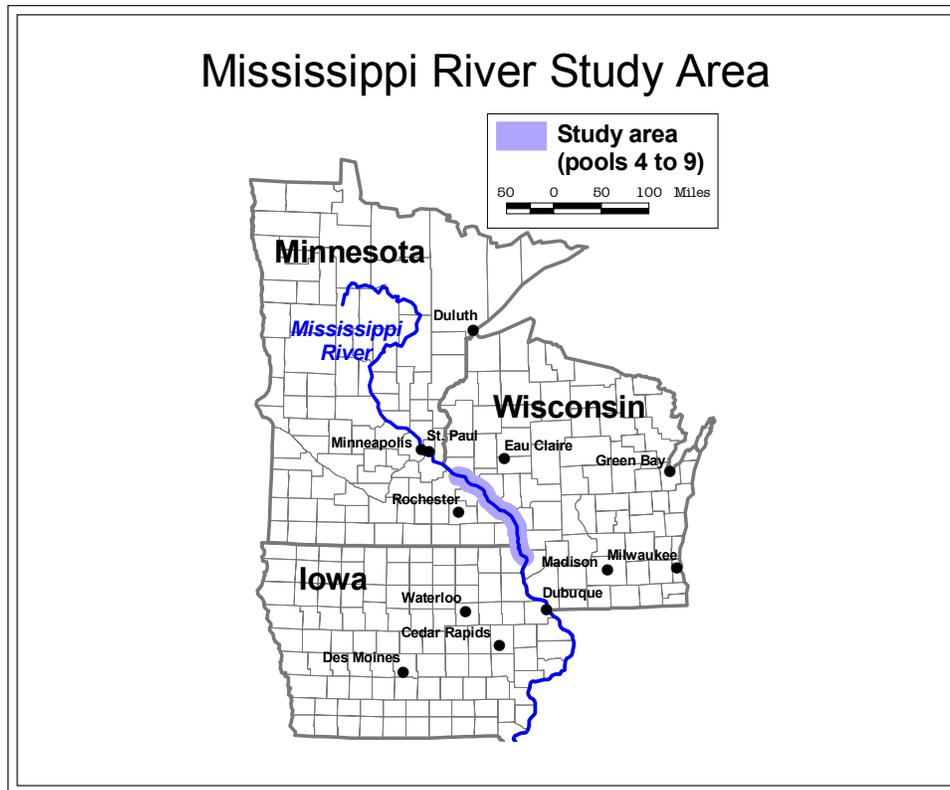




**RECREATIONAL BOATING STUDY
OF THE MISSISSIPPI RIVER,
POOLS 4 TO 9,
SUMMER 2003**



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The 2003 Mississippi River Boating Study was a cooperative research project of the Minnesota and Wisconsin Departments of Natural Resources, Upper Mississippi River National Wildlife and Fish Refuge (U.S. Fish and Wildlife Service), and U.S. Army Corps of Engineers

Report prepared by:
Office of Management and Budget Services
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WI DNR's website: www.dnr.wi.gov; Upper Mississippi River National Wildlife and Fish Refuge's website:
midwest.fws.gov/UpperMississippiRiver/; and U.S. Army Corps of Engineer's website: [www.mvp.usace.army.mil/
recreation/default.asp?pageid=867](http://www.mvp.usace.army.mil/recreation/default.asp?pageid=867).*

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SUMMARY

INTRODUCTION

The Minnesota-Wisconsin portion of the Mississippi River is an important commercial, ecological and recreational resource. The River has long served as a commercial transportation artery, and improvements for transportation date back to the early part of the 19th century. The present set of improvements (a system of locks and dams) dates from the 1930s. Just prior to the creation of the lock and dam system, much of the Minnesota-Wisconsin portion of the River became home to Upper Mississippi River National Wildlife and Fish Refuge. The Refuge protects important riverine habitat, and functions as a significant feeding and resting area for migratory waterfowl using the Mississippi Flyway. As a recreational resource, the Mississippi River offers opportunities for hunting, wildlife observation and a host of water-based activities, including swimming, fishing and pleasure boating.

This study examines the River as a recreation setting. It focuses on recreational boating, which includes fishing from a boat. The reach of the River shared by Minnesota and Wisconsin contains nearly 130,000 acres of boating water and a substantial number of facilities (access ramps, marinas) built by both the public and private organizations to facilitate boating. The study area also contains numerous river-adjacent residences and riverside businesses (resorts, campgrounds) that attract customers due in part to boating opportunities.

The broad intent of the study was to collect the information needed to more effectively understand and manage the River for recreational boating. The study was designed to answer a wide variety of questions, from the amount and origin of boating, to the experiences boaters had on the water, to safety concerns of boaters, to facility preferences and future needs of boaters.

BOATING USE RESULTS

Comparison of Mississippi River with Other Boating Resources

The Mississippi River is by all common measures a major boating resource. The Pool 4 to 9 reach of the River has nearly 130,000 acres of boating water and the quantity of use exceeds one-million boat-hours during the summer period. In comparison with other boating areas, the size of the resource and the quantity of use are high. The boating intensity (boats per acre of water) on the Mississippi River is characteristic of Minnesota's non-metropolitan lake regions.



Amount and Patterns of Mississippi River Boating Use

The two sides of the River generate almost equal quantities of boating use. Most of the boating use comes through public access launch ramps (45%). The next largest source is marina seasonal slip rentals (25%), followed by riparian residences (17%) and other commercial sources (13%). Public access is the leading source on both sides of the River, although its predominance on the Wisconsin side is much larger. On the Minnesota side, marinas rival public accesses as the top boating source. In terms of geography, most of the boating use originates at the extremes of the study area. Pool 4 generates 31 percent, while Pool 8 generates 19 percent, and Pool 9 generates 16 percent.

Boating Use Originating Outside the Study Area

One objective of this study was to estimate the quantity of boating use that enters the study area along the River traveling downstream at Lock 3 and upstream at Lock 9. Based on study estimates, the quantity of use that enters the area represents approximately 5 percent of total boating that originates in the study area.

Comparison of This Study with Boating Use from Other Studies

In previous studies, boats on the River have been counted from aircraft. These aerial counts, however, focus on boats on the main channel, main channel border and adjacent islands. They do not count boats in the side channels and backwater areas. In contrast, this study attempted to estimate all boats, regardless of location on the River. The comparison of studies leads to the following conclusion: the aerial counts appear to measure 60 percent of all boating use as estimated from this study; the other 40 percent is off the main channel in side channels and backwater areas.

BOATER SURVEY RESULTS

Experience of Mississippi River Boaters

When reading the survey results, it is important to keep in mind the depth of experience of Mississippi River boaters. Typically, boaters have been boating on Mississippi River for 25 years (median), and almost 76 percent have been boating on the River for more than 10 years.

Market Area for Mississippi River Boaters

Mississippi River boater travel distances are indicative of a boating market dominated by local (nearby) users. The median travel distance for both public access and marina boaters is under 20 miles. The counties adjacent to the study area contribute 61 percent of all boating use. La Crosse is the leading county (19% of all boating), followed by Winona (10%). Only one county off the River contributes more than 1 percent, and that county is Olmsted (7%—contains Rochester City). The seven-county Minneapolis-St. Paul metropolitan area contributes 5 percent of all boating.

Boating Trip Characteristics

- The average Mississippi River boating party size is 2.9 people, most of whom are adults.
- Overnight boating trips are not that frequent, and account for 12 percent of all trips.

- Most boaters (87%) do not leave (lock out of) the pool into which they launch.
- Beaching is a relatively common activity for Mississippi boaters. One-third of all trips (32%) involve beaching. On weekends and holidays 40 percent of all boaters use a beach.
- Boaters spend about equal amounts of time in the main channel area, and in the side channel and backwater areas. As an activity group, anglers spend most of their time in side channels and backwaters, while boat riders (pleasure boaters) spend most of their time in the main channel.
- Most boaters (85% to 90%) are aware they are spending time in the Upper Mississippi River National Wildlife and Fish Refuge.

Boating Activities

The primary activity of Mississippi River boaters is fishing, as indicated by half of all boaters. Fishing is followed by boat riding and beaching. The portion of boating that is primarily fishing is similar to non-metropolitan lake regions, and is above that found for the metropolitan lake region.

Fishing is by far the dominant activity of public access boaters, 70 percent of whom indicate fishing as their primary activity. Fishing is not as dominant an activity for riparian residents and boaters from all other sources, but it is still the largest activity. Boat riding is a more frequent activity for riparians and boaters from all other sources. It is the leading activity for marina seasonal slip renters; fishing is not a major activity of marina boaters.

Boating Equipment

The most common craft type on the Mississippi River is a fishing boat (has no windshield—unrelated to the activity of fishing). It is followed by runabouts (has windshield) and cruisers (has cabin or superstructure). Fishing boats are a more common craft type on the Mississippi River than in other boating regions, where runabout are as common (or more common) than fishing boats. River boat lengths and horsepower are typical for non-metropolitan lake regions. Also, the small portion of boats that are non-motorized (2%) is normal for the non-metropolitan lake regions.

The large majority of boats have some type of communications equipment, either marine radio or cell phone. Depth finders are common on boats. GPS and radar are not that common. Safety equipment items, except visual distress signals, are generally found on the large majority of craft. Sanitary sewage facilities (toilet or port-a-potty) are uncommon, except on marina vessels.

Boating Safety and Enforcement

Nearly half (45%) of boat occupants wore a life vest on their most recent trip . This percent is slightly smaller than usually found for Minnesota lakes, which are typically around 50 percent. As found in other lake studies, children are far more likely to wear life vests than adults and teens.

Less than one-third (28%) of Mississippi River boaters have completed a formal boating safety course. This completion rate is between metropolitan lake region boaters (32%) and non-metropolitan lake region boaters (18-20%). When asked who should complete a safety course, nearly all boaters (95%) believe that such a requirement should be extended to motorboat operators under 16 years old. Far fewer (35%) think this should be a requirement for motorboat operators of all ages, and even fewer believe it should be required for operators of non-motorized boats (5%).

The prevalence of sighting an enforcement officer is slightly higher for Mississippi River boaters (28%) than for boaters in lake regions (16% to 21%), and the same as Lake Superior boaters (28%). The percent reported being checked by an enforcement officer is 5 percent, within the 4-7 percent range for other boating studies. Mississippi River boaters give high marks to the officers' professional conduct during the check, with 91 percent giving ratings of "good" to "excellent."

Boaters were asked what special boating restrictions are needed where they boated on the River. Responses were similar to those in the Central Lake Region study, the only other study in which this question was asked the same way. Both studies found that "none" was the most frequent response, followed by "special restrictions for personal watercraft (jet skis)." River boaters, however, see a higher need for "slow-no wake/speed restrictions" than Central Region boaters.

Potential River Management Actions

Boaters were presented with a series of eleven potential management actions and asked if they would oppose or support the implementation of each action. Boaters very strongly support prohibiting discharge to the River of any marine sewage. Also given strong support was the action to limit new development to protect River resources. On the issue of development, a number of specific boater-related developments received modest overall support: more boat-accessible campsites; more docks for boaters to use for shopping, restaurants and similar trips; and more transient docks for boaters to use on overnight trips. Also receiving modest support overall was the action of temporarily drawing pools down for fish/wildlife habitat restoration. The action of increasing law enforcement patrols was given similarly modest overall support by boaters. Boaters are neutral overall on the action of setting aside more slow/no wake areas. For one action ("set aside quiet/non-motorized River areas") boaters leaned toward opposition.

Exotic Species Concerns

The reach of the Mississippi River in the study area is infested with Eurasian watermilfoil and zebra mussels, two exotic species that can be inadvertently spread by boaters moving their boats/trailers from the River to other bodies of water. Just under half of Mississippi River boaters (45%) move their boat between the River and another body of water. For those who do move their boat to other waters, most perform some actions nearly all the time: conduct visual inspections, drain water from boat, clean vegetation or mussels. When the actions require more effort, however, the performance of the actions falls off considerably, and a majority of boaters indicate they never perform certain actions: rinse boat with hot water/high pressure water before launching in another water, and flush motor's cooling system with clean water.

The other means to move a boat from the Mississippi River to another body of water is to boat there. Since marina boaters are the most likely group to take long-distance trips in their boats, they were asked in the marina survey if they ever boat to other waters. Nearly 40 percent (38%) indicated that they take such trips. The percent is highest for Pool 4 marina boaters (56%).

Boating Trip Satisfaction and Problems Encountered on the Water

Trip satisfaction is high for Mississippi River boaters: 43 percent report being "very satisfied" and another 52 percent report being "satisfied." Dissatisfaction to any extent is small (4%).

One factor that limits trip satisfaction is perceived crowding among boaters. Most Mississippi River boaters (76%), however, do not find conditions crowded. Crowding perceptions by River boaters are higher than those reported in the non-metropolitan boating regions (which have a similar density of boats on the water as the River), and are comparable to those in the more congested metropolitan boating region (which has a higher density of boats than the River).

In addition to crowding, boaters can experience a host of problems on the water, especially due to the behavior of other boaters. The top-ranked problem for boaters was “high wakes.” Wakes were more of a problem for boaters in fishing boats and pontoons. The next leading problem was “use of personal watercraft (jet skis)”, a perennial leading problem for boaters in the lake region studies. Next was “careless or inconsiderate operation of boats.”

Public Access Facilities

Public Access Use

Public access is the largest source of boating on the River, generating 45 percent of all boating in the study area. More boaters than just those found at the public access in the study, however, are users of public access. For example, the majority of marina seasonal slip renters and riparian residents occasionally use public access to get on the River. Overall, nearly 90 percent (87%) of all River boaters are at least occasional users of public access.

Public Access Quality

Boaters who received their survey after launching through a public access were asked to rate the access for launching and landing a boat. The ratings are generally positive (nearly 70% are “good” to “excellent”), but the ratings tend to be lower than in the non-metropolitan lake regions and Lake Superior (places where this rating question has been asked the same way). One reason for the lower ratings is the higher proportion of River boaters who experience a problem using the access.

Access ratings vary considerably among the administrators of access. Some administrators have average ratings of “good” or above (Alma City, Iowa DNR, La Crosse City, and MN DNR), while one is in the “good” to “fair” range (USFWS), and one is just below “fair” (Wisconsin DNR). Higher ratings are generally associated with fewer boaters having access-use problems.

The types of access-use problems boaters experience cover a range of situations. The leading overall problem has to do with other boaters who are not prepared to launch (especially important at accesses administered by Minnesota DNR, Wisconsin DNR and La Crosse City), followed by shallow water (especially important at accesses administered by Wisconsin DNR), “inadequate toilet facilities or toilet maintenance” and “not enough parking spaces.” For specific administrators, additional leading problems include: “access site in disrepair” (Wisconsin DNR) and “access parking lot being used by non-boaters” (Alma City). Further concerns for some administrators are “docks blocked by boats/anglers” and “insufficient number of launch lanes/ramps.”

