this water this year?

Circle all that apply

- Hazardous wakes1
 Failure to yield right of way2
 Operating too close to swimming area3
 Operating with insufficient lights4
 Operating outside regulated times5
 Operating too close to docks or piers6
 Operating while intoxicated7
 Towing a water skier too close
 (within 100') to anchored boats8

7. Did others on the water interfere with your activity in any way?

Circle all that apply

- Other boaters came too close to my boat1
 Lack of courtesy by other boaters2
 Other boaters going too fast3
 Large wakes from other boats4
 Too much noise from other boats5
 Too many other boaters on the water6
 Other boaters did not know rules of the road7
 Too much law enforcement emphasis on the water8
 Not enough law enforcement emphasis on the water9
 Not enough access points to water10
 Crowding at access points11
 Alcohol use by other boaters made boating unsafe12

Anything else? Please tell us.

8. How much of a problem is EACH of the following on the Wisconsin lake or river you boat on the MOST?

- 1 = Not a problem
 2 = A slight problem
 3 = A moderate problem
 4 = A serious problem

Circle a number for each item

- Inconsiderate behavior of others1 2 3 4
 Lack of enforcement of boating rules and regulations1 2 3 4
 Poor design and condition of boat launch ramps at public water access sites1 2 3 4
 Not enough pamphlets, brochures, or maps describing public water access sites1 2 3 4
 Lack of public water access sites1 2 3 4
 Too many public water access sites1 2 3 4
 Condition of parking lots at public water access sites1 2 3 4
 Lack of parking lots at access sites1 2 3 4
 Shore erosion1 2 3 4
 Maintenance of boating facilities at public water access sites1 2 3 4
 Conflicts with Personal Water Craft (Jet Skis, etc.)1 2 3 4
 Conflicts with water skiers1 2 3 4
 Conflicts with anglers1 2 3 4
 Boat noise1 2 3 4
 Pollution caused by outboard motors1 2 3 4
 Excessive horsepower of power boats1 2 3 4
 Excessive speed of power boats1 2 3 4
 Lack of handicap access sites1 2 3 4
 Too much alcohol use by boat operators1 2 3 4
 Poor water quality, habitat destruction1 2 3 4
 Garbage (cans, bottles, etc.) in the water1 2 3 4

9. Does the body of water you boat MOST have adequate waterway markers?

Yes.....1

No.....2

I don't know3

IF NO, what waterway markers does it need?

V. BOATING POLICY

1. Current regulations require only those boat operators under age 16 to complete a boating safety course. Wisconsin has no requirement for boat operators to have an operator's license.

How do you feel about each of the following possible changes?

1 = Favor

2 = Neutral, neither favor nor oppose

3 = Oppose

4 = I'm not sure

Circle a number for each item

A. Require all boat operators (motorized and non-motorized boats) to complete a boating safety course or pass a boating safety test1 2 3 4

B. Require only motorboat operators to complete a boating safety course1 2 3 4

C. Require all boat operators (powered and unpowered boats) to have a boat operator's license1 2 3 4

D. Require only motorboat operators to have a boat operator's license1 2 3 4

E. Require all boat operators born after January 1, 1978 to have a boat operators license1 2 3 4

2. Current Wisconsin law requires boats to carry at least one personal flotation device (such as a life jacket) for each person on board. There is no requirement, however, that these devices be worn.

How do you feel about the following possible changes in this regulation?

A. Require all boaters, regardless of age, to wear a life jacket1 2 3 4

B. Require only boaters 12 years old or younger to wear a life jacket1 2 3 4

3. Boater registration fees for motor boats and sailboats 12' and over now pay for boat safety and boating law enforcement and registration costs. Additional money to support programs could be raised in each of the following ways.

How do you feel about each of the following suggestions?