Needs for Additional Public Access Facilities

In the boater surveys, access users were asked about the need for more facilities in two ways. One way was indirect and concerned boater’s experience of congestion at access facilities. Places where congestion is comparatively high are priorities for facility expansion, either in terms of new facilities in the same general location or expansion of existing facilities. Standing out as the most congested is Pool 4 on the Minnesota/Iowa side of the River, and Pool 7 on the Wisconsin side.

The other approach to assessing need for more facilities was direct. Boaters were asked if additional access was needed, and, if needed, they were also asked where it was needed. The results, overall, indicate that public access boaters believe they are generally well supplied with facilities. More access boaters indicated “no” to the need question than “yes” (45% and 35%, respectively); the remaining public-access boaters responded “don’t know” (21%).

By combining this direct approach to where additional access is needed with the approach dealing with access congestion, some top priorities for expansion of access are evident. On the Minnesota/Iowa side, Pool 4 and 7 are leading priorities. Pool 4 is the most congested, plus it is the location of nearly 40 percent (38%) of additional access requests. Pool 7 has virtually no access use now, yet nearly one in five boaters (18%) who see a need for additional access would put the addition in Pool 7. On the Wisconsin side, Pool 7 is the leading priority. Pool 7 is the most congested, plus one in four boaters (25%) who see a need for additional access would put the addition in Pool 7.

Marina Use, Facilities and Services

Marina seasonal slip renters visit the marina for reasons other than to take their boat on the water. On average, just over 60 percent (62%) of visits to the marina involve a boating trip. Most marina boaters (72%) engage in land-based activities as part of an outing to their boat. Eating out at restaurants is the most frequent activity, followed by shopping and general sightseeing.

Taking overnight trips is a common activity of Mississippi River marina boaters. Nearly half of marina seasonal slip renters (46%) took at least one overnight trip in the last 12 months. This is comparable, but slightly less than their Lake Superior counterparts.

Certain facilities and services at marinas are far more important to slip renters than others. Very important to slip renters are adequate security, adequate parking, fuel service, electricity dockside, private restroom and showers, and running water dockside. Other services that are nearly “moderately important” on average are sewage pumpout, and knowledgeable marina operator(s) with whom to discuss boats and boating topics. A number of facilities and services are important to some but not others (such as “winter storage capability”) and still others are unimportant to most (such as “internet access”). This importance ranking of marina facilities/services by Mississippi River slip renters is nearly identical to that of Lake Superior slip renters.

Characteristics of Mississippi River Boaters

Certain characteristics of Mississippi River boaters have already been described: the long experience with River boating of most boaters, and the domination of boating by local (nearby) users.

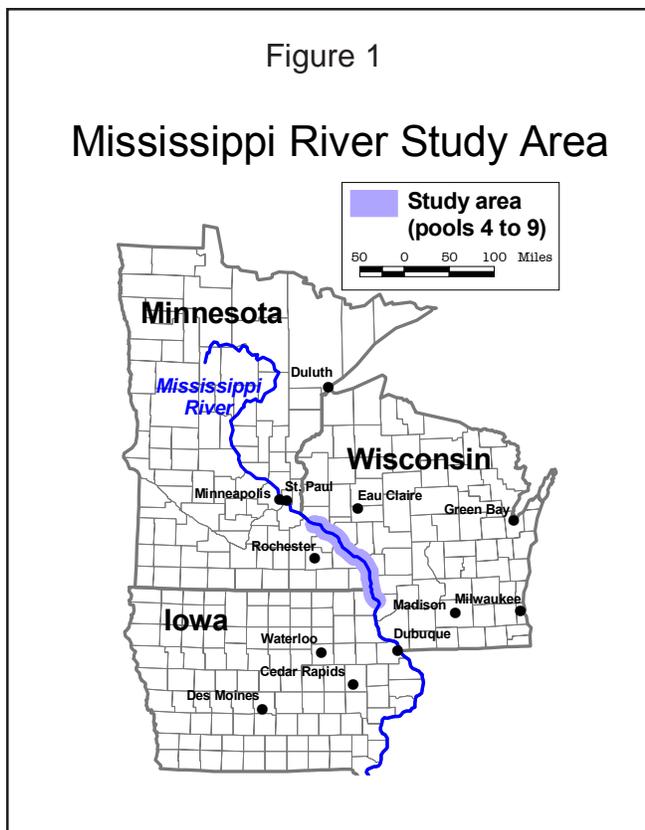
The agencies that contributed to this study are interested in opportunities to reach boaters with information, and, thus, asked questions in the surveys about website use and radio station listening habits. Regarding website use, about half (46%) of Mississippi River boaters have visited one of the three agency websites. The Minnesota and Wisconsin DNR websites are more likely to have been visited than the Fish and Wildlife Service website. Regarding radio, boaters listen to a wide variety of radio stations. Leading the station list is “country”, followed by “rock and roll” and “easy listening/lite.” “Country” is the most popular among all sources of boaters, except marina slip renters, who predominately listen to “easy listening/lite.”

INTRODUCTION

The Minnesota-Wisconsin portion of the Mississippi River is an important commercial, ecological and recreational resource (Figure 1). The River has long served as a commercial transportation artery, and improvements for transportation date back to the early part of the 19th century. The present set of improvements (a system of locks and dams) dates from the 1930s. Just prior to the creation of the lock and dam system, much of the Minnesota-Wisconsin portion of the River became home to Upper Mississippi River National Wildlife & Fish Refuge (established 1924), which extends southward along the Iowa-Illinois reach of the River. The Refuge protects important riverine habitat, and functions as a significant feeding and resting area for migratory waterfowl using the Mississippi Flyway. As a recreational resource, the Mississippi River offers opportunities for hunting, wildlife observation and a host of water-based activities, including swimming, fishing and pleasure boating.

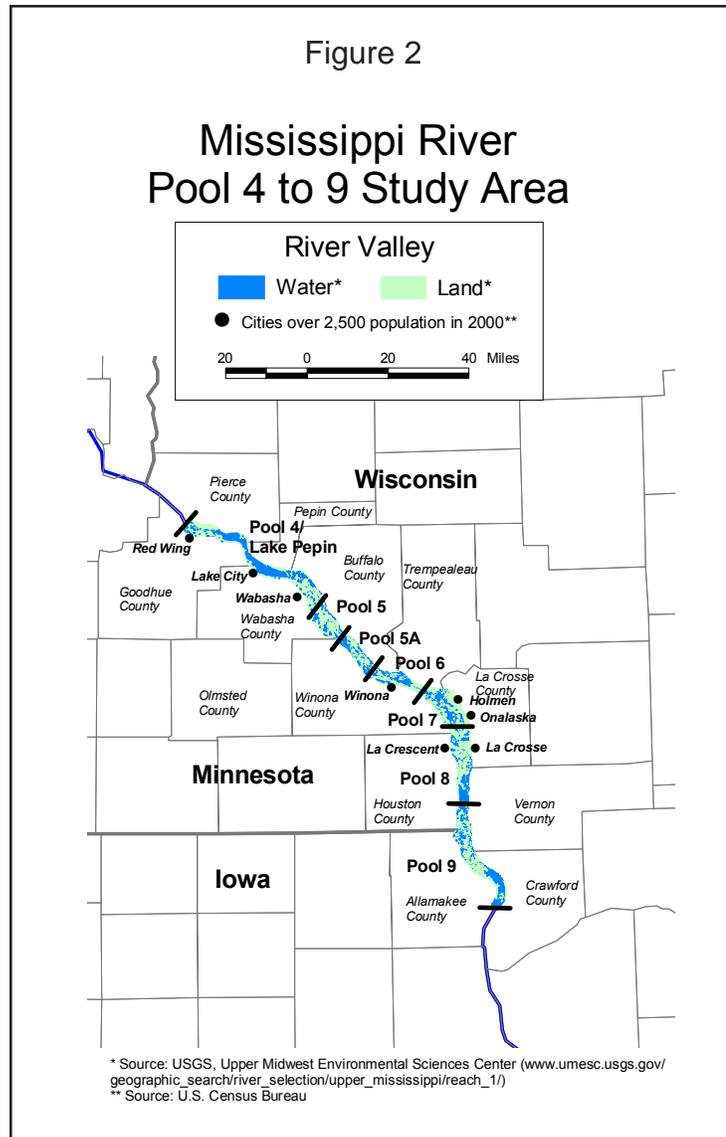
This study examines the River as a recreation setting. It focuses on recreational boating, which includes fishing from a boat. The reach of the River shared by Minnesota and Wisconsin contains nearly 130,000 acres of boating water and a substantial number of facilities (access ramps, marinas) built by both the public and private organizations to facilitate boating. The study area also contains numerous river-adjacent residences and riverside businesses (resorts, campgrounds) that attract customers due in part to boating opportunities.

Specifically, the study area extends from Pool 4 to Pool 9 (Figure 2). “Pools” are the impounded divisions of the Mississippi created by the navigation dams. Each pool is named for the dam that marks its downstream extent. For example, Pool 7 is bounded on the downstream side by Dam 7 (associated with Lock 7), and on



the upstream side by Dam 6 (associated with Lock 6). Pool 4 contains Lake Pepin — a large natural river-lake — which is just over 25,000 acres in size. Locks in the study area are used by recreational as well as commercial craft.

The broad intent of the study was to collect the information needed to more effectively understand and manage the River for recreational boating. The study was designed to answer a wide variety of questions, from the amount and origin of boating, to the experiences boaters had on the water, to safety concerns of boaters, to facility preferences and future needs of boaters. After a brief description of methodology, a summary of the results of the study will be presented as follows:



● Boating use results

- Comparison of Mississippi River with other boating resources
- Amount and patterns of Mississippi River boating use
- Boating use originating outside the study area
- Comparison of this study with boating use from other studies

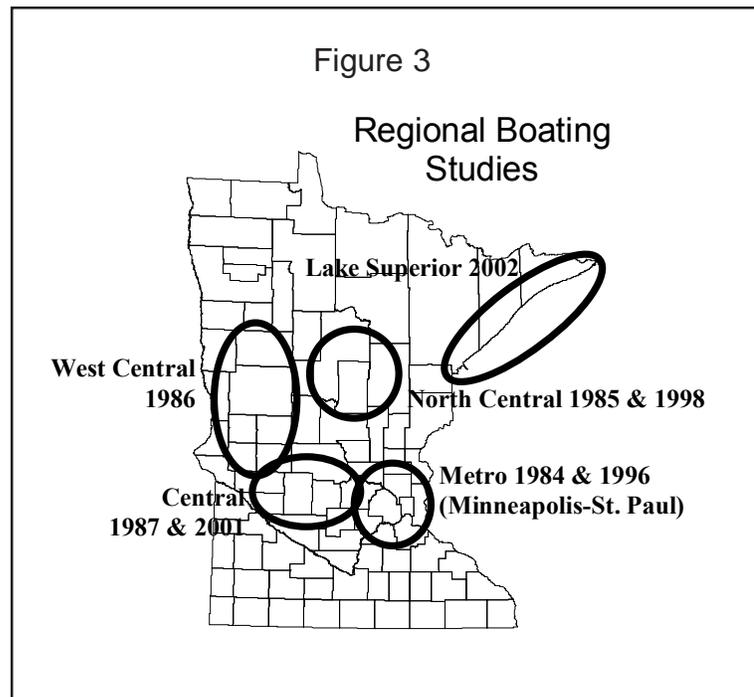
● Boater survey results

- Experience of Mississippi River boaters
- Market area for Mississippi River boaters
- Boating trip characteristics
- Boating activities
- Boating equipment

- Boating safety and enforcement
- Potential River management actions
- Exotic species concerns
- Boating trip satisfaction and problems encountered on the water
- Public access facilities (use, quality, and need for more accesses)
- Marina use, facilities and services
- Characteristics of Mississippi River boaters

To provide some perspective on these Mississippi River boating results, boating information from four recent Minnesota regional studies (Twin Cities metro—1996, north central—1998, central—2001, and Lake Superior—2002) will be woven into the discussions (Figure 3). This will help define the unique and common characteristics of Mississippi River boating.

For those who would like greater detail on methodology and survey results, a tabulation document is available from the Minnesota and Wisconsin DNR. It describes in full the methods used to conduct the study, and provides breakdowns of all survey responses by boater categories. Survey instruments are included in the tabulation document.



METHODOLOGY

The study period in 2003 covered the summer season from the Saturday of Memorial Day weekend to Labor Day. Two types of information were collected in the study: boat-use data, and survey data from boaters. Boat-use data were

gathered from all the four major sources of boating: (1) public access launch facilities, (2) marinas, (3) Mississippi River riparian residences, and (4) other commercial sources (resorts, campgrounds, private launches, and boat rentals). In the study area for 2003 there were 97 public access launch facilities, 34 marinas, 2282 riparian residences, and 23 businesses that provide one or more means of access to the River (e.g., rental boats and private launch ramp). A number of the riparian residents had dock permits from the U. S. Army Corps of Engineers (735) or U. S. Fish and Wildlife Service (37).

Public access and marina boating-use information were collected by field checking facilities according to a statistical sampling schedule, and estimating boats on the water at the time of the field check. Boating use for riparian property owners that originated from their property was estimated from a mail-back survey. Boating use for the other commercial sources was estimated from personal interviews with owners/managers of those businesses. At three marina facilities, boating use was estimated from similar facilities, because the field person could not gain access to the facility or the facility owner/manager would not cooperate with the study. For three of the 23 businesses in the “other commercial sources” category, the owner/manger was unable to estimate boating use; since the study had no valid “comparables” for these three businesses, they were eliminated from further consideration.

Each major source of boating use had an accompanying survey. Public access mail-back surveys were placed on windshields of vehicles believed to have launched a boat at the time of the field check. A marina mail survey was distributed to all seasonal slip renters (includes covered slip renters in garage-type facilities) at cooperating marinas; nearly every marina cooperated. Riparian residences were surveyed by mail; those residents with dock permits from U. S. Army Corps of Engineers or U. S. Fish and Wildlife Service were mailed a survey, while others had a survey dropped at their home. Lastly, business owners/managers in the “other commercial sources” category provided mail-back surveys to their customers.

Overall, some 3625 surveys were received back: 1178 from public access boaters, 1304 from marina seasonal slip renters, 992 from riparian residents, and 151 from boaters using other commercial sources. The number of surveys from boaters using other commercial sources is small. If this study is redone in the future, new procedures for contacting such boaters should be investigated.

The survey return rates were 28 percent for the public access windshield survey, which is acceptable for this procedure; 48 percent for the one mailing of the marina survey without a follow-up mailing (study personnel did not have names and addresses for marina slip renters, and the marina operators attached mailing labels to prepackaged surveys); 55 percent for the riparian residents (dock permit holders had one follow-up mailing to nonrespondents, while all others had no follow-ups), and 11 percent for boaters using other commercial sources (no follow-up mailing). The return rate for the other commercial sources is quite low, and this procedure should be reviewed before it is attempted again.

Since survey sampling was not proportional to boating use, survey responses are weighted by boat-use estimates. Survey-sample weighting is done by type of boating source (public access, marina seasonal slip, riparian residence, other commercial source), by side of River (Minnesota/Iowa, and Wisconsin), by pool, and by day of week (weekend/holidays and weekdays). Survey-sample weighting ensures that responses from one group of boaters, from one side of the River, from one pool, and from one day of week are appropriately represented—in terms of boating use—when combined with responses from another group of boaters, from another side of the River, from another pool, and from another day of week.

One additional boat-use and related survey were conducted as part of this study. To gain an understanding of the quantity of boating use that enters the study area along the River, recreational boaters locking into the study area were given a mail-back survey by U. S. Army Corps of Engineers personnel on scheduled sample days. The surveys were distributed to boaters entering the study area traveling downstream at Lock 3 and upstream at Lock 9. In the survey, the origin of the boating trip was obtained. Overall, 500 surveys were distributed throughout the summer: 250 at Lock 3 and 250 at Lock 9. The number of survey returns was 117, for a return rate of 23 percent. The survey data were used in conjunction with U. S. Army Corps of Engineers records on recreational lockages during the study period to derive estimates of boating use that enters the study area.

Further details on methodology are available in the tabulation document available from Minnesota and Wisconsin DNR.

BOATING USE RESULTS

Comparison of Mississippi River with Other Boating Resources

The Mississippi River is by all common measures a major boating resource. The Pool 4 to 9 reach of the River has nearly 130,000 acres of boating water and the quantity of use exceeds one-million boat-hours during the summer period (Table 1). In comparison with other boating areas, the size of the resource and the quantity of use are high. For example, in comparison with one of Minnesota's better-known boating areas (North Central Region—Brainerd Lakes area) the Mississippi River generates a comparable quantity of boating on a comparable number of water acres, thereby producing a comparable intensity of boating (boat-hours/acre of water). The boating intensity on the Mississippi River is characteristics of Minnesota's non-metropolitan lake regions. In contrast, metropolitan boating intensities are much higher, and extremes are reached on such prime boating waters as Lake Minnetonka and the Lower St. Croix River.

Table 1

Comparison of Mississippi River summer boating use with other boating areas

<u>Study location</u>	<u>Total boating water acres</u>	<u>Total summer boat-hours</u>	<u>Summer boat-hours/acre</u>
<i>Current study</i>			
● Mississippi River, Pools 4 to 9, 2003	129,110	1,118,189	8.7
<i>Non-metropolitan lake regions</i>			
● North Central lakes region in MN, 1998 (excluding Mille Lacs)	145,668	1,067,106	7.3
● Central lakes region in MN, 2001	89,307	693,789	7.8
<i>Metropolitan lake region</i>			
● Twin Cities metro-area lake region in MN, 1996	73,851	1,851,152	25.1
● Lake Minnetonka in Twin Cities metro-area lake region in MN, 2000	14,034	595,272	42.4
<i>Lake Superior</i>			
● MN waters of Lake Superior, 2002	----	140,758	----

Amount and Patterns of Mississippi River Boating Use

The quantity of boating use can be variously reported, depending on one's purpose. The million-plus *boat-hours* of summer use are equivalent to 3,219,072 *boater-hours*, 226,988 million *boat-occasions* and 670,345 *boater-occasions* (Table 2). One *boat-hour* is a single boat on the water for one hour; one *boater-hour* is one boater on the water for one hour; one *boat-occasion* is one boat outing; and one *boater-occasion* is one boater outing. "Boater" measures exceed "boat" measures by a factor equal to the number of boaters in a boat. "Hour" measures exceed "occasion" measures by a factor equal to the number of hours in an outing.

<u>Use measure</u>	Both sides of River		Minnesota/Iowa		Wisconsin	
	<u>Value</u>	<u>Percent</u>	<u>Value</u>	<u>Percent</u>	<u>Value</u>	<u>Percent</u>
Boat hours	1,118,189	100%	531,365	48%	586,824	52%
Boater hours	3,219,072	100%	1,591,987	49%	1,627,085	51%
Boat occasions	226,988	100%	111,331	49%	115,657	51%
Boater occasions	670,345	100%	341,435	51%	328,910	49%

The two sides of the River generate almost equal quantities of boating use. Depending on the boating-use measure, one side will be slightly above half, with the other side slightly below half.

Most of the boating use comes through public access launch ramps (45%) (see Table 3A). The next largest source is marina seasonal slip rentals (25%), followed by riparian residences (17%) and other commercial sources (13%). Public access is the leading source on both sides of the River, although its predominance on the Wisconsin side is much larger. On the Minnesota side, marinas rival public accesses as the top boating source. The contributions of riparian residents and other commercial sources are comparable on both sides of the River.

Table 3

Total summer boating use (boater-hours) by source of use and side of River

A. Percents across sources

<u>Source of boater</u>	Both sides of River		Minnesota/Iowa		Wisconsin	
	<u>Boater-hours</u>	<u>Percent</u>	<u>Boater-hours</u>	<u>Percent</u>	<u>Boater-hours</u>	<u>Percent</u>
Public Access	1,452,508	45%	551,545	35%	900,963	55%
Marina slip/garage	794,631	25%	535,497	34%	259,134	16%
Residence	550,757	17%	268,138	17%	282,619	17%
Other (private launch, resort, rental, etc.)	421,176	13%	236,807	15%	184,369	11%
Total for all sources	3,219,072	100%	1,591,987	100%	1,627,085	100%

B. Percents across sides of River

<u>Source of boater</u>	Both sides of River		Minnesota/Iowa		Wisconsin	
	<u>Boater-hours</u>	<u>Percent</u>	<u>Boater-hours</u>	<u>Percent</u>	<u>Boater-hours</u>	<u>Percent</u>
Public Access	1,452,508	100%	551,545	38%	900,963	62%
Marina slip/garage	794,631	100%	535,497	67%	259,134	33%
Residence	550,757	100%	268,138	49%	282,619	51%
Other (private launch, resort, rental, etc.)	421,176	100%	236,807	56%	184,369	44%
Total for all sources	3,219,072	100%	1,591,987	49%	1,627,085	51%

The Wisconsin side of the River generates nearly two-thirds (62%) of all public access boating, while the Minnesota/Iowa side generates a similar proportion of all marina boating (67%) (see Table 3B). The remaining sources are much more evenly split between the two sides of the River.

In terms of geography, most of the boating use originates at the extremes of the study area. Pool 4 generates 31 percent, while Pool 8 generates 19 percent, and Pool 9 16 percent (Table 4A). Minnesota/Iowa boating use predominately comes from Pool 4, where nearly half (48%) of boating use from the west side of the River originates. In contrast, on the Wisconsin side most of the use is generated in the lower pools, especially Pool 7, 8 and 9, which collectively account for two-thirds of use from the east side of the River.

Table 4

Total summer boating use (boater-hours) by pool and side of River

A. Percents across pools

Pool of boater origin	Both sides of River		Minnesota/Iowa		Wisconsin	
	Boater-hours	Percent	Boater-hours	Percent	Boater-hours	Percent
Pool 4	984,784	31%	769,703	48%	215,081	13%
Pool 5	183,875	6%	50,798	3%	133,077	8%
Pool 5A	280,546	9%	163,577	10%	116,969	7%
Pool 6	277,642	9%	199,554	13%	78,088	5%
Pool 7	374,108	12%	12,552	1%	361,556	22%
Pool 8	601,484	19%	176,160	11%	425,324	26%
Pool 9	516,634	16%	219,643	14%	296,991	18%
Total for all pools	3,219,073	100%	1,591,987	100%	1,627,086	100%

B. Percents across sides of River

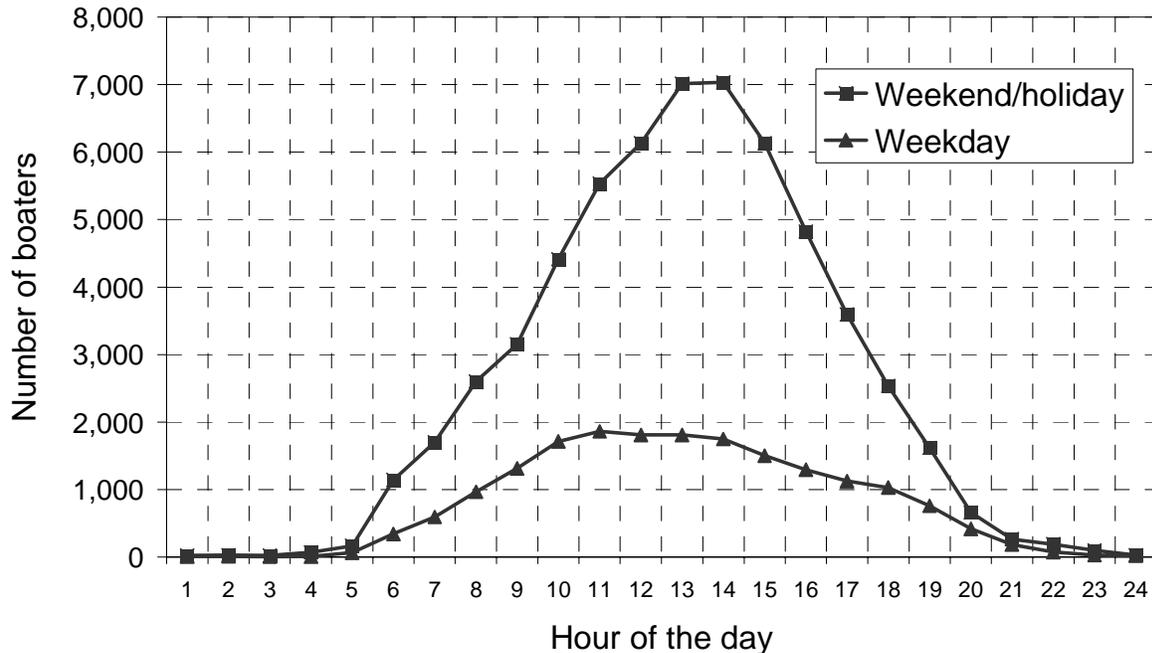
Pool of boater origin	Both sides of River		Minnesota/Iowa		Wisconsin	
	Boater-hours	Percent	Boater-hours	Percent	Boater-hours	Percent
Pool 4	984,784	100%	769,703	78%	215,081	22%
Pool 5	183,875	100%	50,798	28%	133,077	72%
Pool 5A	280,546	100%	163,577	58%	116,969	42%
Pool 6	277,642	100%	199,554	72%	78,088	28%
Pool 7	374,108	100%	12,552	3%	361,556	97%
Pool 8	601,484	100%	176,160	29%	425,324	71%
Pool 9	516,634	100%	219,643	43%	296,991	57%
Total for all pools	3,219,073	100%	1,591,987	49%	1,627,086	51%

For any given pool, the quantity of boating use is usually heavily skewed toward one side of the River or the other. The Minnesota/Iowa side generates over 70 percent of use for Pool 4 and 6, while the Wisconsin side generates over 70 percent of use for Pool 5, 7 and 8 (Table 4B). Pool 7 is almost entirely generated by Wisconsin-based facilities. The remaining two pools (5A and 9) are within a 60 percent/40 percent split between the east and west sides of the River.

At peak boating times on a typical summer weekend day/holiday, over 7000 boaters and over 2,000 boats can be found in the study area (Figure 4). Boating use is substantially less on a typical weekday.

Figure 4

Diurnal distribution of number of boaters on the River on a typical summer weekend/holiday and weekday



Overall, some 60 percent of total summer boating occurs on weekends/holidays, and 40 percent on weekdays. In a majority of Minnesota boating studies, the distribution between weekend/holidays and weekdays is closer to 50/50, which is typical of general outdoor recreation use patterns. However, in one region (Central Lakes Region) the distribution was more skewed toward weekend/holidays (66% of all boating) than was found for the Mississippi River.

Boating Use Originating Outside the Study Area

One objective of this study was to gain an understanding of the quantity of boating use that enters the study area along the River. To accomplish this, recreational boaters locking into the study area at Lock 3 and 9 were given (on scheduled sample days) a mail-back survey by U. S. Army Corps of Engineers personnel. In the survey, the origin of the boating trip was ascertained. The

origin information was used in conjunction with U. S. Army Corps of Engineers records on recreational lockages during the study period to derive estimates of boating use that enters the study area.

The survey showed that about half (54%) of lockages into the study area were from boaters who started their trip outside the study area (Table 5). The other half of the lockages were from boaters who started their trip in the study area, left the area, and returned to the study area through the locks. The half of trips that originated outside the study area represent an addition to boating in the study area not accounted for in the study, since the study only estimated use generated within the study area. Most of the trips (69%) that originate outside the study area are coming through Lock 3, just downstream of the Minneapolis-St. Paul metropolitan area. The magnitude of the boating-use addition represents approximately 5 percent of total study-area boating, and about 10% of boating in both Pool 4 and Pool 9. The addition is balanced, to an uncertain extent, by boaters launching in the study area and spending time outside the study area. Thus, the boating-use estimates from this study are probably not far removed from the estimates that would have been derived had it been possible to track boats entering and leaving the study area.

Table 5

Estimates of recreational boating from outside the Pool 4 to 9 study area

Line	Item	Total, Lock 3 & 9	Lock 3 downstream	Lock 9 upstream
1	Number of summer 2003 recreational lockages	8,841	6,539	2,302
2	Percent of boats originating outside the study area	53.5%	47.7%	70.0%
3	Number of boats from outside the study area (line 1 * line 2)	4,730	3,119	1,611
4	Total boating-trip days anywhere per boat from outside the study area	3.74	3.94	3.37
5	Maximum boat-days in study area for boaters from outside the study area (line 3 * line 4)	17,706	12,273	5,433
6	Minimum boat-days in study area for boaters from outside the study area (line 3 * 1 day)	4,730	3,119	1,611
7	Average days from maximum and minimum (average of line 5 and 6)	11,218	7,696	3,522
8	Total boat occasions sourced in all or parts of study area (for comparison with values in lines 5, 6 and 7)	226,988 (Pool 4 to 9)	68,487 (Pool 4)	36,200 (Pool 9)
9	Relative size of boating use from outside study area: line 7 as a percent of line 8	5%	11%	10%
10	Number of lock surveys	117	66	51

Comparison of This Study with Boating Use from Other Studies

This is not the first study to measure boating use on the Mississippi River. In years past, boats have been counted from aircraft. These aerial counts, however, focus on boats on the main channel, main channel border and adjacent islands. They do not count boats in the side channels and backwater areas, primarily due to the high cost of performing such counts. In contrast, this study attempted to estimate all boats, regardless of location on the River.

The aerial counts appear to measure 60 percent of all boating use as estimated from this study (Table 6). The other 40 percent is off the main channel in side channels and backwater areas. This 40 percent figure is roughly corroborated by results of the boater surveys from this study. When asked in the surveys where on the River most time is spent, 46 percent of boaters indicated side channel and backwater areas.