- 1 = Favor
2 = Neutral, neither favor nor oppose
3 = Oppose
4 = I'm not sure

Circle a number for each item

- A. Charge boaters access fees to improve access on the water where they launch1 2 3 4
- B. Register all boats (canoes, sailboards, sailboats under 12', etc.), not just motorboats and sailboats1 2 3 4
- C. Use currently collected boat gasoline tax for enforcement and education efforts1 2 3 4
4. The following suggestions concern improving safety standards on Wisconsin's waterways. How do you feel about each of the following suggestions?
- A. Increase enforcement of current safety regulations1 2 3 4
- B. Limit the numbers of people using the lakes or rivers at any one time on smaller lakes or rivers (lakes under 200 acres and rivers less than 150' wide)1 2 3 4
- C. Limit the speed of boats on smaller lakes or rivers1 2 3 4
- D. Restrict boating activities to specific times of the day on smaller lakes or rivers1 2 3 4
- E. Increase penalties for violating boating rules and regulations1 2 3 4
- F. Zone areas of water bodies by activity (that is, water skiing would be restricted to a specific part of the lake, fishing would be restricted to a specific part of the lake, etc.)1 2 3 4

- G. Suspend boat operating privileges for three months for operating a boat while intoxicated1 2 3 4

- H. Make it illegal to possess alcoholic beverages on motor boats1 2 3 4

- I. Limit the number of rental boats that can be on the water at one time1 2 3 4

5. What level of boating law enforcement do you think is appropriate in the future?

More than current level1

Less than current level2

The same as current level3

I don't know4

6. Would you like to see more protected harbors, including breakwater, launching facility, and tie-up spots on the lakes or rivers in Wisconsin (such as Lake Superior, Lake Michigan, Lake Winnebago, or Wisconsin River)?

No1

Yes2

IF YES, which ones?

In what county?

7. What do you see as the most important ways the Department of Natural Resources could improve boating recreation in Wisconsin? (Use additional paper if necessary.)

VI. BACKGROUND

1. How old are you? I am _____ years old.

2. Where do you live?

- Farm.....1
- Rural non-farm.....2
- Small town or village under 10,000 population.....3
- Large town of 10,000 to 49,999 population
(but not a suburb of a larger city).....4
- Suburban area of a large city.....5
- Large city of 50,000 to 500,000 population.....6
- Very large city of over 500,000 population.....7

3. In what state and county do you live?

_____ state

_____ county

4. Do you or your family own vacation property or a second home in Wisconsin?

- No1
- Yes2

IF YES, in what county? _____

5. Are you: _____ male _____ female

6. What is your marital status?

- Married.....1
- Divorced.....2
- Widowed.....3
- Separated.....4
- Never married.....5

7. Do you have any children?

- No1
- Yes2

IF YES, what are the ages of your children living at home?

_____, _____, _____, _____, _____, _____

8. What was the highest grade or year of school you completed?

- Eighth grade or less1
- Some high school2
- High school graduate/GED certificate.....3
- Some college/technical school.....4
- Technical school graduate5
- College graduate.....6
- Post graduate/professional degree7

9. What was your total household income from all sources before taxes last year (1989)?

- Less than \$10,0001
- \$10,000-\$19,9992
- \$20,000-\$29,9993
- \$30,000-\$44,9994
- \$45,000-\$59,9995
- \$60,000-\$74,9996
- \$75,000-\$99,9997
- \$100,000-\$149,9998
- \$150,000 or more.....9

THANK YOU for taking the time to fill out this survey. Please return this right away in the enclosed postage-paid envelope to:

1990 Wisconsin Recreational Boating Survey
P.O. Box 7921
Madison, WI 53707



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny, Secretary
Box 7921
Madison, Wisconsin 53707
TELEFAX NO. 608-267-3579
TDD NO. 608-267-6897

October 22, 1990

Dear Friend,

Several weeks ago I sent you a questionnaire that asked about your recreational boating activities. I'm pleased that many people have responded and I'm still hoping to hear from you.

I'm writing to you again because of the importance of what you have to tell us. In order for the results of our study to accurately reflect the boating experience of Wisconsin's boat owners, **we need to hear from everyone**. Your answers will assure us that those similar to you will be represented in our survey.

Even if you rarely boat in Wisconsin, I still need to hear from you.

Because your answers are important to us, I ask that you take a few minutes to complete the enclosed questionnaire.

Please accept my thanks for your help.

Sincerely,

Linda J. Penaloza
Researcher

Appendix B. Glossary of Terms Used in This Report

ATTITUDES: An individual's feelings or perceptions; a subjective measure.