Table 6

Comparison of boats on the water from aerial flights and this study

NOTE: The aerial flights do not count boats on the entire width of the River; they concentrate on counting boats on the main navigation channel, main channel border, and adjacent islands. The 2003 study attempts to estimate all boats on the River.

<u>Study</u>	<u>Value</u>
Average number of boats* from aerial flights in 1995, 1997 and 1999**	820
Average number of boats* in this 2003 Mississippi River study	1367
Estimated percent of boats counted by aerial flights	60%

* Number of boats is at peak times (weekend/holidays from 11:00 to 15:00), and includes the Pool 5 to 9 reach of the River.

** Source: Information taken from: Minnesota-Wisconsin Boundary Area Commission. 1999 Recreation Boating Study, Lower St. Croix National Scenic Riverway and the Mississippi River from the Twin Cities to Lock and Dam 10. pp. III-6, 7.

BOATER SURVEY RESULTS

Experience of Mississippi River Boaters

When reading the survey results, it is important to keep in mind the depth of experience of Mississippi River boaters. Typically, boaters have been boating on the Mississippi River for 25 years (median), and almost 76 percent have been boating on the River for more than 10 years (Table 7). And the long experience is across the board, from public access users, to marina users, to riparian residents.

Table 7

How many years have you been boating on the Mississippi River?

<u>Year range</u>	<u>All boaters (percent)</u>	<i>----- Source of boater -----</i>			
		<u>Public access (percent)</u>	<u>Marina seasonal slip rental (percent)</u>	<u>River-front residence (percent)</u>	<u>All other sources* (percent)</u>
1 year or less	3	3	3	1	2
2 to 5 years	11	10	13	5	21
6 to 10 years	10	10	14	6	9
11 to 20 years	20	22	22	18	12
21 or more years	<u>56</u>	<u>56</u>	<u>48</u>	<u>70</u>	<u>56</u>
Total percent	100	100	100	100	100
<i>Median years</i>	25	25	20	30	25

* Resorts, campgrounds, private launches, boat rentals.

The experience of Mississippi River boaters is quite long compared with other studies, which have overall medians years of experience on the lake surveyed between about 10 and 15. In other studies the public access boater is typically the least experienced. Not so for the Mississippi River, where public access boaters have comparable years of boating experience.

Market Area for Mississippi River Boaters

Nearly all Mississippi River boaters in the study area are from the River-adjacent states of Wisconsin, Minnesota, and Iowa (Table 8). Only a small portion (3%) originates in other states. These other states make their largest contribution to the “all other” source category, which has tourist-related facilities such as resorts and campgrounds.

State	All boaters (percent)	----- Source of boater -----			
		Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Wisconsin	47	54	24	51	48
Minnesota	39	31	66	42	28
Iowa	11	12	10	6	13
All other states	3	3	1	1	11
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

Mississippi River travel distances are indicative of a boating market dominated by local (nearby) users (Table 9). And there is not much use coming from long distances (few boating tourists). The median travel distance for both public access and marina boaters is under 20 miles. Similar results are found in other boating studies where use is dominated by the local market: the median travel distance for public access boaters is about 10-25 miles for Metro and Central boating regions. In contrast, in the tourist-oriented North Central Region, median travel distance for public access boaters is 100 miles. Lake Superior has both a large local and tourist market.

The local nature of the market is shown in another way by examining the county in which boaters reside. The counties adjacent to the study area contribute 61

Table 9

Distance to launching site from permanent home for Pool 4 to 9 Mississippi River boaters

<u>Distance class</u>	All boaters (percent)	----- <i>Source of boater</i> -----			
		Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Within 10 miles	49	43	45	100	26
11 to 25 miles	11	16	8	0	7
26 to 50 miles	14	18	20	0	4
51 to 100 miles	11	9	20	0	18
101 to 200 miles	10	10	5	0	27
201 or more miles	5	5	2	0	17
Total percent	100	100	100	100	100
<i>Median miles</i>	12	18	18	<1	95

* Resorts, campgrounds, private launches, boat rentals.

percent of all boating use (Table 10). La Crosse is the leading county (19%), followed by Winona (10%). Only one county off the River contributes more than 1 percent, and that county is Olmsted (Rochester City), which is a large contributor at 7 percent. The seven-county Minneapolis-St. Paul metropolitan area contributes 5 percent of all boating.

The River-adjacent counties—which contribute the majority (61%) of boating use—did not experience large population growth in the 1990s; growth was generally small (Figure 5). Thus, population growth is unlikely to fuel major increases in boating in the near future. There may be some hot spots, however, around La Crosse and the River areas that serve Olmsted County (Pool 4 gets 68% of Olmsted County boating).

Table 10

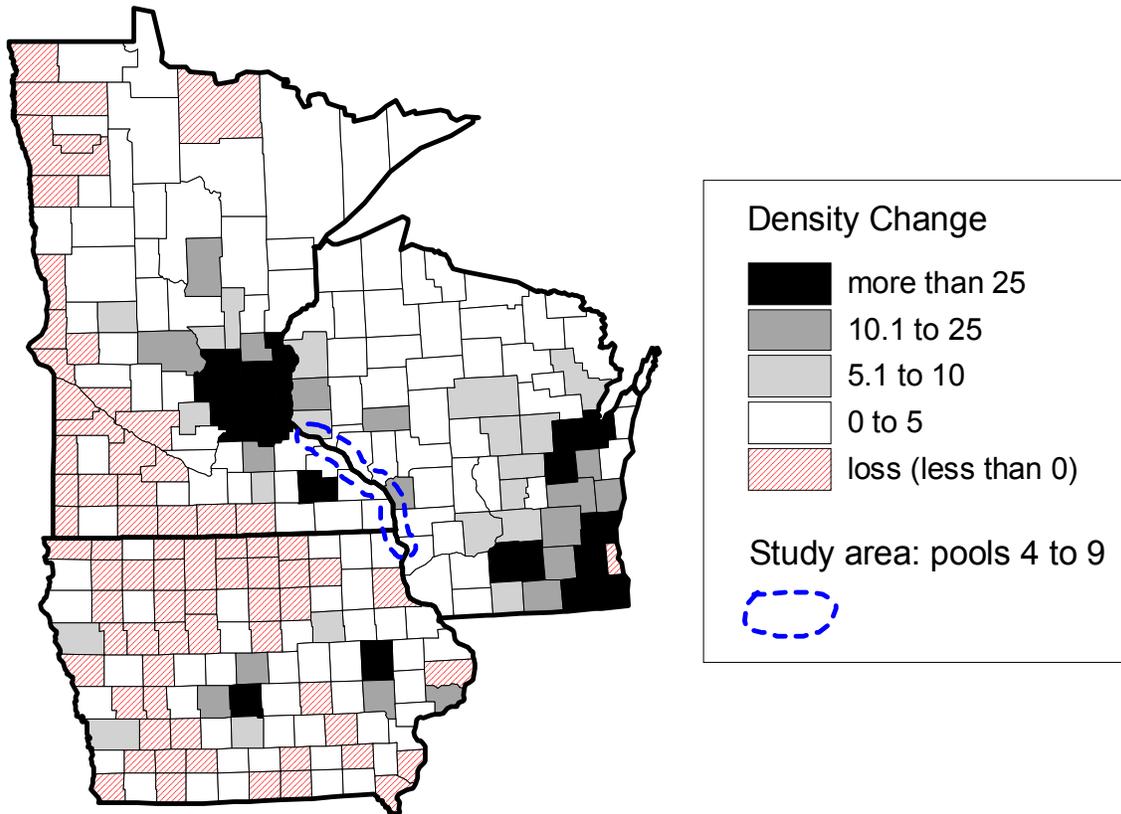
Origin county of summer boating in Pools 4 to 9

<u>State</u>	<u>County</u>	<u>Percent</u>
<i>Counties adjacent to Pool 4 to 9 study area</i>		
Wisconsin	La Crosse	19%
Minnesota	Winona	10%
Minnesota	Wabasha	6%
Wisconsin	Buffalo	6%
Minnesota	Goodhue	4%
Wisconsin	Trempealeau	4%
Wisconsin	Vernon	4%
Minnesota	Houston	3%
Iowa	Allamakee	3%
Wisconsin	Crawford	1%
Wisconsin	Pierce	1%
Wisconsin	Pepin	<u>1%</u>
	<i>Subtotal</i>	<i>61%</i>
<i>Other counties with at least 1% of total boating</i>		
Minnesota	Olmsted	7%
Minnesota	Hennepin	1%
Minnesota	Dakota	1%
Iowa	Winneshiek	1%
Wisconsin	Dane	1%
Wisconsin	Monroe	1%
Wisconsin	Waukesha	1%
Minnesota	Fillmore	1%
Minnesota	Mower	1%
Iowa	Black Hawk	1%
Wisconsin	Eau Claire	<u>1%</u>
	<i>Subtotal</i>	<i>19%</i>
<i>All other counties</i>		
Wisconsin		7%
Iowa		6%
Minnesota		4%
Other states		<u>3%</u>
	<i>Subtotal</i>	<i>20%</i>
<i>All counties</i>	<i>Grand total</i>	<i>100%</i>

Figure 5

Population change from 1990 to 2000

(Density change: change in people per square mile of land area)



Source: U.S. Bureau of the Census

Boating Trip Characteristics

The average Mississippi River boating party size is 2.9 people, most of whom are adults (nearly 80%) (see Table 11). These characteristics are typical of boating groups found in other studies. Also typical is the fact that marina boating parties tend to be the largest, probably due to the large craft of marina boaters.

Overnight boating trips are not that frequent, and account for 12 percent of all trips (Table 12). Marina boaters are the most likely to take an overnight trip, and the portion that do (17%) is similar to that found for Lake Superior marina boaters (19%). Most overnight trips are 2 to 3 nights in length (Table 13). This is a day

Table 11

Including you, how many adults, teens, and children were in your boat on this trip?

<u>Age class of boater</u>	<u>All boaters</u>	<i>Source of boater</i>			
		<u>Public access</u>	<u>Marina seasonal slip rental</u>	<u>River-front residence</u>	<u>All other sources*</u>
All ages	2.9	2.5	3.5	3.3	3.1
Adults (18 or older)	2.3	2.0	2.9	2.5	2.6
Teens (13 to 17)	0.2	0.2	0.2	0.3	0.2
Children (12 or younger)	0.4	0.4	0.4	0.5	0.3

* Resorts, campgrounds, private launches, boat rentals.

Table 12

Characteristics of boating trips

<u>Trip characteristic</u>	<u>All boaters (percent)</u>	<i>Source of boater</i>			
		<u>Public access (percent)</u>	<u>Marina seasonal slip rental (percent)</u>	<u>River-front residence (percent)</u>	<u>All other sources* (percent)</u>
Overnight boating trips	12	12	17	3	16
Went through lock(s)	13	10	15	9	23
Used a beach	32	29	37	35	32

* Resorts, campgrounds, private launches, boat rentals.

or two shorter than typical overnight trips on Lake Superior. Day-use trip lengths (3 to 6 hours) are similar to other boating regions.

Most boaters do not leave the pool into which they launch; only 13 percent of trips involve traveling through a lock (Table 12). This is especially true of public access and riparian resident boaters, 90 percent or more of whom do not leave the pool where they begin their trip.

Table 13

Trip lengths for overnight and day-use trips

Type of trip	All boaters	----- Source of boater -----			
		Public access	Marina seasonal slip rental	River-front residence	All other sources*
Overnight trips					
<i>Number of nights</i>					
Mean nights	2.5	2.5	2.2	2.3	2.8
Median nights	2	2	1	2	3
Day-use trips					
<i>Number of hours</i>					
Mean hours	5.1	5.9	4.2	3.7	5.4
Median hours	5	6	4	3	5

* Resorts, campgrounds, private launches, boat rentals.

Beaching is a relatively common activity for Mississippi boaters. One-third of all trips (32%) involve beaching, and the portion that beach is similar across all sources of boaters (Table 12). Beaching is especially popular on weekends and holidays, when 40 percent of all boaters use a beach. On weekdays it is less popular, but still not a minor activity (22% of all weekday boaters use a beach).

Boaters spend about equal amounts of time in the main channel area, and in the side channel and backwater areas (Table 14). The majority of public access and riparian residents spend most of their time in the side channels and backwaters, while marina boaters are mainly in the main channel. The “other” location was primarily river-lakes, especially Lake Pepin, where many marina sailors spend time. As an activity group, anglers spend most of their time (66%) in side channels and backwaters, while boat riders (pleasure boaters) spend most of their time in the main channel (72%).

Boaters are quite aware they are spending time in the Upper Mississippi River National Wildlife and Fish Refuge. Between 85 and 90 percent of boaters indicated they knew they were boating in the Refuge (Table 15).

Table 14

Where did you spend most of your time on this trip?

Response	----- Source of boater -----				
	All boaters (percent)	Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Main channel	46	41	61	40	50
Side channels & backwaters	46	52	21	54	46
Other	9	7	18	7	4
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

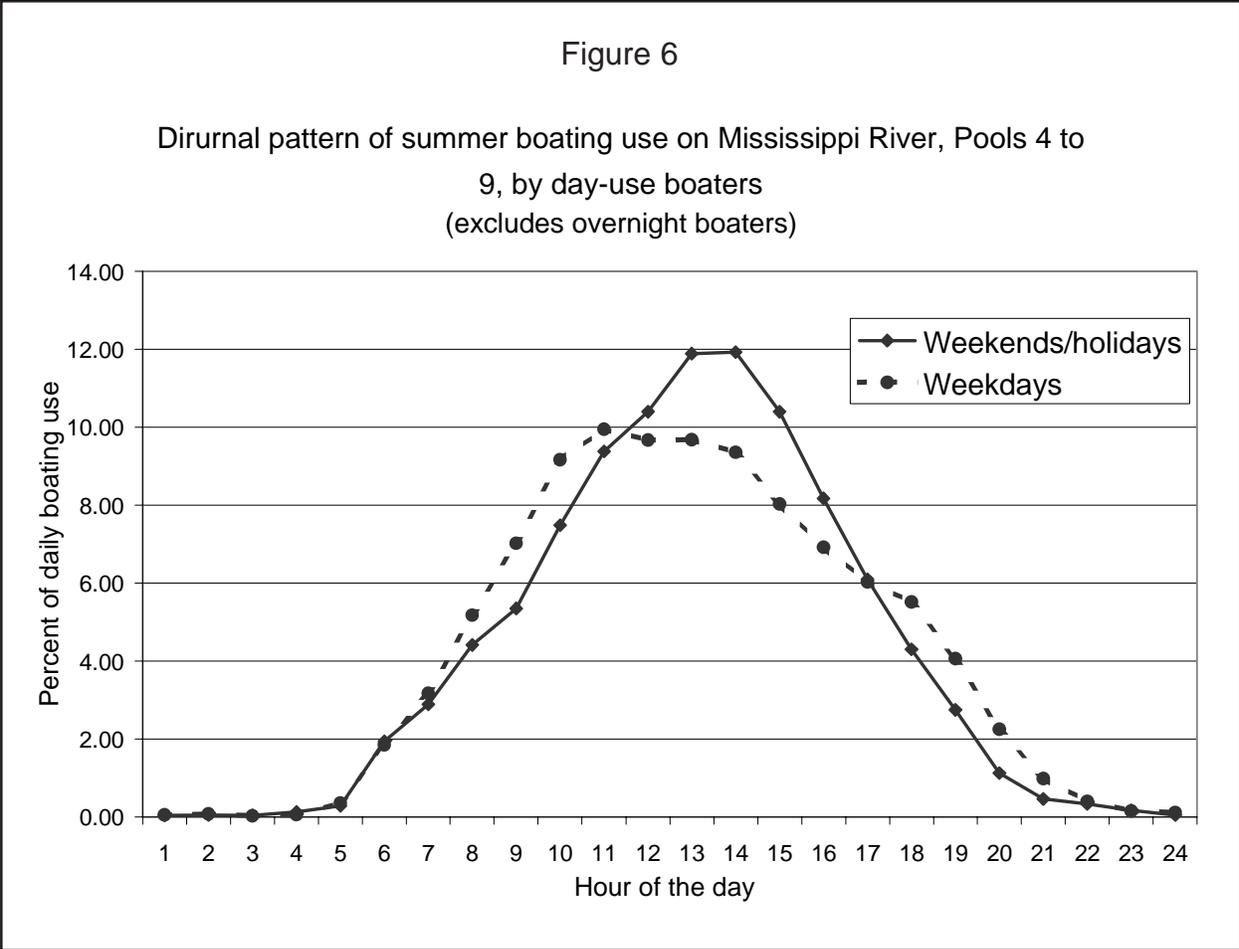
Table 15

Were you aware that you were boating through the Upper Mississippi River National Wildlife and Fish Refuge?

Note: The Refuge extends from lower Pool 4 thru Pool 9; thus, only part of Pool 4 is in the Refuge.

Response	----- Origin pool of boater -----						
	4 (percent)	5 (percent)	5A (percent)	6 (percent)	7 (percent)	8 (percent)	9 (percent)
"Yes"	68	88	83	86	85	85	89
"No"	25	4	15	9	10	11	7
"Don't know/ not sure"	6	8	2	6	5	5	4
Total percent	100	100	100	100	100	100	100

The diurnal pattern of Mississippi River boating use is similar to that found in lake regions (Figure 6). The earlier peak on weekdays is due to more of the use being angling; anglers typically start earlier in the day than other boaters.



Boating Activities

The primary activity of Mississippi River boaters is fishing; half of all boaters indicate fishing as the primary activity (Table 16). Fishing is followed by boat riding (21%) and beaching (10%). Note that “beaching” here is as the “primary” activity. Beaching is a “secondary” activity of many other types of “primary” boating activities. The previous figures on beaching included beaching as both a primary as well as secondary activity, which is why the previous percent of boaters engaging in the activity is much higher (32%).

The portion of boating that is primarily fishing (50%) is similar to non-metropolitan lake regions (North Central and Central), and is above that found for the metropolitan lake region, where only about one-third of boating is fishing. On Lake Superior, a higher percent of boating (60%) is fishing.

Table 16

What was the group's primary activity on the River on this trip?

Activity	All boaters (percent)	----- Source of boater -----			
		Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Fishing	50	68	13	35	45
Boat riding	21	11	33	34	29
Beaching	10	7	17	10	12
Water skiing	4	4	3	4	3
Sailing/sail-boarding	4	0	18	1	0
Wildlife observation/ nature photography	4	3	3	8	1
Camping	2	2	3	0	1
Jet skiing	2	1	1	2	5
Canoeing/kayaking	1	0	0	3	2
Other	3	3	8	3	1
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

Mississippi River fishing represents a higher portion of boating on weekdays (58%) than on weekends and holidays (43%). This is the normal day-of-week pattern found in all lake regions.

Fishing is by far the dominant activity of public access boaters, 70 percent of whom indicate fishing as their primary activity. Fishing is not as dominant an activity for riparian residents and boaters from all other sources, but it is still the largest activity. Boat riding is a more frequent activity for riparians and boaters from all other sources. It is the leading activity for marina seasonal slip renters, who also sail and beach more frequently than other boaters. Fishing is not a major activity of marina boaters; only 13 percent indicated fishing as the primary activity.

These patterns of relative activity predominance by source of boater are also found in lake regions.

The high proportion of public access boaters who fish, coupled with the fact that public access is the major source of boating, means that most fishing (73%) is generated by public access boaters. In contrast, marina seasonal slip renters account for nearly all sailing (95%). Two-thirds of all sailing occurs in Pool 4, which includes Lake Pepin.

Boating Equipment

The most common craft type on the Mississippi River is a fishing boat (no windshield) (see Table 17). It is followed by runabouts (has windshield) and—as a distant third—cruisers (has cabin or superstructure). Fishing boats are the leading craft type for all sources of boaters, except marina seasonal slip renters. For marina boaters, cruisers, runabouts and sailboats are the leading craft. Pontoons are most commonly associated with riparian residents, an association evident in lake region studies.

Fishing boats are a more common craft type on the Mississippi River than in other boating regions, where runabout are as common (or more common) than fishing

Table 17

Boat types on the Mississippi River, Pools 4 to 9

Boat type	All boaters (percent)	----- Source of boater -----			
		Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Fishing (no windshield)	45	60	12	39	42
Runabout (has windshield)	27	27	21	28	33
Cruiser (has cabin or superstructure)	9	3	29	4	9
Pontoon	5	1	9	17	3
Sailboat	4	0	18	1	0
Houseboat	2	0	9	1	2
Jetski	2	1	1	3	5
Canoe	1	0	0	4	2
Kayak	0	0	0	1	0
Other	5	8	1	3	3
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

boats. The general trend in lake regions has been away from fishing boats and toward runabouts.

Mississippi River boat lengths and horsepower are typical for non-metropolitan lake regions (Table 18). Also, the portion of boats that are non-motorized is normal for the non-metropolitan lake regions. Only a small portion of boats (2%) are not motorized. Boaters who rent marina slips, not surprisingly, have the largest craft. The general trend in lake regions has been toward larger boats and larger motors.

Table 18

Boat size and horsepower on the Mississippi River, Pools 4 to 9

<u>Source of boater</u>	<i>Boat length (feet)</i>		<i>Horsepower (for motorized boats)</i>		<i>Boats with gas/diesel motors</i>
	<u>mean</u>	<u>median</u>	<u>mean</u>	<u>median</u>	<u>(percent)</u>
All boaters	19	17	117	70	98%
Public access	17	17	97	60	99%
Marina seasonal slip rental	26	24	171	125	97%
River-front residence	18	17	88	55	93%
All other sources*	18	17	153	90	98%

* Resorts, campgrounds, private launches, boat rentals.

The large majority of boats have some type of communications equipment, either marine radio or cell phone (Table 19). Depth finders are common on boats. GPS and radar are not that common and are far less common than on Lake Superior boats. Safety equipment items, except visual distress signals, are generally found on the large majority of craft. In contrast to the Mississippi, visual distress signals are a staple of Lake Superior boating. Sanitary sewage facilities (toilet or port-a-potty) are uncommon, except on marina vessels.

Table 19

Types of equipment on boats using the Mississippi River, Pools 4 to 9

Equipment type	----- Source of boater -----				
	All boats (percent of boats)	Public access (percent of boats)	Marina seasonal slip rental (percent of boats)	River-front residence (percent of boats)	All other sources* (percent of boats)
Communications equipment					
cell phone	65	60	77	53	78
marine radio	26	17	60	19	16
<i>cell phone or marine radio</i>	<i>69</i>	<i>64</i>	<i>84</i>	<i>58</i>	<i>78</i>
Locational equipment					
depth finder	76	81	80	60	67
GPS unit	16	17	21	8	15
radar	2	1	4	1	0
Safety equipment					
life vests/personal flotation devices	99	100	100	97	100
lights	90	91	95	78	91
throwable lifesaver/buoyant cushion	83	84	92	72	79
fire extinguisher	81	80	92	71	81
horn	64	61	84	54	62
visual distress signal	22	16	43	17	23
Sanitary sewage					
toilet	13	3	49	7	6
port-a-potty	10	6	24	9	10
<i>toilet or port-a-potty</i>	<i>20</i>	<i>7</i>	<i>61</i>	<i>14</i>	<i>15</i>

* Resorts, campgrounds, private launches, boat rentals.

Boating Safety and Enforcement

Life vests are common equipment on boats, as noted above, and nearly half (45%) of boat occupants wore a life vest on their most recent trip (Table 20). The percent wearing a life vest is slightly smaller than usually found for Minnesota lakes, which are typically in the high 40 to low 50 percent range. The overall Mississippi River percent is lowered by the marina boaters, who may feel more secure (and thus less likely to wear a vest) on their large craft. As found in other lake studies, children are far more likely to wear life vests than adults and teens. And the majority of boaters (68%) agree that children should be legally required to wear a life vest while boating (Table 21); similar results have been found in lake region studies. Boaters, however, are not that aware of a Federal law—applicable

to the Mississippi River—that require children to wear a life vest (Table 22). About half were aware and about half were not.

The general trend in Minnesota lake regions has been toward more a greater prevalence of wearing life vests.

Table 20

Percent of boat occupants who wore a life vest on this trip

<u>Age class of boater</u>	<u>All boaters</u>	<i>Source of boater</i>			
		<u>Public access</u>	<u>Marina seasonal slip rental</u>	<u>River-front residence</u>	<u>All other sources*</u>
All ages	45	52	30	50	36
Adults (18 or older)	34	43	19	39	29
Teens (13 to 17)	56	58	42	69	50
Children (12 or younger)	96	99	96	97	79

* Resorts, campgrounds, private launches, boat rentals.

Table 21

How much do you agree or disagree with the following statement:

Children younger than 13 years should be legally required to wear a life vest while boating.

<u>Response</u>	<u>All boaters (percent)</u>	<i>Source of boater</i>			
		<u>Public access (percent)</u>	<u>Marina seasonal slip rental (percent)</u>	<u>River-front residence (percent)</u>	<u>All other sources* (percent)</u>
Strongly agree	41	40	39	46	43
Agree	27	29	28	25	24
Neutral	17	17	16	14	23
Disagree	10	9	12	11	8
Strongly disagree	4	5	4	4	3
Don't know	1	1	1	0	0
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

Table 22

Were you aware of the Federal law that requires children under 13 to wear a life vest while boating?

<u>Response</u>	----- Source of boater -----				
	All boaters (percent)	Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
"Yes"	49	49	55	48	41
"No"	46	47	39	44	54
"Don't know/not sure"	5	4	6	8	5
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

Less than one-third (28%) of Mississippi River boaters have completed a formal boating safety course (Table 23). This completion rate is between metropolitan lake region boaters (32%) and non-metropolitan lake region boaters (18-20%), and well below Lake Superior boaters (51%). As is typically found in other boating studies, marina boaters are more likely to have completed a course.

When asked who should complete a boating safety course, nearly all boaters (95%) believe that such a requirement should be extended to motorboat operators under 16 years old (Table 23). Far fewer (35%) think this should be a requirement for motorboat operators of all ages, and even fewer believe it should be a requirement for operators of non-motorized boats (5%).

As typically found in other boating studies, boaters who have completed a safety course are more likely to believe such course should be required (Table 24). This is particularly evident for the requirement for all motorboat operators. The requirement is supported by 68 percent of boaters who have completed a safety course, but by only 21 percent who have not completed such a course. The requirement for motorboat operators under 16, however, has broad support, even from those who have not taken a safety course.

Compared with other Minnesota boating studies, Mississippi River boaters are more likely to have alcohol on board than lake region boaters (37% for Mississippi River versus 21% to 27% for lake regions), and less likely than Lake

Table 23

Responses of Mississippi River boaters to questions concerning boating safety courses

Question	----- Source of boater -----				
	All boaters	Public access	Marina seasonal slip rental	River-front residence	All other sources*
● <i>Have you ever taken a formal course in boating safety?</i>					
Percent responding:					
"Yes"	28	24	40	26	31
"No"	70	74	58	71	67
"Don't know/not sure"	2	2	2	4	2
Total percent	100	100	100	100	100
● <i>Who should be required to complete a boating safety course? (check all that should be required)</i>					
Percent responding:					
"All motorboat operators"	35	32	48	36	24
"Motorboat operators under 16 years old" [†]	95	95	96	97	96
([†] Includes "all motorboat operators" response)					
"Non-motorized boat operators"	5	3	11	5	1

* Resorts, campgrounds, private launches, boat rentals.

Table 24

Effect of having completed a formal boating safety course on responses to question on requiring a safety course for various types of boat operators

Question	All boaters	<i>Have you completed a formal boating safety course?</i>	
		"Yes"	"No"
● <i>Who should be required to complete a boating safety course? (check all that should be required)</i>			
Percent responding:			
"All motorboat operators"	35	68	21
"Motorboat operators under 16 years old" [†]	95	98	94
([†] Includes "all motorboat operators" response)			
"Non-motorized boat operators"	5	12	2

Superior boaters (43%) (see Table 25). Alcohol is the most prevalent on marina boats and boats from all other sources. Overall, the principal type of beverage on board is soft drinks only, a consistent finding from study to study. Few boaters (5%) take no beverages of any type. The percent taking no beverage is similar to

Table 25

What kinds of beverages did you have on your boat on this trip?

Kinds of beverages	----- Source of boater -----				
	All boaters (percent)	Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Soft drinks only	57	68	42	49	46
Mix of soft drinks and alcoholic beverages	35	27	54	32	46
Alcoholic beverages only	2	2	2	4	4
No beverages of any kind	5	3	3	15	3
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

Lake Superior, but less than lake regions, where the percent is in the 15-25 percent range.

The prevalence of sighting an enforcement officer is slightly higher for Mississippi River boaters (28%) than for boaters in lake regions (16% to 21%), and the same as Lake Superior boaters (28%) (see Table 26). The percent reported being checked by an enforcement officer is 5 percent, within the 4-7 percent range for other boating studies. Most checks are of boaters whose primary activity is fishing (75% of checks), similar to the results in other studies. Mississippi River boaters give high marks to the officers' professional conduct during the check, with 91 percent giving rating of "good" to "excellent." Negative ratings ("poor" or "very poor") were reported by only 2 percent of checked boaters.