BOATING SAFETY: The safe operation and handling of boats, as well as the knowledge of laws concerning boating and the consequences of illegal operation.

BOATING SEASON: For the purposes of this study, the boating season ran from April through October. Different parts of Wisconsin have different lengths of boating seasons; some lakes are not navigable as early as April, while others may be navigable even earlier.

CABIN CRUISER: Motorboats with a cabin that can be completely closed by means of doors or hatches. For the purposes of this study, large motorboats with cabins, often referred to as yachts, are considered to be cabin cruisers.

CROWDING: A subjective measure based on how comfortable an individual recreationist feels with the presence of other recreationists in the vicinity.

EXCESSIVE SPEED: Speed above that which a reasonable and prudent person would operate a boat under given circumstances. It is not necessarily a speed in excess of a posted limit.

HULL MATERIAL: That material which constitutes the majority of the shell of the vessel.

INBOARD: Where the primary propulsion is an engine (diesel or gasoline) located within and permanently attached to the hull.

INBOARD/OUTBOARD: Also called inboard/outdrive. The U.S. Coast Guard generally regards an inboard/outboard as inboard because the power unit is located inside the boat and the drive unit is on the outside of the boat. For the purposes of this study, inboard/outboards are considered a separate category.

INTOXICATION: Immoderate indulgence in alcoholic beverages to such an extent that the use of one's faculties is materially impaired.

MEMORY BIAS: See recall decay.

METAL HULL: A boat hull made of aluminum, steel, or aluminum or steel alloys.

MOTORBOAT: Any vessel equipped with propulsion machinery.

OPEN MOTORBOAT: Craft of open construction specifically built for operating with a motor, including boats canopied or fitted with temporary partial structures.

OUTBOARD: An engine not permanently affixed to the structure of the craft, regardless of the method or location used to mount the engine, e.g., motor wells, "kicker pits," motor pockets, etc.

PERSONAL WATERCRAFT (PWC): A motorboat that uses an inboard motor powering a water jet pump as its primary source of motive power, it is designed to be operated by a person standing, kneeling, or sitting on the watercraft.

PLASTIC HULL: Hulls of fiber-reinforced plastic. The laminate consists of 2 basic components, the reinforcing material (glass filaments) and the plastic or resin in which it is embedded.

RECALL DECAY: A response error caused by the inability of a respondent to recall all of the relevant events occurring in the past.

RECREATIONAL BOATING: Boating activities not associated with commercial or occupational use of waterways.

RECREATIONAL INTERFERENCE: Conflicts between competing users for a limited recreational resource. This measure refers to subjective feelings of crowding and/or dissatisfaction due to the presence or behavior of others in a recreational setting and/or natural or human-made obstructions to recreational enjoyment of a resource.

RESPONSE RATE: The number of usable returned surveys divided by the number of surveys mailed less those returned as undeliverable.

RULES OF THE ROAD: Statutory and regulatory rules governing navigation of vessels.

WATER TOYS: Flotation devices designed to be towed behind a boat with one or more riders.

WOOD HULL: Hulls of plywood, wood planking, or any other wood fiber in its natural consistency, including those of wooden construction that have been "sheathed" with fiberglass or sheet metal.

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Wendy McCown, Technical Editor and Copy Editor

Michelle Jesko, Layout and Production

Michelle Jesko and Katherine Fitzhugh, Figure Preparation

DNR Central Office Word Processing

Acknowledgments

I would like to thank the many people who have helped with this project: Ed Nelson and Eugene Lange of the Bureau of Research, who assisted with all aspects of the planning and design of the methodology; Bill Engfer of the Bureau of Law Enforcement, for his valuable expertise and assistance with planning the project and interpreting the data; Dale Morey, for initiating the project and coming out of retirement to help interpret the data; the Boating Study Steering Committee, for helping us ask the questions we needed to ask; Kathy Fitzhugh, for coordination of survey returns and data entry; Betty Les and Wendy McCown, for their assistance with the writing and dissemination of the results; the DNR copy shop and mailroom, for handling all the printings and mailings; and finally the recreational boaters in Wisconsin who took the time to tell us about the ways they make use of Wisconsin's many varied water resources. THANK YOU!

This project was funded by the Wallop/Breaux Trust Fund, a United States Coast Guard grant.

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