Boaters were asked what special boating restrictions are needed where they boated on the River. The responses were similar to those found in the Central Lake Region study, the only other study in which this question was asked the same way. Both studies found that "none" was the most frequent response, followed by "special restrictions for personal watercraft (jet skis)" (see Table 27). Mississippi River boaters, however, see a higher need for "slow-no wake/speed restrictions" (22%) than Central Region boaters (10%). The restriction to remove exotic species from boats and trailers was indicated as needed by nearly 20 percent of boaters (19%). None of the other restrictions was indicated by over 10 percent of boaters. This pattern of responses on restrictions varies little from pool to pool.

Table 26

Contact with enforcement officers by Mississippi River boaters on their trip

Question	----- Source of boater -----				
	All boaters	Public access	Marina seasonal slip rental	River-front residence	All other sources*
● While you were on the lake on this trip, did you see an enforcement officer? Percent responding "Yes"	28	26	33	22	31
● Were you checked by an enforcement officer? Percent responding "Yes"	5	6	1	2	6
● If checked by an enforcement officer: How would you rate the officer's professional conduct during this check?	Percent responding:				
"Excellent"	60	56	59	61	79
"Good"	31	35	10	32	21
"Fair"	6	7	10	6	0
"Poor"	1	2	5	0	0
"Very poor"	1	1	15	0	0
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

Table 27

What special boating restrictions are needed for the Mississippi River where you boated on this trip?

Restrictions needed	----- Source of boater -----				
	All boaters (percent)	Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
● None	34	32	35	31	39
● Special restrictions for personal watercraft (jet skis)	31	33	24	40	20
● Slow-no wake/speed restrictions	22	18	28	31	15
● Requirement to remove Eurasian watermilfoil & zebra mussels from boat & trailer before leaving water body	19	19	18	18	18
● Boat type and size restrictions	9	10	6	10	11
● Horsepower restrictions	7	7	7	11	4
● No motor areas of the River	1	1	2	4	0
● Time restrictions	1	1	0	2	0
● Other	7	6	7	9	3

* Resorts, campgrounds, private launches, boat rentals.

The relatively high desire to restrict personal watercraft, given that such craft represent a small proportion of all boating (2%), is an indication of the opinion many boaters have of personal watercraft use. This same conclusion was reached in the lake region studies.

Potential River Management Actions

Boaters were presented with a series of eleven potential management actions and asked if they would oppose or support the implementation of each action. The actions cover—among other topics—concerns over pollution, facility development, water-surface zoning, and enforcement. The pattern of boater responses (see Table 28) varies little by source of boater (public access, marina and so on) or from pool to pool. However, the responses vary a great deal by boater activity, and these activity-specific differences are described after the overall response pattern is presented.

Boaters very strongly support prohibiting discharge to the River of any marine sewage (Table 28). Also given strong support, but not as strong as marine sewage prohibition, was the action to limit new development to protect River resources. Forty percent of boaters “strongly support” such limits on new development.

On the issue of development, a number of specific boater-related developments received modest overall support, but none was supported by a majority of boaters. These include developing more areas for beaching; more boat-accessible campsites; more docks for boaters to use for shopping, restaurants and similar trips; and more transient docks for boaters to use on overnight trips.

Also receiving modest support overall was the action of temporarily drawing pools down for fish/wildlife habitat restoration. The action of increasing law enforcement patrols was given similarly modest overall support by boaters.

Boaters are neutral overall on the action of setting aside more slow/no wake areas. About as many support this action as oppose it. This appears consistent with the boaters’ response to the need for slow/no wake restrictions where they boated on the River. The restriction was seen as needed by 22 percent of boaters.

For one action (“set aside quiet/non-motorized River areas”) boaters leaned toward opposition. More oppose this action than supported it.

Table 28

How much do you support or oppose each possible management action being taken for the Mississippi River?

Possible management action	Mean oppose/support response (mean value)	----- Degree of support/opposition -----						Total (percent)
		Strongly oppose (=1) (percent)	Mildly oppose (=2) (percent)	Neutral (=3) (percent)	Mildly support (=4) (percent)	Strongly support (=5) (percent)	Don't know (percent)	
Strong support:								
● Prohibit discharge to the River of any marine sewage	4.7	3	1	4	7	84	1	100
● Limit new development to protect River resources	3.9	5	5	25	22	40	3	100
Leaning toward support:								
● Develop more areas for beaching	3.6	7	6	36	21	26	4	100
● Develop more boat-accessible campsites	3.6	6	6	39	21	25	4	100
● Develop more docks for boaters to use for shopping, restaurants, and similar trips	3.5	8	8	31	22	28	3	100
● Temporary pool draw downs for fish/wildlife habitat restoration (that is, water depths is temporarily decreased to improve habitat)	3.4	12	10	25	21	28	4	100
● More regulation of fishing tournaments on the River	3.4	10	7	35	17	26	6	100
● Develop more transient docks for boaters to use on overnight trips	3.4	7	7	41	20	20	5	100
● Increase law enforcement patrols on the River	3.4	10	9	36	22	20	2	100
Neutral:								
● Set aside more slow/no wake areas	2.9	21	20	23	17	16	2	100
Leaning toward opposition:								
● Set aside quiet (non-motorized) River areas	2.5	30	18	30	12	8	3	100

For this last action, boating activity influences support/opposition, as it does for a number of the actions. The action of setting aside quiet/non-motorized River areas—although more opposed than supported by boaters overall—received strong support from sailors, canoers and kayakers. These non-motorized users represent a small minority of River boaters, and their views are not apparent when combined with the views of the large majority of boaters.

For the action “increase law enforcement patrols”, there was less support from boaters who use beaches and camp on the River. There was more support from these same boaters, plus from nonangling motorboaters in general, for more facilities (beaches, boat-accessible campsites, short-term transient docks for

shopping etc., and overnight transient docks). Anglers were less supportive of these facility developments.

Anglers gave more support to the action “temporarily drawing pools down for fish/wildlife habitat restoration”, while nonangling motorboaters gave less support. The action “more regulation of fishing tournaments” was strongly opposed by fishing-tournament anglers, but other anglers were more supportive of this action than nonangling boaters.

Exotic Species Concerns

The reach of the Mississippi River in the study area is infested with Eurasian watermilfoil and zebra mussels, two exotic species that can be inadvertently spread by boaters moving their boats/trailers from the River to other bodies of water. Controlling the spread of these species is serious concern. To gain some information on the topic, boaters were asked in the surveys about their prevalence of movement between the River and other waters, and about the actions they take when they move their boats to help prevent the spread of these species.

Just under half of Mississippi River boaters (45%) move their boat between the River and another body of water (Table 29). The percentage who transport to

Table 29

Do you ever transport your boat between the Mississippi River and another body of water?

<u>Response</u>	<i>Source of boater</i>				
	<u>All boaters (percent)</u>	<u>Public access (percent)</u>	<u>Marina seasonal slip rental (percent)</u>	<u>River-front residence (percent)</u>	<u>All other sources* (percent)</u>
"Yes"	45	58	20	26	52
"No"	55	42	80	74	48
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

another body of water is higher (understandably) for public access boaters than for marina seasonal slip renters and riparian residents.

For those who do move their boat to other waters, most perform some actions nearly all the time: conduct visual inspections, drain water from boat, clean vegetation or mussels (Table 30). When the actions require more effort, however, the performance of the actions falls off considerably, and a majority of boaters indicate they never perform certain actions: rinse boat with hot water/high pressure water before launching in another water, and flush motor’s cooling system with clean water. This same pattern of responses was found for boaters on Lake Minnetonka, the only other place for which these questions have been asked.

Table 30

After removing your boat from a lake or river, how often do you do each of the following?
(only includes boaters who transport their boats between bodies of water, and for whom the action is applicable)

Action	----- Frequency action is performed -----			Total (percent)
	Never (percent)	Sometimes (percent)	Almost always (percent)	
● Conduct visual inspection of boats and equipment	0	7	93	100
● Drain water from boats, including live wells, bilge and bait containers before going to another lake/river	1	6	93	100
● Clean vegetation or mussels from boat equipment	3	12	85	100
● Dispose of leftover bait or minnows on shore	29	16	55	100
● Allow boat to dry for 5 days before launching in other waters	16	37	47	100
● Rinse boat with hot water or high pressure water before launching in another water	62	22	16	100
● Flush motor's cooling system with clean water	68	22	10	100

The other means to move a boat from the Mississippi River to another body of water is to boat to the other water. Since marina boaters are the most likely group to take long-distance trips in their boats, marina boaters were asked in the marina survey if they ever boat from the River to other waters. Nearly 40 percent of

marina boaters (38%) indicated that they boat to other waters (Table 31). The percent is highest for Pool 4, where over half (56%) of marina boaters indicated such movement. For the other pools, the larger majority of boaters do not travel off the River.

Table 31

Do you (a marina seasonal slip renter) ever boat between the Mississippi River and another body of water?

Response	All boaters (percent)	----- Location of boater's marina -----						
		Pool 4 (percent)	Pool 5 (percent)	Pool 5A (percent)	Pool 6 (percent)	Pool 7 (percent)	Pool 8 (percent)	Pool 9 (percent)
"Yes"	38	56	(no boater res-	15	8	11	31	11
"No"	61	43	ponses from	81	92	87	68	89
"Don't know"	1	1	this pool)	4	0	2	1	0
Total percent	100	100	---	100	100	100	100	100

Pool 4—with its high prevalence of movement to another water and high concentration of marina facilities—is the origin of nearly 80 percent (79%) of all marina-related boating to another body of water. Presumably, one of the main waters Pool 4 marina boaters are traveling to is the St. Croix River, the mouth of which is some 15 miles upriver of Lock and Dam 3.

Boating Trip Satisfaction and Problems Encountered on the Water

Satisfaction with the boating trip is high for Mississippi River boaters: 43 percent report being “very satisfied” and another 52 percent report being “satisfied” (Table 32). Dissatisfaction to any extent is small (4%). Satisfaction is highest for marina boaters. One factor that pulls down the satisfaction of boaters from non-marina sources is the prevalence of anglers using those sources. Anglers, as a group, report lower trip satisfaction than other boaters, both in this study and lake region studies. Marinas have the lowest proportion of anglers, while the remaining sources have higher proportions.

Table 32

Overall, how satisfied or dissatisfied were you with you boating experience on this trip?

Response	----- Source of boater -----				
	All boaters (percent)	Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
"Very satisfied"	43	41	52	42	40
"Satisfied"	52	53	45	51	58
"Dissatisfied"	3	4	2	4	2
"Very dissatisfied"	1	2	1	2	0
"Don't know"	0	0	0	1	0
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

Trip satisfaction varies little by pool, day of week, and years boated on the River. Satisfaction levels are similar to those in lake region studies, but below those of Lake Superior. Lake Superior trip satisfaction is exceptionally high.

In the surveys, boaters were asked to rate the quality of the beach for their use. For the nearly one-third of boaters who used a beach, most gave positive marks (“good” to “excellent”), though the bulk of the positive ratings were “good” and not “excellent” (Table 33). The prevalence of middling (“fair”) plus negative ratings was given by 31 percent of beach users. Overall, the beach-quality ratings are not particularly strong. The ratings vary little by pool, source of boater, and day of week.

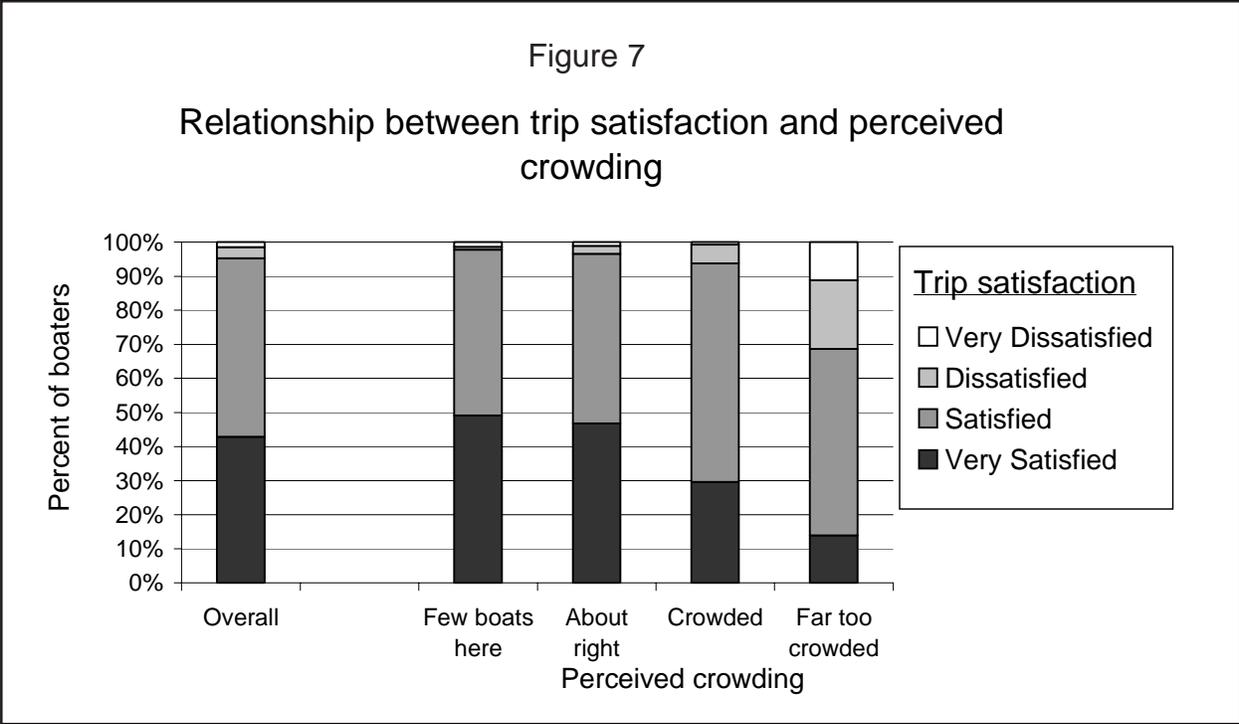
One factor that limits trip satisfaction is perceived crowding among boaters. As perception of crowding rises from “few boats here” to “about right” to “crowded” and “far

Table 33

How would you rate the quality of the beach for your use?

(responses of the 32 percent of boaters who used a beach on this trip)

Response	Percent of beach users
"Excellent"	18
"Good"	52
"Fair"	22
"Poor"	7
"Very poor"	2
Total percent	100



too crowded”, satisfaction levels drop off appreciably (Figure 7). Most Mississippi River boaters (76%), however, do not find conditions crowded (Table 34). For the 23 percent that do find conditions crowded, the bulk report conditions as “crowded” (19%) and not “far too crowded” (4%).

Crowding perceptions are consistent across pools, sources of boaters, and years of experience boating on the River. Weekends/holidays, which are more congested, have higher crowding perceptions than weekdays. The weekday portion of boaters reporting conditions as “crowded” or “far too crowded” is 16 percent, while the weekend/holiday proportion is 27 percent.

Crowding perceptions by Mississippi River boaters are higher than those reported in the non-metropolitan boating regions (which have similar density of boats on the water as the River), and are comparable to those in the more congested metropolitan boating region (which has a higher density of boats on the water than the River). The reason for this is not known, but one hypothesis follows from observations made on Lake Minnetonka and the lower St. Croix River.

Minnetonka and the St. Croix have similarly high boating densities on the water, but Minnetonka boaters are twice as likely as St. Croix boaters to report conditions as crowded. Minnetonka’s arrangement of water (numerous bays

Table 34

How did you feel about the number of boats on the Mississippi River on this boating trip?

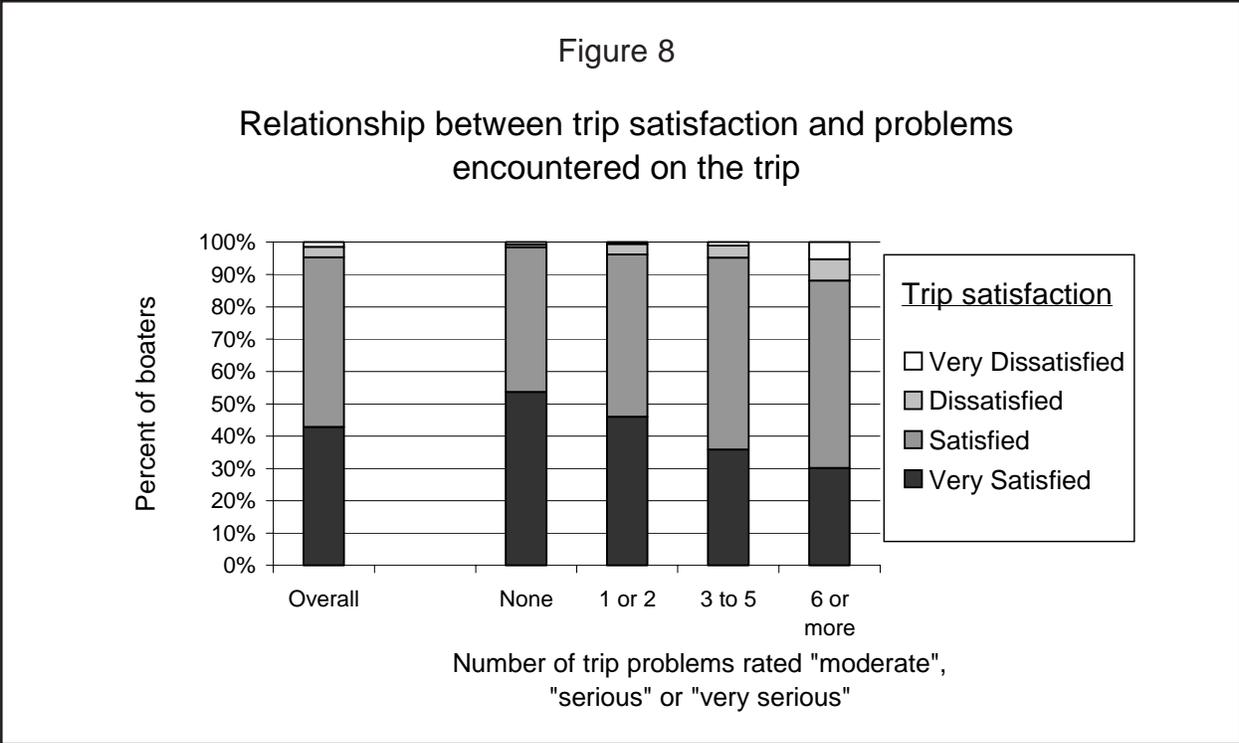
<u>Response</u>	----- <i>Source of boater</i> -----				
	<u>All boaters</u> <u>(percent)</u>	<u>Public access</u> <u>(percent)</u>	<u>Marina seasonal</u> <u>slip rental</u> <u>(percent)</u>	<u>River-front</u> <u>residence</u> <u>(percent)</u>	<u>All other</u> <u>sources*</u> <u>(percent)</u>
"Few boats here"	24	24	27	30	12
"About right"	52	50	52	43	73
"Crowded"	19	21	17	20	10
"Far too crowded"	4	3	4	6	3
"Don't know"	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>2</u>
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

connected by narrow channels) brings boaters into close quarters regularly, while the St. Croix is much more a wide-open expanse of water. Perhaps, the Mississippi River, with its many channels and constrictions, has similarities to Minnetonka that help account for the relatively high levels of perceived crowding.

In addition to crowding, boaters can experience a host of problems on the water, especially due to the behavior of other boaters. And as more and more of these problems are encountered, trip satisfaction declines (Figure 8). In the surveys, boaters were asked to judge how much of a problem (if any) they had with sixteen potential problems on their recent outing.

The top-ranked problem for boaters was “high wakes”, reported as a “serious” or “very serious” problem by 20 percent of boaters, and as a “moderate” problem by another 22 percent (Table 35). Wakes were more of a problem for boaters in fishing boats and pontoons, and less of a problem for boaters in runabouts and cruisers. “High wakes” has never been a top-ranked problem for lake region boaters. The next leading problem was “use of personal watercraft (jet skis)”, a perennial leading problem for boaters in the lake region studies. Next was “careless or inconsiderate operation of boats”, which was reported as a “serious” or “very serious” problem by 12 percent of boaters, and as a “moderate” problem by another 17 percent. All other potential problems were indicated by a majority of



boaters as “not a problem.” One of these lower-ranked problems (“boats operating too fast, too close to shore”) is more a problem to riparian residents than to boaters in general. It is interesting to note that the potential problem of “barge traffic” is small, and is no larger a problem for boaters who spend most of their time in the main channel than for boaters who spend most of their time in side channels and backwaters.

Some problems potentially affect just some boaters, and these problems are presented for those selected boaters at the bottom of Table 35. Two problems of modest levels for their potentially affected boaters are “amount of time it takes to go through locks” and “lack of available beach for my use.” Two others of low levels are “fishing tournament activities at the public access” and “inability to find marine toilet pumpout facilities.”

Table 35

Based on your experience on this trip, how much of a problem is each of the following on the Mississippi River?

Potential problem	Mean problem response (mean value)	----- Degree of problem -----					Very serious problem (=5) (percent)	Don't know (percent)	Total (percent)
		Not a problem (=1) (percent)	Slight problem (=2) (percent)	Moderate problem (=3) (percent)	Serious problem (=4) (percent)				
All boater responses									
● High wakes	2.4	34	25	22	11	9	0	100	
● Use of personal watercraft (jet skis)	2.1	48	17	15	9	10	1	100	
● Careless or inconsiderate operation of boats	2.0	43	27	17	8	4	1	100	
● Excessive speed in channels and crowded areas	1.8	58	18	12	6	5	1	100	
● Boats operating too fast, too close to shore/docks	1.7	62	19	8	5	5	2	100	
● Boats not yielding the right-of-way	1.6	65	20	8	4	3	1	100	
● The amount of noise from boats on the River	1.6	65	19	10	3	2	1	100	
● Fishing tournament activities on the water	1.5	70	8	8	4	4	6	100	
● Boat operators who have been drinking too much	1.4	63	11	6	2	2	16	100	
● High wind and waves	1.4	72	18	7	1	1	1	100	
● Barge traffic on the River	1.4	74	14	6	2	1	4	100	
● Near miss or collision	1.3	83	10	3	2	1	1	100	
● Inclement weather	1.2	85	9	4	0	0	2	100	
Boaters who used locks on this trip									
● Amount of time it takes to go through the locks	1.9	45	30	15	4	5	0	100	
Boaters who used public access on this trip									
● Fishing tournament activities at the public access	1.6	68	9	8	5	4	6	100	
Boaters who used beaches on this trip									
● Lack of available beaches for my use	2.0	52	17	18	7	5	1	100	
Boaters who have a toilet on the boat used on this trip									
● Inability to find marine toilet pumpout facilities	1.1	88	3	3	0	1	5	100	

Public Access Facilities

Public Access Use

Public access is the largest source of boating on the River, generating 45 percent of all boating in the study area. More boaters than just those found at the public access in the study, however, are users of public access. For example, the majority of marina seasonal slip renters and riparian residents occasionally use public access to get on the River (Table 36). Overall, nearly 90 percent (87%) of all River boaters are at least occasional users of public access.

Table 36

Do you or other members of your household ever use public boat accesses to get onto the Mississippi River?

Response	All boaters (percent)	----- Source of boater -----			
		Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
"Yes"	87	100	63	80	79
"No"	12	0	37	19	19
"Don't know"	0	0	1	1	2
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

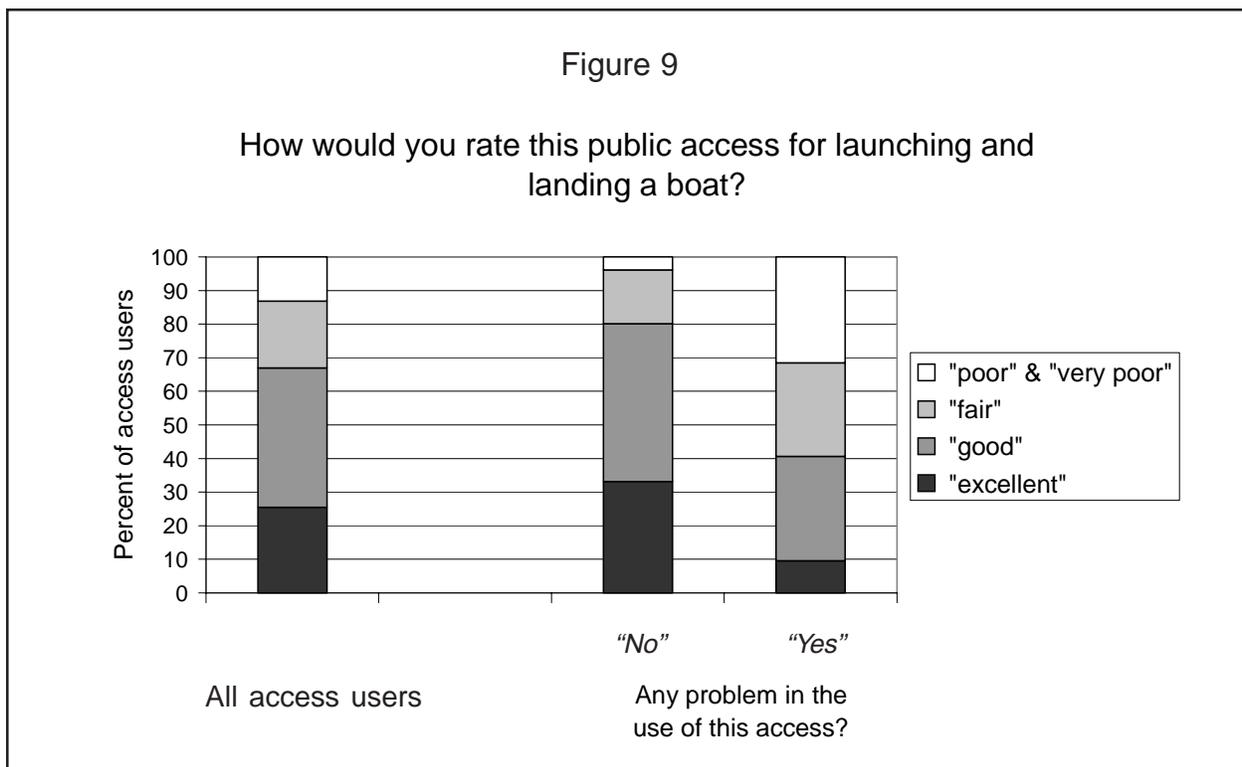
Public access boaters typically use more than one River access. Access boaters report using an average of 4 (and a median of 3) public accesses on the River. Only 11 percent report using just the one access where they received the survey. Nearly all boaters (93%) are repeat users of the access where they received the survey.

A small portion of public access boaters (3%) reported a disability that affects when or where they boat (29 surveys; mostly knee, leg, and back problems). Of these 3 percent, 82 percent found the access adequate; the other 18 percent have

mobility problems (knees/totally disabled) and had trouble with shallow water and use of the dock.

Public Access Quality

Boaters who received their survey after launching through a public access were asked to rate the access for launching and landing a boat (Figure 9). The ratings are generally positive (nearly 70% are “good” to “excellent”), but the ratings tend to be lower than in the non-metropolitan lake regions and Lake Superior (places where this rating question has been asked the same way). One reason for the lower ratings is the higher proportion of River boaters who experience a problem using the access, and the effect of experiencing such a problem on lowering access ratings. For boaters not experiencing a problem, positive ratings are given by 80 percent of boaters, while for those experiencing a problem, positive ratings drop in half to 40 percent (Figure 9). And nearly one-third (32%) of River access uses experienced a problem with the access, which is above the proportions in the two non-metropolitan lake regions (23% to 24%), and well above Lake Superior (11%).



Access ratings vary considerably among the administrators of access in the study area (Table 37—note: administrators are only broken out if they had at least 50 ratings from access boaters). Some administrators have average ratings of “good (=4.0)” or above (Alma City, IA DNR, La Crosse City, and MN DNR), while one is in the “good” to “fair” range (USFWS), and one is just below “fair” (Wisconsin DNR). Higher ratings are generally associated with fewer boaters having access-use problems, lower ratings with more boaters experiencing such problems.

Table 37

How would you rate this access for launching and landing a boat?
(access administrators with at least 50 survey returns are listed individually)

Response	All access users (percent)	Access administrator						
		MN DNR (percent)	WI DNR (percent)	IA DNR (percent)	USFWS (percent)	La Crosse City (percent)	Alma City (percent)	All others (percent)
"excellent" (=5)	25	29	9	38	18	35	62	22
"good" (=4)	41	51	36	48	42	45	28	38
"fair" (=3)	20	13	19	11	28	14	8	26
"poor" (=2)	5	5	10	0	5	4	1	6
"very poor" (=1)	8	3	25	3	7	2	1	9
Total percent	100	100	100	100	100	100	100	100
Mean rating (1 to 5)	3.7	4.0	2.9	4.2	3.6	4.1	4.5	3.6
Percent of boaters indicating a problem in the use of the access	32	29	44	25	42	30	17	29

The types of use problems access boaters experience cover a range of situations. The leading overall problem has to do with other boaters who are not prepared to launch, and this is especially important at accesses for some administrators (Minnesota DNR, Wisconsin DNR and La Crosse City) (see Table 38). The next leading overall problem is shallow water, and this is a very common problem for one access administrator (Wisconsin DNR). The next leading overall problems concern “inadequate toilet facilities or toilet maintenance” and “not enough parking spaces.” No other use problems were indicated by over 25 percent of boaters overall. Accesses for some administrators, however, had additional leading problems. Most notable here are “access site in disrepair” (Wisconsin DNR) and “access parking lot being used by non-boaters” (Alma City).

Table 38

What was the problem with the use of the access?
(responses of the public-access boaters who had a problem)

Problem description	All access users (percent)	Access administrator					All others (percent)	
		MN DNR (percent)	WI DNR (percent)	IA DNR (percent)	USFWS (percent)	La Crosse City (percent)		Alma City (percent)
● other boaters not prepared prior to launching	42	64	58	21	30	58	35	25
● water too shallow; dredging needed to provide better access from ramp to river	36	28	78	39	37	22	14	24
● inadequate toilet facilities or toilet maintenance	28	13	17	58	37	39	7	27
● not enough parking spaces	25	39	31	0	39	11	21	18
● docks blocked by boats, anglers	21	32	28	17	10	24	28	17
● access site in disrepair	19	10	59	0	4	12	7	16
● access parking lot being used by non-boaters	17	18	28	4	29	16	48	4
● insufficient number of launch lanes/ramps	17	18	39	4	13	8	7	13
● inadequate lighting of access/parking area	11	3	22	13	11	12	0	9
● not enough maneuvering room on land near ramp for launch/landing	11	6	7	0	28	1	22	11
● difficult to launch/land because of wind or waves	11	14	12	0	5	5	29	15
● not enough maneuvering room on water near ramp for launch/landing	10	9	19	4	16	3	29	6
● ramp slope not steep enough	9	6	18	4	9	10	7	4
● difficult to launch/land because of river current	8	3	8	0	7	10	22	10
● ramp blocked by parked cars, campers etc.	8	5	10	4	12	5	7	7
● too much litter in access area	7	11	7	0	3	10	0	8
● parking spaces too small	6	6	6	0	8	3	0	7
● difficulty finding access when dark out	5	1	8	8	9	3	7	3
● inadequate informational signs at access	3	4	7	4	1	2	0	2
● safety of entry to access area from road or highway	2	6	4	0	2	0	7	0
● inadequate directional signs to access	2	3	2	0	4	1	0	1

Needs for Additional Public Access Facilities

In the boater surveys, access users were asked about the need for more facilities in two ways. One way was indirect and concerned boater’s experience of congestion at access facilities. Facility congestion provides a measure of where current use is comparatively high (or low) for existing facilities. Places where congestion is comparatively high are priorities for facility expansion, either in terms of new facilities in the same general location or expansion of existing facilities.

The other approach to assessing need for more facilities was direct. Boaters were asked if additional access was need, and, if needed, they were also asked where it was needed. Results from this direct approach are presented after results from the previous approach are presented.

The majority of access users (53%)—who are repeat users at the access where they received the survey—have found the access lot full some time in the past. This happened an average of 4 times (median 3 times) in last 12 months. Nearly all of those who found the access full (92%), however, found a way to boat that day.

The prevalence of finding access lots full varies from location to location along the River. Some places are more congested than others. Table 39 displays by pool and side of River the proportion of boaters indicating “lot full” and “times

Table 39

Comparison of frequency of "lot full" responses of public access boaters with access use across pools and sides of the River

Pool of access	----- Minnesota/Iowa side of River -----			----- Wisconsin side of River -----		
	"Lot full" responses (percent)	"Times lot full in last 12 months" responses (percent)	Public access boating use (percent)	"Lot full" responses (percent)	"Times lot full in last 12 months" responses (percent)	Public access boating use (percent)
4	54%	58%	43%	9%	8%	9%
5	4%	6%	5%	4%	2%	4%
5A	2%	3%	1%	11%	10%	11%
6	15%	14%	19%	4%	5%	6%
7	0%	0%	1%	23%	26%	18%
8	11%	10%	11%	26%	21%	28%
9	<u>13%</u>	<u>9%</u>	<u>22%</u>	<u>24%</u>	<u>28%</u>	<u>24%</u>
Total percent	100%	100%	100%	100%	100%	100%

lot full in last 12 months” responses. Also shown in the table is the proportion of access boating that is generated from that pool and side of River. If all places along the River were equally congested, the “lot full” and “times lot full in last 12 months” proportions would be the same as the boating use proportion. When the former proportions exceed the boating use proportion, the place is more congested than other places and, thereby, would be higher priority for facility expansion. Standing out as the most congested is Pool 4 on the Minnesota/Iowa side of the River, and Pool 7 on the Wisconsin side.

The second approach was direct, and boaters were asked if more public access was needed. The results overall indicate that public access boaters believe they are pretty well supplied with facilities (Table 40). More access boaters indicated “no” to the need question than “yes” (45% and 35%, respectively); the remaining public-access boaters responded “don’t know” (21%). The expressed need of access boaters is noticeably higher on the Minnesota/Iowa side of the River than on the Wisconsin side.

Public access boaters are more likely than boaters from other sources to see a need for additional access, a finding that is consistent with lake region studies. However, the expressed need from boaters from “all other sources” is as high as from public access boaters.

Table 40

Do you think any additional public boat accesses are needed on the Mississippi River?

Source of boater	----- Response -----			Total (percent)
	"Yes" (percent)	"No" (percent)	"Don't know" (percent)	
Public access (both sides of River)	35	45	21	100
<i>Minnesota/Iowa side of River</i>	<i>41</i>	<i>42</i>	<i>17</i>	<i>100</i>
<i>Wisconsin side of River</i>	<i>31</i>	<i>47</i>	<i>23</i>	<i>100</i>
Marina seasonal slip rental	20	49	31	100
River-front residence	23	47	30	100
All other boater sources*	35	45	21	100
<i>All sources combined</i>	<i>30</i>	<i>46</i>	<i>24</i>	<i>100</i>

* Resorts, campgrounds, private launches, boat rentals.

The 35 percent of River access boaters indicating a need is slightly higher than found in the non-metropolitan lake regions where this question has been asked (ranges from 25% to 32% in the lake regions).

The locations where boaters—who indicated a need for more access—would place the additional accesses are displayed in Table 41. Table 41 displays by pool and side of River the proportion of “need more” responses. Also shown in the table is the proportion of access boating that is generated from that pool and side of River. When the “need more” proportion is comparable to the “boating use” proportion, boaters are indicating a desire to reinforce existing use patterns by locating the need in the vicinity where they currently use the River. When the “need more” proportion is higher than the “boating use” proportion, boaters are indicating a desire to open up new places along the River.

Table 41

Where are additional public accesses needed on the Mississippi River?

(responses of public access boaters who indicated additional public access was needed; need was indicated by side of River and pool)

Pool where need indicated	----- Minnesota/Iowa side of River -----		----- Wisconsin side of River -----	
	"Need more" responses (percent)	Public access boating use (percent)	"Need more" responses (percent)	Public access boating use (percent)
4	38%	43%	12%	9%
5	8%	5%	5%	4%
5A	7%	1%	10%	11%
6	13%	19%	13%	6%
7	18%	1%	25%	18%
8	6%	11%	19%	28%
9	<u>9%</u>	<u>22%</u>	<u>15%</u>	<u>24%</u>
Total percent	100%	100%	100%	100%

The pattern of responses roughly follows—with some important exceptions—the reinforcement of existing use: where use is currently high, is where boaters indicate the need for more access. The exceptions are the places where boaters desire to open up new locations. Primary among these is Pool 7 on the Minnesota/Iowa side of the River (18% of “need more” responses and only 1% of current boating use), and Pool 5A to a lesser extent. On the Wisconsin side, Pool

6 and 7 stand out; together the two pools have 38 percent of the “need more” responses and 24 percent of current boating use.

By combining this direct approach to where additional access is needed with the approach dealing with access congestion, some top priorities for expansion of access are evident. On the Minnesota/Iowa side, Pool 4 and 7 are leading priorities. Pool 4 is the most congested, plus it is the location of nearly 40 percent (38%) of additional access requests. Pool 7 has virtually no access use now (1%), yet nearly one in five boaters (18%) who see a need for additional access would put the addition in Pool 7. On the Wisconsin side, Pool 7 is the leading priority. Pool 7 is the most congested, plus one in four boaters (25%) who see a need for additional access would put the addition in Pool 7. This 25 percent is well above the current use proportion of 18 percent.

Marina Use, Facilities and Services

Similar to the preceding questions about public accesses posed to the users of those facilities, seasonal slip renters were asked a series of specific questions about their marina use and the services they desire at marinas.

Marina seasonal slip renters visit the marina for reasons other than to take their boat on the water. On average, just over 60 percent (62%) of visits to the marina involve a boating trip (Table 42). The other visits are no doubt for boat maintenance and off-water leisure activities. In short, marina boats are commonly used like vacation cabins. Similar results were found for Lake Superior marina slip renters, the only other group to be surveyed on this topic.

	<u>median</u>	<u>mean</u>
● Days visited boat at marina	40	53
● Days took boat out of slip and on the water	25	33

Most marina boaters (72%) engage in land-based activities as part of an outing to their boat. Eating out at restaurants is the most frequent activity, followed by

general sightseeing, shopping, visiting historic sites, and visiting state parks (Table 43). Many also participate in hiking, visiting casinos, golfing, and biking.

Compared with their Lake Superior counterparts, Mississippi River marina slip renters are more likely to visit casinos, and are less likely to do certain outdoor activities (general sightseeing, visit historic sites, visit state parks, and hiking). The availability of nearby activity opportunities is probably the principal reason for these differences.

Taking overnight trips is a common activity of Mississippi River marina boaters. Nearly half of marina seasonal slip renters (46%) took at least one overnight trip in the last 12 months. This is comparable, but slightly less than their Lake Superior counterparts, 58 percent of whom took overnight trips in the last year. For those who took overnight trips, the average number of nights away from the marina in the last 12 months was 10.8 and the median was 6. The “nights away” figures were somewhat larger on Lake Superior.

Certain facilities and services at marinas are far more important to slip renters than others. Very important to slip renters are adequate security, adequate parking, fuel service, electricity dockside, private restroom and showers, and running water dockside (Table 44). Other services that are nearly “moderately important” on average are sewage pumpout, and knowledgeable marina operator(s) with whom to discuss boats and boating topics. A number of facilities and services are important to some but not others (such as “winter storage capability”) and still others are unimportant to most (such as “internet access”).

This ranking of marina facilities/services most important to Mississippi River slip renters is nearly identical to that of Lake Superior slip renters.

Table 43

What are the land-based leisure activities you engage in as part of a vacation outing to your boat at the marina?

(responses of marina seasonal slip renters who engage in these activities)

<u>Activity</u>	<u>Percent indicating activity</u>
eating out at restaurants	90
shopping	64
general sightseeing	53
visiting historic sites	30
visiting state parks	27
hiking	26
casino visits	26
golfing	25
biking	24
visiting nightclubs	22
attending plays or concerts	20
camping	18
tennis	3
other (please describe)	8

Table 44

How important is it to have the following facilities and services available to you at a marina where you rent a slip?
(responses of marina seasonal slip renters)

Facility/service	mean importance rating (range 1 to 4)	not important (=1) (percent)	slightly important (=2) (percent)	moderately important (=3) (percent)	very important (=4) (percent)	Total (percent)
● adequate security for me and my guests	3.6	4	5	17	74	100
● adequate parking for me and my guests	3.4	5	7	30	58	100
● gasoline/diesel fuel pumps	3.3	14	8	15	63	100
● electricity connection dockside	3.1	19	8	15	58	100
● private restrooms and showers for marina patrons	3.0	16	13	21	50	100
● running water connection dockside	3.0	21	10	17	52	100
● knowledgeable marina operator(s) with whom to discuss boats and boating topics	2.8	21	16	26	37	100
● sewage pumpout services	2.8	33	7	9	50	100
● boat repair services	2.6	26	20	24	30	100
● haul-out service	2.5	36	12	17	36	100
● winter storage capability	2.4	39	12	15	34	100
● places to shop for groceries and other items near the marina	2.4	34	16	30	20	100
● restaurant opportunities near the marina	2.4	31	19	35	15	100
● ship store	2.0	42	27	21	10	100
● entertainment opportunities near the marina	1.8	51	23	19	7	100
● shuttle or transportation service for shopping, restaurants and entertainment outings	1.6	66	17	12	5	100
● laundry facilities	1.6	66	18	10	6	100
● cable TV connections	1.3	80	11	5	4	100
● internet access	1.2	84	10	4	2	100

Characteristics of Mississippi River Boaters

Certain characteristics of Mississippi River boaters have already been described. These boaters, overall, are an experienced group, having boated on the River for nearly 25 years (median); three-fourths (76%) have been boating on the River for more than 10 years (see previous section on “Experience of Mississippi River boaters”).

Nearly all of the Mississippi River boaters in the study area are from Wisconsin (47%), Minnesota (39%), and Iowa (11%); only 3 percent are from other states (see previous section on “Market area for Mississippi River boaters”). In terms of travel distance, almost half (49%) of boaters come from within 10 miles of their launch site on the River. The median travel distance for both public access and marina boaters is under 20 miles. Such travel distances are indicative of a boating market dominated by local (nearby) users. There is not much boating use coming from long distances (few boating tourists). Overall, the counties that border Mississippi River in the study area contribute 61 percent of all boating. La Crosse is the leading county (19% of all boating), followed by Winona (10%). Only one county off the River contributes more than 1 percent, and that county is Olmsted (Rochester City), which is a large contributor at 7 percent. The seven-county Minneapolis-St. Paul metropolitan area contributes 5 percent of all boating.

The agencies that contributed to this study are interested in opportunities to reach boaters with information, and, thus, asked questions in the surveys about website use and radio station listening habits. Regarding website use, about half (46%) of Mississippi River boaters have visited one of the three agency websites (Table 45). The Minnesota and Wisconsin DNR websites are more likely to have been visited than the Fish and Wildlife Service website. Regarding radio, boaters listen to a wide variety of radio stations (Table 46). Leading the station list is “country”, followed by “rock and roll” and “easy listening/lite.” “Country” is the most popular among all sources of boaters, except marina slip renters, who predominately listen to “easy listening/lite.”

Table 45

Have you ever visited the following websites?

Website	----- Source of boater -----				
	All boaters (percent)	Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Percent having visited the website					
● Minnesota DNR (www.dnr.state.mn.us)	31	32	37	25	29
● Wisconsin DNR (www.dnr.state.wi.us)	32	37	21	31	30
● U.S. Fish & Wildlife Service (www.fws.gov)	18	20	15	21	14
● Any of the three preceding websites	46	50	44	42	43

* Resorts, campgrounds, private launches, boat rentals.

Table 46

What type of radio station do you primarily listen to?

Type of station	----- Source of boater -----				
	All boaters (percent)	Public access (percent)	Marina seasonal slip rental (percent)	River-front residence (percent)	All other sources* (percent)
Country	28	32	18	25	35
Rock & roll	24	27	19	15	29
Easy listening/lite	18	14	27	23	17
Public radio	7	5	13	11	2
Sports	7	8	4	6	7
Talk	5	5	6	7	1
Classical	5	4	8	5	2
Jazz	1	0	3	1	0
Religious radio	1	0	1	1	0
Other	5	5	3	6	6
Total percent	100	100	100	100	100

* Resorts, campgrounds, private launches, boat rentals.

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